IBM Tivoli NetView for z/OS
Version 6 Release 2

Customization Guide

SC27-2849-02

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Note
Before using this information and the product it supports, read the information in "Notices" on page 195.

This edition applies to version 6, release 2 of IBM Tivoli NetView for z/OS (product number 5697-NV6) and to all subsequent versions, releases, and modifications until otherwise indicated in new editions.

This edition replaces SC27-2849-01.

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About this publication

The IBM® Tivoli® NetView® for z/OS® product provides advanced capabilities that you can use to maintain the highest degree of availability of your complex, multi-platform, multi-vendor networks and systems from a single point of control. This publication, the *IBM Tivoli NetView for z/OS Customization Guide*, describes the parts of the NetView program that you can customize and points you to sources of related information.

Intended audience

This publication is for system programmers who customize the NetView program.

Publications

This section lists publications in the IBM Tivoli NetView for z/OS library and related documents. It also describes how to access Tivoli publications online and how to order Tivoli publications.

IBM Tivoli NetView for z/OS library

The following documents are available in the IBM Tivoli NetView for z/OS library:

- *Administration Reference*, SC27-2869, describes the NetView program definition statements required for system administration.
- *Application Programmer's Guide*, SC27-2870, describes the NetView program-to-program interface (PPI) and how to use the NetView application programming interfaces (APIs).
- *Automation Guide*, SC27-2846, describes how to use automated operations to improve system and network efficiency and operator productivity.
- *Command Reference Volume 1 (A-N)*, SC27-2847, and *Command Reference Volume 2 (O-Z)*, SC27-2848, describe the NetView commands, which can be used for network and system operation and in command lists and command procedures.
- *Customization Guide*, SC27-2849, describes how to customize the NetView product and points to sources of related information.
- *Data Model Reference*, SC27-2850, provides information about the Graphic Monitor Facility host subsystem (GMFHS), SNA topology manager, and MultiSystem Manager data models.
- *Installation: Configuring Additional Components*, GC27-2851, describes how to configure NetView functions beyond the base functions.
- *Installation: Configuring Graphical Components*, GC27-2852, describes how to install and configure the NetView graphics components.
- *Installation: Configuring the GDPS Active/Active Continuous Availability Solution*, SC14-7477, describes how to configure the NetView functions that are used with the GDPS Active/Active Continuous Availability solution.
- *Installation: Configuring the NetView Enterprise Management Agent*, GC27-2853, describes how to install and configure the NetView for z/OS Enterprise Management Agent.
- *Installation: Getting Started*, GI11-9443, describes how to install and configure the base NetView program.

- *Installation: Migration Guide*, GC27-2854, describes the new functions that are provided by the current release of the NetView product and the migration of the base functions from a previous release.
- *IP Management*, SC27-2855, describes how to use the NetView product to manage IP networks.
- *Messages and Codes Volume 1 (AAU-DSI)*, GC27-2856, and *Messages and Codes Volume 2 (DUI-IHS)*, GC27-2857, describe the messages for the NetView product, the NetView abend codes, the sense codes that are included in NetView messages, and generic alert code points.
- *Programming: Assembler*, SC27-2858, describes how to write exit routines, command processors, and subtasks for the NetView product using assembler language.
- *Programming: Pipes*, SC27-2859, describes how to use the NetView pipelines to customize a NetView installation.
- *Programming: PL/I and C*, SC27-2860, describes how to write command processors and installation exit routines for the NetView product using PL/I or C.
- *Programming: REXX and the NetView Command List Language*, SC27-2861, describes how to write command lists for the NetView product using the Restructured Extended Executor language (REXX) or the NetView command list language.
- *Resource Object Data Manager and GMFHS Programmer's Guide*, SC27-2862, describes the NetView Resource Object Data Manager (RODM), including how to define your non-SNA network to RODM and use RODM for network automation and for application programming.
- *Security Reference*, SC27-2863, describes how to implement authorization checking for the NetView environment.
- *SNA Topology Manager Implementation Guide*, SC27-2864, describes planning for and implementing the NetView SNA topology manager, which can be used to manage subarea, Advanced Peer-to-Peer Networking, and TN3270 resources.
- *Troubleshooting Guide*, GC27-2865, provides information about documenting, diagnosing, and solving problems that occur in the NetView product.
- *Tuning Guide*, SC27-2874, provides tuning information to help achieve certain performance goals for the NetView product and the network environment.
- *User's Guide: Automated Operations Network*, SC27-2866, describes how to use the NetView Automated Operations Network (AON) component, which provides event-driven network automation, to improve system and network efficiency. It also describes how to tailor and extend the automated operations capabilities of the AON component.
- *User's Guide: NetView*, SC27-2867, describes how to use the NetView product to manage complex, multivendor networks and systems from a single point.
- *User's Guide: NetView Enterprise Management Agent*, SC27-2876, describes how to use the NetView Enterprise Management Agent.
- *User's Guide: NetView Management Console*, SC27-2868, provides information about the NetView management console interface of the NetView product.
- *Licensed Program Specifications*, GC31-8848, provides the license information for the NetView product.
- *Program Directory for IBM Tivoli NetView for z/OS US English*, GI11-9444, contains information about the material and procedures that are associated with installing the IBM Tivoli NetView for z/OS product.
- *Program Directory for IBM Tivoli NetView for z/OS Japanese*, GI11-9445, contains information about the material and procedures that are associated with installing the IBM Tivoli NetView for z/OS product.

- *Program Directory for IBM Tivoli NetView for z/OS Enterprise Management Agent*, GI11-9446, contains information about the material and procedures that are associated with installing the IBM Tivoli NetView for z/OS Enterprise Management Agent.
- *IBM Tivoli NetView for z/OS V6R2 Online Library*, LCD7-4913, contains the publications that are in the NetView for z/OS library. The publications are available in PDF and HTML formats.

Related publications

You can find additional product information on the NetView for z/OS web site at http://www.ibm.com/software/tivoli/products/netview-zos/.

For information about the NetView Bridge function, see *Tivoli NetView for OS/390 Bridge Implementation*, SC31-8238-03 (available only in the V1R4 library).

Accessing terminology online

The IBM Terminology web site consolidates the terminology from IBM product libraries in one convenient location. You can access the Terminology web site at http://www.ibm.com/software/globalization/terminology/.

For NetView for z/OS terms and definitions, see the IBM Terminology web site. The following terms are used in this library:

NetView
For the following products:
- Tivoli NetView for z/OS version 6 release 2
- Tivoli NetView for z/OS version 6 release 1
- Tivoli NetView for z/OS version 5 release 4
- Tivoli NetView for z/OS version 5 release 3
- Tivoli NetView for OS/390® version 1 release 4
- NetView releases that are no longer supported

CNMCMD
For the CNMCMD member and the members that are included in it using the %INCLUDE statement

CNMSTYLE
For the CNMSTYLE member and the members that are included in it using the %INCLUDE statement

DSIOPF
For the DSIOPF member and the members that are included in it using the %INCLUDE statement

PARMLIB
For SYS1.PARMLIB and other data sets in the concatenation sequence

MVS™ For z/OS operating systems

MVS element
For the base control program (BCP) element of the z/OS operating system

VTAM®
For Communications Server - SNA Services

IBM Tivoli Network Manager
For either of these products:
- IBM Tivoli Network Manager
- IBM Tivoli OMNIbus and Network Manager

IBM Tivoli Netcool/OMNIbus

For either of these products:

- IBM Tivoli Netcool/OMNIbus
- IBM Tivoli OMNIbus and Network Manager

Unless otherwise indicated, topics to programs indicate the latest version and release of the programs. If only a version is indicated, the topic is to all releases within that version.

When a topic is made about using a personal computer or workstation, any programmable workstation can be used.

Using NetView for z/OS online help

The following types of NetView for z/OS mainframe online help are available, depending on your installation and configuration:

- General help and component information
- Command help
- Message help
- Sense code information
- Recommended actions

Accessing publications online

The documentation DVD, *IBM Tivoli NetView for z/OS V6R2 Online Library* contains the publications that are in the product library. The publications are available in PDF and HTML formats. Refer to the readme file on the DVD for instructions on how to access the documentation.

IBM posts publications for this and all other Tivoli products, as they become available and whenever they are updated, to the Tivoli Documentation Central website at https://www.ibm.com/developerworks/mydeveloperworks/wikis/home/wiki/Tivoli%20Documentation%20Central

Note: If you print PDF documents on other than letter-sized paper, set the option in the **File > Print** window that enables Adobe Reader to print letter-sized pages on your local paper.

Ordering publications

You can order many Tivoli publications online at http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss

You can also order by telephone by calling one of these numbers:

- In the United States: 800-879-2755
- In Canada: 800-426-4968

In other countries, contact your software account representative to order Tivoli publications. To locate the telephone number of your local representative, perform the following steps:

1. Go to http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss.
2. Select your country from the list and click **Go**.
3. Click **About this site** to see an information page that includes the telephone number of your local representative.

Accessibility

Accessibility features help users with a physical disability, such as restricted mobility or limited vision, to use software products successfully. Standard shortcut and accelerator keys are used by the product and are documented by the operating system. Refer to the documentation provided by your operating system for more information.

For additional information, see the Accessibility appendix in the *User's Guide: NetView*.

Service Management Connect

Connect, learn, and share with Service Management professionals: product support technical experts who provide their perspectives and expertise.

Access Service Management Connect at http://www.ibm.com/developerworks/servicemanagement/z/. Use Service Management Connect in the following ways:

- Become involved with transparent development, an ongoing, open engagement between other users and IBM developers of Tivoli products. You can access early designs, sprint demonstrations, product roadmaps, and prerelease code.
- Connect one-on-one with the experts to collaborate and network about Tivoli and the NetView community.
- Read blogs to benefit from the expertise and experience of others.
- Use wikis and forums to collaborate with the broader user community.

Tivoli technical training

For Tivoli technical training information, refer to the following IBM Tivoli Education website at http://www.ibm.com/software/tivoli/education.

Tivoli user groups

Tivoli user groups are independent, user-run membership organizations that provide Tivoli users with information to assist them in the implementation of Tivoli Software solutions. Through these groups, members can share information and learn from the knowledge and experience of other Tivoli users.

Downloads

Clients and agents, NetView product demonstrations, and several free NetView applications can be downloaded from the NetView for z/OS support web site:

http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliNetViewforzOS.html

In the "Support shortcuts" pane, expand **Tivoli NetView for z/OS**, and click **Fixes (downloads)** to go to a page where you can search for or select downloads.

These applications can help with the following tasks:

- Migrating customization parameters and initialization statements from earlier releases to the CNMSTUSR member and command definitions from earlier releases to the CNMCMDU member.
- Getting statistics for your automation table and merging the statistics with a listing of the automation table
- Displaying the status of a job entry subsystem (JES) job or canceling a specified JES job
- Sending alerts to the NetView program using the program-to-program interface (PPI)
- Sending and receiving MVS commands using the PPI
- Sending Time Sharing Option (TSO) commands and receiving responses

Support information

If you have a problem with your IBM software, you want to resolve it quickly. IBM provides the following ways for you to obtain the support you need:

Online
Access the Tivoli Software Support site at http://www.ibm.com/software/sysmgmt/products/support/index.html?ibmprd=tivman. Access the IBM Software Support site at http://www.ibm.com/software/support/probsub.html.

IBM Support Assistant
The IBM Support Assistant is a free local software serviceability workbench that helps you resolve questions and problems with IBM software products. The Support Assistant provides quick access to support-related information and serviceability tools for problem determination. To install the Support Assistant software, go to http://www.ibm.com/software/support/isa/.

Troubleshooting information
For more information about resolving problems with the NetView for z/OS product, see the *IBM Tivoli NetView for z/OS Troubleshooting Guide*. Additional support for the NetView for z/OS product is available through the NetView user group on Yahoo at http://groups.yahoo.com/group/NetView/. This support is for NetView for z/OS customers only, and registration is required. This forum is monitored by NetView developers who answer questions and provide guidance. When a problem with the code is found, you are asked to open an official problem management record (PMR) to obtain resolution.

Conventions used in this publication

This section describes the conventions that are used in this publication.

Typeface conventions

This publication uses the following typeface conventions:

Bold

- Lowercase commands and mixed case commands that are otherwise difficult to distinguish from surrounding text
- Interface controls (check boxes, push buttons, radio buttons, spin buttons, fields, folders, icons, list boxes, items inside list boxes, multicolumn lists, containers, menu choices, menu names, tabs, property sheets), labels (such as **Tip:**, and **Operating system considerations**:)

- Keywords and parameters in text

Italic

- Citations (examples: titles of publications, diskettes, and CDs
- Words defined in text (example: a nonswitched line is called a *point-to-point line*)
- Emphasis of words and letters (words as words example: "Use the word *that* to introduce a restrictive clause."; letters as letters example: "The LUN address must start with the letter *L*.")
- New terms in text (except in a definition list): a *view* is a frame in a workspace that contains data.
- Variables and values you must provide: ... where *myname* represents...

`Monospace`

- Examples and code examples
- File names, programming keywords, and other elements that are difficult to distinguish from surrounding text
- Message text and prompts addressed to the user
- Text that the user must type
- Values for arguments or command options

Operating system-dependent variables and paths

For workstation components, this publication uses the UNIX convention for specifying environment variables and for directory notation.

When using the Windows command line, replace **$***variable* with **%***variable***%** for environment variables and replace each forward slash (**/**) with a backslash (\) in directory paths. The names of environment variables are not always the same in the Windows and UNIX environments. For example, %TEMP% in Windows environments is equivalent to $TMPDIR in UNIX environments.

Note: If you are using the bash shell on a Windows system, you can use the UNIX conventions.

Syntax diagrams

The following syntax elements are shown in syntax diagrams. Read syntax diagrams from left-to-right, top-to-bottom, following the horizontal line (the main path).

- "Symbols"
- "Parameters" on page xvi
- "Punctuation and parentheses" on page xvi
- "Abbreviations" on page xvii

For examples of syntax, see "Syntax examples" on page xvii.

Symbols

The following symbols are used in syntax diagrams:

►► Marks the beginning of the command syntax.

► Indicates that the command syntax is continued.

| Marks the beginning and end of a fragment or part of the command syntax.

►◄ Marks the end of the command syntax.

Parameters

The following types of parameters are used in syntax diagrams:

Required
Required parameters are shown on the main path.

Optional
Optional parameters are shown below the main path.

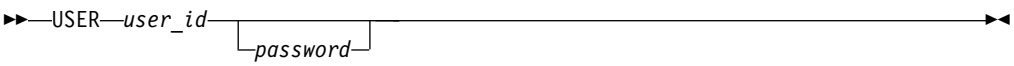
Default
Default parameters are shown above the main path. In parameter descriptions, default parameters are underlined.

Syntax diagrams do not rely on highlighting, brackets, or braces. In syntax diagrams, the position of the elements relative to the main syntax line indicates whether an element is required, optional, or the default value.

When you issue a command, spaces are required between the parameters unless a different separator, such as a comma, is specified in the syntax.

Parameters are classified as keywords or variables. Keywords are shown in uppercase letters. Variables, which represent names or values that you supply, are shown in lowercase letters and are either italicized or, in NetView help, displayed in a differentiating color.

In the following example, the USER command is a keyword, the *user_id* parameter is a required variable, and the *password* parameter is an optional variable.



Punctuation and parentheses

You must include all punctuation that is shown in the syntax diagram, such as colons, semicolons, commas, minus signs, and both single and double quotation marks.

When an operand can have more than one value, the values are typically enclosed in parentheses and separated by commas. For a single value, the parentheses typically can be omitted. For more information, see "Multiple operands or values" on page xviii.

If a command requires positional commas to separate keywords and variables, the commas are shown before the keywords or variables.

When examples of commands are shown, commas are also used to indicate the absence of a positional operand. For example, the second comma indicates that an optional operand is not being used:

```
COMMAND_NAME opt_variable_1,,opt_variable_3
```

You do not need to specify the trailing positional commas. Trailing positional and non-positional commas either are ignored or cause a command to be rejected. Restrictions for each command state whether trailing commas cause the command to be rejected.

Abbreviations

Command and keyword abbreviations are listed in synonym tables after each command description.

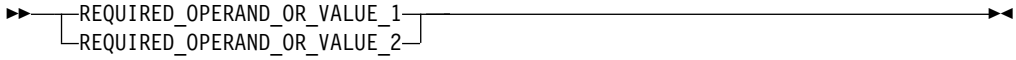
Syntax examples

The following examples show the different uses of syntax elements:

- "Required syntax elements"
- "Optional syntax elements"
- "Default keywords and values"
- "Multiple operands or values" on page xviii
- "Syntax that is longer than one line" on page xviii
- "Syntax fragments" on page xviii

Required syntax elements:
Required keywords and variables are shown on the main syntax line. You must code required keywords and variables.

A required choice (two or more items) is shown in a vertical stack on the main path. The items are shown in alphanumeric order.

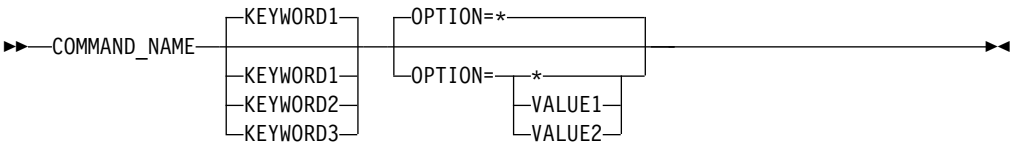


Optional syntax elements:
Optional keywords and variables are shown below the main syntax line. You can choose not to code optional keywords and variables.

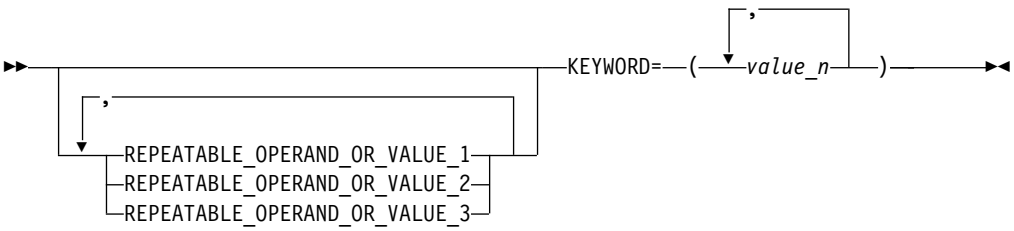
A required choice (two or more items) is shown in a vertical stack below the main path. The items are shown in alphanumeric order.

Default keywords and values:
Default keywords and values are shown above the main syntax line in one of the following ways:

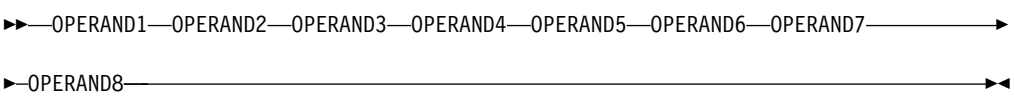
- A default keyword is shown only above the main syntax line. You can specify this keyword or allow it to default. The following syntax example shows the default keyword KEYWORD1 above the main syntax line and the rest of the optional keywords below the main syntax line.
- If an operand has a default value, the operand is shown both above and below the main syntax line. A value below the main syntax line indicates that if you specify the operand, you must also specify either the default value or another value shown. If you do not specify the operand, the default value above the main syntax line is used. The following syntax example shows the default values for operand OPTION=* above and below the main syntax line.



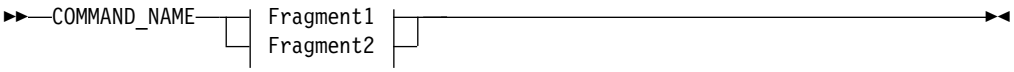
Multiple operands or values:
An arrow returning to the left above a group of operands or values indicates that more than one can be selected or that a single one can be repeated.



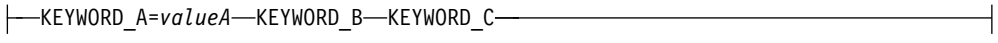
Syntax that is longer than one line:
If a diagram is longer than one line, each line that is to be continued ends with a single arrowhead and the following line begins with a single arrowhead.



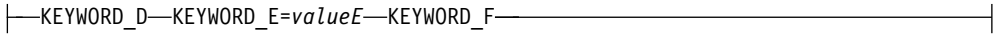
Syntax fragments:
Some syntax diagrams contain syntax fragments, which are used for lengthy, complex, or repeated sections of syntax. Syntax fragments follow the main diagram. Each syntax fragment name is mixed case and is shown in the main diagram and in the heading of the fragment. The following syntax example shows a syntax diagram with two fragments that are identified as Fragment1 and Fragment2.



Fragment1



Fragment2



Chapter 1. Designing Functions

With the NetView program, you can manage complex, multivendor networks and systems from a single point. This chapter describes what you must know before making an addition or change to the NetView program, and shows some of the facilities that you can use to customize tasks.

Customization Areas

Customizing the NetView program takes place at various stages of network and system implementation. These topics are described in several NetView books. See Table 1 on page 3 for the NetView books that contain more information on the listed topics.

Alias names are used to communicate across networks. You can use alias names to resolve conflicts when duplicate resource names exist in multiple networks. With alias names, the name of the resource, such as a logical unit (LU), a class of service, a source LU (SRCLU), or a LOGON mode table from the sending network, is translated to a name that is unique to the receiving network. See *IBM Tivoli NetView for z/OS Installation: Getting Started* for more information about how to define alias names.

Filtering controls the amount of data presented to operators. Filtering also controls the amount of data recorded in the network log. The NetView automation table allows you to control the types of messages that each of your network operators receives, and the amount of data recorded to message logs. See the *IBM Tivoli NetView for z/OS Automation Guide* for descriptions of automation statements and descriptions of how to use automation statements to suppress (filter) messages.

You can also filter event data that network resources send to the hardware monitor. ***Recording filters*** control the information that is recorded in the hardware monitor's database. ***Viewing filters*** determine the records that appear on each network operator's terminal. You can find more information about hardware monitor filtering by referring to the *IBM Tivoli NetView for z/OS User's Guide: NetView* or the *IBM Tivoli NetView for z/OS Automation Guide* for a description of how to use automation statements to set recording filters for specific events. You can also see the NetView online help for the SRF and SVF commands.

Focal point support enables the NetView program to be defined as either a focal point node or a distributed entry point node. A focal point is a central network node that receives information from distributed entry point network nodes. The information forwarded from the entry points to the focal point can be messages, alerts, or MSUs. For more information on NetView focal point support, see the *IBM Tivoli NetView for z/OS Automation Guide*.

You can use ***automation*** to implement automatic responses to events that occur in your network. See the *IBM Tivoli NetView for z/OS Automation Guide* for more information about defining NetView automation statements to improve the productivity of your system operators and your network operators. For additional information the NetView program's automation, see the *IBM Tivoli NetView for z/OS Automation Guide*.

Use ***Generic alerts*** and ***code points*** to obtain problem determination support for devices and applications in your network that the NetView program does not automatically support. Chapter 6, “Customizing Hardware Monitor Displayed Data,” on page 77 contains information on how to use the code point tables that are provided with the NetView program and the user-defined code point tables to build hardware monitor Alerts-Dynamic, Alerts-Static, Alerts-History, Event Detail, and Most Recent Events panels.

National Language Support allows your operators to interact with the NetView program in a language other than English. See *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components* for a description of how to write your own message translations in any other supported language. The Japanese National Language version provides a Japanese version of NetView panels and messages.

You might need to consider ***operator control and security***. To control who can gain access to the NetView program and what effect an operator can have on your network, you should consider some level of logon verification, command authorization, and span of control. See the *IBM Tivoli NetView for z/OS Security Reference* for a complete description of how to implement the different levels of security verification available in the NetView program, how to limit the commands an operator can issue (command authorization), and which part of the network's resources an operator can control (span of control).

You can modify the color and format of the ***NetView command facility panel***. See Chapter 2, “Customizing the NetView Command Facility Panel,” on page 27 for more information.

You can create or change ***panels*** for your online help, online message help, NetView help desk, the hardware monitor, and any user-written, full-screen applications. For a detailed explanation of how to create new panels or modify the panels that are supplied with the NetView program for these components, see Chapter 4, “Modifying and Creating Online Help Information,” on page 65 or Chapter 6, “Customizing Hardware Monitor Displayed Data,” on page 77.

With ***sequential logging*** (sequential access method log support), you can write variable length records to multiple user-defined logs. You can browse or print these logs using your operating system facilities. For more information about defining sequential log tasks, see the *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*, *IBM Tivoli NetView for z/OS Programming: Assembler*, or *IBM Tivoli NetView for z/OS Programming: PL/I and C*.

Session monitor data can be collected and kept in the session monitor database. To control how much session data is collected and kept, customize several session monitor definition statements. See the*IBM Tivoli NetView for z/OS Installation: Configuring Additional Components* for more information. Defining performance classes for the response time monitor (RTM) feature is also described in *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*. Objectives and boundaries are set for each performance class, and a performance class is then chosen for a session.

User-written functions add new function to the NetView program or modify existing ones. You might want to develop your own command lists and user-written code. See the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* for an overview of writing command lists in REXX or in NetView command list language to help you control your network and make

the operators' jobs easier. You can find information about writing code such as command procedures and installation exits in *IBM Tivoli NetView for z/OS Programming: PL/I and C*. Information on writing command processors, installation exit routines, and user subtasks in assembler language can be found in *IBM Tivoli NetView for z/OS Programming: Assembler*.

The NetView ***Resource Object Data Manager (RODM)*** is a data cache that stores network configuration and status information about system resources. With RODM, you can automate network management functions associated with the resources defined to RODM. In addition, you can write RODM applications to perform other network management and automation tasks. See the *IBM Tivoli NetView for z/OS Resource Object Data Manager and GMFHS Programmer's Guide* for more information.

Functions to Consider before Making Modifications

To customize NetView functions, you can write your own command procedures or modify one of the existing command procedures supplied by the NetView program. Ways to modify existing functions include:

- Filtering or modifying the system management facility (SMF) records written by the NetView program
- Providing a policy that routes operator messages
- Reformatting, analyzing, or editing operator messages
- Checking command authority

Additional functions you might want to add involve managing additional components in your network, such as X.25 data network components or voice network components. You can develop new applications and integrate them with existing management functions to meet your requirements. Examples of these user-defined functions include:

- Real-time monitoring of specific resources, applications, or components in your network
- Collecting and recording additional SMF data for trend analysis or other data reduction applications you need
- Providing additional response time problem detection and alerting
- Detecting different classes of line problems

Finding Customization Information

Table 1 lists customization topics and provides the name of the documentation that includes information about that topic.

Table 1. Customization Topics and Documentation

Topic	CGD	GET	OLH	CLS	PLC	ASL	AUT	PIP	ASR	NUG	ADV
Alias names		X							X		
Command Facility Screen Format	X								X	X	

Table 1. Customization Topics and Documentation (continued)

Topic	CGD	GET	OLH	CLS	PLC	ASL	AUT	PIP	ASR	NUG	ADV
Automation							X			X	X
Generic alerts	X						X				
National Language Support											X
Operator control: Logon security Command security Span of control									 X X X		
Panels: Hardware monitor Help Help desk User-written	 X X X X									 X X X X	
Sequential logging	X				X	X					X
Session monitor data: Response time monitor monitor Session awareness											 X X
Suppressing: Message Hardware monitor				X			 X X		X		
User-written functions: Command lists User-written programming (PL/I, C) User-written programming (assembler) NetView Pipelines			 X	X	 X	 X		 X			

Table 1. Customization Topics and Documentation (continued)

Topic	CGD	GET	OLH	CLS	PLC	ASL	AUT	PIP	ASR	NUG	ADV
Legend:											
CGD *IBM Tivoli NetView for z/OS Customization Guide*											
GET *IBM Tivoli NetView for z/OS Installation: Getting Started*											
OLH NetView online help											
CLS *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language*											
PLC *IBM Tivoli NetView for z/OS Programming: PL/I and C*											
ASL *IBM Tivoli NetView for z/OS Programming: Assembler*											
AUT *IBM Tivoli NetView for z/OS Automation Guide*											
PIP *IBM Tivoli NetView for z/OS Programming: Pipes*											
ASR *IBM Tivoli NetView for z/OS Administration Reference*											
NUG *IBM Tivoli NetView for z/OS User's Guide: NetView*											
ADV *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*											

For information about customizing AON, see the *IBM Tivoli NetView for z/OS User's Guide: Automated Operations Network*.

For information about customizing the NetView management console, see the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language*.

For information about customizing the Tivoli NetView for z/OS Enterprise Management Agent, see the *IBM Tivoli NetView for z/OS User's Guide: NetView Enterprise Management Agent*.

Collecting Data

Typical sources for collecting data useful in customization procedures are:

- Installation exit interfaces provided in the NetView program
- System or NetView services that provide status, configuration, processing, or authorization information
- Data files and network devices that are accessed using system or NetView services
- Messages to operators indicating that important events are occurring in a system or an application.

Installation Exits

Some NetView installation exits allow access to network management data. Through these installation exits and user-written functions you can obtain the text of operator commands, messages, and logons. Data that the NetView program writes to VSAM files and to the SMF log, as well as data on the VTAM communication network management (CNM) interface, can be accessed within other NetView installation exits.

Reference: For more information about NetView installation exits, see the *IBM Tivoli NetView for z/OS Automation Guide*, *IBM Tivoli NetView for z/OS Programming: Assembler*, and *IBM Tivoli NetView for z/OS Programming: PL/I and C*.

Service Routines

System or NetView services give you access to information such as:

- System date and time
- Addresses of programs
- Addresses of named storage areas
- Valid NetView operators
- Operator span of control
- Values of command list variables

Reference: See the *IBM Tivoli NetView for z/OS Programming: Assembler* for information about macros such as DSIDATIM, DSICES, DSIFIND, DSIQOS, DSIQRS, and DSIKVS. See the *IBM Tivoli NetView for z/OS Programming: PL/I and C* for information on service routines such as CNMINFC, CNMNAMS, CNMSCOP, and CNMVARS.

Data Files

The NetView program provides specialized disk services and VSAM data services to access network management data files. In addition to these, functions written in a high-level language (HLL), such as PL/I and C, can invoke system allocation and access methods to read from NetView partitioned data sets and request VSAM I/O. CNM interface services also provide access to data coming from devices in the network.

Using the NetView PIPE command, you can read data files using the QSAM and < (From Disk) stages. Through the pipe facility, you also have access to VSAM data using DSIVSAM and DSIVSMX. See the *IBM Tivoli NetView for z/OS Programming: Pipes* for information about DSIVSAM and DSIVSMX.

REXX command lists can make use of the EXECIO command to read from and write to sequential data sets or partitioned data set members.

Reference: See the *IBM Tivoli NetView for z/OS Programming: PL/I and C* for information about VSAM and CNM interface services.

For more information about pipes, see the *IBM Tivoli NetView for z/OS Programming: Pipes*.

See the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* for information on REXX file input and output. See the *IBM Tivoli NetView for z/OS Programming: Assembler* for information on using DSIDKS for read access to NetView data sets or files, DSIZVSMS for VSAM I/O, and DSIZCSMS for CNM data services.

Operator Commands and Messages

You can issue operator commands within command procedures to request status data. The resulting response messages containing the requested status data can be trapped and processed in the command procedure. You can also process data in other system and network messages in user-written command procedures that are invoked through NetView automation.

Reference: See the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* for information on REXX and NetView command list language message processing. See the *IBM Tivoli NetView for z/OS Programming:*

PL/I and C for information on PL/I and C message processing. For more information on writing automation options, see the *IBM Tivoli NetView for z/OS Automation Guide*.

Data Storage and Recording

You can use NetView command procedures to store and retrieve data needed for many user-written functions. Command procedures written in REXX, NetView command list language, PL/I, or C can create, set, and read global and task variables.

For permanent storage and for larger volumes of data, you can record certain information in data files rather than naming it and storing it as a command list variable. The NetView program allows you to record this data in a log. For example, you can log activities of your applications along with system or network activities that the NetView program is logging. You might want to produce a separate log of data that you collect.

Reference: See the *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components* and "Choosing a Language" on page 14 in this book for information on sequential logging.

Operator Presentation

You can customize or extend some of the NetView program's operator presentation functions with the VIEW command or by modifying panels that some components of the NetView system use to present data to operators. See Chapter 3, "Using the VIEW Command," on page 31 and Chapter 4, "Modifying and Creating Online Help Information," on page 65 for more information.

You can also use messages to present information to operators. With messages, the data from user-written functions becomes subject to NetView automation processing, allowing both automatic and manual operation of your functions.

Reference: See the *IBM Tivoli NetView for z/OS Programming: Assembler* for information about DSIWCS, DSIMBS, DSIMQS, DSIPSS, and other message services. See the *IBM Tivoli NetView for z/OS Programming: PL/I and C* for information about using CNMSMSG. See the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* for descriptions of REXX and NetView command list language write-to-operator (WTO) messages and other message services.

You can also customize the NetView command facility panel. See Chapter 2, "Customizing the NetView Command Facility Panel," on page 27 for more information.

Tasks

To write functional extensions to the NetView program, keep in mind that the NetView design is based on z/OS.

Reference: The z/OS library is a good reference for explanations of how words such as *dispatch*, *task*, and the names of various system services are used in this section.

NetView Program as a System Application Program

The NetView program is organized into several parallel tasks, each one capable of being dispatched separately in a multitasking environment. When any one task is idle, any of the others is eligible to run. A system multitasking dispatcher uses the NetView program's ATTACH system service to create each new task. When a task has no more processing to do and is ready to become idle, the task calls the WAIT system service. The POST system service takes a task out of an idle state, and allows it to be dispatched when new input data is ready to be processed for that task.

NetView Program Tasks

When the NetView program starts, its main task attaches several subtasks of different types, depending on the function to be performed. Each different task type determines the specific system interfaces and operator interfaces that are available under that task, and the type of transactions you can perform.

Each operator station task (OST) supports one NetView operator identified by a unique name. The operator identifiers (OPIDs) are defined in the NetView parameter library. OPIDs are assigned to an OST when an automated operator, known as an autotask, is activated using the AUTOTASK command, or when an operator logs on using a VTAM-connected terminal.

Each NetView-NetView task (NNT) also supports an operator. This type of task is used when the operator logs on to the NetView program from another NetView program rather than from a terminal. The other NetView program can be running in a different machine but must be connected through VTAM. The operator logs on from the other NetView program using the START DOMAIN command.

Each hardcopy task (HCT) supports a 3287 printer connected through VTAM to provide a hardcopy log for operators. See Figure 1 on page 9 for a structural overview of the command facility and its task structure.

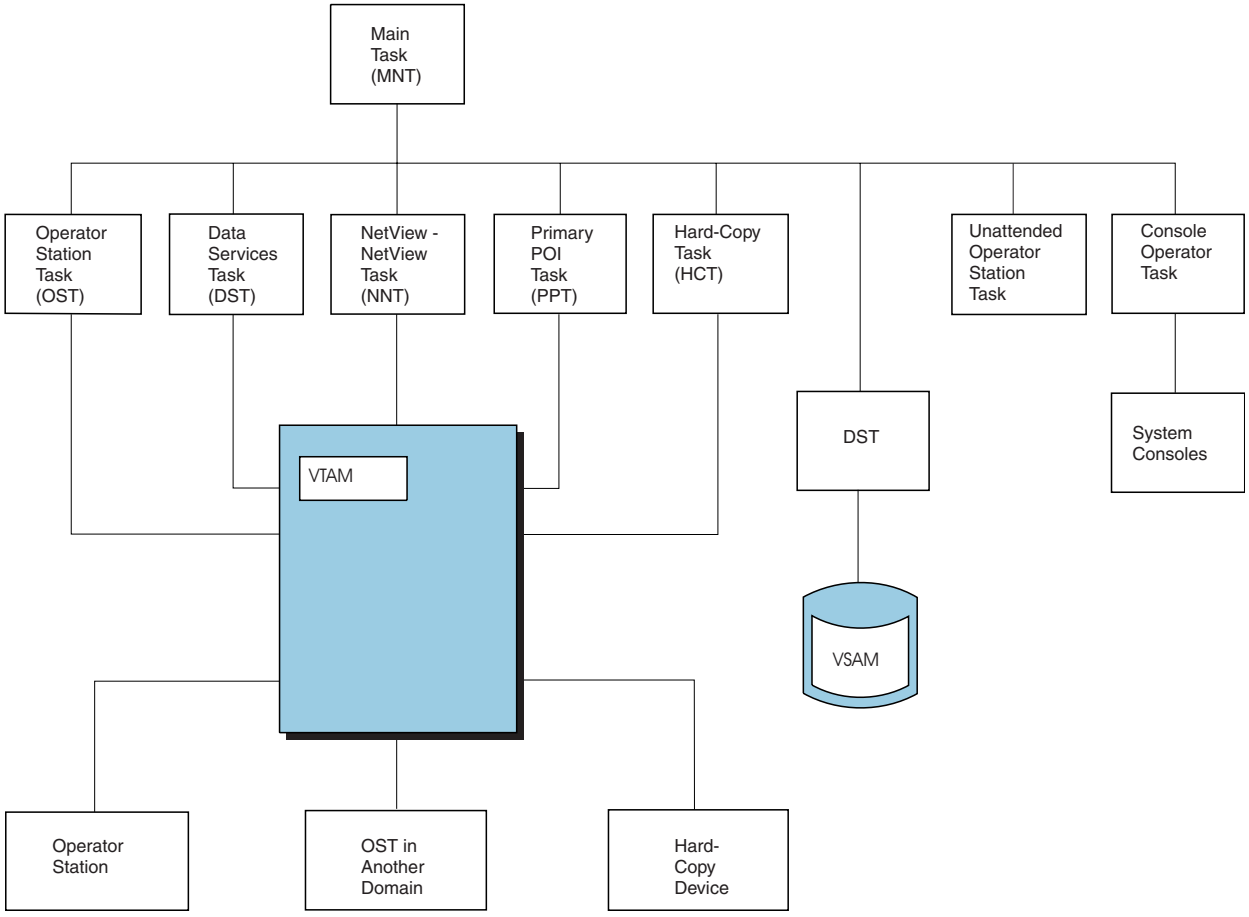


Figure 1. Structural Overview of the Command Facility

There is only one primary program operator interface task (PPT) for each NetView program. When VTAM is running, the PPT opens a special VTAM application control block (ACB) for the VTAM programmable operator interface (POI) to receive unsolicited data from VTAM.

Note: When the term *VTAM* is used in this book, it means the VTAM component of the z/OS Communications Server.

Each optional task (OPT) must be defined by a TASK statement in the NetView parameter library. The program module that runs for an OPT can be any program that meets the specification for optional tasks described in "Adding Optional Tasks to the NetView Program" on page 14.

Each data services task (DST) is a specific case of an optional task. See "Adding Optional Tasks to the NetView Program" on page 14. The TASK statement for a DST can name an initialization member in the NetView parameter library from which statements are read to define parameters for the functions performed by the specified DST.

Program Activity within a Task

After being activated, each type of NetView task waits for a request to perform a specific unit of work. When that unit of work is complete, the task enters a normal

wait state. The task runs again when another request to perform a unit of work is received. Each task uses a list of event control blocks (ECBs) when it issues its WAIT. The NetView customization macros and services are provided to ensure that any implied waiting is done through the ECB list of the task so that all of the task-request interfaces within the NetView program remain enabled.

Every NetView task has its own termination ECB and its own message queue ECB. Some types of tasks (for example, OSTs or DSTs) can have additional ECBs in their ECB lists. The additional ECBs represent processing that the task tests for and performs when it is posted out of its WAIT state.

Queuing Work to NetView Program Tasks

While a task is in its normal WAIT state, another task in the NetView program can run. A NetView task that is running can be interrupted at any time by an event in the system, and can be preempted by a higher-priority task until that task issues its normal WAIT. System functions outside of the NetView program can also interrupt the NetView processing by running scheduled interrupt exit routines that are associated with specific NetView tasks.

Data for a task can be placed in its message queue or another work queue, and the task can be posted to perform that work at any time. The data can originate in another NetView task. This can happen when a DST queues message data to an OST to be displayed to an operator. The data can come into the NetView program through an interrupt exit routine that is scheduled by an event such as the completion of a VTAM RECEIVE request.

Message and Command Buffers

The data placed in the various task queues is formatted into a special data structure called a message buffer or a command buffer. A header at the beginning of the buffer indicates the type of data the buffer contains and any special formats by which the data must be accessed. Commands are processed by programs called command processors that you provide in your customization programming for the NetView program. Messages are processed either according to predefinitions built into the NetView task, or by NetView automation command processors. Message buffers are also available for automation at various points in NetView processing through installation exits.

Immediate Commands

An immediate command starts processing as soon as an operator enters the command. The requested function is performed immediately, even if the task is in the middle of a large queue of work.

An immediate command runs under the OST and NNT subtask environments. Unlike other commands, immediate commands can receive control with the TVBINXIT bit set on. Immediate commands interrupt mainline processing and cannot be interrupted by another command. Immediate commands can be interrupted by other exits in asynchronous activity.

Long-Running Commands

A long-running command is a command that can suspend processing to allow other activity, such as operator commands and data retrieval, and then resume processing. All the NetView components are long-running commands. NetView

command list language, REXX, PL/I, and C command procedures are also long-running commands. The DSIPUSH macro allows an assembler command to run as a long-running command.

Long-running commands run under an OST, NNT, PPT, or DST (logoff routines only). Long-running commands can be:

- Invoked directly by operator input
- Called by a command list
- Called by another long-running command.

Long-running commands return control to the NetView program after scheduling work but before processing is complete. The NetView program then processes other work that is pending.

You can use long-running command processors to retrieve data from another task or from another domain without allowing the calling function or calling command list to proceed during the retrieval. When the retrieval is executing, the processor's task can continue to receive messages and accept commands.

Data Services Commands

A data services command processor (DSCP) runs under the DST subtask environment. DSCPs perform CNM data services and VSAM data services. DSCPs can also be called for centralized or serialized user-defined functions that do not use CNM interface or VSAM services.

Defining User-Written Programs on the Host: Exits and Commands

You can provide two types of user-written programs within the NetView task environments:

- Installation exits
- Command processors.

Reference: The programming interface details are provided in *IBM Tivoli NetView for z/OS Programming: PL/I and C* and *IBM Tivoli NetView for z/OS Programming: Assembler*. In designing user-written functions, you can use the installation exit interface and the command processor interface in the NetView program to fit your own programming into the overall structure of the NetView program.

Installation Exit Programs

Installation exits are provided in the NetView program at several points in the processing of logon and logoff data, command buffers, and message buffers. Different exits are driven based on the origin of the buffer and the stage of the NetView processing that the exit is in. Special exits are driven under DSTs to handle the data for a task during initialization, input, and output.

Reference: For a summary of the NetView installation exits, see the *IBM Tivoli NetView for z/OS Automation Guide*, *IBM Tivoli NetView for z/OS Programming: Assembler*, and *IBM Tivoli NetView for z/OS Programming: PL/I and C*.

General installation exits are identified and invoked with preassigned module names of DSIEX*nn*, and the DST exits are uniquely identified in the task DSTINIT initialization statements.

DSIEX21 is used to access the DSITCPRF member. For more information, see the *IBM Tivoli NetView for z/OS Security Reference*.

Command Processors and Command Lists

NetView command processors and command lists can be started by:

- An operator request
- A command buffer queued to a task for processing by any NetView program
- A command call from another command processor
- An action specified in the NetView automation table

Reference: To define command lists written in the NetView command list language or REXX to the NetView program, place them in the NetView command list library (*ddname* DSICLD). See the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* to find out how to create command lists for specific operating systems.

You must link-edit PL/I, C, and assembler command processors into the NetView load library (*ddname* STEPLIB), and define them to the NetView program. To define command processors written in PL/I, C, or assembler to the NetView program, use a CMDDEF statement in the CNMCMD member of DSIPARM. Command processors are link-edited into the NetView load library.

You can implement parts of a function in multiple installation exit programs and command processors. A common way of splitting a function across command processors is to divide processing between OSTs and DSTs. Because OSTs receive data from operator stations and return data back to them, a command processor is written to:

- Be called when the command is entered by an operator
- Parse the command data and form a data services request
- Queue a command buffer containing the data services command to be processed by the DST
- Return an error message or a command confirmation message to the operator

The DST completes the function in a separate command processor that is called because of the command buffer that is built and queued by the first command processor. Under the DST, functions requiring the special data services of VSAM, external logging, or the VTAM CNM interface are performed and messages can be returned to the operator task that queued the command. Figure 2 on page 13 shows a typical program design for a function that uses the CNM interface and VSAM services.

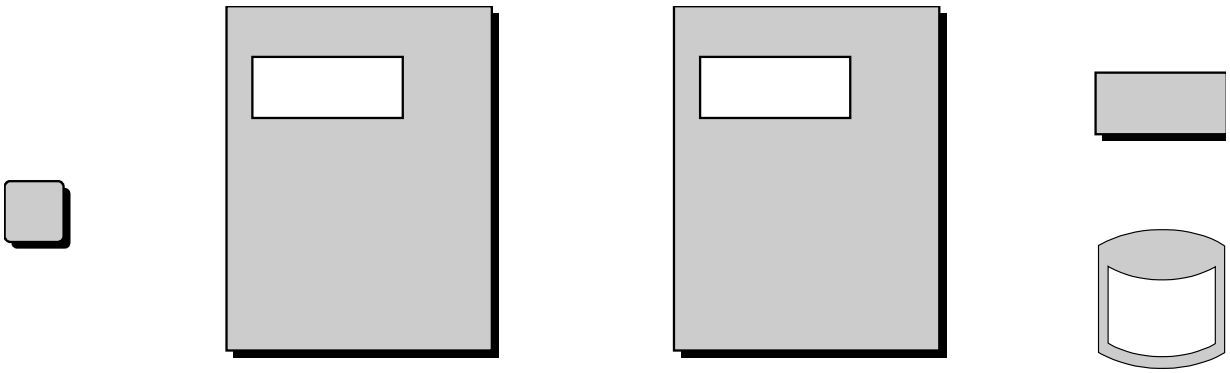


Figure 2. Program Design Example for DST Function

With long running commands, you can separate a complex function into a sequence of separate transactions. Command processors can establish a named stack entry where an anchor address is saved. A related command processor can later retrieve this address and perform another phase of the same processing.

When naming your commands, observe the following guidelines:

- Start with a letter (alphabetic)
- Avoid special characters such as commas and colons
- Avoid NetView command names, both internal commands and those shipped in CNMCMD. NetView internal command names are CSCFDST, HMSTATS, LOGNMVT, LOGRU, MESSAGE, PIPE, and VIEW.
- Avoid the following NetView prefixes:
  - AAU
  - BNH
  - BNI
  - BNJ
  - BNK
  - BNT
  - CNM
  - DSI
  - DUI
  - DWO
  - EGV
  - EKG
  - EUY
  - EXQ
  - EYV
  - EZL
  - FKB
  - FKV
  - FKW
  - FKX
  - FLB
  - FLC
  - FMG
  - FNA
  - IHS

Note: Messages that are issued by different means in a command processor or command list might not be displayed at its destination in the same order in which

they are requested by the command processor or command list. For example, assume that a command list gets control via the designator character (DSIG) and runs on a CONSOLE=*ANY* autotask. If the command list then issues a **PIPE** command with the **CONSOLE** stage followed by a **WTO** command, the message issued by the **WTO** command might be displayed on the operator console before the message issued by the **PIPE** command with **CONSOLE**.

Adding Optional Tasks to the NetView Program

You can write a completely new subtask in assembler language that the NetView program starts as an optional task (OPT) or subtask.

For an OPT, you must supply code for the subtask's initialization, installation exit, message, and command processing functions and termination. Because some of these elements are already provided in an existing DST, using the DST as a starting point is more practical.

Reference: For more information on OPTs and DSTs in assembler language, see the *IBM Tivoli NetView for z/OS Programming: Assembler*.

Choosing a Language

One application program interface might be more suitable than another for your particular customization requirements. Consider the effects on performance, ease of creation, and maintenance when determining the interface to use. This section describes the languages available and lists reasons that you might choose one language over another.

Input and Output

REXX, PL/I, C, and assembler all offer functions for reading from and writing to direct access storage devices (DASD). The NetView program provides specialized disk services and VSAM data services to access network management data files. In addition, functions written in PL/I or C can invoke system allocation and access methods to read and write data. CNM interface services also provide access to data coming from devices in the network.

Reference: See the *IBM Tivoli NetView for z/OS Programming: PL/I and C* for information about VSAM and CNM interface services. See the *IBM Tivoli NetView for z/OS Programming: Assembler* for information about using DSIDKS for read access to NetView data sets or files, DSIZVSMS for VSAM I/O, and DSIZCSMS for CNM data services.

See the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* for information on REXX file input and output.

Performance

Write performance-critical applications in a compiled or assembled language. Generally, compiled or assembled command procedures execute faster than interpretive (REXX and NetView command list language) command lists.

You must write NetView-driven installation exit routines in assembler, PL/I, or C. Any command processor that accesses NetView control blocks must be written in assembler. Command procedures that can be driven by terminal input or by messages and that do not need to access NetView control blocks can usually be written in REXX or in NetView command list language. Generally, command lists

written in REXX perform somewhat better than those written in NetView command list language. See "REXX Versus the NetView Command List Language." Additionally, the performance of REXX command lists can be improved by compiling the REXX command list.

Preloading a REXX or NetView command list (see the NetView online help for the LOADCL command) improves overall performance of the command list.

Reference: For details about compiling REXX command lists, see the *IBM Tivoli NetView for z/OS Tuning Guide*.

For additional performance recommendations, see the *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components* and *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*.

Stability

If you anticipate changes to your procedures as you gain more experience or as your operating environment changes, you might want to use command lists to implement the procedures initially. Changes are easier to make in command lists because you can incorporate the changes and test them online without having to restart the NetView program. You can translate procedures into a compiled language when you become confident of their stability.

Testing

Testing capabilities for command lists include the ability to trace execution using either operator commands or command list statements. A remote interactive debugger (RID) that displays information to a NetView operator console can help you in debugging PL/I and C user-written command processors and installation exits. The NetView program does not provide any specific functions to help debug assembler programs.

Speed of Implementation

Because command lists are easy to write, test, and put into production, they can be an appropriate choice in addressing immediate operational needs.

REXX Versus the NetView Command List Language

If all of your systems can run REXX, choose REXX over the NetView command list language for writing command lists. REXX is a structured language that enables the use of subroutines. REXX is the easier language to learn and provides additional functions, such as mathematical capabilities and improved string handling. REXX can read from and write to data sets with EXECIO. In addition, the performance of REXX command lists can be improved by compiling the REXX command list.

REXX language skills can be used in environments other than the NetView program. However, REXX procedures written for the NetView program probably will not be transportable to other environments because of their function content. In multiple environments, REXX is more useful because you can transfer REXX programming skills to solve NetView problems without learning another language.

If your installation uses several operating systems, it is possible that some of them support REXX and others do not. In this case, you can create bilingual command lists that contain both REXX and NetView command list versions of your

instructions. The command lists run in REXX if REXX is available; otherwise, they process in the NetView command list language.

Reference: For details about compiling REXX command lists, see the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language*.

See the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* for more information about bilingual command lists.

Language Choices by Function

Table 2 lists additional capabilities to consider when choosing which language to use.

Table 2. Language Choices by Function

Function	REXX or NetView CLIST	PL/I or C	Assembler
Send message to NetView operator in line mode.	Yes	Yes	Yes
Interact with operator through NetView operator's screen (PAUSE/GO command).	Yes	Yes	No
Invoke NetView commands.	Yes	Yes	Difficult
Trap and process messages destined for an operator.	Yes	Yes	Difficult
Access task and common global variables.	Yes	Yes	Yes
Create and access named areas of storage.	Yes REXX; No CLIST	Yes	Yes
Interact with operator through full-screen panels.	With VIEW command	With VIEW command	Difficult
Communicate non-SPCI data over the CNM interface.	No	Yes	Yes
Access DASD or VSAM files. **Note:** The PIPE command provides the ability to read from disk. DSIVSAM and DSIVSMX provide access to VSAM files.	Yes	Yes	Yes
Program debugging support provided.	Yes	Yes	No
Implement NetView installation exits.	No	Most	Yes
Access NetView control blocks.	No	No	Yes

Reference: See your specific programming language guides for considerations on writing in mixed languages.

Logging

The NetView program provides several ways to log information. Table 3 lists the available features of the common logging methods.

Table 3. Features of NetView Logging Methods

Feature	Network Log	External SMF Log	External User-Defined Log	NetView Sequential Log
Access method	VSAM	VSAM	Sequential	BSAM

Table 3. Features of NetView Logging Methods (continued)

Feature	Network Log	External SMF Log	External User-Defined Log	NetView Sequential Log
Device-independent	No	No	Yes	Yes
Function provided	Record all operator station activity	Service level verification and accounting	User-defined	Base service for user-defined functions
API–PL/I and C *	CNMSMSG	CNMSMSG	CNMSMSG	CNMSMSG
API–assembler	DSIWLS	DSIWLS	DSIWLS	DSIWLS
Begin recording	START	See *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*.	See *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*.	See *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*.
Browse	NetView BROWSE	No	Operating system browse	Operating system browse
Multiple log tasks	No	No	No	Yes
Variable length blocks and records	No	Yes	Yes	Yes
Primary / secondary data sets or files	Yes	System controlled	No	Yes
SWITCH, RESUME, AUTOFLIP	Yes	N/A	No	Yes
Installation exits	Many	XITXL	XITXL	XITBN, XITBO

Reference: For information about the network log, see the *IBM Tivoli NetView for z/OS Automation Guide*. For information about external logging using the system management facility (SMF), a user-defined log, or sequential logging, see the *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*.

Cross-Reference for Message and Environment Functions

Table 4 on page 18, Table 5 on page 19, and Table 6 on page 20 provide a cross-reference for the NetView system data, task data, and message functions. With these matrixes, you can determine whether the function you are interested in is available to the automation table, REXX, NetView command list language, or assembler. You can also determine what the name of the function is. Each matrix is alphabetized by the name of the REXX function.

Note:

1. If you are writing assembler-language command processors, see the *IBM Tivoli NetView for z/OS Programming: Assembler* for the BUFHDR mapping within the DSITIB mapping macro, the DSIIFR mapping macro, and the DSIAIFRO mapping macro for exact field definitions.

2. If you are writing command lists, see the *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* for more information about NetView command list language control variables and REXX functions.
3. If you are writing in PL/I or C language, see the *IBM Tivoli NetView for z/OS Programming: PL/I and C* for more information about the CNMINFC, CNMINFI, and CNMGETA service routines.
4. If you are writing automation table statements, see the *IBM Tivoli NetView for z/OS Automation Guide* for a description of the automation table condition items.

Table 4. Automation Variable Cross-Reference Table for System Data. The data returned is about the system. The same data is returned in every message for every task.

REXX Function	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
ASID()	NetView address space identifier	Not available	CNMINFI ASID	ASCBASID
CURSYS()	Current z/OS system name	CURSYS	CNMINFC CURSYS	CVTSNAME (MVS)
Date(USA)	Current date	Not available	CNMINFC DATE	
DOMAIN()	Current domain name	DOMAIN	CNMINFC DOMAIN	MVTCURAN
ECVTPSEQ()	Product sequence number	ECVTPSEQ	CNMINFC ECVTPSEQ	IHAECVT (MVS)
MVSLEVEL()	Current z/OS system level	MVSLEVEL	CNMINFC MVSLEVEL	CVTPRODN (MVS)
NETID()	VTAM network identifier	NETID	CNMINFC NETID	ACB vectors
NETVIEW()	NetView version and release identifier	NETVIEW	CNMINFC NVVER	MVTVER
OPSYSTEM()	Operating system for which the NetView program was compiled	OPSYSTEM	CNMINFC OPSYSTEM	DSISYS Compiler variable
STCKGMT() 8-byte value	Greenwich Mean Time Store Clock Value	Not available	CNMINFC CLOCK 8-byte value	
SUPPCHAR()	In the NetView program, the character that suppresses the command echo or the command's message output	Not available	CNMINFC SUPPCHAR	MVTSPCHR
SYSPLEX()	1–8 character name of the z/OS SYSPLEX where the command list is running	SYSPLEX	CNMINFC SYSPLEX	ECVTSPLX
TIME(option)	Current time	Not available	CNMINFC TIME	
VTAM()	VTAM level if active	VTAM	CNMINFC VTAM	ACB vectors MVTACB ACBOPEN
VTCOMPID()	VTAM component identifier	VTCOMPID	CNMINFC VTCOMPID	ACB vectors MVTACB ACBOPEN

Table 4. Automation Variable Cross-Reference Table for System Data (continued). The data returned is about the system. The same data is returned in every message for every task.

REXX Function	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
WEEKDAYN()	Decimal number representing day of week	WEEKDAYN	CNMINFI WEEKDAYN	

Table 5. Automation Variable Cross-Reference Table for System Data. The data returned is about the system. The same data is returned in every message for every task.

REXX Function	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
	NetView program termination indicator	NVCLOSE	CNMINFI CLOSING	MVTCLOSE
APPLID()	Application name of the current task	Not available	CNMINFC APPLID	TVBAPID
ARG()	Input parameters for the active command list	Not available	Not available	
ATTENDED()	Task information	ATTENDED	CNMINFI ATTENDED	TVBSYSCN TVBAUTOO TVBDAUT
AUTCONID()	MVS console name that is associated with an autotask. This MVS console can issue NetView commands to run under this autotask.	Not available	CNMINFC AUTCONID	TVBSYSCN TVBCNAME
AUTOTASK()	Autotask indicator	AUTOTASK	CNMINFI AUTOTASK	TVBAUTOO
COMPNAME()	Component name that was active when command list invoked	Not available	Not available	
CURCONID()	MVS console name used by a NetView task to issue MVS commands and receive MVS messages	Not available	CNMINFC CURCONID	TVBMCSNU TVBMCSNA
DISTAUTO()	Distributed autotask indicator	DISTAUTO	CNMINFI DISTAUTO	TVBDAUT
HCOPY()	Hardcopy task for this task	Not available	CNMINFC HCOPY	TVBHCTVB -> TVBOPID
LU()	Terminal name of the currently running task	Not available	CNMINFC LU	TVBLUNAM
NVCNT()	Number of domains available	Not available	Not available	
NVID(n)	Domain ID array	Not available	Not available	
NVSTAT(name)	Domain status	Not available	Not available	

Table 5. Automation Variable Cross-Reference Table for System Data (continued). The data returned is about the system. The same data is returned in every message for every task.

REXX Function	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
OPID()	ID of currently running task	OPID	CNMINFC OPID, or CNMINFC TASKNAME	TVBOPID
PARMCNT()	Number of input parameters to the active command list	Not available	Not available	
TASK()	Type of task	TASK	CNMINFC TASK	CBHTYPE in DSITVB
WTO.REPLY	WTOR reply text	Not available	Not available	

Table 6. Automation Variable Cross-Reference Table for Message Data. Data is different for each message or MSU. The message ID is message data.

REXX Functions and variables	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
	1–1100 byte source object	Not available	CNMGETA MSGSRCOB	MSODATA MSOLEN
ACTIONDL()	Message deletion reason	ACTIONDL	CNMCAGA ACTIONDL	IFRAUDLO IFRAUDTO IFRAUNVD IFRAUDFL IFRAUDF2
ACTIONMG()	Action message	ACTIONMG	CNMCAGA ACTIONMG	IFRAUACN
AREAID()	MVS area ID	AREAID	CNMGETA AREAID	IFRAUWMA CPOCAREA MDBCAREA
AUTOTOKE()	MPF automation token 1–8 characters, or null	AUTOTOKE	CNMGETA AUTOTOKE	IFRAUTOK CPOCAUTO MDBCAUTO
CART()	8-byte command and response token	CART	CNMGETA CART	CPOCCART MDBCCART
DESC()	2 bytes of MVS descriptor codes	DESC	CNMGETA DESC	IFRAUWDS CPOCDESC MDBCDESC
GETMLINE command	Message text	TEXT	CNMGETD GETFIRST or CNMGETD GETNEXT	

Table 6. Automation Variable Cross-Reference Table for Message Data (continued). Data is different for each message or MSU. The message ID is message data.

REXX Functions and variables	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
GETMPRES command	4 bytes of presentation attributes This information is contained in the text buffers chained from IFRAUTBA.	LINEPRES LINEPRES only returns presentation characteristics for the first line of the message	Not available	HDRTMTPA MDBTMTPA
GETMSIZE command	2-byte count of number of lines of message The value in CPOCLCNT might not reflect the actual number of buffers in the message. Therefore, assembler command processors should count the number of buffers on the IFRAUTBA chain.	Not available	Not available	CPOCLCNT MDBCLCNT
GETMTFLG command	2 bytes of text object flags This information is contained in the text buffers chained from IFRAUTBA.	LINETFLG LINETFLG only returns object type flags for the first line of the message	Not available	HDRTLNTY MDBTLNTY
HDRMTYPE()	NetView message type	HDRMTYPE	ORIG_MSG_TYPE ORIG_MSG_TYPE contains the message type only after CNMGETD has been issued.	HDRMTYPE
IFRAUGMT()	8-byte hexadecimal Store Clock value when AIFR was created	None	CNMGETA IFRAUGMT	
IFRAUIND()	2 bytes of automation IFR indicator flags	IFRAUIND(nn)	CNMGETA IFRAUIND	IFRAUIND
IFRAUIN3()	1 byte of indicator bits	IFRAUIN3(nn)	CNMGETA IFRAUIN3	IFRAUIN3
IFRAUI3X()	32-bit field of which IFRAUIN3 are the first 8 bits	IFRAUI3X	CNMCAGA IFRAUI3X	IFRAUI3X
IFRAUNVF	MVS Retain Flags	MVSRTAIN	CNMGETA MVSRTAIN	IFRAUNVF
IFRAUSDR()	Original sender of a message or MSU, whereas HDRSENDR is unreliable	IFRAUSDR	CNMGETA IFRAUSDR	IFRAUSDR
IFRAUSRB() IFRAUSB2()	2-byte user field from the AIFR. This user field can be referenced either as bits or characters.	IFRAUSRB(nn), IFRAUSB2(n)	CNMGETA IFRAUSRB, CNMGETA IFRAUSB2	IFRAUSRB

Table 6. Automation Variable Cross-Reference Table for Message Data (continued). Data is different for each message or MSU. The message ID is message data.

REXX Functions and variables	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
IFRAUSRC() IFRAUSC2()	16-byte user field from the AIFR. This user field can be referenced either as bits or characters.	IFRAUSRC, IFRAUSC2	CNMGETA IFRAUSRC, CNMGETA IFRAUSC2	IFRAUSRC
IFRAUTA1()	6 bytes of control flags	IFRAUTA1(nn)	CNMGETA IFRAUTA1	IFRAUTA1
IFRAUWF1()	4 bytes of MVS specific WQE flags	IFRAUWF1(nn)	CNMGETA IFRAUWF1	IFRAUWF1
JOBNAME()	8-byte MVS job name	JOBNAME	CNMGETA JOBNAME	IFRAUWJA GOJGJBNM MDBGJBNM
JOBNUM()	8-byte MVS job number	JOBNUM	CNMGETA JOBNUM	IFRAUWJU CPOCOJID MDBCOJID
KEY()	8-byte key associated with a message	KEY	CNMGETA KEY	CPOCKEY MDBCKEY
LINETYPE() GETMTYPE command	Message MLWTO indicators	Not available	ORIG_LINE_TYPE ORIG_LINE_TYPE contains the line type only after CNMGETD has been issued.	HDRLNTYP IFRAUWF1(3) HDRTTYPE MDBTTYPE
MCSFLAG()	2 bytes of MVS MCS flags In command lists, PL/I, and C, MCSFLAG returns a selection of eight MCSFLAG bits. In the automation table, MCSFLAG returns 16 bits that match the assembler control block field.	MCSFLAG	CNMGETA MCSFLAG	IFRAUMCS
MSGASID()	z/OS system address space identifier	Not available	CNMGETA MSGASID	IFRAUASI IFRAUWAS CPOCASID MDBCASID
MSGAUTH()	Indicates whether an MVS system message was issued by an authorized program	MSGAUTH	CNMGETA MSGAUTH	CPOCAUTH MDBCAUTH
MSGCATTR()	2 bytes of MVS message attributes flags	MSGCATTR	CNMGETA MSGCATTR	CPOCATTR MDBCATTR

Table 6. Automation Variable Cross-Reference Table for Message Data (continued). Data is different for each message or MSU. The message ID is message data.

REXX Functions and variables	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
MSGCMISC()	1 byte of MVS miscellaneous routing information flags	MSGCMISC	CNMGETA MSGCMISC	CPOCMISC MDBCMISC
MSGCMLVL()	2 bytes of MVS message-level flags	MSGCMLVL	CNMGETA MSGCMLVL	CPOCMLVL MDBCAUTH
MSGCMSGT()	2 bytes of message type flags	MSGCMSGT	CNMGETA MSGCMSGT	CPOCMSGT MDBCMSGT
MSGCNT()	Number of tokens in a message	Not available	Not available	
MSGCOJBN()	8-character originating job name	MSGCOJBN	CNMGETA MSGCOJBN	CPOCOJBN MDBCOJBN
MSGCPROD()	MVS system product level of the system that issued the message	MSGCPROD	CNMGETA MSGCPROD	CPOCPROD MDBCPROD
MSGCSPLX()	1–8 character name of MVS SYSPLEX where the received message originated	MSGCSPLX	CNMGETA MSGCSPLX	CPOCSPLX
MSGCSYID()	Decimal system ID (for DOM)	Not available	CNMGETA MSGCSYID	CPOCSYID MDBCSYID
MSGDOMFL()	1 byte of DOM flags	MSGDOMFL	CNMGETA MSGDOMFL	CPODOMFL MDBDOMFL
MSGGBGPA()	4 bytes of background presentation attributes	MSGGBGPA	CNMGETA MSGGBGPA	GOJGBGPA MDBGBGPA
MSGGDATE()	7-character date in the form *yyyyddd*	MSGGDATE	CNMGETA MSGGDATE	GOJGDSTP MDBGDSTP
MSGGFGPA()	4 bytes of foreground presentation attributes	MSGGFGPA	CNMGETA MSGGFGPA	GOJGFGPA MDBGFGPA
MSGGMFLG()	2 bytes of MVS general message flags	MSGGMFLG	CNMGETA MSGGMFLG	GOJGMFLG MDBGMFLG
MSGGMID()	4-byte MVS message ID field	MSGGMID	CNMGETA MSGGMID	GOJGMID MDBGMID
MSGGSEQ()	MVS message sequence number. This sequence number, together with MSGGSYID, determine MSGGMID.	Not available	CNMGETA MSGGSEQ	GOJGSEQ
MSGGSYID()	System ID of the MVS system from which the message was issued	Not available	CNMGETA MSGGSYID	GOJGSYID MDBGSYID

Table 6. Automation Variable Cross-Reference Table for Message Data (continued). Data is different for each message or MSU. The message ID is message data.

REXX Functions and variables	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
MSGGTIME()	11-byte time *hh.mm.ss.th* character string	MSGGTIME	CNMGETA MSGGTIME	GOJGTIMH MDBGTIMH GOJGTIMT MDBGTIMT
MSGID()	Message ID, which is not always the first item of a message. For example, if the message is a WTOR, a REPLYID precedes the message ID.	MSGID	ORIG_PROCESS ORIG_PROCESS contains the message ID only after CNMGETD is issued.	
MSGORIGN()	Message domain name (or sometimes TAF session name). This always returns the domain name in AIFR buffers.	DOMAINID	ORIG_DOMAIN ORIG_DOMAIN contains the domain name only after CNMGETD has been issued.	HDRDOMID
MSGSRCNM()	1–17 character source name from the source object	MSGSRCNM	CNMGETA MSGSRCNM	MSOSUBDA MSOSBNIK MSOSBNID MSOSBNAU
MSGSTR()	Text of message after the message ID	Not available	CNMGETD GETFIRST or CNMGETD GETNEXT	
MSGTOKEN()	Numeric token associated with message	Not available	CNMGETA MSGTOKEN	CPOCTOKN MDBCTOKN
MSGTSTMP()	Message time stamp	Not available	CNMGETA MSGTSTMP	HDRTSTMP
NVDELID()	NetView DOM ID	NVDELID	CNMCAGA NVDELID	IFRAUGMT HDRDOMID
MSGVAR(n)	Tokens of the message In command lists, the token after the message ID is returned as the first token. In the automation table, the message ID is returned as the first token.	TOKEN	CNMGETD GETFIRST or CNMGETD GETNEXT	
PARTID()	First two characters of a VSE message prefix, which, for some VSE messages, indicates the VSE partition ID	PARTID	CNMGETA PARTID	
PRTY()	2-byte MVS message priority	Not available	CNMGETA PRTY	CPOCPRTY MDBCPRTY
REPLYID()	Reply ID	Not available	CNMGETA REPLYID	CPOCRPYI MDBCRPYI CPOCRPYB MDBCRPYB

Table 6. Automation Variable Cross-Reference Table for Message Data (continued). Data is different for each message or MSU. The message ID is message data.

REXX Functions and variables	Description	Automation Table Condition Item	HLL Service Routine and Options	Control Block Field
ROUTCDE()	16 bytes of MVS routing codes (128 bits)	ROUTCDE	CNMGETA ROUTCDE	IFRAUWRT CPOCERC MDBCERC
SESSID()	TAF session name	SESSID	CNMGETA SESSID	IFRAUTAF
SMSGID()	MVS message ID for DOM correlation	Not available	CNMGETA SMSGID	IFRAUWID
SYSCONID()	The MVS console name that is associated with the message	SYSCONID	CNMGETA SYSCONID	IFRAUWUC IFRAUCON CPOCCNID MDBCCNID
SYSID()	8-byte z/OS system name that is associated with the message	SYSID	CNMGETA SYSID	IFRAUWSN GOJGOSNM MDBGOSNM

Customizing PF Keys and Immediate Message Line

You can set global variables that can be searched for and placed on the PF key line on panels displayed by BROWSE, STATMON, and VIEW commands. On VIEW panels, the immediate message line is also used as the PF key line. The variable names are prefixed by (&)CNMIM and followed by the application name. Valid variables include CNMIMLBROWSE, CNMIMMBROWSE, CNMIMSTATMON, CNMIMVIEW, and CNMIMWINDOW.

For View panels, if the VIEW application has not provided a value for CNMIMDL, VIEW searches the global dictionaries (task, then common) for a variable named CNMIM*xxx*, where *xxx* is the application name provided when VIEW was invoked. If the CNMIM*xxx* variable is not found, VIEW searches for CNMIMVIEW in the same dictionaries. This is similar to the way keys are set for VIEW applications. Finally, if none of these variables is present, the text from message BNH257I is used.

Modifying CNMKEYS

```
-------------------- DEFINE TEXT FOR KEY LINES ------------------
*
*  The separator line above is required in any key definition file
*  which defines "key line" texts.  This separator line MUST begin
*  with 9 dashes.  All key definitions must precede this line, and
*  all "key line" definitions must follow it.
*
*  Optionally uncomment and modify the following statements, which
*  assign values to the "key line" area of Statmon, Browse and View
*  panels.  The same rules are followed in this section as above with
*  respect to commas and continuation lines.  Keep the variable name
*  between the delimiters, and PFKDEF will assign the rest of the line
*  (including continuations) to that variable.  Do not use leading
*  blanks.
*
*/CNMIMSTATMON/1=HLP 2=END 3=RET 4=KYS 5=LOG 6=,
*ROL 7=BCK 8=FWD 9=SR  10=SV  11=SC  12=RTV
*/CNMIMLBROWSE/1=HLP 2=END 3=RET 4=KYS 5=RPF 6=,
*ROL 7=BCK 8=FWD 9=TOP 10=LFT 11=RGT 12=RTV
*/CNMIMMBROWSE/1=HLP 2=END 3=RET 4=KYS 5=RPF 6=,
*ROL 7=BCK 8=FWD 9=TOP 10=WIN 11=WHO 12=RTV
*/CNMIMVIEW/1=HLP 2=END 3=RET 4=KYS 5=LOG 6=,
*ROL 7=BCK 8=FWD 9=TOP 10=WIN 11=ENT 12=RTV
*/CNMIMWINDOW/1=HLP 2=RFR 3=RET 4=KYS 5=FIN 6=,
*ROL 7=BCK 8=FWD 9=TOP 10=LFT 11=RGT 12=RTV
```

Figure 3. Excerpt from CNMKEYS Sample to Set PF Keys

The PFKDEF command list (CNME1010) can assign one or more task global variables from the target file to match the key settings for applicable NetView applications. Figure 3 shows how you can set the PF keys for the Browse, Status Monitor, and View panels.

Chapter 2. Customizing the NetView Command Facility Panel

The NetView command facility panel can be customized. You can customize:

- The colors of fields on the panel
- The information that precedes the message text
- The default colors for held, action, normal, and immediate classes of messages
- The color of the command area
- How much of the panel area is set aside for held and action messages

Using a Screen Format Definition

You can use a screen format (SCRNFMT) definition to specify attributes for the command facility panel and a default value for the color of messages. To activate the screen format definition, use the NetView DEFAULTS and OVERRIDE commands. Refer to NetView online help for details on how to use DEFAULTS and OVERRIDE. A short description of each option that can be specified in a screen format definition is listed under "Screen Format Definition Statements."

Reference: For detailed descriptions of the screen format definition statements, refer to *IBM Tivoli NetView for z/OS Administration Reference*. CNMSCNFT is a sample screen format definition, provided in *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*.

Note:

1. Color and highlighting must be supported by your hardware and emulator. In addition, you must log on to the NetView system with a query-type logmode.
2. When you replace an active screen format definition with a new screen format definition, all definition statements are replaced. Any definition statement that is not specified in the new screen format definition uses the value that is supplied with the NetView program. The values that are supplied with the NetView program for each definition statement are listed in *IBM Tivoli NetView for z/OS Administration Reference*.

   For example, a screen format definition has been activated with the DEFAULTS command. Subsequently, operators activate customized screen format definitions using the OVERRIDE command. The statements that were not specified in an operator's screen format definition use the value that is supplied with the NetView program rather than the value from the screen format definition that was activated with the DEFAULTS command.

Screen Format Definition Statements

The following screen shows the fields that you can customize on the NetView message panel.

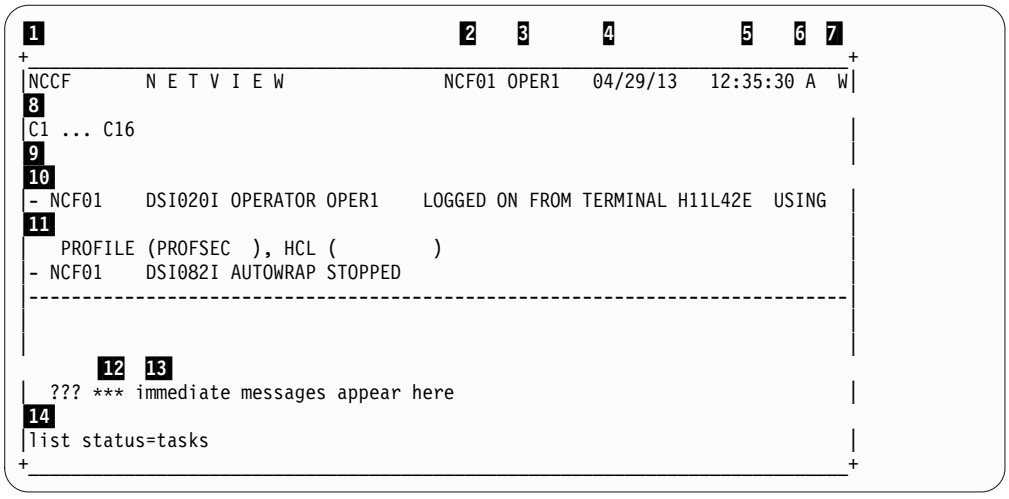


Figure 4. NetView Message Panel.

NetView Message Panel

The following formats can be customized:

1 Title area
Use the TITLE statement in a SCRNFMT definition to customize the color of the word NETVIEW on the screen.

2 Domain identifier
Use the TITLEDOMID statement in a SCRNFMT definition to customize the color of the NetView domain name.

3 Operator identifier
Use the TITLEOPID statement in a SCRNFMT definition to customize the color of the operator name.

4 Current date
Use the TITLEDATE statement in a SCRNFMT definition to customize the color of the date. You can also customize the format of the date using the DEFAULTS and OVERRIDE commands.

5 Time data was last displayed
Use the TITLETIME statement in a SCRNFMT definition to customize the color of the time. You can also customize the format of the time using the DEFAULTS and OVERRIDE commands.

6 and 7 System states
Use the TITLESTAT statement in a SCRNFMT definition to customize the color of the status characters in the upper right corner of the panel.

8 COLUMNHEAD line
Use the COLUMNHEAD statement in a SCRNFMT definition to create a line at the top of the screen with labels for prefixes. This line can have up to 16 tags (C1...C16) in any order. Total length of tags, including one space between each tag, cannot exceed 78 characters. Set the tags using the SCRNFMT definition. The PREFIX and NOPREFIX statements control which tags appear. You can also choose not to have the line appear on the screen.

9 Output area
Use the HELD, ACTION, NORMAL, and NORMQMAX statements of the SCRNFMT definition.

Note: HELD, ACTION and NORMAL statements set default colors for messages. If message color has been previously set, the default message color will not take effect. See "Message Color and Highlighting" on page 30 for more information.

The NORMQMAX statement specifies how many normal messages are queued for later display (excluding held and action messages). An example of this is the number of messages kept while you are working in another panel, or while the panel is locked.

When the NORMQMAX is exceeded, the NetView program automates and logs (if required) incoming messages and then discards them, without interrupting the operator. The oldest messages are discarded until the number of queued messages is half the NORMQMAX value.

When the operator returns to the command facility (or the panel is unlocked), message DSI593A indicates how many messages were discarded.

The value of NORMQMAX can range from 0 to 2147483647; the default is 3000. The minimum value allowed is 100 messages, so if you specify less than 100, it is rounded to 100. Specifying a NORMQMAX value of 0 means an infinite queue, and is basically the same as specifying the maximum value of 2147483647.

Attention: Setting the value of NORMQMAX too high might cause out of storage conditions. Conversely, setting the value too low can prevent your operators from seeing all of their messages even when message traffic rates are low.

The NORMQMAX value also applies to hardcopy printers and to OST-NNT cross-domain sessions. Hardcopy printers can get backlogged because they are slow or because they run out of paper. An OST-NNT session can get backlogged because the message traffic over the session exceeds the send rate for that session.

10 Area for held and action messages

Use the HOLDPCNT statement in the SCRNFMT definition. The NetView program uses 10 lines of the screen for the title line, immediate message area, command area, and a warning held-message: DSI151I. Held messages are not displayed in these 10 lines. You can use HOLDPCNT to specify what percentage *of the remaining lines* you want to use for held messages. For example, on a 24-line screen, setting HOLDPCNT to 100% will give you 14 lines for held messages.

Specifying HOLDPCNT as 0 means that held messages are not displayed on the screen. If HOLDPCNT is non-zero, the minimum number of lines used for held messages is two.

You can use HOLDWARN to get a warning message that held messages exist, even though they are not displayed on the screen.

Note: The NetView program will not display the control line of a held message without the data line of the message. This helps prevent operators from accidentally erasing a held message without seeing the text.

11 Indentation

Use the INDENT and MLINDENT statements in the SCRNFMT definition.

Separator line
The LASTLINE statement of the SCRNFMT definitions changes the color of the dashed separator line between the new and old messages of the screen.

12 Command entry indicator
Use the CMDLINE statement of the SCRNFMT definition.

Lock/unlock indicator (***)
Use the LOCKIND statement in the SCRNFMT definition.

13 Immediate message area
Use the IMDAREA statement in the SCRNFMT definition.

14 Command area
Use the CMDLINE statement in the SCRNFMT definition to change the color used for the command input area. You can change the size of the command area with the INPUT command.

Message Color and Highlighting

Four color and highlighting attributes can be set for messages:

- Foreground color
- Background color
- Intensity
- Highlighting

Note: Background color is not supported on most 3270 devices and emulators. In this case, black is used for the background color.

The color and highlighting attributes for messages can be set in several places:

- In the automation table
- For MVS system messages, in the MVS MPF table
- In installation exits
- In a screen format definition

Of all of the options listed, the screen format definition takes the lowest precedence. The following rules of precedence apply:

- MPF table color intensity and highlighting for MVS system messages override the screen format definition for these attributes.
- Automation table specifications of color intensity and highlighting override the following:
  - The MPF table specified color intensity and highlighting
  - Screen format definition of color intensity and highlighting
  - DSIEX02A and DSIEX17 specification of color intensity and highlighting (these exits are driven prior to automation).
- Installation exit specifications of color intensity and highlighting override the MPF and the screen format definition for these attributes. In addition, installation exit DSIEX16 (post-automation) can override the color intensity and highlighting specified in the automation table.

Each of these presentation attributes can be manipulated independently. For example, an MVS system message that had a match in the automation table with a color action would be presented in the intensity and highlighting as specified in the MPF table, but with the color as specified in the automation table.

Chapter 3. Using the VIEW Command

This chapter documents general-use programming interface and associated guidance information.

The VIEW command processor can be used to display full-screen panels from user-written programs. With the VIEW command, users can design their own panels and control the color and highlighting of panel text.

The VIEW command enables command lists or command processors written in PL/I or C to interact with an operator with full-screen panels. The data from the command list or PL/I or C variables can be substituted into the panels.

Creating Full-Screen Panels

To create panels for your operators, define the text and format in a data set or file. The panel source consists of a prologue, followed by text and variables that define the panel to be displayed. Figure 5 on page 32 is an example of the information in the help source file. See "General Help Fields" on page 32 for descriptions of each numbered field in the figure.

If your display consists of a sequence of lines or messages, you might find it easier to use the WINDOW command for your full-screen panel. Use WINDOW to alter its display and to define or redirect subcommands. For more information, refer to the online help for WINDOW.

The NetView program provides a number of command lists that use the VIEW command to display full-screen panels. Displaying a new panel by invoking VIEW from a command list requires that you either modify an existing command list or write a new one. When you modify a command list that is supplied by IBM, first copy it into a user data set and change its name.

```
/*******************************************************************************
/*  (C) COPYRIGHT IBM CORP. 2011 1
/*  DESCRIPTION: MENU FOR NCCF INFORMATION
/*  CHANGE ACTIVITY:
/*******************************************************************************
HELP=CNM5H000  help panel title 2
1 CNM1OVER Cmd Facility Overview
2 CNMKTAAF TAF Help
3 CNMKNCSC Using NCCF Screens 3
4 CMD='HELP NCCF COMMANDS'
5 CNMZZZZZ Field Level Help
*** 4
+CNMKNCCF  5      %COMMAND FACILITY HELP MENU 6
$
$
\Select+ To get information about
$
$  %1   $Operator's overview of the command facility
$  %2   $Using the terminal access facility (TAF)
$                                                          7
$  %3   $The command facility screen
$  %4   $Command facility commands and command lists
$
$  %5   $Field level help
$
$
$
+Type a number (1 through 5) and press ENTER.
$
$
%                     HELP NETVIEW --->$NetView Help Menu
$
$
$
&CNMIMDL 8
%Action===>~&CUR 9
```

Figure 5. Example of Source for General Help Information.

Example of Source for General Help Information

General Help Fields

The special characters in the source file, such as the dollar sign ($) and the percent sign (%), are described in “Controlling Color and Highlighting of Fields” on page 38.

1 Prologue

An optional section for programmer comments. Each line of the prologue begins with /* in columns 1 and 2. Only comments can be placed in this section. If comments are displayed in the Help or Option Definitions section, a return code of 83 is sent, and the panel is not displayed. Comments that are displayed after these sections are treated as data.

2 Help

Optional definition of the panel. This field follows the prologue and is coded in the following format:

```
Column
1               15
HELP=helppan    comment
```

Note: You can also use HELP `CMD='command_text'`. See the following description for **3** .

3 Option Definitions

An optional list of selections the operator can choose. This list can contain panel names or commands. You can add an optional comment after the panel name or command. At least one blank must separate the panel name or command from the comment. The list cannot exceed 49 entries. The list is coded in the following format:

```
Column
1 3
n panel_name or CMD='command_text'  comment
```

Where *n* is the character the operator enters to call the panel or issue the command.

To produce a continuation panel, *n* is blank, as follows:

```
Column
1 3
  panel_name  comment
```

In this case, `panel_name` identifies the continuation panel.

4 Text Indicator

Three required asterisks separate the prologue, help, and panel definitions from the displayed panel text. These asterisks can be followed by the following options, which can be in any order and must be separated by at least one blank.

- The AT1 option is attribute set 1 for color and highlighting attributes. See Table 7 on page 34 and Table 11 on page 39 for more information.
- The AT2 option is attribute set 2 for color and highlighting attributes. See Table 7 on page 34 and Table 11 on page 39 for more information.
- The SFD (screen-format default) option means that when the color or highlighting for a field on a VIEW panel is either specified or else defaults to X'00' (the default for 3270), then the color or highlighting specified for the NCCF screen by the DEFAULTS SCRNFMT command or OVERRIDE SCRNFMT command is used. IF SFD is not specified, or if no active SCRNFMT member is in effect, X'00' is sent to the device. If the VIEW panel field is interpreted as the input command line, the color and highlighting specified by the SCRNFMT CMDLINE is used; for any other field, the SCRNFMT NORMAL specification is used. Sample CNMSCNFT contains additional information.
- The XVAR option provides variables that can contain up to 31 characters, including periods.

  Without this option, variables can contain only 11 characters and cannot contain periods. See Table 7 on page 34 and “Compound Symbols” on page 45 for more information on the XVAR option.
- The OPTROW=*optchar* option can be used to specify that any row (line) that begins with the character defined by *optchar* is an optional row. The maximum number of optional rows is defined as the number of rows supported by the terminal, minus 24 (which can be zero). Optional rows defined on the panel that go beyond this maximum are not displayed. Also, rows (regular or optional) that go beyond the terminal's limit are not displayed.

  For an optional row, all the characters are shifted left one position to compensate for the *optchar*, and the resulting last position (column 80) is treated as a blank.

See the WINDOW command list (CNME1505) and its View panel, CNMKWIND, as an example of how to use OPTROW.

- The WIDE option enables the entire line width to be used on terminals that support more than 80 columns. When WIDE is specified, panel variables that are the last non-blank specifications on their respective lines are substituted. The variables are not truncated until the end of the line, which is defined by the terminal.

  See the WINDOW command list (CNME1505) and its View panel, CNMKWIND, as an example of how to use WIDE.

Table 7. Examples of Using Text Indicator Options

Coding	Results
*** AT1	• Attribute set 1 • English • 11-character variable names, no periods

When three asterisks are followed by the AT2 option, attribute set 2 is used for color and highlighting. For example:

- `*** AT2` for English
- For attribute set 1, use *** or `*** AT1`

For attribute set 1 and variables as long as 31 characters, use `*** AT1 XVAR` for English.

See "Controlling Color and Highlighting of Fields" on page 38 for more information on attribute sets 1 and 2.

5 Name
The name of the panel.

6 Heading
The text that describes the use of the panel.

7 Panel Text
Up to 24 lines of text that constitute the displayed panel. See also the OPTROW option described under Text Indicator.

Command list variables can be displayed anywhere in the panel text.See "Displaying Variables in Source Panels" on page 43 for more information.

8 Message Area
The variable &CNMIMDL displays NetView error messages on line 23 of the panel. If the application has not provided a value for CNMIMDL, VIEW searches the global dictionaries (task, then common) for a variable named CNMIM*xxx*, where *xxx* is the application name provided when VIEW was invoked. If the variable is not found, VIEW searches for CNMIMVIEW in the same dictionaries. Finally, if none of these variables is present, the text from message BNH257I is displayed. The default English text for BNH257I is `"TO SEE YOUR KEY SETTINGS, ENTER 'DISPFK'"`. The text of message BNH257I can be changed in the message translation table.

See "Using PF Keys and Subcommands with VIEW" on page 57 for a list of the subcommands that can be assigned to PF keys and "Customizing PF Keys and Immediate Message Line" on page 25.

9 Command Line
NetView commands are typed on the command line. In a VIEW command

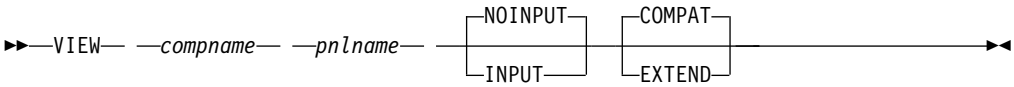
with the NOINPUT option specified, a command line is defined by the tilde (~) attribute symbol. The &CUR option identifies the cursor position within the command line. Only one input field and only one &CUR option is processed per panel. This option is useful for predefining a command in the input field. Otherwise, the cursor defaults in the following order:

1. The last attribute variable that specified 'UY'
2. The first tilde field, if one is present
3. The first position in the upper-left corner

Coding the VIEW Command

Code the VIEW command as follows:

VIEW



Where:

compname
Specifies the name (1–8 characters) that is used with PF key definitions by the NetView program. The first character must be alphabetic. A distinct name must be used for each separately rollable application.

pnlname
Specifies the name (1–8 characters) of the panel to be displayed.

NOINPUT
Specifies that the VIEW command does not return any information to the procedure that invoked it. NOINPUT is the default. If the panel defines a command line, the NetView program treats input as a command. With the NOINPUT option, there is no need for your command procedure to invoke the UNIQUE command.

See Figure 5 on page 32 for the PF keys provided by the NetView program when you specify NOINPUT.

INPUT
Specifies that input values and AID information can be returned to the procedure calling the VIEW command. INPUT also specifies that cursor location can be received from and returned to the procedure calling the VIEW command. When you use the VIEW command with the INPUT option, use the UNIQUE command to enforce uniqueness (only one occurrence of the command on the roll stack). See “Using the UNIQUE Command” on page 48 for more information.

COMPAT
Specifies that the functionality for this invocation of VIEW is compatible with the behavior of VIEW for releases of the NetView program prior to Version 5 Release 1. Refer to the documentation for the prior release in which the program using VIEW had been written for details of the functionality. The COMPAT option is the default.

EXTEND

Specifies that the extended functionality introduced in Tivoli NetView for z/OS Version 5 Release 1 be used for this invocation of VIEW. Examples of this functionality are:

- The ability to have VIEW pick up any local variable values that are specified and use those values rather than any global variable values that have been specified.
- The ability for VIEW to be interrupted with RC=2 when a message is trapped.

The EXTEND option can be used to allow dynamic updating of variables without the need to run separate programs (using global variables) to perform the updating.

The EXTEND option is not supported for the NetView command list language.

Usage Notes

- This table summarizes the difference between VIEW with the EXTEND option and VIEW with the COMPAT option:

Table 8. Comparison of VIEW with the EXTEND option and VIEW with the COMPAT option

Functionality	Behavior using VIEW=EXTEND	Behavior using VIEW=COMPAT
Search order for variables	• Locally defined • Control variables • Task global • Common global	Value retrieved from local or global dictionary according to how the variable was defined in the CLIST invoking VIEW.
View interrupted with RC=0 when message is trapped?	Yes	No
Changed value for global variable stored in appropriate global dictionary?	Yes, if specified on GLOBALV before VIEW	Yes, if specified on GLOBALV before VIEW
Changed value for global variable stored in local dictionary?	Yes	No, although this is irrelevant for NetView CLIST language.

Note: All subsequent descriptions of VIEW in this book assume the extended functionality introduced in Tivoli NetView for z/OS Version 5 Release 1. However, in order to use this functionality, you must specify the EXTEND option on the VIEW command.

- By specifying NOINPUT, you can use a command procedure to display online help panels. See Chapter 4, “Modifying and Creating Online Help Information,” on page 65, for more information on how to code help panel hierarchies.
- You can use the VIEW command to display data from messages obtained through TRAP processing immediately upon receipt of the message. Updates are also possible from non-message sources on a timed basis. For more information, see “Dynamic Update Capabilities” on page 59.
- The VIEW command is intended to be used only from a command procedure. If you use the VIEW command in command lists to display a panel, minimum

processing should be done between exiting the view and the end of the procedure. Operator input might be inhibited between the time the view is ended and the end of the procedure.

- If a VIEW NOINPUT command is invoked with the same *compname* as a previous VIEW command, then the previous VIEW command is canceled as well as the command procedure that invoked that VIEW command.

Return Codes from VIEW and BROWSE

Table 9 lists and describes the return codes that can be received for the VIEW and BROWSE command. The table also provides a brief description of the action you must take.

Table 9. Return Codes from VIEW and BROWSE

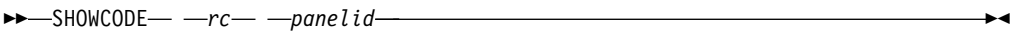
Code	Meaning	Your Action
2	Trapped messages exist for this task.	Discard or process the trapped messages before calling VIEW or BROWSE.
4	• Specified panel not found in CNMPNL1, CNMMSGF, or CNMCMDF data sets • Possible input/output (I/O) error.	Put panel definition in correct data set or file.
8	Panel definition format not valid; no non-comment lines found.	Correct format of panel definition.
12	You are not authorized to browse the member.	Ask your system programmer to redefine your authorization.
16	VIEW command processor invoked with parameters that are not valid. *Name1* must be 1 - 8 characters and *name2* must be a valid panel ID. Valid parameters are INPUT, NOINPUT, MSG, NOMSG.	Correct command list to use valid option.
24	Full-screen command processor is available to OST only.	Do not invoke VIEW from a non-OST.
28	Logical record length of panel not 80 bytes (VM only).	Change file to logical record length of 80 bytes.
32	Unrecoverable error resulted from macro call. Error could be that CNMMSGF or CNMCMDF has not been installed for online message or command help. Also, refer to message DWO050I in the NetView log.	Install CNMMSGF or CNMCMDF. Contact IBM Software Support.
36	Unrecoverable internal programming error occurred. Also, refer to message DWO050I in the NetView log.	Contact IBM Software Support.
40	Browse panel CNMBROWS, which is used for browsing members, was not found.	Put CNMBROWS in correct data set or file.
81	Panel definition format not valid; no text indicator line found, or more than 49 option definitions found. (See Figure 5 on page 32, for more information.)	Correct format of panel definition.
83	Panel definition format not valid; comment lines in wrong place.	Correct format of panel definition.

Displaying VIEW Return Codes with SHOWCODE

The SHOWCODE command list is used by command procedures to display descriptions of the nonzero return codes returned from the VIEW command.

Code the SHOWCODE command as follows:

SHOWCODE



Where:

rc Is the name of the variable that contains the return code for which you want to display a description.

panelid
Specifies the name of the panel that the VIEW command attempted to display before issuing the return code. This parameter is only required for return codes 4, 8, 12, 28, 81, and 83.

SHOWCODE displays descriptions of the nonzero VIEW return codes as messages. Table 10 shows the return codes and their related message IDs.

Table 10. Nonzero VIEW Return Codes and Related Message IDs

Return Code	Message ID
4	CNM335I
8	CNM336I
12	CNM337I
16	CNM338I
24	CNM340I
28	CNM341I
32	CNM342I
36	CNM343I
40	CNM9071
81	CNM388I
83	CNM390I

Before issuing SHOWCODE from a command procedure, check to make sure that the return code is not zero. See "Example of a REXX Command List to Update a Panel" on page 60 for an example that uses SHOWCODE to display error messages from VIEW.

Controlling Color and Highlighting of Fields

You can change or add to the color and highlighting of the existing panels. Text color and highlighting in the displayed panel are controlled by attribute symbols or variables. After you code attribute symbols in the source panel, they appear as blanks in the displayed panel.

Scanning for attribute symbols or variables in a particular line occurs only if column 1 contains an attribute symbol or panel variable. Otherwise, the line is displayed as is, in the default color and without variable substitution.

Note: Color and highlighting depend on the terminal you are using.

Attribute Symbols

You can specify attribute symbols on the source panel to color or highlight text. Edit the source panel and replace the blank space before the text with an attribute symbol selected from the second column of Table 11 or Table 12.

Variables are parsed only at the first level. Nested VIEW variables are substituted but not parsed. Therefore, color attribute symbols that are located in nested variables are displayed as data.

An option specified in the header of a panel determines the set of attribute definitions to use for that panel. If you specify no option (***), use the original set (attribute set 1). Use attribute set 2 when you specify the option (*** AT2) on the text indicator line of the panel definition. See "View-Based Help" on page 66 for more information on the text indicator line.

Table 11. Set 1 Color and Highlighting Attributes

Attribute Set 1	Symbol	Hex Character	Intensity	Field
White	%	X'6C'	High	Text
Reversed white	}	X'D0'	High	Text
Underscored white	!	X'5A'	High	Text
White	~	X'A1'	High	Input
Turquoise	$	X'5B'	Normal	Text
Underscored turquoise	\	X'E0'	High	Text
Blue	+	X'4E'	Normal	Text
Reversed blue	{	X'C0'	High	Text
Green	@	X'7C'	Normal	Text
Yellow	¬	X'5F'	Normal	Text
Pink	¦	X'6A'	Normal	Text
Red	¢	X'4A'	High	Text

Table 12. Set 2 Color and Highlighting Attributes

Attribute Set 2	Symbol	Hex Character	Intensity	Field
White	%	X'6C'	High	Text
Reversed white	}	X'D0'	High	Text
Reversed red	!	X'5A'	High	Text
White	~	X'A1'	High	Input
Turquoise	$	X'5B'	Normal	Text
Reversed green	\	X'E0'	Normal	Text
Blue	+	X'4E'	Normal	Text
Reversed blue	{	X'C0'	Normal	Text
Green	@	X'7C'	Normal	Text
Yellow	¬	X'5F'	High	Text
Reversed yellow	¦	X'6A'	High	Text
Blinking red	¢	X'4A'	Normal	Text

Displaying Special Attributes

If you want to display a particular symbol that doubles as an attribute within a colored or highlighted row, place a double quotation mark (") in front of the symbol. For example, if you want the left brace ({) to appear in text, enter "{ in the source panel. If you want to display a double quotation mark ("), enter "". When you use a double quotation mark (") in the source panel, the text following the double quotation mark is shifted to the left in the displayed panel. When the same hexadecimal values for these symbols are coded as part of double-byte character text surrounded with shift-out and shift-in control characters, they are not treated as attributes.

Using the + Attribute

Be careful how you use the plus sign (+) for the color blue. If you want to assign the color blue to a variable defined by the NetView command list language, enclose the plus sign within a pair of single quotation marks as follows:

```
&COLOR = '+'
```

To assign the color blue to the REXX variable **A** so that its contents, **G**, are changed to blue, do the following:

```
A = '+G'
```

Without the pair of single quotation marks, the NetView program interprets the plus sign as a continuation character.

Using the $ and the @ Attributes

Because the $ character and the @ character are often used as data inside a command list or REXX variable, VIEW treats them differently when defined in a panel or in a variable. When in a panel, they are treated as attribute symbols as described in Table 11 on page 39 and Table 12 on page 39. When in a variable, they are treated as data. If the associated attributes are needed inside a variable, substitute the greater than (>) and less than (<) signs as synonyms for @ and $ respectively. Use the respective synonym in your command list. In the following NetView command list example, the AMOUNT field displays the string $1,000 in turquoise and the HEIGHT field displays the string @ 6 feet in green.

```
&AMOUNT = '<$1,000'
&HEIGHT = '>@ 6 feet'
```

This is what the same example would look like in REXX.

```
AMOUNT = '<$1,000'
HEIGHT = '>@ 6 feet'
```

When they are not used in a variable, the less-than and the greater-than symbols are displayed as characters.

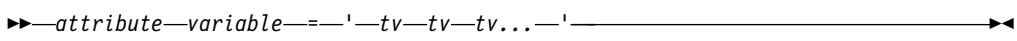
Attribute Variables

Attribute variables are assigned in the command procedure that drives the view panel. An alternative to defining attribute symbols on the panel or within the variable data is to define attribute variables that are associated with panel variables. Attribute variables describe attributes associated with panel variables and their text following on the same line. Using an attribute variable provides a wider range for attribute selection and allows you to define input fields. When you use an attribute variable, the contents of the associated panel variable are not scanned for attribute symbols.

An attribute variable name is formed by concatenating a dollar sign onto the front of the panel variable name. For example, in NetView command list language, the attribute for panel variable &V1 is defined in a variable called `&$V1.`

In REXX, PL/I, and C, the ampersand (`&`) is not used. For a PL/I or C program, attribute variables must be set using CNMVARS in PL/I or *Cnmvars* in C.

The following is the syntax for the contents of an attribute variable:



where `tv` is the *type value* pair. Multiple pairs of the same type in one attribute variable are allowed. The last pair is accepted and the previous pairs are ignored.

The values for *type value* are as follows:

tv =
`type value`

A =
Alarm

AN No audible alarm

AY Audible alarm (beep) when panel is presented

Note: The alarm specification applies only to the attribute variable for the immediate message line ($CNMIMDL).

C =
Color

CB Blue

CD The default device color when a color value is not specified

CG Green

CP Pink

CR Red

CT Turquoise

CW White or neutral

CY Yellow

F =
Field

FA Protected; data cannot be entered on displayed panel; FA is the default

FI Unprotected; data can be entered on displayed panel

H =
Highlight

HB Flashing

HD The default extended highlighting when a highlighting value is not specified

HR Reverse video

HU Underscored

I =

Intensity

ID Dark, nondisplayable

IH High intensity

IN Normal intensity; the default when an intensity value is not specified

U =

Cursor

UN The cursor is not placed at the beginning of this field; UN is the default.

UY The cursor is placed at the beginning of this field. UY specifications for multiple variables cause the last variable specified to be accepted and the previous variables to be ignored.

Notes:

1. If you do not want the cursor to be associated with a particular variable, you can place the cursor in any row and column. Use the VIEWICROW and VIEWICCOL variables in the procedure that calls VIEW with the INPUT option. See "Full-Screen Input Capabilities" on page 50 for more information on the VIEWICROW and VIEWICCOL variables.
2. If you use the VIEWICROW and VIEWICCOL variables and also specify UY on an attribute variable, the cursor is positioned by the attribute variable.
3. If you do not use the VIEWICCOL and VIEWICROW variables or specify a cursor for any attribute variable on a panel, the cursor is placed at the beginning of the first input field.

Use one or more blanks to separate the *type value* pairs. The following is a NetView command list language example where &V1 is defined as a protected field with high intensity in red. &V2 is defined as a protected field in high intensity, in turquoise, with the cursor placed in the field.

```
&$V1 = 'FA IH    CR'
&$V2 = 'IN IH CT UY IH'
```

In the following REXX example, V1 is defined as an input variable (unprotected field) with no cursor. For V2, all the defaults are used.

```
$V1 = 'FI  UN'
$V2 = ' '
```

Attributes defined by attribute variables or attribute symbols apply until one of the following is encountered:

- The end of the line
- The explicit placement of an attribute symbol later in the line
- A variable later in the line that has one of the following:
  - A valid attribute variable that specifies new attributes
  - No valid attribute variable, but contains one or more attribute symbols.

Constants or variables defined on a panel can become part of an input field and are updated only when you type over some portion of the input field. When you enter data in an input field, the entire contents of the input field are assigned to the panel variable.

The first byte of a field defined by a panel variable (the &) is used for attribute specification, and is followed by the contents of the variable. If an attribute variable corresponds to a panel variable, it takes effect at this first byte even if the panel variable is not found (and is replaced by blanks).

Note: If an attribute variable contains a syntax error and the NetView log is active, message CNM944I is written to the log.

Displaying Variables in Source Panels

When the VIEW command attempts to resolve a variable name coded on the panel definition, it searches the following environments in the following order until it finds a defined variable that contains a value:

- Variables assigned in the command procedure
- Control variables (such as &OPID)
- Task global variables
- Common global variables

If a variable name specified on the panel is not defined to any of the previous environments, it is displayed as a string of blanks. Note that variables that are defined as control or global variables can also be assigned in the calling command procedure. The value assigned to it is displayed on the panel instead of the control or global variable value.

If the associated attribute variable is not defined, the substituted value of a variable is scanned for attribute symbols. The located attribute symbols are used in controlling color, highlighting, and data fields. If symbols are to be displayed as symbols and not used as attributes then code an associated attribute variable for the variables. This causes the symbols in the data to be treated as data instead of attribute variables.

When an attribute symbol is to be displayed as data, special rules must be followed. See “Displaying Special Attributes” on page 40 and “Attribute Variables” on page 40 for more information on these rules.

Note: If the XVAR option is not coded on the panel text indicator line, use only 1 to 11 alphanumeric characters (A–Z and 0–9) for the variable names in VIEW panel definitions. If the XVAR option is coded, variable names can be up to 31 characters long and contain periods. See “Compound Symbols” on page 45 for more information. Alphabetical characters must be in uppercase. Variable names also must conform to any other variable naming conventions set by the language invoking VIEW if the variable is to be referenced by that language. For example, variable names used in PL/I, C, and REXX must start with an alphabetical character.

Although global variables can be found and displayed using VIEW, they can also be referenced by the command procedure prior to running the VIEW command.

Global variables are defined by &TGLOBAL, &CGLOBAL, or GLOBALV in NetView command list language, GLOBALV in REXX, CNMVARS or GLOBALV in PL/I, or *Cnmvars* or *GLOBALV* in C.

Reference: Refer to *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* or *IBM Tivoli NetView for z/OS Programming: PL/I and C* for more information about global variables.

For the VIEW command to find local or attribute variables when invoked from a high-level language program, the variable must be set using CNMVARS in PL/I or *Cnmvars* in C.

A REXX user can update the values of global variables using the VIEW command as long as the following tasks are performed for the variable *varname* before starting VIEW:

1. Define the field used by the global variable on the VIEW panel as an input field using an attribute variable.
2. Issue a GLOBALV DEFT (or DEFC) *varname* command to define the global variable.
3. Ensure that *varname* is defined (having a non-null value) in the common or task global dictionary. Use GLOBALV PUTT (or PUTC) *varname* to store a value, if necessary.

If all the steps just listed are followed, the global variable *varname* is updated. Otherwise, the REXX local variable *varname* is displayed and updated. When VIEW accesses a global variable this way, any REXX local variable with the same name is also modified by VIEW. In order to access the new value for a global variable, the REXX user must issue a command such as GLOBALV GETT (or GETC) to get a local copy of the value.

If you specify a NetView control variable (for example, APPLID or OPID) on a VIEW panel, and the field is defined as an input field, the updated value is only stored in the command procedure environment. Control variable values cannot be updated.

The following REXX example shows how you can use VIEW to update a global variable:

```
/*   */
'GLOBALV GETT XYZ'
IF LENGTH(XYZ) = 0 THEN
 DO
   XYZ = '    '
   'GLOBALV PUTT XYZ'
 END
$XYZ = 'FI'
'VIEW NAME1 TESTPANL INPUT EXTEND'
SAY 'XYZ IS NOW' XYZ
EXIT
```

If the length of the value assigned to the variable exceeds the length of the variable in the source panel, and if the variable is followed by alphanumeric or special characters (such as !, ¢, \, ¦, @, #, $, %, ¬, &, ", +) on the panel definition, the value is truncated. When a variable is followed by characters other than these mentioned (such as a period or a dash), the characters are overwritten.

If the value assigned to the variable contains double-byte text, all the double-byte text must be within DBCS shift-out and shift-in characters. If the panel cannot

display all the double-byte text within a pair of DBCS shift-out and shift-in characters, VIEW displays all the text that fits and displays a period (.) to indicate a truncated character.

For example, if a variable named `&DBCSTEXT` is defined with a value of `NetView Help Menu` in Kanji, this value might be truncated because the field on the panel is too short, because the operator has scrolled the panel to the right or left, or because an application that uses VIEW has truncated data. For instance, the NetView WINDOW command uses VIEW to handle double-byte character truncation. Here is the hexadecimal representation of the double-byte Kanji characters, showing the text length:

```
....+....1....+....2....+....3..

04945494D4545444A4A4D444A4945450
E39363530343835323F373537373438F
```

If the panel definition allows fewer than 32 characters for the value of `&DBCSTEXT`, or if the operator scrolls the text so that fewer than 32 characters can be displayed on the panel, VIEW displays all characters that will fit. If VIEW can only display one-half of a double-byte character, it substitutes a period (.) for the displayable part of the character in the same way that BROWSE handles leading and trailing double-byte text truncation for netlogs. In this example, if the first two bytes were truncated, VIEW would substitute a shift-out (X'0E') for the non-displayable last half of the first double-byte character (X'4399'). If the first three bytes were truncated, VIEW would substitute a period and a shift-out character (X'4B0E') for the entire second double-byte character (X'4356').

If an operator tries to display a VIEW panel that does not have properly defined double-byte shift-out and shift-in pairs, a data stream that is not valid will be sent to the device, and unpredictable results, such as the operator being logged off, will occur. Examples of DBCS definitions in which the double-byte shift-out and shift-in characters are improperly matched:

- A greater number of shift-out or shift-in characters (not paired)
- One pair split between two or more variables
- One pair split between a variable and a panel definition
- One pair split across more than one line of a panel

Compound Symbols

A compound symbol contains at least one period and at least one other character. It cannot start with a digit or a period. If there is only one period, the period cannot be the last character.

The name begins with a STEM (part of the symbol up to and including the first period), which is followed by PARTs of the name (delimited by periods) that are constant symbols, simple symbols, or null. A constant symbol starts with a digit (0–9) or a period. A simple symbol contains no periods and does not start with digits (0–9).

VIEW starts with a compound symbol coded in a panel. VIEW then creates a derived variable name by replacing PARTs with their values. VIEW then requests the value of the derived variable for display in the panel.

This example is a small extract from a REXX program:

```
a=3                  /* assigns '3' to the variable 'A'*/
b=4                     /* '4'      to  'B'            */
c='Fred'                /* 'Fred'   to  'C'            */
a.b='Fred'              /* 'Fred'   to  'A.4'          */
a.fred=5                /* '5'      to  'A.FRED'       */
a.c='Bill'              /* 'Bill'   to  'A.Fred'       */
c.c=a.fred              /* '5'      to  'C.Fred'       */
x.a.b='Annie'           /* 'Annie'  to  'X.3.4'        */
d=''                    /* ''       to  'D'            */
e='4'                   /* '4'      to  'E'            */
x.d.e='Annie'           /* 'Annie'  to  'X..4'         */
say  a    b    c    a.a    a.b    a.c    c.a    a.fred   x.a.4   x.d.4
/*                                                                 */
/* Rexx will display the following values:                         */
/*   3    4    Fred A.3    Fred   Bill   C.3    5        Annie   Annie*/
/* If these same variables are displayed on a View panel           */
/* (preceded by '&' and in upper case) and if the View panel       */
/* definition includes the XVAR option, View displays the following   */
/* values:                                                         */
/*   3    4    Fred        Fred   5             5        Annie        */
```

Figure 6. Example of a REXX Program Requesting Values of Variables for a VIEW

Implementation Maximum

All HLL and REXX variables are restricted to 31 characters when the panel text indicator has the XVAR option; otherwise, the limit is 11. NetView command list language does not support compound variables or variable names longer than 11 characters. It is important to note the differences between the way REXX displays the string and the way VIEW displays the string.

Usage Notes

1. VIEW does not support mixed case symbols defined in REXX. For example, `a.c` in Figure 6 is displayed as 5 in VIEW, but REXX will display it as Bill.
2. VIEW displays blanks for the value of the compound variable if the final value is undefined, null, or not valid.

   In Figure 6 `a.a, c.a, and x.d.4` are displayed as blanks in VIEW.
3. VIEW does not distinguish unknown compound variable PARTs from those with null values. When a PART is null or unknown, its NAME is used in building the compound variable name. In Figure 6, VIEW searches for `&X.D.4, not &X..4`, and thus cannot find Annie.
4. Enter *** **XVAR** in the text indicator section of your panel definition in order to use compound variables. See Text Indicator for more information.

Issuing Commands from Command Procedures

When a command is issued directly from a command procedure, the procedure is suspended until that command completes. When the called command is complete and the return code is available, the procedure resumes. If the called command is a long-running command, it and the calling procedure form a group that is treated as a unit by the NetView ROLL command (roll group).

Note: The BGNSESS FLSCN command is an exception because it allows a calling procedure to complete before the session begins by using the MINOR option of DSIPUSH. Refer to *IBM Tivoli NetView for z/OS Programming: Assembler* for information about DSIPUSH.

Grouping commands and procedures is beneficial if the intent is to build a hierarchy of related panels, using different procedures to build each one. You should not group commands and procedures when running unrelated commands, such as those received from an operator.

To disassociate an unrelated command from the calling procedure, use the CMD command. To illustrate this, assume that the variable *cmdline* contains an operator's command that was entered on your panel. You can queue the *cmdline* command asynchronously by issuing one of the following in your REXX command procedure:

```
'CMD HIGH ' cmdline
'CMD LOW ' cmdline
```

The HIGH or LOW parameter of the CMD command indicates the priority at which the command should be queued.

Note: Issuing the CMD command with the HIGH parameter usually interrupts other processing, allowing the queued command to run.

For example, suppose an operator enters the STATMON command on the command line of your panel. By using the CMD command, you can queue the STATMON command rather than calling it directly. This allows the operator to roll back to your command procedure from STATMON, even though STATMON is not complete. Refer to *IBM Tivoli NetView for z/OS Programming: Assembler* for more information about the ROLL function and the NetView online help for more information about the CMD command.

Queuing, rather than calling a command, protects your procedure from any reset condition the queued command encounters.

Creating a Rollable Component with VIEW

A NetView component is a command or command procedure that controls the terminal's screen, provides for operator entry of arbitrary NetView commands, and is capable of resuming when such commands are complete. In a command procedure, you can create a rollable component using VIEW to provide the necessary screen control.

If you specify the NOINPUT option, VIEW handles the operator command interface for you. If you specify the INPUT option on your VIEW command, VIEW returns the operator input to your procedure in the form of named variables, one or more of which might be treated as a command.

The commands contained in these variables must be in uppercase for the NetView program. PL/I and C command procedures should verify that these command strings are in uppercase before issuing CNMCMD. The NetView command list language provides the UPPER command for translating the contents of a variable to uppercase. REXX command lists can use the UPPER instruction to ensure that commands are in uppercase.

Using the UPPER Command

Use the UPPER command to change the contents of the specified variables to uppercase.

The format of the UPPER command is:

UPPER

Where:

variable
Specifies the 1- to 11-character name of the variable to be translated to uppercase. The comma in the repeat separator indicates that you can optionally specify more than one variable name on an UPPER command.

Example:

```
UPPER CMDLINE
CMD HIGH &CMDLINE
```

Usage Notes

1. Do not specify the leading ampersand (&) in front of the variable name.
2. If you specify more than one variable, all variables are translated, even if one of the variables has an error condition (not found or the length is not valid).
3. The UPPER command is provided in the NetView command list language only. A similar function is available to REXX command lists with the REXX UPPER instruction.
4. The UPPER command should not be concatenated with other commands in a command string.

Return Codes: The return codes for this command are as follows:

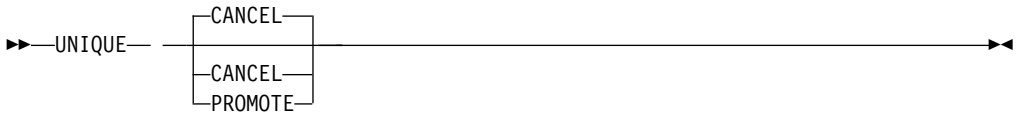
0	Successful completion of all specified variables
4	At least one variable not found, or at least one variable is not valid
8	At least one variable length not within range
12	At least one variable not found and at least one other variable length not within range
16	Not invoked from a command procedure
20	No variables specified

Using the UNIQUE Command

With the UNIQUE command, you can search the roll stack for a component that has a subcomponent with the same member name (for command lists and REXX) or module name (for PL/I and C) as the issuing command procedure. If such a component is found, the UNIQUE command allows only one of the two components to remain on the roll stack, either the issuing component or the older component.

The format of the UNIQUE command is:

UNIQUE



Where:

CANCEL
Specifies to reset (CANCEL) the roll group containing the matching element on the roll stack as the currently running component. CANCEL is the default. (The issuing component remains on the roll stack.)

PROMOTE
Specifies to position (PROMOTE) the roll group containing the matching element on the roll stack as the currently running component.

Usage Notes

1. The UNIQUE command is valid only when issued from a command list.
2. The NetView program allows an operator to start many copies of the same command processor. You might not want more than one copy, as when creating a NetView component. By using DSIPOP or DSIPUSH with the PROMOTE option, assembler programmers guarantee the uniqueness of long-running commands. Using the UNIQUE command guarantees uniqueness in a command procedure.
3. Issuing UNIQUE from your procedure has no effect (and gives a return code of 0) if the current copy of the procedure is the only one active. An *active* long-running command or procedure is one that is in any stage of its processing but is not yet complete. Active procedures include procedures that are suspended (blocked) by some other long-running command. If another copy of the same procedure exists under the same task, the UNIQUE command affects the entire roll group that includes that copy.
4. When you use UNIQUE with the CANCEL option (the default format), the calling procedure is temporarily suspended while the older copy is given control with a reset condition. The NetView program suppresses the cancellation messages normally issued when a procedure is reset. When the canceled copy of the procedure and any others in its group complete, the issuing copy resumes with the next line after the UNIQUE command. The return code is set to 4.
5. Using the UNIQUE command with the PROMOTE option moves the previous copy of the calling procedure and its roll group to the top of the roll stack, ready to resume when the copy issuing UNIQUE completes. The return code is set to 4. The procedure invoking UNIQUE should exit to allow the promoted procedure to regain control. An exit code -5 is used to let the caller know that it can now regain control.
6. When you use UNIQUE in NetView command list language, code a suppression character (&SUPPCHAR) to suppress unwanted command echoes that occur when the command has an error. Code SIGNAL ON HALT in your REXX procedures to suppress the REXX cancellation message. The HALT subroutine should return a -5 return code. When you code SIGNAL ON ERROR in your REXX procedures, a return code of 4 signals the error label.

7. No special processing is required for the ROLL command. It is issued in the same way as other NetView commands. To be consistent with other NetView applications, set PF6 and PF18 to issue the ROLL command.
8. Parameter synonyms are supported.
9. Parameter authorization restrictions are not appropriate for the UNIQUE command.
10. Upon cancellation of a component, REXX, PL/I, and C command procedures can perform a cleanup.

Return Codes: The return codes for this command are as follows:

0 The calling procedure is unique.

4 A matching procedure was found. Action successful.

12 Environment is not valid (not called from a procedure).

16 Syntax error, argument is not valid.

Full-Screen Input Capabilities

The VIEW command can receive the following values from the calling procedure:
- The cursor row position
- The cursor column position

You specify this information with the INPUT keyword and by coding VIEWICROW and VIEWICCOL in the calling procedure. When the panel is displayed, the cursor is positioned at the location specified by VIEWICROW and VIEWICCOL. If you used an attribute variable to associate the cursor with a variable, that overrides cursor positioning by VIEWICROW and VIEWICCOL. Table 13 on page 51 describes these two variables.

The VIEW command allows the following to be returned to the invoking procedure:
- The contents of multiple input-capable variables on a panel
- The attention identifier (AID) information
- The cursor location
- The number of panel rows put out by the VIEW command
- The number of panel columns put out by the VIEW command

You specify this information with the INPUT keyword and by coding an attribute variable with the FI *type value* pair.

When you use the INPUT option, an input field is available only if you defined an attribute variable specifying FI. (See "Attribute Variables" on page 40 for information on the *type value* pair.)

When the panel is displayed, it contains the variable values that you can modify by typing over them. The modified variables are returned to the invoking procedure when you press the AID key. Table 14 on page 51 describes the AID key and the variables that are set on return to the calling command procedure.

Table 13. Variables Specified in the Calling Command Procedure

REXX, PL/I, and C	NetView Command List Language	Description
VIEWICCOL	&VIEWICCOL	The cursor location (column) set by the command procedure that calls VIEW. Use this variable with VIEWICROW to position the cursor any place on the panel. An acceptable value is a positive or negative integer less than or equal to the number of columns on the panel. A positive integer positions the cursor relative to the left side; a negative integer, relative to the right side. If you specify an integer greater than the number of columns on the panel, the cursor is placed at the beginning of the first input field. See Figure 7.
VIEWICROW	&VIEWICROW	The cursor location (row) set by the command procedure that calls VIEW. Use this variable with VIEWICCOL to position the cursor any place on the panel. An acceptable value is a positive or negative integer less than or equal to the number of rows on the panel. A positive integer positions the cursor relative to the top; a negative integer, relative to the bottom. If you specify an integer greater than the number of rows on the panel, the cursor is placed at the beginning of the first input field. See Figure 7.

Assume a panel 80 x 24, and the calling procedure specifies:

```
VIEWICCOL = 2
VIEWICROW = 2
```

The cursor is placed in the second column from the left, second row from the top.

```
VIEWICCOL = -2
VIEWICROW = -2
```

The cursor is placed in the second column from the right, second row from the bottom.

```
VIEWICCOL = 82
VIEWICROW = 22
```

The cursor is placed at the beginning of the first input field because one of the variables specifies a value that is greater than the panel size.

Figure 7. VIEWICCOL and VIEWICROW Examples.

VIEWICCOL and VIEWICROW Examples

Table 14. Variables Set on Return to Calling Command Procedure

REXX, PL/I, and C	NetView Command List Language	Description
VIEWAID	&VIEWAID	The AID key used to enter the input.

Table 14. Variables Set on Return to Calling Command Procedure (continued)

REXX, PL/I, and C	NetView Command List Language	Description
VIEWCURCOL	&VIEWCURCOL	The cursor location (column) when the AID key is pressed.
VIEWCURROW	&VIEWCURROW	The cursor location (row) when the AID key is pressed.
VIEWCOLS	&VIEWCOLS	The number of columns output by the VIEW command. The default number will be 80 if neither WIDE nor OPTROW is coded on the panel text indicator line, or if the terminal only supports 80 columns. Otherwise, VIEWCOLS is set to the number of columns supported by the terminal. See Chapter 4, "Modifying and Creating Online Help Information," on page 65 for more information.
VIEWROWS	&VIEWROWS	The number of rows (lines) of the given panel that were output by the VIEW command, which is determined by the number of regular data lines in the source panel, the number of optional data lines in the source panel, and the number of rows available on the output terminal. See Chapter 4, "Modifying and Creating Online Help Information," on page 65 for more information.

The contents of the VIEWAID variable are defined as PF1 through PF24, PA1, PA2, PA3, or the ENTER key.

If you press PA1, PA2, or PA3, only the AID (VIEWAID) information is returned to the invoking procedure. The cursor row, column locations, and any input fields defined on a panel are not returned.

Note: If you press the ATTN key on an SNA terminal, VIEW with INPUT/NOINPUT ends.

Figures Figure 8 on page 53 through Figure 11 on page 56 illustrate source panels using VIEW with the INPUT option to create a rollable component. Figure 8 on page 53 and Figure 9 on page 53 show the source panels containing input-capable variables to be replaced. These panels use attributes from attribute set 2 (see Table 12 on page 39).

```
/*********************************************************************/
/*  FIRST PANEL DISPLAYED                                            */
/*********************************************************************/
*** AT2
+PANEL1
$ X=================================================================X
$ |                                                                 |
$ |                                                                 |
$ |%     PPPPPPP    AAAAAAA   NN    NN  EEEEEEEE  LL          111   $ |
$ |%     PP    PP  AA     AA  NNN   NN  EE        LL        11 11   $ |
$ |%     PPPPPPPP  AAAAAAAAA  NN NN NN  EEEEEEE  LL          11   $ |
$ |%     PP        AA     AA  NN   NNN  EE        LL          11   $ |
$ |%     PP        AA     AA  NN    NN  EEEEEEEE  LLLLLLLL  11111111$ |
$ |-----------------------------------------------------------------|
$ |  INPUT VARIABLE 1 = &VARIN1                                    $|
$ |  INPUT VARIABLE 2 = &VARIN2                                    $|
$ |                                                                 |
$ |  You entered:  &VAROUT1                                         |
$ |  You also entered:  &VAROUT2                                    |
$ X=================================================================X
$
$Enter a command on the command line OR...
$Enter NEXT or press PF8 to view the next panel.
$
%Action==> &COMMAND                                                %
$                          PF2= End
$          PF6/PF18= Roll     PF8=Next
```

Figure 8. Source for First Panel with Input-Capable Variables and Command Line.

Source for First Panel with Input-Capable Variables and Command Line

```
/*********************************************************************/
/*  SECOND PANEL DISPLAYED                                           */
/*********************************************************************/
*** AT2
+PANEL2
$ X=================================================================X
$ |                                                                 |
$ |                                                                 |
$ |%     PPPPPPP    AAAAAAA   NN    NN  EEEEEEEE  LL        22222222 $ |
$ |%     PP    PP  AA     AA  NNN   NN  EE        LL              22 $ |
$ |%     PPPPPPPP  AAAAAAAAA  NN NN NN  EEEEEEE  LL        22222222 $ |
$ |%     PP        AA     AA  NN   NNN  EE        LL        22       $ |
$ |%     PP        AA     AA  NN    NN  EEEEEEEE  LLLLLLLL  22222222 $ |
$ |                                                                 |
$ |-----------------------------------------------------------------|
$ |                                                                 |
$ |                                                                 |
$ |                                                                 |
$ |                                                                 |
$ |                                                                 |
$ X=================================================================X
$
$Enter a command on the command line OR...
$Enter BACK or press PF7 to view the previous panel.
$
%Action==> &COMMAND                                                %
$                          PF2= End
$          PF6/PF18= Roll     PF7= Previous
```

Figure 9. Source for Second Panel with Command Line Only.

Source for Second Panel with Command Line Only

"Example of a REXX Command List that Drives a Rollable Component" on page 54 is an example of a REXX command list that invokes VIEW with the INPUT option to display PANEL1. The command list assigns initial values to the VARIN1

and VARIN2 input-capable variables in the source panel. The command list also returns the AID information and command line input to the caller.

Example of a REXX Command List that Drives a Rollable Component

```
/*****************************************************************************/
/*  EXAMPLE:  NETVIEW COMPONENT USING THE VIEW COMMAND                       */
/*****************************************************************************/
SIGNAL ON HALT
/*****************************************************************************/
/*  RESUME OLD COPY IF ONE EXISTS                                            */
/*****************************************************************************/
 'UNIQUE PROMOTE'
 if rc = 4 then EXIT -5               /* -5 will cancel caller if it exists */
SIGNAL ON ERROR             /* any nonzero rc other than as a result of the */
 /* UNIQUE command is an error                    */
/*****************************************************************************/
/* set up VAR1 and VAR2 as input capable fields                              */
/*****************************************************************************/
$VARIN1 = 'FI IN CR HB UN'
$VARIN2 = 'FI IH CG HR UN'
/*****************************************************************************/
/* set up COMMAND as an input command line using an attribute                */
/* variable.  Also define the cursor to stop at this field.                  */
/*****************************************************************************/
$COMMAND = 'FI UY'
  VARIN1 = 'INITIALIZE 1'
  VARIN2 = 'INITIALIZE 2'
Do forever
  COMMAND = '00'X                        /* COMMAND = nullchar (this clears */
                                         /* the command line and provides   */
                                         /* for insert capability)          */
  'VIEW USERAPPL PANEL1 INPUT'
  UPPER COMMAND
  VAROUT1 = VARIN1
  VAROUT2 = VARIN2
  SELECT
    When viewaid = 'PF2' then exit                    /* Quit if PF2       */
    When viewaid = 'PF6' then CMD HIGH ROLL           /* Roll if PF6       */
    When viewaid = 'PF8' then call PANEL2             /* Next panel if PF8 */
    When viewaid = 'ENTER' then
        SELECT
          when command = NEXT then call PANEL2
          /*******************************************************************/
          /*         Assume any other input given on command line is         */
          /*         to be issued to NCCF                                    */
          /*******************************************************************/
          when COMMAND ¬= ' ' then
               DO
                'CMD HIGH' COMMAND
               END
          otherwise nop
        END
    OTHERWISE nop
  End                                                          /* select */
End                                                         /* Do forever  */
PANEL2:
Do forever
  COMMAND = '00'X                        /* COMMAND = nullchar (this clears */
                                         /* the command line and provides   */
                                         /* for insert capability)          */
  'VIEW USERAPPL PANEL2 INPUT'
  UPPER COMMAND
  SELECT
    When viewaid = 'PF2' then exit                    /* Quit if PF2       */
```

```
    When viewaid = 'PF7' then return                    /* Previous panel PF7*/
    When viewaid = 'PF6' then 'CMD HIGH ROLL     '            /* Roll if PF6 */
    When viewaid = 'ENTER' then
        SELECT
          When COMMAND = 'BACK' then return
          /*****************************************************************/
          /*          Assume any other input given on command line is      */
          /*          to be issued to NCCF                                 */
          /*****************************************************************/
          when COMMAND ¬= ' ' then
               DO
                'CMD HIGH' COMMAND
               END
          otherwise nop
        END
    OTHERWISE nop
  End    /* select */
End   /* Do forever  */
RETURN
ERROR:
 EXIT -1                     /*  -1 means "FATAL ERROR IN NESTED PROCEDURE" */
HALT:
 EXIT -5                     /*  -5 means "CANCEL REQUESTED"                */
```

Figure 10 on page 56 is an example of the first panel created from this command list. See Figure 8 on page 53 for the source for this panel. The variables VARIN1 and VARIN2 are replaced with the actual values INITIALIZE 1 and INITIALIZE 2, respectively. The attribute specification is defined by $VARIN1 and $VARIN2 (see "Attribute Variables" on page 40 for more information).

The following attributes are for VARIN1 where the length of the input field continues until the next attribute symbol is encountered. In this case, the attribute symbol is %.

VARIN1 attributes are as follows:
- Input, tab (unprotected)
- Normal intensity
- Red
- Flashing
- No cursor position

The following attributes are for VARIN2 where the length of the input field continues until the end of the line.

VARIN2 attributes are:
- Input, tab (unprotected)
- High intensity
- Green
- Reverse video
- No cursor position

COMMAND attributes are:
- Input, tab (unprotected)
- Position the cursor at the beginning of this field

```
PANEL1
 X=====================================================================X
 |                                                                     |
 |                                                                     |
 |      PPPPPPP    AAAAAAA   NN    NN  EEEEEEEE  LL          111      |
 |      PP    PP  AA     AA  NNN   NN  EE        LL        11 11      |
 |      PPPPPPPP  AAAAAAAAA  NN NN NN  EEEEEEE  LL          11       |
 |      PP        AA     AA  NN   NNN  EE        LL          11       |
 |      PP        AA     AA  NN    NN  EEEEEEEE  LLLLLLLL  11111111   |
 |---------------------------------------------------------------------|
 |  INPUT VARIABLE 1 = INITIALIZE 1                                    |
 |  INPUT VARIABLE 2 = INITIALIZE 2                                    |
 |                                                                     |
 |  You entered:                                                       |
 |  You also entered:                                                  |
 X=====================================================================X

Enter a command on the command line OR...
Enter NEXT or press PF8 to view the next panel.

Action==> _
                          PF2= End
          PF6/PF18= Roll     PF8=Next
```

Figure 10. Display Panel of Component with Variables Replaced by REXX Command List.

Display Panel of Component with Variables Replaced by REXX Command List

Figure 11 shows a second display panel from the command list. See Figure 9 on page 53 for the source for this panel.

```
PANEL2
 X=====================================================================X
 |                                                                     |
 |                                                                     |
 |      PPPPPPP    AAAAAAA   NN    NN  EEEEEEEE  LL        22222222   |
 |      PP    PP  AA     AA  NNN   NN  EE        LL              22   |
 |      PPPPPPPP  AAAAAAAAA  NN NN NN  EEEEEEE  LL        22222222   |
 |      PP        AA     AA  NN   NNN  EE        LL        22         |
 |      PP        AA     AA  NN    NN  EEEEEEEE  LLLLLLLL  22222222   |
 |                                                                     |
 |---------------------------------------------------------------------|
 |                                                                     |
 |                                                                     |
 |                                                                     |
 |                                                                     |
 |                                                                     |
 X=====================================================================X

Enter a command on the command line OR...
Enter BACK or press PF7 to view the previous panel.

Action==> _
                          PF2= End
          PF6/PF18= Roll     PF7= Previous
```

Figure 11. Display Panel of Component.

Display Panel of Component

Returning Command Line Input

When you specify NOINPUT for the NetView program to start processing at the command line, you should define a tilde (~) on the panel to be displayed.

The tilde definition defines an input field that is returned to the NetView program as a command. An &CUR coded after the tilde on the same line determines where the cursor is positioned.

The &CUR is useful for predefining a partial command. For example:

```
~ V NET,ACT,ID=&CUR
```

coded on a panel displays:

```
V NET,ACT,ID=_
```

with the remaining ID to be completed by the operator.

If more than one is defined on the panel, the last &CUR is processed and previous ones are ignored. If more than one tilde (~) is defined on the panel, the first tilde is processed and any subsequent ones are changed to a percent (%) sign.

If you specify INPUT for the NetView program, code the command line as you would code any other input-capable field. Do not use the &CUR and tilde definitions. The procedure that displays the panel issues the commands. See "Issuing Commands from Command Procedures" on page 46 for information on issuing CMD HIGH.

Using PF Keys and Subcommands with VIEW

PF keys and VIEW subcommands are treated differently with the two view options, INPUT and NOINPUT. The following two sections explain the differences.

Using PF Keys and Subcommands with the NOINPUT Option

When you use VIEW with the NOINPUT option, you can define your PF keys using the PFKDEF command. The values you assign can be NetView commands, or VIEW subcommands. The following is a list of the VIEW subcommands; some have the same name as similar NetView commands:

Help Displays the help panel previously coded:

```
HELP=helppan
```

End Exits to the originating component.

Return
Returns to the last panel from which a selection was made.

Top Returns to the first page of a multipage panel.

Bottom
Goes to the last page of a multipage panel.

Backward
Returns to the previous page of a multipage panel.

In addition to assigning the Backward subcommand to a PF key, you can also enter the following command on the command line to scroll backward a specific number of pages:

B *n* Scrolls backwards *n* number of pages or panels.

Forward
Goes to the next page of a multipage panel.

In addition to assigning the Forward subcommand to a PF key, you can also enter the following command on the command line to scroll forward a specific number of pages:

F *n* Scrolls forward *n* number of pages or panels.

Entry Point
Shows the panel that the operator first saw upon entry to help.

Reference: Refer to the PFKDEF command in the *IBM Tivoli NetView for z/OS Administration Reference* for more information.

Using PF Keys and Subcommands with the INPUT Option

When you use VIEW with the INPUT option, you can use settable PF keys defined using the PFKDEF command or you can interpret PF keys in your command list. You need to code the panel definition and parameters differently depending on the option you select.

Using Settable PF Keys

To use settable PF keys with VIEW, complete each of the following steps:

1. In the panel definition, create a variable named CNMIMDL that has no attribute-variable ($CNMIMDL) which makes it an input field. Define the immediate message line by putting &CNMIMDL in column 1 of the line. Do not put anything else on that line.

   If the VIEW application has not provided a value for CNMIMDL, VIEW searches the global dictionaries (task, then common) for a variable named CNMIM*xxx*, where *xxx* is the application name provided when VIEW was invoked. If this variable is not found, VIEW searches for CNMIMVIEW in the same dictionaries. This is similar to the way keys are set for VIEW applications. Finally, if none of these variables are present, the text from message BNH257I is used.
2. In the panel definition, create a variable named CNMCMDL that does have an attribute-variable ($CNMCMDL) which makes it an input field. CNMCMDL defines the command area.
3. Optionally, create another variable named CNMDIMD to define a default immediate message. This message is displayed by the NetView program whenever the CNMIMDL message has been displayed and there are no other immediate messages. If you do not create CNMDIMD, the NetView program defaults it the same way it defaults CNMIMDL.

All these variables support attribute ($) variables.

For example, you might call VIEW with an error message in CNMIMDL and a default message in CNMDIMD, with $CNMIMDL set to CR and $CNMDIMD set to CG. The error message will be displayed in red, but if the user presses a RETRIEVE key or delay-type key, for example, the red message is replaced by the default message, in green.

The REXX command WINDOW is a good example of coding VIEW panels to set PF keys. Enter BROWSE WINDOW to see the REXX source for this command.

Notes:

1. VIEW-input applications that do steps 1 and 2 always have their VIEWAID variable set to ENTER after invoking VIEW, because other keys are converted as if the user typed the command text and pressed ENTER.

2. The &CNMIMDL variable is nulled out when control is returned to the command list from VIEW, if VIEW detected that the immediate message area was overwritten by the NetView program after the VIEW panel was output (for example, by an immediate command entered by the operator).
3. The special variables CNMIMDL and CNMDIMD are supported in VIEW-noinput as well as VIEW-input. CNMCMDL only has special meaning in VIEW-input.

Dynamic Update Capabilities

Use the VIEW command to dynamically update the contents of the panel being displayed. The updates can be controlled by:

- **The calling procedure**

  When using EXTEND mode, if VIEW detects that a message TRAP is satisfied, VIEW returns control to the calling procedure to allow the update of local variable values displayed on the VIEW panel. VIEW refreshes the display with the new values when control is returned to VIEW using the RESUME command.
- **Any automation or procedure running on the same task**

  If the variables named on your VIEW panel are not defined by the calling procedure, VIEW attempts to read values from task global variables. For more information, refer to the online help for the GLOBALV command and the PIPE VAR stage. Values of task global variables can be updated by any procedure called on the same task (same operator ID) and VIEW immediately refreshes the display when the procedure completes.
- **Any procedure in the NetView program**

  If the variables named on your VIEW panel are not defined by the calling procedure and do not exist as task global variables, VIEW attempts to read values from common global variables. For more information, refer to the online help for the GLOBALV command and the PIPE VAR stage. Any procedure in the NetView program can update the values of common global variables; however, VIEW refreshes the display only when an event (such as receipt of a message) occurs at the task that started VIEW.

While a panel is displayed, automation from timers, messages, or alerts can drive command procedures that update some of the variables substituted into the displayed panel. Any processing under the OST where the panel is displayed causes a dynamic update of the panel with new values for any variables that have changed.

To make information on the panel easier to see, and make it easier to enter information on the panel while a panel is dynamically updated, assign values to attribute variables for all variables on the panel that can be changed dynamically. This enables VIEW to send only the updated information to the screen without rewriting the entire screen for each update.

When VIEW detects certain changes to common, task, and local variables or their associated attribute variables, VIEW must rewrite the entire panel.

If the entire screen is redisplayed, changes typed by the operator on the screen being redisplayed are lost. Following is a list of these changes:

- The attribute variable for a given data variable has changed to indicate that a field has been changed from protected to unprotected or vice versa.
- An attribute variable for a given data variable now has a valid value. It either did not exist or it had a value that is not valid.

- An attribute variable for a given data variable now has no value or a value that is not valid. It previously had a valid value.
- The value for a data variable has changed, and a valid attribute variable is not associated with the data variable.

To continue processing of the VIEW command after variables used by the displayed panel are updated, use the RESUME command.

Sample of Panel Updating

The following figures show the dynamic updates of the contents of a panel.

"Example of a REXX Command List to Update a Panel" is an example of a command list called RESDYN which is shipped as part of sample CNMS1101. RESDYN uses the RESOURCE command output as data to be displayed in a panel using the VIEW command. The displayed data is updated on a time interval that you specify when calling the command list. The default time interval is 10 seconds. Note that this example of the VIEW issued for the RESDYN function (option 12) uses the EXTEND parameter in order to make use of the NetView for z/OS Version 5 Release 1 extended functionality.

Example of a REXX Command List to Update a Panel

```
/* -------------- Dynamic Resource Display (option 12) -------------- */
/*  A demonstration of using VIEW and TRAP to dynamically update a    */
/*  full screen display.  We use the SPILL option of pipe's KEEP      */
/*  (new for V5) to create a message after the specified refresh      */
/*  interval.  This message is TRAPped, causing VIEW to return        */
/*  control to this procedure WITHOUT removing the displayed panel.   */
/*  The 'RESUME', below is a REINVOCATION of the original VIEW!!!     */
/*                                                                    */
/*  Note that the first call to "fillVars" passes an extra little     */
/*  bit of pipe to the subroutine. The purpose is to get the first    */
/*  word of the second data line (STC name) for the panel.            */
/*                                                                    */
/* ------------------------------------------------------------------ */
resdyn:
  interval = 10              /* refresh at 10 second intervals              */
  privMsgID  = 'CNMRESDYN'   /* special purpose "msgid" for trapping        */
  getSTC = '% STC:|DROP 1|TAKE 1|EDIT W1|VAR JBN'
  Call fillVars getSTC       /* set local variables with data from RESOURCE */
  'TRAP AND SUPPRESS MESSAGES' privMsgID   /* TRAP our special message      */
  'PIPE VAR privMsgID | KEEP RESDYN' interval 'SPILL'  /* make msg later    */
  'VIEW RESDYN CNMSRESP EXTEND'
  DO WHILE (rc = 2)          /* RC indicates "message trapped"?             */
    'MSGREAD'                /* just getting msg off trap queue  */
    CALL fillVars
    'PIPE VAR privMsgID | KEEP RESDYN' interval 'SPILL'  /* make msg later  */
    'RESUME'                 /* Invoke VIEW, previously suspended           */
     /* NOTE: RC, at this point, is RC from VIEW, which was resumed.        */
  END
 'pipe hole | keep resdyn'    /* empty safe created above           */

return
/* ----------- Obtain data for RESDYN display (option 12) ----------- */
/*   Notice that the stem variable "out." is in our local variable    */
/*   dictionary.  VIEW could always read these value;                 */
/*   we will have an opportunity to update them while VIEW is active. */
/*   ---------------------------------------------------------------  */
fillVars:
  ARG xtraStg                       /* use extra first time only     */
  'PIPE (NAME RESDYN END %)',
  '| NETVIEW RESOURCE',
```

```
  '| SEPARATE DATA',                 /* No use for DSI386I title line */
  '| STC: FANOUT',                   /* MAYBE need extra copies       */
  '| EDIT SKIPTO /=/ 2.* STRIPL 1 ',
  '| COLOR WHITE',
  '| $STEM OUT.',
  xtraStg
  TM = date() time()
  $TM = 'CB HR'
return
```

Figure 12 is an example of the output from the RESDYN command list.

```
CNMSRESP NetView Resource Utilization      5 Sep 2011 15:26:41


         TOTAL CPU PERCENTAGE    =   100.00
         T510EENV CPU PERCENTAGE =   33.62
         T510EENV CPU TIME USED  =   41,175.45 SEC.
         REAL STORAGE IN USE     =   23360K
         PRIVATE ALLOCATED < 16M =   752K
         PRIVATE ALLOCATED > 16M =   23180K
         PRIVATE REGION < 16M    =   7144K
         PRIVATE REGION > 16M    =   65536K



TO SEE YOUR KEY SETTINGS, ENTER 'DISPFK'
CMD ==>
```

Figure 12. RESDYN Command List Output Example

Figure 13 is the source panel text that displays the previous panel (Figure 12).

VIEW manages the PF keys and the command line without the intervention of the RESDYN command list.

```
*** AT2 XVAR SFD
+CNMSRESP NetView Resource Utilization +    &TM
$
$
$        TOTAL CPU PERCENTAGE    =  &OUT.1
$        &JBN     CPU PERCENTAGE =  &OUT.2
$        &JBN     CPU TIME USED  =  &OUT.3
$        REAL STORAGE IN USE     =  &OUT.4
$        PRIVATE ALLOCATED < 16M =  &OUT.5
$        PRIVATE ALLOCATED > 16M =  &OUT.6
$        PRIVATE REGION < 16M    =  &OUT.7
$        PRIVATE REGION > 16M    =  &OUT.8
$
$
$
$
$
$
$
$     $Display is updated approximately every 10 seconds.
&CNMIMDL
%CMD==>~&CUR
```

Figure 13. CNMSRESP Source Panel Text

Changing Colors in Browse

The template shown in "BROWSE Command Panel Definition Showing Color Attributes" is used when browsing members of a partitioned data set. Note the various applications of the color attributes shown in Table 11 on page 39 and Table 12 on page 39. The characters %, $, ¬, and + each assign a specific color to the screen area immediately following their positions. To change a color area on the screen, you need only change the color attribute. You can change only existing attribute fields; changing any other field can result in errors when browsing.

BROWSE Command Panel Definition Showing Color Attributes

```
/*******************************************************************************
/*  BROWSE Command Panel for displaying member data                            *
/*******************************************************************************
*** WIDE OPTROW=(
%NETVIEW.BRWS ------ BROWSE &BMEMBER (&BDDNAME) --- LINE &BTOP TO &BBOT OF &BTOT
¬&BMESSAGE                                                      %&BSCL     &BSC +
&BCOL                                                                        $
&BDATALINE
&BDATALINE
&BDATALINE
&BDATALINE
&BDATALINE
&BDATALINE
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&BDATALINE
&BDATALINE
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```
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(&BDATALINE
(&BDATALINE
(&BDATALINE
(&BDATALINE
%CMD==>~&BCOMMAND                                                    $
&CNMIMDL
```

Chapter 4. Modifying and Creating Online Help Information

The NetView program contains a help facility, which has two types of help information.

The first type of help is ***view-based help***, which is displayed by using the VIEW command. The second type is ***window-based help***, which is displayed by using the WINDOW command.

This chapter explains how you can add, delete, or modify help information and is arranged in the sequence you use to accomplish this. The sequence follows:

1. Locate the help source file.
2. Copy and change the source file.
3. Store the copy.
4. Display the help to test your changes.

Locating Help Source Files

Source files define the panel contents that are displayed.

Help information is contained in a separate file and is shipped as a member in a partitioned data set (PDS). English help source files are stored in the NETVIEW.V6R2M0.CNMPNL1 data set.

Notes:

1. Japanese help source files are stored in the NETVIEW.V6R2M0.SCNMPNL2 data set.
2. Copies of the command and message help are stored on the web server. If you customize the command and message help in NetView data set members, you may want to make the same changes to the web server files.

Verify that your organization has not changed the library name.

Before you create a new help source, try to locate an existing online help that is similar to the one you want to create. Generally, when you have a help source file displayed, the file name is in the upper left corner.

For command help information, you can locate the source file you want to change by browsing the HELPMAP. Window-based help files are prefixed with the < character. See “HELPMAP Facility” on page 70 for more information on the HELPMAP. Help information for groups of messages is stored as members of the PDS, one member for each group. The member name is determined by truncating the message ID prior to the last numeric digit. For example, help for messages DSI001I and DSI002I is stored in member DSI00. Help for message EKGV68001I is stored in member EKGV6800.

If a message or command help panel is currently being displayed, you can use the SHOWDATA command to locate the source file. Figure 14 on page 66 displays the information returned after entering SHOWDATA on the command line.

Note: In Figure 14 on page 66, the following are true:

1. The panel is located in member EUYCLIST of the CNMPNL1 data set.
2. The !+! listed in the response from the SHOWDATA command is generated by special processing from the help search procedure and can be ignored.

```
CNMPNL1.EUYCLIST      HELP PIPE STAGES                      LINE 1 OF 41

  <         Read from a PDS member . . . . . . . . . . . . . <
  $STEM     Read and set stemmed variables and attributes. $1
  $VAR      Read and set variables and attributes  . . . . $2
  BETWEEN   Divide message streams into sections . . . . . B2
  CASEI     Compare character strings  . . . . . . . . . . C3
  CHANGE    Replace string occurrences . . . . . . . . . . C12
  CHOP      Truncate lines after string  . . . . . . . . . C14
  COLLECT   Create multiline messages  . . . . . . . . . . C31
  CONSOLE   Display messages in a pipeline . . . . . . . . C32
  CORRCMD   Process a command in a pipeline  . . . . . . . C33
  CORRWAIT  Allow asynchronous messages in a pipeline  . . C34
  CONSOLE   Display messages in a pipeline . . . . . . . . C59
  DROP      Drop messages from a pipe  . . . . . . . . . . D34
  ENVDATA   Output environment data  . . . . . . . . . . . E15
  EXPOSE    Exposes messages in a pipe . . . . . . . . . . E23
  FANIN     Read from multiple input streams . . . . . . . F1
  HELDMSG   Place held messages in a pipeline  . . . . . . H18
  HOLE      Discard messages or judge correlation  . . . . H34
  INTERPRT  Build stages from data . . . . . . . . . . . . I10
  JOINCONT  Joins consecutive messages . . . . . . . . . . J1
CNMPNL1.EUYCLIST, for !+! PIPE,STAGES PIPE,COMMANDS STAGES
CMD==> showdata
```

Figure 14. Example of Using the SHOWDATA Command to Locate Help Source Files

View-Based Help

The source file contents include the text of the displayed panel and the definition statements associated with the panel. A definition statement includes:

- A prologue
- The help panel name
- The continuation panel name
- A list of associated help panels

To view the source file for a View-based help panel, enter:

```
BROWSE CNMPNL1.panelid
```

Where *panelid* is the name that is displayed in the upper-left corner of the source for the help. For additional information, see "Creating Full-Screen Panels" on page 31.

Window-Based Help

Figure 15 on page 67 is an example of the source format of the Window-based help information. Descriptions of each numbered field follow the figure.

```
*** EUYRET    5697-B82 (C) Copyright IBM Corp. 2011      1
*             All Rights Reserved.
*  CHANGE ACTIVITY:
*
============== REPEAT RFIND      2
 REPEAT (BROWSE)      3

:H2. Syntax     4

 >>--REPEAT--><
:H2. IBM-Defined Synonyms

 +-----------------------------------+-----------------------------------+
 | Command or Operand                | Synonym                           |
 +-----------------------------------+-----------------------------------+
 | REPEAT                            | R or RFIND                        |
 +-----------------------------------+-----------------------------------+

:H2. Purpose of Command

 The REPEAT command reissues the last FIND command while you are browsing
 the network log or a member of a partitioned data set.  Since this
 command is sensitive to the current position of the cursor, it is
 normally entered using a PF key.

 By repeatedly pressing the PF key set to REPEAT, you can find successive
 occurrences of a specified character string.  After the first occurrence
 of a character string has been found, the REPEAT key will find the next
 occurrence.  After the last occurrence of a character string has been
 found, the REPEAT key can be used to continue the search, wrapping
 around from the bottom line to the top line (or from the top line to the
 bottom line if the FIND command included the PREV parameter.)
============== RETURN RET
 2
 RETURN (BROWSE, HELP, HELPDESK, NCCF, NLDM, NPDA, STATMON, TARA, VIEW)

:H2. Syntax

 >>--RETURN--><
:H2. IBM-Defined Synonyms

 +-----------------------------------+-----------------------------------+
 | Command or Operand                | Synonym                           |
 +-----------------------------------+-----------------------------------+
 | RETURN                            | RET (for BROWSE, HELP, HELPDESK,  |
 |                                   |     STATMON, and VIEW)            |
 |                                   |                                   |
 |                                   | R   (for NLDM, NPDA, and TARA)    |
 +-----------------------------------+-----------------------------------+

 Note:  The command facility has no synonym for RETURN.

:H2. Purpose of Command

 The RETURN command returns you to the previous component or the last
 selection panel that you used.

 You should not issue this command from a command list.
:H2. Restrictions

:
```

Figure 15. Example of Source for Message and Command Help Information.

Example of Source for Message and Command Help Information

1 Prologue
An optional section for programmer comments.

2 Message or Command
The message or command to which the text applies. If the help information

is for a command that can be used in more than one component, the command name is prefixed with the component name. Command names must be preceded by 14 equal (=) signs and a blank space.

3 Message or Command Help Title
The title of this help source file.

4 Tags
Information can be presented in different ways. These can include:

- :H2. is used to highlight command names.
- :XMP. and :EXMP. are used to surround examples.
- :IF DTYPE=PANEL followed by :ENDIF marks a section that is shown when HELP presents a full-screen display.
- :IF DTYPE=MSGS followed by :ENDIF marks a section that is shown when HELP presents a line mode display. This occurs when HELP is called at an autotask or when full-screen displays are otherwise unsupported.
- :LINK. is used to move from one topic to another. The :LINK. tag must be in uppercase and begin in column one; it precedes the display line to which it pertains. This line becomes a tab stop and is highlighted by WINDOW. If more than one line of text is to be highlighted for linking, the :LINK. tag must precede each line. See the example coding in Figure 16 on page 69.

  The operator makes a selection by placing the cursor on the line or by issuing a FIND command that selects the line. Optionally, you can designate a keyword that the operator can type to issue the command. The keyword is enclosed in parentheses immediately following the :LINK. tag.
- :CMD. is used to precede a command that can be executed immediately when that line is selected. The command line can contain variable text (for example, HELP *msgno*) that the operator can overlay with specific data, then press the ENTER key to execute the command. The :CMD. tag has an end tag, :ECMD., and must follow the line of command text. Both :CMD., and its end tag must be in uppercase and begin in column 1.

A portion of EUYSLIST is shown in Figure 16 on page 69 to show how the :IF DTYPE and :LINK. statements are coded.

```
:
============== COLLECT
COLLECT (NLDM,PIPE)

COLLECT is associated with more than one NetView component.

:IF DTYPE=PANEL
Select    To Get Information About
:LINK.(A)HELP NLDM COLLECT
 A        NLDM COLLECT  Use Session Monitor to collect response time data
:LINK.(B)HELP PIPE COLLECT
 B        PIPE COLLECT  A Pipe stage which collects messages in a pipe
:LINK.(C)HELP PIPE STEM
 C  If you use the COLLECT command following a STEM command, see the
:LINK.(C)HELP PIPE STEM
    description of the COLLECT operand of the STEM command.  Enter C.
:ENDIF
:IF DTYPE=MSGS
 Enter HELP NLDM COLLECT for help on the Session Monitor COLLECT command
 Enter HELP PIPE COLLECT for help on the COLLECT pipe stage
:ENDIF
:
:
```

Figure 16. Example of Using :IF DTYPE= and :LINK..

Example of Using :IF DTYPE= and :LINK.

Copying and Changing Help Source Files

Before you create a new help source file, try to locate an existing online help file that is similar to the one you want to create. See "Locating Help Source Files" on page 65.

If you find a comparable panel, copy it using a screen editor. Change the panel by typing over the existing text or by adding text. If you cannot find a similar online help file, use a screen editor to build a new one.

If you want to modify or create a help source file while the NetView program is running, define your panel data set without secondary extents. Otherwise, a panel can be filed in a new extent, requiring that you close and restart the NetView program to use the panel.

The conventions for structuring a new panel are the same as those for modifying an existing panel. All help source files must have a fixed-length blocked record format and a logical record length of 80 bytes (RECFM=FB, LRECL=80), unless you are using a fully qualified data set name listed in the HELPMAP. See "HELPMAP Facility" on page 70 for more information. Null characters are also counted within this 80-byte record. In addition, you might need to change a command list or another panel that is affected by your new panel.

You can customize the HELPDESK to include topics specific to your installation. The NetView program provides a template file, CNMHDSKU, that can be edited to create these topics.

1. Add the new topics to CNMHDSKU.
2. Add the new topic identifiers to the table of contents in file CNMHDSK0.

Note: If you want to customize any of the existing HELPDESK files (CNMHDSK1–CNMHDSK9), put the information in a separate file and use the %INCLUDE statement. Otherwise, that information will need to be added each release.

After creating or modifying a help file, store it in a data set concatenated to DDNAME CNMPNL1. As an alternative, you can also modify the panel with an SMP USERMOD. See "Storing Help Source Files" for more information.

Storing Help Source Files

Ensure that your panel names do not use the same prefixes used by the panel names that are supplied with the NetView program.

Store all help source files that you create or modify. Two methods for storing help files follow:

- Concatenate the user partitioned data set that contains the modified help file to the CNMPNL1 DD statement in the NetView startup procedure **before** the data set NETVIEW.V6R2M0.CNMPNL1. If the Support Center modifies the panel, those changes will not be added to your help file.
- Include your modified help file into a System Modification Program (SMP) USERMOD and apply the USERMOD so that SMP stores the modified panel in NETVIEW.V6R2M0.CNMPNL1. SMP automatically notifies you of any future changes that the Support Center makes to the panel you modified. For more information on how to use an SMP USERMOD, refer to the *System Modification Program* library.

Note:

1. The default data set for the Japanese version of the product is NETVIEW.V6R2M0.SCNMPNL2.
2. English help source files are stored in the NETVIEW.V6R2M0.CNMPNL1 data set. Verify that your organization has not changed the library name.

HELPMAP Facility

The HELP command scans the HELPMAP for the required command help member name using the arguments as search targets. HELP uses the arguments in the following manner:

- With no arguments

  When you enter HELP without supplying any arguments, you get component-level HELP for the component you are in.

  If the target arguments are not found in the table, HELP searches for a pair of parentheses () and uses the associated panel name.
- With one argument

  When one argument is supplied, HELP attempts to resolve the argument as a command synonym, if possible.
- With two or three arguments

  When two or three arguments are supplied, the search target is constructed by concatenating the arguments with commas. For example:

  ```
  ONE,TWO,THREE
  ```

HELPMAPU is a specific HELPMAP for user-defined help files created for commands. A %INCLUDE statement contained in HELPMAP embeds HELPMAPU that provides the mapping for those help files created by the user.

Note: Do not map user-defined help files to HELPMAP. These changes interfere when IBM applies maintenance to HELPMAP.

A portion of CNMHELPF is shown in Figure 17 to show how the help names are listed. Those that are prefixed with the < character are window-based help files; others are view-based help files.

```
*************************************************************************
*    5697-B82 (C) COPYRIGHT IBM CORPORATION 2011                        *
*     ALL RIGHTS RESERVED.                                              *
*    NAME(CNMHELPF)  SAMPLE(CNMHELPF)  RELATED-TO(HELPMAP)              *
*    DESCRIPTION: NETVIEW HELP MAPPINGS FOR                             *
*                 FULL BASE FUNCTION.                                   *
*                                                                       *
*************************************************************************
CNMKNEEW  ()
<EUYACQ   ACQ
<EUYACT   ACT
<EUYACION ACTION NPDA,ACTION
.
.
.
<EUYMENU  MENU NLDM,MENU NPDA,MENU TARA,MENU
<EUYMEAGE MESSAGE
<EUYMONIT MONIT STATMON,MONIT
<EUYMOOFF MONOFF STATMON,MONOFF
<EUYMONON MONON STATMON,MONON
<EUYMRENT MRECENT MR NPDA,MRECENT NPDA,MR
<EUYMSG   MSG
<EUYSLIST MVS
<EUYMVS   NCCF,MVS COMMAND,MVS
<EUYSTART MVS,START
CNMKNCCF  NCCF DSINCCF
.
.
.
```

Figure 17. Example of the HELPMAP.

Example of the HELPMAP

You can add fully qualified data set names within single quotes to the HELPMAP. See the following example as a guide:

```
< 'USER.CNMPNL1(MYCMDHLP)' MYCOMAND
```

Displaying New Help Panels

After you have created a new help panel, use the HELP command to view the new panel, and any associated commands or panels, to ensure that they display properly.

Chapter 5. Customizing Session Monitor Sense Descriptions

The NetView program provides help for VTAM sense codes through the session monitor SENSE command. You can request help for either 2-byte or 4-byte sense codes. The information used to present explanations for the sense codes is stored as a set of members in the DSIPARM data set. You can customize these members or include additional members to include help for sense codes that have additional meaning for a specific application.

Session Monitor Sense Codes

The session monitor sense code descriptions are stored as DSIPARM members named CNMB*nnn*, where *nnn* is the first three hexadecimal digits of the 2-byte and 4-byte sense codes described in the member. For example, help for sense codes 08B2 and 08B60001 is stored in DSIPARM member CNMB08B. The CNMB08B member shipped with the NetView product is shown in Figure 18 on page 74.

The general conventions are:

- The descriptions are first grouped by the leftmost two bytes of the sense code, using a separator of $$$KEY *xxxx*???? where *xxxx* is the hexadecimal value of the leftmost two bytes. The description of the 2-byte sense code *xxxx* (or 4-byte sense code *xxxx*0000) follows this separator.
- Extended sense code descriptions, identified by the rightmost two bytes of a 4-byte sense code, are grouped using a separator of $*nnnn* where *nnnn* is the hexadecimal value of the rightmost two bytes. The extended description follows this separator.
- Text descriptions must be contained in columns 1–57 of the DSIPARM member. This text is not DBCS-enabled.

Note: Any modifications you make to existing DSIPARM CNMB*xxx* members may be replaced by maintenance or another release of the NetView product. You can update the comments at the beginning of the DSIPARM CNMB*xxx* members to document your changes, and store any members you create or modify in a data set concatenated before the DSIPARM data set that is supplied with the NetView program. This helps keep your modifications from being overlaid by subsequent maintenance or product changes.

```
********************************************************************
*    5697-B82 (C) COPYRIGHT IBM CORP. 2011                         *
*    DESCRIPTION:  SAMPLE  --  SENSE CODES                         *
*    CNMB08B  CHANGED ACTIVITY:                                    *
*    CHANGE CODE  DATE      DESCRIPTION                            *
*    -----------  --------  ---------------------------------------*
********************************************************************
$$$KEY 08B2????
Data transmission failure: the data transmission between
an application program in an SNA MS entry point and an
application program in a subentry point was incomplete,
causing abnormal termination of the function.  Bytes 2
and 3 following the sense code contain sense code
specific information.
$0000
No specific code applies.
$0001
A time-out has occurred while waiting for transmission of
data between the two application programs.  For example,
a service processor has timed out while waiting to
receive data from the main processor.
$0002
A time-out has occurred while waiting for transmission of
data between two applications.
$$$KEY 08B5????
Network Node Server Not Required:  Sent by an APPN end
node control point to a network node control point (1) to
deactivate CP-CP sessions with the NNCP, or (2) to reject
a CP-CP session BIND from the NNCP.  The end node no
longer requires network node services from the receiver.
Note:  This sense data value is carried within the X'35'
control vector on an UNBIND(Type = X'01') for case (1)
above, or on an UNBIND(Type = X'FE') for case (2).
VTAM Hint: A possible cause of this error is that the
Network Node Server for the CP-CP session attempt is not
in the Network Node Server List.
$$$KEY 08B6????
CP-CP Sessions Not Supported:  Sent by a network node
control point to reject a CP-CP session BIND from another
APPN control point; support for CP-CP sessions on that TG
was removed since the time when the TG was first
activated.
Note:  This sense data value is carried within the X'35'
control vector on an UNBIND(Type = X'01').  Bytes 2 and
3 following the sense code contain sense-code-specific
information.
$0000
No specific code applies.
$0001
During link activation on a switched link, it
was discovered that the partner node does not
support CP-CP sessions on this TG.
```

Figure 18. CNMB08B Sense Code Help

Examples

Following are some examples of adding and modifying sense code description members in DSIPARM:

- To add additional help for sense code 08B2 or 08B20000, change the help that is supplied with the NetView program in the following way:

```
$$$KEY 08B2????
Data transmission failure: the data transmission between
an application program in an SNA MS entry point and an
application program in a subentry point was incomplete,
causing abnormal termination of the function.  Bytes 2
and 3 following the sense code contain sense code
specific information.
The SNA MS entry points currently defined are SYSTEM1
and SYSTEM2.
```

Note the two lines of help information added for this installation-specific sense code.

- To add help for a new sense code 08B3 or 08B30000, add the following information immediately after the information that is supplied with the NetView program for sense code 08B2. For example:

```
$$$KEY 08B3????
This sense code is generated by application XYZ when a
failure occurs between components of the application.
```

Note the two lines of help information added for this installation-specific sense code.

- To add help for a new sense code 08B60002, add the following information immediately after the information that is supplied with the NetView program for sense code 08B60001. For example:

```
$0002
During link activation on a switched link, it
was discovered that the partner node does not
permit sessions with this partner.
```

Note the three lines of help information added for this installation-specific sense code.

- To add help for a new sense code 08C1*xxxx*, create a new member in DSIPARM named CNMB08C, and include the following statements:

```
$$$KEY 08C1????
This sense code is generated by application ABC when a
failure occurs in a component of the application.
The third and fourth bytes of the sense code identify
the failing component ID.
```

Note the four lines of help information added for this installation-specific sense code.

Chapter 6. Customizing Hardware Monitor Displayed Data

This chapter describes how to modify the presentation of generic and nongeneric alerts. In prior releases of the NetView program, Recommended Action panels, Event Detail panels, and alert messages were stored at the host. Each nongeneric alert had a unique set of panels and messages. Many of these remain in the current release of the NetView program. With generic alerts, generic alert code points are used to dynamically build the hardware monitor panels.

This chapter describes how to do the following:

- Modify the text of nongeneric Recommended Action and Event Detail panels
- Modify nongeneric alert messages
- Overlay recommended action numbers from a generic alert
- Control the use of color and highlighting for hardware monitor panels
- Include user-defined errors, such as creating and modifying generic code points or adding resource types to the hardware monitor

Note: Color maps for hardware monitor help panels and command description panels are available only in prior releases of the NetView program.

If your panels or alert messages have been translated into a language that requires double-byte characters, take care to preserve the integrity of the double-byte character set (DBCS) strings.

Modifying Hardware Monitor Nongeneric Panels

Recommended Action panels and Event Detail panels are defined for event conditions that are not based on generic alert records. If several event conditions use the same Recommended Action panel or Event Detail panel, the panel is physically defined under a single name, the ***actual panel name***. Any other name under which the actual panel can be displayed is the ***panel alias***. Determining whether the panel name is an actual name or an alias is the first step in modifying panel text.

You can make changes to the panel text, and these changes are reflected in all its aliases. You can also make changes to a panel alias, resulting in the creation of a new panel under the former alias name.

Determining a Panel Name

To determine a panel name and whether it is a panel name or an alias, you must know the event associated with the text you want to change and then identify a resource for which the event is logged. Use the following steps as a guide to help you determine the type of name:

1. To identify a resource, display the Alerts-Static, Alerts-History, or Most Recent Events panel.
2. Enter `sel# C`, where `sel#` is the selection number on the panel of the event associated with the text you want to change. Message BNJ962I displays a 5-digit code associated with the event. If message BNJ378I is displayed, the event is generic and stored panels are not associated with the event.

If you receive a product ID and alert ID rather than a 5-digit code, the associated record is a generic alert. Generic alerts do not have unique prestored panels in the hardware monitor. See "Using NMVT Support for User-Written Programming" on page 91 for more information on generic alerts.

3. Examine the 5-digit code, *xxxyy*, that the NetView program returns. The variables are described as follows:

   xxx Is the NetView-designated product code, or block ID, for the resource.

   yy Is an individual panel identifier.

4. Determine which panel contains the text you want to change, as follows:
   - For a Recommended Action panel, the panel name (or panel alias) is BNI*xxxyy*, where *xxx* and *yy* are the codes you identified in step 3.
   - For an Event Detail panel, the panel name (or panel alias) is BNK*xxxyy*, where *xxx* and *yy* are the codes you identified in step 3.
   - Determine whether BNI*xxxyy* or BNK*xxxyy* is an actual or alias panel name:
     – Use an editor such as ISPF/PDF to examine the directory listing of panel names. This listing is in the partitioned data set (PDS) named NETVIEW.V6R2M0.BNJPNL1 that is provided with the NetView program. The word *alias* is displayed next to the panel names that are aliases.
   - See the appropriate section of this book for the action you want to perform: "Changing Panel Text" on page 80, "Changing from Alias to Actual" on page 80, "Deleting an Actual or Alias" on page 80, or "Adding an Actual or Alias" on page 80.

"Sample BNJBLKID Table" is an example of a BNJBLKID table.

Sample BNJBLKID Table

```
TITLE 'BNJBLKID:  LIST OF ALIAS TABLES BY BLOCK ID'
BNJBLKID CSECT
         EJECT
           DS  0F
NUMENT     DC  AL4((TABEND-TABSTART)/LENG)  NO. OF ENTRIES
TABSTART   EQU *
           DC  CL3'FED'
           DC  CL3'FEE'
           DC  CL3'FEF'
           DC  CL3'FE1'
           DC  CL3'FE2'
           DC  CL3'FE3'
           DC  CL3'FE4'
           DC  CL3'FFD'
           DC  CL3'FFE'
           DC  CL3'FFF'
           DC  CL3'FF2'
           DC  CL3'FF5'
           DC  CL3'FF6'
           DC  CL3'FF7'
           DC  CL3'FF8'
           DC  CL3'FF9'
           DC  CL3'GA1'
           DC  CL3'GB1'
           DC  CL3'GC1'
           DC  CL3'003'
           DC  CL3'005'
           DC  CL3'017'
           DC  CL3'02D'
           DC  CL3'02F'
           DC  CL3'021'
           DC  CL3'022'
```

```
          DC  CL3'023'
          DC  CL3'03E'
          DC  CL3'036'
          DC  CL3'037'
          DC  CL3'038'
          DC  CL3'04A'
          DC  CL3'04B'
          DC  CL3'04C'
          DC  CL3'04D'
          DC  CL3'04E'
          DC  CL3'04F'
          DC  CL3'043'
          DC  CL3'044'
          DC  CL3'047'
          DC  CL3'048'
          DC  CL3'049'
          DC  CL3'057'
          DC  CL3'47C'
TABEND    EQU *
LENG      EQU 3                   ENTRY BYTE LENGTH
          END BNJBLKID
```

"Sample BNJALxxx Table" is an example of a BNJAL*xxx* table.

Sample BNJAL*xxx* Table

```
      TITLE 'BNJAL036: ALIAS TABLE FOR BLOCKID 036'
BNJAL036  CSECT
        EJECT
          DS 0F
NUMENT    DC  AL4((TABEND-TABSTART)/LENG)   NO. OF PAIRS
*              REAL NAME       ALIAS NAME
TABSTART  EQU *
          DC  CL8'BNI03609',CL8'BNI0366D'
          DC  CL8'BNI03608',CL8'BNI0366C'
          DC  CL8'BNI03607',CL8'BNI0366B'
          DC  CL8'BNI03606',CL8'BNI0366A'
          DC  CL8'BNI03605',CL8'BNI03669'
          DC  CL8'BNI03605',CL8'BNI03671'
          DC  CL8'BNI03605',CL8'BNI0360D'
          DC  CL8'BNI03604',CL8'BNI03668'
          DC  CL8'BNI03604',CL8'BNI03670'
          DC  CL8'BNI03604',CL8'BNI0360C'
          DC  CL8'BNI03603',CL8'BNI03667'
          DC  CL8'BNI03602',CL8'BNI03666'
          DC  CL8'BNI03601',CL8'BNI03665'
          DC  CL8'BNI0360B',CL8'BNI0366F'
          DC  CL8'BNI0360A',CL8'BNI0366E'
          DC  CL8'BNK03609',CL8'BNK0366D'
          DC  CL8'BNK03608',CL8'BNK0366C'
          DC  CL8'BNK03607',CL8'BNK0366B'
          DC  CL8'BNK03606',CL8'BNK0366A'
          DC  CL8'BNK03605',CL8'BNK03669'
          DC  CL8'BNK03604',CL8'BNK03668'
          DC  CL8'BNK03603',CL8'BNK03667'
          DC  CL8'BNK03602',CL8'BNK03666'
          DC  CL8'BNK03601',CL8'BNK03665'
          DC  CL8'BNK0360D',CL8'BNK03671'
          DC  CL8'BNK0360C',CL8'BNK03670'
          DC  CL8'BNK0360B',CL8'BNK0366F'
          DC  CL8'BNK0360A',CL8'BNK0366E'
TABEND    EQU *
LENG      EQU 16                  ENTRY PAIR BYTE LENGTH
          END BNJAL036
```

Changing Panel Text

If BNI*xxxyy* or BNK*xxxyy* is an actual panel name (not an alias), follow these steps to change the panel wording. BNI*xxxyy* panels must contain exactly 14 noncomment lines; BNK*xxxyy* panels must contain exactly seven noncomment lines. Comment lines contain an asterisk (*) in column 1.

1. Use an editor, such as ISPF/PDF, to edit the PDS member containing the panel. The PDS name is NETVIEW.V6R2M0.BNJPNL1 (unless it is changed during installation), and the member name is the same as the panel name.
2. Save the changed member.

The changes apply to all event conditions that use the panel or any of its aliases.

Changing from Alias to Actual

If you want to make a panel that now appears under an alias into an actual panel, follow these steps:

1. Use an editor, such as ISPF/PDF, to edit the PDS member containing the panel alias. The PDS name is NETVIEW.V6R2M0.BNJPNL1 (unless it is changed during installation), and the alias member name is the same as the panel name.
2. Save the changed member. TSO converts the panel alias into an actual panel.

A new actual panel is created under the name that was formerly the alias.

Reference: For more information about z/OS utilities and JCL, refer to the z/OS library.

Deleting an Actual or Alias

To delete an actual or alias panel name, do one of the following:

- Delete the PDS member containing the actual or alias panel name. The PDS name is NETVIEW.V6R2M0.BNJPNL1 (unless it is changed during installation), and the member name is the same as the panel name.
- Use the utility IEHPROGM. For example, to delete aliases BNK04B2E and BNK04B2F using this utility, you could code the following:

```
//DELMEBR2 JOB  MSGLEVEL=(1,1)
//STEP1    EXEC  PGM=IEHPROGM
//SYSPRINT  DD  SYSOUT=A
//DS1   DD  VOL=SER=vsnum,DISP=SHR,UNIT=device_type
//SYSIN DD *
 SCRATCH VOL=device_type=vsnum,DSNAME=panel_dsname,
         MEMBER=BNK04B2E
//STEP2    EXEC  PGM=IEHPROGM
//SYSPRINT  DD  SYSOUT=A
//DS1   DD  VOL=SER=vsnum,DISP=SHR,UNIT=device_type
//SYSIN DD *
 SCRATCH VOL=device_type=vsnum,DSNAME=panel_dsname,
         MEMBER=BNK04B2F
/*
```

  In this example, *device_type* is the device type, *vsnum* is the volume serial number on which the data set resides, and *panel_dsname* is the name of the data set containing the panels.

  Reference: For more information on z/OS utilities and JCL, refer to the z/OS library.

Adding an Actual or Alias

If you want BNI*xxxyy* or BNK*xxxyy* to be a new (or replacement) panel name or alias, follow these steps:

- Enter a new panel using an editor, such as ISPF/PDF, and copy an existing panel that is similar to the desired panel. Then, change the copied panel.
- Add the new panel name or an alias, using the utility IEBUPDTE.

For example, to add BNK04B2E as an alias of BNK04B2A using IEBUPDTE, code the following:

```
//PANELS JOB MSGLEVEL=1,MSGCLASS=A
//UPDATE1 EXEC PGM=IEBUPDTE,PARM=NEW
//SYSPRINT DD SYSOUT=A
//SYSUT2 DD DSN=panel_dsname,DISP=SHR,UNIT=device_type,
//       VOL=SER=vsnum
//SYSIN DD *
./ ADD NAME=BNK04B2A
 DETAIL DESCRIPTION: THE ERROR ANALYSIS MICROCODE
 HAS DETECTED AN INVALID ERROR LOG ENTRY.



     LOG ENTRY 0-3       4-7               8-11
**************************************************
                                .
                                .
                                .
*
*
*
***************LAST LINE OF PDS MEMBER************
./  ALIAS  NAME=BNK04B2E
/*
```

In this sample, *panel_dsname* is the name of the data set where the panel is stored, and *vsnum* is the volume serial number on which the data set resides. Although the sample defines only one new alias, up to 15 aliases are valid.

Reference: For more information on z/OS utilities and JCL, refer to the z/OS library.

Nongeneric Alert Messages

To change the Event Description: Probable Cause text of any selection on an Alerts-Static, Alerts-History, Alerts-Dynamic, Event Detail, or Most Recent Events panel that is not associated with generic alerts, follow these steps:

1. Determine the event of the associated text and identify a resource against which the event is logged.
2. For the resource identified in Step 1, display the Alerts-Static, Alerts-History, Alerts-Dynamic, Event Detail, or Most Recent Events panel.
3. Enter `sel# C`, where `sel#` is the selection number of the event associated with the text you want to change. Message BNJ962I displays a 5-digit code associated with the event. If message BNJ378I is displayed, the event is generic.

   If you receive a product ID and an alert ID rather than a 5-digit code, the associated record is a generic alert. Generic alerts do not have unique prestored Event Description: Probable Cause text messages in the hardware monitor. See "Using NMVT Support for User-Written Programming" on page 91 for more information on generic alerts.
4. Examine the following 5-digit code, *xxxyy*, that the NetView program returns.

   xxx Is the NetView-designated product code, or block ID, for the resource

yy Is an individual hexadecimal panel identifier

5. Use an editor such as ISPF/PDF to retrieve and edit the CSECT that contains the text you want to change. The name of the CSECT is BNJVM*xxx* (PDS member in NETVIEW.V6R2.BNJSRC1), where *xxx* is the block ID you identified in Step 4.
6. Locate the message text within BNJVM*xxx*. The message number for this text is the decimal equivalent of *yy*, where *yy* is the hexadecimal identifier you determined in Step 4.
7. Change the assembler language macro DSIMDS.

   Reference: For the syntax of DSIMDS, refer to *IBM Tivoli NetView for z/OS Programming: Assembler* for the text you want to change.
8. Save the changed CSECT.
9. Reassemble the CSECT, and link edit the CSECT into the load module of the same name.

Using the ACTION Command List

You can use the ACTION command list to get more information on a recommended action that is displayed in the hardware monitor. See Chapter 4, "Modifying and Creating Online Help Information," on page 65 for information on how to modify the Action Help panels displayed by the ACTION command list. D*nnn*, E*nnn*, and I*nnn* are recommended action numbers found on the Recommended Action panels. R*nnn* numbers are actions found on the resolution action panel. The following describes what the ACTION command list displays for recommended action numbers:

ACTION Dnnn
Displays a detailed description that is provided with the NetView program of a recommended action.

ACTION Ennn
Displays a description of a recommended action, created by your system programmer, for a user-defined generic alert action.

ACTION Innn
Displays a description of a recommended action created for a generic alert action that is provided with the NetView program.

ACTION Rnnn
Displays a description of an actual action created for a resolution action that is provided with the NetView program.

Overlaying Recommended Action Numbers

Because details of a particular generic alert Recommended Action can vary depending on the sending product, Action Help panels cannot be provided for all possible generic actions. Therefore, on NetView Action Help panels built for generic alerts, each recommended action is preceded by an I-number (action that is supplied with the NetView program) or an E-number (user-supplied action).

On Recommended Action panels of the hardware monitor, each recommended action is identified with a special action number. Figure 19 on page 83 shows a sample Recommended Action panel with three recommended actions (D225, D001, and D238).

```
N E T V I E W          SESSION DOMAIN: CNM01    OPER1     05/17/10 14:40:53
NPDA-45A           * RECOMMENDED ACTION FOR SELECTED EVENT *     PAGE  1 OF  2
 CNM01       CENTRAL    LN08PTP    PU32768
            +--------+            +--------+
 DOMAIN     |  COMC  |----LINE----|  CTRL  |
            +--------+            +--------+


USER    CAUSED - LSL 2 REMOTE DSU/CSU IN TEST MODE
                 LSL 2 REMOTE DSU/CSU IN CONFIGURATION MODE
                 LINE SWITCHED TO INCORRECT POSITION
       ACTIONS - D001 - CORRECT THEN RETRY

INSTALL CAUSED - LSL 2 REMOTE DSU/CSU ADDRESS INCORRECT
                 LSL 2 DSU/CSU'S SPEED MISMATCH
                 PHYSICAL LINE CONNECTIONS
       ACTIONS - D225 - CORRECT ADDRESS FROM DSU/CSU CONTROL PANEL
                 D001 - CORRECT THEN RETRY
                 D238 - PERFORM REMOTE DSU/CSU PROBLEM DETERMINATION

ENTER ST (MOST RECENT STATISTICS), DM (DETAIL MENU), OR D (EVENT DETAIL)

???
CMD==>
```

Figure 19. Recommended Action Panel for Selected Event.

Recommended Action Panel for Selected Event

I-number and E-number actions do not have associated panels that are supplied with the NetView program. However, the NetView program allows users to overlay I-numbers and E-numbers with action numbers, to create panels that are specific to the sending product.

You can do this by modifying either table BNJDNUMB, which correlates a Product Set ID with action numbers, or table BNJDNAME, which correlates a Product Common Name with action numbers. BNJDNUMB is searched before BNJDNAME.

Modify table BNJDNUMB or BNJDNAME in NETVIEW.V6R2M0.BNJPNL2 and create BNJ*wwwww* PDS members.

Modifying BNJDNUMB, BNJDNAME, and BNJwwwww

This section uses the names BNJDNUMB and BNJ*wwwww* to indicate a PDS member.

BNJDNUMB

BNJDNUMB correlates a product-set identification (PSID) with a unique file or PDS member (BNJ*wwwww*) that contains the action numbers to use for this product. To modify BNJDNUMB, use an editor such as ISPF/PDF.

Note: If the NetView program receives a generic alert whose PSID does not exist in BNJDNUMB and whose product common name does not exist in BNJDNAME, the default I-number or E-number is not modified.

The format for BNJDNUMB follows:

```
xxx
yyyyyyyyy BNJwwwww     comment
    .         .            .
    .         .            .
    .         .            .
```

Where:

xxx Specifies the number of entries in BNJDNUMB. This number must begin in column 1 and should be three characters long with leading zeros, if necessary.

yyyyyyyyy
Specifies up to nine characters representing the PSID. This entry must begin in column 1.

BNJ*wwwww*
Is the name of the PDS member beginning in column 11, that contains generic alert recommended action code points and associated action numbers. Names such as BNJDNUM2, BNJDNUM3, for example, are recommended. However, you can use any unique name. The name BNJDNUM1 is already used for generic alerts produced by the hardware monitor.

Entries in BNJDNUMB must be in ascending order. Comment lines contain an asterisk (*) in column 1.

Determining the PSID: Because the sending product can be either a hardware product or a software product, the PSID is defined as follows:

- For hardware products, the PSID is defined with the four numeric characters identifying the machine type found in the X'00' subfield, Hardware Product Identifier (located in the first X'11' subvector of the first X'10' subvector in the generic alert).
- For software products, the PSID is defined with the nine uppercase alphanumeric characters of the serviceable component identifier in the X'02' subfield, software product serviceable component identifier (located in the first X'11' subvector of the first X'10' subvector in the generic alert).

  Note: If the X'02' subvector does not exist, use the seven uppercase alphanumeric characters of the licensed program number in the X'08' subvector, software product program number (located in the first X'11' subvector of the first X'10' subvector in the generic alert).

Two methods are available to determine the PSID of a generic alert that is logged to the hardware monitor database:

- Select `sel# C` from Alerts-Static, Alerts-History, or Most Recent Events panels to display a message containing the PSID.
- Make a selection from the Event Detail menu to display page 1 of the PSID panel. This panel displays the sending PSID.

BNJDNAME

BNJDNAME correlates a product common name with a unique file or PDS (BNJ*wwwww*) that contains the action numbers to use for this product. To modify BNJDNAME, use an editor such as ISPF/PDF.

The format for BNJDNAME follows:

```
xxx
yyyyyyyyyyyyyyyyyyyyyyyyyyyyyyy BNJwwwww     comment
```

Where:

xxx Specifies the number of entries in BNJDNAME. This number must begin in column 1 and must be three characters long with leading zeros, if necessary.

yyy...y Specifies up to 30 characters representing the software product common name or up to 15 characters specifying the hardware common name.

BNJ*wwwww*
Is the name of the PDS member beginning in column 32, that contains generic alert recommended action code points and associated action numbers. Names such as BNJDNUM2, BNJDNUM3, and so forth, are recommended. However, you can use any unique name. The name BNJDNUM1 is already used for generic alerts produced by the hardware monitor.

comment
Comments must start in column 45.

The NetView program provides the following data in this PDS member:

Sample BNJDNAME Table

```
001
NETVIEW                        BNJDNUM1     NETVIEW PRODUCT
```

Determining the Product Common Name: Because the sending product can be either hardware or software, the product common name is defined as follows:

- For hardware products, the hardware common name is defined by the EBCDIC characters found in the X'0E' subfield, Hardware Product Common Name (located in the first X'11' subvector of the first X'10' subvector in the generic alert).
- For software products, the software common name is defined by the EBCDIC characters found in the X'06' subfield, Software Product Common Name (located in the first X'11' subvector of the first X'10' subvector in the generic alert).

To determine the product common name of a generic alert that is logged to the hardware monitor database, make selection 2 from the Event Detail menu. This selection will display the common name (hardware or software) of the sending product.

BNJwwwww

Each BNJ*wwwww* member contains generic alert recommended action code points and associated action numbers. To create the BNJ*wwwww* files or members specified in table BNJDNUMB, use an editor such as ISPF/PDF. Each BNJ*wwwww* PDS member should be stored in the first data set in the concatenation string for the DD statement BNJPNL2. This DD statement is in the NetView startup procedure.

Avoid defining your panel data set with secondary extents when modifying or creating a panel while the NetView program is running. If a secondary extent is defined while the NetView program is running, a secondary extent failure can occur causing error recovery and loss of a single instance of a request. If a second attempt is made to execute the request, error recovery might succeed in the execution of the request. However, recycling the NetView program would be required for a full data set.

The format for BNJ*wwwww* follows:

```
xxxx      yyyyyyyy  dnum
 .           .       .
 .           .       .
 .           .       .
```

Where:

xxxx Is the 4-character generic alert recommended action code point (EBCDIC version of the recommended action code point as defined by the generic alert architecture). This field must begin in column 1.

yyyyyyyy
Is the 8-character alert ID number (EBCDIC version of the alert ID number as defined in the X'92' subvector architecture). This field is optional. If present, it must begin in column 11.

dnum Is the 4-character unique action number. This field begins in column 21. Action numbers can be any combination of four EBCDIC characters. The limiting factor of the action number is the ability of the ACTION command list to use these four characters and display the associated panel.

Entries in each BNJ*wwwww* file or member must be in ascending hexadecimal order. If a non-hexadecimal number is used, it is skipped.

The BNJ*wwwww* file or member specified in BNJDNUMB or BNJDNAME is searched serially until a match is found or the end of the file is reached. After the first * is found in column 1, the serial searching stops.

You can place blanks in the alert ID field, along with specific alert IDs, for a particular action code point.

Figure 20 shows a sample BNJ*wwwww* user-defined table.

```
1002                D562
1002    93987791    D890
1002    D2556B79    D777
```

Figure 20. Sample BNJwwwww User-Defined Table

For alert D2556B79, the code point 1002 uses D777 as its action number. For alert 93987791, code point 1002 uses D890 as its action number. For all other alerts from this sending product, code point 1002 uses D562 as its action number.

Changing Color and Highlighting for Hardware Monitor Panels

For the hardware monitor displays, you can alter the color, highlighting, and intensity of the display's text. You can also enable the display to produce an audible alarm. Consider the needs of the display users before you modify these four attributes as assigned by the NetView program.

Note: Changing the length of any attribute, row placement, or column placement yields unpredictable results.

For any string of display text that is preceded by a blank, you can modify up to four attributes as follows:

Color Text is red, yellow, blue, white, green, turquoise, or pink.

Highlighting
Text is underscored, blinking, or in reverse video.

Intensity
Text is more intense (monochrome terminals only).

Alarm Text causes an audible alarm at the user's terminal.

You can change these attributes for specific displays or for all displays. For example, you can select a single color for prompt lines on all displays.

The procedure for modifying these attributes begins with a color map. A color map is a table that embeds characters, representing the various attributes, in a color buffer. These characters in the color buffer control the appearance of the text.

The automation table can also be used to set or change the color and highlighting of specific alerts for hardware monitor display.

Reference: For more information, refer to the*IBM Tivoli NetView for z/OS Automation Guide*.

Selecting the Color Map

The first step in modifying a hardware monitor display is to determine which color map controls the display you want to change. Appendix A, "Color Maps for Hardware Monitor Panels," on page 185, contains a matrix of the panel name, panel number, and color map for hardware monitor panels.

After you identify the color map you need, edit the map using an editor such as ISPF/PDF. The color maps are contained in the PDS named NETVIEW.V6R2M0.BNJPNL2 (unless the name is changed during installation). The member name is the color map name.

Note: If you want a particular attribute to apply to the same portion of **each** panel, modify the color map BNJOVERW, which overwrites all other panel-specific color maps. Be sure to test the results of BNJOVERW on each panel before putting it into your production system. This map can produce unexpected results.

Modifying the Color Map

After you select the color map, you can modify it. A color map consists of a series of lines of data, called map elements. The first line of a color map is always the number of subsequent map elements. Map elements begin in column 1, and are paired with comments that begin in column 41.

Each map element specifies, for a particular display row, the attribute, the attribute's placement in the row, and the length in characters. Each item in the map is followed by a comma, except for the last one, which is followed by a period.

Note: Changing any attribute's length, row placement, or column placement can yield unpredictable results.

"Sample Color Map" shows a sample color map.

Sample Color Map

```
13, 1                          NUMBER OF ELEMENTS IN TABLE
1,1,1,79,BLU, 2                NETVIEW HEADER
1,2,1,14,BLU,                  SCRN ID
2,2,16,64,HIG,WHI,             SCRN TITLE
1,3,1,7,BLU,                   DOMAIN
1,3,9,71,TUR,
1,5,1,79,BLU,                  HEADING
99,SIZE-0-7,2, 3               REPETITION
2,6,1,4,HIG,WHI,               SEL #
1,6,6,74,TUR,                  DATA
```

```
1,SIZE-4,1,50,BLU, 4          PROMPT LINE
2,SIZE-4,52,1,HIG,WHI,        PROMPT LINE
1,SIZE-4,54,26,BLU,           PROMPT LINE
1,SIZE-3,1,79,BLU.            PROMPT LINE
```

1 The first item in the color map represents the number of subsequent lines of data, or map elements. A map can have any number of map elements. The sample map has 13 map elements.

2, **3**, and **4** describe the three types of map elements as follows:

2 This type of map element contains attribute information in the following format:

- The first item is the number of attributes in the map element. This can be a value from 1 to 4.. A map element might have only one set of attributes, for example, pink color, or any combination of attributes, such as pink color and underscoring. The sample map element has one attribute, the color blue (BLU).
- The second item is the number of the display row that reflects the attribute. In the sample, the attribute is to appear in row 1.
- The third item is the number of the display column that contains the attribute character. In the sample, the attribute character is to be placed in column 1. Consequently, the displayed text will begin in column 2.

  Note: Be sure that the display text you want to modify is preceded by a blank space. Otherwise, the character representing the attribute in the color buffer overwrites some of the display text, and some characters are replaced with blanks. For example, in the following string you cannot make the colon a different color from the text:

  ```
  EVENT DESCRIPTION:PROBABLE CAUSE
  ```
- The fourth item is the maximum character length of the attribute. In the sample, the specified attribute covers 79 characters on the display, or columns 2–80.
- The last item is the attribute or sequence of several attributes. In the sample, the color blue is the specified attribute. You can specify up to four attributes, but only one from each category. If you want multiple attributes to apply to the same character or string, you must specify the attributes for each category in this order:
  1. Alarm: ALM produces an audible alarm.
  2. Intensity:
     - HIG intensifies the color.
     - NOH returns the color to normal intensity.
  3. Highlighting:
     - UND underlines the character or string.
     - BLI causes the character or string to blink.
  4. Color:
     - RED produces red.
     - YEL produces yellow.
     - BLU produces blue.
     - WHI produces white.
     - GRE produces green.
     - TUR produces turquoise.
     - PIN produces pink.

This map element makes the text in row 1, columns 2–80, blue. As the map element's corresponding comment confirms, this blue string of text is the display header.

3 This type of map element uses the repetition factor option to copy the attribute or attributes specified for a particular row onto subsequent rows. A repetition map element uses the following format:

- The number 99 signals the repetition of an element.
- In SIZE-*x*-*y*:
  - SIZE represents the total number of rows in the panel. Use the word SIZE as shown; do not replace it with a number.
  - *x* is the number of unused or blank lines between the end of the panel data and the prompt line. In the sample, no blank or unused lines occur between the end of the panel data and the prompt line.
  - *y* is the number of the starting row that is to copy, or repeat, the attribute or attributes from the preceding row. In the sample, attributes from row 6 are to be repeated on the subsequent rows, starting with row 7.
- The last item (2) is the number of attributes on row 6 that are repeated. In the sample, the two attributes specified in the map for row 6 are to be repeated.

This map element copies the two attributes specified for row 6 onto subsequent rows starting at row 7, and continues to the prompt line.

4 This type of map element uses the variable row placement option to specify the row that contains the attribute. This option uses the following format:

- The first item (1) is the number of attributes in the map element. This number can be 1–4. In the sample, the map element has one attribute, the color blue (BLU).
- The second item (SIZE-*x*) indicates the display row that reflects the attribute, where:
  - SIZE represents the total number of rows in the display. Use the word SIZE as shown; do not replace it with a number.
  - *x* is the number of lines preceding the command line. For example, for the Alerts-Static display:
    - SIZE-4 is the first prompt line.
    - SIZE-3 is the second prompt line.
    - SIZE-2 is the message line.
    - SIZE-1 is the NetView status line.
    - SIZE-0 is the command line.

    In the sample, the attribute is to appear on the first prompt line.

    Note: Be sure that the command line is defined on byte 80 of the NetView status line. Otherwise, some bytes can be overwritten.
- The third item (1) is the number of the display column that contains the attribute character. In the sample, the attribute character is placed in column 1. Consequently, the displayed text begins in column 2.

  Note: Be sure that the display text you want to modify is preceded by a blank space. Otherwise, the character representing the attribute in the color buffer overwrites some of the display text, and some characters are replaced with blanks.

- The fourth item (50) is the maximum character length of the attribute. In the sample, the specified attribute covers 50 characters on the display.
- The last item (BLU) is the attribute or sequence of several attributes. You can specify up to four attributes, but only one from each category. If you want multiple attributes to apply to the same character or string, you must specify the attributes in the order shown in "Sample Color Map" on page 87. In the sample, the color blue is the specified attribute.

This sample map element makes the text in the first prompt line, columns 2–51, blue.

Prompt Highlight Tokens

The prompt highlight token table BNJPROMP is located in the PDS named NETVIEW.V6R2M0.BNJPNL2. You can modify this table. The maximum size of the table is 25 prompts, with the prompt being a 15-byte character field. If you decide to modify the table, use the Comment column for notes about the table. For performance reasons, this table is not processed when building the Alert Dynamic panel. Color is a 3-byte character field beginning at column 20. You can select only those colors that are valid in the color maps. Table 15 is a sample of the format for the prompt highlight token table.

Table 15. Prompt Highlight Tokens

Prompt Token	Color	Comment
SEL#	WHI	PROMPT SEL#
LDM	WHI	PROMPT LDM
LSL1	WHI	PROMPT LSL1
LSL2	WHI	PROMPT LSL2
RESNAME	WHI	PROMPT RESNAME
RESNAME1	WHI	PROMPT RESNAME1
RESNAME2	WHI	PROMPT RESNAME2
'A'	WHI	PROMPT A
'B'	WHI	PROMPT B
'P'	WHI	PROMPT P
'EV'	WHI	PROMPT EV
'ST'	WHI	PROMPT ST
'DM'	WHI	PROMPT DM
'M'	WHI	PROMPT M
'DEL'	WHI	PROMPT DEL
'S'	WHI	PROMPT S
'D'	WHI	PROMPT D
'R'	WHI	PROMPT R

The table is read into storage at initialization. You can redefine the prompt highlight tokens or add new ones, up to a maximum of 25. You receive a message if the table is not successfully read at initialization.

Using NMVT Support for User-Written Programming

Network management vector transport (NMVT) support enables user-written programs to report errors to the hardware monitor through generic alerts. Prior to generic alerts, Recommended Action panels, Event Detail panels, and alert messages were stored at the host in the NetView program. Each nongeneric alert had a unique set of panels and messages.

Note: The original NMVT encoding contains many SNA major vectors including Alerts. Subsequent encoding such as MDS_MU and CP_MSU contains many of the same major vectors and are covered under the term NMVT in this section.

Coded generic alerts are contained in the NMVT. Generic alert code points are used to dynamically build the hardware monitor panels. Nongeneric alerts are used mainly for migration purposes. You should create new user-defined alerts using generic alerts.

Reference: For more information on major vectors and subvectors of an NMVT, refer to the *SNA* library.

This section contains a sample generic alert and the associated panels that are built by the hardware monitor. (See Figure 21 on page 94 through Figure 25 on page 98.) This section also describes how each panel is built.

User-Defined Alerts (Nongeneric)

Sixteen block IDs (X'F00'–X'F0F'), which are part of NMVT major vector X'0000', are reserved for generating user-defined alerts.

The hardware monitor reserves USER0␣␣–USERF␣␣ (where ␣␣ are required blank space X'40' characters to pad the name to 7 characters) for use as the corresponding 7-character software identifier in the software product program number (X'08') subfield of the first product identifier (X'11') subvector of the NMVT. These are mapped to the block IDs from X'F00' to X'F0F'.

The hardware monitor allows a 1-byte alert description code within the basic alert (X'91') subvector of the NMVT. This code lets you further qualify the alert. Put your alert description code in the second byte of the 2-byte Alert Description Code field. The hardware monitor ignores the first byte of that field.

NMVT-to-Panel ID Mapping

Using the block ID derived from the software product program number and the alert description code, the hardware monitor maps the NMVT to the following:

- 14-line panel

  A 14-line panel appears on the Recommended Action panel of the hardware monitor for the NMVT. The PDS member name for this 14-line panel is in the range between BNIF00*xx* and BNIF0F*xx*, where the range of block IDs is from X'F00' to X'F0F', and *xx* is the hexadecimal value of the alert description code. The lines can be up to 80 characters long.

- 7-line panel

  A 7-line panel appears on the hardware monitor's event detail panel for the NMVT. The 7-line panel's PDS member name is in the range between BNKF00*xx* and BNKF0F*xx*, where the range of block IDs is from X'F00' to X'F0F', and *xx* is the hexadecimal value of the alert description code.

The first eight translated characters of each of the first three X'A0' or X'A1' qualifier subvectors are displayed on an eighth line, immediately following the Event Detail panel. Write the Event Detail messages, with titles on the seventh line, to describe the qualifiers.

- 48-byte alert description

  A 48-byte alert description appears on the Alerts-Dynamic, Alerts-Static, Alerts-History, Event Detail, and Most Recent Events panels. The 48-byte text descriptions for a block ID are in a NetView message CSECT whose link-edit load module name is in the range between BNJVMF00 and BNJVMF0F.

Panel Formats

For each new Recommended Action panel or Event Detail panel, use the same format as in the existing panels to add a panel to the NetView panel library or a concatenated user library.

For each new 48-byte alert description CSECT, use the same format as an existing BNJVM*xxx* CSECT. BNJVM*xxx* CSECTs are coded using the macro DSIMDS. No variable substitution is permitted for 48-byte alert descriptions.

User-Defined Alerts (Generic)

Generic alerts allow coded alert data to be transported within the alert, eliminating the need for stored panels. The coded data can be one of the following:

- An index into predefined tables, containing short units of text that are used to build a panel
- Textual data that appears directly on the panel

Coded data is maintained in code point tables which can be customized (For more information on customizing code point tables, see “Modifying Generic Code Point Tables” on page 100). The text strings indexed by the code points, and the display of textual data that was sent in the alert, are in the same format no matter which product sent the alert. Also, the same terminology is used to define similar problems within different products because each product uses terminology defined by Tivoli.

Generic alerts produce the same Alerts, Recommended Action, and Detail panels as the hardware monitor's nongeneric alert support, but the panels are built dynamically rather than using stored panels. Code points index into the tables defined by Tivoli and the user.

The alert description and probable cause code points are used to build the hardware monitor Alerts-Dynamic, Alerts-Static, Alerts-History, Event Detail, and Most Recent Events panels. The user cause, install cause, failure cause, and recommended action code points are used to build the hardware monitor Recommended Action panel. The detail data code points are used to identify the qualifiers that can appear on the hardware monitor Recommended Action or Event Detail panel. Products use the same set of architected product-independent terminology to define their Alert, Recommended Action, and Detail panels. Text data transported in the NMVT is displayed on the Event Detail panel.

The NetView program ships generic code point tables that can be customized (for more information on customizing code point tables, see “Modifying Generic Code Point Tables” on page 100.). The generic code point tables shipped by the NetView product are:

- BNJ92TBL—Alert description code points

- BNJ93TBL—Probable cause code points
- BNJ94TBL—User cause code points
- BNJ95TBL—Install cause code points
- BNJ96TBL—Failure cause code points
- BNJ81TBL—Recommended action code points
- BNJ82TBL—Detail data code points
- BNJ85TBL—Detailed data code points, subfield X'85'
- BNJ86TBL—Actual action code points.

Using the GENALERT Command

You can use the GENALERT command to create your own alerts. The GENALERT command is described in the NetView online help. For more information about the code points and code point formats that can be used by the GENALERT command, see the generic alert code points appendix in the *IBM Tivoli NetView for z/OS Messages and Codes Volume 2 (DUI-IHS)*.

Building Generic Alert Panels

Figure 21 on page 94 is an example of a generic alert NMVT. Unique panels are built using the information contained in a generic alert record.

Reference: For more information on NMVTs, refer to the *SNA* library.

```
X'41038D5002000000'             Response Header
X'01230000'                     Major Vector Length and Key
X'0A0108105901020A2827'         01 SV - Date/Time
X'0B92000001'                   92 SV - Alert Description
X'1603'                           code point
X'1A2B3C4D'
X'0693'                         93 SV - Probable Cause(s)
X'0403'                           code point
X'2012'                           code point
X'1195'                         95 SV - Install Cause(s) and Action(s)
X'0601'                           01 SF - install cause(s)
X'1502'                             code point
X'13E1'                             code point
X'038391'                         83 SF - qualifier(s)
X'0681'                           81 SF - recommended action(s)
X'0101'                             code point
X'1504'                             code point
X'2796'                         96 SV - Failure Cause(s) and Action(s)
X'0601'                           01 SF - failure cause(s)
X'0503'                             code point
X'33C2'                             code point
X'068200'                         82 SF - qualifier(s)
X'61'                               code point
X'0004'
X'0C8200'                         82 SF - qualifier(s)
X'53'                               code point
X'11F0F0406040F1C6'
X'0A81'                           81 SF - recommended action(s)
X'0611'                             code point
X'0500'                             code point
X'3110'                             code point
X'00E1'                             code point
X'038321'                         83 SF
X'1705'                         05 SV - Resource Hierarchy
X'151000'                         10 SF
X'07D7E4F9F9F9F900F1'               name/type pair
X'07D3C9D5C5F0F440F9'               name/type pair
X'4D1000'                       10 SV - PSID
X'341104'                         11 SV - Product Identifier
X'0E02C1C3C661C9C2D44040F0F0F3'     02 SF - software product serviceable component ID
X'0804F0F1F0F2F0F3'                 04 SF - software product common level
X'0A06C1C3C661C9C2D440'             06 SF - software product common name
X'0A07C6C6C7C1C9E3D9F3'             07 SF - software product customization ID
X'07098603351225'                   09 SF - software product customization date and time
X'161101'                         11 SV - Product Identifier
X'130012'                           00 SF - hardware product identifier
X'F9F9F9F9F1F1C1F0F5'
X'F0C1F0C1F0C1F0'
X'1798'                         98 SV - Detailed Data
X'0782213400'                     82 SF - qualifier
X'0004'
X'0782000911'                     82 SF - qualifier
X'F2F2'
X'0782000E00'                     82 SF - qualifier
X'00DC'
X'2548'                         48 SV - Correlation
X'1060'                           60 SF - correlation for supporting data
X'D7C3C9C4D3E4F0F4'
X'05C3D5D4F0F1'
X'0D82'                           82 SF - qualifier
X'00DA11C3D6D4D460C5D9D9'
X'068200D1010F'                   82 SF - qualifier
X'3631'                         31 SV - Self Defining Text Message
X'060211340500'                 02 SF - Coded Character Set ID
X'0512C5D5E4'                   12 SF - National Language ID
X'032112'                       21 SF - Sender ID
X'2630'                         30 SF - Text Message
X'E3C8C9E240E2E4C2C6C9C5D3C440C9C4C5D5E3C9C6C9C5E240E3C8C540E3C5E7E340D4E2'
```

Figure 21. Sample Generic Alert Record

Figure 22 on page 95 through Figure 24 on page 98 describe how each unique panel is built using the information contained in a generic alert NMVT. Figure 22 on page 95 shows a sample Alerts-Dynamic panel. Explanations of the numerical references follow the panel.

Alerts-Dynamic Panel

```
N E T V I E W          SESSION DOMAIN: CNM01    OPER1     03/01/11 14:41:03
NPDA-30A                      * ALERTS-DYNAMIC *


    DOMAIN RESNAME  TYPE  TIME  ALERT DESCRIPTION:PROBABLE CAUSE
     CNM01 PU9999  *LINE  14:41 COMM SUBSYSTEM FAILURE:COMM SUBSYSTEM  CTRL    +
             1     2                  3                      4           5









 DEPRESS ENTER KEY TO VIEW ALERTS-STATIC

 ???
CMD==> _
```

Figure 22. Sample of Alerts-Dynamic Panel.

Sample of Alerts-Dynamic Panel

An entry on the Alerts-Dynamic panel is built from a number of subvectors (X'92', X'93', and X'05'). Figure 21 on page 94 creates the results for Figure 22.

1 The RESNAME and TYPE come from the last name and type pair in the X'05' subvector. The sample display shows a RESNAME of PU9999 and a TYPE of LINE.

2 The * indicates that the RESNAME preceding the TYPE does not belong to the TYPE. The TYPE is always associated with the last name in the hierarchy, but the name depends on how the X'05' is coded. The Do Not Display Resource Name Indicator bit is set to 1 for the last name and type pair (subvector X'05', subfield X'10', second name and type pair, eighth byte, second bit).

3 The ALERT DESCRIPTION is derived from code point X'1603' in the X'92' subvector. The code point provides an index into a table containing the alert description text messages. The sample shows an ALERT DESCRIPTION of COMM SUBSYSTEM FAILURE.

4 The PROBABLE CAUSE is derived from code point X'0403' in the X'93' subvector. The code point provides an index into a table containing the probable cause text messages. The sample shows a PROBABLE CAUSE of COMM SUBSYSTEM CTRL.

5 The + is included because the X'93' subvector in Figure 22 contains more than one probable cause code point. The + indicates that more probable causes can be seen on the Event Detail panel.

Figure 23 on page 96 shows a sample Recommended Action panel. Explanations of the numerical references follow the panel.

Recommended Action for Selected Event Panel

```
N E T V I E W          SESSION DOMAIN: CNM01    OPER1     03/01/11 14:41:17
NPDA-45A          * RECOMMENDED ACTION FOR SELECTED EVENT *       PAGE 1 OF 1
CNM01        PU9999     LINE04  1
            +--------+
 DOMAIN     |  PU    |----LINE----  2
            +--------+

USER    CAUSED - NONE  3

INSTALL CAUSED - INCORRECT MICROCODE FIX  4
                 INCORRECT SOFTWARE GENERATION: ACF/IBM  5
       ACTIONS - I013 - VERIFY X.25 SUBSCRIPTION NUMBER  6
                 I085 - APPLY CORRECT SOFTWARE LEVEL

FAILURE CAUSED - COMMUNICATIONS SUBSYSTEM  7
                 LINE ADAPTER MICROCODE
                      ADAPTER NUMBER 04  8
                      LINE ADDRESS RANGE 00 - 1F  9
       ACTIONS - I032 - DUMP CHANNEL ADAPTER MICROCODE  10
                 I026 - RUN APPROPRIATE TRACE
                 I136 - CONTACT COMMUNICATIONS SYSTEMS PROGRAMMER
                 I010 - PERFORM 9999 PROBLEM DETERMINATION PROCEDURES
                                  11

ENTER DM (DETAIL MENU) OR D (EVENT DETAIL)

???
CMD==> _
```

Figure 23. Sample of Recommended Action for a Selected Event Panel.

Sample of Recommended Action for a Selected Event Panel

The Recommended Action panel is built from a number of subvectors (X'94', X'95', and X'96') and subfields (X'01', X'81', X'82', and X'83').

1 The resource names (PU9999 and LINE04) are taken from the X'05' hierarchy names list subvector. In Figure 21 on page 94, only names from the X'05' subvector are used because the Hierarchy Complete Indicator bit (byte 2 bit 0) in the indicator bit X'05' subvector is set to X'0'. If this bit was set to 1, the NetView program would concatenate the names in the X'05' subvector to the names supplied by VTAM.

2 The resource types (PU and LINE) are derived by converting the type codes in the X'10' subfield of the X'05' subvector (X'F1' and X'F9') into displayable resource types. For more information on changing resource types, see "Adding or Modifying Resource Types" on page 103.

3 The X'94' subvector (NONE) carries user-caused information. Because the X'94' subvector is not included in Figure 21 on page 94, user-caused information is not displayed.

4 The two install-caused probable causes:

```
INCORRECT MICROCODE FIX
INCORRECT SOFTWARE GENERATION:
```

are built from code points (X'1502' and X'13E1') in the X'01' subfield within the X'95' subvector. The E in the X'13E1' code point indicates an X'83' subfield is needed to complete the install cause.

5 The qualifier on the install cause (ACF/IBM) is displayed because of the X'83' subfield of the X'95' subvector. The X'83' subfield contains the value X'91' indicating that the qualifier is taken from the product ID subfield (X'06' Software Product Common Name) of the first product identifier subvector (X'11').

6 The two install-caused actions:

```
I013 - VERIFY X.25 SUBSCRIPTION NUMBER
I085 - APPLY CORRECT SOFTWARE LEVEL
```

are taken from code points (X'0101' and X'1504') in the X'81' subfield of the X'95' subvector.

7 The two failure-caused probable causes:

```
COMMUNICATIONS SUBSYSTEM
LINE ADAPTER MICROCODE
```

are taken from code points (X'0503' and X'33C2') in the X'01' subfield of the X'96' subvector. The C in the X'33C2' code point indicates that two detail data subfields, either X'82' or X'85' subfields, are needed to complete the failure cause. This example uses X'82' subfields. While either X'82' or X'85' subfields can be used here, a combination of the two would not be valid. Within a subvector, all of the detail qualifiers must be X'82' subfields or X'85' subfields.

8 Indicates the ADAPTER NUMBER 04 is broken down from the first X'82' subfield in the X'96' subvector. The number can be:

00 No information is taken from the PSID subvector

61 A code point for adapter number

00 Hexadecimal data follows

04 Hexadecimal data to be displayed

9 LINE ADDRESS RANGE 00 - 1F is broken down from the second X'82' subfield in the X'96' subvector. The range can be:

00 No information is taken from the PSID subvector

53 A code point for line address range

11 EBCDIC data follows

F0F0406D40F1C6
EBCDIC data to be displayed

10 The failure-caused actions:

```
I032 - DUMP CHANNEL ADAPTER MICROCODE
I026 - RUN APPROPRIATE TRACE
I136 - CONTACT COMMUNICATIONS SYSTEMS PROGRAMMER
I010 - PERFORM 9999 PROBLEM DETERMINATION PROCEDURES
```

are taken from the code points (X'0611', X'0500', X'3110', and X'00E1') in the X'81' subfield of the X'96' subvector. The E in the X'00E1' code point indicates that an X'83' subfield is needed to complete the failure cause.

11 The qualifier on the failure cause (9999) is displayed because of the X'83' subfield of the X'96' subvector. The X'83' subfield contains the value X'21', indicating that the qualifier is taken from the first hardware PSID subfield (X'00') of the PSID subvector (X'11').

Figure 24 and Figure 25 show sample Event Detail panels. Explanations of the numerical references follow the figures.

Event Detail Panel

```
N E T V I E W          SESSION DOMAIN: CNM01    OPER1     03/20/11 14:41:32
NPDA-43S                      * EVENT DETAIL *                   PAGE 1 OF 2

 CNM01       PU9999     LINE04  1
            +--------+
 DOMAIN     |  PU    |----LINE----  2
            +--------+

DATE/TIME: RECORDED - 01/02 10:41    CREATED - 03/20/11 10:40:39  3

EVENT TYPE: PERMANENT  4

DESCRIPTION: COMMUNICATIONS SUBSYSTEM FAILURE  5
PROBABLE CAUSES:
   COMMUNICATIONS SUBSYSTEM CONTROLLER  6
   TOKEN-RING LAN

QUALIFIERS:
   1) 9999 COMMUNICATION CONTROL UNIT 0004  7

ENTER A (ACTION) OR DM (DETAIL MENU)

???
CMD==> _
```

Figure 24. Sample of Event Detail Panel (Page 1).

Sample of Event Detail Panel (Page 1)

```
N E T V I E W          SESSION DOMAIN: CNM01    OPER1     03/20/11 14:41:49
NPDA-43S                      * EVENT DETAIL *                   PAGE 2 OF 2

 CNM01       PU9999    LINE04
            +--------+
 DOMAIN     | PU     |----LINE----
            +--------+

QUALIFIERS (CONTINUED):
   2) EVENT CODE 22
   3) REASON CODE 00DC

CONTROL PROGRAM TEXT:  8
   THIS SUBFIELD IDENTIFIES THE TEXT MS

CORRELATION FOR SUPPORTING DATA  9
  PCID: PCIDLU01          NETWORK QUALIFIED NAME: CNM01
   1) LOG ID COMM_ERR
   2) LOG RECORD NUMBER 15

UNIQUE ALERT IDENTIFIER: PRODUCT ID - ACF/IBM            ALERT ID - 1A2B3C4D
                                      10                          11
ENTER A (ACTION) OR DM (DETAIL MENU)

???
CMD==> _
```

Figure 25. Sample of Event Detail Panel (Page 2).

Sample of Event Detail Panel (Page 2)

The Event Detail panel is built from subvectors X'92', X'93', X'98', X'01', X'31', and X'48', and subfield X'82'.

1 The resource names (PU9999 and LINE04) are taken from the X'05' hierarchy names list subvector. In Figure 21 on page 94, only names from the X'05' subvector are used because the Hierarchy Complete Indicator bit (byte 2, bit 0) in the X'05' subvector is set to X'0'. If this bit was set to 1, the NetView program would concatenate the names in the X'05' subvector to the names supplied by VTAM.

2 The resource types (PU and LINE) are derived by converting the type codes in the X'10' subfield of the X'05' subvector (X'F1' and X'F9'), into displayable resource types. For more information on changing resource types, see "Adding or Modifying Resource Types" on page 103.

3 The DATE/TIME RECORDED is the time the record is logged to the hardware monitor database. The created field shows the time the record was created by the sending product. It is taken from the X'10' subfield of the X'01' subvector.

4 EVENT TYPE is derived from byte 4 (Alert Type) the X'92' subvector.

5 DESCRIPTION is derived from the code point (X'1603') in the X'92' subvector, as is the description on the Alerts panel. However, a longer version of the text is displayed on this panel.

6 PROBABLE CAUSES are taken from the code points (X'0403' and X'2012') in the X'93' subvector. A longer version of the text is displayed on this panel than was displayed on the Alerts panel. Also, all of the probable causes are displayed.

7 QUALIFIERS are derived from either X'82' or X'85' subfields. The NetView program ignores X'01' subfields and associated sub-subfields (including X'82' and X'85') in a X'98' subvector.

While either X'82' or X'85' subfields can be used here, a combination of the two would not be valid. Within a subvector, all of the detail qualifiers must be X'82' subfields or X'85' subfields.

This example uses X'82' subfields, and the qualifiers are decoded as follows:

First in the X'98' subvector:

21 Data should be taken from the first hardware PSID subfield (X'00') of the PSID subvector (X'11').

34 Code point indicating communication control unit.

00 Hexadecimal data follows.

0004 Hexadecimal data to be displayed.

Second in the X'98' subvector:

00 No data is taken from the PSID subvector.

09 Code point indicating event code.

11 EBCDIC data follows.

F2F2 EBCDIC data to be displayed.

Third in the X'98' subvector:

00 No data is taken from the PSID subvector.

0E Code point indicating reason code.

00 Hexadecimal data follows.

00DC Hexadecimal data to be displayed.

Page 2 of the Event Detail panel (see Figure 24 on page 98) contains the following information:

8 `CONTROL PROGRAM TEXT` is the text title displayed because of the subfield X'21' of subvector X'31'. The text itself is taken directly from subfield X'30' of the X'31' subvector and displayed on the screen.

9 The `CORRELATION FOR SUPPORTING DATA` is displayed from the X'48' subvector. Subfield X'60' specifies that the network-qualified procedure correlation identifier be used to uniquely identify a session.

Either X'82' or X'85' subfields are used for supporting data. This example uses two X'82' subfields to identify the supporting data.

While either X'82' or X'85' subfields can be used here, a combination of the two is not valid. Within a subvector, all of the detail qualifiers must be X'82' subfields or X'85' subfields.

10 The product ID (`ACF/IBM`) is taken directly from the first product identifier (X'11') subvector in the first PSID (X'10') subvector. Figure 21 on page 94 uses the Software Product Serviceable Component Identifier (X'02') subfield.

11 The alert ID number (`1A2B3C4D`) is taken from subvector X'92' bytes 7–10.

Modifying Generic Code Point Tables

This section explains how to modify the generic alert code point tables that are shipped with the NetView program. You can modify the tables before or after NetView initialization. If after, use the CPTBL command to dynamically activate the changes. The CPTBL command is described in NetView online help.

Table Formats

Each table contains a different type of code point. The tables are:

- BNJ92TBL: Alert description code points
- BNJ93TBL: Probable cause code points
- BNJ94TBL: User cause code points
- BNJ95TBL: Install cause code points
- BNJ96TBL: Failure cause code points
- BNJ81TBL: Recommended action code points
- BNJ82TBL: Detail data code points
- BNJ85TBL: Detail data code points, X'85' subfield
- BNJ86TBL: Actual action code points.

The fourth and fifth characters of the table name identify the subvector or subfield that contains the code points.

The first entry in the code point table is the control entry. Columns 1 and 2 represent the subvector number which specifies which of the code point tables is being created or updated. Acceptable values are 92, 93, 94, 95, 96, 81, 82, 85, or 86. During initialization, this number must match the table name. Column 3 must be blank and all remaining columns are unused and are ignored. (You should not use

this area for comments because it may be used for other purposes in the future.) When using the CPTBL command, the name of the file that contains the code point definitions does not have to be one of the predefined names. The NetView program uses this control entry to determine the table type.

The format of each subsequent entry in the code point table is:

- Columns 1–4 contain the 4-character hexadecimal code point number. Valid characters are 0–9 and A–F. The code point range from X'E000' to X'EFFF' is reserved for your use. To use code points outside this range, contact the Tivoli Support Center.

  If a code point is defined more than once in a given table, the first entry is used, subsequent entries are ignored, and an informational message is generated.
- Column 6 contains the embed flag (`Y`) indicating that qualifier data associated with the X'82', X'83', or X'85' subfield is placed before the code point's text, embedded within the code point's text, or follows on the same line after the code point's text. Any character other than `Y` indicates that the embed flag is off. If the embed flag is turned on, the embed information included in the generic alert is embedded at the point marked by a dollar sign ($). Embedded text is only supported for BNJ81TBL, BNJ86TBL, BNJ94TBL, BNJ95TBL, and BNJ96TBL. Because no variable substitution is allowed for probable cause and alert description, an embed flag is ignored in BNJ92TBL and BNJ93TBL.
- Columns 8–72 contain the text description for this code point. The maximum length of the text varies as follows:
  - Probable cause: 40 characters for the first entry of a given code point, 20 for the second. (See **4** in "Example of BNJ92TBL Code Points Table" on page 102 for an explanation of the second entry.)
  - Alert description: 40 characters for the first entry of a given code point, 25 for the second. (See **4** in "Example of BNJ92TBL Code Points Table" on page 102 for an explanation of the second entry.)
  - Detail data: 40 characters
  - Others: 108 characters.

  Start in column 2 when continuing the text on the next line.
- Columns 73–80 are ignored and can be used for optional sequence numbers.

Note:

1. Code points in table BNJ82TBL must be left-justified and padded with zeros. For example, you enter code point 12 as 1200.
2. The text for the code point entries added to the NetView BNJ81TBL code point table should begin with E*nnn*. The text for the code point entries added to the NetView BNJ86TBL code point table should begin with R*nnn*. The use of E*nnn* and R*nnn* allows the code points to be supported by the ACTION command list (for more information on the ACTION command list, refer to the NetView online help). The action text in BNJ81TBL and BNJ86TBL should begin this way. Otherwise, when BNJDNUMB is used to generate recommended action numbers, it overlays the first 4 bytes of the recommended action text.
3. The hardware monitor searches the tables for the specific code points. If a match is not found, the hardware monitor searches some tables for a general code point.

   A general code point is the code point with the last 2 bytes set to zero. For example, if the specific code point is 1620, the general code point is 1600. If a general code point is found, its text is returned as if it matched the original code point. A general code point contains text that is valid for all specific code

points that it applies to. General code points are not available for BNJ82TBL and BNJ85TBL (for information on general code points, refer to the *SNA* library).

4. All code point tables are in uppercase. However, if you want to enter your own code in lowercase or mixed case, the NetView program does not convert the text to uppercase.

Use of %INCLUDE Statements

The use of %INCLUDE statements in the code points tables allows you to organize your code points information for easier maintainability.

You can choose to have one main table for each code point type. This table can contain the code points shipped with the NetView program and %INCLUDE statements for user-defined subtables and subtables defined by other products.

BNJ*xx*TBL (where *xx* is the table number) are tables Tivoli does not recommend modifying. Use these tables as main tables for each code point. If customization of these tables is required, use the BNJ*xx*UTB (where *xx* is the table number) file which is included by the main table (BNJ*xx*TBL) for this purpose.

Example of BNJ92TBL Code Points Table

An example of a code points table is shown in "Sample of BNJ92TBL Code Points Table." Explanations of the numeric references follow the figure.

Sample of BNJ92TBL Code Points Table

```
   * An asterisk in column 1 indicates a comment line.
   * The following line is the control entry indicating table type.
1  92
   * Blank lines are allowed for readability.

2  %INCLUDE BNJ92UTB
     3     4
   0100   SIMPLE CODE POINT TEXT;
5  E123   THIS TEXT IS EXACTLY FORTY CHARS LONG XX;
   E123   THIS IS THE SAME IN 25 XX;
6  FFFF
```

1 The first non-comment line is the control entry.

2 Code point tables can use %INCLUDE statements to embed other files into the code point table.

3 The code point (`0100`) is a 4-character hexadecimal number, starting in column 1.

4 The text description in columns 8–72 appears on the hardware monitor displays.

5 The hardware monitor has different panel formats that allow different length text for alert descriptions (92) and probable causes (93). The maximum length of the text for either entry is 40 characters. Abbreviated text is required, if the text exceeds 25 characters for alert descriptions or 20 characters for probable causes. Errors occur for text entries greater than 40 characters.

6 Any entries in the table with code point FFFF and no text are ignored (to allow for migration). Entries with code point FFFF and text are treated as any other code point.

Example of BNJ94TBL Code Points Table

Another example of a code points table is shown in "Sample of BNJ94TBL Code Points Table."

Sample of BNJ94TBL Code Points Table

```
    * An asterisk in column 1 indicates a comment line.
    * The following line is the control entry indicating table type.
    94
 1  %INCLUDE BNJ94UTB
 2  0100 Y CODE POINTS TEXT WITH DETAIL INSERTS $ AND $
 3  0200   CODE POINTS TEXT ILLUSTRATING CONTINUATION OF THE TEXT TO A SECON
     D LINE
 4  0100   DUPLICATE TEXT
```

1 Code point tables can use %INCLUDE statements to embed other files into the code point table.

2 The embed flag (Y in column 6) indicates that qualifier data is embedded at the point marked by a dollar sign ($).

3 Start in column 2 when continuing text on the next line. The text on the first line starts in column 8 and continues through column 72.

4 Because this code point has already been defined in the table, this entry is ignored and an informational message is generated.

Activating the Modified Code Point Tables

The CPTBL command is very similar to the AUTOTBL command and is used to dynamically activate changes made to code point tables after the NetView program is initialized (for a description of the CPTBL command, refer to NetView online help). Use the TEST option on the CPTBL command to verify the syntax of a code point table before activation.

Adding or Modifying Resource Types

You can add new resource types for hierarchical displays in the hardware monitor by modifying the member BNJRESTY.

BNJRESTY is a member of the data set NETVIEW.V6R2M0.BNJPNL2, defined by the definition statement BNJPNL2 in the NetView start procedure.

"Sample Contents of BNJRESTY" shows the format for BNJRESTY. Explanations of the numeric references follow the figure.

Sample Contents of BNJRESTY

```
 1   2 3
10 DISK your comments
```

1 A 2-character hexadecimal number, starting in column 1, flows to the NetView program in the X'05' subvector. Valid characters are 0–9 and A–F. If you include duplicate hexadecimal codes, the system uses the first entry of the duplicated code. Numbers from X'E0' to X'EF' are reserved for customer-defined resource types.

2 The four characters in columns 4–7 are taken as the resource type. Valid characters are 0–9, A–Z, and any printable special characters. A resource type of

less than 4 characters must begin in column 4, and be padded on the right with blanks. Do not use delimiters, such as a comma (,), period (.), or equal sign (=), as characters in the resource type.

3 An optional comment can begin anywhere after the resource type.

If BNJRESTY is modified while the hardware monitor task BNJDSERV is active, the new resource types are not recognized. Use STOP TASK=BNJDSERV followed by STARTCNM NPDA so that the NetView program can recognize any new resource types or use the RTTBL command to activate a modified BNJRESTY member.

If the NetView program finds an entry that is not valid in BNJRESTY during activation of the NetView program or when the RTTBL command is invoked, an error message appears on the command facility console and the NetView program uses the resource types that are supplied by IBM.

Chapter 7. Modifying Network Asset Management Command Lists

Network asset management provides a way of collecting inventory data from a subset of hardware and software devices automatically. You can use network asset management to collect vital product data (VPD) such as serial numbers, machine types, and model numbers for hardware products and software information. This information includes version and release levels. However, the NetView program does not verify the returned data from devices supporting network asset management; it only provides a way to collect and log the data.

Reference: Refer to the *IBM Tivoli NetView for z/OS Administration Reference* for information on the record formats. Refer to the NetView online help for information about the command lists that are provided with the NetView program.

Any device that supports the REQUEST/REPLY PSID architecture can report VPD to the NetView program. An attempt to solicit VPD from a device that does not support the architecture can cause the keyboard to lock or extraneous data to appear on the screen. You may need to press the RESET key or clear the screen, but these actions do not affect the VPD collection in the NetView program.

Reference: Refer to the *SNA* library for information on the REQUEST/REPLY PSID architecture.

The following examples are some physical units (PUs) that support the REQUEST/REPLY PSID architecture:

- 3720/NCP
- 3725/NCP
- 3745/NCP
- 3174 that reports data for itself and many types of attached devices such as various models of 3191, 3192, and 3194 display stations.

Personal computers running OS/2 are required with these products.

Reference: Instructions for entering VPD for a device are located in the user's guides for that device.

Network asset management provides the VPDCMD command to solicit VPD from a given device and the VPDLOG command to build and log a record to an external logging facility (such as SMF). You can use Service Level Reporter (SLR) to view the data interactively or to generate reports, or the VPDALL command to generate VPDPU and VPDDCE command entries for all devices within a NetView domain. If you have any resources that require switched lines, be sure that the switched lines are active before collecting VPD.

Network asset management provides the following command lists:

VPDPU
: Collects and logs VPD from a single PU and its attached devices. You can enter this command list from an operator's console or from another command list.

VPDDCE
Solicits and logs VPD from DCEs that are in a direct path between a specified NCP and a specified PU. You can issue this command list from an operator's console or from another command list.

VPDACT
Is the default name of a command list that the VPDALL command generates when issued with the CREATE option. VPDALL reads a VTAM configuration member in VTAMLST as input and generates a command list called VPDACT (the default). VPDACT contains a list of VPDPU and VPDDCE entries for devices in your domain. You can later issue VPDACT to collect and log VPD from the supported devices in the NetView domain.

VPDLOGC
Is the command list that builds and logs START and END records. A START record is generated for a VPDACT command list at the beginning of a VPD solicitation. An END record is generated for a VPDACT command list at the end of a VPD solicitation. Do not issue this command list from an operator's console or from a user-written command list.

VPDXDOM
Is a service command list used for VPD solicitation from cross-domain resources. This command list is driven through a NetView automation table. Do not issue this command list from an operator's console or from a user-written command list.

Reference: Refer to *IBM Tivoli NetView for z/OS Administration Reference* for the record formats and the NetView online help for descriptions of VPD command lists. Refer to *IBM Tivoli NetView for z/OS Automation Guide* for additional information.

VPD Collection from a Single PU

The following list describes the procedures for collecting VPD from a single PU and its attached devices:

1. Specify a resource name and issue the VPDPU or VPDDCE command list.
2. The command list issues a VPDCMD command to solicit data from the specified resource, and waits for the response messages.
3. A PU responds with VPD for itself, or for itself and its attached devices.
4. The command list traps the response messages and saves the VPD, such as machine type, model number, and serial numbers, in command list variables.
5. When the completion message is received, the command list builds records and writes them to an external logging facility.
6. If any abnormal events occur before completion, a command list error message is issued and the command list terminates. An abnormal event can be a logging failure, an inactive VPDTASK, or an abend.

VPD Collection from a Single NetView Domain

The following list describes procedures for collecting VPD from a single NetView domain:

1. A NetView operator enters the following command:
   ```
   VPDALL CONFIG(ATCCON01),CREATE,CLIST(VPDACT),ADD
   ```
2. The VPDALL command list reads the specified nodes from the configuration member (ATCCON01, in this example) in VTAMLST. VPDALL extracts all the

resource names from the VTAMLST nodes so that VPD can be collected. VPDALL then builds VPDPU and VPDDCE entries in a command list called VPDACT. VPDALL does not support dynamic reconfiguration decks (DRDs) or DCEs on switched lines.

Note: To collect data from the entire domain, the configuration member must contain the definitions for all the resources in the domain.

3. You can modify VPDACT by adding or deleting resource names.
4. When the VPDACT command list is executed, VPDLOGC is called to generate a START record. VPDACT then calls the VPDPU and VPDDCE command lists and, after they are complete, calls the VPDLOGC to generate an END record.

Focal Point VPD Collection

Figure 26 shows a focal point NetView program for VPD.

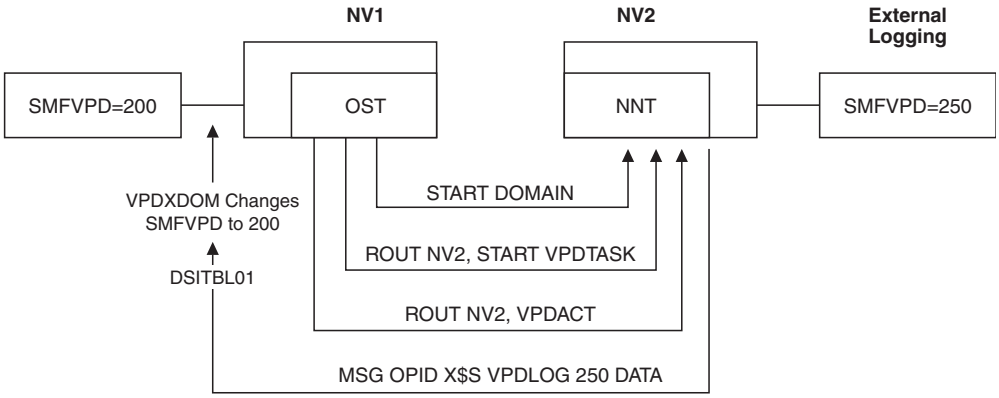

Figure 26. VPD Focal Point NetView Program

The following steps describe the procedures for the collection of VPD for the sample focal point NetView program shown in Figure 26.

1. During installation, NV1 sets the common global variable SMFVPD to 200. NV2 sets the common global variable to 250.

   Note: CNMSTYLE sets the common global variable SMFVPD to 37.
2. NV1 is designated as a focal point NetView program for VPD collection. In the NetView automation table (DSITBL01), for NV1 only, uncomment the statement designated to drive the VPDXDOM command list.

   Reference: For more information, refer to the *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*.
3. Start DSIELTSK from the focal point NetView NV1.
4. NV1 establishes a direct OST-to-NNT session with NV2 using the START DOMAIN command.
5. NV1 issues START VPDTASK.
6. NV1 issues ROUTE NV2, START VPDTASK.
7. NV1 issues ROUTE NV2, VPDACT. This causes the VPDACT command list in NV2 to run under an NNT.
8. In NV2, VPDACT verifies that it is running under an NNT, and generates the following message:

   ```
   MSG OPID X$S VPDLOG 250 '1 STRING1 10 STRING2...'
   ```

where X$S is a special string recognized by the NetView automation table.

9. When the VPDACT command list in NV2 writes the generated message to the operator in NV1, the message triggers the NetView automation table to execute the VPDXDOM command list in NV1.

   Reference: Refer to *IBM Tivoli NetView for z/OS Automation Guide* for additional information about the VPXDOM command list.

10. When VPDXDOM is entered, the message string is as follows:

    ```
    DSI039I MSG FROM OPID : X$S VPDLOG 250 1 STRING1...
    ```

11. VPDXDOM verifies that NV1 set SMFVPD as a common global variable and changes SMFVPD from 250 (NV2) to 200 (NV1).
12. VPDLOGC logs the data records under NV1's SMF record number 200.
13. Be sure that the cross-domain session stays active until after the VPD solicitation is completed.

Customization Considerations

You can customize the VPD command lists that are provided with the NetView program to suit your requirements.

When modifying network asset management command lists to build different record formats, do not exceed 256 bytes per record. The NetView program has a command string limitation of 240 characters. You can write a command processor to make full use of the VPD command.

Reference: Refer to *IBM Tivoli NetView for z/OS Programming: Assembler* for information about command processors.

If you are changing the SMF record format, you cannot use record number 37. You must globally define the SMF record number within the user-defined range of 128–255. If you are using SLR, you must write the SLR table to match your modified SMF record format.

Reference: Refer to NetView online help and *IBM Tivoli NetView for z/OS Programming: REXX and the NetView Command List Language* for limitations on the use of &WAIT and RESET, and for considerations regarding the issuance of a second network asset management command list and network asset management command while a previous network asset management command list is running.

To improve performance, you can do the following:

- Write a command list that reads in VPDACT to distribute the workload among several autotasks. Dividing the workload among several OSTs or autotasks allows multiple VPDPU or VPDDCE entries to execute simultaneously. Otherwise, the VPDPU and VPDDCE entries are executed serially.
- Create several configuration members (for example, one member for each major node) or, using VPDALL, create several command lists.
- Make each command list run under several tasks, such as an OST and an autotask.

Chapter 8. Customizing the Event/Automation Service

With the Event/Automation Service (E/AS), you can manage all network events from the platform of your choice. You can use either an event server (such as Tivoli Netcool®/OMNIbus or Tivoli Enterprise Console®) or the NetView for z/OS program to see a comprehensive list of events in your network.

Event/Automation Service: Overview

The Event/Automation Service consists of the following services:

- Alert adapter service

  The alert adapter service is an event adapter that converts NetView for z/OS alerts to Event Integration Facility (EIF) events and forwards the events to a designated event server. The alert adapter service collects filtered SNA alerts directly from the NetView hardware monitor and translates the alerts into appropriate event class or subclass instances. To receive alerts from the NetView program, the Event/Automation Service registers with the NetView PPI. Filtered alerts from the NetView hardware monitor are sent over the PPI to the alert adapter service. All alerts to be converted will match the formats described in the *IBM Systems Network Architecture Management Services Reference*.

- Confirmed alert adapter service

  The confirmed alert adapter service is an event adapter that converts NetView for z/OS alerts to EIF events. The resulting events are forwarded to a designated event server. The event server then replies with a confirmation that indicates acceptance of the EIF event.

  The confirmed alert adapter service collects filtered SNA alerts directly from the NetView hardware monitor and translates the alerts into appropriate event class or subclass instances. To receive alerts from the NetView program, the Event/Automation Service registers with the NetView PPI. Filtered alerts from the NetView hardware monitor are sent over the PPI to the confirmed alert adapter service. The confirmation expected by the adapter is described in a note in the sample class definition statement file IHSABCDS for the confirmed alert adapter. All alerts to be converted match the formats that are described in the *IBM Systems Network Architecture Management Services Reference*.

- Message adapter service

  The message adapter service is an event adapter that converts any message forwarded from NetView message automation into EIF events. The resulting events are forwarded to a designated event server. The message adapter collects filtered messages directly from the NetView automation table and translates the messages into appropriate event class or subclass instances. To receive messages from the NetView program, the Event/Automation Service registers with the NetView PPI. Filtered messages from the NetView message automation table are sent over the PPI to the message adapter.

- Confirmed message adapter service

  The confirmed message adapter service is an event adapter that converts any message forwarded from NetView message automation into EIF events. The resulting events are forwarded to a designated event server. The event server then replies with a confirmation that indicates acceptance of the EIF event. The confirmation expected by the adapter is described in a note in the sample message format file IHSANFMT for the confirmed message adapter.

The confirmed message adapter collects filtered messages directly from the NetView automation table and translates the messages into appropriate event class or subclass instances. To receive messages from the NetView program, the Event/Automation Service registers with the NetView PPI. Filtered messages from the NetView message automation table are sent over the PPI to the confirmed message adapter.

- Event receiver service

  The event receiver service receives events from an event server and converts them into SNA alerts. The converted alerts are then forwarded to the NetView hardware monitor where they are filtered and routed to the NetView automation table.

- Alert-to-trap service

  The alert-to-trap service is an SNMP sub-agent that converts NetView for z/OS alerts to SNMP traps and forwards the traps to an SNMP agent. The alert-to-trap service collects filtered SNA alerts directly from the NetView hardware monitor and translates the alerts into appropriate SNMP trap instances. To receive alerts from the NetView program, the Event/Automation Service registers with the NetView PPI. Filtered alerts from the NetView hardware monitor are sent over the PPI to the alert-to-trap service. All alerts to be converted match the formats that are described in the *IBM Systems Network Architecture Management Services Reference*.

- Trap-to-alert service

  The trap-to-alert service receives events from an SNMP manager and converts them into SNA alerts. The converted alerts are then forwarded to the NetView hardware monitor where they are filtered and routed to the NetView automation table.

Starting the Event/Automation Service

The Event/Automation Service (E/AS) can be started from either the MVS system console using a startup procedure, or from the UNIX System Services command shell using a command file. The sample startup procedure installed with the E/AS is IHSAEVNT. The command file used to start the E/AS from the UNIX System Services command shell is IHSAC000.

The environment that the E/AS is started from (either the MVS system console or the UNIX System Services command shell) determines certain operational characteristics of the E/AS as follows:

- The location of default configuration files.
- Whether certain startup parameters can be specified.
- The default output logs for trace/error data.

All other operational characteristics of the E/AS are the same regardless of the startup environment.

For information about installing and starting the E/AS, see the *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*.

Customizing the Initialization of the Event/Automation Service

The Event/Automation Service (E/AS) has a number of configurable settings. A few must be set by the E/AS administrator in order for the E/AS to successfully initialize. For more information, refer to *IBM Tivoli NetView for z/OS Installation: Configuring Additional Components*.

Configurable settings can be set by the E/AS administrator using configuration files, startup parameters, and E/AS modification commands. Some configurable settings can be set using more than one of these methods. Configurable settings are set in the following order, from highest priority to lowest:

- E/AS modification commands are issued to the E/AS after initialization. Any E/AS modification commands that affect a configurable setting change that setting for the duration of the current execution of the E/AS only.
- A configurable setting that is specified as an E/AS startup parameter.
- A configurable setting that is specified in a configuration file.
- The default value of the configurable setting.

E/AS modification commands are discussed fully in the *IBM Tivoli NetView for z/OS Command Reference Volume 1 (A-N)*.

Defaults for Configurable Settings

The following table lists all configurable settings and their defaults:

Setting	Default	Overridden by
E/AS PPI name	IHSATEC	PPI startup parameter, global initialization file PPI statement
Global initialization file name	Started with IHSAEVNT - IHSAINIT Started with IHSAC000 --/etc/netview/global_init.conf	IHSAINIT startup parameter
Alert adapter configuration file name	Started with IHSAEVNT - IHSAACFG Started with IHSAC000 --/etc/netview/alert_adpt.conf	ALRTCFG startup parameter, global initialization file ALRTCFG statement
Confirmed alert adapter configuration file name	Started with IHSAEVNT - IHSABCFG Started with IHSAC000 --/etc/netview/ confirm_alert_adpt.conf	CALRTCFG or -b startup parameter, global initialization file CALRTCFG statement
Alert-to-trap configuration file name	Started with IHSAEVNT - IHSAATCF Started with IHSAC000 --/etc/netview/alert_trap.conf	ALRTTCFG startup parameter, global initialization file ALRTTCFG statement
Trap-to-alert configuration file name	Started with IHSAEVNT - IHSATCFG Started with IHSAC000 --/etc/netview/trap_alert.conf	TALRTCFG startup parameter, global initialization file TALRTCFG statement
Message adapter configuration file name	Started with IHSAEVNT - IHSAMCFG Started with IHSAC000 --/etc/netview/message_adpt.conf	MSGCFG startup parameter, global initialization file MSGCFG statement
Confirmed message adapter configuration file name	Started with IHSAEVNT - IHSANCFG Started with IHSAC000 --/etc/netview/ confirm_message_adpt.conf	CMSGCFG or -n startup parameter, global initialization file CMSGCFG statement

Setting	Default	Overridden by
Event receiver configuration file name	Started with IHSAEVNT -- IHSAECFG Started with IHSAC000 --/etc/netview/event_rcv.conf	ERCVCFG startup parameter, global initialization file ERCVCFG statement
Output log wrapping	0	OUTSIZE startup parameter
Disable console messages to OpenEdition shell	Enabled	-P startup option
Console messages file name	Started with IHSAEVNT -- IHSAMSG1 Started with IHSAC000 -- /usr/lpp/netview/msg/C/ihsamsg1	-M startup option
Trace/error HFS path	/tmp	-E startup option
Trace settings	Off for all tasks	Global initialization file TRACE statement, TRACE command
Service startup	All services are started	Global initialization file NOSTART statement
Trace/error data logical destination	SYSOUT	Global initialization file OUTPUT statement, OUTPUT command
Event server locations	No default	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file ServerPort statement
Event server port numbers	For the confirmed alert adapter and the confirmed message adapter the default is 5539. For the alert adapter and the message adapter, the default value is 0.	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter file ServerPort statement
Alert adapter class definition statement (CDS) file name	Started with IHSAEVNT -- IHSAACDS Started with IHSAC000 --/etc/netview/alert_adpt.cds	Alert adapter configuration file AdapterCdsFile statement
Confirmed alert adapter class definition statement (CDS) file name	Started with IHSAEVNT -- IHSABCDS Started with IHSAC000 --/etc/netview/ confirm_alert_adpt.cds	Confirmed alert adapter configuration file AdapterCdsFile statement
Alert-to-trap adapter class definition statement (CDS) file name	Started with IHSAEVNT -- IHSALCDS Started with IHSAC000 -- /etc/netview/alert_trap.cds	Alert-to-trap configuration file AdapterCdsFile statement
Trap-to-alert adapter class definition statement (CDS) file name	Started with IHSAEVNT -- IHSATCDS Started with IHSAC000 -- /etc/netview/trap_alert.cds	Trap-to-alert configuration file AdapterCdsFile statement

Setting	Default	Overridden by
Event receiver class definition statement file name	Started with IHSAEVNT -- IHSAECDS Started with IHSAC000 --/etc/netview/event_rcv.cds	Event receiver configuration file AdapterCdsFile statement
Message adapter format file name	Started with IHSAEVNT -- IHSAMFMT Started with IHSAC000 -- /etc/netview/message_adpt.fmt	Message adapter configuration file AdapterFmtFile statement
Confirmed message adapter format file name	Started with IHSAEVNT -- IHSANFMT Started with IHSAC000 -- /etc/netview/ confirm_message_adpt.fmt	Confirmed message adapter configuration file AdapterFmtFile statement
Maximum event cache size	64KB	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file BufEvtMaxSize statement
Event cache HFS path	/etc/Tivoli/tec/cache	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file BufEvtPath statement
Maximum event cache retrieval buffer size	64KB	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file BufEvtRdblkLen statement
Amount to shrink the event cache	8KB	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file BufEvtShrinkSize statement
Enable event buffering	YES	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file BufferEvents statement
Rate to flush the event cache	0	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file BufferFlushRate statement
Maximum number of events allowed in the event cache	0	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file BufferEventsLimit statement

Setting	Default	Overridden by
Event server connection mode	connection_less	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file ConnectionMode statement
Maximum size of an EIF event	4096 bytes	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file EventMaxSize statement
EIF event filtering definitions	No filters defined	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file Filter statement
EIF event filtering from event cache definitions	No filters defined	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file FilterCache statement
Mode of EIF event filtering	OUT	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file FilterMode statement
Broken connection retry interval and time to wait for a response	120 seconds	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file RetryInterval statement. Only the confirmed alert adapter and the confirmed message adapter wait for a response.
Negative response limit	0	Confirmed alert adapter or confirmed message adapter configuration file BufEvtNegRespLimit statement
EIF event forwarding debug mode	NO	Alert adapter, confirmed alert adapter, message adapter, and confirmed message adapter configuration file TestMode statement
Event receiver PPI name	NETVALRT	Event receiver configuration file NetViewAlertReceiver statement
Event receiver port number	0	Event receiver configuration file PortNumber statement
Enable PortMapper for the event receiver	YES	Event receiver configuration file UsePortmapper statement
Create a single SV31 from incoming event data; truncation occurs if necessary	YES	Event receiver service and trap-to-alert service configuration files TruncateSV31s statement
Alert-to-trap SNMP agent IP location	loopback	Alert-to-trap service configuration file Hostname statement
Alert-to-trap community name	public	Alert-to-trap service configuration file Community statement

Setting	Default	Overridden by
Alert-to-trap Enterprise Object ID	1.3.6.1.4.1.1.1588.1.3	Alert-to-trap service configuration file Enterpriseoid statement
Trap-to-alert PPI name	NETVALRT	Trap-to-alert service configuration file NetViewAlertReceiver statement
Trap-to-alert port number	162	Trap-to-alert service configuration file PortNumber statement

Customizing the Event/Automation Startup Parameters

Startup parameters can be specified for the IHSAEVNT startup procedure if you are starting the E/AS from the MVS system console, or on the UNIX System Services command line for the IHSAC000 command. Startup parameters follow two general formats:

- `parameter=value`
- `-option [value]`

Either format can be used from either startup environment unless otherwise noted in the information that follows. However, to pass the option/value format to the IHSAEVNT startup procedure, the list of options and values must be encoded into a single parameter/value format. The IHSAEVNT startup procedure provides the following parameter to accomplish this:

```
OELINE
```

An example of using the OELINE parameter to pass option/value format startup parameters to the IHSAEVNT startup procedure follows:

```
s IHSAEVNT,OELINE='-opt1 value1 -opt2 value2...'
```

Use single quotes to surround the options and values passed with the OELINE parameter.

The option/value format is a case-sensitive format. Ensure you specify the following options exactly as they are described. Values are not translated to uppercase. For some options, only the option is specified. There is no corresponding value associated with the option.

The startup parameters are:

INITFILE=*file* **or -i** *file*
: This startup parameter specifies the name of the global initialization file in *file*. If you use the **INITFILE=***file* format, the file is a 1–8 character PDS member name that is associated with the IHSSMP3 data set definition from the IHSAEVNT startup procedure. This format is not valid when starting the E/AS from the UNIX System Services command line. If you use the **-i** *file* format, the file is a full MVS data set or HFS path and file name. Surround MVS data set names with single quotes to make them fully-qualified data sets. For example:

```
INITFILE=IHSAINIT
-i 'NETVIEW.V6R2M0.SCNMUXCL(IHSAINIT)'
-i /etc/netview/global_init.conf
```

MSGCFG=*file* **or -m** *file*
: This startup parameter specifies the name of the message adapter configuration file in *file*. If you use the **MSGCFG=***file* format, the file is a 1–8 character PDS member name that is associated with the IHSSMP3 data

set definition from the IHSAEVNT startup procedure. This format is not allowed when starting the E/AS from the UNIX System Services command line. If you use the **-m** *file* format, the file is a full MVS data set or HFS path and file name. Surround MVS data set names with single quotes to make them fully-qualified data sets. For example:

```
MSGCFG=IHSAMCFG
-m 'NETVIEW.V6R2M0.SCNMUXCL(IHSAMCFG)'
-m /etc/netview/message_adpt.conf
```

CMSGCFG=*file* **or -n** *file*

This startup parameter specifies the name of the confirmed message adapter configuration file in *file.* If you use the **CMSGCFG=***file* format, the file is a 1 - 8 character PDS member name that is associated with the IHSSMP3 data set definition from the IHSAEVNT startup procedure. This format is not allowed when starting the Event/Automation Service from the UNIX System Services command line. If you use the **-n** *file* format, the file is a full MVS data set or HFS path and file name. Surround MVS data set names with single quotation marks to make them fully-qualified data sets. For example:

```
CMSGCFG=IHSANCFG
-n 'NETVIEW.V6R2M0.SCNMUXCL(IHSANCFG)'
-n /etc/netview/confirm_message_adpt.conf
```

ALRTCFG=*file* **or -a** *file*

This startup parameter specifies the name of the alert adapter configuration file in *file.* If you use the **ALRTCFG=***file* format, the file is a 1–8 character PDS member name that is associated with the IHSSMP3 data set definition from the IHSAEVNT startup procedure. This format is not allowed when starting the E/AS from the UNIX System Services command line. If you use the **-a** *file* format, the file is a full MVS data set or HFS path and file name. Surround MVS data set names with single quotes to make them fully-qualified data sets. For example:

```
ALRTCFG=IHSAACFG
-a 'NETVIEW.V6R2M0.SCNMUXCL(IHSAACFG)'
-a /etc/netview/alert_adpt.conf
```

CALRTCFG=*file* **or -b** *file*

This startup parameter specifies the name of the confirmed alert adapter configuration file in *file.* If you use the **CALRTCFG=***file* format, the file is a 1 - 8 character PDS member name that is associated with the IHSSMP3 data set definition from the IHSAEVNT startup procedure. This format is not allowed when starting the Event/Automation Service from the UNIX System Services command line. If you use the **-b** *file* format, the file is a full MVS data set or HFS path and file name. Surround MVS data set names with single quotation marks to make them fully-qualified data sets. For example:

```
CALRTCFG=IHSABCFG
-b 'NETVIEW.V6R2M0.SCNMUXCL(IHSABCFG)'
-b /etc/netview/confirm_alert_adpt.conf
```

ALRTTCFG=*file* **or -a** *file*

This startup parameter specifies the name of the alert-to-trap service configuration file in *file.* If you use the **ALRTTCFG=***file* format, the file is a 1–8 character PDS member name that is associated with the IHSSMP3 data set definition from the IHSAEVNT startup procedure. This format is not allowed when starting the E/AS from the UNIX System Services command line. If you use the **-a** *file* format, the file is a full MVS data set or HFS path and file name. Surround MVS data set names with single quotes to make them fully-qualified data sets. For example:

```
ALRTTCFG=IHSAATCF
-l 'NETVIEW.V6R2M0.SCNMUXCL(IHSAATCF)'
-l /etc/netview/alert_trap.conf
```

TALRTCFG=*file* **or -t** *file*

This startup parameter specifies the name of the trap-to-alert service configuration file in *file.* If you use the **TALRTCFG=***file* format, the file is a 1–8 character PDS member name that is associated with the IHSSMP3 data set definition from the IHSAEVNT startup procedure. This format is not allowed when starting the E/AS from the UNIX System Services command line. If you use the **-t** *file* format, the file is a full MVS data set or HFS path and file name. Surround MVS data set names with single quotes to make them fully-qualified data sets. For example:

```
TALRTCFG=IHSATCFG
-t 'NETVIEW.V6R2M0.SCNMUXCL(IHSATCFG)'
-t /etc/netview/trap_alert.conf
```

ERCVCFG=*file* **or -e** *file*

This startup parameter specifies the name of the event receiver configuration file in *file.* If you use the **ERCVCFG=***file* format, the file is a 1–8 character PDS member name that is associated with the IHSSMP3 data set definition from the IHSAEVNT startup procedure. This format is not allowed when starting the E/AS from the UNIX System Services command line. If you use the **-e** *file* format, the file is a full MVS data set or HFS path and file name. Surround MVS data set names with single quotes to make them fully-qualified data sets. For example:

```
ERCVCFG=IHSAECFG
-e 'NETVIEW.V6R2M0.SCNMUXCL(IHSAECFG)'
-e /etc/netview/event_rcv.conf
```

PPI=*ppiname* **or -p** *ppiname*

This startup parameter specifies the name of the E/AS PPI mailbox in *ppiname.* For example:

```
PPI=IHSATEC
-p IHSATEC
```

OUTSIZE=*size* **or -O** *size*

This startup parameter enables output log wrapping and specifies the maximum size of the output log file, in kilobytes. If *size* is specified as 0, output log wrapping is disabled. For more information about E/AS output, see “Event/Automation Service Output” on page 118.

```
OUTSIZE=0
-O 0
```

-M *msgfile*

This startup parameter specifies the location of the E/AS messages file. *msgfile* specifies a full MVS data set or HFS path and filename. Surround MVS data set names with single quotes to make them fully qualified data sets. For example:

```
-M 'NETVIEW.V6R2M0.SDUIMSG1(IHSAMSG1)'
-M /usr/lpp/netview/msg/C/ihsamsg1
```

-P This startup parameter is not allowed when starting the E/AS from the IHSAEVNT startup procedure. It is used to disable the forwarding of MVS system console messages to the UNIX System Services command shell if the E/AS was started under the UNIX System Services command shell. By default, a message that is issued to the MVS system console is also issued at the UNIX System Services command shell.

-E *path*

This startup parameter is not allowed when starting the E/AS from the IHSAEVNT startup procedure. This startup parameter specifies the HFS path of trace/error log files. *path* specifies an HFS path. For example:

```
-E /tmp
```

Customizing the Event/Automation Service Configuration Files

The E/AS uses configuration files. These files and their default names are:

- The global initialization file
  IHSAINIT or /etc/netview/global_init.conf
- The alert adapter configuration file
  IHSAACFG or /etc/netview/alert_adpt.conf
- The confirmed alert adapter configuration file
  IHSABCFG or /etc/netview/confirm_alert_adpt.conf
- The alert-to-trap service configuration file
  IHSAATCF or /etc/netview/alert_trap.conf
- The trap-to-alert service configuration file
  IHSATCFG or /etc/netview/trap_alert_trap.conf
- The message adapter configuration file
  IHSAMCFG or /etc/netview/message_adpt.conf
- The confirmed message adapter configuration file
  IHSANCFG or /etc/netview/confirm_message_adpt.conf
- The event receiver configuration file
  IHSAECFG or /etc/netview/event_rcv.conf

The global initialization file is used to change configurable settings that are required by all the services. Each of the other configuration files are used to change configurable settings that are specific to the services. The statements within these files must all be contained on one line. Each of these files can have comments. Comment statements begin with the number sign (#).

If the E/AS is started from the IHSAEVNT startup procedure, by default the 8–character PDS name specified is used to locate the file. The file must be in a data set specified by the IHSSMP3 data set definition statement from the IHSAEVNT startup procedure. If the E/AS is started from the UNIX System Services command shell, by default the HFS name specified is used to locate the file.

Every statement in a configuration file can be a comment. If all configuration file statements are comments, the configuration file will not change any of the configurable settings. Each of the four configuration files **must** exist for the E/AS to properly initialize, even if the file contains nothing but comments. The E/AS will not initialize if it cannot locate a configuration file.

For more information about the configuration file statements, see the *IBM Tivoli NetView for z/OS Administration Reference*.

Event/Automation Service Output

All Event/Automation Service (E/AS) output can be sent to one or both of two destinations: the generalized trace facility (GTF) and the E/AS output logs. By default, data is sent to the E/AS output logs. The destination of E/AS output can be changed using the OUTPUT command or the OUTPUT statement in the global

initialization file. Refer to the *IBM Tivoli NetView for z/OS Command Reference Volume 1 (A-N)* and *IBM Tivoli NetView for z/OS Administration Reference* for more information.

There is an output log associated with each of the three services, and an output log associated with the entire E/AS address space. If output log wrapping is disabled, these output logs are physically represented by one system file. If output log wrapping is enabled, these output logs are physically represented by two system files — a primary file and a secondary file.

When wrapping is disabled, all output log data is written to the primary file.

When wrapping is enabled, the wrap size is used to limit the total amount of bytes that can be written to either the primary or the secondary file. When this wrap size is exceeded, the current file being used for output log output (either the primary or secondary file) is closed, and the file that was not previously in use (either the primary or the secondary) is opened for further logging. Whenever an output log is opened, all data that was previously in the log is destroyed. Therefore, the maximum amount of output log data available is 2 times the wrap size (both the primary and secondary files are full), and the minimum amount of output log data available is the wrap size (a switch has just occurred to either the primary or secondary file, destroying all data previously in that file).

> For more information about setting output log wrapping, refer to the OUTSIZE
> parameter in "Customizing the Event/Automation Startup Parameters" on page 115.

Event/Automation Service Output Log Names

When the E/AS is started using the IHSAEVNT startup procedure, the names of the output logs are defined by the following data set definition statements within the IHSAEVNT procedure:

- IHSA (primary file) and IHSAS (secondary file): defines the output log files for the alert adapter service.
- IHSB (primary file) and IHSBS (secondary file): defines the output log files for the confirmed alert adapter service.
- IHSC (primary file) and IHSCS (secondary file): defines the output log files for the E/AS address space.
- IHSE (primary file) and IHSES (secondary file): defines the output log files for the event receiver service.
- IHSL (primary file) and IHSLS (secondary file): defines the output log files for an alert-to-trap service.
- IHSM (primary file) and IHSMS (secondary file): defines the output log files for the message adapter service.
- IHSN (primary file) and IHSNS (secondary file): defines the output log files for the confirmed message adapter service.
- IHST (primary file) and IHSTS (secondary file): defines the output log files for a trap-to-alert service.

If output log wrapping is disabled, the data set definition for the secondary file does not need to be present in the IHSAEVNT startup procedure, but it is a good practice to leave it in. The data set definition for the primary file must always be present.

By default, the output log files are set to the IHSAEVNT jobs SYSOUT data set. If SYSOUT data sets are used for the output log files, output log wrapping is disabled. If you want to enable output log wrapping, you must change these data set definitions to reference an MVS sequential data set or HFS file.

Note: There is no restriction placed on the type of file that you specify in the data set definition statements in the IHSAEVNT startup procedure. However, it is recommended that you do not define a PDS member as an output log file due to synchronization problems that may occur when trying to write data to the PDS member. You also should use a different file for each data set definition statement.

Unless you have been instructed to run with tracing enabled by a Tivoli service representative, it is recommended that you use the default SYSOUT data sets that are specified in the sample IHSAEVNT startup procedure and do not enable output log wrapping.

When the E/AS is started using IHSAC000 in the UNIX System Services command shell, the names of the output log files are defined as follows:

- The files must be HFS files. By default, the path of the files is /tmp. This path can be changed using the -E startup option. Refer to this option on page "-E path" on page 117.
- controlp.log (primary file) and controls.log (secondary file) are the names of the output log files for the E/AS address space. These names cannot be changed.
- alertp.log (primary file) and alerts.log (secondary file) are the names of the output log files for the alert adapter service. These names cannot be changed.
- calertp.err (primary file) and calerts.err (secondary file) are the names of the output log files for the confirmed alert adapter service. These names cannot be changed.
- alrttrpp.log (primary file) and alrttrps.log (secondary file) are output error log files for the alert-to-trap adapter service.
- trapalrtp.log (primary file) and trapalrts.log (secondary file) are output error log files for the trap-to-alert service.
- messagep.log (primary file) and messages.log (secondary file) are the names of the output log files for the message adapter service. These names cannot be changed.
- cmessagep.err (primary file) and cmessages.err (secondary file) are the names of the output log files for the confirmed message adapter service. These names cannot be changed.
- eventrcvp.log (primary file) and eventrcvs.log (secondary file) are the names of the output log files for the event receiver service. These names cannot be changed.

The E/AS creates these output log files if they do not exist.

Note: Unless you have been instructed to run with tracing enabled by a Tivoli service representative, it is recommended that you do not enable output log wrapping.

Types of Event/Automation Service Output Data

The E/AS generates two types of output data: trace data and error data.

Trace data is only generated if tracing is enabled. By default, tracing is disabled. To change trace settings, see the *IBM Tivoli NetView for z/OS Command Reference Volume*

2 (O-Z) for information about the TRACE command, and the *IBM Tivoli NetView for z/OS Administration Reference* for information about the global initialization file TRACE statement.

In general, tracing should only be used if you are requested to do so by a Tivoli service representative.

Error data is composed of MVS system console messages and output log only messages. In general, any error condition detected by the E/AS results in an MVS console message. This console message is also written to E/AS output. To aid in problem determination, additional messages may also be written to E/AS output. These output log only messages that were not issued to the MVS system console may give more detail concerning the problem.

The combination of system console and output log only messages should allow you to resolve most E/AS problems without the aid of a Tivoli service representative.

Not all MVS console messages describe error conditions. There are a number of informational messages that are also issued by the E/AS and sent to E/AS output logs.

Format of Event/Automation Service Output Data

When an output log file is initially opened, the first entry in the output log file is composed of the name of the output file followed by a date/time string in the format:

```
day month date time year
```

The following example shows the header for the message adapter service primary output log file, assuming that the E/AS was started from the IHSAEVNT startup procedure:

```
IHSM Fri Feb 20 10:45:55 2011
```

All other E/AS output data is composed of a header followed by the specific data.

The header is composed of:

- A date/time string in the format:

  ```
  day month date time year
  ```
- The module name of the module where the message was issued
- The line number within the module where the message was issued
- The type of message, which can be one of the following:
- LOW - Specifies this message is issued if the LOW or higher level of tracing has been enabled.
- NORMAL - Specifies this message is issued if the NORMAL or higher level of tracing has been enabled.
- VERBOSE - Specifies this message is issued if the VERBOSE level of tracing has been enabled.
- CONSMSG - Specifies this is an MVS console message.
- LOGONLY - Species this is a message that accompanies an MVS console message, but is issued only to E/AS output.
- IP - Specifies this message is issued if IP tracing has been enabled.

An example of an E/AS output entry follows:

```
 -----date/time--------    module line
|                       | |        |  |
Fri Feb 20 10:45:55 2011 IHSAEAS0:2016
                       msgtype ->specific data
                       |     |
                       CONSMSG: IHS0075I Event/AutomationService started
Subtask initialization is in progress for IHSATEC
```

In this example, the console message IHS0075I was issued from the reported E/AS module at the specified time and date.

Note: Module and line numbers are for use by a Tivoli service representative if additional problem determination is needed.

Customizing Alert and Message Routing from the NetView program

When the NetView program is installed, the routing of alert and message data to the Event/Automation Service is by default disabled. NetView automation table statements and hardware monitor filter commands are used to enable the routing of alert and message data to the Event/Automation Service. See the *IBM Tivoli NetView for z/OS Automation Guide* for complete information about enabling and customizing the routing of alerts and messages from the NetView program to the E/AS.

Running More Than One Event/Automation Service

Multiple E/AS address spaces can be active at the same time. In most cases, you only need one E/AS; however, you might need more than one for any of the following reasons. You want:

- A subset of alerts or messages to be translated and sent to a different event server.
- Alerts or messages to be translated and sent to more than one event server.
- A subset of EIF events to be translated and sent to a different NetView alert receiver.
- EIF events to be translated and sent to more than one NetView alert receiver.

If you run more than one E/AS, the E/AS PPI mailbox name must be unique for each. All other configurable settings can be shared between the E/AS invocations. However, you should consider changing the following configurable settings between each E/AS invocation:

- If you use more than one event receiver service, only one should register with the PortMapper. Others should specify a port number and disable the use of PortMapper. If more than one event receiver attempts to use the PortMapper, only the last event receiver to access PortMapper is actually registered; all other registrations for the other event receivers are lost. A warning message is written to the MVS system console when the event receiver PortMapper registration is overwritten.
- The E/AS output log files should be unique for each E/AS invocation. Otherwise, data from one E/AS are interleaved in the same output log file as data from another E/AS. If you are using the IHSAEVNT startup procedure to execute the E/AS, and the output log files are to SYSOUT data sets, then these data sets are automatically unique for each E/AS invocation.

Advanced Customization - Translating Data

In addition to the configuration files that the E/AS uses to define operational characteristics, each E/AS service uses a translation file that contains a set of rules that tell the service how to translate the incoming data into an EIF event or an SNMP trap. Each translation file is a text-readable file that can be customized.

The translation files used by the services of the E/AS have two different formats. The alert adapter, confirmed alert adapter, alert-to-trap, trap-to-alert and event receiver services use a class definition statement (CDS) translation file. The message adapter service and confirmed message adapter service uses a message format translation file.

To customize these translation files, you should have an understanding of the format of EIF events, SNMP traps, or both.

For additional information about SNMP traps, see the appropriate z/OS documentation for SNMP agent.

Class Definition Statement Files

The class definition statement (CDS) file defines how to construct EIF events from the information that is sent by a data source. For the alert adapter service, confirmed alert adapter service, and the alert-to-trap service, the data source is the NetView program. For the event receiver service, the data source is an event server. For the trap-to-alert service, the data source is an SNMP trap manager. The statements in this file are referred to as *class definition statements*. Class definition statements are rules that enable the service to map the incoming data that it receives to a console event.

Note: The event receiver service, alert-to-trap service, and trap-to-alert service further processes the EIF event that is produced using these class definition statements to turn it into an alert or SNMP trap. See "Event Receiver Post-CDS Processing" on page 141 for more information about creating alerts from event servers. See "Alert-to-Trap Post-CDS Processing" on page 165 for more information about creating traps from alerts. See "Trap-to-Alert Post-CDS Processing" on page 158 for more information about creating alerts from SNMP traps.

A CDS file is composed of one or more CDS's. Each CDS can include a **SELECT**, **FETCH** and a **MAP** segment that specifies the rules for mapping data into an EIF event. These rules allow for **selecting** an event class based on the incoming data, **fetching** additional data for creating the console event, and **mapping** the information collected from the incoming event into event attributes for the outgoing EIF event.

A CDS has this general format:

```
CLASS <class_name> SELECT <select_statements> FETCH <fetch_statements>
    MAP <map_statements> END
```

The CDS file also supports comment lines beginning with the comment sign (#).

The keywords in a CDS provide the following kinds of information:

CLASS
: The <*class_name*> defines the class name that will be used on the outgoing console event if the incoming data matches this CDS.

SELECT
Consists of one or more <*select_statement*> entries that incoming data must satisfy to match, or select, this CDS. Select statements are evaluated in the order that they appear in the SELECT segment. If all of the <*select_statements*> of a particular CDS are satisfied, then the incoming data matches the corresponding CDS. Otherwise, the adapter tries to match the incoming data with the next CDS. If the incoming data cannot be matched with any CDS, it is discarded.

FETCH
Consists of zero or more <*fetch_statement*> entries that are used to retrieve additional pieces of data from the incoming data in order to build the event attributes in the **map** segment. The FETCH segment is used to retrieve data not retrieved by the SELECT segment, or to change the data that was retrieved by the SELECT segment.

MAP Consists of zero or more <*map_statement*> entries that specify how to build the event attributes of the EIF event instance using the service's default data, user-defined constant data and pieces of data retrieved in the SELECT and FETCH segments.

For the alert adapter service, each class of event defined in the **.baroc** file of the service on an event server must match one or more CDS in the CDS file. The CDSs specify how to map incoming data to the class and event attributes of the outgoing EIF event instance. If you change or add classes or event attributes in the CDS file, you must make a corresponding change to the **.baroc** file on the event server.

For the event receiver service, the outgoing EIF event is never sent to an event server; it is a pseudo-event that is processed further to create an alert. Therefore, there is no corresponding **.baroc** file on an event server for any EIF events created from the event receiver's CDS file.

Each CDS is evaluated in the order it appears in the CDS file. An incoming event is mapped to the class specified by the first CDS whose SELECT segment is evaluated successfully. When more than one CDS is provided for a given class of event, the CDS with the most restrictive SELECT segment should appear first in the CDS file.

If the <*class_name*> is equal to ***DISCARD***, any incoming data matching the SELECT segment should be discarded. Note that data will also be discarded if it does not match any CDS. However, if a given type of incoming data must always be discarded, it is more efficient to define a ***DISCARD*** statement and put it at the beginning of the CDS file rather than letting the adapter evaluate all CDS's before finally discarding the event.

Encoding Incoming Event Data

Incoming event data is encoded by the service into name/value pairs. Name/value pairs are also referred to as ***attributes***. For any incoming event, all of the attributes are placed in a list that is then used in the SELECT, FETCH and MAP segments. The service selects which, if not all, of the incoming data to encode into name/value pairs, see the specific service encoding discussion later in this section.

The name part of the attribute is a text string. There are two types of names - ***generic*** and ***keyword***.

Generic names are text strings created by the services. A service may create these names internally, or it may create them from information provided in the incoming raw data; in either case, the method used by the service to create attribute names will be discussed with the specific service encoding later in this chapter.

Keywords have the format $*keyword*. Data that is commonly provided in the incoming datastream to the service is usually coded into keywords rather than generic names. The actual keyword name is never derived from the incoming data, but rather is defined by the service.

The main difference between keywords and generic names is how the names are used in processing the CDS file. Keywords provide faster data lookup during CDS file processing. Otherwise, keywords and generic names are nothing more than data tags, with keywords prefaced with $.

The value part of the attribute is also a text string. Again, the service will assign this text string based on data in the raw event.

Alert Adapter Service, Confirmed Alert Adapter Service, and Alert-to-Trap Service Data Encoding

The alert adapter, confirmed alert adapter, and alert-to-trap service uses keyword attributes exclusively for their data encoding. The following table lists each of the keyword attribute names used and how the value field is assigned from the incoming alert data.

Attribute name	Description
$ALERT_CDPT	A 2-byte hexadecimal value taken from the alert description code field of the generic alert data subvector, or the resolution description code field of the resolution data subvector.
$ORIGIN	A character string with the name/type hierarchy pairs from the Hierarchy Name List or Hierarchy/Resource List subvectors. The string contains the hierarchy in the form: `resnam1/typ1,resnam2/typ2,resnam3/typ3, resnam4/typ4,resnam5/typ5` Only the number of pairs in the actual subvector are used.
$SUB_ORIGIN	A character string with the last pair in the name/type hierarchy pair list from the Hierarchy Name List or Hierarchy/Resource List subvectors. The string is in the form: `resnam`*x*`/typ`*x* where *x* is the number of the last pair in the list.
$HOSTNAME	The *netid.nau* node name of the SNA node where the alert originated. This could be a NetView/390 node, an AS/400 node, etc.
$ADAPTER_HOST	The IP name of the host where the NetView alert adapter or confirmed alert adapter resides.

Attribute name	Description
$DATE	The date when the alert was received by the NetView alert adapter or confirmed alert adapter. In format: `MMM HH:MM:SS`, e.g. `OCT 10 12:08:30`.
$SEVERITY	FATAL, CRITICAL, etc. The alert type field from the Generic Alert Data subvector, or the event type, is used to determine the severity. Refer to Table 16 on page 127.
$MSG	The *Long Error Description:Long Probable Cause* message that describes the problem. This message is similar to the `ALERT DESCRIPTION:PROBABLE CAUSE` message displayed on the NPDA ALERTS-DYNAMIC panel.
$ADAPTER_HOST_SNANODE	The *netid.domainid* node name of the NetView system that sent the alert to the NetView alert adapter or confirmed alert adapter.
$EVENT_TYPE	For example, PERMANENT, or TEMPORARY. For Generic Alerts, it is obtained by inspecting the Alert Type byte of Generic Alert Data subvector. It matches the EVENT TYPE displayed on the NPDA EVENT DETAIL panel.
$ARCH_TYPE	GENERIC_ALERT, GENERIC_RESOLUTION, or NONGENERIC_ALERT. NMVT Alert Major Vectors contain a Generic Alert Data subvector are GENERIC_ALERTs. NMVT Resolution Major Vectors are GENERIC_RESOLUTIONs. All other alerts are NONGENERIC_ALERTs.
$PRODUCT_ID	The hardware or software product set identifier (PSID) of the alert or event sender. This can be 4, 5, 7, or 9 characters. Pertains to all generic alerts and some non-generic alerts.
$ALERT_ID	An 8-character hexadecimal value assigned by the sender to designate an individual alert condition. The value will always be 00000000 for resolution alerts. Pertains only to generic alerts (including resolutions).
$BLOCK_ID	The code used to identify the IBM hardware or software associated with the alert. See the *NetView Resource Alerts Reference* manual. Pertains only to non-generic alerts.
$ACTION_CODE	A code that provides an index to predefined screens. Pertains only to non-generic alerts. For non-generic alerts, the combination of the block id and action code uniquely identify the sending product.
$SELF_DEF_MSG	Text extracted from Self-defining Text Message Sv31.

Attribute name	Description
$EVENT_CORREL	Correlators extracted from MSU Correlation Sv47. These correlators correlate alerts to other alerts. That is, you may have two or more alerts that pertain to the same underlying problem and such alerts are correlated by Sv47. The tecad_snaevent.rls file on the event manager server contains rules that discard alerts that have already been reported.
$INCIDENT_CORREL	Correlators extracted from Incident Identification subvectors. These correlators correlate alerts to resolutions. The tecad_snaevent.rls file on the event manager server contains rules that CLOSE all correlated alerts when a resolution is received.
$ADAPTER_CORREL	A correlator that has meaning only to the alert adapter.
$DETAILED_DATA	Always assigned the string "[N/A]".
$CAUSES	Always assigned the string "[N/A]".
$ACTIONS	Always assigned the string "[N/A]".

Non-keyword attributes can also be assigned by users in the NetView address space. Refer to *IBM Tivoli NetView for z/OS Automation Guide* for more information about how to customize alerts forwarded from the NetView program. Using this method, any attribute name/value pair can be created and used by the CDS file process. The alert adapter and trap-to-alert service do not use generic attributes other than when they are assigned within the NetView program.

The value for the severity event attribute is determined by mapping an alert type (or event type) to a severity. The following table shows this mapping. The hexadecimal byte is the alert type field from the generic alert data subvector.

Table 16. Alert Types and Severities

Alert Type	Severity
0x01, PERMANENT	CRITICAL
0x02, TEMPORARY	HARMLESS
0x03, PERFORMANCE	WARNING
0x04, INTERVENTION REQ'D	CRITICAL
0xNN, CUSTOMER APPLICATION	MINOR
0xNN, END USER GENERATED	MINOR
0xNN, SUMMARY	HARMLESS
0xNN, INTENSIVE MODE REC	HARMLESS
0x09, AVAILABILITY	CRITICAL
0x0A, NOTIFICATION	WARNING
0x0B, ENVIRONMENT	CRITICAL
0x0C, INSTALLATION	WARNING
0x0D, OPERATION/PROCEDURE	WARNING

Table 16. Alert Types and Severities (continued)

Alert Type	Severity
0x0E, SECURITY	CRITICAL
0x0F, DELAYED RECOVERED	WARNING
0x10, PERMANENT AFFECTED	MINOR
0x11, IMPENDING PROBLEM	WARNING
0x12, UNKNOWN	UNKNOWN
0xNN, HELD	MINOR
0x14, BYPASSED	WARNING
0x15, REDUNDANCY LOST	WARNING
0x16, SITUATION	WARNING
0xNN, RESENT ALERT	MINOR
0xNN, RESOLVED PROBLEM	HARMLESS
0xNN, UNSUPPORTED TYPE	UNKNOWN

Alert-to-Trap Service Data Encoding

The alert-to-trap service constructs enterprise traps (type 6). The CDS file enables customization of the specific code field in the trap. This is done by supplying a value for the SPECIFIC keyword in the MAP sections of the CDS file.

The basic approach of the alert-to-trap service is to construct EIF event keyword/value pairs from the alert and then map the keyword/value pairs (other than SPECIFIC) into SNMP OCTET strings to be included as variable bind data in the resulting trap. Both the keyword and the value are included in the resulting OCTET string.

The alert-to-trap service has access to the alert-adapters keyword attributes, and these can be used in SELECT, MAP and FETCH statements. However, not all alert adapter attributes are applicable to SNMP traps.

The CLASS names in class definition statements are not used in the traps built by the alert-to-trap servicer. However, the CLASS name is still required to satisfy CDS syntax rules, and it is useful when you document the trap you are constructing.

Trap-to-Alert Service Data Encoding

The trap-to-alert service receives an SNMP trap as its incoming data. This data is encoded into both keyword attributes and generic attributes.

The following table lists the keyword attributes created by the trap-to-alert service.

Attribute name	Description
$ORIGIN_ADDR	The value is a string containing the IP address from which the trap came. Note that when the sample datagram forwarding daemon is used, the value is the IP address of the host in which the daemon is running.

Attribute name	Description
$ORIGIN_PORT	The value is a string containing the number of the port (in decimal) at the origin address from which the trap came. Note that when the sample datagram forwarding daemon is used, the value is the number of the port over which the daemon forwarded the trap.
$SNMP_VERSION	The value is a string containing the number (in decimal) indicating which SNMP version was implemented at the agent that sent the trap. This determines how the trap was formatted. The value for SNMPv1 is "0".

The following table lists the generic attributes created by the trap-to-alert service from the SNMP trap data that is not a variable binding. All data is converted to a character string before assigning it to the generic attribute name.

Attribute name	Description
community	The value of the SNMP trap community field.
enterpriseOID	The value of the SNMP trap enterpriseOID field.
agent_address	The value of the SNMP trap agent address field.
generic_trap	The value of the SNMP trap generic trap field.
specific_trap	The value of the SNMP trap-specific trap field.
timestamp	The value of the SNMP trap timestamp field.

The variable binding data is created directly from the variable binding data. The variable binding name becomes the name of the generic attribute, and the variable binding data is converted to a character string if it is not already a character string and assigned to the generic attribute. When more than one variable binding within an SNMP trap contains the same name, the name and index are appended to the name to create the generic attribute name. For example, if the variable binding name

```
1.3.6.1.4.1.2.2.1.3.1.0
```

occurred 3 times within the same SNMP trap, the generic attribute names that are created as a result would be as follows:

```
1.3.6.1.4.1.2.2.1.3.1.0
1.3.6.1.4.1.2.2.1.3.1.0<1>
1.3.6.1.4.1.2.2.1.3.1.0<2>
```

Event Receiver Service Data Encoding

The event receiver service receives an EIF event as incoming data. This data is encoded into both keyword attributes and generic attributes. This encoding is very straightforward since the data is already in the name/value form of an attribute. Every event attribute name in the incoming console event becomes the name of a generic attribute in the attribute list, and the corresponding event attribute value becomes the value of the attribute. The className of the event is encoded as the

value of the $CLASSNAME keyword attribute. As such, the event receiver creates one keyword attribute, $CLASSNAME, and as many generic attributes as there are event attribute/value pairs in the incoming console event.

SELECT Segment of a Class Definition Statement

The SELECT segment of a CDS is composed of one or more <*select_statement*> entries. Each <*select_statement*> entry has the following format:

```
<n>: ATTR(<a_op>, <a_op_value>),
     VALUE(<v_op>, <v_op_value>);
```

A <*select_statement*> is satisfied if an attribute is found in the list of attributes provided by the service that fulfills the conditions specified by the **ATTR** and **VALUE** expressions of the <*select_statement*>. An attribute must be found for each <*select_statement*> for the SELECT segment to be satisfied. If a SELECT segment is not satisfied, the entire CDS is ignored and processing continues with the next CDS in the CDS file.

<*n*> Is the identification number of the <*select_statement*>. *n* can be any valid integer. Each <*select_statement*> must have a unique identification number; this identification number is used in further processing of the CDS.

ATTR

Specifies the name of an attribute, in <*a_op_value*> and a modifying condition on the attribute name in <*a_op*>. The **ATTR** expression is mandatory in the SELECT statement. The list of attributes created by the service from the incoming data are searched until an attribute is found that has a name field which matches the condition expressed by the **ATTR** expression.

<*a_op*>

Modifies the **ATTR** name and can have one of the following values:

= Specifies that the attribute name in <*a_op_value*> must match the name of an attribute in the attribute list.

PREFIX

Specifies that the attribute name in <*a_op_value*> must be a prefix of the name of an attribute in the attribute list.

SUFFIX

Specifies that the attribute name in <*a_op_value*> must be a suffix of the name of an attribute in the attribute list.

<*a_op_value*>

Specifies the name of an attribute. The attribute list is searched sequentially and the **ATTR** <*a_op*> expression is applied to each attribute name field until a matching attribute is found.

By default, <*a_op_value*> is a string. However, <*a_op_value*> can also be a variable. Variables are described in the list that follows.

When specified as a string, <*a_op_value*> must be enclosed in double quotes (") if the string contains a blank character or if it is all digits (0 through 9). The following examples show possible <*a_op_value*> strings:

```
hello
$ORIGIN
"hello, world"
"12"
```

When specified as a variable, <*a_op_value*> can contain any of these types of variables:

Keyword
A keyword provided by the event adapter, for example, $ORIGIN.

Name Name variables are assigned the value of the name field of an attribute that has satisfied a previous <*select_statement*>**ATTR** expression. A name variable is specified as `$Nn`, where *n* is the number of the <*select_statement*> that the desired attribute satisfied (for example, $N2).

Value Value variables are assigned the value of the value field of an attribute that has satisfied a previous <*select_statement*> **VALUE** expression. A value variable is specified as `$Vn`, where *n* is the number of the <*select_statement*> that the desired attribute satisfied (for example, $V5).

The following example of an **ATTR** expression looks for a generic name that is equal to **user1.** If the service has provided an attribute named **user1**, the **ATTR** expression will be satisfied.

```
ATTR(=,"user1")
```

The following example of an **ATTR** expression looks for a keyword that is equal to **$ORIGIN**. If the service has provided an attribute named **$ORIGIN,** the **ATTR** expression will be satisfied.

```
ATTR(=,$ORIGIN)
```

VALUE
This expression is optional. For the attribute in the attribute list that matches the associated **ATTR** expression, the value of the attribute is subjected to a match based on the information in the **VALUE** expression.

<*v_op***>**
Modifies the **VALUE** expression and can have one of the following values:

= Specifies that the **VALUE** expression in <*v_op_value*> must match the value of an attribute in the attribute list.

PREFIX
Specifies that the **VALUE** expression in <*v_op_value*> must be a prefix of the value of an attribute in the attribute list.

SUFFIX
Specifies that the **VALUE** expression in <*v_op_value*> must be a suffix of the value of an attribute in the attribute list.

!= Specifies that the **VALUE** expression in <*v_op_value*> must **not** be equal to the value of an attribute in the attribute list.

<*v_op_value***>**
Specifies the value of an attribute. By default, <*v_op_value*> is a string. However, <*v_op_value*> can also be a variable.

When specified as a string, <*v_op_value*> must be enclosed in double quotation marks (") if the string contains a blank character or if it is all digits (0 through 9). The following examples show possible <*v_op_value*> strings:

```
hello
$ORIGIN
"hello, world"
"12"
```

When specified as a variable, <*v_op_value*> can contain any of these types of variables:

Keyword
The keyword is assigned a constant value (either a string or a number), and the keyword can be used to reference the value.

Name Name variables are assigned the value of the name field of an attribute that has satisfied a previous <*select_statement*> **ATTR** expression. A name variable is specified as $N*n*, where *n* is the number of the <*select_statement*> that the desired attribute satisfied (for example, $N2).

Value Value variables are assigned the value of the value field for an attribute that has satisfied a previous <*select_statement*> **VALUE** expression. A value variable is specified as $V*n*, where *n* is the number of the <*select_statement*> that the desired attribute satisfied (for example, $V5).

The following example of a **VALUE** expression looks for an attribute with a value that is prefixed with **Serial**:

```
VALUE(PREFIX,"Serial")
```

A valid match for this **VALUE** expression is **Serial1**.

SELECT Segment Evaluation:

1. For an entire SELECT segment to be matched, an attribute must be matched for each of the <*select_statement*> expressions in that SELECT segment. More than one attribute in the attribute list may satisfy a <*select_statement*>. The first one in the attribute list that satisfies the statement is used for further CDS processing.
2. If the SELECT segment is satisfied, the class name of the SELECT segment is used for the outgoing EIF event. Processing of the event continues with the FETCH segment, unless the class is ***DISCARD***, in which case the event is discarded. If the incoming data satisfies no SELECT segment of a CDS in the CDS file, the incoming data is discarded.
3. Each time a <*select_statement*> is evaluated successfully, the two variables $N*n* and $V*n* are created. These variables, along with the adapter-provided keywords, can be used in any subsequent SELECT, FETCH, or MAP segment.

FETCH Segment of a Class Definition Statement

The SELECT segment of a CDS retrieves attribute names and values from the incoming data, but it does not allow for changes to the selected pieces of information. In some circumstances, it is necessary to extract a substring out of an attribute value or to provide user-defined variables. The FETCH segment in a CDS allows you to do this.

The FETCH segment is composed of one or more <*fetch_statement*> expressions. Each <*fetch_statement*> has the following format:

```
<n>:   <expression>
```

where

<*n*> Is an identification number of the <*fetch_statement*>. <*n*> can be any valid integer. Each <*fetch_statement*> must have a unique identification number. A <*fetch_statement*> results in the value of <*expression*> being assigned to a new variable, $F*n*, where *n* is the identification number of the <*fetch_statement*>.

<*expression*>
Is one of the following:

- A string
- Any output value from the SELECT segment (such as adapter-provided keywords and SELECT segment variables.
- Any output from a previous <*fetch_statement*>
- A substring with any combination of strings, SELECT segment output, and <*fetch_statement*> output.

An example of a FETCH segment using substrings is:

```
1: SUBST ($V2, 1, 5);
```

This statement uses the value of the variable $V2, as assigned from <*select_statement*> number 2, and assigns the substring represented by the first 4 characters of $V2 to the variable $F1.

The output of the FETCH segment is the set of fetch variables $F*n*.

MAP Segment of a Class Definition Statement

The MAP segment of a CDS creates the event attributes and associated values that are put in the outgoing EIF event.

The MAP segment is composed of one or more <*map_statement*> expressions. Each <*map_statement*> has one of the following formats:

```
<slot name> = <string>;
<slot name> = <variable>;
<slot name> = PRINTF(<format_string>, <var1>, ..., <varn>);
```

<*slot_name*>
The name of any event attribute. For the alert adapter service, this should be an event attribute that corresponds to an event attribute in the service's **.baroc** file on an event server. For the event receiver service, this should be an event attribute that is allowed by the event receivers post-CDS file processing.

<*string*>
Any character string.

<*variable*>
Any variable passed to the MAP segment from the SELECT or FETCH segments, such as adapter-defined keywords or segment variables.

PRINTF
Specifies a format that allows the value of the event attribute to be formatted using a C-style **printf()** format string. This format string currently supports only the **%s** format specifier.

<*var*> Can contain either a <*string*> or a <*variable*>.

Here is an example of a MAP segment:

```
MAP
  origin = $V2;
  hostname = $HOSTNAME;
  msg = PRINTF("The origin is %s", $V2);
```

In this example, the **origin** event attribute would be given the value of the SELECT segment variable $V2. The **hostname** event attribute would be given the value of the $HOSTNAME keyword. Assuming the value of the variable $V2 is **NV390SP/SP**, the **msg** event attribute would be given the value "**The origin is NV390SP/SP**" (the double quotes are not included in the value).

The output of the map process is a list of event attribute name/value pairs that are used to generate the outgoing EIF event that is either sent to the event server or used for post CDS-file processing.

MAP_DEFAULT Section of the Class Definition Statement Files

Some event attributes, like source and hostname, will probably have a constant value for all the EIF events generated by a given service. To avoid repeating identical map statements in many CDS's, the CDS file supports a MAP_DEFAULT section. This section defines event attribute name/value pairs for all CDS's in the CDS file. The event attributes that are defined in this global definition section can be overridden by specific definitions in a CDS.

Here is an example of a MAP_DEFAULT section:

```
MAP_DEFAULT
  origin = $ORIGIN;
  sub_origin = $SUB_ORIGIN;
  msg = $MSG;
END
```

In some cases, you may want to put CDSs into more than one CDS file and have them all be used by a service. To enable this, an extension to normal CDS file processing has been added for the E/AS services. The **%INCLUDE** statement allows additional CDS files to be embedded within the current CDS file. The %INCLUDE keyword cannot be preceded by blank characters, and it must be followed by a separator of one blank character. Following the separator is the file name of the CDS file to be opened. This file name is either a 1 to 8 character PDS member name that is associated with the IHSSMP3 data set definition, or a complete file name that is preceded by the backslash ('\') character. The maximum number of CDS file members that can be opened at the same time is 20; this represents the maximum number of nested %INCLUDE statements that are valid.

The following example shows the %INCLUDE statement syntax. Assume that the file named IHSAACD1 contains the single statement:

```
sub_origin = $SUB_ORIGIN;
```

In this example:

```
MAP_DEFAULT                          //Statements from IHSAACDS
  source = NV390ALT;
  origin = $ORIGIN;
%INCLUDE IHSAACD1                    //New file with sub_origin statement
  hostname = $HOSTNAME;              //Continuation of IHSAACDS
  adapter_host = $ADAPTER_HOST;
END
```

For an example of using CDS's, see the IHSAACDS, IHSABCDS, or IHSAECDS sample that is shipped with the Event/Automation Service. These are the default translation files used for the alert adapter, confirmed alert adapter, and event receiver services, respectively.

Message Format Files

The FMT file defines how the message adapter service and the confirmed message adapter service construct EIF events from message information that is sent by the NetView program. The statements in this file are referred to as *format specification statements* (FSS). Format specification statements are rules that allow a service to map the incoming message data that it collects from the NetView program to an outgoing console event.

The following sections describe the syntax of the message and confirmed message adapter service format specifications and how format specifications are mapped into events.

Encoding Incoming Event Data

For the message adapter service and the confirmed message adapter service, the incoming data is a message string. This message text string is matched against ***format specifications*** in the FMT file. The primary piece of information, therefore, is the message string itself.

Like a CDS file, the job of the FMT file is to allow the user to customize the outgoing console event based on the incoming message data. This method does not encode the data into attributes; however, there are certain event attribute names that receive default information from the incoming message data.

The following table lists each of the default event attribute names and their corresponding default values. If the value for the event attribute is not actually present in the incoming data, then the default event attribute value will be the null string. ANY event attribute that is listed in the map rules portion of a format specification statement has a default value; if it is not provided in the incoming data, its default value is the null string ("").

Event attribute name	Description
origin	The *netid.domainid* node name of the NetView system where the message originated.
sub_origin	The job number associated with the message. If a job number is not available for the message, the value defaults to a null string ("").
hostname	Same as the origin event attribute.
adapter_host	The IP name of the host where the Event/Automation Service is running.
date	The date and time that the message was sent from the NetView automation table. In format: `MMM HH:MM:SS`, e.g. `OCT 10 12:08:30`.
msg_id	The first token of the message. In most cases, this token is the actual message identifier.

Event attribute name	Description

severity	Inferred from the last character of the msg_id. The translation of this character to a value for this event attribute is:
	`A, E, S CRITICAL`
	`T FATAL`
	`anything else WARNING`

msg	The message text, which includes msg_id as the first token.
adapter_host_snanode	The *netid.domainid* node name of the NetView system that sent the message to the message adapter service or the confirmed message adapter service.
multiline_msg	The second and succeeding message lines from the message. If the message is contained in one line, the value of multiline_msg is **N/A**.
jobname	The jobname associated with the message. If a jobname is not available for the message, the value of jobname defaults to a null string ("").

Default event attributes and values can also be assigned by users in the NetView address space. Refer to the *IBM Tivoli NetView for z/OS Automation Guide* for more information about customizing messages forwarded from the NetView program. Using this method, any attribute name/value pair can be created and used by the FMT file process.

Format Specifications

The FMT file is made up of 1 or more FSS. An FSS has the following three parts:

- The format header has the keyword **FORMAT** followed by the class name. This is optionally followed by the **FOLLOWS** keyword and a previously defined **FORMAT** class name. If the incoming message matches this FSS, the class name following the **FORMAT** keyword is used on the outgoing EIF event.
- The format content has a format string optionally followed by a list of map rules. The format string performs a function similar to the **SELECT** segment of a CDS file; that is, it matches the incoming message to a particular FSS. The map rules perform a function similar to the **MAP** segment in the CDS file; that is, they assign values to event attributes.
- The **END** keyword completes the FSS.

The format header, the format string, each map rule, and the **END** keyword must begin on a new line.

The **FOLLOWS** relationship is used to enable a specific FSS to be built from more generic ones. When format B follows format A, B inherits all of the map rules (but not the format string) from A. Format B can define any additional map rules, but any map rules redefined by B are *not* inherited from A. Format B can override inherited map rules by redefining them.

Messages that are forwarded by the NetView program typically have a common format consisting of a message identifier and message-specific text. These message components can be represented in the format string using a component specifier

notation that is very similar to the C-style **printf()** notation. This **printf()** notation is similar to the notation used in CDS files.

The following format string describes the entire class of messages that are produced by the NetView automation table:

```
%s*
```

Input messages are tokenized into constants and blanks. A constant is any consecutive string of non-blank characters. Component specifiers allow the constants and blanks to be grouped into more complex "tokens" when trying to match an FSS against a specific message. The current allowable component specifiers are:

%*lengths* Matches one constant in the input message
%*lengths** Matches zero or more constants in the input message
%*lengths+* Matches one or more constants in the input message

The optional ***length*** is a decimal number of any size that truncates the constant if the actual length is greater than the specifier length. For the specifiers that can match multiple constants, each constant in the accumulated string is truncated. Also, the string itself terminates on a constant that is less than the specifier length.

The format string **DSI%s %s*** is taken from the default message adapter FMT file shipped with the E/AS, and is used in the following discussion to demonstrate the usage of format strings.

As an example of matching a message to the **DSI%s %s*** format specification, consider the following NetView message:

```
DSI002I INVALID COMMAND: 'BADCOMMAND'
```

The component specifiers and matches are as follows:

```
DSI DSI
%s 002I
%s* INVALID COMMAND:'BADCOMMAND'
```

The DSI002I message has some constant parts and some variable parts. That is, certain parts of the message (constant parts) will be the same for any DSI002I message that is generated. The constant parts of the message are:

```
DSI002I INVALID COMMAND: '  '
```

The variable part of the message is:

```
BADCOMMAND
```

Note that the first constant part of the message goes all the way to the first single quote (') in the message. The second single quote is the beginning of the second constant part of the message, which also happens to be the last character in the message. The data inside of the single quotes is all variable.

The following message is an example of another DSI002I message with different variable parts:

```
DSI002I INVALID COMMAND: 'WORSE COMMAND'
```

In this case, the variable part is composed of two words and a space -- `WORSE COMMAND.`

The format string **DSI%s %s*** can be specialized for the DSI002I message as follows:

```
DSI %s INVALID COMMAND: '%s*'
```

Using the previously described DSI002I message, the component specifiers and matches are as follows:

```
DSI DSI
%s 002I
INVALID COMMAND: 'INVALID COMMAND: '
%s* WORSE COMMAND
' '
```

The blank characters that separate the words of a message must also be present in the format string. A single space character in the format string will match any number of blank characters in the message.

Suppose the space between the colon (:) and the quote (') is deleted in the specialized DSI002I format string given previously:

```
DSI %s INVALID COMMAND:'%s*'
```

In this example, the format string would no longer match DSI002I messages. However, in the following example, the NetView message **would** match the format specification, since all consecutive blanks from both the input message and the format specification are boiled down to a single blank character:

```
DSI %s INVALID COMMAND:       '%s*'
```

Care should be taken when using arbitrary length repeater component specifiers (**%s*** and **%s+**). The following format string does not make much sense:

```
This is not a good format %s* %s*
```

The first **%s*** matches everything through the end of the message, and the second **%s*** will never match anything. It might appear that this does not matter, but the importance becomes obvious when map rules are discussed in "Map Rules."

The following format string, however, is meaningful:

```
This is a good format %s* : %s*
```

The first **%s*** matches everything up to the first colon (:), and the second **%s*** matches everything through the end of the message.

From the examples here, you can see that you can specialize a generic format to match a more specific event by either replacing component specifiers with constants or by restricting the arbitrary length repeater specifiers to a fixed length by using constants to terminate the specifier.

Map Rules

The service translates incoming message data into an event class with event attribute name/value pairs, and sends this information to an event server. As with the alert adapter service, a **.baroc** file at the event server must be present to match the outgoing EIF events created by the message adapter service. This is not required for the confirmed message adapter service.

The event class is determined by matching an input message to an FSS as described previously. However, once the class is determined. Values must be assigned to the event attribute names. These values can come from a variety of

places, such as from the message itself, from default event attributes provided by the service, or from specifications within the FMT file. Map rules define how event attributes are assigned values.

The map rule portion of the format string consists of zero or more lines that contain a **.baroc** file event attribute name followed by a value specifier. The value specifiers are one of four types:

- $*i* , where *i* indicates the position of a component specifier in a format string. Each component specifier is numbered from 1 to the maximum number of component specifiers in the format string. For example, in the specialized format specification for the DSI002I message given previously, the **%s*** component specifier would be referred to in the map rules as **$2.** The value of a $*i* value specifier, also referred to as a *variable* value specifier, is the portion of the input message that was consumed by the component specifier. These variables are very similar to the variables output from the SELECT and FETCH segments in the CDS file.
- A constant string. The value of the event attribute is the specified string. If the string is a single constant, it can be specified without surrounding double quotes ("). Otherwise, double quotes must be used.
- A **PRINTF** statement. This mechanism allows you to compose more complex event attributes from other event attributes. The **PRINTF** statement consists of the keyword **PRINTF** followed by a C-style **printf()** format string and a list of event attribute names. The **printf()** format string currently only supports the **%s** conversion specifier. The values of the event attributes that are used in the **PRINTF** statement must also have been derived from either the $*i* value specification or a constant string value specification. They cannot be derived from another **PRINTF** value specification. The value of the argument event attributes will be used to compose a new constant string according to the **printf()** format string. This constant string becomes the value of the event attribute. This value specifier is very similar to the **PRINTF** MAP segment format in the CDS file.
- **DEFAULT.** This keyword indicates that the adapter should use its internal logic to derive the value of the indicated event attribute. For example, the incoming message data contains the hostname (netid.nau) where the message originated. If the hostname event attribute is therefore set to the value DEFAULT, netid.nau will be the value of the hostname event attribute. This is similar to the use of keywords in the alert adapter service.

  If the incoming message does not provide a specific value for a slot, the DEFAULT value is the null string (""). The DEFAULT value for non-specified slot names can be overridden. An additional value specifier, delimited with a colon (:), may follow the DEFAULT value specifier. This value specifier will be used to provide the DEFAULT value of the slot only if a slot value is not provided in the incoming message.

  Only constant string and $i variable specifiers can be used to provide DEFAULT overrides.

  For example, the following assigns the slot *numericslot* with the DEFAULT value from the incoming message:

  ```
  numericslot DEFAULT : 0
  ```

  If the incoming message does not contain a value for *numericslot*, a value of 0 is assigned rather than a null string.

  Note that because **DEFAULT** is a keyword, a constant map whose value is the string DEFAULT must be specified in double quotes ("").

You should specify only one map rule for each **.baroc** file event attribute in any one format specification. The map rule can be inherited from a more generic format specification (using the **FOLLOWS** keyword), or it can be explicitly defined on the format specification that directly matches the input message. Since the service does not have access to the **.baroc** file, which resides on the event server, care must be taken to make sure that the format specifications agree with the corresponding **.baroc** file definitions. If an event attribute name is misspelled in a map rule, for example, the service will not report any error and will send the event to the event server as usual. However, the event will be meaningless to the event server.

There can be attributes in the incoming message that do not directly correspond to any **.baroc** file event attributes. However, the service might need to use these values to compose **PRINTF** style constant strings. This data needs to be assigned to temporary event attributes, which can then be used in the **PRINTF** value specification but does *not* allow the event attribute to be sent over to the event server as an independent event attribute name/event attribute value pair. Temporary event attributes are designated with a minus sign (-) immediately preceding the event attribute name in the map rule. These temporary event attributes are not **.baroc** file event attributes. Do not use the minus sign (-) when referring to the temporary event attribute in the PRINTF specification.

%INCLUDE Statements

The **%INCLUDE** statement allows additional FMT files to be imbedded within the current FMT file. The %INCLUDE keyword cannot be preceded by blank characters, and it must be followed by a separator of one blank character. Following the separator is the file name of the FMT file to be opened. This file name is either a 1 to 8 character PDS member name that is associated with the IHSSMP3 data set definition, or a complete file name that is preceded by the backslash ('\') character. The maximum number of FMT file members that can be opened at the same time is 20; this represents the maximum number of nested %INCLUDE statements that are allowed.

Format File Example: The following sample is used to demonstrate the concepts discussed previously; this example was taken (and modified somewhat) from the message adapter services default message format file (IHSAMFMT):

```
FORMAT NV390MSG_Event
%s*
source NV390MSG
origin DEFAULT
desctext "This string will be overridden"
END
FORMAT NV390MSG_NetView_NCCF FOLLOWS NV390MSG_Event
DSI%s %s*
sub_source "NetView NCCF"
msgnumber $1
temp1 $2
desctext PRINTF("Got a DSI message: %s", temp1)
END

%INCLUDE MOREFMTS
```

Using this format file, assume that the following message is received by the service:

```
DSI002I INVALID COMMAND: 'A BAD COMMAND'
```

This message matches the `NV390MSG_NetView_NCCF` format specification defined previously IF the additional format statements include in `MOREFMTS` do not specify

another format specification that this message can match on. Remember, matches on the FSS in the FMT file begin with the **last** FSS in the file and progress toward the first FSS until a match occurs.

With this match, the `source` event attribute will be assigned the string value `NV390MSG.` The `origin` event attribute will be assigned whatever default the event adapter associates with this event attribute. The `desctext` event attribute will be assigned the string `This string will be overridden` initially. These event attributes are all assigned with the more generic `NV390MSG_Event` FSS, from which the `NV390MSG_NetView_NCCF` FSS follows.

The `sub_source` event attribute will be assigned the value of `NetView NCCF.` The `msgnumber` event attribute will be assigned the value `002I` (which was dissected from the input message on the first *%s** specification). The `-temp1` temporary event attribute will be assigned the string `INVALID COMMAND: 'A BAD COMMAND'` (which was dissected from the input message on the second *%s** specification). This temporary variable is then used with the **PRINTF** value specifier to override the `desctext` event attribute with the string `Got a DSI message: INVALID COMMAND: 'A BAD COMMAND'`.

All of the event attributes, with the exception of the `-temp1` event attribute, will be used to build the outgoing EIF event. The classname for the event will be `NV390MSG_NetView_NCCF` , the name of the most specifically matched FSS.

For an example of using FSS, refer to the IHSAMFMT sample (message adapter service or the IHSANFMT sample (confirmed message adapter service) that is shipped with the Event/Automation Service.

Event Receiver Post-CDS Processing

For the alert adapter service, confirmed alert adapter service, message adapter service, and confirmed message adapter service, translation files are used to translate incoming service-specific data into an EIF event. For the event receiver, a CDS file will be used to go in the opposite direction (translate an event into a NetView alert).

To do this, the processing of the CDS file by the event receiver will be modified slightly from the processing that is done on the file by the alert adapter service or the confirmed alert adapter service. Syntactically, all of the information that is discussed in “Class Definition Statement Files” on page 123 is still true for the event receiver CDS file. The event receiver treats the event that is output by the CDS file process as a pseudo event; that is, the event is not meant to be sent to an event server, but rather is parsed for certain specific event attributes that are encoded into the NMVT.

Input Attribute List

The incoming EIF event is encoded into an attribute list as described in the service-specific encoding section later in this chapter. In addition to the **$CLASSNAME** keyword created when the incoming event is parsed, there are additional keywords created for the input attribute list by the event receiver. The following list describes the additional keywords:

Keyword	Description	Default
$NMVT_TYPE	The type of the NMVT to be created (alert or resolution). This keyword is modified by the NMVT_TYPE event attribute. The NMVT_TYPE event attribute can have a value of ALERT or RESOLVE.	ALERT
$CDS_GROUP	This keyword contains values in the set `GROUP001`, `GROUP002`, ... `GROUP999`. The value of the CONTINUE event attribute is used to set the value of this keyword. For more information about the $CDS_GROUP keyword and the CONTINUE event attribute, see "Matching Multiple CDSs to Create the Pseudo Event" on page 147.	GROUP001
$BUILD_SV31LIST	Assigned the value of the BUILD_SV31LIST event attribute. This event attribute can have a value of NO or YES. When the alert is built, the value of this keyword is used to determine whether subvector 31s are to be added for each event attribute/value pair in the original EIF event. For more information about the $BUILD_SV31LIST keyword and the BUILD_SV31LIST event attribute, see "Building the SV 31s Containing the Original Event" on page 151.	YES

Output Pseudo Event

Like any EIF event, this pseudo event contains a class name, followed by event attribute/value pairs. Note that because this event will never be sent to a console, there is no **.baroc** file on any console server that corresponds to these events. In general, a CDS file enables any event attribute/value pair and any class name to be put into the pseudo event. Even though any class name and event attribute/value pair can be placed in the pseudo event, the event receiver only uses certain predefined event attribute names to translate the event into an alert. Any other event attributes are ignored.

Pseudo Event Class name

The event receiver does not use the pseudo event class name for translating the EIF event. All of the CDSs in the event receiver CDS file *can* have the same name; however, for ease of organizing the various CDSs and debugging, it is recommended that you use a different class name for each CDS in the CDS file. The convention used in the sample CDS file shipped with the E/AS is to group the CDSs that are associated with producing a particular subvector within the NMVT

together and prefacing them with a common character string. The end of the class name can then have some unique designation to make it unique.

An example:

```
CLASS SV05_1
...
END
CLASS SV05_2
...
END

CLASS SV05_3
...
END

...
```

In this example, the SELECT segments (not shown) in each CDS statement will cause a different subvector 05 to be built. The class name for the SV 05 that is eventually built will have a unique name that identifies it as an SV 05. Again, this information is used only for visual organization and debugging.

NMVT_TYPE event attribute

You can specify the type of NMVT, whether it is an alert or a resolution, by coding the NMVT_TYPE event attribute in the MAP segment of a CDS. There are two valid values for this event attribute: **RESOLVE** and **ALERT**. The value of this event attribute is copied to the **$NMVT_TYPE** keyword.

SV event attribute

This event attribute is the main vehicle for creating the subvectors that are to be placed into the NMVT.

The event attribute name must be prefixed with `SV`; the rest of the event attribute name can be any character string. `SV05`, `SVAA` and `SVNONSENSE` are all recognized as **SV** event attributes. Again, for clarity and debugging, it is recommended that the event attribute names contain the number of the subvector being created -- `SV05`, `SV92`, `SV05_1`.

An SV event attribute value contains the full subvector (including the length and subvector key). The values that are assigned to SV event attributes in the MAP segment of a CDS are interpreted as character strings; the event receiver will decode the numeric character string into the hexadecimal values that are to be used in the alert. An example of a subvector event attribute from the sample CDS file:

```
SV05 = "0B0509100004E3C5C30040";
```

The value in the `SV05` is a character string with hexadecimal characters. The event receiver translates this character string into true numeric format for inclusion in the NMVT. The event receiver does not validate this subvector. The subvector that is placed into the NMVT is similar to the following:

```
0B0509100004E3C5C30040
```

Following the general CDS file syntax, if the event attribute value contains only the digits in the range of 0–9, the value must be enclosed within double quotations to be interpreted as a string. The previous example has alphabetic characters (representing the hexadecimal values A-F) in it, so it was not necessary to enclose

the event attribute value within quotes. It is a good habit, though, to enclose SV event attributes within double quotations.

Disabling Hexadecimal String Translation

In some cases, you may want to add a character string that is **not** a hexadecimal value to the subvector string. As previously described, by default the event receiver attempts to translate the event attribute value hexadecimal string into numeric format under the assumption that the string is a sequence of hexadecimal characters (0–9, A–F). In the previous example, the hexadecimal string E3C5C3 is, in EBCDIC, TEC.

To specify the string `TEC` directly within the event attribute value, enclose the string within <> braces. The braces must have escape characters preceding them; the escape character is # . Using this convention, for example, the string is as follows:

```
SV05 = "0B0509100004#<TEC#>0040"
```

This event attribute value would produce exactly the same NMVT subvector as the first example, as follows:

```
0B0509100004E3C5C30040
```

The braces indicate to the event receiver that the data enclosed within the braces is **not** a hexadecimal string number that needs to be converted, but the string is to be placed directly into the NMVT.

Using Attribute List Data in the Output Subvector

Event attributes can be assigned the value of a CDS variable ($V, $N, $F variables), the value of a keyword, or generic attribute from the attribute list. When using these variables, it is likely that the value of the variable should not be converted. Also, it is likely that these variables do not contain the entire coded subvector entirely within the variable. To handle this, the **PRINTF** style of MAP statement assignment is useful.

Extending the SV 05 example introduced previously, assume that the string `TEC` is the value of the $V2 variable generated by a SELECT segment. To produce an identical SV 05 for the NMVT, enter the following:

```
SV05 = PRINTF("0B0509100004#<%s#>0040", $V2);
```

Using the **PRINTF** syntax, the %s format specifier is substituted with the value of the $V2 variable, which is `TEC`. The escaped braces tell the event receiver not to translate the `TEC` string into numeric format, and again the following subvector produced is identical to that produced in the first two examples:

```
0B0509100004E3C5C30040
```

Any time you need to assign data that came from the original EIF event to the output subvector, you will likely need to use the PRINTF syntax with string translation disabled. However, it is possible that the incoming event has, as an event attribute value, the string `E3C5C3` instead of the string `TEC`. In this case, use the following string to produce the desired NMVT subvector:

```
SV05 = PRINTF("0B0509100004%s0040", $V2);
```

If you continued to disable the hexadecimal string translation, your output subvector is similar to the following:

```
0B0509100004C5F3C3F5C3F30040
```

Each of the six characters E,3,C,5,C and 3 is left in their character state (C5,F3,C3,F5,C3 and F3).

Automatic Subvector/Subfield Length Calculation

In the initial SV 05 example

```
SV05 = "0B0509100004E3C5C30040";
```

The length of the subvector was coded directly into the string. Because there is no variable information in the subvector, the length is coded directly into the event attribute value within the CDS MAP segment. The length of the subvector might not be known when the CDS file is created if variable data is used.

Consider the following example that inserts attribute list data into the subvector:

```
SV05 = PRINTF("0B0509100004#<%s#>0040", $V2);
```

In this example, the value of the $V2 variable was TEC; therefore, it has a length of 3. This was used to calculate the total subvector length (0B), the subfield 10 length (09), and the resource name length (04). In reality, the length of the value of the $V2 variable will be unknown until the event arrives.

To enable the event receiver to calculate the length of a portion of the subvector string, use curly braces {} around that portion of the string. The curly braces must be escaped with the escape character #. The curly braces are removed from the string when the length is calculated, but the opening curly brace is the place holder in the subvector string for the length field.

Modify the previous example as follows:

```
SV05 = PRINTF("#{05#{1000#{#<%s#>#}0040#}#}", $V2);
```

Following is a step-by-step translation of this event attribute. The **PRINTF** substitution is first as follows:

```
SV05 = "#{05#{1000#{TEC#}0040#}#}";
```

At this stage, the output subvector is similar to the following:

```
...E3C5C3...
```

Where the ellipsis represents all data yet to be translated into the subvector. Next, the segment #{TEC#} is used to calculate the length of the resource name entry.

The output subvector is as follows:

```
...04E3C5C3...
```

The first #{ is replaced with the length of the segment, the matching #} is removed. Next, the segment #{100004TEC0040#} is used to calculate the length of the subfield 10 entry.

The output subvector is as follows:

```
...09100004E3C5C30040
```

Again, the #{ is replaced with the length of the segment, the matching #} is removed. Finally, the segment #{05091000100004TEC0040#} is used to calculate the length of the entire subvector 05.

The final output subvector is as follows:

```
0B0509100004E3C5C30040
```

BUILD_SV31LIST Event Attribute

The entire original EIF event is, by default, coded into SV 31s and attached to the NMVT. The class name, each event attribute/value pair, and the END designator are coded into separate SV 31s. The **BUILD_SV31LIST** event attribute enables the user to control whether this list of SV 31s is to be added to the NMVT. When the pseudo event is completed, if a **BUILD_SV31LIST** event attribute is present in the event AND has a value of **NO**, the SV 31 list is excluded. Otherwise, the SV 31 list is included.

If any single slot/value pair is larger than what an SV 31 will allow, the slot/value string is continued in additional SV 31s. The last character of a continued SV 31 will contain a + (plus sign) to indicate that it is continued into the next SV 31. The + (plus sign) must be in character position 255 of the SV 31 to signify continuation; otherwise, the + (plus sign) is interpreted as part of the text message.

Multiple SV 31s will be created in order to continue a slot/value pair, if needed. Each continued SV 31 will contain a + (plus sign) as the last character. The first non-continued SV 31 represents the end of the slot/value pair.

CONTINUE Slot

This event attribute is used to enable the matching of multiple CDSs to create a single pseudo event. A full description of this multiple pass process on the CDS file is given in "Matching Multiple CDSs to Create the Pseudo Event" on page 147. This event attribute can have a value of either **NEXT** or **GROUP*xxx***, where *xxx* is a value in the range of 000–999.

The value of this event attribute is used to update the value in the **$CDS_GROUP** keyword. This keyword defaults to a value of **GROUP001**. If the value of a CONTINUE event attribute is **NEXT**, $CDS_GROUP is updated by adding a 1 to the three numeric digits at the end of the value. If the current value of $CDS_GROUP is **GROUP001**, and a CONTINUE event attribute with a value of **NEXT** is encountered in a MAP segment, the new value of the $CDS_GROUP keyword will be **GROUP001**.

If the value of the CONTINUE event attribute is **GROUP*xxx***, this value is used to replace the $CDS_GROUP value **only if** the numeric digits in the event attribute value are greater than the numeric digits in the current $CDS_GROUP value.

SF21 Slot

This event attribute is used to override the code point in any Subfield 21s that are in the SV 31s used to send the original EIF event. The value of this event attribute must be as follows:

```
attributeName=codepoint
```

Where `attributename` is the name of any generic attribute in the input attribute list, and `codepoint` is a 2-digit hexadecimal string that defines the value to be placed in the SF 21 that is associated with the SV31 for the named generic attribute.

Like the SV event attribute, the SF21 must only be prefixed with the string SF21; any characters after this prefix are ignored.

Matching Multiple CDSs to Create the Pseudo Event

A major difference between the way that CDS files are processed by the event adapters and how the CDS file is processed by the event receiver is the number of CDSs that can be matched to produce a single EIF event (or pseudo event, in the case of the event receiver).

One-Pass Method

The event adapters will run through all of the statements in a CDS file until either one statement is matched or the end of the file is reached without a match. The MAP segment of that single matching CDS is then used to create the event attribute/value pairs that will go into the outgoing EIF event.

Although this same one-pass process *can* be used to create any of the pseudo events that will be translated into an alert, it can result in a cumbersome CDS file. To illustrate this, consider the following example.

From an incoming event, create an alert that has various combinations of SV 05s and SV 92s based on event attribute/value pairs in the event. For the SV 05 creation, you look for the presence of two event attributes -- `resource1` and `resource2.` The following four CDSs map the SV 05:

```
CLASS SV05_1
  SELECT
    1: ATTR(=,resource1);
    2: ATTR(=,resource2);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0084#{#<%s#>#}0040#}#}", $V1, $V2);
END

CLASS SV05_2
  SELECT
    1: ATTR(=,resource1);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0084#}#}", $V1);
END
CLASS SV05_3
  SELECT
    1: ATTR(=,resource2);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0040#}#}", $V1);
END

CLASS SV05_4
  SELECT
    1: ATTR(=,$CLASSNAME);
  MAP
    SV05 = "#{05#{1000#{#<NONE#>#}0084#}#}";
END
```

To produce the four different event attributes, different SELECT segments must be used to inspect for the presence of these event attributes; therefore, there will be 4 different CDSs in the CDS file. Only one of these SV 05s will be in the pseudo event. The last CDS uses the $CLASSNAME keyword as a default. This keyword will always be present, so the last CDS will be selected if none of the other CDSs are matched.

The SV 92 subvector depends on value of another event attribute, `severity`. There are three different values for the `severity` event attribute that can result in different SV 92s, and a fourth SV 92 that is created if the `severity` event attribute contains none of these values. These CDSs are as follows:

```
CLASS SV92_1
  SELECT
    1: ATTR(=,severity), VALUE(=,FATAL);
  MAP
    SV92 = "0B92010001FE0300000000"
END
CLASS SV92_2
  SELECT
    1: ATTR(=,severity), VALUE(=,WARNING);
  MAP
    SV92 = "0B92010011FE0300000000"
END

CLASS SV92_3
  SELECT
    1: ATTR(=,severity), VALUE(=,HARMLESS);
  MAP
    SV92 = "0B92010002FE0300000000"
END

CLASS SV92_4
  SELECT
    1: ATTR(=,$CLASSNAME);
  MAP
    SV92 = "0B92010012FE0300000000"
END
```

Again, this requires 4 different CDSs to produce one and only one of these 4 different event attributes.

To produce a single pseudo event that can have any combination of the previous SV 05s and SV 92s using one pass through the CDS file requires 16 different CDS statements. The multiplication of the 4 statements needed to produce a unique SV05 and the 4 statements needed to produce a unique SV 92. Each of the 16 MAP segments has a single SV 05 and SV 92, representing all of the combinations that can occur. The four CDSs that represent both resources in combination with the various SV 92s are:

```
CLASS SVBOTH_1
  SELECT
    1: ATTR(=,resource1);
    2: ATTR(=,resource2);
    3: ATTR(=,severity), VALUE(=,FATAL);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0084#{#<%s#>#}0040#}#}", $V1, $V2);
    SV92 = "0B92010001FE0300000000"
END
CLASS SVBOTH_2
  SELECT
    1: ATTR(=,resource1);
    2: ATTR(=,resource2);
    3: ATTR(=,severity), VALUE(=,WARNING);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0084#{#<%s#>#}0040#}#}", $V1, $V2);
    SV92 = "0B92010011FE0300000000"
END

CLASS SVBOTH_3
  SELECT
    1: ATTR(=,resource1);
    2: ATTR(=,resource2);
    3: ATTR(=,severity), VALUE(=,HARMLESS);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0084#{#<%s#>#}0040#}#}", $V1, $V2);
    SV92 = "0B92010002FE0300000000"
END
```

```
CLASS SVBOTH_4
  SELECT
    1: ATTR(=,resource1);
    2: ATTR(=,resource2);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0084#{#<%s#>#}0040#}#}", $V1, $V2);
    SV92 = "0B92010012FE0300000000"
END
```

When other subvectors that need to be placed in the same output NMVT are added, the number of needed CDSs and the duplication of event attribute mappings in the MAP segment grows considerably.

Multiple-Pass Method

To alleviate this problem, the event receiver makes multiple passes though the CDS file and collects separate mappings from each segment that it matches for the one pseudo event that is created. The $CDS_GROUP keyword and the CONTINUE event attribute are used to control the multiple pass method.

Each pass starts at the beginning of the CDS file. If a CDS is matched that contains a valid CONTINUE event attribute, at least one more pass will be made through the CDS file. If a CDS is matched that does not have a CONTINUE statement, or no CDS is matched, that pass will be the last pass through the CDS file and all of the event attributes collected to this point are used to create the pseudo event.

EVERY CDS SELECT segment **MUST** have one statement that looks for the $CDS_GROUP keyword to be equal to a string in the range of GROUP001–GROUP999. By default, the initial value of the $CDS_GROUP keyword is GROUP001, so the first CDS statement matched must look for this keyword to be equal to GROUP001.

When a CDS is matched, the CONTINUE event attribute definition in the MAP segment of that CDS controls whether another pass will be made to match another CDS. The CONTINUE event attribute will cause the value of the $CDS_GROUP keyword to change to a specific value (`CONTINUE = GROUP004`) or to the next numeric value (`CONTINUE = NEXT`). If a specific value is given, it must be greater than the current value of the $CDS_GROUP keyword.

To illustrate the usage of the $CDS_GROUP keyword and the CONTINUE event attribute, using the previous example, fill in the keyword and event attribute as follows:

```
CLASS SV05_1
  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,GROUP001);
    2: ATTR(=,resource1);
    3: ATTR(=,resource2);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0084#{#<%s#>#}0040#}#}", $V2, $V3);
    CONTINUE = NEXT;
END

CLASS SV05_2
  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,GROUP001);
    2: ATTR(=,resource1);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0084#}#}", $V2);
    CONTINUE = NEXT;
END
```

```
CLASS SV05_3
  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,GROUP001);
    2: ATTR(=,resource2);
  MAP
    SV05 = PRINTF("#{05#{1000#{#<%s#>#}0040#}#}", $V2);
    CONTINUE = NEXT;
END

CLASS SV05_4
  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,GROUP001);
  MAP
    SV05_4 = "#{05#{1000#{#<NONE#>#}0084#}#}";
    CONTINUE = NEXT;
END

CLASS SV92_1
  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,GROUP002);
    2: ATTR(=,severity), VALUE(=,FATAL);
  MAP
    SV92 = "0B92010001FE0300000000"
END

CLASS SV92_2
  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,GROUP002);
    2: ATTR(=,severity), VALUE(=,WARNING);
  MAP
    SV92 = "0B92010011FE0300000000"
END

CLASS SV92_3
  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,GROUP002);
    2: ATTR(=,severity), VALUE(=,HARMLESS);
  MAP
    SV92 = "0B92010002FE0300000000"
END

CLASS SV92_4
  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,GROUP002);
  MAP
    SV92 = "0B92010012FE0300000000"
END
```

When an EIF event arrives to be translated, the first subvector created is the SV 05 subvector. Because the initial value of the $CDS_GROUP keyword is GROUP001, the SELECT segments for all of the CDSs that create the SV 05 will look for this value. If none of the first three CDSs in this group are selected, the fourth will be selected by default. Because these CDSs define a CONTINUE event attribute with a value of NEXT, the value of the $CDS_GROUP keyword will be updated to GROUP002, and another pass will be made through the CDSs to attempt to match on another CDS.

All of the SV 05 CDSs will now be ignored, because the $CDS_GROUP keyword is another value. Without this gate, the same SV 05 CDS would continue to be matched indefinitely. An SV 92 CDS will be matched next. The GROUP002 value for the $CDS_GROUP keyword determines this. Because none of the SV 92 CDSs have a CONTINUE event attribute, this will be the last pass made through the CDS file.

Using the previous CDSs, if an event arrives with event attributes, as follows:

```
resource1=FIRSTRES
resource2=SECNDRES
severity=WARNING
```

The following two subvectors will be produced:

```
1B0519100009C6C9D9E2E3D9C5E2008409E2C5C3D5C4D9C5E20040
0B92010011FE0300000000
```

Building the NMVT

When the pseudo event has been created, the NMVT will be built from data in the event attributes and keywords.

Building the SV 31s Containing the Original Event

The $BUILD_SV31LIST keyword indicates whether the SV 31s that contain the original EIF event data will be built. These SV 31s are added to the NMVT first. The value of this keyword is modified by the contents of the BUILD_SV31LIST event attribute.

Each SV 31 contains an element of the original event: the class name, an event attribute/value pair, or the END designator. Formatted on an NPDA screen, a simple CDS example follows (assuming that the original event had a class name of `SAMPLE`):

```
ORIGINAL T/EC EVENT:
   SAMPLE;
   resource1=FIRSTRES;
   resource2=SECNDRES;
   severity=WARNING;
   END
```

Overriding the SF21 Codepoint

Each SV 31 contains an SF 21 subfield. By default, the codepoint associated with this subfield is X'00'. Two codepoints allow the SV 31 to be associated with the alert description and probable causes: codepoint X'21' to probable causes, and codepoint X'22' to alert description. By default, the SV 31 associated with a ***severity*** event attribute is assigned a X'21' codepoint, and the SV 31 associated with a ***msg*** event attribute is assigned a X'22' codepoint.

You can change which SV 31 is associated with the alert description or probable causes using the **SF21** event attribute. This event attribute contains the name of an attribute from the input attribute list (which must be an event attribute value from the incoming EIF event), followed by an equal (=) sign, followed by a one byte hexadecimal codepoint. For example, if you want to associate an event attribute called `eventdetail` from the incoming event with the alert description, code the following CDS:

```
CLASS SF21_1
  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,"GROUP001");
    2: ATTR(=,eventdetail);
  MAP
    SF21_1 = PRINTF("%s=21",$N2);
END
```

The `SF21_1` event attribute value follows:

```
eventdetail=21
```

When the SV 31 list is built, the data in the event attribute/value pair named by `eventdetail` will be associated with the alert description.

This SF 21 override only has an effect if the $BUILD_SV31LIST keyword indicates that the SV 31 list will be built; if the list is not to be built, this event attribute is ignored.

Alert or Resolve

The value of the $NMVT_TYPE keyword indicates whether the NMVT will be an alert NMVT (type 0000) or a resolve NMVT (type 0002). This keyword defaults to an alert NMVT. If the NMVT_TYPE event attribute is set within any matched CDS, the value of the $NMVT_TYPE keyword is set to this event attribute.

Adding User Subvectors

After the SV 31s are added and the NMVT type is determined, the user subvectors created from CDS MAP segments are added to the NMVT. As previously mentioned, any event attribute can be assigned a value in the MAP segment of a CDS statement. The only event attributes that will be used to build user subvectors, however, must be prefixed with `SV`.

If the same event attribute name is used more than once, the value of the last one is used as the value of the event attribute. Therefore, if you need multiple subvectors of the same type, name the event attributes with this subvector data uniquely. Using **SV10** as the event attribute name for more than one SV 10 is not valid, because all preceding event attributes will be overwritten in the event attribute list. Use unique names such as **SV10_1**, **SV10_2**, and so forth.

The names for subvector event attributes do not necessarily correspond to the subvector. The value of an event attribute that you name as **SV10_1** can contain data for a completely different subvector. The value of the subvector event attribute determines the subvector type, not the name of the event attribute.

The value of a subvector event attribute is decoded as previously described. Subvectors are added to the NMVT in the order that their defining event attributes are encountered in the MAP segments.

Calculating the AlertID for SV 92

Because the alert ID field must be calculated for the subvector at the time that NMVT is built, the event receiver will calculate the value for this field of SV 92. However, you must specify an alert ID place holder in any SV 92 event attributes that you code in a CDS file. You can put any 4 bytes there; they will be overwritten by the event receiver. It is recommended that you code four bytes of zero (`00000000`) as the place holder.

The event receiver calculates the alert ID as described in ***SNA Formats***.

Example

The following example uses the default event receiver service CDS file (IHSAECDS) provided in the Event/Automation Service.

Assume that the following EIF event was received by the event receiver:

```
SNA_Performance_Degraded;source=NV390ALT;origin=B3088P2;
sub_origin=TX12/DEV;hostname=USIBMNT.NTVED;adapter_host=NMPIPL06;
date=OCT 29 16:32:52;severity=WARNING;msg=PERFORMANCE DEGRADED:
CONTROLLER;adapter_host_snanode=USIBMNT.NTVED;
event_type=NOTIFICATION;arch_type=GENERIC_ALERT;
product_id=3745;alert_id=00000009;
block_id='';action_code='';alert_cdpt=4000;
self_def_msg=[ALRTTXT2];event_correl=[N/A];
incident_correl=[N/A];adapter_correl=E7735930A;END
```

The previous event was an alert that was changed into an event by the alert adapter. All of the event attribute/value pairs are first coded into generic attributes for the input attribute list; the $CLASSNAME keyword attribute is assigned the value SNA_Performance_Degraded.

The first group in the CDS file is GROUP001; these CDSs determine the NMVT type. Because there is not a status event attribute in the incoming EIF event, the NMVT_TYPE event attribute and the $NMVT_TYPE keyword are set to the value ALERT. Because CONTINUE=NEXT is specified in the MAP segment, the $CDS_GROUP keyword is set to GROUP002.

The next group in the CDS file defines the SV 93. None of the information in the original event determines the value of the SV 93; the value of this subvector is as follows:

```
0493FE03
```

CONTINUE=NEXT is specified in the MAP segment. The $CDS_GROUP keyword is set to GROUP003.

The next group in the CDS file defines the SV 05. The example event will match on the class SV05_4, it has a host name, origin, and source event attribute, but not a probe event attribute. After PRINTF and translation, the value of this subvector follows:

```
2A052810000EE4E2C9C2D4D5E34BD5E3E5C5C4008408C2F3F0F8F8D7F200F509D5E5F3F9F0C1D3E30040
```

CONTINUE=NEXT is specified in the MAP segment. The $CDS_GROUP keyword is set to GROUP004.

The next group in the CDS file defines the SV 10. None of the information in the original event determines the value of the SV 10; the value of this subvector follows:

```
1C10001911040506C7C5D40908F5F6F9F7C2F8F3080FE3C9E5D6D3C9
```

CONTINUE=NEXT is specified in the MAP segment. The $CDS_GROUP keyword is set to GROUP005.

The next group in the CDS file defines the SV 92. The example event will match on the class SV92_4, it has severity=WARNING and the $NMVT_TYPE is set to ALERT. The value of this subvector follows:

```
0B92010011FE0300000000
```

The alert ID portion of this subvector (the last 4 bytes) will be calculated and filled in by the event receiver. CONTINUE=NEXT is specified in the MAP segment. The $CDS_GROUP keyword is set to GROUP006.

The next group in the CDS file defines the SV 97. The example event will match on the class SV97_1, the $NMVT_TYPE is set to ALERT. The value of this subvector follows:

```
0A970881200035003000
```

CONTINUE=NEXT is specified in the MAP segment. The $CDS_GROUP keyword is set to GROUP007.

The next group in the CDS file defines an SF 21. The example event will match on the one and only CDS for this group, the `msg` event attribute is present in the event. The value of this subfield override follows:

```
msg=21
```

`CONTINUE=NEXT` is specified in the MAP segment. The $CDS_GROUP keyword is set to GROUP008.

The last group in the CDS file defines another SF 21. The example event will match on this last CDS, the `severity` event attribute is present in the event. The value of this subfield override follows:

```
severity=22
```

The $BUILD_SV31LIST keyword is still set to YES. The NMVT built from the previous process follows:

```
03D800002B31060202800000512C5D5E40321001B30E2D5C16DD7859986969994819583
856DC48587998184858 45E2231060202800000512C5D5E40321001230A296A49983857E
D5E5F3F9F0C1D3E35E4A3106020280000000512C5D5E40321003A3096998987899 57EC2F3
F0F8F8D7F261E2D76BD5C1D761E3D76BC4C5C3D5C5E361E3C5D9D46BD9C1D3E5F461C4C5
E56BE3E7F1F261C4C5E55E263106020280000000512C5D5E40321001630A2A4826D969989
8789957EE3E7F1F261C4C5E55E2931060202800000 0512C5D5E403210019308896A2A395
8194857EE4E2C9C2D4D5E34BD5E3E5C5C45E283106020280000000512C5D5E40321001830
81848197A385996D8896A2A37ED5D4D7C9D7D3F0F65E2731060202800000 0512C5D5E403
210017308481A3857ED6C3E340F2F940F1F67AF3F27AF5F25E2331060202800000 0512C5
D5E40321221330A285A5859989A3A87EE6C1D9D5C9D5C75E3631060202800000 0512C5D5
E4032121263094A2877ED7C5D9C6D6D9D4C1D5C3C540C4C5C7D9C1C4C5C47AC3D6D5E3D9
D6D3D3C5D95E3531060202800000 0512C5D5E4032100253081848197A385996D8896A2A3
6DA29581959684857EE4E2C9C2D4D5E34BD5E3E5C5C45E2A3106020280000000512C5D5E4
0321001A3085A58595A36DA3A897857ED5D6E3C9C6C9C3C1E3C9D6D55E2A310602028000
000512C5D5E40321001A30819983886DA3A897857EC7C5D5C5D9C9C36DC1D3C5D9E35E22
3106020280000000512C5D5E4032100123097999684A483A36D89847EF3F7F4F55E243106
02028000000512C5D5E4032100143081938599A36D89847EF0F0F0F0F0F0F95E1E3106
02028000000512C5D5E40321000E308293968392 6D89847E7D7D5E213106020280000005
12C5D5E403210011308183A38996956D839684857E7D7D5E2231060202800000 0512C5D5
E4032100123081938599A36D838497A37EF4F0F0F05E2A3106020280000000512C5D5E403
21001A30A28593866D8485866D94A2877EADC1D3D9E3E3E7E3F2BD5E2531060202800000
0512C5D5E4032100153085A58595A36D8396999985937EADD561C1BD5E28310602028000
000512C5D5E403210018308995838948595A36D8396999985937EADD561C1BD5E2B3106
02028000000512C5D5E40321001B3081848197A385996D8396999985937EC5F7F7F3F5F9
F3F0C15E153106020280000000512C5D5E40321000530C5D5C40493FE032A052810000EE4
E2C9C2D4D5E34BD5E3E5C5C4008408C2F3F0F8F8D7F200F509D5E5F3F9F0C1D3E300401C
10001911040506C7C5D40908F5F6F9F7C2F8F3080FE3C9E5D6D3C90B92010011FE030000
00000A970881200035003000
```

Translating ASCII Text Data

SNMP agents send up data (whether in variable bindings or other parts of the trap) that is essentially ASCII text data, but the data type in the encoding trap indicates an octet string. Since the data type is an octet string, the trap-to-alert data encoding process treats each byte of data as raw hexadecimal data rather than an encoded character. As a result, the parsing done by the trap-to-alert conversion task merely turns this data into a character representation of the hex data bytes for in SELECT criteria in the CDS file. For example, assume the character string **ABC** appears in a variable binding value with a type of octet string. Since the data is an octet string, the data is converted to the character string **414243** and assigned to the generic keyword associated with the variable binding name.

If you want to use the original ASCII string value of the generic keyword in the outgoing alert, the ASCII string **414243** needs to be converted back to the character

string **ABC** and changed to EBCDIC. The $[and $] escape sequence has been provided to allow for conversion of the EBCDIC character string **414243** back to the EBCDIC character string **ABC**.

Within the value encoding, inside the double quotes for the value of the subvector event attribute (whether in a PRINTF or not), this escape set is used to delimit data that is considered to be the character representation of hex data that, in turn, is ASCII character data. Data delimited in this way is turned into EBCDIC character data and placed within the value of the subvector event attribute. For example, if you had the following event attribute assignment in a Class Definition Statement:

```
SV05 = "0B0509100004#[414243#]0040"
```

The encoding of this event attribute value into an actual hexadecimal alert subvector would produce:

```
0B0509100004C1C2C30040
```

If data within the range delimited by the escape sequences turns out not to be character representations of hex data that are ASCII characters, then the conversion to EBCDIC will fail, and the translation of the trap (and thus, building of the alert/resolve) is terminated and the trap is discarded. Note that if other escape sequences occur following "#[" and before "#]" is encountered, they are simply treated as characters that are put into the subvector, which would later fail conversion to hex then EBCDIC, because they aren't character representations of hex digits. Also, if "#[" or "#]" occur following the "#<" escape sequence, which "turns off" translation of character representations of hex digits to hex data in the subvector, and before "#>", which "restores" that translation mode, then "#[" and "#]" are simply treated as untranslated character data, and not escape sequences.

Translating SNMP Non-String Data Types

Some attributes used in CDS selection are assigned names based upon the places in the trap from which their values are extracted, while other names are adapted directly from the trap (for example, variable names, which are object identifiers, in the variable bindings). The encoded values are all string data, displayable forms of the data within the trap, and the formats of these strings depend upon the data types assigned to these pieces of data in the trap.

As an example, suppose that the data type of a value in the trap was found to be that of an IP address. The trap-to-alert conversion task would turn this into a string which was the IP address. The following data types can be assigned to data in an SNMP trap, and the corresponding string to which it is translated.

integer
signed decimal number string. The integer 30 becomes the EBCDIC string "30"

null a pair of single quotes in EBCDIC. This becomes the EBCDIC string "''".

octet string
hexadecimal data string. The hex string 313233 becomes the EBCDIC string "313233".

object identifier
ASN.1 data in dotted decimal notation format. The object 2C010306 becomes the EBCDIC string "1.4.1.3.6".

printable string
an EBCDIC string

visible string
an EBCDIC string

general string
an EBCDIC string

IP address
IP address. For example, if you are using, dotted decimal notation format, the address 09080706 becomes the EBCDIC string "9.8.7.6".

counter
unsigned decimal number string. The number 05 becomes the EBCDIC string "5".

gauge unsigned decimal number string. The number 50 becomes the EBCDIC string "50".

ticks unsigned decimal number string. The number 132 becomes the EBCDIC string "132".

When the value is not one of the data types listed, then that value is treated as if it had a data type of octet string. Also, if the data type of the value in the binding is a complex structure like SEQUENCE OF (something that should not happen), then the value is treated as if it had the null data type.

The following example uses the default trap-to-alert service CDS file (IHSATCDS) supplied with the Event/Automation Service. Assume that the following trap data is received by the trap-to-alert conversion task (words separated for readability).

```
303B0201 00040670 75626C69 63A42E06
0C2B0601 14011203 01020101 03400449
B5203F02 01050201 00430100 300F300D
06082B06 01120108 07000201 30
```

Also assume that the IP address and port associated with the agent originating the trap is 9.50.20.8 and 161, respectively.

The trap data is first coded into corresponding keyword and generic attributes for the input attribute list. The encoded string attributes are:

```
  $ORIGIN_ADDR        9.50.20.8
    $ORIGIN_PORT         161
    $SNMP_VERSION     0
    community                      public
    enterpriseOID
1.3.6.1.20.1.18.3.1.3.1.1.3
    agent_address                73.181.32.63
    generic_trap                   5
    specific_trap                  0
    timestamp                      0
    1.3.6.1.18.1.8.7.0         30
```

The first group in the CDS file is GROUP001; this CDS determines the NMVT type and BUILD_SV31LIST setting. Since this trap is not a Multi-System Manager trap, the generic formatting done by the CDS file IHSATALL is used. The NMVT_TYPE event attribute (and therefore, the $NMVT_TYPE keyword) is set to the value ALERT. The BUILD_SV31LIST event attribute (and therefore, the $BUILD_SV31LIST keyword) is set to the value YES. Since CONTINUE=NEXT is specified in the MAP segment, the $CDS_GROUP keyword is set to GROUP002.

The next group in the CDS file defines the SV 92. The value of this subvector is:

```
0B92080012FE0000000000
```

The Alert ID portion of this subvector (the last 4 bytes) will be calculated and filled in by the event receiver. CONTINUE=NEXT is specified in the MAP segment, the $CDS_GROUP keyword is set to GROUP003.

The next group in the CDS file defines the SV 05. After PRINTF and translation, the value of this subvector is:

```
22050E100009F7F34BF1F8F14BF300811211000DF7F34BF1F8F14BF3F24BF6F30081
```

CONTINUE=NEXT is specified in the MAP segment, the $CDS_GROUP keyword is set to GROUP004.

The next group in the CDS file defines the SV 10. The value of this subvector is:

```
5A10002811030300002 20EE261F3F9F040D78199819393859340C595A3859997
9989A28540E28599A585992F11040804F0F1F0F3F0F01B06E389A596938940D5
85A3E58985A64086969940D6E261F3F9F00908F5F6F9F7C2F8F2
```

CONTINUE=NEXT is specified in the MAP segment, the $CDS_GROUP keyword is set to GROUP005.

The next group in the CDS file defines another SV 10, which contains information about the resource reporting the trap. The value of this subvector is:

```
2C10000F1109030000090EA495929596A6951A110C0E02F0F0F0F0F0F0F0F0F0
F0F0F00906A495929596A695
```

CONTINUE=NEXT is specified in the MAP segment, the $CDS_GROUP keyword is set to GROUP006.

The next group in the CDS file defines the SV 93 and SV 97. The values of these subvectors are:

```
0493FE000
A970401210004810000
```

CONTINUE=NEXT is specified in the MAP segment, the $CDS_GROUP keyword is set to GROUP007.

The last group in the CDS file defines the SV 98. The enterpriseOID, specific trap, and generic trap values are added as information in this subvector. The value of this subvector is:

```
severity=22
```

The $BUILD_SV31LIST keyword is still set to YES, the actual NMVT built from the previous process is:

```
027B0000293106020280000000512C5D5E40321001930D6D9C9C7C9D56DC1C4C4D97EF94B
F6F74BF5F04BF1F85E2331060202800000000512C5D5E40321001330D6D9C9C7C9D56DD7D6
D9E37EF1F0F3F45E2131060202800000000512C5D5E40321001130E2D5D4D76DE5C5D9E2C9
D6D57EF05E2931060202800000000512C5D5E4032100193083969494A49589A3A87EF7F0F7
F5F6F2F6C3F6F9F6F35E3C31060202800000000512C5D5E40321002C308595A38599979989
A285D6C9C47EF14BF34BF64BF14BF2F04BF14BF1F84BF34BF14BF24BF14BF14BF35E2D31
0602028000000512C5D5E40321001D3081878595A36D8184849985A2A27EF7F34BF1F8F1
4BF3F24BF6F35E2131060202800000000512C5D5E4032100113087859585998 36DA39981
977EF55E2231060202800000000512C5D5E40321001230A297858389868936DA39981977E
F05E1E31060202800000000512C5D5E40321000E30A3899485A2A38194977EF05E28310602
028000000512C5D5E40321001830F14BF34BF64BF14BF1F84BF14BF84BF74BF07EF4F85E
0B92080012FE00331AA4A122050E100009F7F34BF1F8F14BF300811211000DF7F34BF1F8
F14BF3F24BF6F300815A1000281103030000220EE261F3F9F040D78199819393859340C5
95A38599979989A28540E28599A585992F11040804F0F1F0F3F0F01B06E389A596938940
D585A3E58985A64086969940D6E261F3F9F00908F5F6F9F7C2F8F22C10000F1109030000
```

```
090EA495929596A6951A110C0E02F0F0F0F0F0F0F0F0F0F0F00906A495929596A69504
93FE000A97040121000048100002E98208229F811F14BF34BF64BF14BF2F04BF14BF1F84B
F34BF14BF24BF14BF14BF3068229FA11F5068229FB11F0
```

Trap-to-Alert Post-CDS Processing

The trap-to-alert service post-CDS processing is nearly identical to that used by the event receiver post-CDS processing. The differences are:

- There is no $CLASSNAME keyword created by the trap-to-alert service since the incoming data was not an EIF event.
- An additional escape sequence set $[and $] is available to aid in translating variable binding data that are ASCII octet strings.
- Unlike EIF event data, SNMP trap data can have a data type other than a character string.

Advanced Customization - Trap-to-Alert Forwarding Daemon

The way the Event/Automation Service trap-to-alert conversion task receives traps is through a datagram socket which is bound to a port that you define in the configuration file (sample member name IHSATCFG). The conventional trap manager data port number, 162, is the default port.

Since port 162 is a "well-known" port for SNMP managers, and there may be multiple SNMP manager applications that are interested in trap data, this sort of port assignment can cause a conflict. To help resolve any conflicts, there is also a sample datagram forwarding daemon, IHSAUFWD, and an associated sample configuration file, IHSAUCFG, that are shipped with the Event/Automation Service. The daemon receives data on a datagram socket and forwards that data to the destinations given in the configuration file.

Most SNMP agents are set to forward traps to the trap manager at port 162. IHSAUFWD can use this port to receive the trap data for all interested managers and then forward this data to the managers. These managers can be on the local system or at any IP address on the network.

The IHSAUFWD daemon uses a sample configuration file (IHSAUCFG) to specify the SNMP managers that are to receive the data. A description of the contents of this configuration file follows:

comments

Comments can be formed by beginning a line with the number sign (#) or the exclamation point (!).

host IP address and port

To code a destination for the datagram forwarding daemon, put the following on a line in the file:

- IP address
- white space (one or more blanks)
- port number, in decimal

An example of a lone coded like this would be:

```
137.45.110.2       6001
```

For more information about how to use and customize the forwarding daemon, see the comments in the IHSAUFWD sample.

Detailed Example for Trap-to-Alert Conversion

Suppose an SNMP trap is emitted for a managed entity with a problem, and you want the NetView program to take some action when it appears. A way to do that is to have the Event/Automation Service receive the trap, convert it to an alert NMVT, then use NetView automation to process the alert NMVT and take some action (execute a command).

Generally, you will need to know something about the information the SNMP trap contains in order to parse the trap and transfer the most useful of the information to the alert NMVT so that the processing of the alert NMVT will be the most effective. Documentation associated with the entities emitting the SNMP traps may contain this kind of information. It may also be obtained by a trace that is active when the SNMP trap flows, such as the IP data trace of the Event/Automation Service or a z/OS Communications Server packet trace.

Knowing what information to expect in the SNMP trap, you then create the class definition statements necessary to extract the interesting information from the trap and construct the alert NMVT. Of course, if you are also using Multisystem Manager's IP management functions, you will want to ensure that your new definitions are integrated so that Multisystem Manager's IP management functions still work. The class definition statements in this example are designed so that theycan be placed in sample member IHSATUSR and work with the sample definitions provided by the NetView program in IHSATCDS and the other members it includes.

This example starts with an SNMP trap that is emitted for an uninterruptible power supply problem. The data is shown in hex and has been separated and annotated to make the trap contents more clear.

```
*
* Outermost constructor for the trap (tag and length)
*
30820127
* SNMP version (00 = SNMPv1)
020100
* Community name (public)
04067075626C6963
* Trap PDU
A4820118
*   Enterprise object ID (1.3.6.1.4.1.12270)
06072B06010401DF6E
*   Agent address (10.71.225.20)
40040A47E114
*   Generic trap code (6 = enterprise specific)
020106
*   Specific trap code (32 in decimal)
020120
*   Timeticks
430402A2D49D
*   Variable bindings "container"
308200F9
*     Variable binding 1
3015
*       Variable 1 (1.3.6.1.4.1.12270.200.2.1.1.1)
060D2B06010401DF6E814802010101
*       Value 1 (octet string "1493")
040431343933
*     Variable binding 2
3019
*       Variable 2 (1.3.6.1.4.1.12270.200.2.1.1.2)
060D2B06010401DF6E814802010102
*       Value 2 (octet string "/L20/O50")
```

```
04082F4C32302F4F3530
*     Variable binding 3
3024
*       Variable 3 (1.3.6.1.4.1.12270.200.2.1.1.3)
060D2B06010401DF6E814802010103
*       Value 3 (octet string "2005-01-10T16:13:00")
0413323030352D30312D31305431363A31333A3030
*     Variable binding 4
3014
*       Variable 4 (1.3.6.1.4.1.12270.200.2.1.1.4)
060D2B06010401DF6E814802010104
*       Value 4 (octet string "I14")
0403493134
*     Variable binding 5
3025
*       Variable 5 (1.3.6.1.4.1.12270.200.2.1.1.5)
060D2B06010401DF6E814802010105
*       Value 5 (octet string "DIGIN ON    OCCURRED")
0414444947494E204F4E202020204F43435552524544
*     Variable binding 6
3015
*       Variable 6 (1.3.6.1.4.1.12270.200.2.1.1.6)
060D2B06010401DF6E814802010106
*       Value 6 (octet string "DI=1")
040444493D31
*     Variable binding 7
3025
*       Variable 7 (1.3.6.1.4.1.12270.200.2.1.1.7)
060D2B06010401DF6E814802010107
*       Value 7 (octet string "RC2 Gas Status Man. ")
0414524332204761732053746174757320 4D616E2E20
*     Variable binding 8
3011
*       Variable 8 (1.3.6.1.4.1.12270.200.2.1.1.8)
060D2B06010401DF6E814802010108
*       Value 8 (NULL)
0500
*     Variable binding 9
3011
*       Variable 9 (1.3.6.1.4.1.12270.200.2.1.1.9)
060D2B06010401DF6E814802010109
*       Value 9 (NULL)
0500
```

Knowing that this type of SNMP trap will always contain these variable bindings and that the values, at least of the interesting variables, will always be the same kind of data, you can use these class definition statements provide a way to convert the SNMP trap to an alert NMVT. These sample statements contain additional commentary to explain the trap data transferred to the NMVT.

Note: In the following example, note the following:

- Because of printing constraints, some of the command lines had to be "broken" in order to fit on the page.
- Use codepage 1047 X'AD' to code a left bracket ([ ) and codepage 1047 X'BD' to code a right bracket ( ]).

```
#*********************************************************************
#
# Definitions for catching an SNMP trap indicating a UPS problem
# and turning it into an alert NMVT.
#
#   First pass, build subvectors X'92' (generic alert), X'10'
#   product set ID (one each for alert sender and reported resource),
#   X'93' (probable cause), and X'96' (failure cause).
#
```

```
#   The first pass looks for GROUP001 and a specific trap value
#   of 32 (the specific trap value in the trap was converted to
#   a string representing the value in decimal).
#*********************************************************************
CLASS IHSATUSR_UPS1

  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,"GROUP001");
    2: ATTR(=,specific_trap), VALUE(=,"32");
  MAP
#
#               |-- First pass sets desire for alert NMVT
    NMVT_TYPE = ALERT;
#
#                    |-- For this, we don't want SV x'31' set
#                    |   We'll build our own SV x'31' later
    BUILD_SV31LIST = NO;
#
#                     |-- Alert description code-point
#                     |   I chose X'1501' LOSS OF EQUIPMENT COOLING
#                     |   to illustrate.
    SV92 = "#{92080001150100000000#}";
#
#     Hardware and software information for alert builder
#     (basically hard-coded and uses our software product name,
#      because E/AS is building the alert NMVT)
#
#  Note that the line beginning SV10_1 and the line beginning SV10_2 should be
#  coded on continuous lines up to and including the semicolon character
     SV10_1 = "#{1000#{1103#{0000#}#{0E#<S/390 Parallel Enterprise Server#>#}#}#
{1104#{02#<5697-ENV0000#>#}#{04#<050200#>#}#{06#<Tivoli NetView for z/OS#}#}#}";
    SV10_2 = "#{1000#{1109#{0000#}#{0E#<UPS system#}#}#{110C#{02#<000000000000#>#}#
{06#<unknown#}#}#}";
#
#               |-- Probable cause code-point
#               |   x'0301' COOLING FAN chosen to illustrate.
#               |
    SV93 = "#{930301#}";
#
#                   |-- Failure cause code-point
#                   |   X'0301' COOLING FAN chosen to illustrate
#                   |
#                   |         |-- Recommended action code-point
#                   |         |   X'0300' CHECK FOR DAMAGE and
#                   |         |   X'1800' REPLACE DEFECTIVE EQUIPMENT
#                   |         |   to illustrate
    SV96 = "#{96#{010301#}#{8103001800#}#}";
#
#              |-- Keep going to next pass (GROUP002, for example)
    CONTINUE = NEXT;
END
#
#   Second pass for our UPS trap - defer to third pass, where we will
#   use the generic subvector X'05' (hierarchy/resource list)
#   construction from member IHSATALL.
#
CLASS IHSATUSR_UPS2

  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,"GROUP002");
    2: ATTR(=,specific_trap), VALUE(=,"32");
  MAP
#              |-- Tells trap to alert to continue to third pass
    CONTINUE = NEXT;
END
#
# Defer subvector X'05' definition to GROUP003 generic CLASS
```

```
# definition in IHSATALL
#
#
#   Fourth pass for UPS trap, construct subvector X'98' (detailed
#   data) and subvectors X'31'.  ALL selection criteria must be met
#   in order for inclusion of the information defined here in the
#   alert NMVT.
#
#   1) fourth pass, (CDS_GROUP keyword has the value GROUP004)
#   2) generic trap
#
#      Because no VALUE was supplied, we just look for
#      presence of the item, which, for an SNMPv1
#      trap, should always be there.
#
#      A primary reason to look for the presence of
#      of something that should always be there is that
#      this provides the method by which we can retrieve
#      the value, perhaps manipulate it, then put it in
#      the alert NMVT.
#
#   3) specific trap code with value 32 decimal,
#
#   4) MIB variable with name "1.3.6.1.4.1.12270.200.2.1.1.1"
#
#       Because gave no VALUE, we merely expect it to
#       have been present in the trap, again so we
#       retrieve its value and use it.
#
#   5) presence of origin address keyword,
#   6) presence of origin port keyword,
#   7) presence of community information,
#   8) presence of enterprise object ID,
#   9) presence of agent address,
#  10) presence of a timestamp,
#  11) presence of MIB variable "1.3.6.1.4.1.12270.200.2.1.1.2",
#  12) presence of MIB variable "1.3.6.1.4.1.12270.200.2.1.1.3",
#  13) presence of MIB variable "1.3.6.1.4.1.12270.200.2.1.1.5"
#
CLASS IHSATUSR_UPS3

  SELECT
    1: ATTR(=,$CDS_GROUP), VALUE(=,"GROUP004");
    2: ATTR(=,generic_trap);
    3: ATTR(=,specific_trap), VALUE(=,"32");
    4: ATTR(=,"1.3.6.1.4.1.12270.200.2.1.1.1");
    5: ATTR(=,$ORIGIN_ADDR);
    6: ATTR(=,$ORIGIN_PORT);
    7: ATTR(=,community);
    8: ATTR(=,enterpriseOID);
    9: ATTR(=,agent_address);
   10: ATTR(=,timestamp);
   11: ATTR(=,"1.3.6.1.4.1.12270.200.2.1.1.2");
   12: ATTR(=,"1.3.6.1.4.1.12270.200.2.1.1.3");
   13: ATTR(=,"1.3.6.1.4.1.12270.200.2.1.1.5");
  MAP
#                                  |-- Special detail data = hard-code
#                                  |           enterprise information
#                                  |                        |-- Special detail data
#                                  |                        |     = generic trap code
#                                  |                        |
#                                  |                        |                  |-- Special
#                                  |                        |                  |  detail data
#                                  |                        |                  |  = specific
#                                  |                        |                  |   trap code
#                                  |                        |                  |
#                                  |                        |                  |
```

```
#                                  |                        |                  |
#                                  |                        |                  |
#                                  |                        |                  |
#                                  |                        |                  |
    SV98 = PRINTF("#{98#{8229F811#<Ent_Name#>#}#{8229FA11#<%s#>#}#{8229FB11#<%s#>#}#}",$V2,$V3);
#
# Now we also add some X'31' subvectors to convey additional
# information that came in the SNMP trap.
#
# Notice something in the definitions for SV31_2 and SV31_6.
# Both the community and the information from the variable binding
# expected in the SNMP trap are, for this example, presumed to have
# ASCII text data even though the data type encoded in the trap
# indicates merely OCTET STRING.  When E/AS encounters the OCTET
# STRING data type, E/AS converts it to a string representing the
# value in hexadecimal.  Because we have decided it's really text
# data and we want to be able to read in the display of the alert
# in hardware monitor, we use the escape character sequences (pound-sign followed
# by left bracket and pound-sign followed by right bracket) to delimit
# the string representing hexadecimal data and tell E/AS to convert it
# to EBCDIC text for inclusion in the subvector we're building.
#
# Subvector x'31' showing origin IP address:port number
#
# Note that this should be coded on one continuous line
    SV31_1 = PRINTF("#{31#{0202800000#}#{12#<ENU>#}#{2100#}#{30#<Origin
Address=%s:%s#>#}#}",$V5,$V6);
#
# Subvector x'31' showing community name in EBCDIC
#
# Note that the left square bracket must be x'AD' and the
#  right square bracket must be x'BD'
#
#                                                                    |--Left square
#                                                                    |  bracket must
#                                                                    |  be x'AD'
#                                                                    |  codepage 1047
#                                                                    |
#                                                                    |    |Right square
#                                                                    |    |bracket must
#                                                                    |    |be x'BD'
#                                                                    |    |codepage 1047
#                                                                    |    |
    SV31_2 = PRINTF("#{31#{0202800000#}#{12#<ENU#>#}#{2100#}#{30#<Community=#>#[%s#]#}#}",$V7);
#
# Subvector x'31' showing enterprise object ID
#
# Note that this should be coded on one continuous line
    SV31_3 = PRINTF("#{31#{0202800000#}#{12#<ENU#>#}#{2100#}#{30#<Enterprise
Object ID=%s#>#}#}",$V8);
#
# Subvector x'31' showing agent IP address
#
    SV31_4 = PRINTF("#{31#{0202800000#}#{12#<ENU#>#}#{2100#}#{30#<Agent Address=%s#>#}#}",$V9);
#
# Subvector x'31' showing the timestamp
#
    SV31_5 = PRINTF("#{31#{0202800000#}#{12#<ENU#>#}#{2100#}#{30#<Timestamp=%s#>#}#}",$V10);
#
# Subvectors x'31' showing what we presume to be text from the
# variable bindings in the trap.  We hard-code the MIB variable names
# in the text.  For the MIB variable values we want to also include
# in the text, we are assuming that the values are, in fact, ASCII
# text that we want to see in EBCDIC when we display the alert NMVT
# in hardware monitor.
#
#
```

```
# Note that the left square bracket must be x'AD' and the right square bracket
# must be x'BD'
# Note also that this should be coded on one continuous line
    SV31_6 = PRINTF("#{31#{0202800000#}#{12#<ENU#>#}#{2100#}#
{30#<1.3.6.1.4.1.12270.200.2.1.1.1 =
 #>#[%s#]#}#}",$V4);
#
# Builds SV31 with 1.3.6.1.4.1.12270.200.2.1.1.2 = its value in EBCDIC
#
# Note that this should be coded on one continuous line
    SV31_7 = PRINTF("#{31#{0202800000#}#{12#<ENU#>#}#{2100#}#
{30#<1.3.6.1.4.1.12270.200.2.1.1.2 = #>#[%s#]#}#}",$V11);
#
# Builds SV31 with 1.3.6.1.4.1.12270.200.2.1.1.3 = its value in EBCDIC
#
# Note that this should be coded on one continuous line
    SV31_8 = PRINTF("#{31#{0202800000#}#{12#<ENU#>#}#{2100#}#
{30#<1.3.6.1.4.1.12270.200.2.1.1.3 = #>#[%s#]#}#}",$V12);
#
# Builds SV31 with Message = and the value of the
# 1.3.6.1.4.1.12270.200.2.1.1.5 MIB variable in EBCDIC.
#
# Note that this should be coded on one continuous line
    SV31_9 = PRINTF("#{31#{0202800000#}#{12#<ENU#>#}#{2100#}#
{30#<Message=#>#[%s#]#}#}",$V13);
END
```

For details of the class definition statement processing, see "Multiple-Pass Method" on page 149 as well as "Trap-to-Alert Post-CDS Processing" on page 158.

Assuming that the hardware monitor recording filters allow the alert NMVT to be saved, the alert NMVT produced by the trap-to-alert conversion process would look like this in hardware monitor event detail.

```
N E T V I E W          SESSION DOMAIN: CNM01    NETOP2    08/19/10 13:27:17
 NPDA-43S                       * EVENT DETAIL *                 PAGE  1 OF  4

  NTV90       10.71.22
             +--------+
  DOMAIN     |  SP    |
             +--------+

 SEL# TYPE AND NAME OF OTHER RESOURCES ASSOCIATED WITH THIS EVENT:
 ( 1) SP      10.71.225.20

 DATE/TIME: RECORDED - 08/19 13:16    CREATED - 08/19/10 13:16:16

 EVENT TYPE: PERMANENT

 DESCRIPTION: LOSS OF EQUIPMENT COOLING

 PROBABLE CAUSES:
    COOLING FAN

N E T V I E W          SESSION DOMAIN: CNM01    NETOP2    08/19/10 13:27:52
 NPDA-43S                       * EVENT DETAIL *                 PAGE  2 OF  4

  NTV90       10.71.22
             +--------+
  DOMAIN     |  SP    |
             +--------+

 QUALIFIERS:
    1)  ENTERPRISE Ent_Name
    2)  SNMP GENERIC-TRAP NUMBER 6
    3)  SNMP SPECIFIC-TRAP NUMBER 32
```

```
    Origin Address = 10.71.225.21:5644

    Community = public

N E T V I E W          SESSION DOMAIN: CNM01    NETOP2    08/19/10 13:28:22
 NPDA-43S                       * EVENT DETAIL *                  PAGE  3 OF  4

  NTV90       10.71.22
              +--------+
  DOMAIN      |  SP    |
              +--------+

    Enterprise Object ID = 1.3.6.1.4.1.12270

    Agent Address = 10.71.225.20

    Timestamp = 44225693

    1.3.6.1.4.1.12270.200.2.1.1.1 = 1493

    1.3.6.1.4.1.12270.200.2.1.1.2 = /L22/O50

N E T V I E W          SESSION DOMAIN: CNM01    NETOP2    08/19/10 13:28:40
 NPDA-43S                       * EVENT DETAIL *                  PAGE  4 OF  4

  NTV90       10.71.22
              +--------+
  DOMAIN      |  SP    |
              +--------+

    1.3.6.1.4.1.12270.200.2.1.1.3 = 2005-01-10T16:13:00

    Message = DIGIN ON    OCCURRED

 FLAGS:
    SNMP TRAP



 UNIQUE ALERT IDENTIFIER: PRODUCT ID - 5697-ENV0  ALERT ID - 673BB726
```

Of course, NetView automation could be used to drive one or more commands that scan the alert NMVT and take actions based upon the information found in it.

Alert-to-Trap Post-CDS Processing

The alert-to-trap service post-CDS processing converts the EIF event that is produced from the CDS process into an SNMP trap.

All non-variable binding information in the trap is put into the constructed trap by the alert-to-trap service directly, without the opportunity to customize it using the CDS file. The only exception to this is the specific trap value.

The alert-to-trap adapter sets the non-variable binding fields as follows:

version
: 0

community
: the value of the community statement from the alert-to-trap configuration file (IHSAATCF)

enterpriseOID
the value of the enterpriseOID statement from the alert-to-trap configuration file

IP address
the local host IP address

generic type
6

timestamp
0

The specific type is taken from the value of the specific event attribute that is created by the CDS processing.

All other slot/value pairs are encoded into variable bindings on the trap. If the name of the slot in the alert-to-trap adapter CDS file is a valid object id, the slot name is used as the object id in the variable binding and the value of the slot becomes the value of the variable binding. If the slot name in the CDS file is not a valid object id, an object id of 1.3.6.1.4.1.2.5.1.4.1.4.x is used for the variable binding and the value of the variable binding is *slot=value*, where slot is the CDS file slot name and value is the CDS file value. The value of x is an index starting at 1 that is increased by one for each variable binding in the trap.

For example, a CDS file MAP statement that maps the slot name `1.3.6.1.4.1.2.5.1.4.1.4.1` to the value *examplevalue* has a variable binding in the final trap with an object id of `1.3.6.1.4.1.2.5.1.4.1.4.1` and a value of *examplevalue*.

A CDS file MAP statement that maps the slot name *source* to the value *examplevalue* has a variable binding in the final trap with an object id of `1.3.6.1.4.1.2.5.1.4.1.4.1` and a value of *source=examplevalue*. The object id in this example assumes that there were no other variable bindings that required the object id to be created by the alert-to-trap adapter, and therefore the starting index for this object id is 1.

Chapter 9. NetView Instrumentation

NetView instrumentation consists of subsystems. The topology display subsystem is available if you have the NetView management console or the Tivoli Business Service Manager program installed. For any other subsystem, including the event flow subsystem, the Tivoli Business Service Manager program must be installed.

Considerations

The REXX programs for NetView instrumentation have been compiled with the ALTERNATE option. If you access the REXX runtime library from NetView, instrumentation REXX programs run in compiled mode. Otherwise, the REXX alternate library is used and instrumentation REXX programs run in interpreted mode. If the REXX runtime library or REXX alternate library is not accessible from the pageable link pack area (PLPA), you must modify the NetView start procedure to access one of these libraries.

Events carrying management information to the topology server start as messages containing keyword/value pairs. These messages issued by the API are BNH351I, BNH352I, BNH353I, and BNH354I. These messages are converted and forwarded to a topology server.

Customization

The following samples were updated for application management instrumentation. You might need to customize them for your environment.

- **CNMSTYLE**

  Use CNMSTYLE %INCLUDE member CNMSTUSR or C*xx*STGEN to add the DSIAMIAT automation table and the AUTOAMI autotask. Also, copy the TOWER statement from CNMSTYLE to CNMSTUSR or C*xx*STGEN and remove the asterisk (*) from the AMI tower.

- **DSIAMIAT**- in sample DSIPARM

  A separate automation table for application management instrumentation. You need to uncomment one of the following includes:

  – %INCLUDE DSIAMIR - to route the BNH351-BNH354 messages to another NetView program. Use this for NetView Version 2 Release 4 and Version 3 Release 1.

  – %INCLUDE DSIAMIT - to route the BHN351-BNH354 messages to a message adapter (the Event/Automation Service should be started). You might need to modify the PPI receiver ID of your Event/Automation Service message adapter (default is IHSATEC). The message adapter converts and sends the messages to Tivoli Enterprise Console or Tivoli Netcool/OMNIbus, where program rules format and send the converted messages to the Tivoli Business Service Manager program.

    Configure the message adapter by including IHSAAPMF in the message adapter format file. Refer to the*IBM Tivoli NetView for z/OS Installation: Configuring Additional Components* for more information.

    Configure the Tivoli Enterprise Console event console or Tivoli Netcool/OMNIbus by importing the files interapp.baroc and interapp_o.rls to your rules base if they were not previously added by the ihsttec.sh script. See the Tivoli Business Service Manager library for more information.

– %INCLUDE DSIAMIN - to route the BHN351-BNH354 messages directly to a NetView management console topology server across NETCONV (this is the default)

- **DSIAMII**- in sample DSIPARM

  Application management instrumentation member

  – On the focal point NetView (the NetView system that routes messages to the topology server or message adapter), code the NetView domain of all remote NetView programs (if any) with the RMTLU=luname keyword.

  – Customize the monitor default threshold specifications and polling intervals as appropriate for your environment. Note that the defaults defined here apply to all instances of a component or connection type. You can change threshold specifications and polling intervals for a specific instance by invoking the set threshold or set polling interval tasks.

    You can define multiple threshold specifications. Each one consists of three values. The first value is the threshold value, the second value is the operator, the third value is the severity of the threshold event. For example:

    ```
    BEGIN_THRESHOLD
     SS=Tivoli;TME10NVCNMTAMEL;1.2
     MONITOR=('STATE'UP,6,0,DOWN,6,5 MVR=CNMETDMV 10)
     MONITOR=('IPC QUEUE' 25,8,2)
     MONITOR=('VIEWMGR QUEUE' 25,8,2)
     MONITOR=('VSTATMGR QUEUE' 25,8,2)
    END_THRESHOLD
    ```

    In the example, for the IPC QUEUE monitor, when the current value goes over (operator **8**) 25, a WARNING (2) threshold event is sent.

    The meaning of each value is:

    1. The threshold value against which the current monitor value is compared.
    2. The comparison operator used to compare the current monitor value against the threshold value:

       ```
       0 = greater than
       1 = greater than or equal
       2 = less than
       3 = less than or equal
       4 = equal
       5 = not equal
       6 = changes to
       7 = changes from
       8 = goes over
       9 = goes less than
       10 = matches
       11 = does not match
       ```

    3. The severity of the threshold event to be sent if a match occurs follows:

       ```
       0 = "NORMAL"
       1 = "INFORMATIONAL"
       2 = "WARNING"
       3 = "SEVERE"
       4 = "CRITICAL"
       5 = "FATAL"
       ```

  – The following list details what you can customize in DSIAMII to activate one or all of the components.

    - Hardware monitor component

      ```
      INIT=CNME3016(60)
      TERM=CNME3017()
      ```

      The parameter for CNME3016 is the heartbeat_interval.

    - Event/Automation Service components (message adapter, alert adapter, event receiver)

```
INIT=CNME9503(60 IHSAEVNT.IHSATEC)
TERM=CNME9531()
```

Change the INIT=CNME9503 statement to include the procname and PPI receiver ID of your adapters.

- MSM agent instrumentation

```
INIT=FLCAPMIN(60)
TERM=FLCAPMTR()
```

The parameter for FLCAPMIN is the heartbeat_interval.

- Topology display subsystem components. These DSIAMII members have multiple statements for instrumentation initialization. The statements are as follows:

```
INIT=CNMETDIN(HBEAT,60)
INIT=CNMETDIN(QDEPTH,10)
INIT=CNMETDIN(GMFHS,CNMSJH10.C)
INIT=CNMETDIN(GPARM,DOMAIN=CNM01)
INIT=CNMETDIN(RODM,EKGXRODM.X)
INIT=CNMETDIN(COLDPARM,TYPE=COLD,INIT=EKGLISLM)
INIT=CNMETDIN(WARMPARM,TYPE=WARM)
INIT=CNMETDIN(COMPLETE)
```

The parameters are:

- HBEAT specifies the heartbeat. It is required.
- QDEPTH specifies the queue depth. It is required.
- GMFHS specifies the GMFHS startup procedure and its alias. It is required.
- GPARM specifies the parameters to be used with the GMFHS start-up procedure. It is not required but if the domain value is not specified here, GMFHS will look to find the domain in the initialization member DUIGINIT or in the specified GMFHS start-up procedure.
- RODM specifies the RODM start-up procedure and its alias. It is required.
- COLDPARM specifies the parameters for a RODM start-up procedure when a user chooses to do a RODM cold start. It is not required.
- WARMPARM specifies the parameters for a RODM start-up procedure when a user chooses to do a RODM warm start. It is not required.

If you create instrumentation, you should modify DSIAMII to add default threshold specifications and calls to instrumentation initialization and termination routines. See the Tivoli Business Service Manager library for API descriptions.

Starting and Stopping Instrumentation

To start instrumentation, issue the INITAMI command on the focal point NetView (the NetView program that routes messages to the message adapter). INITAMI is automatically issued on NetView programs defined as remote in DSIAMII. The INITAMI command starts the AUTOAMI on the focal point of the NetView program (if not already started). The console identifier for AUTOAMI is set to AMI*xxxxx* where *xxxxx* is the five rightmost characters of the NetView domain. Therefore, the console will be unique within a sysplex, and the commands issued from the autotask will correlate.

Instrumentation is not, however, forced to run on AUTOAMI. Therefore, in environments with multiple NetView programs in a system, or in a sysplex, the INITAMI command should be issued on autotask AUTOAMI.

The INITAMI command also establishes a RMTCMD session with any NetView system whose domain name is coded on the RMTLU statement in DSIAMII. This will log on the AUTOAMI autotask on that NetView program.

To stop instrumentation, issue the TERMAMI command. TERMAMI is automatically issued on NetView programs defined as remote in DSIAMII. In addition, stop the AUTOAMI autotask on the focal point NetView. This ends the RMTCMD sessions established by INITAMI.

The topology server can issue instrumentation-related commands after issuing the TERMAMI command. However, the AUTOAMI autotask must be started for this to work.

Customizing the IBM Tivoli Enterprise Console

If you route the instrumentation messages to the IBM Tivoli Enterprise Console through the Event/Automation Service message adapter, you will need to customize the console.

ACB Monitor Customization

The application control block (ACB) Monitor focal point receives status updates for ACBs from the focal point Virtual Telecommunications Access Method (VTAM) and entry point VTAMs. If used in conjunction with the Tivoli Business Service Manager program, the ACB Monitor discovers the following:

- generic resources
- user-specified applications,
- applications matching user-specified models

The ACB Monitor also monitors the following:

- ACB status
- session count
- persistent recovery events for ACB applications

If used in conjunction with the Tivoli Business Service Manager program or with the NetView management console TN3270 management, the ACB Monitor discovers TN3270 servers and clients. Optionally, ACB data can be saved in a DB2® database.

Define one ACB Monitor focal point for each System complex (or sysplex, the set of z/OS systems). To fully enable instrumentation of application dynamics in a sysplex environment, define all other images in the sysplex to be entry points of that focal point.

By saving ACB data in DB2, you can query telnet clients by IP address, host name, or application name (using the Locate TN3270 Client TBSM tasks). You can also change your list of critical TN3270 client resources without restarting the ACB Monitor.

Note:

1. To save ACB data to DB2, DB2 must be operational on the ACB Monitor focal point, and the NetView SQL pipe stage must be enabled.
2. The AMI must be enabled on the ACB Monitor focal point to enable the ACB Monitor instrumentation.

Parts

The parts that are shipped as part of the ACB Monitor are listed in Table 17.

Table 17. Tivoli Business Service Manager parts list

Part Name	Language	Function
TN3270.BSDF	MIF	TN3270 business system description file
TN3270.BCDF	MIF	TN3270 business component description file
TN3270.BMDF	MIF	TN3270 business mapping description file
TN3270.CDF	MIF	TN3270 component definition file
Ltn3270loc.ddf	DDF	Locate TN3270 client local dialog definition
Ltn3270glob.ddf	DDF	Locate TN3270 client global dialog definition
TN3270.html	HTML	Help file
GENRSC.BSDF	MIF	Generic Resources business system description file
GENRSC.BCDF	MIF	Generic Resources business component description file
GENRSC.BMDF	MIF	Generic Resources business mapping description file
GENRSC.CDF	MIF	Generic Resources component definition file
GENRSC.html	HTML	Help file
VTAMAPPL.BSDF	MIF	VTAM Application business system description file
VTAMAPPL.BCDF	MIF	VTAM Application business component description file
VTAMAPPL.BMDF	MIF	VTAM Application business mapping description file
VTAMAPPL.CDF	MIF	VTAM Application component definition file
VTAMAPPL.html	HTML	Help file

Defining a Focal Point

To define an ACB Monitor focal point, perform the following steps:

1. Customize the automation table in sample `DSIAMIAT`. Uncomment the following include: `%INCLUDE CNMSVTFT`.
2. Customize the AMI configuration member in sample `DSIAMII` using the following steps:
   a. Code the NetView domain name of each ACB Monitor entry point on `AMONLU=`*keyword*.
   b. Do you want to save ACB data to DB2?
      - If yes, perform steps 2c and 2d.
      - If no, go to step 2e on page 172.
   c. Code `AMONDB2=`*y*.
   d. Code the DB2 volume on `DB2VOL=`*keyword*.

e. Code the DB2 volume catalog on DB2VCAT=*keyword*.

f. Code the DB2 buffer pool on DB2BUFFERPOOL=*keyword* for each predefined VTAM Application to be monitored.

3. Customize the list of VTAM applications and models to be discovered in sample DSIAMII as follows:
   a. Code the application name on APPLCOMPONENT=*applname* for each predefined VTAM application to be monitored.
   b. Code the model name on MODELCOMPONENT=*modelname* for each VTAM model to be monitored.
4. Do you want to save ACB data to DB2?
   - If no, go to step 5.
   - If yes, customize the DB2 parameters in sample DSIAMII by completing the following steps:
     a. Code AMONDB2=*Y*.
     b. Code the DB2 volume on DB2VOL=*keyword*.
     c. Code the DB2 volume catalog on DB2VCAT=*keyword*.
     d. Code the DB2 buffer pool on DB2BUFFERPOOL=*keyword*.
5. Customize the default thresholds in sample DSIAMII. You can customize any of the following:
   - when threshold events are issued for the ACB status monitor
   - the severity of the events issued for the ACB status monitor
   - the session count monitor
   - the persistent recovery monitor

   Customization in DSIAMII defines default thresholds. You can also customize thresholds for each instance (icon) with the set threshold task.

   For example, if you want to change the threshold severity of CONCT and RESET states to SEVERE (3) rather than INFORMATIONAL (1) for APPLCOMPONENT and MODELCOMPONENT Applications, change the following line:

   ```
   ACT,6,0,CONCT,6,1,RESET,6,1,INACT,6,2,UNKNOWN,6,2,PINACT,6,4,PACT,6,4
   ```

   To:

   ```
   ACT,6,0,CONCT,6,3,RESET,6,3,INACT,6,2,UNKNOWN,6,2,PINACT,6,4,PACT,6,4
   ```

   Or, if you want a WARNING threshold event to be issued when session counts exceed 999, and a NORMAL threshold event when session counts fall below 1000, change the following line:

   ```
   MONITOR=('SESSION COUNT' 0,1,0 EVENT)
   ```

   To:

   ```
   MONITOR=('SESSION COUNT' 999,8,2,1000,9,0 EVENT)
   ```
6. Install the ACB Monitor VTAM exit. Link edit CSECT CNMIETMN into load module ISTIETMN in the VTAMLIB DD for VTAM.

Defining an Entry Point

To define an ACB Monitor entry point, perform the following steps.

1. Customize the automation table in sample DSIAMIAT. Uncomment the following include: %INCLUDE CNMSVTET
2. Install the ACB Monitor VTAM exit. Linked CSECT CNMIETMN into load module ISTIETMN in the VTAMLIB DD of VTAM.

Starting the VTAM ACB Monitor

Start the AMI by issuing the **INITAMI** command on the focal point NetView system to enable instrumentation for:

- generic resource
- TN3270 servers
- APPLCOMPONENT VTAM applications
- MODELCOMPONENT VTAM applications

To start the VTAM ACB Monitor, issue the **INITAMON** command on the focal point NetView. The focal point and all entry points identified on the `AMONLU=`*keyword* will be activated.

After the VTAM ACB Monitor has been activated, issue the **INITAMON** *entry_point* command, to activate an additional entry point, where *entry_point* is the NetView domain name of the entry point.

Recovering a VTAM ACB Monitor Entry Point:

When the RMTCMD LU 6.2 session between an entry point and the focal point fails, the entry point is automatically stopped. When the error that caused the communication failure between the two NetView programs has been corrected, issue the **INITAMON** *entry_point* command on the focal point to recover the entry point.

Stopping the VTAM ACB Monitor

To stop the VTAM ACB Monitor, issue the **TERMAMON** command on the focal point NetView. The focal point and all active entry points will be deactivated.

To stop a specific entry point, issue the **TERMAMON** *entry_point* command, where *entry_point* is the NetView domain name of the entry point. Status for all of the applications on the VTAM associated with that NetView system will be removed from the database.

Chapter 10. Designing HTML Files for the NetView Web Server

The NetView program provides a web application server that accepts commands through a web browser interface. You can design HTML files for your own web page.

Referencing Files and Commands

The HTML for accessing the NetView program from the web browser is dynamically generated at the web application server.

The HTML (including user-written HTML) can be divided between the web application server (workstation) and the NetView for z/OS host. This can include referencing workstation files from host HTML.

Understanding the Base URL

The following is a typical URL when browsing the NetView program:

`https://web_application_server:port/netview/domain_ID/`

where *web_application_server:port* is the TCP host name and port number of the HTTPS server on which the NetView web application is installed, `netview` is the NetView web application context root, and *domain_ID* is the domain ID of the NetView for z/OS program to which you want to connect.

The URL in the example is considered to be the *base URL*. If the URL contains a question mark, any remaining data is considered query data and is not considered to be part of the base URL.

Referencing Workstation Files on the Web Application Server

References to other sources should be relative to the base URL. For files on the web application server, use `../` to back up to the `/netview/` directory.

Referencing NetView Commands

The following example specifies the NetView command to be issued. Any blanks in the command must be specified as a plus sign (+) so that the command will be correctly parsed. The NetView web server (DSIWBTSK) changes the plus signs to blanks before issuing the command.

```
https://web_application_server:port/netview/domain_ID/?DSICMDS+=+command
```

Adding Tasks and Links to the Portfolio

You can customize the NetView web application by adding tasks (links) for your own web pages or for other web pages. To add tasks to the portfolio, use the webmenu statement; for more information, see the *IBM Tivoli NetView for z/OS Administration Reference* or the CNMSTWBM member.

For example, if you want to add a new group of tasks, add an ID for your group to the `webmenu.groups` statement that already exists. To assign a name for your group, use the `webmenu.group_ID.name` statement. To assign one or more tasks (links) to your group, identify the IDs of your tasks with the `webmenu.group_ID.groups` statement.

To define each task in your new group:

- Assign a name for the task with the `webmenu.group_ID.task_ID.name` statement.
- Assign an action for the task with the `webmenu.group_ID.task_ID.action` statement.

For example, to call a NetView program-based HTML-generating routine named *myhtml*, use the following webmenu statements:

```
webmenu.group_ID.task_ID.name = My HTML
webmenu.group_ID.task_ID.action =
      https://web_application_server:port/netview/domain_ID/?DSICMDS=myhtml
```

To launch a web site (such as http://www.ibm.com/), you must include `http:` (or `https:`) and code each slash in the `action` statement, as shown in the following webmenu statement:

```
webmenu.group_ID.task_ID.action = http:&slash;&slash;www.ibm.com/
```

Note:

1. For an example of launching a web site, see the webmenu statements for the Launch Sample URL task in the CNMSTWBM member.
2. Ensure that user-defined uniform resource identifiers (URIs) do not contain 2 consecutive slashes; instead, a URI must specify 2 consecutive slashes in one of the following ways:
   - &SLASH;/
   - /&SLASH:
   - &SLASH;&SLASH;

Using REXX to Generate HTML

The NetView program supports an interface similar to the Common Gateway Interface (CGI) for REXX procedures. Use the REXX function CGI ( ) to determine whether your procedure was invoked by the NetView web server. If CGI ( ) returns **1**, the procedure can create a dynamic web page by ensuring that the beginning characters of the first line of output are either:

- <HTML
- <!DOCTYPE

Note: HTML and DOCTYPE must be in uppercase.

In this case, the NetView program does not modify or add to the output. You can create output using the pipe stage CONSOLE ONLY to prevent the logging and automation of the HTML output.

Note: The CGI function is the preferred method to provide customization.

To improve performance, you can place static HTML or binary files on the web application server.

The NetView web application continues to process both the POST method and the GET method in user-written HTML. If you are using the POST method, the NetView web application changes it to a GET before processing. For the GET method, all relevant data is placed in the query string portion of the URL and is displayed at the top of the browser window. You can add a TITLE element in your HTML so that the TITLE is displayed instead of the data in the query string.

Chapter 11. Customizing Using Common Base Events

Common Base Events are XML-based representations of system events, such as status changes or problem reports. The NetView program supports converting messages and MSUs into XML-formatted events and forwarding them to an event server for storage and distribution to interested parties. The *IBM Tivoli NetView for z/OS Automation Guide* contains a section on automation involving Common Base Events. Customization for this support involves modifying and creating the XML templates that the NetView program uses when messages and MSUs are converted. The templates provide an easy way to control what information from the message or MSU is contained in the event.

The Common Base Event format is defined by schema, described in the *Autonomic Computing Toolkit Developer's Guide*, SC30-4083. In that publication, locate the section titled "Understanding Common Base Event Specification", which is contained in the section titled "Common Base Event XML Schema".

XML Formats

The NetView program provides a predefined set of event templates that you can use to create common base events using automation table actions or, in the case of alerts, using hardware monitor filter settings. The templates are shipped in samples file CNMSCBET. Templates are loaded into storage by the NetView program when the CBE.TEMPLATES statement in CNMSTYLE is processed, either at initialization or as a result of a RESTYLE CBE command.

Customization of events involves modifying or adding XML templates for the events or modifying events as part of automation table processing. For examples of modifying events during automation, see sample CNMSCBEA. The remainder of this section discusses the event templates the NetView program provides, and how to modify them. The templates are XML skeletons that use several variable symbols that are filled in at run-time with data from messages or MSUs. To successfully work with the templates, some knowledge of the XML format of events is needed. For full details, see the previously referenced section in the *Autonomic Computing Toolkit Developer's Guide*.

The major XML elements of a Common Base Event include the following:

The CommonBaseEvent element
: This element is the root of the Common Base Event. It contains many attributes that describe the event, including
  - A unique global identifier
  - The creation time of the event
  - A textual description of the event (the `msg` attribute)

  The default that is supplied with the NetView program for the CommonBaseEvent element is the *root* template in CNMSCBET.

The reportingComponent element
: This identifies the system component that generates the event. It includes information such as product name and network location. It can also provide detail such as thread and process identifiers. For events that are generated by the NetView program, this component typically specifies `NetView`.

The sourceComponent element
This identifies the system component that caused the event to be generated. It can, for example, identify a z/OS job that issued a message that was used to generate an event.

The situation element
This provides a high-level view of the type of event, such as a startSituation event generated as a result of a component starting up. The templates *repsitm* (for messages) and *repsita* (for MSUs) are the defaults that are supplied with the NetView program for this element.

ExtendedDataElements
These provide extensions of the event to hold product-specific information. the NetView program provides a number of extensions that can be used to hold additional information about the message or alert that is generating the event.

Common Base Event Format Rules

A valid Common Base Event XML document is described by the XML schema in the *Autonomic Computing Toolkit Developer's Guide*. Briefly, XML event elements are contained with the CommonBaseEvent element. The following elements can be included in this sequence:

contextDataElements
optional

extendedDataElements
optional

associatedEvents
optional

reporterComponentId
required, unless it is the same as the source component, in which it is not included

sourceComponentId
required

msgDataElement
optional

situation
required

Template File CNMSCBET

The NetView template sample CNMSCBET provides several templates that define complete events, such as `msgdefault` and `msudefault`. Other elements only define bits and pieces of an event, such as extended data elements, that can be combined to form a complete event. These templates are intended for use with the CBETEMP global order on the pipe EDIT stage. This order can be used with the event automation table action to read in templates and construct complete events. The simplest use of CBETEMP is to read in one of the complete event templates such as `msgdefault`, but the order can be used to read templates that define bits of an event that are then constructed in the edit specification.

The template file itself is an XML document. The `<cbedata name='xxxx'>` tag defines the event XML data and provides the opportunity for naming this data. The value of the `name` attribute is used on the CBETEMP global edit order and in

<?include> processing. The template file consists of two XML elements, *cbedata* and *templates*, and one processing instruction, *include*. In nearly all cases, the XML defined by *cbedata* is contained within an XML CDATA section. The XML markup within the CDATA sections is treated as pure character data when the template file is loaded by the NetView program. This XML is not processed or parsed as XML until an event is constructed.

The <?include name='xxx'?> defines a processing element that pulls in a <cbedata> element defined elsewhere in the templates file, making it possible to predefine an XML element that can be used in multiple templates. As an example, note that root is used by both msgdefault and msudefault.

Include processing is done when the CBE.TEMPLATES statement in CNMSTYLE is being processed. The resulting XML templates are stored internally in memory for reference by CBETEMP. The DISPCBET command can be used to display the in-memory contents of the templates after they have been processed and loaded.

This is an example of a template:

```
<cbedata name='root'>
<![CDATA[
<CommonBaseEvent
elapsedTime='0'
version='1.0.1'
msg='&TEXT'
priority='&PRIORITY'
severity='&SEVERITY'
repeatCount='0'
sequenceNumber='0'
>
]]>
</cbedata>
```

This element defines the beginning of an event. Other templates use the *include* processing order to pull in this template. For example:

```
<cbedata name='msgdefault'>
<!-- Beginning of CBE goes here -->
<?include name='root'?>
```

Both <?include and <cbedata use a name='xxxx' attribute. Enclose this value in single quotes. The name attribute value is not case-sensitive. However, the XML element names (cbedata, include, and templates) within the file are case-sensitive, as is the XML markup contained with the CDATA section.

The NetView program provides several templates that construct a complete event. This is the msgdefault template:

```
<cbedata name='msgdefault'>
<-- Beginning of CBE goes here -->
<?include name='root'?>
<!-- Context Data Elements, if any, go here -->
<!-- Extended Data Elements start here -->
<?include name='nvobjtypems'?>
<?include name='correlate'?>
<?include name='actionmg'?>
<?include name='mlwtolns'?>
<!-- Associated Events, if any, go here -->
<!-- Reporting component goes here -->
<?include name='nvrepcompmsg'?>
<! -- Source component goes here -->
<?include name='nvsrccompmsg'?>
<!-- Message Data Element goes here -->
```

```
<?include name='nvmsgdataelm'?>
<!-- Situation goes here -->
<?include name='repsitm'?>
<?include name='tail'?>
</cbedata>
```

Codepage considerations

The CNMSCBET file is encoded using code page 037 code (US EBCDIC). The code that parses it can work with code page 037, code page 1047, or code page 939. The major differences in the code pages are the square bracket characters. These map to different hexadecimal code points in code pages 037, 1047, and 939. The encoding is specified by the encoding attribute on the XML processing instruction in the file. The specified encoding must match the characters used in the file. The encoding value is specified as an attribute on the xml instruction. For example

```
<?xml version="1.0" encoding="ebcdic-cp-us"?>
```

The valid values for encoding, and the code pages that they map to are:

ebcdic-cp-us
: 037

IBM-037
: 037

IBM037
: 037

IBM-1047
: 1047

IBM1047
: 1047

X-EBCDICJapaneseAndJapaneseLatin
: 939

IBM-939
: 939

IBM939
: 939

The characters used for square brackets, especially in CDATA sections, must correspond to the proper hexadecimal encodings for the specified code page. In codepage 037, the left bracket character [is X'BA', the right bracket character] is X'BB'. However, in code pages 1047 and 939, the left bracket character [is X'AD', the right bracket character] is X'BD'.

If square brackets are used within the CDATA sections, map them to the 037 encoding on English systems and to the 1047 or 939 encoding on Japanese systems, regardless of the encoding specified on the xml instruction. The character stream containing the bracket characters is converted based on code page 037 or 939 when the XML event is processed, depending on whether the system is English or Japanese. To avoid incompatibilities, the codepage-independent sequence of `&#x5B;` can be used for left square brackets and `&#x5D;` for right square brackets. For example

```
<cbedata name='example'>
<![CDATA[
<extendedDataElements name='example' type='string'>
```

```
<values>This code will have a bracket character coded as &#x5B' in it.</values>
</extendedDataElements>
]]>
</cbedata>
```

Note: The `&#x5B;` and the `&#x5D;` cannot be used for the square bracket characters on the CDATA sections.

Predefined Variables

Many of the templates reference variables such as &DOMAIN. The variables are substituted at runtime with text strings such as NTVE4 for &DOMAIN. If data is not available for a variable, nothing is returned. Most but not all of the variables are patterned after automation table conditionals. Most but not all automation table conditionals are supplied. Some additional variables are supplied. Bit items are presented as binary strings; for example a bit value of `one` is the character 1. For information about the conditionals and possible values, see the *IBM Tivoli NetView for z/OS Automation Guide*.

The following variables are available:

&ACTIONMG
Indicates action message

&ALRHOSTNAME
For alerts, the SNA name of the node where the alert originated

&AUTOTOKE
MVS message automation token

&AUTOMATED
Indicates whether the NetView program has performed automation based on the message

&CART
MVS command/response token

&CURSYS
The local name of the z/OS system

&DESC
Message descriptor codes

&DOMAIN
Current NetView domain ID

&DOMAINID
For messages, the NetView domain where the message originated

&HDRMTYPE
NetView indicator of message type

&HIER
Alert name/type list

&HMASPRID
For alerts, the hardware or software product set identifier of the

&HMBLKACT
Block ID and action code of an alert

&HMCPLINK
Complex link indicator

&HMEPNAU
NAU name of entry point node where alert originated

&HMEPNET
Network of the entry node where alert originated

&HMEPNETV
Specifies whether the entry point node was from the NetView program

&HMEVTYPE
MSU event type

&HMFWDED
Indicates whether alert forwarded using LUC

&HMFWDSNA
Indicates whether alert forwarded using LU 6.2

&HMGENCAU
General cause code of an MSU

&HMONMSU
Indicates whether MSU was automated

&HMORIGIN
For alerts, the last name in the name/type hierarchy list

&HMSECREC
Indicates whether secondary recording performed for an MSU

&HMSPECAU
Specific component code of an MSU

&HMUSRDAT
User data from subvector 33 of an MSU

&JOBNAME
The originating z/OS job name associated with a message

&JOBNUM
The originating z/OS job number associated with a message

&KEY
Key associated with a message

&MCSFLAG
MVS multiple console support flags

&MSGAUTH
Authorized program indicator

&MSGCATTR
MVS message attribute flags

&MSGCMISC
MVS miscellaneous routing flags

&MSGCMLVL
MVS message-level flags

&MSGCMSGT
MVS message-type flags

&MSGCOJBN
Originating job name

&MSGCPROD
z/OS level

&MSGCSPLX
Sysplex sending message

&MSGDOMFL
MVS DOM flags

&MSGGDATE
Date associated with a message

&MSGGMFLG
MVS general message flags

&MSGGMID
MVS message ID

&MSGGTIME
Time a message was issued

&MSGID
For messages, the message ID

&MVSLEVEL
Current MVS product level

&MVSRTAIN
MVS AMRF flags

&MSGSCRNM
Source name from source object

&NETID
VTAM network identifier

&NETVIEW
NetView version and release

&NVASID
The z/OS address space identifier of the local NetView program

&NVCLOSE
NetView CLOSE processing flag

&NVHOSTNAME
The fully qualified name of the TCP stack the NetView program is using

&NVJOBNAME
The z/OS job name of the local NetView program

&NVTASKID
The NetView name of the task under which a message is being automated

&OPID
NetView operator or task ID

&OPSYSTEM
Operating system

&PRIORITY
An integer 0 - 100 representing the importance of an event

&ROUTECD
MVS routing codes

&SEVERITY
An integer 0 - 70 representing the severity of the event

&SYSID
The z/OS system ID for the origin of a message

&SYSPLEX
Local z/OS sysplex name

&TEXT
The first (or only) line of a text message, or the long error description

&VTAM
VTAM level

&VTCOMPID
VTAM component identifier

Appendix A. Color Maps for Hardware Monitor Panels

Table 18 lists the panel name, panel number, and color map for hardware monitor panels. See Chapter 6, "Customizing Hardware Monitor Displayed Data," on page 77 for more information on color maps.

Note: Color maps for hardware monitor help and command description panels are available only in prior releases of the NetView. program. Also, color maps beginning with BNJMP1 are no longer supported.

Table 18. Color Maps for Hardware Monitor Panels

Panel Name	Panel Number	Color Map
Alerts-Dynamic	NPDA-30A	BNJMP30A
Alerts-History	NPDA-31A	BNJMP31A
Alerts-Static	NPDA-30B	BNJMP30A
Common Format Glossary	NPDA-02C	BNJMP2C1
Controller Information Display	NPDA-02E	BNJMP02E
Controller (CTRL) Selection Menu	NPDA-CTRL	BNJMPCTL
Downstream Member of Token-Ring LAN Fault Domain	NPDA-44B	BNJMP4BH
DSU/CSU and Line Status DSU/CSU and Line Parameters Link Segment Level *n*	NPDA-22C, page 1	BNJMPDL1
DSU/CSU and Line Status Remote DSU/CSU Interface-Remote Device Status-Link Segment Level *n*	NPDA-22C, page 2	BNJMPDL2
DSU/CSU and Line Status Configuration Summary, Link Segment Level *n*	NPDA-22C, page 3	BNJMPDL3
Event Detail	NPDA-43B	BNJMP43B
Event Detail	NPDA-43M	BNJMP43M
Event Detail	NPDA-43N, 43Q	BNJMP43N
Event Detail	NPDA-43C	BNJMP43C
Event Detail	NPDA-43T	BNJMP43T
Event Detail	NPDA-43A	BNJMP43A
Event Detail	NPDA-43P NPDA-43S	BNJMP43P BNJMP43S
Event Detail	NPDA-43T NPDA-43S	BNJMP434 BNJMP433
Event Detail, alternate		
Event Detail, alternate		
Event Detail for	NPDA-43T NPDA-43T	BNJMP43T BNJMP43T
BSC Line	NPDA-43B NPDA-43B	BNJMP43B BNJMP43B
Event Detail for BSC Station	NPDA-43B	BNJMP43B
Event Detail for BSC/SS Line		
Event Detail for BSC/SS Station		
Event Detail for Channel-Attached Station		
Event Detail for Channel Link	NPDA-43B NPDA-43J	BNJMP43B BNJMP43J
Event Detail for Instruction Exception	NPDA-43K	BNJMP43D
Event Detail for Miscellaneous Interrupts	NPDA-43G	BNJMP43D
Event Detail for Scanner-Type 1/4	NPDA-43H	BNJMP43D
Event Detail for Scanner-Type 2/3		
Event Detail for Scanner-Type 1	NPDA-43D	BNJMP43D
Event Detail for Scanner-Type 2	NPDA-43E NPDA-43F	BNJMP43D
Event Detail for Scanner-Type 3	NPDA-43I NPDA-43P	BNJMP43D
Event Detail for Scanner-Type 4		BNJMP43D
Event Detail for SDLC Line		BNJMP43B

Table 18. Color Maps for Hardware Monitor Panels (continued)

Panel Name	Panel Number	Color Map
Event Detail for SDLC Line Event Detail for SDLC Station Event Detail for SDLC Station Event Detail for 3270 Non-SNA Controller Event Detail Menu Event Detail Menu	NPDA-43T NPDA-43B NPDA-43T NPDA-43L NPDA-43R NPDA-43R	BNJMP43T BNJMP43B BNJMP43T BNJMP43L BNJMP43R BNJMP43R
Event Detail Menu, alternate Event Detail Menu for BSC Line Event Detail Menu for BSC Line, alternate Event Detail Menu for BSC Station Event Detail Menu for BSC Station, alternate	NPDA-43R NPDA-43R NPDA-43T NPDA-43R NPDA-43T	BNJMP432 BNJMP43R BNJMP434 BNJMP43R BNJMP434
Event Detail Menu for SDLC Line Event Detail Menu for SDLC Line, alternate Event Detail Menu for SDLC Station Event Detail Menu for SDLC Station, alternate Event Summary	NPDA-43R NPDA-43T NPDA-43R NPDA-43T NPDA-42A	BNJMP43R BNJMP434 BNJMP43R BNJMP434 BNJMP42A
Event Summary Event Summary Glossary displays HELP Menu Hexadecimal Display of Error Record	NPDA-42B NPDA-42C (many displays) NPDA-44C NPDA-02B	BNJMP42B BNJMP42C BNJMPGLO BNJMP44C BNJMP02B
Line Analysis-Link Segment Level *n* Link Configuration Link Configuration Link Configuration, alternate	NPDA-24B NPDA-44A1 NPDA-44A2 NPDA-44A1	BNJMPLNA BNJMP441 BNJMP442 BNJMP443
Link Configuration Summary-Level Selection Link Data for SNA Controller Link Problem Determination Aid (LPDA-1) Data Link Problem Determination Aid (LPDA-1) LDM Data	NPDA-LSLS NPDA-23A NPDA-52A NPDA-52AL	BNJMPLSL BNJMP23A BNJMP52A BNJMP52L
(LPDA-2) Data Link Segment Level 1 (LPDA-2) Data Link Segment Level 1, alternate (LPDA) Data Link Segment Level 2	NPDA-52B NPDA-52B NPDA-52C	BNJMP52B BNJMP522 BNJMP52B
Link Status and Test Results Link Status and Test Results for LDM LPDA-1 Command Menu LPDA-2 Command Menu Menu	NPDA-24A NPDA-24AL NPDA-LPDA1 NPDA-LPDA2 NPDA-01A	BNJMP24A BNJMP24L BNJMPLP1 BNJMPLP2 BNJMP01A
Modem and Line Status Modem and Line Parameters Link Segment Level *n*	NPDA-22B, page 1	BNJMPML1
Modem and Line Status Remote Modem Interface-Remote Device Status-Link Segment Level *n*	NPDA-22B, page 2	BNJMPML2
Modem and Line Status Configuration Summary, Link Segment Level *n*	NPDA-22B, page 3	BNJMPML3
Most Recent Events Most Recent Statistical Data Most Recent Statistical Data Most Recent Statistical Data Most Recent Statistical Data Most Recent Statistical Data	NPDA-41A NPDA-51E NPDA-51F NPDA-51G NPDA-51H NPDA-51I	BNJMP41A BNJMP51E BNJMP51F BNJMP51G BNJMP51H BNJMP51I

Table 18. Color Maps for Hardware Monitor Panels (continued)

Panel Name	Panel Number	Color Map
Most Recent Statistical Data	NPDA-51B	BNJMP51B BNJMP51B
Most Recent Statistical Data for Printer	NPDA-51D	BNJMP51B
Most Recent Statistical Data for Tape	NPDA-51C	BNJMP51A
Most Recent Traffic Statistics	NPDA-51A	BNJMP51A
Most Recent Traffic Statistics for BSC/SS Station	NPDA-51A	
Most Recent Traffic Statistics for BSC STA. w/LPDA	NPDA-51A	BNJMP51A
Most Recent Traffic Statistics for Channel Attached STA	NPDA-51A	BNJMP51A
Most Recent Traffic Statistics for Local CTRL	NPDA-51A	BNJMP51A
Most Recent Traffic Statistics for SDLC	NPDA-51A	BNJMP51A
Station	NPDA-51A	BNJMP51A
Most Recent Traffic Statistics for SDLC STA. w/LPDA	NPDA-70A (all	BNJMP70A
Multiple Entries for Selected Resource	displays)	BNJOVERW
Overwrite Map		
Recommended Action for Selected Event	NPDA-BNIxxxyyy	BNJMP45A
Recording and Viewing Filter Status	NPDA-20A,20B	BNJMP20A
Release Level for SNA Controller	NPDA-21A	BNJMP21A
Remote DTE Interface Status	NPDA-25A	BNJMP25A
Remote DTE Interface Status for LDM	NPDA-25AL	BNJMP25A
Remote Self-Test Results	NPDA-22A	BNJMP22A
Remote Self-Test Results for LDM	NPDA-22AL	BNJMP22L BNJMP44B
Reported Resource Hardware	NPDA-44B NPDA-44B	BNJMP4BS
Reported Resource Software Product	NPDA-02A, page 1	BNJMP2A1
Screen Control/Help	NPDA-02A, page 2	BNJMP2A2
Screen Control/Help		
Sender Hardware Product ID	NPDA-44B NPDA-44B	BNJMP4BH
Sender Software Product ID	NPDA-54D	BNJMP4BS BNJMP541
Statistical Counter Detail Display, page 1	NPDA-54D	BNJMP54N
Statistical Counter Detail Display, page *n*	NPDA-53E NPDA-53F	BNJMP53E BNJMP53F
Statistical Detail	NPDA-53KA	BNJMP53K
Statistical Detail	NPDA-53R	BNJMP43R
Statistical Detail Display for Ethernet		
Statistical Detail Menu		
Statistical Detail	NPDA-53R	BNJMP43R
Menu for BSC	NPDA-53R	BNJMP43R
Statistical Detail Menu for SDLC	NPDA-02D	BNJMP02D
TEST Information Display	NPDA-40A	BNJMP40A
Total Events	NPDA-50A	BNJMP50A
Total Statistical Data		
Transmit Receive	NPDA-25B NPDA-44B	BNJMPTRT
Test-Link Segment Level *n*		BNJMP4BH
Upstream Member of Token-Ring Fault Domain		

Appendix B. NetView Macros and Control Blocks

The macros and control blocks identified in this appendix are provided by the NetView program as programming interfaces for customers.

Attention: Do not use as programming interfaces any NetView macros other than those identified in this appendix.

General-Use Programming Interface Control Blocks and Include Files

The following control blocks and include files are provided as general-use programming interfaces.

Name	Use
DSIBC	NetView Bridge HLL C include file
DSIBCCALL	NetView Bridge HLL C service routine definition
DSIBCCNM	NetView Bridge HLL C return codes
DSIBCHLB	NetView Bridge HLL C mapping of DSIHLB
DSIBPCNM	NetView Bridge HLL PL/I return codes
DSIBPHLB	NetView Bridge HLL PL/I mapping of DSIHLB
DSIBPHLS	NetView Bridge HLL PL/I service routine definitions
DSIBPLI	NetView Bridge HLL PL/I include file
DSIC	Main HLL C include file
DSICCALL	HLL C service routine definitions
DSICCNM	HLL C return codes
DSICCONS	HLL C constants
DSICHLB	HLL C mapping of DSIHLB
DSICORIG	HLL C origin block mapping
DSICPRM	HLL C NetView bridge parameter block
DSICVARC	HLL C varying length character strings
DSIPCNM	HLL PL/I return codes
DSIPCONS	HLL PL/I constants
DSIPHLB	HLL PL/I mapping of DSIHLB
DSIPHLLS	PL/I definitions for HLL service routines
DSIPLI	Main HLL PL/I include file
DSIPORIG	HLL PL/I origin block mapping
DSIPPRM	HLL PL/I NetView bridge parameter block
EKG1ACCB	PL/I RODM access block
EKG1ENTB	PL/I RODM entity access information block
EKG1FLDB	PL/I RODM field access information block
EKG1IADT	PL/I abstract data types
EKG1IEEP	PL/I external entry point declaration
EKG1IINC	PL/I include statements
EKG1LOGT	PL/I log record type definitions
EKG1TRAB	PL/I RODM transaction information block
EKG11100	PL/I function block for EKG_ConnectLong
EKG11101	PL/I function block for EKG_Connect
EKG11102	PL/I function block for EKG_Disconnect
EKG11201	PL/I function block for EKG_Checkpoint
EKG11202	PL/I function block for EKG_Stop
EKG11302	PL/I function block for EKG_CreateClass
EKG11303	PL/I function block for EKG_DeleteClass
EKG11304	PL/I function block for EKG_CreateField

Name	Use
EKG11305	PL/I function block for EKG_DeleteField
EKG11306	PL/I function block for EKG_CreateSubfield
EKG11307	PL/I function block for EKG_DeleteSubfield
EKG11401	PL/I function block for EKG_ChangeField
EKG11402	PL/I function block for EKG_SwapField
EKG11403	PL/I function block for EKG_ChangeSubfield
EKG11404	PL/I function block for EKG_SwapSubfield
EKG11405	PL/I function block for EKG_LinkTrigger
EKG11406	PL/I function block for EKG_LinkNoTrigger
EKG11407	PL/I function block for EKG_UnLinkTrigger
EKG11408	PL/I function block for EKG_UnLinkNoTrigger
EKG11409	PL/I function block for EKG_CreateObject
EKG11410	PL/I function block for EKG_DeleteObject
EKG11411	PL/I function block for EKG_RevertToInherited
EKG11412	PL/I function block for EKG_AddNotifySubscription
EKG11413	PL/I function block for EKG_DeleteNotifySubscription
EKG11415	PL/I function block for EKG_TriggerNamedMethod
EKG11416	PL/I function block for EKG_TriggerOIMethod
EKG11417	PL/I add object deletion notification subscription
EKG11418	PL/I delete object deletion notification subscription
EKG11501	PL/I function block for EKG_QueryField
EKG11502	PL/I function block for EKG_QuerySubfield
EKG11503	PL/I function block for EKG_QueryEntityStructure
EKG11504	PL/I function block for EKG_QueryFieldStructure
EKG11505	PL/I function block for EKG_QueryFieldID
EKG11506	PL/I function block for EKG_QueryFieldName
EKG11507	PL/I function block for EKG_QueryNotifyQueue
EKG11508	PL/I query multiple subfields
EKG11509	PL/I locate
EKG11510	PL/I function block for EKG_QueryResponseBlockOverflow
EKG11600	PL/I function block for EKG_ExecuteFunctionList
EKG12001	PL/I function block for EKG_QueryFunctionBlockContents
EKG12002	PL/I function block for EKG_LockObjectList
EKG12003	PL/I function block for EKG_UnlockAll
EKG12004	PL/I function block for EKG_ResponseBlock
EKG12005	PL/I function block for EKG_SendNotification
EKG12006	PL/I function block for EKG_SetReturnCode
EKG12007	PL/I function block for EKG_WhereAmI
EKG12008	PL/I function block for EKG_OutputToLog
EKG12009	PL/I function block for EKG_MessageTriggeredAction
EKG12011	PL/I function block for EKG_QueryObjectName
EKG21415	PL/I response block for EKG_TriggerNamedMethod
EKG21416	PL/I response block for EKG_TriggerOIMethod
EKG21501	PL/I response block for EKG_QueryField
EKG21502	PL/I response block for EKG_QuerySubfield
EKG21503	PL/I response block for EKG_QueryEntityStructure
EKG21504	PL/I response block for EKG_QueryFieldStructure
EKG21505	PL/I response block for EKG_QueryFieldID
EKG21506	PL/I response block for EKG_QueryFieldName
EKG21507	PL/I response block for EKG_QueryNotifyQueue
EKG21508	PL/I query multiple subfields
EKG21509	PL/I locate
EKG21510	PL/I response block for EKG_QueryResponseBlockOverflow
EKG22001	PL/I response block for EKG_QueryFunctionBlockContents

Name	Use
EKG22007	PL/I response block for EKG_WhereAmI
EKG22011	PL/I response block for EKG_QueryObjectName
EKG3ACCB	C/370™ RODM access block
EKG3CADT	C/370 RODM abstract data types
EKG3CEEP	C/370 external entry point declaration
EKG3CINC	C/370 include statements
EKG3CLOG	C/370 log record definitions
EKG3ENTB	C/370 RODM entity access information block
EKG3FLDB	C/370 RODM field access information block
EKG3TRAB	C/370 RODM transaction information block
EKG31100	C/370 function block for EKG_ConnectLong
EKG31101	C/370 function block for EKG_Connect
EKG31102	C/370 function block for EKG_Disconnect
EKG31201	C/370 function block for EKG_Checkpoint
EKG31202	C/370 function block for EKG_Stop
EKG31302	C/370 function block for EKG_CreateClass
EKG31303	C/370 function block for EKG_DeleteClass
EKG31304	C/370 function block for EKG_CreateField
EKG31305	C/370 function block for EKG_DeleteField
EKG31306	C/370 function block for EKG_CreateSubfield
EKG31307	C/370 function block for EKG_DeleteSubfield
EKG31401	C/370 function block for EKG_ChangeField
EKG31402	C/370 function block for EKG_SwapField
EKG31403	C/370 function block for EKG_ChangeSubfield
EKG31404	C/370 function block for EKG_SwapSubfield
EKG31405	C/370 function block for EKG_LinkTrigger
EKG31406	C/370 function block for EKG_LinkNoTrigger
EKG31407	C/370 function block for EKG_UnLinkTrigger
EKG31408	C/370 function block for EKG_UnLinkNoTrigger
EKG31409	C/370 function block for EKG_CreateObject
EKG31410	C/370 function block for EKG_DeleteObject
EKG31411	C/370 function block for EKG_RevertToInherited
EKG31412	C/370 function block for EKG_AddNotifySubscription
EKG31413	C/370 function block for EKG_DeleteNotifySubscription
EKG31415	C/370 function block for EKG_TriggerNamedMethod
EKG31416	C/370 function block for EKG_TriggerOIMethod
EKG31417	C/370 add object deletion notification subscription
EKG31418	C/370 delete object deletion notification subscription
EKG31501	C/370 function block for EKG_QueryField
EKG31502	C/370 function block for EKG_QuerySubfield
EKG31503	C/370 function block for EKG_QueryEntityStructure
EKG31504	C/370 function block for EKG_QueryFieldStructure
EKG31505	C/370 function block for EKG_QueryFieldID
EKG31506	C/370 function block for EKG_QueryFieldName
EKG31507	C/370 function block for EKG_QueryNotifyQueue
EKG31508	C/370 query multiple subfields
EKG31509	C/370 locate
EKG31510	C/370 function block for EKG_QueryResponseBlockOverflow
EKG31600	C/370 function block for EKG_ExecuteFunctionList
EKG32001	C/370 function block for EKG_QueryFunctionBlockContents
EKG32002	C/370 function block for EKG_LockObjectList
EKG32003	C/370 function block for EKG_UnlockAll
EKG32004	C/370 function block for EKG_ResponseBlock
EKG32005	C/370 function block for EKG_SendNotification

Name	Use
EKG32006	C/370 function block for EKG_SetReturnCode
EKG32007	C/370 function block for EKG_WhereAmI
EKG32008	C/370 function block for EKG_OutputToLog
EKG32009	C/370 function block for EKG_MessageTriggeredAction
EKG32011	C/370 function block for EKG_QueryObjectName
EKG41415	C/370 response block for EKG_TriggerNamedMethod
EKG41416	C/370 response block for EKG_TriggerOIMethod
EKG41501	C/370 response block for EKG_QueryField
EKG41502	C/370 response block for EKG_QuerySubfield
EKG41503	C/370 response block for EKG_QueryEntityStructure
EKG41504	C/370 response block for EKG_QueryFieldStructure
EKG41505	C/370 response block for EKG_QueryFieldID
EKG41506	C/370 response block for EKG_QueryFieldName
EKG41507	C/370 response block for EKG_QueryNotifyQueue
EKG41508	C/370 query multiple subfields
EKG41509	C/370 locate
EKG41510	C/370 response block for EKG_QueryResponseBlockOverflow
EKG42001	C/370 response block for EKG_QueryFunctionBlockContents
EKG42007	C/370 response block for EKG_WhereAmI
EKG42011	C/370 response block for EKG_QueryObjectName
FLBTREM	C/370 exception view update parameter structure
FLBTRSM	C/370 status change parameter structure

The following macros are provided as general-use programming interfaces.

Name	Use
CNMALTDATA	Alter data on a queue
CNMAUTOTAB	Invoke automation table
CNMCLOSMEM	Close NetView partitioned data set
CNMCODE2TXT	Code point translation
CNMCOMMAND	Invoke NetView commands
CNMCOPYSTR	Copy storage
CNMETINIT	Initialize the server support
CNMETNEXT	Get next transaction request
CNMETQUIESCE	Quiesce the database
CNMETREADY	Ready for next transaction
CNMETRPARM	Get transaction request
CNMETTERM	Terminate the Server support
CNMETWAIT	Wait for a transaction request
CNMGETATTR	Query message attributes
CNMGETDATA	Data queue manipulation
CNMGETPARM	Get transaction reply parameters
CNMHREGIST	High performance transport application registration
CNMHSENDMU	Send high performance message unit
CNMI	CNMI access under a DST
CNMINFOC	Query NetView character information
CNMINFOI	Query NetView integer information
CNMKEYIO	Keyed file access under a DST
CNMLOCK	Control a lock
CNMNAMESTR	Named storage
CNMOPENMEM	Open NetView partitioned data set
CNMOPREP	Resource object data manager
CNMPRSMDB	Process message data block
CNMREADMEM	Read NetView partitioned data set

Name	Use
CNMREGIST	Application registration
CNMSCOPECK	Check command authorization for security
CNMSENDMSG	Send message or command
CNMSENDMU	Send message unit
CNMSENDSTR	Send transaction replay to NetView requester
CNMSENDTR	Send transaction request to database server
CNMSSCAN	Parse or convert character string
CNMSTRCELL	Storage cell
CNMSTRPOOL	Storage pool
CNMVARPOOL	Set or retrieve variables
DUIFEDST	Assembler macro

Product-Sensitive Programming Interfaces

The following control blocks are provided as product-sensitive programming interfaces.

Name	Use
AAUTISAW	Internal session awareness record
AAUTLOGR	Structure map for NetView SMF log record
BNJTBRF	Batch record format table
DSIAIFRO	Automation internal function request object extension vector
DSIASYPN	Asynchronous panel parameter list
DSICBH	Control block header
DSICWB	Command work block
DSIDSB	Data services block
DSIDSRB	Data services request block
DSIDTR	Data transport Request block
DSIELB	External logging block
DSIID	NetView level identifier
DSIIFR	Internal function request
DSILOGDS	NetView log DSECT
DSIMVT	Main vector table
DSIPDB	Parse descriptor block
DSISCE	System command entry
DSISCT	System command table (include only)
DSISVL	Service routine vector list (include only)
DSISWB	Service work block
DSITECBR	Branch table of ECB processor load module
DSITIB	Task information block
DSITVB	Task vector block
DSIUSE	Installation exit parameter list

The following macros are provided as product-sensitive programming interfaces.

Name	Use
DSIAUTO	Automation services
DSIBAM	Build automation message
DSIBAMKW	Build automation message keyword
DSICBS	Control block services
DSICES	Command entry services
DSICVTHE	Convert to hex
DSIC2T	Translate alert code point to text

Name	Use
DSIDATIM	Date and time
DSIDEL	Delete user-defined module
DSIDKS	Disk services
DSIFIND	Find long-running command storage
DSIFRE	Free storage
DSIFREBS	Free buffer structure service
DSIGET	Get storage
DSIGETDS	Retrieve messages
DSIHREGS	High-performance registration
DSIHSNDS	High-performance send
DSIKVS	Keyword/value services
DSILCS	Obtain/release control blocks
DSILOD	Load user-defined module
DSIMBS	Message buffer services
DSIMDS	Message definition services
DSIMMDBS	Message data block service
DSIMQS	Message queuing services
DSINOR	Resource object data manager d
DSIPAS	Parameter/alias services
DSIPOP	Remove long-running command
DSIPOS	ECB post services
DSIPRS	Parsing services
DSIPSS	Presentation services
DSIPUSH	Establish long-running command
DSIQOS	Query operator services
DSIQRS	Query resource services
DSIRDS	Resource definition services
DSIRXCOM	Access REXX variables (VM only)
DSIRXEBS	Get an EVALBLOK
DSISRCMV	Search for subvector/subfield
DSISYS	Operating system indicator
DSITECBS	Manage a dynamic ECB list for DSTs
DSIVARS	Global Variable Access
DSIWAT	ECB wait services
DSIWCS	Write console services
DSIWLS	Write log services
DSIZCSMS	CNM data services
DSIZVSMS	VSAM data services
DSI6REGS	Registration services
DSI6SNDS	Send services

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