IBM Z Performance and Capacity Analytics
Version 3 Release 1

Guide to Reporting

SC28-3216-01

Note

Before using this information and the product it supports, read the information in “Notices” on page 99.

This edition applies to version 3, release 1 of IBM Z Performance and Capacity Analytics (program number 5698-AS3) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Preface

This book provides an introduction to the reporting dialog of IBM Z Performance and Capacity Analytics as it is used from host sessions. It describes how to use the reporting dialog to display, search, modify, and create reports and report groups.

It also describes how to setup and configure for extended reporting capability through interfacing analytics tools, both on and off-platform.

The following terms are used interchangeably throughout the guide:

- MVS, OS/390®, and z/OS.
- VM and z/VM.

Who should read this book

The *Guide to Reporting* is primarily for IBM Z Performance and Capacity Analytics users who display existing reports using the reporting dialog. It is also for more experienced users who create and modify reports, or for the IBM Z Performance and Capacity Analytics administrator who controls reporting dialog default functions and capabilities.

What this book contains

Use this book as a guide to using the IBM Z Performance and Capacity Analytics reporting dialog from a host session. The book contains these chapters:

- Introducing the Reporting Dialog introduces IBM Z Performance and Capacity Analytics, the reporting dialog, and products with which it interacts, such as Db2®, and (optionally) Query Management Facility (QMF™).
- Getting started explains how to use the reporting dialog. It describes how to start and exit IBM Z Performance and Capacity Analytics and how to use the reporting dialog. It also introduces the IBM Z Performance and Capacity Analytics help system and shows how to get help when you need it.
- Working with existing reports describes general tasks, including how to display, print, and modify reports that your IBM Z Performance and Capacity Analytics administrator has installed and made available for your use or that you created.
- Working with report groups describes how to create, modify, and use logical groups of reports.
- Searching for reports describes how to locate reports that describe the performance of a particular system or subsystem, or that show similar performance characteristics across a range of systems.
- Creating a new report using QMF describes how to use IBM Z Performance and Capacity Analytics and the products with which it interacts to create character (*tabular*) or graphical data display manager (GDDM)-based graphic reports (*charts*). It also shows you how to use an existing report as a template for a new one.
- Creating a new report with the report generator describes how to use IBM Z Performance and Capacity Analytics's built-in report generator to create character (*tabular*) reports or Graphical Data Display Manager (GDDM)-based graphic reports (*charts*). It also shows you how to use an existing report as a template for a new one.
- Using other Reporting Dialog functions describes how to generate reports in batch, communicate with the IBM Z Performance and Capacity Analytics administrator using messages, and set dialog parameters.
- Reporting Dialog Navigation Reference is a reference of all the options on the menu bar pull-downs in the reporting dialog. It shows the pull-downs as they are displayed on your screen, and describes each option.

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- Chapter 10, “Preparing for web reporting,” on page 79 describes setting up Db2 on z/OS for JDBC access to enable IBM Z Performance and Capacity Analytics web reporting using Cognos.
- Chapter 11, “Implementing Cognos reporting,” on page 81 describes the web reporting functionality available with IBM Z Performance and Capacity Analytics to run queries and present reports in a variety of formats using Cognos.
- Chapter 12, “Implementing Splunk and ELK reporting,” on page 91 describes off-platform web reporting functionality using Splunk and ELK to run queries and present reports in a variety of formats from IBM Z Performance and Capacity Analytics data streamed using the Data Mover or optionally through IBM Common Data Provider for z.
- Appendix A, “Support information,” on page 97 explains how to obtain support for IBM software products.

Publications

This section describes how to access the IBM Z Performance and Capacity Analytics publications online.

For a list of publications and related documents, refer to “IBM Z Performance and Capacity Analytics publications” on page 101.

Accessing publications online

Publications for this and all other IBM products, as they become available and whenever they are updated, can be viewed on the IBM Knowledge Center website from where you can also download the associated PDF.

IBM Z Performance and Capacity Analytics V3.1.0
https://www.ibm.com/support/knowledgecenter/SSPNK7_3.1.0

IBM Knowledge Center
https://www.ibm.com/support/knowledgecenter

Accessibility

Accessibility features help users with a physical disability, such as restricted mobility or limited vision, to use software products successfully. With this product, you can use assistive technologies to hear and navigate the interface. You can also use the keyboard instead of the mouse to operate all features of the graphical user interface.

For additional information, refer to the IBM Accessibility website:

https://www.ibm.com/accessibility

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:

- Searching knowledge bases: You can search across a large collection of known problems and workarounds, Technotes, and other information.
- Obtaining fixes: You can locate the latest fixes that are already available for your product.
- Contacting IBM Software Support: If you still cannot solve your problem, and you need to work with someone from IBM, you can use a variety of ways to contact IBM Software Support.

Refer to Appendix A, “Support information,” on page 97 for more details.

Conventions used in this book

This guide uses several conventions for special terms and actions, operating system-dependent commands and paths, and margin graphics.

PDF only: Except for editorial changes, updates to this edition are marked with a vertical bar to the left of the change.

Typeface conventions

This guide 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**)
- Column headings in a table
- Keywords and parameters in text

Italic

- Citations (titles of books, diskettes, and CDs)
- Words defined in text
- Emphasis of words (words as words)
- Letters as letters
- New terms in text (except in a definition list)
- Variables and values you must provide

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

What's new in this edition (November 2020)

The changes in this edition relate to IBM Z Performance and Capacity Analytics V3.1.0 new function and enhancements.

The changes in this edition include:

- Added a reference to the complete list of reports: “Using IBM Z Performance and Capacity Analytics reports” on page 2
- Updated installation and implementation instructions for Cognos reporting: Chapter 11, “Implementing Cognos reporting,” on page 81, “Step 2: Changing the schema name in Framework Manager” on page 84 and “Step 3: Dynamic schema changing (optional)” on page 85
- Updated Splunk Dashboard implementation instructions: “Creating a common Splunk index” on page 91 and “Downloading and installing the dashboard files” on page 91 for APAR PH28499
- Updated ELK reporting information with the addition of new reports: “Configuring ELK” on page 93, “Configuring Kibana” on page 95 and “Kibana IZPCA homepage” on page 95 for APAR PH28948
- Updated installation instructions for ELK reporting: “Downloading and installing the dashboard files” on page 94

Except for editorial changes, revisions are marked in the PDF with a vertical bar to the left of the change.

Chapter 1. Introduction

IBM Z Performance and Capacity Analytics is a reporting system that collects utilization and throughput data logged by computer systems, then summarizes the data and presents it in a variety of forms.

After reading this chapter, you should have a basic understanding of IBM Z Performance and Capacity Analytics and be ready to learn to use the provided reporting platforms.

Understanding how IBM Z Performance and Capacity Analytics works

IBM Z Performance and Capacity Analytics performs these basic functions:

- Collecting systems management data into a Db2 database
- Reporting on the data in the database

IBM Z Performance and Capacity Analytics consists of a base product and several optional features. The IBM Z Performance and Capacity Analytics base can generate graphic and tabular reports by using systems management data it stores in its Db2 database. The base product includes the administration dialog, the reporting dialog, and the log collector, all of which interact with a standard Db2 database. The following figure provides an overview of IBM Z Performance and Capacity Analytics and its processes.

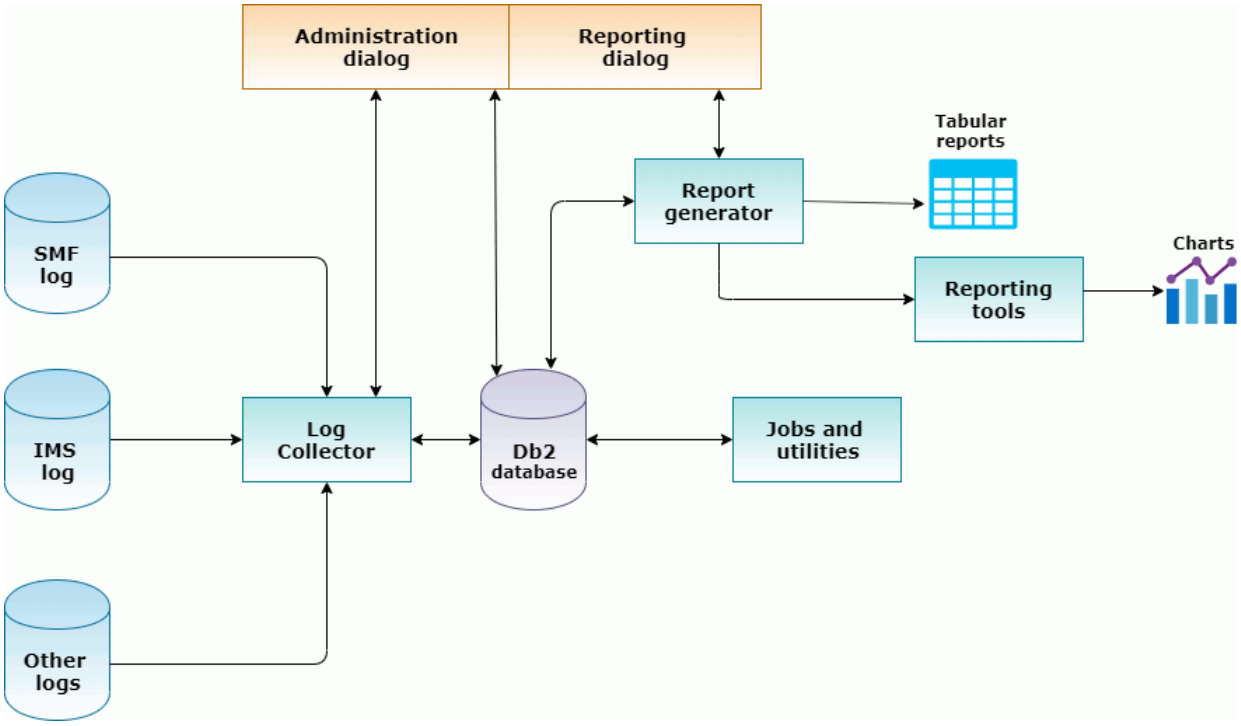

Figure 1. Overview of IBM Z Performance and Capacity Analytics

IBM Z Performance and Capacity Analytics stores systems management data in a standard Db2 database. You can use Structured Query Language (SQL) statements from the reporting dialog as you perform specialized searches and create reports. If Query Management Facility (QMF) is installed on your system, it is used for reporting functions. Otherwise, the built-in report generator of IBM Z Performance and Capacity Analytics is used.

The administrator can control almost every aspect of IBM Z Performance and Capacity Analytics using the administration dialog. The IBM Z Performance and Capacity Analytics administrator can use the administration dialog to install and customize features, work with log and record definitions, run COLLECT procedures, and work with tables (including displaying or editing them).

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IBM Z Performance and Capacity Analytics provides batch procedures and an interactive interface that enable you to collect systems management data from the system management facility (SMF) log and other sources, extract and manipulate the data, and then store the data in the IBM Z Performance and Capacity Analytics database.

In the same database that holds collected data, IBM Z Performance and Capacity Analytics stores information you supply, such as performance objectives or department and workload definitions.

You use the IBM Z Performance and Capacity Analytics reporting dialog to work with reports and report groups to display, customize, create, and print reports. You can create IBM Z Performance and Capacity Analytics reports to support each of your specialized applications.

Reporting dialog windows conform to IBM Common User Access® (CUA®) guidelines, and greatly resemble the windows of other IBM CUA products.

Using IBM Z Performance and Capacity Analytics features

IBM Z Performance and Capacity Analytics features provide Db2 table definitions for collecting systems management data, and provide predefined queries, forms, and reports for presenting that data.

These optionally installable features are available for use with IBM Z Performance and Capacity Analytics:

- Resource Accounting for z/OS (previously known as Resource Accounting)
- AS/400 System Performance feature
- CICS Performance feature
- Distributed Systems Performance feature
- IMS Performance feature
- Monitoring Agent feature
- Network Performance feature
- System Performance feature

These features let you collect and report on systems management data, such as SMF data or IMS log data.

An overview of the reporting dialog

You can use the reporting dialog to display reports that present data collected by IBM Z Performance and Capacity Analytics.

If QMF is used with IBM Z Performance and Capacity Analytics in your installation, it is used when you work with reports. Otherwise, the built-in reporting dialog of IBM Z Performance and Capacity Analytics is used. For more information about using the IBM Z Performance and Capacity Analytics reporting dialog with or without QMF, see Creating a new report using QMF, and Creating a new report with the report generator.

Using IBM Z Performance and Capacity Analytics reports

IBM Z Performance and Capacity Analytics features come with a comprehensive set of predefined reports. When you use the reporting dialog to display or print a report, IBM Z Performance and Capacity Analytics runs the query associated with the report to retrieve data from the database, and then displays or prints the results according to the form associated with the report.

The current list of reports is available here:

https://www.ibm.com/support/pages/node/6356531

Understanding the different report formats

You can display a report in either tabular or chart format. (To generate and display chart reports, IBM Z Performance and Capacity Analytics uses Graphical Data Display Manager (GDDM®). If GDDM is not

installed on your system, all reports are displayed in tabular form.) Reports displayed in tabular format are displayed as tables with rows and columns. Charts are displayed as graphic representations of the row and column data. Each predefined report has a default form (either tabular or chart) associated with it.

Charts are useful for displaying data trends and providing an overview of the data. For example, the chart in Figure 2 on page 3 identifies the projects that use their allocated direct access storage device (DASD) storage inefficiently.

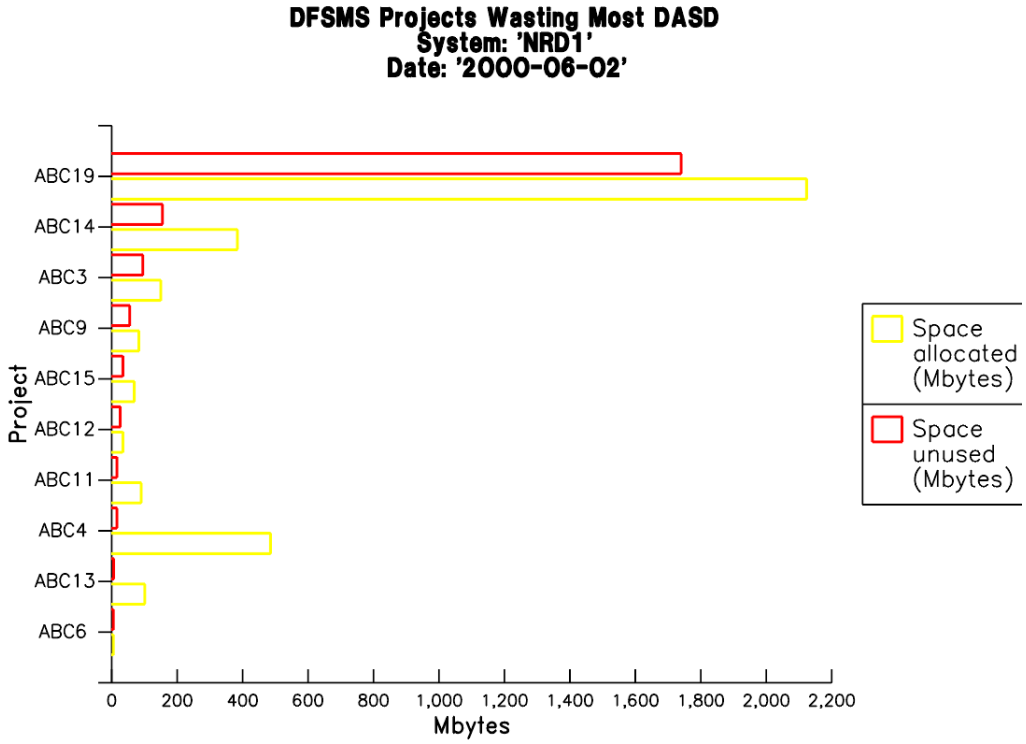

Figure 2. Sample chart showing projects wasting the most DASD

IBM Z Performance and Capacity Analytics tabular reports provide various levels of detail to assist you in solving systems management problems. Because these reports present data in a numerical format, you can view indicators of a potential system constraint in more detail than in charts.

For example, by examining the tabular report in Figure 3 on page 4, you can determine if DASD overallocation is a problem. If it is, you need to know what projects have a high amount of unused storage. You can then contact people or departments in your organization who are responsible for an application with a high amount of unused storage. Either they can release wasted storage, or you can ensure that the proper management class has been assigned.

DFSMS Total Storage Used by Project
System: 'NRD1'
Date: '2000-10-03'

Project	Total storage (Mbytes)	Space allocated (Mbytes)	Mspace DASD (Mbytes)	Mspace tape (Mbytes)	Bspace DASD (Mbytes)	Bspace tape (Mbytes)	Migration ratio (%)	Backup ratio (%)
ABC11	437	90	74	0	273	0	12.0	11.5
ABC12	114	34	10	0	69	0	4.3	5.2
ABC13	381	101	277	0	2	0	77.5	1.2
ABC14	1 354	384	662	0	308	0	61.7	6.3
ABC15	103	69	5	0	29	0	11.1	6.0
ABC16	6	2	1	0	3	0	73.0	48.6
ABC18	874	9	370	0	495	0	57.4	48.2
ABC19	13 768	2 123	3 499	0	8 147	0	33.0	24.0
ABC2	57	5	10	0	41	0	45.0	19.2
ABC22	336	1	126	0	210	0	64.0	18.8
ABC3	356	150	5	0	201	0	7.9	10.8
ABC4	3 328	485	2 288	0	555	0	18.0	17.1
ABC5	3 936	26	1 809	0	2 101	0	52.6	22.9
ABC6	39	5	9	0	25	0	59.7	43.0
ABC9	896	83	138	0	675	0	22.5	7.0

IBM Z Performance and Capacity Analytics Report: DFSMS05

Figure 3. Sample IBM Z Performance and Capacity Analytics tabular report

When you create a report, you can use the reporting dialog to save the report data as a member in either the tabular reports data set or the charts data set. (Your administrator defined the names of these report data sets during installation. You can change them from the Dialog Parameters pop-up.)

Organizing IBM Z Performance and Capacity Analytics reports

You can store related reports (for example, all CICS reports) in logical report groups for easier access. You can also use report groups to keep together all reports for a particular group of users (for example, managers). Predefined reports shipped with IBM Z Performance and Capacity Analytics features are stored in predefined groups. You can use the reporting dialog to define new report groups, or to add reports to or delete reports from existing groups. IBM Z Performance and Capacity Analytics reports can exist in more than one group.

IBM Z Performance and Capacity Analytics provides a search function that lets you find reports you need without manually scrolling through all available reports. If you define search criteria that you are likely to use often, you can save the criteria for future use.

Each predefined IBM Z Performance and Capacity Analytics report has one or more attributes associated with it. These attributes help identify the report and are used by the reporting dialog search function. For example, the attribute CICS identifies reports that show CICS data.

IBM Z Performance and Capacity Analytics reports, groups, and saved criteria of searches are classified as:

Public
Reports and report groups that are available to all IBM Z Performance and Capacity Analytics users

Private
Reports and report groups that you created for your use

You can display or print private reports and public reports. However, you can modify or delete only private reports and public reports that you created. If you are an IBM Z Performance and Capacity Analytics administrator, you can display, print, modify, or delete all reports.

Getting help information

The online help system provides field help, window help (general help), message help, and keys help.

The reporting platforms

IBM Z Performance and Capacity Analytics provides support for data curating, reporting and analysis functions on a number of reporting platforms.

IBM Z Performance and Capacity Analytics performs these basic functions:

- Curate systems management data
- Store the curated data in a Db2 database
- Optionally, stream the curated data to an off-platform database using either of two streaming mechanisms
- Report on the data in the database

The following reporting platforms are supported with IBM Z Performance and Capacity Analytics:

- Db2 database:
  - IBM Z Performance and Capacity Analytics native reporting using the reporting dialog
  - Web reporting using IBM Cognos Analytics
- Off-platform database:
  - Splunk
  - ELK

Chapter 2. Getting started

This chapter explains how to use the IBM Z Performance and Capacity Analytics reporting dialog. After reading this chapter, you should be familiar with these tasks:

- Starting the reporting dialog for the first time
- Using an IBM Z Performance and Capacity Analytics dialog
- Getting help
- Using IBM Z Performance and Capacity Analytics commands to navigate
- Exiting IBM Z Performance and Capacity Analytics

Starting the reporting dialog for the first time

About this task

When you use the reporting dialog, you can customize certain dialog defaults. One of these defaults lets you select a report group to display as your list of reports whenever you start the reporting dialog.

To start the reporting dialog and set a report group as a default:

Procedure

1. Type **TSO %DRLEINIT REPORTS** on the command line of any Interactive System Productivity Facility/ Program Development Facility (ISPF/PDF) window.

   Note: Depending on how IBM Z Performance and Capacity Analytics was installed on your system, you might be able to select the reporting dialog from the ISPF primary menu.

   The first time you start the reporting dialog, IBM Z Performance and Capacity Analytics displays the Reporting Dialog Defaults pop-up (Figure 4 on page 7). In subsequent sessions, if you elect not to display this pop-up each time you start the reporting dialog, you can access this pop-up by selecting the Reporting dialog defaults option from the Options pull-down.

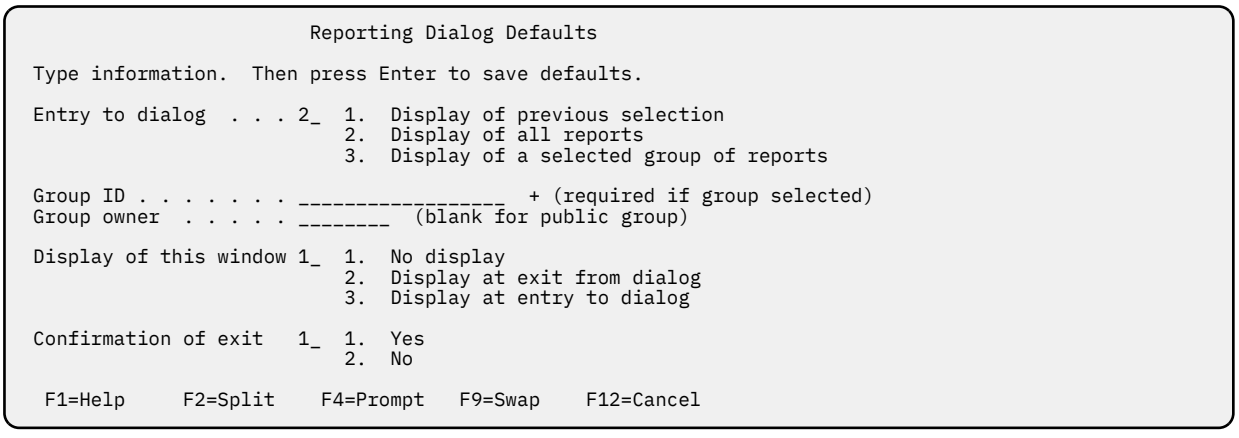

   Figure 4. Reporting dialog defaults pop-up

2. Type the number of your selection in the Entry to dialog field.

   If you type 1, Display of previous selection, IBM Z Performance and Capacity Analytics uses the search criterion you used last to limit the list of reports shown in the Reports window. This is the default selection. If you choose this option the first time you use the IBM Z Performance and Capacity Analytics reporting dialog, the Reports window displays nothing until you specify a group or search criteria.

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If you type 2, Display of all reports, IBM Z Performance and Capacity Analytics displays the Reports window listing all the reports available for your use. On subsequent entries into the reporting dialog, the Reports window displays all reports.

If you type 3, Display of selected group of reports, you must also type the name of the report group in the Group name field and the user ID of the group owner, if it is a private report group. To see a list of report groups, move the cursor to the Group name field and press **F4**. On subsequent entries into the reporting dialog, IBM Z Performance and Capacity Analytics displays the Reports window and lists only the reports in the group you have identified.

3. Press Enter to save the defaults.

Using the IBM Z Performance and Capacity Analytics dialog

The reporting dialog consists of a series of windows through which you provide information to IBM Z Performance and Capacity Analytics. You use the IBM Z Performance and Capacity Analytics reporting dialog to select items such as reports and report groups, and then select the actions to perform on these items.

Understanding IBM Z Performance and Capacity Analytics windows

The following figure shows a sample IBM Z Performance and Capacity Analytics window and points out the elements common to many windows:

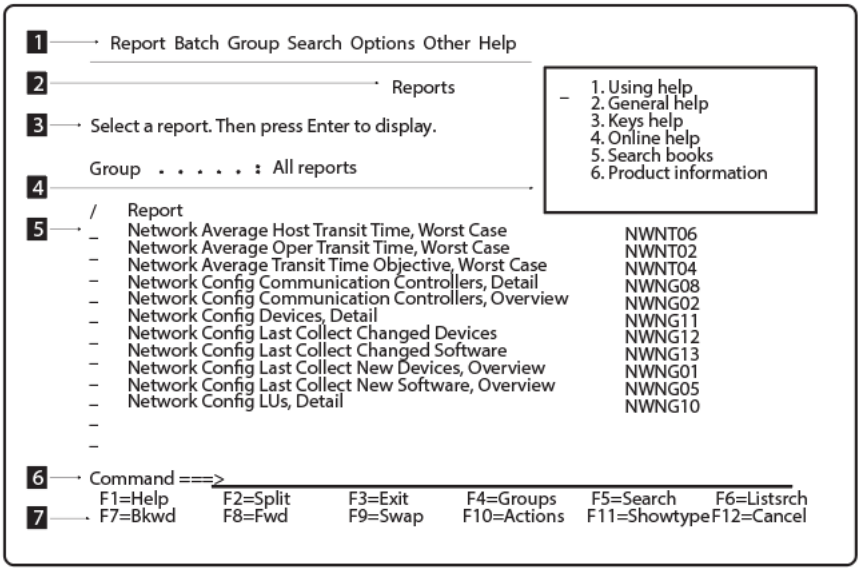

Figure 5. A sample IBM Z Performance and Capacity Analytics window

1 Menu bar
Lists the types of actions available from the window. Every primary window has a menu bar; pop-up windows do not. Using the menu bar describes how to use the options on the menu bar.

2 Window title
Indicates the contents and function of the window.

3 Instructions
Provides direction about what action to take, and describes the default action (what happens when you press Enter without selecting another action).

4 Pull-down

Contains the options related to the categories listed in the menu bar. Using the menu bar describes how to select these options.

5 Selection field
Lets you select an option, or a report or report group, from a displayed list. The selection field for a list of options is a blank where you can type the number of the option you want to select (as in pull-downs). The selection field for a list of reports or groups is a column of blanks with a slash (/) as the column heading. You can type a slash in the blank beside a report or group to select it.

Note: You can actually type any character in the selection field of a list of reports or groups. If you select a report by typing a question mark, IBM Z Performance and Capacity Analytics shows you a description of that report.

6 Command line
Lets you specify any command available on your system, including IBM Z Performance and Capacity Analytics commands, TSO commands, and ISPF commands. Using IBM Z Performance and Capacity Analytics commands to navigate describes the commands.

7 Function keys
Lists the function key settings for the current window. Using function keys describes the function key settings in IBM Z Performance and Capacity Analytics.

8 Text entry field (not shown)
Lets you specify information to IBM Z Performance and Capacity Analytics by typing text. If you type information that is not valid, an error message is displayed. Correct the information and try the action again. If an entry field is followed by a plus (**+**) sign, you can use the **F4** (Prompt) function key, described in Using function keys.

Performing actions in IBM Z Performance and Capacity Analytics

You can perform actions in IBM Z Performance and Capacity Analytics by:

- Pressing Enter to perform the default action
- Pressing a function key
- Selecting a menu bar option
- Typing a command

In most cases, you select a report or group upon which to act *before* selecting an action. “Selecting reports and groups” on page 9 describes how to select reports and groups.

The instructions below the title of the window describe the default action (what happens if you press Enter) for that window. “Selecting the default action” on page 9 describes how to initiate the default action.

Function keys are defined to perform some of the most frequently used IBM Z Performance and Capacity Analytics actions. “Using function keys” on page 10 describes how to use the function keys to select actions.

The menu bar provides access to all possible actions in IBM Z Performance and Capacity Analytics. “Using the menu bar” on page 11 describes how to use the menu bar to select actions.

Selecting reports and groups

To select a report or group from an IBM Z Performance and Capacity Analytics selection list, type a slash (/) or another character in the selection field beside the name of the report or group. The selection field has a slash as its column heading.

Selecting the default action

Every IBM Z Performance and Capacity Analytics window has a default, which you select by pressing Enter. The default action is described in the instructions below the title of the window. For example, the default on the Reports window is to display the selected report. When you select a report and press Enter, IBM Z Performance and Capacity Analytics processes the default immediately.

Using function keys

A list of function keys and their actions are displayed at the bottom of each reporting dialog window. When you press a function key, IBM Z Performance and Capacity Analytics immediately performs the action assigned to that function key.

You can use an ISPF command to display the list of function keys if they are not displayed. Type **FKA ON** or **PFSHOW ON** on the command line and press Enter. To change the display of function keys, such as whether to display them as F1 to F12 or F13 to F24, type **PFSHOW TAILOR** on the command line, press Enter, and specify your preference.

Note: You should always display the list of function keys. In pop-ups, you have no other way to start the functions that are assigned to function keys. Also, some function keys might have different functions in different windows.

Figure 5 on page 8 shows the function keys available in the Reports window.

These function keys perform the same actions regardless of where they are displayed in the dialog:

F1

If the cursor is on a selectable field, a menu bar option, or a pull-down option, IBM Z Performance and Capacity Analytics displays field-level help. Otherwise, general help is displayed for the entire dialog window. If you press **F1** after IBM Z Performance and Capacity Analytics displays a message, help is displayed for the message.

F2

Initiates the ISPF split-screen mode. If split-screen mode is already activated, pressing F2 repositions the split line.

Note:

1. Split-screen mode is not always available from products with which IBM Z Performance and Capacity Analytics works.
2. You can use the alternate ISPF session for every task except those that allocate and free the same DDNAMEs that IBM Z Performance and Capacity Analytics uses. An example is SLR, which can free ADMCFORM.
3. You cannot run a second IBM Z Performance and Capacity Analytics session from the other ISPF session.

F3

Exits from the window. F3 is available only on the Reports window and help windows. It is not available on pop-ups.

F9

Swaps the cursor from one portion of a split screen to another. You must have initiated ISPF split-screen mode by pressing F2. Note that split-screen mode is not available with all of the products with which IBM Z Performance and Capacity Analytics works.

F12

Returns to the previous window without saving any changes made in the current window.

These function keys are used in many IBM Z Performance and Capacity Analytics windows and help windows:

F7

If information cannot fit in one window, press F7 to scroll backward to the previous window.

F8

If information cannot fit in one window, press F8 to scroll forward to the next window.

F10

In the Reports window, press F10 to move the cursor between the work area and the menu bar.

F11
In the Reports window, press F11 to toggle the display between showing the report ID and showing the report type and owner. When the report ID is displayed (the default display), F11 is labeled Showtype; when the report type and owner are displayed, the key is labeled Show ID.

Using the menu bar

Each IBM Z Performance and Capacity Analytics primary window contains a menu bar that lists the options available in that window. When you select an option from the menu bar, a pull-down menu is displayed beneath it listing the actions you can perform. Pop-ups do not contain a menu bar. The Reports window (Figure 6 on page 11) is a primary window and contains a menu bar from which you can select these options:

- Reports
- Batch
- Group
- Search
- Options
- Other
- Help

```
  Report  Batch  Group  Search  Options  Other  Help
-------------------------------------------------------------------------------
                              Reports                  Row 221 to 231 of 438

Select a report. Then press Enter to display.

Group  . . . . . : All reports

/   Report                                              ID
_   Network Average Host Transit Time, Worst Case       NWNT06
_   Network Average Oper Transit Time, Worst Case       NWNT02
_   Network Average Transit Time Objective, Worst Case  NWNT04
_   Network Config Communication Controllers, Detail    NWNG08
_   Network Config Communication Controllers, Overview  NWNG02
_   Network Config Devices, Detail                      NWNG11
_   Network Config Last Collect Changed Devices         NWNG12
_   Network Config Last Collect Changed Software        NWNG13
_   Network Config Last Collect New Devices, Overview   NWNG01
_   Network Config Last Collect New Software, Overview  NWNG05
_   Network Config LUs, Detail                          NWNG10

Command ===> ____________________________________________________________
 F1=Help      F2=Split     F3=Exit      F4=Groups    F5=Search    F6=Listsrch
 F7=Bkwd      F8=Fwd       F9=Swap     F10=Actions  F11=Showtype F12=Cancel
```

Figure 6. Reports window

To select an action from the menu bar:

1. Press **Actions (F10)** (or the **Home** key) or use the cursor movement keys to move the cursor to the menu bar.
2. Use the cursor movement keys to move the cursor to the option you want to select, and press Enter.

   IBM Z Performance and Capacity Analytics displays a pull-down listing the actions you can perform.
3. In the selection field on the pull-down, type the number of the action you want to perform, or press the up arrow and down arrow keys until the cursor is on the action you want to perform.
4. Press Enter.

IBM Z Performance and Capacity Analytics does the action you selected.

Getting help

IBM Z Performance and Capacity Analytics provides help on all windows and functions. This help explains how to use dialog windows and how to fill in fields in windows. IBM Z Performance and Capacity Analytics provides these types of help:

- Field help
- Using help
- General help
- Keys help
- Product information

Getting field help

IBM Z Performance and Capacity Analytics provides field help for every menu bar option, pull-down option, and entry field.

To request field help, place the cursor in the field you want to learn more about and press **F1**. IBM Z Performance and Capacity Analytics displays help for the field you selected.

Getting general help

General help provides help for an entire window. To get general help for a window, you can use any one of these methods:

- Press **F5** from a field help window.
- Press **F1** when the cursor is not on an entry field or the menu bar.
- Type **help** on the command line and press Enter.
- Select the **General help** option from the **Help** pull-down of the IBM Z Performance and Capacity Analytics Reports window (Figure 7 on page 12).

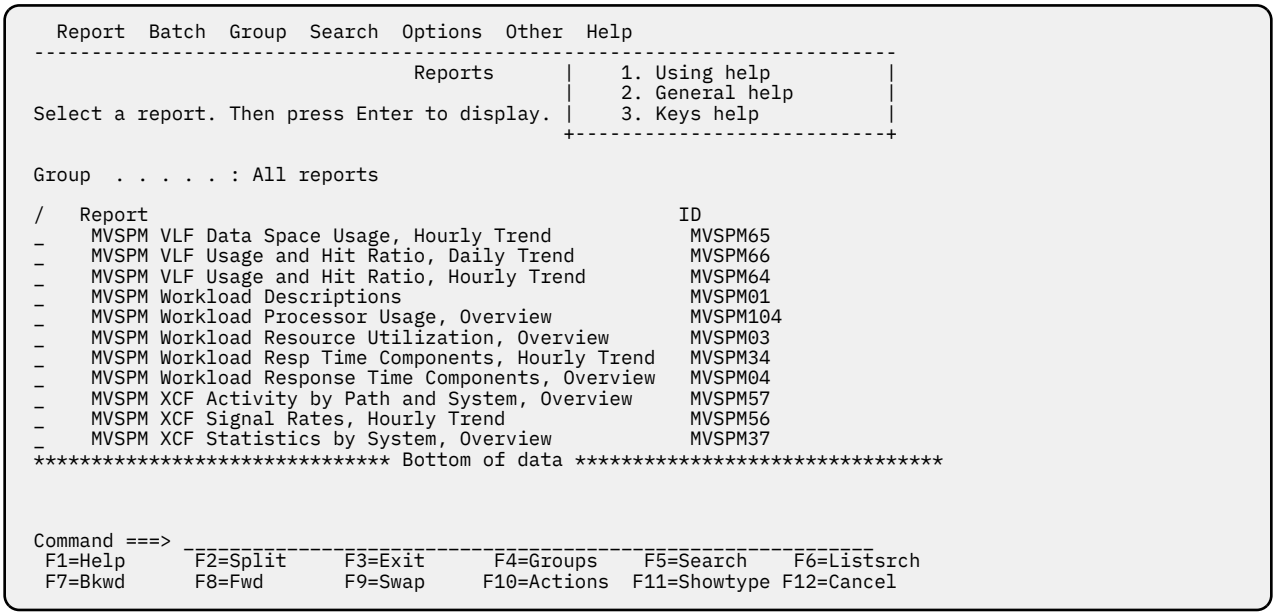

Figure 7. Help pull-down for the Reports

Getting keys help

IBM Z Performance and Capacity Analytics provides help for the function keys used by the reporting dialog. To get help for function keys, either:

- Select the **Keys help** option from the **Help** pull-down on the Reports window.
- Press **F6** from a help window.

Getting help on using help

IBM Z Performance and Capacity Analytics provides instructions for using online help. To get help on using help, select the **Using help** option from the **Help** pull-down.

Using help function keys

A list of function keys and their actions are displayed at the bottom of each help window. When you press a function key, IBM Z Performance and Capacity Analytics immediately performs the action assigned to that function key.

These function keys perform the same actions in all field help windows:

F1
Displays help for a reference phrase selected by the cursor, or displays ISPF help

F2
Initiates ISPF split-screen mode

F3
Exits from help

F5
Displays general help, which is help for tasks coordinated by the entire window

F6
Displays keys help for the window

F7
Scrolls the help window backward

F8
Scrolls the help window forward

F9
Swaps to the alternate ISPF window, if operating in ISPF split-screen mode

F12
Returns to the previous window

Function keys for general help are slightly different. There is no F5 (Gen help) key to link you to general help.

Using IBM Z Performance and Capacity Analytics commands to navigate

You can immediately start an action anywhere in the IBM Z Performance and Capacity Analytics reporting dialog by typing these commands on the command line (uppercase letters indicate the abbreviation for the command):

DB2I
Starts a DATABASE 2 Interactive (DB2I) facility session and displays its primary menu.

DISPLay REPort *report_ID*
Displays the specified report. From the Reports window, this command is simply **DISPLay `report_ID`**. By default, the report IDs are listed in the Report window next to their corresponding report descriptions. You can toggle the display to display either the report IDs or the report types and owners by pressing F11.

HELP
Displays general help for the window or help for a message.

ISPF

Displays the ISPF primary menu.

LOcate *argument*
In an IBM Z Performance and Capacity Analytics window, locates the first row that starts with *argument*.

PDF
Displays the ISPF/PDF primary menu.

QMF

If your installation uses QMF with IBM Z Performance and Capacity Analytics, this command starts a QMF session and displays either its SQL primary window or its prompted query primary menu.

SOrt *column_name* ASC|DESC
Sorts an IBM Z Performance and Capacity Analytics list by the column you specify as *column_name* in either ascending or descending order. (You can also sort by column number by specifying the number of the column instead of the name. The first column after the selection field column on the left is column 1.)

Exiting the reporting dialog

When you have finished using the reporting dialog, press **F3** from the Reports window (Figure 6 on page 11).

IBM Z Performance and Capacity Analytics exits the reporting dialog and returns you to the place from which you started the reporting dialog. If you chose to display a confirmation pop-up whenever you exit the reporting dialog (from the Reporting Dialog Defaults pop-up) IBM Z Performance and Capacity Analytics prompts you to confirm your exit from the reporting dialog.

Chapter 3. Working with existing reports

This chapter explains how to select a report and perform actions on it. After reading this chapter, you should be familiar with these tasks:

- Displaying a report
- Saving report data
- Printing a report
- Printing a list of reports
- Deleting a report
- Opening an existing report definition
- Opening the definition of saved report data

Displaying a report

Procedure

1. To display a report, select the report from the list (by typing a slash or other character in its selection field) in the Reports window, and press Enter.

```
  Report  Batch  Group  Search  Options  Other  Help
------------------------------------------------------------------------------
                              Reports                  Row 221 to 231 of 438

Select a report. Then press Enter to display.

Group  . . . . . : All reports

/   Report                                          ID
_   Network Average Host Transit Time, Worst Case   NWNT06
_   Network Average Oper Transit Time, Worst Case   NWNT02
_   Network Average Transit Time Objective, Worst Case  NWNT04
_   Network Config Communication Controllers, Detail    NWNG08
_   Network Config Communication Controllers, Overview  NWNG02
_   Network Config Devices, Detail                  NWNG11
_   Network Config Last Collect Changed Devices     NWNG12
_   Network Config Last Collect Changed Software    NWNG13
_   Network Config Last Collect New Devices, Overview   NWNG01
_   Network Config Last Collect New Software, Overview  NWNG05
_   Network Config LUs, Detail                      NWNG10

Command ===> ____________________________________________________________
 F1=Help      F2=Split     F3=Exit      F4=Groups    F5=Search    F6=Listsrch
 F7=Bkwd      F8=Fwd       F9=Swap     F10=Actions  F11=Showtype F12=Cancel
```

Figure 8. Reports window

The Reports window displays the following information about existing reports:

Group
Displayed above the list of reports and shows whether you have selected all reports (All reports) or restricted the display of reports to those in a specific group (name of group) or search criteria (Search).

/
Shows which item is selected (select an item from a list by typing a slash, or any other character, in this field).

Report
Shows the title of each report in the list.

ID
Shows the ID of each report in the list. The Report window displays report IDs by default, but you can press **Showtype (F11)** to display the report type and owner columns.

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Type
Shows the report type of each report in the list:

QUERY
Indicates that the report has not been saved and exists as a query that must be run to generate the report.

TABDATA
Indicates that someone has run the query for the report and saved the results to a data set in a tabular format.

GRAPHDATA
Indicates that someone has run the query for the report and saved the results to a data set in a GDDM-based graphic report.

Owner
Identifies the user that owns the report in IBM Z Performance and Capacity Analytics. If no owner is listed, the report is public. This window lists only public reports and reports that you own.

When you select a report for display and press Enter, IBM Z Performance and Capacity Analytics runs the query associated with that report to extract current data, and then displays the report using its associated tabular or graphic format.

Predefined IBM Z Performance and Capacity Analytics reports are those shipped by IBM as part of the components of the features. For every predefined report, an SQL query extracts current data for the report, and a form specifies how the report is displayed. If you need to find the names of the query, form, and GDDM/ICU format associated with a report, follow the procedure described in Opening a report definition.

IBM Z Performance and Capacity Analytics report queries use variables that specify data selection criteria for columns in the data tables. If the query you select contains no variables, IBM Z Performance and Capacity Analytics displays the report. If the query contains variables, you must specify values for them that determine which rows of data the query selects when the report is built. See Specifying values for variables for more information.

2. To control which reports IBM Z Performance and Capacity Analytics displays in the list shown in the Reports window, there are several ways to do this:
   - Showing reports that belong to a report group, described in Working with report groups
   - Showing certain types of reports (queries, saved reports, or all types), described in Searching for reports
   - Showing reports that have similar attributes or descriptions, described in Searching for reports

Specifying values for variables

About this task

IBM Z Performance and Capacity Analytics uses variables in its report queries to let you specify the contents of the report. If the query contains variables, IBM Z Performance and Capacity Analytics displays the Data Selection pop-up where you can specify values for the variables.

```
                              Data Selection               Row 1 to 4 of 4

Type values.  Then press Enter to generate the report.

Report . . . : MVSPM Channel Path Busy

Variable            Value                                       Oper  Req
DATE                ____________________________________   >  +  =     Yes
MVS_SYSTEM_ID       ____________________________________   >  +  =     Yes
PERIOD_NAME         ____________________________________   >  +  =     No
MAXROWS             ____________________________________   >     =     Yes
***************************** Bottom of data ********************************


Command ===> _____________________________________________________________
 F1=Help     F2=Split    F4=Prompt   F5=Table    F6=Chart    F7=Bkwd
 F8=Fwd      F9=Swap    F10=Showfld F11=Hdrval  F12=Cancel
```

Figure 9. Data Selection pop-up

Procedure

1. Specify values for variables in the Data Selection pop-up.

   For example, suppose you select the MVSPM, Channel Path Busy report. When you press Enter, the Data Selection pop-up is displayed as shown in Figure 9 on page 17.

   If the variable does not require you to provide a specific value (that is, its value in the Req column is No), you can select all available values for that variable by leaving the field blank. If the Req column has a value of Yes for the variable, you must specify a value for it.

   When specifying the values for variables (for example dates) you normally do not have to use quotes. However, you must use quotes if you specify a numeric value for a non-numeric column, or if you are using an IN operator and the values are both numeric and alphanumeric.

   The value you can specify for a variable depends on how the variable is used in the query associated with the report. The Oper column in the Data Selection pop-up shows how the variable is used:

   Operator
   Description of value specification

   =
   Specify one value to retrieve data rows that are an exact match for the value of the variable.

   >
   Specify one value to retrieve data rows that have a value of the variable that is greater than the value you specify.

   >=
   Specify one value to retrieve data rows that have a value of the variable that is greater than or equal to the value you specify.

   <
   Specify one value retrieve data rows that have a value of the variable that is less than the value you specify.

   <=
   Specify one value to retrieve data rows that have a value of the variable that is less than or equal to the value you specify.

   IN
   Specify a list of values separated by blanks or commas. For example:

   ```
   VOLSR1, VOLSR2 VOLSR3,VOLSR4
   ```

   IN indicates that the query uses the variable in an SQL IN clause. An IN clause specifies that retrieval is based on an exact match of any of the values in a list of values. If some values in the list are numeric and some are alphanumeric, all values must be enclosed in quotes. For example:

   ```
   '15A' '15B' '154'
   ```

LIKE
Allows the use of global search characters to specify a value. The reporting dialog uses the pattern of the value you specify to retrieve data. Like operators are:

*** or %**
Specifies zero or more characters of any value.

? or _
Specifies exactly one character of any value.

Note: You can combine global search characters when specifying variable values. For example, D?2* would match DB21, DB22, and DB2. It would not match DB322, because there can be only one character between the D and the first 2.

If there is a plus sign (+) beside the entry field for a variable, you can display a list of available values for that variable by positioning the cursor on the field and pressing F4 (Prompt). See Using prompts for more information about prompting for variables.

2. After you have specified values for the variables, press Enter.

   IBM Z Performance and Capacity Analytics runs the query and displays the report. If a chart format exists for the report, GDDM/ICU is called to display the chart. Otherwise, the report is displayed in a tabular format.

   Alternatively, you can press **Table (F5)** to force the use of a tabular format, or you can press **Chart (F6)** to call GDDM/ICU to display your report graphically.

   If GDDM/ICU is not installed on your system, all reports are shown in tabular format.

   The chart format defines how the chart looks; for example, if it is a bar chart or a line chart.

   If you specify a chart format that does not exist:

   If QMF is used
   QMF uses its default chart format to display the report graphically.

   If QMF is not used
   GDDM/ICU shows the report as a bar chart. You can either change the chart format while in the GDDM/ICU environment, or go back to the report definition and specify a valid chart format.

   For more information about chart formats, see Opening a report definition, and the GDDM/ICU documentation.

   Note: If you do not specify a value when prompted for one, IBM Z Performance and Capacity Analytics selects all possible values, for example for SYSTEM_ID, in the query. It does this by setting the value of SYSTEM_ID to `SYSTEM_ID`, which has the effect of nullifying the WHERE clause. Although the query runs without a problem, all systems are included in the report, and the report title is displayed as: `System ID: SYSTEM_ID`

Using prompts

About this task

Some data entry fields in the dialog windows are prompted fields, which you can identify by the plus sign (+) to the right of the field. You can use F4 (Prompt) to see a list of available query values for prompted fields. For example:

Procedure

1. In the Data Selection pop-up, place the cursor in the value field beside a variable identified with a plus sign (**+**) and press **F4**. (See Figure 9 on page 17.)

   IBM Z Performance and Capacity Analytics displays the Prompt for *variable_name* Values pop-up, where *variable_name* is the prompted field. For a large table, this might take some time. Figure 10 on page 19 shows an example of the Prompt for DATE Values pop-up.

```
                    Prompt for DATE Values          Row 1 to 7 of 7

Select a value. Then press Enter to return.

/   Value
/   2019-10-14
_   2019-10-15
_   2019-10-16
_   2019-10-17
_   2019-10-18
_   2019-10-19
_   2019-10-20
************************ Bottom of data ***************************


Command ===> _____________________________________________________
 F1=Help    F2=Split    F7=Bkwd    F8=Fwd    F9=Swap    F12=Cancel
```

Figure 10. Prompt for DATE Values pop-up

2. Depending on the type of variable, select one or more values from the list by typing a slash or any character in the selection field, then press Enter.

   IBM Z Performance and Capacity Analytics returns to the Data Selection pop-up, where the values you selected are displayed.
3. Press Enter to display the report.

   If your installation uses QMF with IBM Z Performance and Capacity Analytics, QMF is used to display reports. For graphical reports, GDDM is used.
4. To exit the report, do either of the following:
   - If a tabular report is displayed, press **F3** to exit QMF.
   - If a graphic report is displayed, press **F9** to exit GDDM. The tabular version of the report is displayed with QMF or ISPF Browse. To exit, press **F3**.

Saving report data

About this task

You can save reports in data sets. Once the report is saved, you and any other reporting dialog user can see the report without running the query again.

In a typical configuration, each report is run once initially and saved to create a place for it in the report list. That report is then replaced daily, weekly, or monthly (depending on the frequency specified in the report) when the report is run again with the batch reporting facility. For more information about running reports in batch, see Using other Reporting Dialog functions and refer to the *Administration Guide and Reference*.

To save reports to a file:

Procedure

1. From the Reports window, select the report to save.
2. Select option 4 **Save report data** from the Report pull-down.

   IBM Z Performance and Capacity Analytics displays the Saved Report Definition pop-up (Figure 11 on page 20).

```
                        Saved Report Definition

Type information.  Then press Enter to return.

Report ID  . . . . . CICSCMF01_________
Owner  . . . . . . . USER1___
Report description   CICS CMF Transaction Statistics____________________
Created by . . . . : USER1
Date created . . . : 2019-11-22
Member name  . . . . CE930316
Report format  . . . 1_  1.  Tabular
                         2.  Graphic

Attributes . . . . . CICS CMF WEEKLY_____________________________________  +
                     ________________________________________________  +
                     ________________________________________________  +

 F1=Help     F2=Split    F4=Prompt   F6=Remarks  F9=Swap    F12=Cancel
```

Figure 11. Saved Report Definition pop-up

3. Complete the entry fields as follows:

   Report ID
   A unique identifier for this report.

   Owner
   The owner (in IBM Z Performance and Capacity Analytics) of the report. You can specify your user ID to make this report private, or leave the field blank to make the report public.

   Report description
   A description of the report. This is the text that is displayed when listing reports.

   Member name
   The member of the data set in which the report is stored. You can use the Dialog Parameters pop-up, described in Customizing the reporting dialog, to find and change the name of the partitioned data set in which IBM Z Performance and Capacity Analytics stores saved reports.

   Report format
   The report is created as either a tabular (TABDATA) report or a graphic (GRAPHDATA) report. IBM Z Performance and Capacity Analytics uses fields in the Dialog Parameters pop-up to determine what data sets to store the reports in. The Saved reports data set field specifies where to store tabular reports, and the Saved charts data set field specifies where to store charts.

   Attributes
   One or more attributes that you want to assign to your report. You can use these attributes later to search for this report and categorize it with other reports that share the same attributes. If you press **F4** with the cursor on the Attributes field, IBM Z Performance and Capacity Analytics displays a list of all available report attributes, from which you can select one or more for your report. You can add new attributes simply by typing them in the Attributes field.

4. To associate some remarks with the report, press **Remarks (F6)**.

   IBM Z Performance and Capacity Analytics displays the Report Remarks pop-up. This pop-up contains blank lines on which you can enter your comments.

   Type your remarks, then press Enter to return to the Saved Report Definition pop-up.

5. When you have completed all of the fields in the Saved Report Definition pop-up, press Enter.

   IBM Z Performance and Capacity Analytics runs the query associated with the report you selected.

   If the query contains variables, you must specify their values before IBM Z Performance and Capacity Analytics can generate the report. See Specifying values for variables for more information.

Results

IBM Z Performance and Capacity Analytics saves the report data and returns to the Reports window. The report you just saved is displayed in the list under the name you specified in the Report description field in the Saved Report Definition pop-up. Its report type is either TABDATA or GRAPHDATA.

Printing a report

About this task

You can use the reporting dialog to print a report.

Note: If you are using the reporting dialog without QMF, you cannot print graphic reports directly with the print option. Graphic reports are printed in tabular format. You can, however, use GDDM to print saved graphic reports.

If you are using QMF with the reporting dialog, you can also print reports via QMF. Refer to the QMF documentation for more information about printing reports directly from QMF.

To print a report using the reporting dialog:

Procedure

1. From the Reports window, select the report.
2. Select option 6, Print, from the Report pull-down.

   If the query contains variables, the Data Selection pop-up is displayed.
3. You must specify values for variables before IBM Z Performance and Capacity Analytics can print the report.

   See Specifying values for variables for more information.

   After you have specified values for any variables, IBM Z Performance and Capacity Analytics runs the query.
4. When prompted, specify the report query output destination.
   a) If the report is a graphic report (that is, it has a chart format) and you are using the reporting dialog with QMF, IBM Z Performance and Capacity Analytics displays the Print Chart Options pop-up (Figure 12 on page 21). Type the nickname of the graphic printer defined in GDDM to which you want to route the report, and press Enter.

   For information about graphic printers defined in GDDM, refer to the *Administration Guide and Reference*.

```
          Print Chart Options

Type a printer name.  Then press Enter.

Printer name . . ________

F1=Help   F2=Split   F9=Swap   F12=Cancel
```

Figure 12. Print Chart Options pop-up

   b) If the report has a tabular format, IBM Z Performance and Capacity Analytics displays the Print Options pop-up (Figure 13 on page 21). Confirm a print action, specify an output destination (which can be a printer or a data set), and press Enter.

```
                            Print Options

Select output destination, type information.  Then press Enter to print.


Route print output to  . . . . 2_  1.  Printer
                                   2.  Data set

SYSOUT print class . . . . . . A

Print output data
set name  . . . . . USER1A.REPORTS(NEWREPRT)_______________________________


 F1=Help     F2=Split    F9=Swap    F12=Cancel
```

Figure 13. Print Options pop-up

IBM Z Performance and Capacity Analytics routes the output to the destination you specified.

5. You can also use these procedures to print reports saved in TABDATA format.
6. To print a saved graphic report (GRAPHDATA format), select the report to display, and press Enter.
   IBM Z Performance and Capacity Analytics invokes GDDM to display the chart.
   a) When GDDM displays the chart, press **F4**.
   b) GDDM displays a menu that contains a print option, which you can then use to print the chart.
      For more information about printing charts using GDDM, refer to the GDDM documentation.

Printing a list of reports

About this task

To print the list of reports in the IBM Z Performance and Capacity Analytics Reports window:

Procedure

1. In the Reports window, select option 7 **Print list** from the **Report** pull-down.

   IBM Z Performance and Capacity Analytics displays the Print Options pop-up (Figure 13 on page 21).
2. Confirm the print action, specify an output destination (a printer or a data set), and press Enter.

   IBM Z Performance and Capacity Analytics prints the list of reports to the data set or printer you specified.

Deleting a report

About this task

If you no longer need a private report or a public report that you created, you can delete it. When you delete a report, IBM Z Performance and Capacity Analytics removes all references to the report in the dialog. If the query, form and any attributes associated with the report are unique to that report, IBM Z Performance and Capacity Analytics deletes those also. If another report uses the query, form, and attributes, IBM Z Performance and Capacity Analytics does not delete them. To delete a report:

Procedure

1. From the Reports window, select the report.
2. Select option 5 **Delete** from the **Report** pull-down.

   IBM Z Performance and Capacity Analytics displays a pop-up for you to confirm the deletion.
3. Press Enter to delete the report.

   IBM Z Performance and Capacity Analytics deletes the query, form, and attributes (unless another report refers to them), and removes the report ID from the list of available reports.

Opening a report definition

You can modify an IBM Z Performance and Capacity Analytics report. You can change the query and form associated with the report, and the report attributes that help identify the report.

Note: You can modify only your private reports and any public reports that you created. If you must modify a public report that you did not create, create a new report using the public report as a template, and then modify the new report. See Using an existing report as a template for a new report for more information.

There are two versions of the Report Definition pop-up. One is shown if you use QMF with the reporting dialog; the other one if you are using the built-in report generator. They are described in Opening a report definition when QMF is used or Opening a report definition when the built-in report generator is used.

Opening a report definition when QMF is used

About this task

To modify a report definition:

Procedure

1. From the Reports window, select the report.
2. Select option 2 **Open report definition** from the Report pull-down.

   IBM Z Performance and Capacity Analytics displays the Report Definition pop-up for the report you selected, (Figure 14 on page 23).

```
                          Report Definition

Type information.  Then press Enter to save and return.

Report ID  . . . . : CICS807_
Owner  . . . . . . . ________  (blank for public report)
Report description   CICS Transaction Usage_____________________________

Created by . . . . : USER1
Date created . . . : 2019-08-29

Query name . . . . . DRLQC807  (leave blank if same as report ID)

Form name. . . . . . DRLQF807
Chart format . . . . _________

Attributes . . . . . STATISTICS CICS ESA 3.3 TRANSACTIONS_____________  +
                     ____________________________________________________  +
                     ____________________________________________________  +

 F1=Help        F2=Split       F4=Prompt      F5=Query/Fm    F6=Remarks
 F9=Swap       F10=Header     F11=Batch      F12=Cancel
```

   Figure 14. Report Definition pop-up when QMF is used

3. Type information in the fields you want to modify. This pop-up contains these fields:

   Report ID
   Identifies the report.

   Owner
   Identifies the owner (in IBM Z Performance and Capacity Analytics) of the report. This can be either your user ID (for a private report) or blank (for a public report).

   Report description
   Describes the report.

   Query name
   Identifies the name of the query associated with the report.

   Form name
   Identifies the name of the QMF form associated with the report.

   Chart format
   Identifies the name of the GDDM/ICU chart format associated with the report. If there is a chart format associated with the report, then the report is graphic; otherwise this field is blank, and the report is tabular.

   The format name can be a chart format that you have saved in GDDM/ICU, or one of these GDDM/ICU formats: bar, histogram, line, pie, polar, tower, surface, or table.

   Attributes
   Lists the attributes associated with this report. You can use these attributes to help you search for and organize groups of reports. After putting the cursor in one of the Attributes fields, press **Prompt (F4)** to see which values IBM Z Performance and Capacity Analytics allows there.

4. To change the query or form, press **Query/Fm (F5)**.

IBM Z Performance and Capacity Analytics invokes QMF, where you can modify the query or form. See Using QMF to create new queries for more information about working with QMF.

5. To edit remarks about the report, press **Remarks (F6)**.

   IBM Z Performance and Capacity Analytics displays the Report Remarks pop-up. After you have typed your remarks, press Enter to return to the Report Definition pop-up.

6. When you have finished modifying the report definition, press Enter.

   If you have made changes to the query or form, QMF prompts you to confirm that you want to replace the existing query.

Opening a report definition when the built-in report generator is used

About this task

This applies when you use IBM Z Performance and Capacity Analytics without QMF.

Some of the IBM Z Performance and Capacity Analytics predefined reports have one column more on the form than in the query. If you modify the form or the owner of any of the following reports using the built-in report generator, you must remove the extra column from the form:

DB209, DFSMS05, DFSMS06, DFSMS07, DFSMS13, NWSM02, NWSM09, NWSM10, NWSM11, NWSM17, NWSM18.

To modify a report definition:

Procedure

1. From the Reports window, select the report.
2. Select option 2 **Open report definition** from the Report pull-down.

   IBM Z Performance and Capacity Analytics displays the Report Definition pop-up for the report you selected. (Figure 15 on page 24).

```
                          Report Definition

Type information.  Then press Enter to save and return.

Report ID  . . . . . : MVSPM24
Owner  . . . . . . . _________  (blank for public report)
Report description   MVSPM System Resources by Workload Types__________

Created by . . . . : USER1
Date created . . . : 2019-08-29

Chart format . . . . DRLGMP24_

Attributes . . . . . MVS PERFORMANCE RMF CPU WORKLOAD STORAGE I/O______  +
                     SYSPLEX_____________________________________________  +
                     _____________________________________________________  +


 F1=Help        F2=Split       F4=Prompt      F5=Query/Fm    F6=Remarks
 F9=Swap       F10=Header     F11=Batch      F12=Cancel
```

Figure 15. Report Definition pop-up when QMF is not used

3. Type information in the fields you want to modify. This pop-up contains these fields:

   Report ID
   Identifies the report.

   Owner
   Identifies the owner (in IBM Z Performance and Capacity Analytics) of the report. This can be either your user ID (for a private report) or blank (for a public report).

   Report description
   Describes the report.

Chart format
Identifies the name of the GDDM/ICU chart format associated with the report. If there is a chart format associated with the report, then the report is graphic; otherwise this field is blank, and the report is tabular.

The format name can be a chart format that you have saved in GDDM/ICU, or one of these GDDM/ICU formats: bar, histogram, line, pie, polar, tower, surface, or table.

Attributes
Lists the attributes associated with this report. You can use these attributes to help you search for and organize groups of reports. After putting the cursor in one of the Attributes fields, press **Prompt (F4)** to see which values IBM Z Performance and Capacity Analytics allows there.

4. To change the query or form, press **Query/Fm (F5)**.

   A dialog lets you modify the query or form. For information about how to change the form, see Modifying the form for a report.
5. To edit remarks about the report, press **Remarks (F6)**.

   IBM Z Performance and Capacity Analytics displays the Report Remarks pop-up. After you have typed your remarks, press Enter to return to the Report Definition pop-up.
6. To add header or footer lines to the report, press **Header (F10)**.

   See Adding page headers and footers to a report for information about using the Report Headers and Footers window.
7. When you have finished modifying the report definition, press Enter.

Opening the definition of saved report data

About this task

You can make some modifications to the definitions of saved report data.

Note: You can modify your private saved reports and those public reports that you created. If you must modify a public report that you did not create, create a new report using the public report as a template, run the report and save the data, and modify the new saved report definition. See Using an existing report as a template for a new report for more information.

To modify the definition for saved report data:

Procedure

1. From the Reports window, select the saved report. Saved report data files have a file type of TABDATA or GRAPHDATA.
2. Select option 4 **Save report data** from the Report pull-down.

   IBM Z Performance and Capacity Analytics displays the Saved Report Definition pop-up (Figure 16 on page 26).

```
                        Saved Report Definition

Type information.  Then press Enter to return.

Report ID  . . . . . CICSCMF01
Owner  . . . . . . . USER1___
Report description   CICS CMF Transaction Statistics_____________________
Created by . . . . : USER1
Date created . . . : 2019-11-22
Member name  . . . . CE930316
Report format  . . . 1   1.  Tabular
                         2.  Graphic

Attributes . . . . . CICS CMF WEEKLY_____________________________________  +
                     ________________________________________________  +
                     ________________________________________________  +


 F1=Help     F2=Split    F4=Prompt   F6=Remarks  F9=Swap    F12=Cancel
```

Figure 16. Saved Report Definition pop-up

3. Type information in the fields you want to modify, which can include only the Owner, Description, and Attribute fields.

   Saving report data describes these fields.

4. To edit remarks about the report, press **Remarks (F6)**.

   IBM Z Performance and Capacity Analytics displays the Report Remarks pop-up. After you have typed your remarks, press Enter to return to the Saved Report Definition pop-up.

5. When you have finished modifying the saved report definition, press Enter.

   IBM Z Performance and Capacity Analytics saves changes to the saved report definition and returns to the Reports window.

Chapter 4. Working with report groups

This chapter explains how to manipulate report groups. After reading this chapter, you should be familiar with these tasks:

- Listing report groups
- Displaying the contents of a report group
- Viewing and modifying a report group definition
- Adding a report to a group
- Creating a report group
- Deleting a report group

Listing report groups

About this task

You can display a list of all available report groups.

Procedure

To display a list of report groups, press **F4** from the Reports window.

IBM Z Performance and Capacity Analytics displays the Report Groups pop-up (Figure 17 on page 27).

```
                          Report Groups               Row 1 to 4 of 4

Select a report group.  Then press Enter to display.

/   Group                                             Owner
_   CICS group                                        USER1
_   Db2 and other reports
_   My special reports
_   Selected IMS reports                              USER1
*************************** Bottom of data ****************************


Command ===> ____________________________________________________________
 F1=Help     F2=Split    F5=Def      F7=Bkwd     F8=Fwd      F9=Swap
F11=Delete  F12=Cancel
```

Figure 17. Report Groups pop-up

Displaying the contents of a report group

Procedure

1. To display the contents of a report group, select the report group and press Enter.

   IBM Z Performance and Capacity Analytics returns to the Reports window and lists the reports in the report group you selected.
2. To display the complete list of reports again, select option 1 **Show all reports** from the Search pull-down.

Viewing and modifying a report group definition

About this task

You can change the definition of an IBM Z Performance and Capacity Analytics report group. You can also add reports to a report group or delete reports from a report group.

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A single report can belong to several groups. When you add a report to a group, IBM Z Performance and Capacity Analytics does not make a copy of the report, but adds only a reference to the report to the group. When you delete a report from a group, you do not delete the report itself, but only its reference in the group.

If you use several reports more frequently than others, you can add these reports to a new group.

To select and display the report group to modify:

Procedure

1. From the Reports window, press **F4** (Groups).

   IBM Z Performance and Capacity Analytics displays the Report Groups pop-up.
2. From the Report Groups pop-up, select the report group and press F5.

   IBM Z Performance and Capacity Analytics displays the Report Group Definition pop-up for the report group (Figure 18 on page 28).

```
                DFSMS Daily Report Group Definition         Row 1 to 3 of 3

 Modify the fields if required.  Then press Enter to save and return.

 Description  . . . . DFAMS daily trend reports
 Owner  . . . . . . . ________  (blank for public group)

 Created by . . . . : USER1
 Date created . . . : 2019-08-29

 Included reports

 /   Description                                          Owner
 _   DFSMS Total DASD Usage, Daily Trend
 _   DFSMS Active/Migrat/Backup Storage, Daily Trend
 _   DFSMS Allocated/Used/Unused Storage, Daily Trend
***************************** Bottom of data ******************************

 Command ===> ____________________________________________________________
  F1=Help     F2=Split    F5=Add      F7=Bkwd     F8=Fwd      F9=Swap
 F11=Delete  F12=Cancel
```

Figure 18. Report Group Definition pop-up

3. From the Report Group Definition pop-up, you can change the report group definition, add reports to the group, and delete reports from the group.

   The procedures for doing these tasks are described in the sections that follow:

   - “Changing the report group definition” on page 28
   - “Adding a report to the group” on page 29
   - “Deleting a report from the group” on page 29
4. When you finish changing the report group definition, press Enter.

   IBM Z Performance and Capacity Analytics saves the changes you made and returns to the Report Groups pop-up.

Changing the report group definition

Procedure

1. To change the report group definition from the Report Group Definition pop-up, type changes to the report group definition in the appropriate fields. You can change the description and the report group owner.
2. When you finish making changes, press Enter to save the changes.

Adding a report to the group

Procedure

1. To add a report to the group displayed in the Report Group Definition pop-up, press **F5**.

   IBM Z Performance and Capacity Analytics displays the Add Report to Group pop-up.
2. In the appropriate fields, type the ID and owner of the report. You can press **F4** to see a list of available report IDs.
3. After you complete the fields in the pop-up, press Enter to add the report.

   IBM Z Performance and Capacity Analytics adds the report to the report group and returns to the Report Group Definition pop-up.

Deleting a report from the group

Procedure

1. To delete a report from the group displayed in the Report Group Definition pop-up, select the report and press **F11**.

   IBM Z Performance and Capacity Analytics displays the Confirmation pop-up.
2. Press Enter to confirm the deletion and return to the Report Group Definition pop-up.

   Note that this does not delete the actual report, but only its place in the report group.

Creating a report group

About this task

When you install a component on your system, the predefined reports included with the component are stored in predefined groups. However, you may want to create new report groups. For example, you may want to store your private or weekly reports in one group.

To save selected reports in a group:

Procedure

1. From the Reports window (Figure 8 on page 15), select the reports you want to save in a group, then from the Group menu, select option 1 **Save selected reports as a group**.

   IBM Z Performance and Capacity Analytics displays the Report Group Definition pop-up (Figure 19 on page 29).

```
                        Report Group Definition

Type in information.  Then press Enter to save and return.

ID . . . . . . . . . _________________
Owner  . . . . . . . ________  (blank for public group)
Description  . . . . ________________________________________________


 F1=Help     F2=Split    F9=Swap    F12=Cancel
```

   Figure 19. Report Group Definition pop-up, creating a report group
2. Specify the group ID, group owner, and a brief description in the fields.

   The report group can be either public or private:

   - To create a public group, leave the Owner field blank.
   - To create a private group, type your user ID in the Owner field.
3. When the specification is complete, press Enter.

   IBM Z Performance and Capacity Analytics saves the report group and returns to the Reports window.

4. From the Reports window, you can now press **F4** for the Report Groups pop-up, then select the new report group from the list. SeeFigure 17 on page 27.

Deleting a report group

About this task

You can delete your private report groups or the public report groups you have created. This action deletes only the report group definition, and not the reports referenced in the group.

Procedure

1. To delete a report group, select the report group you want to delete from the list displayed on the Report Groups pop-up and press **F11**.

   IBM Z Performance and Capacity Analytics displays the Confirmation pop-up.
2. Press Enter to confirm the deletion and return to the Report Groups pop-up.

Chapter 5. Searching for reports

This chapter explains how to search for reports. After reading this chapter, you should be familiar with these tasks:

- Searching by report description and attributes
- Saving search criteria
- Listing, modifying, and deleting saved search criteria

Searching by description and attributes

About this task

IBM Z Performance and Capacity Analytics can display a list of reports that satisfy search criteria that you specify. These search criteria include the description (or part of the description) of a report, attributes associated with the report, whether the report is a query or saved data, and whether the report is public or private.

Procedure

1. To specify search criteria to search for reports, press **F5** from the Reports window.

   IBM Z Performance and Capacity Analytics displays the Search for Reports pop-up (Figure 20 on page 31).

```
                          Search for Reports

Type in the search criteria.  Then press Enter to execute.

Report description ___________________________________________________

Attributes . . . . ___________________________________________________  +
 or  . . . . . . . ___________________________________________________  +
 or  . . . . . . . ___________________________________________________  +

Report type  . . . 1_  1.  All reports
                       2.  Queries
                       3.  Saved reports

Report owner . . . 1_  1.  All reports
                       2.  Public reports
                       3.  Private reports

 F1=Help     F2=Split    F4=Prompt   F9=Swap    F12=Cancel
```

   Figure 20. Search for Reports pop-up

2. Use the fields in the pop-up to specify criteria for the report description, attributes, type, and owner.

   You can specify values for one or more of these fields, in any combination, to narrow the search for the reports to display.

3. When you have specified all of your search criteria in the Search for Reports pop-up, press Enter.

   IBM Z Performance and Capacity Analytics returns to the Reports window and lists the reports that meet the description you specified.

4. You can save the search criteria that you specified. See Saving search criteria for more information.

Searching by report description

To specify criteria for the report description, type all or part of the report description in the Report description field. You can use global search characters to search for all reports whose titles contain a particular string of text. Substitute global search characters for actual characters when you are unsure of how a word is spelled in the report titles, or when you want to search for report titles that contain the same word in different forms (such as abbreviations).

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For example, to search for all reports that contain the word *migration* (which is sometimes abbreviated to migrat), type `*migrat*` in the Report description field. The first asterisk (*) takes the place of all words in the report description before migrat. The second asterisk takes the place of all letters in the word after migrat and any following words in the report description. Other global search characters include the percent (%) symbol (which works the same as the asterisk), and the question mark (?) and underscore (_), both of which can replace a single character in a string of text (instead of multiple characters).

Note: If you use underscores as global search characters, you must enclose the search argument (in this case, the report description) in single quotes.

Searching by report attributes

To specify criteria for report attributes, specify the attributes that are common to the reports you are searching for. For example, to search for all CICS reports that are monthly, type `cics monthly` on one line of the Attributes field.

Attributes typed on the same line are connected by a logical AND operator; attributes typed on separate lines are connected a logical OR operator. For example, if you specify `cics overview` on one line of the Attributes field, and `cics trend` on another line, then IBM Z Performance and Capacity Analytics displays all CICS reports that are either overviews or trends.

To see a list of attributes, move the cursor to a line of the Attributes field and press **F4**. IBM Z Performance and Capacity Analytics displays a list of all valid attributes, from which you can select one or more for your search criteria. When you select more than one attribute from the list, IBM Z Performance and Capacity Analytics places these attributes on a single line of the Attributes field (thus linking them with a logical AND operator).

Searching by report type

To narrow the search by including only report queries or only saved report data, type the appropriate number in the Report type field. The default is all types of reports.

To narrow the search by including only public reports or only private reports, type the appropriate number in the Report owner field. The default is all reports to which you have access.

Saving search criteria

About this task

You can save the criteria you use to search for reports. You can then specify the search criteria again later, without having to retype values for the criteria fields.

To save the search criteria:

Procedure

1. Search for reports that meet the criteria that you specify.

   See Searching by description and attributes for more information.

   IBM Z Performance and Capacity Analytics displays the Reports window listing the reports that meet the search criteria you specified.
2. From the **Search** pull-down, select option 4 **Save current search criteria**.

   IBM Z Performance and Capacity Analytics displays the Save Search Criteria pop-up.
3. Specify a name for the search criteria, the owner, and a brief description.

   Name
   This value is used to identify the search criteria in the Saved Search Definition pop-up, and must not contain any blanks or special characters.

   Owner
   The search criteria can be either public or private:

- If you want this search criteria to be public, leave the Owner field blank.
- If you want this search criteria to be private, type your user ID in the Owner field.

Description
A brief description of the search criteria.

4. When the specification is complete, press Enter.

   IBM Z Performance and Capacity Analytics saves the search criteria using the name you specified and returns to the Reports window.
5. You can now select this search criteria in the future without having to specify search criteria on the Search for Reports pop-up, as described in the following section.

Listing, modifying, and deleting saved search criteria

About this task

You can display a list of search criteria saved from previous searches. From this list, you can select a saved criteria to run, modify, or delete.

Procedure

1. To list the saved search criteria: press **F6** from the Reports window.

   IBM Z Performance and Capacity Analytics displays the Search Criteria List pop-up (Figure 21 on page 33), which lists all of the previously saved search criteria.

```
                  Seach Criteria List                  Row 1 to 4 of 4

 Select a search criteria. Then press Enter to display.

 /   Search Criteria                                    Owner
 _   CICS exception reports                             USER1
 _   CICS performance reports
 _   Db2 performance management reports                 USER1
 _   IMS performance management reports
*************************** Bottom of data ***************************

 Command ===> ____________________________________________________________
  F1=Help     F2=Split    F5=Def     F7=Bkwd     F8=Fwd      F9=Swap
 F11=Delete  F12=Cancel
```

Figure 21. Search Criteria List pop-up

2. From this list, you can select saved criteria to use for your search. Select the criteria by typing a slash or any other character next to its name, and pressing Enter.

   IBM Z Performance and Capacity Analytics displays the list of reports that meet the search criteria.
3. You can view, modify, and delete the saved search criteria, as described in the following sections.

Viewing and modifying saved search criteria

Procedure

1. To view or modify a search criteria definition, select the saved search criteria from the Search Criteria List pop-up and press **F5**.

   IBM Z Performance and Capacity Analytics displays the Search Criteria Definition pop-up for the search criteria (Figure 22 on page 34).

```
                  CICSTRENDS Search Criteria Definition

Modify the fields if required. Then press Enter to save and return.

Description. . . . . CICS trends and overviews
Owner. . . . . ________
Created by . . . . . : USERID1
Date created . . . . : 2019-08-29
Report description . . ____________________________________________
Search attributes. . . CICS TREND_________________________________  +
 or. . . . . CICS OVERVIEW_____________________________________  +
 or. . . . . ____________________________________________  +

Report type  . . . 1_  1.  All reports
                       2.  Queries
                       3.  Saved reports

Report owner . . . 1_  1.  All reports
                       2.  Public reports
                       3.  Private reports

 F1=Help     F2=Split     F4=Prompt     F9=Swap     F12=Cancel
```

Figure 22. Search Criteria Definition pop-up

2. The fields in this pop-up follow the same conventions as the fields in the Search for reports pop-up, described in Searching by description and attributes. You can change these fields only if the saved search criteria is private, or if it is public and you created it.
3. When you have finished viewing or modifying the search criteria, press Enter.

   IBM Z Performance and Capacity Analytics returns to the Saved Criteria List pop-up.

Deleting saved search criteria

Procedure

1. To delete a saved search criteria from the list, select the search criteria to delete from the Search Criteria List pop-up and press **F11**.

   IBM Z Performance and Capacity Analytics displays the Confirmation pop-up.
2. From the Confirmation pop-up, press Enter to confirm the deletion.

   IBM Z Performance and Capacity Analytics deletes the search criteria you specified and returns to the Search Criteria List pop-up.

Chapter 6. Creating a new report using QMF

The IBM Z Performance and Capacity Analytics components installed on your system contain several predefined reports. Although these reports present the information in the IBM Z Performance and Capacity Analytics database in several useful ways, you might have a specific need for which you must create your own report. This chapter explains how to create a new report.

Note: Reports can be created using the reporting dialog's built-in report generator or QMF, if your installation uses QMF with IBM Z Performance and Capacity Analytics. This chapter describes how to create reports using QMF. For information on how to create reports using the built-in report generator, refer to Creating a new report with the report generator.

After reading this chapter, you should be familiar with these tasks:

- Using QMF to create new queries
- Using an existing report as a template for a new report
- Creating a query for a new report
- Modifying a form for a new report
- Saving a new report definition

Using QMF to create new queries

IBM Z Performance and Capacity Analytics works with QMF to provide these ways for you to specify report queries:

- If you are not familiar with SQL, you can use QMF's prompted query language that lets you build a query by selecting choices in a menu-driven interface.
- If you are familiar with SQL, you can use QMF to build an SQL query.

The queries in the reports provided with IBM Z Performance and Capacity Analytics are written in SQL, so you must be familiar with SQL if you want to use them as a base for a new report.

Using an existing report as a template for a new report

About this task

The quickest way to create a new report is to base its query and form on an existing report that is similar to the report you need. Using an existing report as a template, you can use the reporting dialog to create a new report.

To create a report using an existing report as a template:

Procedure

1. From the Reports window, select the report you want to use as a template, then from the Reports menu, select option 1 **New**.

   IBM Z Performance and Capacity Analytics invokes QMF, which displays the SQL for the query associated with the report selected as a template. Figure 23 on page 36 is an example of an SQL query.

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```
SQL QUERY        DRL.DRLQC807

SELECT TRANSACTION_ID,
       PROGRAM_NAME,
       SUM(TRANSACTIONS),
       SUM(RESTARTS),
       SUM(DYNAMIC_ROUTING_L),
       SUM(DYNAMIC_ROUTING_R),
       SUM(STORAGE_VIOLATIONS)
  FROM &PREFIX CICS_S_TRAN_D
  WHERE (MVS_SYSTEM_ID=&MVS_SYSTEM_ID AND
         CICS_SYSTEM_ID=&CICS_SYSTEM_ID AND
         DATE >= &FROM_DATE AND DATE <= &TO_DATE)
  GROUP BY TRANSACTION_ID, PROGRAM_NAME
  ORDER BY 3 DESC
*** END ***


1=Help        2=Run         3=End       4=Print       5=Chart       6=Draw
7=Backward    8=Forward     9=Form     10=Insert     11=Delete     12=Report
```

Figure 23. Sample SQL query in QMF

2. Edit the SQL query using QMF.

   If you do not want to change the query, but just want to change the form, see the notes at the end of this section.
3. When you have finished editing the query, you can take one of the following actions:
   - Edit the form of the report (described in Modifying the form for a new report).
   - Exit QMF by pressing F3. IBM Z Performance and Capacity Analytics displays the Report Definition pop-up.

     You need not save the report query or form using the QMF SAVE command before exiting QMF. IBM Z Performance and Capacity Analytics saves the query and form automatically after you return to the reporting dialog and complete the Report Definition pop-up. Saving the definition of a new report describes how to save the definition of your new report.

What to do next

Note: When using existing reports as templates:

1. If you have changed the query, form, or chart format of the template report in QMF, you must change the names of these fields in the Report Definition window when you are saving the report. Otherwise, QMF attempts to overwrite the existing data set members. Also, you must change the Report description field so that your new report has a description different from that of the template report.
2. You can change the template form without changing the query. When QMF displays the query of the report you selected, press **Form (F9)**. QMF displays the Form window, from which you can edit the form. (See Editing the form for information about editing the form.) When you finish changing the form, press **Exit (F3)** to return to IBM Z Performance and Capacity Analytics. After you complete the Report Definition pop-up, the report is saved with the new form and the unchanged query.
3. If the query you use as a template is an SQL query (as all queries supplied with features are), then this method of creating a report requires you to edit the SQL query in QMF. Although this method is quicker because you can alter an existing query to fit your requirements instead of creating a new query, it requires some knowledge of SQL. Creating a query for a new report describes the QMF prompted query language, which is a more intuitive method of creating a query that does not require knowledge of SQL.
4. When you use an existing report as a template for a query, QMF picks up the form associated with the report. However, depending on how you modify the query (for example, if you change the number of columns), the form might not be usable. If you press **Run (F2)** to run the query in QMF, QMF resets the form to a default format.

   To use the form associated with the template report, you must either:
   - Run the query using the QMF RUN command and specify the name of the form. To learn the name of the form, press the Form function key in QMF to go to the Form window. The name of the form is displayed at the top of the window. The QMF RUN command uses this format:

```
RUN QUERY (FORM=formname
```

where *formname* is the name of the QMF form. When you use this command, QMF runs the current query and displays the results using the form you specify.

- Exit QMF (by pressing the End function key) without running the query. IBM Z Performance and Capacity Analytics displays the Report Definition pop-up. After you complete this pop-up, the report is saved with the new query and the unchanged form. You can then use IBM Z Performance and Capacity Analytics to display the report.

Creating a query for a new report

About this task

IBM Z Performance and Capacity Analytics reports are defined using QMF. When you display a report, IBM Z Performance and Capacity Analytics runs the QMF query associated with that report. When you create a report, you must create a new QMF query and, optionally, a new QMF form for the report.

To create a QMF query for a new report:

Procedure

1. From the Reports window, select option 1 **New**.
   QMF displays the Prompted Query Tables pop-up (Figure 24 on page 37).

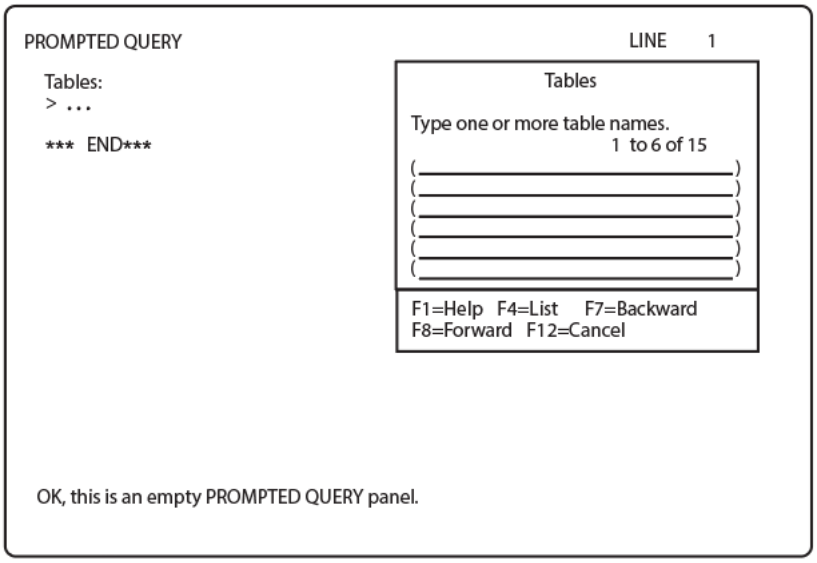

Figure 24. QMF Prompted Query Tables pop-up

2. To see a list of available tables, press **F4**.
   QMF displays the Table List pop-up (Figure 25 on page 38).

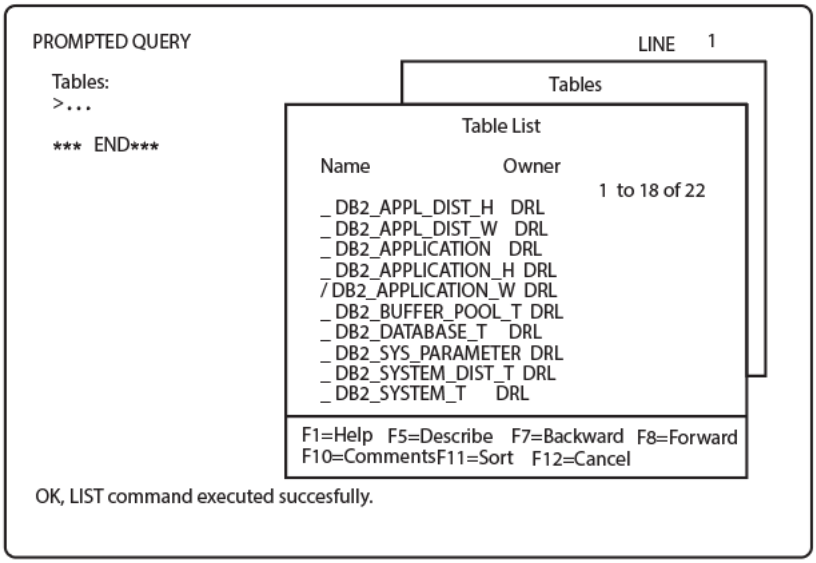

Figure 25. Table List pop-up

3. Select a table from the list, and press Enter.

   QMF returns to the Prompted Query Tables pop-up and displays the name of the table you selected.
4. Press Enter again to insert the table name into the query.

   IBM Z Performance and Capacity Analytics displays the Prompted Query Specify pop-up (Figure 26 on page 38).

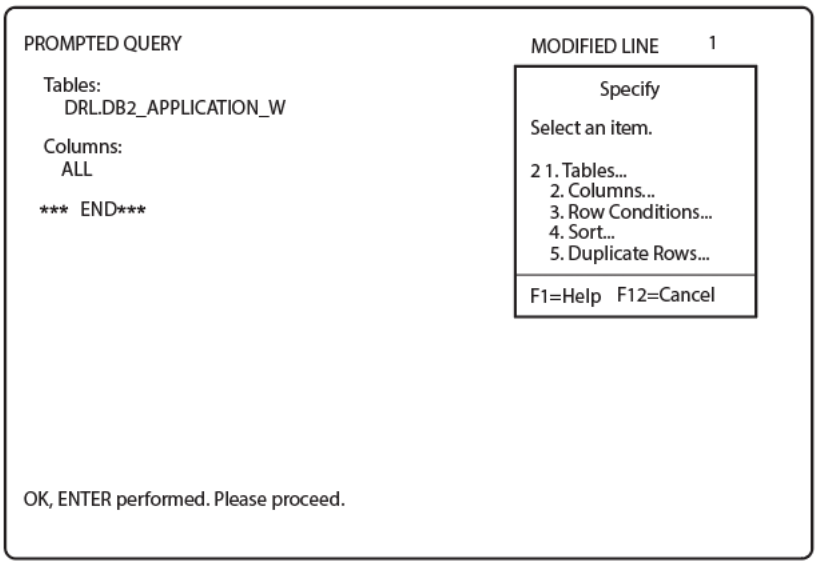

Figure 26. Prompted Query Specify pop-up

5. From the Specify pop-up, select option 2 **Columns**.

   QMF displays the Prompted Query Columns pop-up (Figure 27 on page 39).

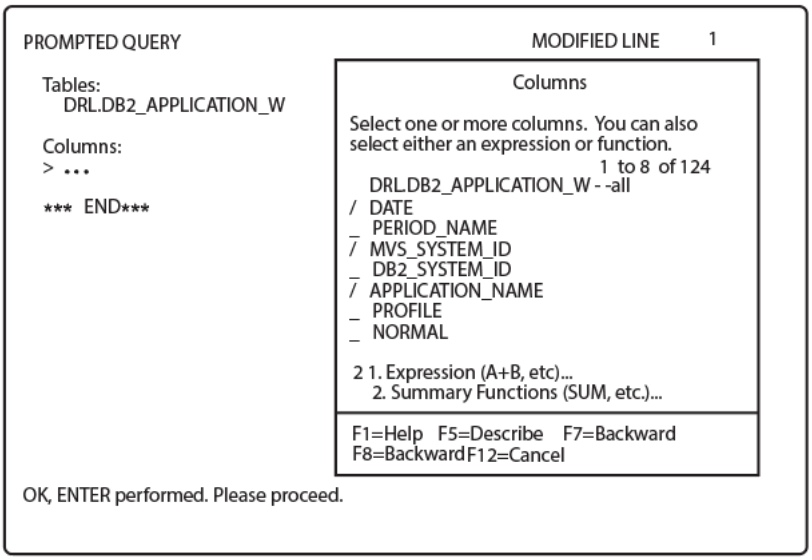

Figure 27. Prompted Query Columns pop-up

6. Select one or more columns from the pop-up. To include summary functions in the query, select option 2 **Summary Functions** at the bottom of the pop-up, then press Enter.

   QMF inserts the columns you selected into the query and displays the Summary Functions pop-up (Figure 28 on page 39).

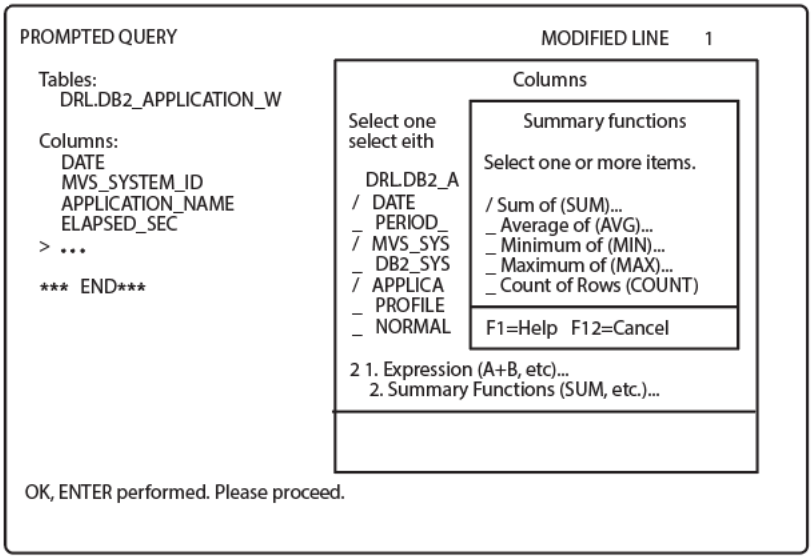

Figure 28. Summary Functions pop-up

7. If you are including summary functions in your query, select the type of function you want from the Summary Functions pop-up.

   QMF displays the Summary Function Items pop-up (Figure 29 on page 40).

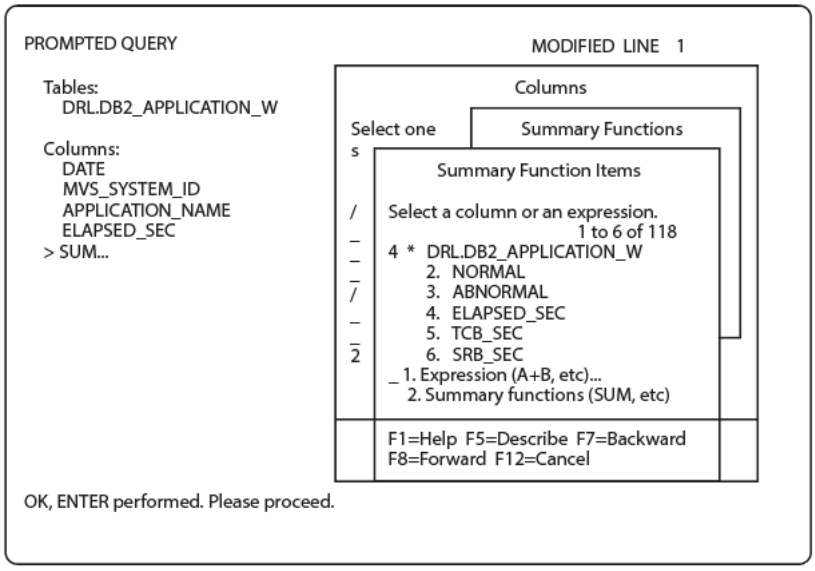

Figure 29. Summary Function Items pop-up

8. Select a summary function from the list and press Enter.

   QMF inserts the summary function you selected into the query and returns to the Prompted Query Specify pop-up.

9. Select option 3 **Row conditions** to specify row conditions.

   QMF displays the Row Conditions pop-up.

10. Follow the screens to specify row conditions, comparison operators, and condition connectors.

    You can include variables in place of actual values in your query. This lets you use the same query to produce several reports. In QMF, variables begin with an ampersand (&) and are no longer than 17 characters. By default, a variable is not required. To make a variable required, in the query use the operator less than (<) or greater than (>), or in the WHERE clause specify as the value an expression rather than a variable.

    For more information about how to specify variables in QMF, refer to the *Query Management Facility: Reference* or the QMF online help.

    When you have finished, QMF inserts the row condition you specified into the query and returns to the Prompted Query Specify pop-up (Figure 30 on page 41).

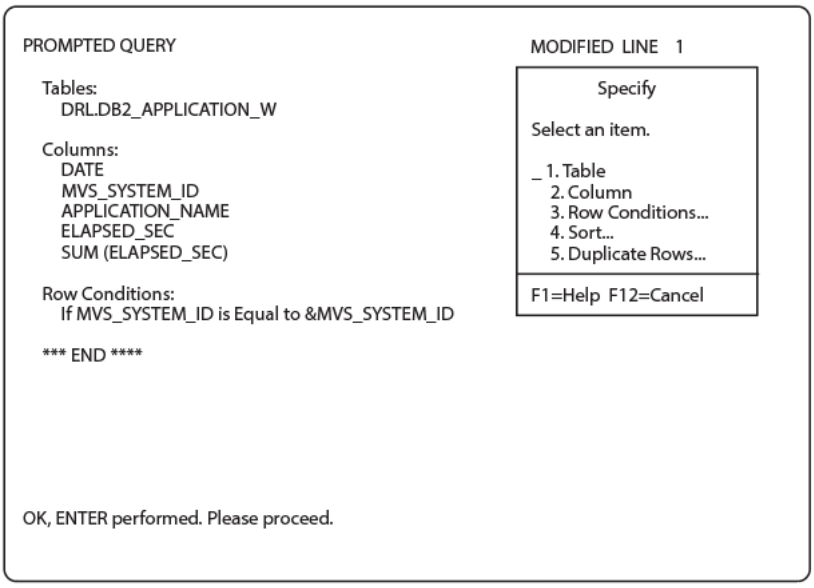

Figure 30. Row condition inserted in the query

You can further refine your query by specifying a sort order and whether to display duplicate rows. For more information about these options, refer to *Query Management Facility: Reference* or the QMF online help. When you finish making changes to the prompted query, press **F12** to leave the Specify pop-up.

11. To see the SQL statement that QMF generates from your prompted query, press **F4**.

    QMF displays the SQL pop-up that contains the SQL statement equivalent to your query (Figure 31 on page 41).

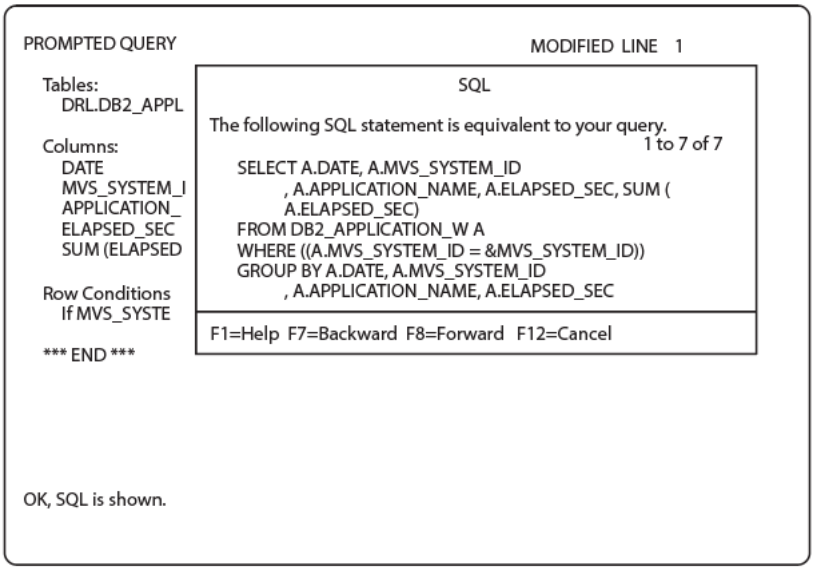

Figure 31. QMF Prompted Query SQL pop-up

12. Press **Cancel (F12)** to leave the pop-up.
13. Type RUN QUERY or press **Run (F2)** to run the query from QMF.

    If you have variables defined in your query, QMF displays the RUN Command Prompt pop-up so that you can provide values for them (Figure 32 on page 42).

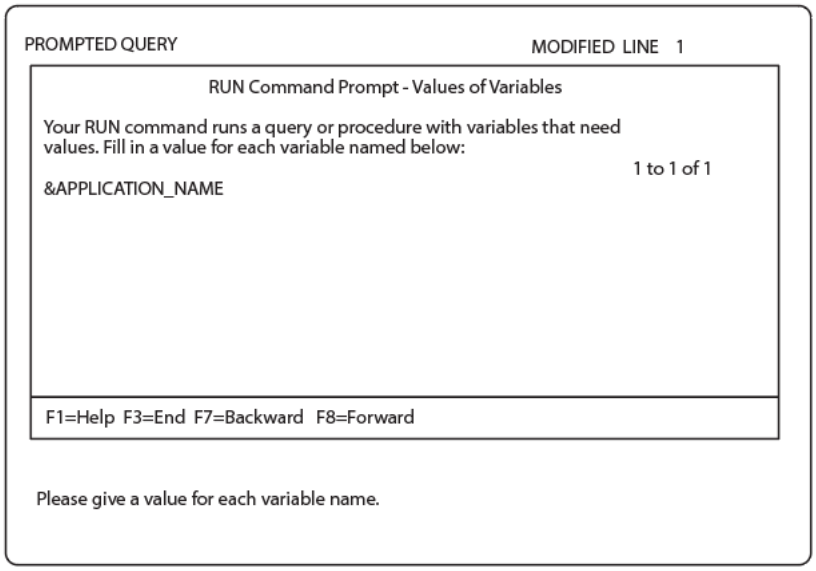

Figure 32. QMF RUN Command Prompt pop-up

14. Specify values for each variable name, then press Enter.

    The procedure for specifying variables in QMF differs from the procedure for specifying variables in IBM Z Performance and Capacity Analytics. QMF does not provide prompted fields nor does it display an operator to indicate how the variable is applied to the query. Also, QMF requires that you delimit text values with single quotes, where IBM Z Performance and Capacity Analytics automatically inserts them when necessary. (See Specifying values for variables for more information about specifying variables in IBM Z Performance and Capacity Analytics.)
15. When specification of values for the variables is complete, press Enter.

    QMF runs the query and displays your report.
16. From the window in which your report is displayed, press **Exit (F3)**.

    IBM Z Performance and Capacity Analytics exits QMF and displays the Report Definition pop-up, which you can complete by following the instructions in Saving the definition of a new report.

    Note: You need not save the report query or form using the QMF SAVE command before exiting QMF. IBM Z Performance and Capacity Analytics saves the query and form automatically after you complete the Report Definition pop-up.

Modifying the form for a new report

About this task

You can use QMF to create reports from data stored in the database. After you retrieve data by running a query or displaying a table or view, QMF formats it into a report and displays the report.

If you do not specify a form when you select the data, the report format is based on a default form comprised of values assigned by QMF. You can change the format of your report by changing the values on the form.

Procedure

To display the form and modify its values, either:

- Press **Form (F9)**.
- Type **SHOW FORM** on the command line and press Enter.

A main form window is displayed (Figure 33 on page 43).

```
FORM.MAIN

COLUMNS:             Total Width of Report Columns: 34
 NUM  COLUMN HEADING                    USAGE   INDENT  WIDTH  EDIT  SEQ
 ---  --------------------------------  ------  ------  -----  ----  ---
   1  DATE                                      2       10     TDY-  1
   2  APPLICATION_NAME                          2       12     C     2
   3  ELAPSED_SEC                        SUM    2       12     E     3
      *** END ***


PAGE:     HEADING  ===> MVS System: &MVS_SYSTEM_ID
          FOOTING  ===> &PRODUCT_NAME:  &REPORT_ID
FINAL:    TEXT     ===>
BREAK1:   NEW PAGE FOR BREAK?  ===> NO
          FOOTING  ===>
BREAK2:   NEW PAGE FOR BREAK?  ===> NO
          FOOTING  ===>
OPTIONS:  OUTLINE? ===> YES                DEFAULT BREAK TEXT? ===> YES

1=Help        2=Check     3=End    4=Show       5=Chart     6=Query
7=Backward    8=Forward   9=      10=Insert    11=Delete   12=Report
OK, FORM is displayed.
COMMAND ===> ________________________________________  SCROLL ===> PAGE
```

Figure 33. A sample main form window

Editing the form

To change the definition of the form, edit the fields in the main form window by doing any of the following actions:

- Type over the previous values and press Enter.
- Insert a column by placing the cursor in the column above the insert location and pressing **Insert (F10)**.
- Delete a column by placing the cursor in that column and pressing **Delete (F11)**.

Note: The Insert and Delete functions are valid only for the column data fields.

Here is a brief description of the fields in the main form window:

NUM field
Contains a value assigned by QMF to the column order. You cannot change this value on a forms screen. To change the order of the column in your report, rearrange the numbers in the SEQ column.

COLUMN HEADING
Specifies the text that is displayed as the column headings. To specify new column headings in your report, type the new headings over the former headings and press Enter. If you want a column heading to be displayed on two or more lines, type an underscore (_) at the points where you want the heading to split.

For example, if you want the heading LAST YEAR'S FIGURES to be displayed on three lines with one word on each line, enter:

```
LAST_YEAR'S_FIGURES
```

USAGE codes
Define how QMF uses column data to produce reports and charts. Some of the functions you can perform with usage code are:

- Exclude a column and its values from your report or chart with the OMIT usage code.
- Display one line of summary data for each set of values in the column with the GROUP usage code.
- Add or perform another aggregate function on data in a column using the SUM or another aggregation usage code.
- Provide summary data across the report using aggregation, GROUP, and ACROSS usage codes.

Refer to *Query Management Facility: Reference* or the QMF online help for complete descriptions of the usage codes.

INDENT field
Specifies the number of spaces between a column and the column to its left. For the left-most column, the INDENT value is the number of spaces between the column and the left margin.

WIDTH field
Specifies the number of characters used for the column.

EDIT code
Determines the formatting of character, graphic, numeric, and time data for each column. Refer to *Query Management Facility: Reference* or the QMF online help for complete descriptions of the edit codes.

SEQ field
Specifies the sequence in which the columns are displayed in the report. The initial values in the SEQ field are the same as those in the NUM field. To change a SEQ value, type the new sequence numbers in the SEQ column.

PAGE HEADING and FOOTING
Specifies the text that is displayed at the top and bottom of each page of the report. You can use global variables (such as &DATE and &PAGE) to specify the text. You can also use IBM Z Performance and Capacity Analytics variables, such as &REPORT_TITLE and &REPORT_ID, to specify this text. For more information about how IBM Z Performance and Capacity Analytics uses variables in a form, see "Using variables in forms" on page 45.

FINAL TEXT
Specifies text to be displayed at the end of your report. You can use global variables to specify the text.

BREAK*n* fields

Specifies whether to start a new page at each level-1 or level-2 break. The FOOTING fields located under the BREAK*n* fields let you specify text at the footing of each level of break. To start a new page at a particular break level, type YES in the appropriate BREAK field.

OUTLINE option
Specifies whether to suppress the printing of repeated values that are displayed in the break control columns. The OUTLINE option applies to breaks of every level.

DEFAULT BREAK TEXT
Specifies whether to display the default break text at each break level. The default break text is a string of asterisks: one (*) for the lowest-level break, two (**) for the second lowest break, and so forth, up to a maximum of six levels. The asterisks are replaced at break levels where you have specified break footing text.

Besides the fields in the main form window, QMF has several other form windows that you can use to tailor the format of your report. You can access these windows from the main form window by pressing **F4** (Show). When you press **F4**, QMF displays a pop-up with a list of possible form windows it can show. To show a different window, type the number in the list that corresponds to the window you want to show. Then press Enter to display the window. Some of the other windows that you can use to change the form are:

Form.page
Changes the alignment and text of headings and footings

Form.options
Changes options such as the width of the report page, maximum number of columns, and how QMF breaks a page

Form.final
Specifies text to be printed at the end of the report

For more information about these windows and how to use them to change the form of a report, refer to *Query Management Facility: Reference* or the QMF online help.

Using variables in forms

You can use global variables in forms wherever text is displayed, such as in headings and detail text, or in form calculations. The variables in a form can also be the same as those you used in a query. For example, suppose you have an SQL SELECT statement in your query structured like this:

```
SELECT ...
  FROM ...
  WHERE SYSTEM_ID=&SYSTEM_ID
```

Your report form might have title text like this:

```
System ID: &SYSTEM_ID
```

When you run this report in IBM Z Performance and Capacity Analytics, the reporting dialog prompts you to specify a value for SYSTEM_ID. The value you specify (for example, MVS1) is used in the query and is also displayed in the report title.

Note: If you do not specify a value when prompted for one, IBM Z Performance and Capacity Analytics selects *all* possible values for SYSTEM_ID in the query. It does this by setting the value of SYSTEM_ID to SYSTEM_ID, which has the effect of nullifying the WHERE clause. Although the query runs without a problem, the report title would then be displayed as:

```
System ID: SYSTEM_ID
```

Alternatively, you can specify the report title on the form as:

```
System ID: &1
```

where `&amp.1` indicates that the system ID is in the first column of the report. The report then shows the first system ID on the page as part of the title.

Creating and displaying a graphic report

To display a graphic report of the data, press the Chart key (F5). QMF starts GDDM/ICU to display the graphic report using the default chart format.

When GDDM/ICU displays the graphic report, you can print it by pressing F4 (Print). GDDM/ICU displays a print options menu. For more information about printing a chart from GDDM/ICU, refer to the GDDM documentation.

You can also use GDDM/ICU to create or modify a chart format for your report data. For more information about using GDDM/ICU, refer to the GDDM documentation.

When you use QMF to display an existing graphic report (using the Chart function key), the chart format is different than the form that is displayed when you use IBM Z Performance and Capacity Analytics to display the report. The reason for this is that QMF displays the report using the default form, whereas IBM Z Performance and Capacity Analytics uses the chart format specified in the report definition. To display a graphic report in QMF using the format defined in the IBM Z Performance and Capacity Analytics report definition, use this command:

```
DISPLAY CHART (ICUFORM=chartform
```

where *chartform* is the name of the chart format defined in the report definition. To learn the name of the chart format, select the report in the reports window and then select 2, Open Report Definition, from the Report pull-down. IBM Z Performance and Capacity Analytics displays the report definition for the selected report.

Saving the definition of a new report

About this task

After you specify the QMF query and form for your new report and exit QMF, IBM Z Performance and Capacity Analytics displays the Report Definition pop-up (Figure 34 on page 46).

```
                          Report Definition

Type information.  Then press Enter to save and return.

Report ID  . . . . . ____________________
Owner  . . . . . . . ________  (blank for public report)
Report description   ________________________________________________

Created by . . . . : USER1
Date created . . . : 2019-08-29

Query name . . . . . ________________  (leave blank if same as report ID)

Form name. . . . . . ________________
Chart format . . . . _________

Attributes . . . . . ________________________________________________  +
                     ________________________________________________  +
                     ________________________________________________  +

 F1=Help        F2=Split       F4=Prompt      F5=Query/Fm    F6=Remarks
 F9=Swap       F10=Header     F11=Batch      F12=Cancel
```

Figure 34. Report Definition pop-up, saving a QMF report

To save the report definition:

Procedure

1. Complete the entry fields as follows:

   Report ID
   A unique identifier for this report.

   Owner
   The owner (in IBM Z Performance and Capacity Analytics) of the report. You can specify your user ID to make this a private report, or leave the field blank to make the report public.

   Report description
   A description of the report. This is the text that is displayed when listing reports.

   Query name
   A unique name for the QMF query. If you leave this field blank, IBM Z Performance and Capacity Analytics uses the value of the report ID for the query name

   Form name
   A unique name for the QMF form. Note: If you have modified the default form, you must enter a value in the Form name field or you will lose the changed form.

   Chart format
   The chart format used for generating graphic reports. If you leave this field blank, IBM Z Performance and Capacity Analytics displays the report in tabular form. The format name can be a chart format that you have saved in GDDM/ICU or one of these GDDM/ICU formats supplied with QMF: bar, histogram, line, pie, polar, tower, surface, or table.

   Attributes
   One or more attributes that you want to assign to your report. You can use these attributes later to search for this report and categorize it with other reports that share the same attributes. With the cursor on the Attributes field, press **Prompt (F4)** to see a list of all available report attributes, from which you can select one or more for your report. You can add new attributes by typing them in the Attributes field.

2. To associate remarks with the report, press **Remarks (F6)**.

IBM Z Performance and Capacity Analytics displays the Report Remarks pop-up. Type remarks in the space and press Enter to return to the Report Definition pop-up.

3. To add header and footer lines to your report, press **Header (F10)**.

   For more information about adding header and footer lines, see Adding page headers and footers to a report.

4. To use the IBM Z Performance and Capacity Analytics batch reporting utility to generate this report, press **Batch (F11)** to display the Batch Settings pop-up.

   See Changing the batch settings for a report for information about using the batch reporting utility and the Batch Settings pop-up.

   Type batch selections in the appropriate fields in the Batch Settings pop-up. When you have completed all of the fields, press Enter to return to the Report Definition pop-up.

5. When you have finished defining the report, press Enter.

   IBM Z Performance and Capacity Analytics saves the report definition and returns to the Reports window.

Chapter 7. Creating a new report with the report generator

The IBM Z Performance and Capacity Analytics components installed on your system contain several predefined reports. Although these reports present the information in the IBM Z Performance and Capacity Analytics database in several useful ways, you might have a specific need for which you must create your own report. This chapter explains how to create a new report.

Note: Reports can be created using the reporting dialog's built-in report generator or QMF, if your installation uses QMF with IBM Z Performance and Capacity Analytics. This chapter describes how to create reports using the IBM Z Performance and Capacity Analytics report generator. For information on how to create reports using QMF, refer to Creating a new report using QMF

After reading this chapter, you should be familiar with these tasks:

- Creating and saving a new report definition
- Using an existing report as a template for a new report
- Creating a query for a new report
- Creating and modifying a form for a new report
- Adding page headers and footers to a report

Using SQL to work with queries

IBM Z Performance and Capacity Analytics queries are written in SQL, so you must be familiar with SQL to define new reports or modify the reports provided with IBM Z Performance and Capacity Analytics.

This chapter uses simple examples to show you how to create or change an SQL query for a report. For more information about SQL, refer to *DATABASE 2 SQL Learner's Guide* or *DATABASE 2 SQL Reference*.

Note: The IBM Z Performance and Capacity Analytics SQL parser is not as sophisticated as a Db2 interactive interface. You should therefore avoid complex queries.

Using an existing report as a template for a new report

The quickest way to create a new report is to base its query and form on an existing report that is similar to the report you need. Using an existing report as a template, you can use the reporting dialog to create a new report.

Example:

Assume that you want to create a report that is similar to Sample Report 3, which is shipped with IBM Z Performance and Capacity Analytics (see Figure 53 on page 68).

Instead of showing the number of CPU seconds used per department, you want to show the number of pages printed by each department during a certain time period.

Creating a report definition using a template

About this task

To create a report using an existing report as a template:

Procedure

1. From the Reports window, select the report you want to use as a template.
   For example:

   To find Sample Report 3, type **`lo samp`** on the command line, press Enter, then select it from the list.

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2. Select option 1 **New** from the Reports pull-down.

   IBM Z Performance and Capacity Analytics displays the Report Definition pop-up. When creating a new report based on an existing report, you can fill in the fields as shown in the example in Figure 35 on page 50.

```
                    Report Definition

Type information. Then press Enter to save and return.

Report ID  . . . . . TESTREP1_________
Owner  . . . . . . . ________ (blank for public report)
Report description   Test copy of sample report no 3_____________________

Created by . . . . : User1
Date created . . . : 2004-07-15

Chart format . . . . DRLGHORB_

Attributes . . . . . Test User1 example___________________________________  +
                     ________________________________________________  +
                     ________________________________________________  +

 F1=Help       F2=Split       F4=Prompt      F5=Query/Fm      F6=Remarks
 F9=Swap      F10=Header     F11=Batch      F12=Cancel

DRLA872 This is a template
```

   Figure 35. Report Definition pop-up, changing a report with the report generator

3. Complete the entry fields as follows:

   Report ID
   A unique identifier for this report.

   Owner
   The owner (in IBM Z Performance and Capacity Analytics) of the report. You can specify your user ID to make this a private report or leave the field blank to make the report public.

   Report description
   A description of the report. This is the text that is displayed when listing reports. When you base a new report on an existing report, it is important that you change the report description.

   Chart format
   The chart format used for generating graphic reports. If you leave this field blank, IBM Z Performance and Capacity Analytics displays the report in tabular form.

   The format name can be a chart format that you have saved in GDDM/ICU or one of these GDDM/ICU formats: bar, histogram, line, pie, polar, tower, surface, or table.

   Attributes
   One or more attributes that you want to assign to your report. You can use these attributes later to search for this report and categorize it with other reports that share the same attributes. With the cursor on the Attributes field, press **Prompt (F4)** to see a list of all available report attributes from which you can select one or more for your report. You can add new attributes by typing them in the Attributes field.

4. To associate remarks with the report, press **Remarks (F6)** to display the Report Remarks pop-up. Type remarks in the space, and press Enter to return to the Report Definition pop-up.
5. To add header or footer lines to the report, press **Header (F10)**.

   See Adding page headers and footers to a report for information about using the Report Headers and Footers pop-up.

6. To use the batch reporting utility to generate this report, press **Batch (F11)** to display the Batch Settings pop-up.

   See Changing the batch settings for a report for information about using the batch reporting utility and the Batch Settings pop-up.

   Type batch selections in the fields in the Batch Settings pop-up. When you have completed all the fields, press Enter to return to the Report Definition pop-up.

7. When you have finished defining the report, you can:

- Press **Query/Fm (F5)** to define the SQL query and a form for the new report. See Changing the SQL query and the form.
- Press Enter to save the report definition and return to the Reports window.

Changing the SQL query and the form

When you press **Query/Fm (F5)** on the Report Definition pop-up, the SQL Query pop-up for the report is shown.

Example:

If you are basing your new report on Sample Report 3, the SQL query looks like the example in Figure 36 on page 51.

```
                    SQL Query for report DRLQ0213_MOD1   Row 1 to 19 of 50

Enter an SQL Select statement.  Press Enter to save and return.
--
--  Name: DRLQ0213
--
SELECT A.PROFILE
     , SUM(B.ELAPSED_DB2_SEC)/SUM(B.ELAPSED_SEC) * FLOAT(100)
     , SUM(B.TCB_DB2_SEC)/SUM(B.ELAPSED_DB2_SEC) * FLOAT(100)
     , (SUM(B.IO_WAIT_SEC)/SUM(B.ELAPSED_DE2_SEC) +
        SUM(B.OTHER_READ_SEC)/SUM(B.ELAPSED_DB2_SEC) +
        SUM(B.OTHER_WRITE_SEC)/SUM(B.ELAPSED_DB2_SEC) * FLOAT(100)
     ,  SUM(B.LOCK_LATCH_SEC)/SUM(B.ELAPSED_DB2_SEC) * FLOAT(100)
     , (SUM(B.SERVICE_TASK_SEC)/(B.ELAPSED_DB2_SEC) +
        SUM(B.ARC_LOGWAIT_SEC)/SUM(B.ELAPSED_DB2_SEC) +
        SUM(B.ARC_LOGREAD_SEC)/SUM(B.ELAPSED_DB2_SEC) * FLOAT(100)
     , (SUM(B.ELAPSED_DB2_SEC)/(B.TCB_DB2_SEC) -
        SUM(B.IO_WAIT_SEC) - SUM(B.LOCK_LATCH_SEC) -
        SUM(B.OTHER_READ_SEC) - SUM(B.OTHER_WRITE_SEC) -
        SUM(B.SERVICE_TASK_SEC) - SUM(B.ARC_LOGREAD_SEC) -
        SUM(B.ARC_LOGWAIT_SEC) * FLOAT(100) / SUM(B.ELAPSED_DB2_SEC)
  FROM &PREFIX.DB2_APPLICATION A,
Command ===> _____________________________________________________________
 F1=Help      F2=Split     F4=Run       F5=Tables    F6=Cols      F7=Bkwd
 F8=Fwd       F9=Swap     F10=Edit     F11=Form     F12=Cancel
```

Figure 36. SQL Query pop-up, modifying a report with the report generator

Example:

This query selects the system ID, department name, and CPU seconds used from the sample table SAMPLE_M. (For an overview of the sample reports and tables, refer to *Administration Guide and Reference*.) The SUM in `SUM(CPU_SECONDS)` is a column function, which causes the sum of a collection of CPU_SECONDS values to be shown.

The WHERE clause in the query limits the data shown to a certain time period and a certain system. `&FROM_MONTH, &TO_MONTH, and &SYSTEM_ID` are variables. Variables are used to make the query more flexible. When the report is run, you are prompted to enter values for these variables to specify which system and time period you want to include in the report. Variables are preceded by an ampersand (&) and can be 18 characters, including the ampersand.

The GROUP BY and ORDER BY clauses affect the formatting of the report. The data on the report is grouped by system ID and department name and ordered by CPU seconds used per department, in descending order.

1. You can edit the query on this window or go into ISPF Edit. To use ISPF Edit to edit the query, press **Edit (F10)** or type **EDIT** on the command line. In ISPF Edit, you can use line commands when changing the query. When you have finished editing the query, press **F3** to return to the SQL Query pop-up.

   To delete the entire query and start writing from the beginning, type **CLEAR** on the command line on the SQL Query pop-up.

   You can add comments to the query, for example to explain your modifications. Start each comment line with two dashes (- -). Comments are not shown in the report.

   Example:

To make the report show the number of pages printed per department instead of the number of CPU seconds used, go to the first line of the report, the SELECT clause, and change `SUM(CPU_SECONDS)` to `SUM(PAGES_PRINTED)`.

2. When you have changed the query, you can press **F2** to see the result of your changes. To run the report from the SQL Query pop-up, you must substitute any variables in the query with actual values.

   The result of the query is displayed in tabular form.

   Example:

   In this example, you would need to enter values for `&FROM_MONTH`, `&TO_MONTH`, and `&SYSTEM_ID`.

3. When you change a query, you must also change the form that is associated with it. The form determines the layout of the report. (For more information about the report form, see Modifying the form for a report.) Press **F9** to go to the Form for Report *report name* pop-up.

   Example:

   In our example, the form is as shown in Figure 37 on page 52.

```
FORM.MAIN               DRLQ.DRLFD213

COLUMNS:                   Total Width of Report Columns: 52
 NUM COLUMN HEADING                              USAGE   INDENT  WIDTH EDIT SEQ
 --- --------------                               ------- ------  ----- ---- ---
   1 Profile                                             0       12    C    1
   2 Elapsed_DB2_time                             OMIT   1       7     P2   2
   3 DB2_TCB_time                                        1       7     P2   3
   4 I/O _wait_time                                      1       7     P2   4
   5 Lock_latch_time                                     1       7     P2   5

PAGE:    HEADING  ===>  &REPORT_TITLE
         FOOTING  ===>  &PRODUCT_NAME: &REPORT_ID
FINAL:   TEXT     ===>
BREAK1:  NEW PAGE FOR BREAK?  ===>  NO
         FOOTING  ===>
BREAK2:  NEW PAGE FOR BREAK?  ===>  NO
         FOOTING  ===>
OPTIONS: OUTLINE? ===>  YES               DEFAULT BREAK TEXT?  ===>  NO

1=Help        2=Check       3=Check        4=Show        5=Chart        6=Query
7=Backward    8=Forward     9=Form        10=Insert     11=Delete      12=Report
```

Figure 37. Report form definition pop up

   Example:

   You must change the column heading `CPU_seconds` to, for example, `Pages_printed`. In this example, no more changes to the form are needed.

4. When you have changed the form, you can press **F2** to save the current report definition and display the report. If the query contains variables, you are prompted for values for these variables on the Data Selection pop-up.

   When you have specified values for the variables, you can press Enter to display the report. You can also press **F4** to display the report in tabular form, or **F5** to display the report as a chart. If the report does not have a chart format defined in the report description, the default format, bar chart, is used.

   Example:

   Press Enter on the Data Selection pop-up to display the report as a chart. IBM Z Performance and Capacity Analytics calls GDDM to display the report. Press **F9** to leave GDDM when you have finished viewing the report. The tabular version of the report is displayed. Press **F3** to return to the Form for Report *report name* pop-up.

5. When you have finished working with the form, press Enter to save it. Then press Enter to save the query.

   On the Report Definition pop-up, you can press **F10** to add or change header or footer lines for the report. For more information about header and footer lines, see Adding page headers and footers to a report.

When you have finished working with the report, press Enter to save the report definition. Your report is included in the list of reports, and can be selected and displayed.

Example:

The report now shows the number of pages printed per department with the department that printed the most pages at the top of the report. It might look like Figure 38 on page 53.

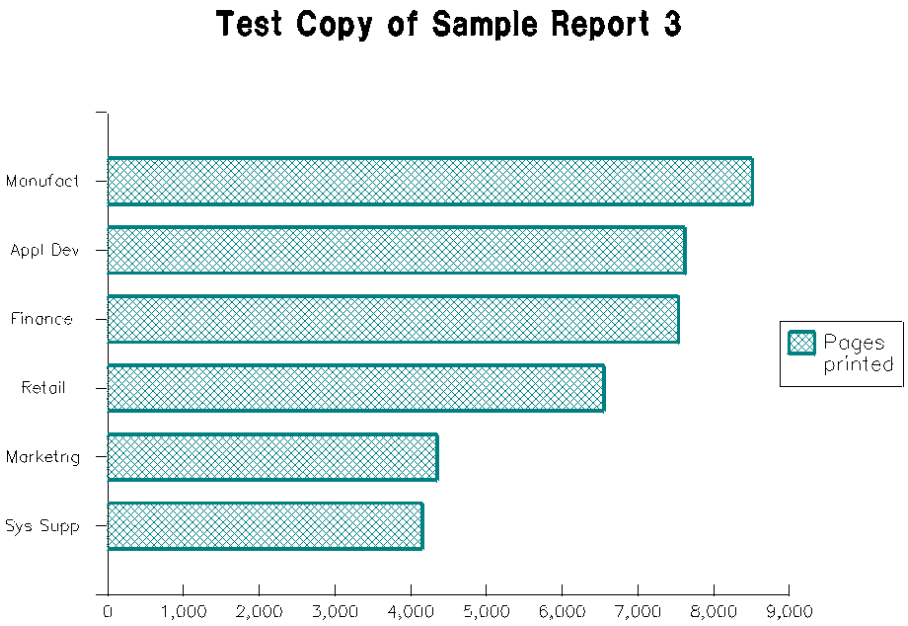

Figure 38. The changed copy of Sample Report 3.

Creating a query and form for a new report

You create a new report in IBM Z Performance and Capacity Analytics by creating an SQL query to extract the information you want from the database. There is a form specifying the layout of the report connected to the query. By changing the form you can, for example, change the width of the columns and the column heading texts.

Example:

Assume that you want to create a tabular report that looks like the example in Figure 39 on page 54 showing the number of transactions and pages printed for a number of users in different departments. (Only the first page of the report is shown here. In the dialog you can page forward with **F8**.)

```
                        An Example of a New Report


            Depart-   User                          Pages
Date        ment      ID        Transactions      printed
----------  --------  --------  ------------  -----------
2000-01-01  Appl Dev  ADAMS             1109          821
                      JONES             1138         1055
                      SMITH              870          864
                                ------------  -----------
                             *          3117         2740

            Finance   GEYER              509          529
                      HAAS               786          648
                      PARKER             462          704
                      SPENCER            800          640
                                ------------  -----------
                             *          2557         2521

            Manufact  LEE               1197         1086
                      LUTZ               606          623
                      MEHTA              968          748
                      PULASKI            716          738
                                ------------  -----------
                             *          3487         3195
```

Figure 39. An example of a tabular report

Creating a new report definition without using a template

About this task

To create a report definition for a new report without using a template:

Procedure

1. Select option 1 **New** from the Reports pull-down.
   IBM Z Performance and Capacity Analytics displays the Report Definition pop-up.

   Example:

   When creating a new report, you can fill in the fields as in Figure 40 on page 54.

```
                     Report Definition

Type information.  Then press Enter to save and return.

Report ID  . . . . . NEWREPORT_________
Owner  . . . . . . . ________ (blank for public report)
Report description   An example of a new report___________________________

Created by . . . . : USER1
Date created . . . : 2000-05-12

Query name . . . . . DRLQD213___________  (leave blank if same as report ID)
Form name  . . . . . DRLFD213___________
Chart format . . . . DRLGD213_

Attributes . . . . . EXAMPLE TEST NEW_____________________________________  +
                     ____________________________________________________  +
                     ____________________________________________________  +

 F1=Help       F2=Split       F4=Prompt      F5=Query/Fm      F6=Remarks
 F9=Swap      F10=Header     F11=Batch      F12=Cancel
```

Figure 40. Report Definition pop-up, defining a new report with the report generator

2. Complete the entry fields as follows:

   Report ID
   A unique identifier for this report.

   Owner
   The owner (in IBM Z Performance and Capacity Analytics) of the report. You can specify your user ID to make this a private report or leave the field blank to make the report public.

Report description
A description of the report. This is the text that is displayed when listing reports.

Query name
The name of the SQL query used to extract the data you want displayed.

Form name
The name of the form definition file used to define the presentation of the data.

Chart format
The chart format used for generating graphic reports. If you leave this field blank, IBM Z Performance and Capacity Analytics displays the report in tabular form.

The format name can be a chart format that you have saved in GDDM/ICU, or one of these GDDM/ICU formats: bar, histogram, line, pie, polar, tower, surface, or table.

Attributes
One or more attributes that you want to assign to your report. You can use these attributes later to search for this report and categorize it with other reports that share the same attributes. With the cursor on the Attributes field, press **Prompt (F4)** to see a list of all available report attributes from which you can select one or more for your report. You can add new attributes by typing them in the Attributes field.

3. To associate remarks with the report, press **Remarks (F6)**.

   IBM Z Performance and Capacity Analytics displays the Report Remarks pop-up. Type remarks in the space, and press Enter to return to the Report Definition pop-up.
4. To add header or footer lines to the report, press **Header (F10)**.

   See Adding page headers and footers to a report for information about using the Report Header and Footer pop-up.
5. To use the batch reporting utility to generate this report, press **Batch (F11)**.

   IBM Z Performance and Capacity Analytics displays the Batch Settings pop-up. See Changing the batch settings for a report for information about using the batch reporting utility and the Batch Settings pop-up.

   Type batch selections in the fields in the Batch Settings pop-up. When you have completed all the fields, press Enter to return to the Report Definition pop-up.
6. When you have finished defining the report, you can:
   - Press **Query/Fm (F5)** to define the SQL query and, optionally, a form for the new report. See Creating a new SQL query and a form.
   - Press Enter to save the report definition and return to the Reports window.

Creating a new SQL query and a form

About this task

When you press **Query/Fm (F5)** in the Report Definition pop-up, the SQL Query pop-up (Figure 41 on page 56) is displayed.

```
                        SQL Query for report NEWREPORT     Row 1 to 12 of 12

Enter an SQL Select statement.  Press Enter to save and return.
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
Command ===> _____________________________________________________________
 F1=Help     F2=Split    F4=Run      F5=Tables   F6=Cols     F7=Bkwd
 F8=Fwd      F9=Swap    F10=Edit    F11=Form    F12=Cancel
```

Figure 41. SQL Query pop-up (creating a new report)

An SQL query is used to find information in tables to display it in a report. The SQL language uses normal English words to do this. Some commonly used clauses in a query are:

SELECT
You select columns in the order you want them to be displayed in the report (for example, user ID, system ID).

FROM
You select the columns from one or more tables.

WHERE
You select the rows (in the columns) for which a certain condition is true.

ORDER BY
You can order the rows in the columns in a certain order. For example, you can order the rows of a column in alphabetical order by name.

SORT BY
You can sort the rows in the columns in ascending or descending order.

GROUP BY
You can group the rows in the columns.

For more information about SQL, refer to *DATABASE 2 SQL Learner's Guide* or *DATABASE 2 SQL Reference*

Procedure

1. Write the query in the SQL Query pop-up.

   To delete the entire query and start again, type **CLEAR** on the command line on the SQL Query pop-up.

   If you know the names of the table and columns you want to use, you can start typing the query. Otherwise, IBM Z Performance and Capacity Analytics helps you find out which tables and columns to use.
2. To see a list of tables available on your system, press **Chart (F5)**.

   IBM Z Performance and Capacity Analytics displays the Tables pop-up (Figure 42 on page 57).

```
                                Tables           ROW 229 TO 242 OF 277

Select table(s).  Then press Enter to see the column definitions.

/   Tables              Prefix    Type
_   SAMPLE_H            DRL       TABLE
/   SAMPLE_M            DRL       TABLE
_   SAMPLE_USER         DRL       TABLE
_   SCHEDULE            DRLSYS    TABLE
_   SPECIAL_DAY         DRLSYS    TABLE
_   USER_GROUP          DRL       TABLE
_   VMACCT_SESSION_D    DRL       TABLE
_   VMACCT_SESSION_M    DRL       TABLE
_   VMPARM              DRL       TABLE
_   VMPRF_CONFIG_T      DRL       TABLE
_   VMPRF_DASD_D        DRL       TABLE
_   VMPRF_DASD_H        DRL       TABLE
_   VMPRF_DASD_M        DRL       TABLE
_   VMPRF_PROCESSOR_D   DRL       TABLE

Command ===> ____________________________________________________________
 F1=Help     F2=Split    F7=Bkwd     F8=Fwd      F9=Swap    F12=Cancel
```

Figure 42. IBM Z Performance and Capacity Analytics Tables pop-up

3. Select one or more tables, and press Enter.

   Example:

   For this example, select the SAMPLE_M table. To locate it, type **lo samp** on the command line and press Enter.

   IBM Z Performance and Capacity Analytics displays the Columns of Selected Tables pop-up. If you need information about a column, you can type a question mark (**?**) beside the column, and press Enter. IBM Z Performance and Capacity Analytics goes into BookManager and displays information about the column and table from the relevant online book. Press **F3** to return to the column list (Figure 43 on page 57).

```
                        Columns of selected Tables          ROW 1 TO 8 O

Select columns to generate a Query. Then press Enter to return.

/   Column              Type        Len   Key  Table
/   DATE                DATE        4     Yes  SAMPLE_M
_   SYSTEM_ID           CHAR        4     Yes  SAMPLE_M
/   DEPARTMENT_NAME     CHAR        8     Yes  SAMPLE_M
/   USER_ID             CHAR        8     Yes  SAMPLE_M
/   TRANSACTIONS        INTEGER     4     No   SAMPLE_M
_   RESPONSE_SECONDS    INTEGER     4     No   SAMPLE_M
_   CPU_SECONDS         FLOAT       8     No   SAMPLE_M
/   PAGES_PRINTED       INTEGER     4     No   SAMPLE_M
***************************** BOTTOM OF DATA ***************************


Command ===> ____________________________________________________________
 F1=Help     F2=Split    F7=Bkwd     F8=Fwd      F9=Swap    F12=Cancel
```

Figure 43. IBM Z Performance and Capacity Analytics Columns of Selected Tables pop-up

4. Select the columns you want to use, and press Enter.

   Example:

   For this example, select the DATE, DEPARTMENT_NAME, USER_ID, TRANSACTIONS, and PAGES_PRINTED columns, and press Enter. (A confirmation pop-up might be displayed, asking you to confirm that you want to replace the existing query definition. Press Enter.)

   The table and column names are copied to your SQL Query pop-up, and SQL SELECT and FROM clauses are added (see Figure 44 on page 58).

   Example:

   In our example, DRL is the table prefix; it might be something else in your installation. The prefix is shown in the Prefix for all other tables field on the Dialog Parameters window.

```
                        SQL Query for report NEWREPORT     Row 1 to 12 of 12

Enter an SQL Select statement.  Press Enter to save and return.
-- NEWREPORT_____________________________________________________________
SELECT DATE, DEPARTMENT_NAME, USER_ID, TRANSACTION, PAGES_PRINTED_________
__FROM DRL.SAMPLE_M___________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
Command ===> ____________________________________________________________
 F1=Help     F2=Split    F4=Run      F5=Tables   F6=Cols     F7=Bkwd
 F8=Fwd      F9=Swap    F10=Edit    F11=Form    F12=Cancel
```

Figure 44. SQL Query pop-up, table and columns selected

Note: If you know the name of the table you want to use, but are unsure about the column names, you can enter the name of the table in your SELECT statement, and press **Cols (F6)** to see a list of the columns included in that table.

If you have selected a table from the Tables pop-up and want to use another table, press **Tables (F5)** to go back to the Tables pop-up and:

- Select a new table, or
- Press **Cancel (F12)** from the Tables pop-up without selecting a table, and enter a new table name in the query.

5. Edit the query, to add more clauses.

   Example:

   In our example, we want to show the sum of transactions and pages printed for each user. Press **Edit (F10)** to go into Edit mode, and change the query so that it looks like this:

   ```
   SELECT DATE, DEPARTMENT_NAME, USER_ID,
          SUM(TRANSACTIONS),
          SUM(PAGES_PRINTED)
    FROM DRL.SAMPLE_M
   ```

   Press **F3** to leave Edit mode.

6. You can specify conditions for the rows to use with a WHERE condition. You can use variables in this condition to make the query more flexible. Variables are preceded by an ampersand (&), and can be 18 characters, including the ampersand. When the report is run, the Data Selection pop-up is displayed, and you can specify values for the variables.

   Example

   In our example, no WHERE condition is needed. An example of a query with a WHERE condition is shown in Figure 36 on page 51.

7. Select the order in which the information should be shown with an ORDER BY condition, or specify a GROUP BY condition.

   Example:

   In our example, we must group the date, department name, and user ID columns. We also order the date (column 1), department name (column 2), and user ID (column 3) columns in ascending order. Add these clauses to the query:

   ```
   GROUP BY DATE, DEPARTMENT_NAME, USER_ID
   ORDER BY 1 ASC, 2 ASC, 3 ASC
   ```

8. Press **Run (F4)** to run the query to verify that the report contains the information you want.

   Note:

a. If the query contains variables, you must replace those variables with values before you can run the query.

b. If you get an SQL error message when you try to run the query, there is probably something wrong with the query's syntax. A column name might be misspelled, or a comma might be missing.

Example:

The report you see after pressing **Run (F4)** can look like the example inFigure 45 on page 59. (Only the first page of the report is shown here. In the dialog you can page forward with **F8**.)

```
DATE       DEPARTMENT USER
           NAME       ID
---------- ---------- -------- ----------- -----------
2000-01-01 Appl Dev   ADAMS           1109         821
2000-01-01 Appl Dev   JONES           1138        1055
2000-01-01 Appl Dev   SMITH            870         864
2000-01-01 Finance    GEYER            509         529
2000-01-01 Finance    HAAS             786         648
2000-01-01 Finance    PARKER           462         704
2000-01-01 Finance    SPENCER          800         640
2000-01-01 Manufact   LEE             1197        1086
2000-01-01 Manufact   LUTZ             606         623
2000-01-01 Manufact   MEHTA            968         748
2000-01-01 Manufact   PULASKI          716         738
2000-01-01 Marketng   KWAN             637         577
2000-01-01 Marketng   STERN            474         792
2000-01-01 Retail     GOUNOT           798         790
2000-01-01 Retail     MARINO           653         685
2000-01-01 Retail     PEREZ            716        1060
2000-01-01 Sys Supp   PIANKA           770        1210
2000-01-01 Sys Supp   THOMPSON         509         395
2000-02-01 Appl Dev   ADAMS            422         650
2000-02-01 Appl Dev   JONES            893         826
2000-02-01 Appl Dev   SMITH            842         842
2000-02-01 Finance    GEYER            379         515
2000-02-01 Finance    HAAS             674         771
...
```

Figure 45. An intermediate report shown with Run (F4)

IBM Z Performance and Capacity Analytics displays the results of the query. Press **F3** to go back to the SQL Query pop-up.

Modify the query if necessary, and press **Run (F4)** again to check the results.

You can add comments to the query, for example to explain your modifications. Start each comment line with two dashes (- -). Comments are not shown in the report.

9. When you are satisfied with the contents of the query, you can change the layout of the report.

   a) Press **Form (F11)** to go to the Form for Report *report name* pop-up.

   Example:

   The Form for Report NEWREPORT pop-up is shown. (For a new report, you might need to press **F5** to build the form from the query.) The resulting form can look like the example in Figure 46 on page 60.

```
FORM.MAIN               NEWREPORT

COLUMNS:                   Total Width of Report Columns: 52
 NUM COLUMN HEADING                              USAGE   INDENT  WIDTH EDIT SEQ
 --- --------------                              ------- ------  ----- ---- ---
   1 DATE                                                 0       10    C    1
   2 DEPARTMENT_NAME                                      1       8     C    2
   3 USER_ID                                              1       8     C    3
   4                                                      1       11    L0   4
   5                                                      1       11    L0   5

PAGE:    HEADING  ===>  &REPORT_TITLE
         FOOTING  ===>  &PRODUCT_NAME: &REPORT_ID
FINAL:   TEXT     ===>
BREAK1:  NEW PAGE FOR BREAK?  ===>  NO
         FOOTING  ===>
BREAK2:  NEW PAGE FOR BREAK?  ===>  NO
         FOOTING  ===>
OPTIONS: OUTLINE? ===>  YES               DEFAULT BREAK TEXT?  ===>  NO

1=Help        2=Check       3=Check        4=Show        5=Chart        6=Query
7=Backward    8=Forward     9=            10=Insert     11=Delete      12=Report
OK, FORM is displayed.
COMMAND  ===> _                                                SCROLL  ===>  PAGE
```

Figure 46. A new report form

b) First of all, you must add column headings for columns four and five. Move the cursor to the empty line after column three, and type `Transactions`. Type `Pages_printed` on line five. (The underscore (_) makes printed Pages appear on two lines.)

   If you run the report using **Run (F4)**, you will notice that some headings are uppercase and some are lowercase. Also, some headings are truncated because they are too long. To solve this, you can either add an underscore to break the heading into two lines, or increase the width of the column.

   - Change the width of the transactions column to 12 instead of 11.
   - Change the heading DEPARTMENT_NAME to `Depart-_ment`, and press **Run (F4)** again.
   - Change other headings from uppercase to lowercase if needed.

c) Break the report into sections to make the information more readable. You can also summarize data for each section.

   You do this with usage codes. (For a full description of the usage codes available, see Usage codes.)

   Fill in the usage code columns as shown in the example in Figure 47 on page 60.

```
FORM.MAIN               NEWREPORT

COLUMNS:                   Total Width of Report Columns: 52
 NUM COLUMN HEADING                              USAGE   INDENT  WIDTH EDIT SEQ
 --- --------------                              ------- ------  ----- ---- ---
   1 Date                                        BREAK1   0       10    C    1
   2 Department                                  BREAK2   1       8     C    2
   3 User_ID                                              1       8     C    3
   4 Transactions                                SUM      1       12    L0   4
   5 Pages_printed                               SUM      1       11    L0   5

PAGE:    HEADING  ===>  &REPORT_TITLE
         FOOTING  ===>  &PRODUCT_NAME: &REPORT_ID
FINAL:   TEXT     ===>
BREAK1:  NEW PAGE FOR BREAK?  ===>  NO
         FOOTING  ===>
BREAK2:  NEW PAGE FOR BREAK?  ===>  NO
         FOOTING  ===>
OPTIONS: OUTLINE? ===>  YES               DEFAULT BREAK TEXT?  ===>  NO

1=Help        2=Check       3=Check        4=Show        5=Chart        6=Query
7=Backward    8=Forward     9=            10=Insert     11=Delete      12=Report
OK, FORM is displayed.
COMMAND  ===> _                                                SCROLL  ===>  PAGE
```

Figure 47. A modified report form

With these usage codes, the date and department names are shown only once instead of being repeated. The transactions and pages printed columns are summarized for each department and time period.

d) When you have finished working with the form, press Enter to save it. Then press Enter to save the query.

10. On the Report Definition pop-up, you can press **Header (F10)** to add header and footer lines to your report.

    For more information about adding header and footer lines, see Adding page headers and footers to a report.

11. When you have finished working with the report, press Enter to save the report definition.

    Your report is included in the list of reports, and can be selected and displayed.

Modifying the form for a report

About this task

After you retrieve data by running a query, it is formatted into a report and displayed.

You can change the format of your report by changing the values on the form. If you change the query by, for example, adding or deleting columns, you must change the form so that the number of columns in the query matches the number of columns on the form. The columns must also be in the same order in the query as on the form.

Procedure

To display the form and modify its values, press **Form (F9)** on the SQL Query pop-up.

IBM Z Performance and Capacity Analytics shows the Form for report *report name* pop-up (Figure 48 on page 61).

```
FORM.MAIN               Sample Report 2

COLUMNS:                   Total Width of Report Columns: 52
 NUM COLUMN HEADING                              USAGE   INDENT  WIDTH EDIT SEQ
 --- --------------                              ------- ------  ----- ---- ---
   1 Month_start_date                            BREAK1  0       10    C    1
   2 System_ID                                   OMIT    1       6     C    2
   3 Department_name                             BREAK2  1       10    C    3
   4 User_ID                                             1       8     C    4
   5 Transactions                                SUM     1       8     L    5
   6 Average_response_seconds                    AVERAGE 1       8     L2   6
   7 CPU_seconds                                 SUM     1       8     L2   7
   8 Pages_printed                               SUM     1       8     L    8

PAGE:    HEADING  ===>  &REPORT_TITLE
         FOOTING  ===>  &PRODUCT_NAME: &REPORT_ID
FINAL:   TEXT     ===>
BREAK1:  NEW PAGE FOR BREAK?  ===>  NO
         FOOTING  ===>
BREAK2:  NEW PAGE FOR BREAK?  ===>  NO
         FOOTING  ===>
OPTIONS: OUTLINE? ===>  YES               DEFAULT BREAK TEXT?  ===>  NO

1=Help        2=Check       3=End          4=Show        5=Chart        6=Query
7=Backward    8=Forward     9=            10=Insert     11=Delete      12=Report
OK, FORM is displayed.
COMMAND  ===> _                                              SCROLL  ===>  PAGE
```

Figure 48. A sample report form

These function keys are available:

F2
Use Check to verify that the form definitions are correct.

F4
Use Show to display forms.

F5
Use Chart to display the report in the form of a chart.

F6
Use Query to display queries.

F10
Use Insert to insert lines in the column list.

F11
Use Delete to delete lines from the column list.

F12
Use Report to display reports.

You can also type CLEAR on the command line to remove all input from the Form window.

Editing the form

To change the definition of the form, edit the fields on the form pop-up. You can:

- Type over the previous values, and press Enter.
- Insert a column by placing the cursor in the column above the insert location and pressing **Insert (F10)**.
- Delete a column by placing the cursor in that column and pressing **Delete (F11)**.

Here is a brief description of the fields on this pop-up:

Final text
If you have specified that you want a final summary line, you can add text that is displayed to the left of the first column summarized. The text is left-justified, and truncated if it does not fit. You can use global variables in the text, provided that the same variables are used in the query.

Num field
Shows the column order for tabular reports as defined in the query. The number of columns and the order of the columns on the form must be the same as in the query. To change the order of the columns in your report, change the order of the columns in the query.

Column heading
Specifies the text to be displayed as column headings. To specify new column headings for your report, type the new headings over the existing headings, and press Enter. If you want a column heading to be displayed on two or more lines, type an underscore (_) at the points where you want the heading to split.

For example, if you want the heading RESPONSE TIME to be displayed on two lines with one word on each line, type:

```
RESPONSE_TIME
```

Usage codes

Usage codes define how column data is used to produce reports and charts. You can, for example, break a report into smaller sections with BREAK usage codes. For more information about usage codes, see Usage codes.

Indent
Specifies the number of characters used to indent the column.

Width field

Specifies the number of characters used for the column. When specifying the width, take into account if the data contains a minus sign, decimal or thousands separators, or a percent sign.

Edit codes
Edit codes determine the formatting of character, graphic, numeric, and time data for each column. For more information about edit codes, see Edit codes.

Seq
Specifies the order in which the columns are displayed (the sequence).

Usage codes

Usage codes define how column data should be used to produce reports and charts. If, for example, you do not want a column to be included at all, you use the OMIT usage code. If you select to show or print a column as it is, the usage code is blank.

Some usage codes let you decide how a column should be formatted. Others let you perform calculations. They are called *aggregation* usage codes.

You can, for example:

- Add or perform another aggregate function on data in a column using the SUM or another aggregation usage code.
- Provide summary data across the report using aggregation, GROUP, and ACROSS usage codes.

These usage codes are supported in the IBM Z Performance and Capacity Analytics built-in report generator:

ACROSS

Use the ACROSS usage code to display data horizontally for one of the columns in your report. When you use ACROSS for one column, you must use GROUP for one or more of the other columns. For the remaining columns, you can use the OMIT usage code. In that case, the summary line for each group value can contain several sets of results from the columns that use aggregations. There is one set for each group of values in the column that uses ACROSS.

A report can have only one column with the ACROSS usage code. If you specify more than one ACROSS column, you get an error message.

Example:

Sample report 1 uses the ACROSS usage code for the Department_name column. (See Figure 50 on page 67 and Figure 51 on page 67.)

MVS52, MVS Number of Jobs with Tape Mounts, Daily Trend, is another example of a report with an ACROSS usage code.

BREAKn

Use break usage codes to divide the information in your report into smaller sections, to make the report easier to read and understand. There are six levels of break codes (n=1-6) that provide columns for different levels of breaks. Any change in the value of the column causes a break; subtotals are displayed for columns whose usage is one of the aggregation usages.

You can use each break level only once in a report, and the break levels must come in sequence (that is, you can specify BREAK1 and BREAK2, but you cannot specify BREAK1 and BREAK3).

To be able to show breaks in a meaningful way in a report, the SQL query must contain an ORDER BY clause for the column or columns for which you specify BREAKn.

Example:

Sample Report 2 uses BREAK usage codes for the Month_start_date and Department_name columns. (See Figure 52 on page 68.) MVS53, MVS Jobs Statistics by Period and User Group, Daily, is another example of a report with BREAK usage codes.

GROUP

Use the GROUP usage code to display one line of summary data for each set of values in the column. The summary line can display only values that are the same for each member of the group, such as the value in a control column or the results of columns whose usage is an aggregation code.

Note that blank usage codes cannot be used with GROUP usage codes.

To be able to present reports with GROUP usage codes in a meaningful way, the SQL query must use an ORDER BY clause for the column or columns for which you specify GROUP.

Example:

Sample report 1 uses the GROUP usage code for the Time column. (See Figure 50 on page 67 and Figure 51 on page 67.) MVS52, MVS Number of Jobs with Tape Mounts, Daily Trend, is another example of a report with a GROUP usage code.

blank
If no usage code is given, the column is displayed without any aggregation or summary. This usage code cannot be used with the GROUP usage code.

The following usage codes are aggregation usage codes:

SUM
The sum of the values in the column. The data in the column must be numeric.

AVERAGE
The average of the values in the column. The data in the column must be numeric.

MAXIMUM
The greatest value in the column. The data in the column must be numeric.

MINIMUM
The smallest value in the column. The data in the column must be numeric.

FIRST
The first value in the column. The data in the column can be numeric or character (edit code C) data.

LAST
The last value in the column. The data in the column can be numeric or character (edit code C) data.

COUNT
The number of values in the column. The data in the column can be numeric or character (edit code C) data.

TPCT
The percentage each value is of the column total. This aggregation usage code replaces the data value with a calculation. The data in the column must be numeric.

Example:

Sample Report 2 (Figure 52 on page 68) is an example of a report that uses aggregation usage codes.

Edit codes

Edit codes determine the formatting of character, graphic, numeric, and time data for each column. You can use the edit codes listed below in the IBM Z Performance and Capacity Analytics built-in report generator. n defines the number of decimal places after the decimal separator, if applicable. n can be 0. If n is omitted, it is assumed to be 0.

E
Displays the numbers in exponential (scientific) notation.

In
Displays the numbers with any decimal places, negative sign, and leading zeros, but no thousands separators.

Jn
Displays the numbers with any decimal places and leading zeros, but no negative sign or thousands separators.

Kn
Displays the numbers with any decimal places, negative sign, and thousands separators, but no leading zeros.

Ln
Displays the numbers with any decimal places and negative sign, but no leading zeros or thousands separators.

Pn
Displays the numbers with a percent sign, any decimal places, negative sign, thousands separators, but no leading zeros.

C
Displays the numbers as character data, without thousands separators or decimal places.

Other QMF edit codes used in the predefined reports, such as edit codes for DATE, or TIME, are interpreted as edit code C, character data. If you are basing a new report on a predefined report, you must replace such edit codes with edit code C.

The table below shows examples of how edit codes affect the formatting of values. For example, it shows the effect of the edit code if the number -1234567.885 is written to a column with the width 15.

Table 1. Examples of how edit codes affect the formatting of values

Edit code	Result	Leading zeros	Negative sign	Thousands separator	Percent sign
E	-1.23456789E+06	No	Yes	No	No
I2	-00001234567.89	Yes	Yes	No	No
J2	000001234567.89	Yes	No	No	No
K2	-1,234,567.89	No	Yes	Yes	No
L2	-1234567.89	No	Yes	No	No
P2	-1234567.89%	No	Yes	No	Yes

Displaying a graphic report from the Form for Report pop-up

To display a graphic report from the Form for Report *report name* pop-up, press **F4**. IBM Z Performance and Capacity Analytics displays the Data Selection pop-up. Specify values for variables, and press Enter. IBM Z Performance and Capacity Analytics starts GDDM/ICU to display the graphic report. (If GDDM/ICU is not installed on your system, all reports are shown in tabular format.) The chart format specified in the report description is used when displaying the report. If you press **Chart (F6)** on the Data Selection pop-up to display a tabular report as a chart, the default chart format, bar chart, is used.

When GDDM/ICU displays the graphic report, you can print it by pressing F4 (Print). GDDM/ICU displays a print options menu. For more information about printing a chart from GDDM/ICU, refer to the GDDM documentation.

You can also use GDDM/ICU to create or modify a chart format for your report data. For more information about using GDDM/ICU, refer to the GDDM documentation.

Adding page headers and footers to a report

About this task

You can add up to four lines of text to be displayed and printed at the top of your reports, and up to four lines to be displayed and printed at the bottom of tabular reports.

Header lines are displayed and printed at the top of each page of a report. Footer lines are displayed and printed at the bottom of each page of a tabular report. Footer lines are not used on graphic reports.

To define header or footer lines for your report:

Procedure

1. From the Report Definition pop-up, press **Header (F10)**. The Report Header and Footer pop-up is displayed.

```
                      Report Header and Footer

Type information. Then press Enter to save and return.

Header  . . . . &REPORT_TITLE_____________________________________________
                ___________________________________________________________
                ___________________________________________________________
                ___________________________________________________________

Footer  . . . . &PRODUCT_NAME: &REPORT_ID_________________________________
                ___________________________________________________________
                ___________________________________________________________
                ___________________________________________________________

Align header    2_  1.  Left      Align footer    2_  1.  Left
                    2.  Center                        2.  Center
                    3.  Right                         3.  Right

 F1=Help     F2=Split    F4=Clear    F9=Swap    F12=Cancel
```

Figure 49. Report Header and Footer pop-up

2. Type header and footer information in the **Header** and **Footer** fields.

   You can use variables that are defined in the query, or you can use special variables that are substituted with values when the report is run, such as:

   &REPORT_TITLE
   the defined report description

   &REPORT_ID
   the report ID

   &PRODUCT_NAME
   the text IBM Z Performance and Capacity Analytics Report
3. Specify whether to **Align header** and **Align footer** on the left, center, or right.
4. Press Enter to save the header and footer information and return to the report description.

Sample reports

The Sample Component, shipped with IBM Z Performance and Capacity Analytics, contains sample reports. For a description of the Sample Component, refer to the *Administration Guide and Reference.*

Figure 50 on page 67 shows the chart version of Sample Report 1.

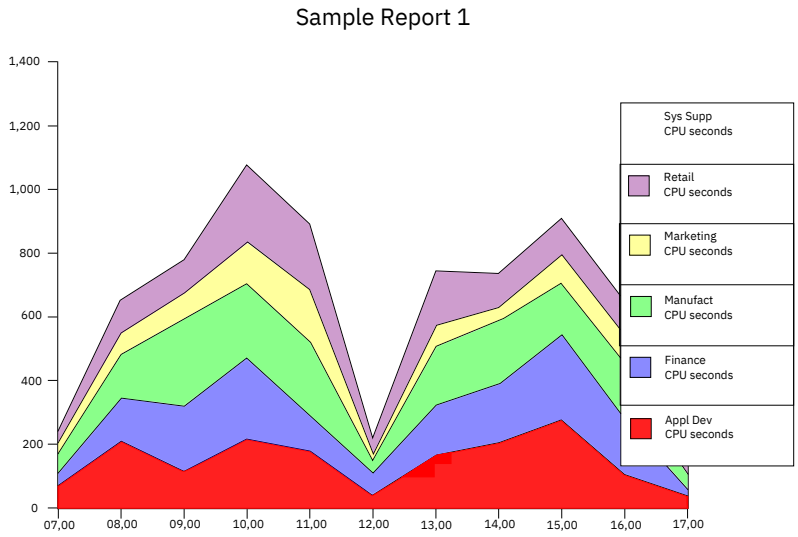

Figure 50. Sample Report 1, chart version

Figure 51 on page 67 shows the tabular version of Sample Report 1.

Sample Report 1

	<----------Department name---------->						
	<Appl Dev->	<-Finance->	<Manufact->	<Marketng->	<-Retail-->	<Sys Supp->	<--TOTAL-->
Time	CPU seconds	CPU seconds	CPU seconds	CPU seconds	CPU seconds	CPU seconds	CPU seconds
07.00	70.45	37.94	59.64	34.55	38.94	33.67	275.19
08.00	211.18	134.12	137.35	66.45	105.73	84.02	738.85
09.00	114.02	205.97	267.25	87.63	105.80	38.65	819.32
10.00	217.00	254.56	233.83	129.98	243.34	123.26	1201.97
11.00	178.85	107.87	234.51	163.52	204.87	100.02	989.64
12.00	38.74	68.49	36.60	16.74	51.48	39.54	251.59
13.00	165.48	156.54	185.19	65.45	175.58	76.02	824.26
14.00	204.09	186.38	198.06	41.67	104.72	105.56	840.48
15.00	278.02	268.75	159.89	89.63	114.41	76.31	987.01
16.00	103.34	171.02	178.80	89.73	102.26	88.08	733.23
17.00	36.93	19.73	44.10	59.58	43.30	3.79	207.43
	1618.10	1611.37	1735.22	844.93	1290.43	768.92	7868.97

IBM Z Performance and Capacity Analytics Report: SAMPLE01

Figure 51. Sample Report 1, tabular version

Figure 52 on page 68 shows Sample Report 2.

```
                              Sample Report 2


                                               Average
   Month      Department  User        Trans-   response     CPU      Pages
 start date      name      ID        actions   seconds    seconds   printed
 ----------  ----------  --------  --------  --------  --------  --------
 2000-01-01  Appl Dev    ADAMS         1109      3.84    244.13       821
                         JONES         1138      3.40    228.79      1055
                         SMITH          870      4.27    183.03       864
                                   --------  --------  --------  --------
                                *      3117      3.84    655.95      2740

             Finance     GEYER          509      4.29    115.97       529
                         HAAS           786      3.56    137.48       648
                         PARKER         462      6.79    171.51       704
                         SPENCER        800      3.33    172.82       640
                                   --------  --------  --------  --------
                                *      2557      4.50    597.78      2521
...
                                   ========  ========  ========  ========
                                      36396      4.03   7868.97     38711


                    IBM Z Performance and Capacity Analytics Report: SAMPLE02
```

Figure 52. Sample Report 2

Figure 53 on page 68 shows Sample Report 3.

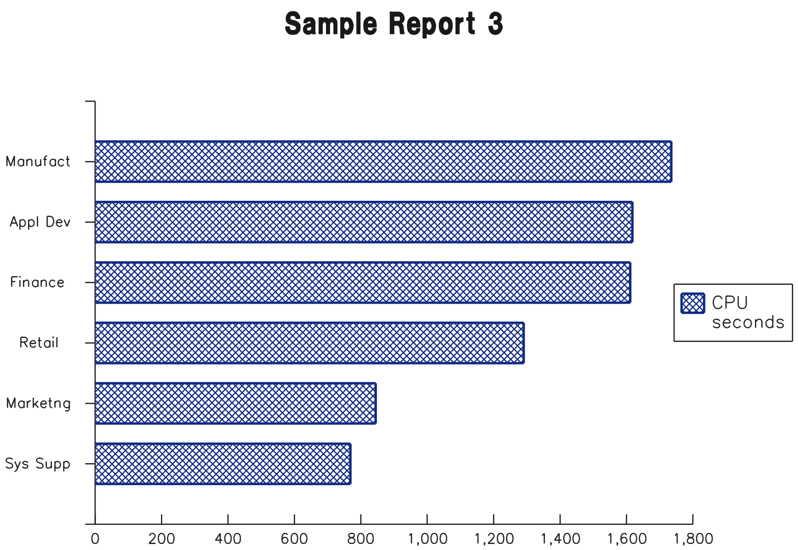

Figure 53. Sample Report 3

Chapter 8. Using other Reporting Dialog functions

This chapter describes how to change batch settings for reports, define reports for batch processing, run reports in batch mode, view and send messages in IBM Z Performance and Capacity Analytics, and set dialog parameters.

Changing the batch settings for a report

About this task

You can associate batch settings with a report to specify whether the report should be run in batch, how often it should be run (daily, weekly, or monthly), and where the batch reporting utility should direct the report output.

You set the batch settings from the Batch Settings pop-up, which you can display for a report using either of these methods:

- Select the report in the Reports window, and from the **Batch** pull-down, select option 1 **Set batch options for report**
- Press **Batch (F11)** in the Report Definition pop-up for the selected report

Figure 54 on page 69 shows the Batch Settings pop-up.

```
                SAMPLE_02 Batch Settings

Type information. Then press Enter to save and return.

Produce report in batch   2_  1.  Yes
                              2.  No

Run cycle . . . . . . . . 1_  1.  Daily
                              2.  Weekly
                              3.  Monthly

Output option . . . . . . 1_  1.  Print report
                              2.  Save report
                              3.  Print and save report
Save member name  . . . . ________

 F1=Help     F2=Split    F9=Swap    F12=Cancel
```

Figure 54. Batch Settings pop-up

To change the settings in the Batch Settings pop-up:

Procedure

1. To have IBM Z Performance and Capacity Analytics produce the report in batch, type 1 in the Produce report in batch field. Type 2 (the default) to produce the report in the foreground (interactively).
2. For reports you want IBM Z Performance and Capacity Analytics to produce in batch, specify in the Run cycle field the frequency with which you want the report run.
3. For reports you want IBM Z Performance and Capacity Analytics to produce in batch, specify in the Output option field where to direct the output of the report.
4. If you specified Save or Print and save in the Output option field, specify a member name in which to save the report in the Save member name field.

   Note: You can select Print for graphic reports only if you are using QMF with the reporting dialog.
5. When you have completed the fields in the Batch Settings pop-up, press Enter.

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IBM Z Performance and Capacity Analytics saves the settings for the report and returns to either the Reports window or the Report Definition pop-up, depending on how you invoked the Batch Settings pop-up.

Defining reports for batch execution

All IBM Z Performance and Capacity Analytics reports can be produced in batch. However, most of them are not suited for it because you must supply values for all the variables used in the queries and forms.

For example, a typical query looks like this:

```
SELECT column1, column2, ...
 FROM table
 WHERE DATE <= &FROM_DATE
    AND DATE >= &TO_DATE
    AND SYSTEM_ID = &SYSTEM_ID
```

When the report is displayed in the dialog, IBM Z Performance and Capacity Analytics prompts you for the values for FROM_DATE, TO_DATE, and SYSTEM_ID. If you run this report in batch must supply these values in the job, and you must change them when you want the reports to cover a different time period.

It would be better to change the query to something like this:

```
SELECT SYSTEM_ID, column1, column2, ...
 FROM table
 WHERE DATE >= CURRENT DATE - 7 DAYS
```

This query requires no variables and always covers the last week.

The forms used for the IBM Z Performance and Capacity Analytics reports also contain at least three variables (REPORT_TITLE, PRODUCT_NAME, and REPORT_ID). For a batch report, you should create a new form without these variables.

Using an existing report as a template for a new report describes how to create a new report by using an existing report as a base. You can use this method to create reports that are better suited for batch processing.

Running reports in batch mode

About this task

You can run reports that you need on a regular basis using the batch utility instead of running them in the foreground. The reporting dialog lets you specify criteria for running batch jobs. Typically, you use the reporting dialog to prepare reports for batch reporting, and then use the batch reporting utility to run them. For more information about IBM Z Performance and Capacity Analytics batch reporting, refer to the *Administration Guide and Reference*.

To run one or more individual reports in batch mode using the reporting dialog:

Procedure

1. From the Reports window, select the reports you want to run in batch mode. Then select option 2 **Invoke batch** from the **Batch** pull-down.

   If any of the reports that you have selected contain variables that require values, IBM Z Performance and Capacity Analytics displays the Batch Reports Data Selection pop-up (Figure 55 on page 71). This pop-up contains entry fields for all of the variables in all of the selected reports.

```
                      Batch Reports Data Selection         Row 1 to 4 of 4

Type information.  Then press Enter to edit JCL.

Report ID  . : CICS A06 Transactions by MVS CPU sec, Daily

Variable            Value                                    Oper  Req
MVS_SYSTEM_ID       ______________________________________   >  =     Yes
CICS_SYSTEM_ID      ______________________________________   >  =     Yes
FROM_DATE           ______________________________________   >  =     Yes
TO_DATE             ______________________________________   >  =     No
****************************** Bottom of data ********************************


Command ===> ____________________________________________________________
 F1=Help       F2=Split       F7=Bkwd        F8=Fwd         F9=Swap
F10=Show fld   F12=Cancel
```

Figure 55. Batch Reports Data Selection pop-up

2. Provide values for the variables by typing the values in the fields provided. Note that the Batch Reports Data Selection pop-up does not let you specify values using prompted fields.
3. After you complete all the necessary fields on the Batch Reports Data Selection pop-up, press Enter.

   IBM Z Performance and Capacity Analytics begins an ISPF editing session with the JCL file to be submitted to run the reports.

   Figure 56 on page 71 shows sample JCL. If your installation does not use QMF, no QMF libraries are included.

```
EDIT ---- USER1.SPFTEMP1.CNTL ------------------------------ COLUMNS 001 072
****** ***************************** TOP OF DATA ******************************
000001 //USER1A  JOB  (ACCOUNT),'NAME'
000002 //*
000003 //*
000004 //*
000005 //*****************************************
000006 //* BATCH REPORTING
000007 //*****************************************
000008 //EPDMBAT EXEC PGM=IKJEFT01,DYNAMNBR=25
000009 //STEPLIB  DD DISP=SHR,DSN=DRLxxx.SDRLLOAD
000010 //         DD DISP=SHR,DSN=QMFloadlibrary
000011 //         DD DISP=SHR,DSN=db2loadlibrary
000012 //SYSPROC  DD DISP=SHR,DSN=DRL.LOCAL.EXEC
000013 //         DD DISP=SHR,DSN=DRLxxx.SDRLEXEC
000014 //         DD DISP=SHR,DSN=QMCLISTlibrary
000015 //SYSEXEC  DD DISP=SHR,DSN=DRL.LOCAL.EXEC
000016 //*****************************************
Type SUBMIT on the command line to start batch processing.
COMMAND ===>                                                 SCROLL ===> PAGE

 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=RFIND     F6=RCHANGE
 F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

Figure 56. ISPF editing session with JCL

4. If necessary, make changes in the job card information. When the JCL is ready, type **SUBMIT** at the command line and press Enter.

   IBM Z Performance and Capacity Analytics submits the batch job and returns to the Reports window.

What to do next

To run reports that are members of a particular group or associated with a particular batch cycle:

1. Without selecting any reports in the Reports window, from the **Batch** pull-down, select option 2 **Invoke batch**.

   IBM Z Performance and Capacity Analytics displays the Batch Reports Selection pop-up (Figure 57 on page 72).

   Note: If you are using the reporting dialog without QMF, the Printer field is not shown on this window.

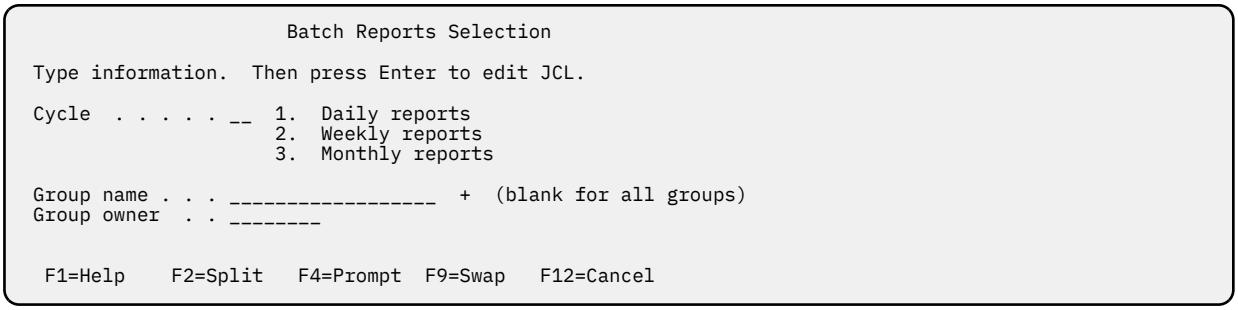

Figure 57. Batch Reports Selection pop-up

2. Select the execution cycle of the batch reports you want to submit (daily, weekly, or monthly) and type the corresponding number in the Cycle selection field. The default is 1 (daily).
3. If the reports you want to run are in a group, type the name of the group in the Group name entry field. The Group name is a prompted field; to see a list of groups that are currently defined, move the cursor to the Group name field and press **F4**. If the group is not public, type the name of the owner in the Group owner field. (For more information about working with report groups, see Working with report groups.)

   If you do not specify a report group, IBM Z Performance and Capacity Analytics uses all reports included in the specified batch execution cycle.

   After you specify the execution cycle and (optionally) the group name and owner, press Enter.

   If any of the reports contain variables, IBM Z Performance and Capacity Analytics displays the Batch Reports Data Selection pop-up. Type the values for the variables in the fields and press Enter to return to the Batch Reports Selection pop-up.
4. When you have completed all of the fields in the Batch Reports Selection pop-up, press Enter. IBM Z Performance and Capacity Analytics begins an ISPF editing session with the JCL for the batch job.
5. If necessary, edit the job card information in the JCL. Submit the job by typing **SUBMIT** at the command line and pressing Enter.

   IBM Z Performance and Capacity Analytics submits the job for batch processing and returns to the Reports window.

Viewing and sending messages

About this task

IBM Z Performance and Capacity Analytics administrators and users can send messages to each other using the IBM Z Performance and Capacity Analytics messages option.

Note: Users can use this option to send messages to administrators, but not to each other. An administrator can send messages to any IBM Z Performance and Capacity Analytics user.

To send a message to an administrator (or, if you are an administrator, to an IBM Z Performance and Capacity Analytics user):

Procedure

1. Select option 6 **Messages** from the **Other** pull-down on the Reports window.

   The Message Options pop-up is displayed.
2. In the Message Options pop-up, select option 2 **Send message**. The Message Text pop-up is displayed.
3. Complete the Message Text pop-up with the user ID of the administrator to whom you are sending the message, the subject of the message, and the message text itself.
4. When you finish typing the message, press **F5** to send it.

IBM Z Performance and Capacity Analytics sends the message and returns to the Message Options pop-up.

What to do next

You can look at messages that you have sent to the IBM Z Performance and Capacity Analytics administrator and that the administrator has sent to you (and, if you are an administrator, messages the IBM Z Performance and Capacity Analytics users have sent to you).

To view messages that you have sent or received:

1. In the Reports window, select option 6 **Messages** from the **Other** pull-down. IBM Z Performance and Capacity Analytics displays the Message Options pop-up.
2. Select option 1 **View messages** to display the Message Log window (Figure 58 on page 73).

```
                              Message Log                  ROW 19 FROM 34

Select a message.  Then press Enter to display.

/   Date        From      Subject
_   00/02/16    EPDMADM   New DFSMS reports
_   00/02/17    EPDMADM   CICS update
****************************** BOTTOM OF DATA ******************************


Command ===> ____________________________________________________________
F1=Help     F2=Split    F3=Exit     F7=Bkwd     F8=Fwd      F9=Swap    F11=Delete
F12=Cancel
```

Figure 58. Message Log window

3. Select the message that you want to display from the list in the Message Log window and press Enter. IBM Z Performance and Capacity Analytics displays the Message Text pop-up containing the text of the message you select.
4. When you finish viewing the message, press **Cancel (F12)** to return to the Message Log window.

To delete a message in the Message Log window, select the message you want to delete and press **Delete (F11)**. IBM Z Performance and Capacity Analytics prompts you to confirm the delete action.

Customizing the reporting dialog

About this task

You can set dialog parameters to control which data sets IBM Z Performance and Capacity Analytics uses to store your reports, charts, and messages. These dialog parameters also control some aspects of the IBM Z Performance and Capacity Analytics environment.

To view or change the dialog parameters:

Procedure

1. Select option 1 **Dialog parameters** from the Options pull-down in the Reports window.

   IBM Z Performance and Capacity Analytics displays the Dialog Parameters pop-up.
2. You can change the values of the parameters by typing over the information that you want to change, and then press Enter.

   Note:

   - Some of these parameters do not take effect in the dialog until you exit and restart.
   - Not all of the parameters in the Dialog Parameters pop-up are related to the reporting dialog. For a complete description of the IBM Z Performance and Capacity Analytics dialog parameters, refer to the *Administration Guide and Reference*.

Chapter 9. Reporting Dialog navigation reference

This section describes the functions you can access from the Reports window. You access these functions by moving the cursor to the menu-bar option whose pull-down contains the function you want, and pressing Enter. With the pull-down displayed, select an option in one of these ways:

- Type its number in the selection field inside the pull-down and press Enter.
- Press the up arrow or down arrow keys until the cursor is on the line of the action you want to perform, and then press Enter.

Figure 59 on page 75 shows the Reports window.

```
  Report  Batch  Group  Search  Options  Other  Help
 ----------------------------------------------------------------------------
             IBM Z Performance and Capacity Analytics Reports        ROW 25 TO 35 OF 625

Select a report. Then press Enter to display.

Group  . . . . . : All reports

/   Report                                            ID
_   Network Average Host Transit Time, Worst Case     NWNT06
_   Network Average Oper Transit Time, Worst Case     NWNT02
_   Network Average Transit Time Objective, Worst Case  NWNT04
_   Network Config Communication Controllers, Detail    NWNG08
_   Network Config Communication Controllers, Overview  NWNG02
_   Network Config Devices, Detail                    NWNG11
_   Network Config Last Collect Changed Devices       NWNG12
_   Network Config Last Collect Changed Software      NWNG13
_   Network Config Last Collect New Devices, Overview   NWNG01
_   Network Config Last Collect New Software, Overview  NWNG05
_   Network Config LUs, Detail                        NWNG10

Command ===> ____________________________________________________________
 F1=Help      F2=Split     F3=Exit      F4=Groups    F5=Search    F6=Listsrch
 F7=Bkwd      F8=Fwd       F9=Swap     F10=Actions  F11=Showtype F12=Cancel
```

Figure 59. The Reports window

The Report pull-down

The Report pull-down (Figure 60 on page 75) provides options to let you perform actions on individual reports. If QMF is installed on your system, it is used to perform some of the actions below. Otherwise, the IBM Z Performance and Capacity Analytics built-in report generator is used.

```
   Report  Batch  Group  Search  Options  Other  Help
 --------------------------------------------------------------------------------
 | _  1. New...                          |
 |    2. Open report definition...       |
 |    3. Display...              Enter   |
 |    4. Save report data...             |
 |    5. Delete...                       |
 |    6. Print...                        |
 |    7. Print list...                   |
 |    8. Exit...                 F3      |
 +---------------------------------------+
```

Figure 60. Report pull-down

The Report pull-down contains these options:

New
: See Creating a new report using QMF or Creating a new report with the report generator.

Open report definition
: See Opening a report definition.

Display
: See Displaying a report.

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Save Report Data
See Saving report data.

Delete
See Deleting a report.

Print
See Printing a report.

Print list
See Printing a list of reports.

Exit
See Exiting the reporting dialog.

The Batch pull-down

The Batch pull-down (Figure 61 on page 76) provides options that let you use the batch utility to process reports.

```
  Report  Batch  Group  Search  Options  Other  Help
--------+-------------------------------------+-----------------------------
        | _  1. Set batch options for report... |
        |    2. Invoke batch...                |
        +--------------------------------------+
```

Figure 61. Batch pull-down

The Batch pull-down contains these options:

Set batch options for report
See Changing the batch settings for a report.

Invoke batch
See Running reports in batch mode.

The Group pull-down

The Group pull-down (Figure 62 on page 76) provides options that let you perform actions on groups of reports.

```
  Report  Batch  Group  Search  Options  Other  Help
--------------+-----------------------------------------------+-------------
              | _  1. Save selected reports as a group...     |
              |    2. List report groups...               F4  |
              +-----------------------------------------------+
```

Figure 62. Group pull-down

The Group pull-down contains these options:

Save selected reports as a group
See Creating a report group.

List report groups
See Listing report groups.

The Search pull-down

The Search pull-down (Figure 63 on page 77) provides options that let you search the list of reports for reports that meet criteria you specify.

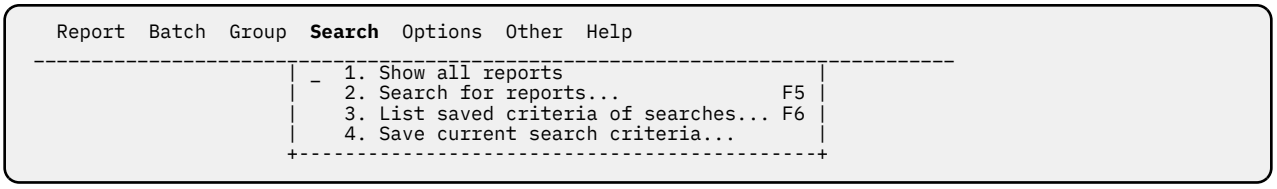

Figure 63. Search pull-down

The Search pull-down contains these options:

Show all reports
Shows all available reports.

Search for reports
See Searching by description and attributes.

List saved criteria of searches
See Listing, modifying, and deleting saved search criteria.

Save current search criteria
See Saving search criteria.

The Options pull-down

The Options pull-down (Figure 64 on page 77) provides options that let you customize the way the reporting dialog works for you.

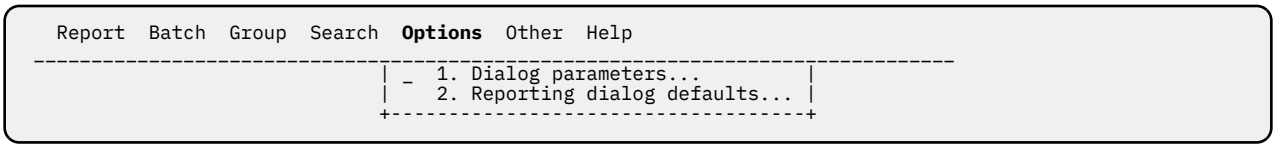

Figure 64. Options pull-down

The Options pull-down contains these options:

Dialog parameters
See Customizing the reporting dialog.

Reporting dialog defaults
See Starting the reporting dialog for the first time.

The Other pull-down

The Other pull-down (“The Other pull-down” on page 77) provides options that let you access services outside of the reporting dialog.

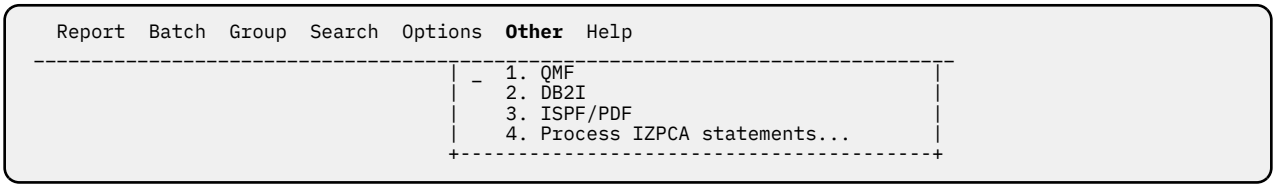

Figure 65. Other pull-down

The Other pull-down contains these options:

QMF
Initiates a QMF session, if QMF is available in your installation.

DB2I
Initiates a DB2I session.

ISPF/PDF
Initiates an ISPF/PDF session.

Process IZPCA statements
Refer to the *Administration Guide and Reference*.

The Help pull-down

The Help pull-down (“The Help pull-down” on page 78) provides options that let you access online help information.

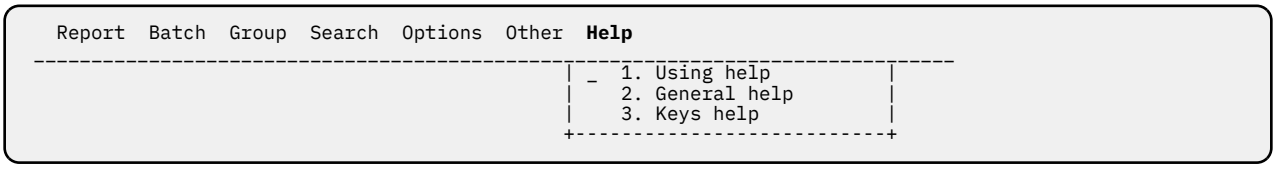

Figure 66. Help pull-down

The Help pull-down contains these options:

Using help
See Getting help on using help.

General help
See Getting general help.

Keys help
See Getting keys help.

Chapter 10. Preparing for web reporting

There are a number of steps you need to follow to correctly install, configure and use IBM Z Performance and Capacity Analytics web reporting.

- Configure Db2 on z/OS for JDBC access.
- Install the web reporting companion product, such as IBM Cognos Analytics. Then refer to Chapter 11, “Implementing Cognos reporting,” on page 81 for installing and configuring the IBM Z Performance and Capacity Analytics Cognos report packages.
- Add in the JDBC drivers for accessing Db2 on z/OS.
- Configure the IBM Z Performance and Capacity Analytics web reporting parameters file.
- Optionally, off-platform web reporting tools such as Splunk and ELK can be setup for IBM Z Performance and Capacity Analytics reporting. Refer to Chapter 12, “Implementing Splunk and ELK reporting,” on page 91 for the installation and configuration instructions.

Configuring Db2 on z/OS for JDBC access

In order for a JDBC client program, such as IBM Cognos Analytics, to communicate with Db2 on z/OS, Db2 itself must be configured to handle incoming connections.

This involves setting up special stored procedures and tables and ensuring that WLM is installed.

Details can be found in the relevant *Application Programming Guide and Reference for Java* for your version of Db2 for z/OS.

Adding in the JDBC drivers for accessing Db2 on z/OS

About this task

For a device connecting to Db2 for z/OS, such as a central server running Cognos, to access the IBM Z Performance and Capacity Analytics data stored in Db2 tables, you need to install the correct JDBC drivers into Cognos.

Procedure

1. Download the JDBC drivers from the Db2 for z/OS files location.
   For example, the drivers may be found at the following location, although consult with your Database Administrator to confirm the exact location for the correct version of Db2:

   `/usr/lpp/db2_version/jdbc/classes/`
2. Copy the following jar files to the drivers directory for Cognos.
   For example, the default directory for Windows is located at:

   ```
   C:\Program Files\IBM\cognos\analytics\drivers
   ```

   The required files are:

   db2jcc.jar
   Universal type 4 JDBC driver

   db2jcc_license_cisuz.jar
   License file
3. Once these files have been copied, you may need to stop and restart the Cognos server.

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Configuring the web reporting parameters file

About this task

In addition to the JDBC drivers, the IBM Z Performance and Capacity Analytics web reporting report packs use an external file to control which Db2 server and instance to connect to. This allows changes to be made to the Db2 server configuration easily without regenerating the report packs or reconfiguring database parameters within Cognos itself.

Procedure

Create a parameters file in the root directory of the device where Cognos is running.

This is typically `C:\` under Windows. The file should be named `tdszweb_params.txt` and contain five lines with the following information:

- JDBC connection string
- User ID to use
- Password for that user ID
- Standard schema name
- System schema name

For example:

```
jdbc:db2://bobs_mainframe.bobs_company.com:5000/QXPBOB1
bob
bobs_password
drl.
drlsys.
```

a) The JDBC connection string is available from the administrators who set up Db2 for z/OS for JDBC access. The components are typically:

- A fixed prefix for Db2 JDBC connections, `jdbc:db2://`
- The DNS name of the System z, for example, `bobs_mainframe.bobs_company.com`
- A fixed separator for the port, `:`
- The port number to connect to, for example, `5000`
- A fixed separator for the instance, `/`
- The database instance, for example, `QXPBOB1`
- Any other configuration details such as debugging, for example,

  `:traceFile=c:/db2.trc;traceLevel=-1;`

b) Since the user ID and password are stored in clear text, the following best practices should be adhered to for security when running Cognos in a server environment. If each user has their own copy of Cognos (and the required licenses), they can configure the parameters file to use their own user ID.

Best practices include:

- Limit access to the machine where Cognos is running.
- Use a functional ID rather than one that belongs to a user.
- Limit the power of that functional ID as much as practicable. That means no write access to the database, and limit TSO and other non-database access.

c) The schema and system schema should be left as `drl.` and `drlsys.` respectively unless you have used different naming standards when installing IBM Z Performance and Capacity Analytics.

d) Synchronize the user ID and password in this parameters file with RACF on z/OS.

The use of a functional ID may ease that process if the normal password expiry rules can be relaxed.

Chapter 11. Implementing Cognos reporting

Cognos is provided with IBM Z Performance and Capacity Analytics for web reporting. After installing Cognos and configuring Db2 on z/OS for JDBC access, follow these steps to install the supplied IBM Z Performance and Capacity Analytics web report packages on your Cognos server.

In response to new function requests, IBM Z Performance and Capacity Analytics web reporting report packs are updated continuously and shipped as APARs.

Cognos reporting files are provided in binary format in the *HLQ*.SDRLBIN library.

All functionality for Cognos web reporting in IBM Z Performance and Capacity Analytics is provided in two packages:

- a report package
- a metadata package that contains data table mappings

Table 2. Cognos report packages

Binary file name in *HLQ*.SDRLBIN	**File type**	**Name of downloaded zip file**	**IZPCA Component**	**File contents description**
DRLWCPCA	Report package	IZPCA_ReportsPack.zip	IBM Z Performance and Capacity Analytics	IBM Z Performance and Capacity Analytics reports
DRLWC31M	Data table mappings	DRLWC31M.zip	N/A	IBM Z Performance and Capacity Analytics Data table mappings

Step 1: Importing Cognos report packages

Follow these instructions for installing the supplied web report packages on your Cognos server. The procedure is described for one IBM Z Performance and Capacity Analytics component. Repeat the procedure for each component.

Before you begin

If you are installing a refresh package, that is, you have previously installed a Cognos report package for an IBM Z Performance and Capacity Analytics component, then correspondingly, you must delete the previous version as an important first step before installing the new web report package.

To delete the previous version, navigate to the Team Content folder in the IBM Cognos Analytics window, right click the IZPCA folder and click **Delete**.

When the Confirm Delete window is displayed, click **OK** to confirm the delete request.

About this task

The instructions are provided for one IBM Z Performance and Capacity Analytics component as an example, the z/OS Key Performance Management (KPM) component. Repeat these steps for each report package you want to install by adjusting for the corresponding component names. For a list of the supplied and suggested package names, refer to Table 2 on page 81.

Procedure

1. Download the report package file from the *HLQ*.SDRLBIN library (DRLWCPCA) in binary format and then rename it to a .zip file.
   For example, rename the downloaded DRLWCPCA binary file as "IZPCA_ReportsPack.zip".

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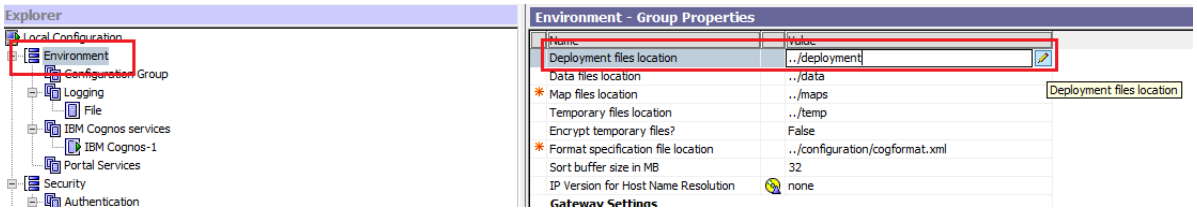
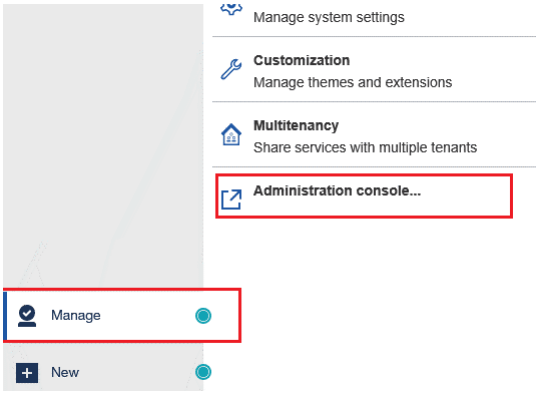
2. Locate the deployment folder where Cognos is installed:
   a) Open the local Cognos Configuration.
   b) Select the **Environment** node, then click the pencil next to **Deployment files location** to identify the folder.



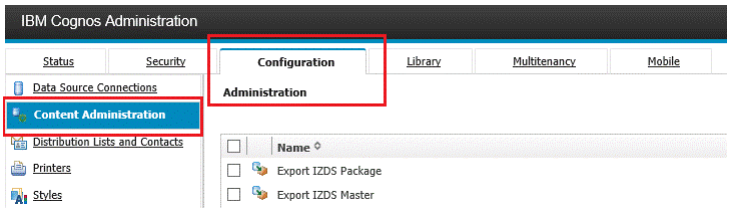
3. Copy the downloaded zip file into the Cognos folder identified in the previous step.
   For example, the default location is:

   ```
   C:\Program Files\IBM\cognos\analytics\deployment
   ```

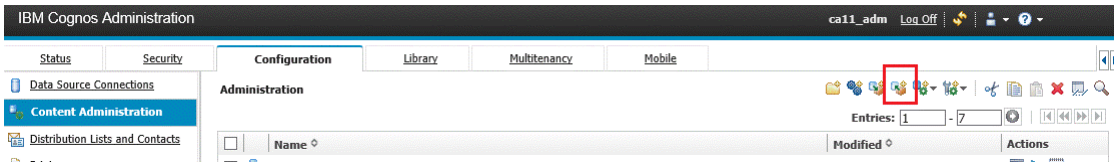
4. Open Cognos and navigate to the **Administration console**.



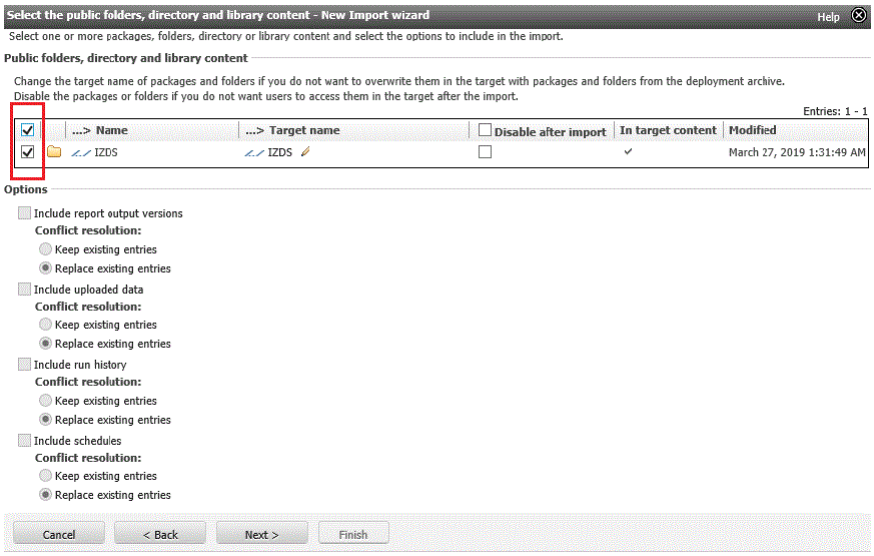
5. Select the **Configuration** tab, and then from the left side menu, select **Content Administration**.



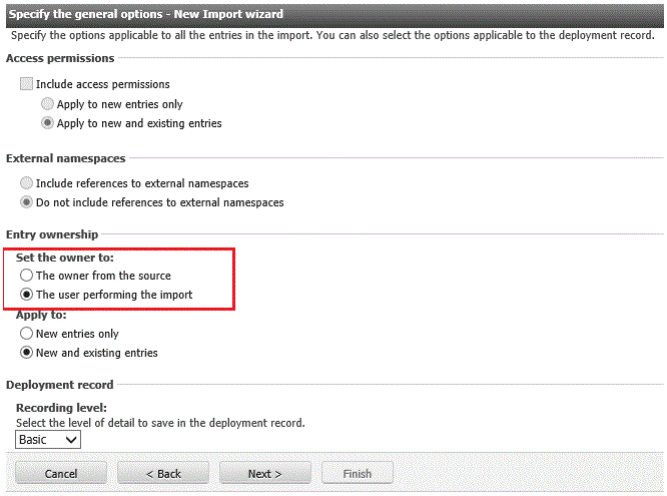
6. If an import job has previously been created for the same package, jump to step “7” on page 83. Otherwise follow the instructions below to create a new import job:
   a) Click the icon to **Create a New Import**.



   b) Select a deployment archive from the list, for example IZPCA_ReportsPack, then click **Next**.
   c) Specify a name for the import job, for example IZPCA Reports Import, then click **Next**.
   d) Ensure the import objects are checked in the list.

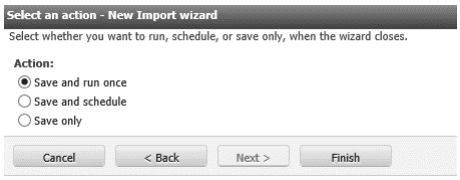


e) Set the owner to "the user performing the input", then click **Next**.



f) Review the summary, then click **Next**.

g) Select a save action, then click **Finish** to move ahead to step “8” on page 83.



7. Click the **Run** button next to 'IZPCA Reports Import'.
8. Click the **Run** button and then the **OK** button to run the import.
9. If your schema names are DRL and DRLS, confirm that the installation is successful by running the installed reports in the Cognos reports folders. If your schema names are not DRL and DRLS, proceed to the next step to change the default schema names of DRL and DRLS to your schema name.

What to do next

Repeat the procedure for each component.

Step 2: Changing the schema name in Framework Manager

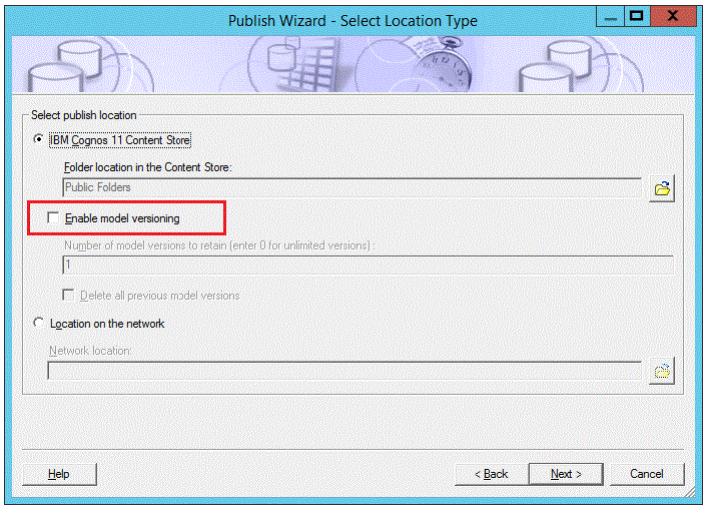
After importing the report package, if your schema names are not DRL and DRLS, then you must change the schema name in Framework Manager.

About this task

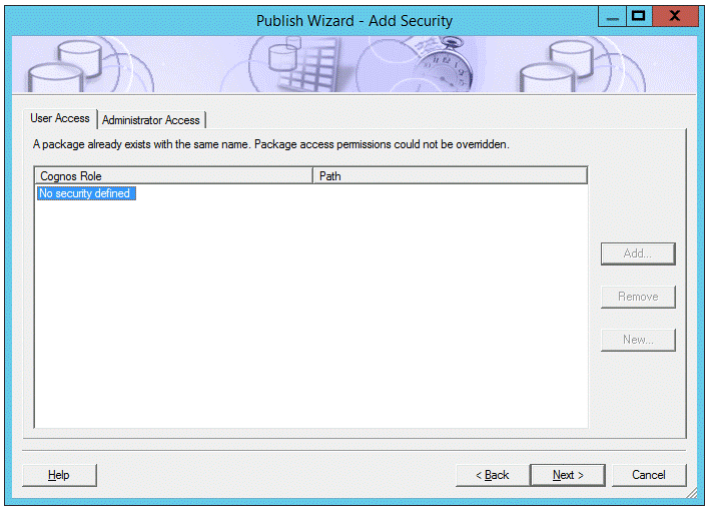
Note: This step applies to installations with one schema. If you operate in an environment where Cognos users must be restricted to differing schemas, then skip this step and follow the instructions in "Step 3: Dynamic schema changing (optional)" on page 85.

Procedure

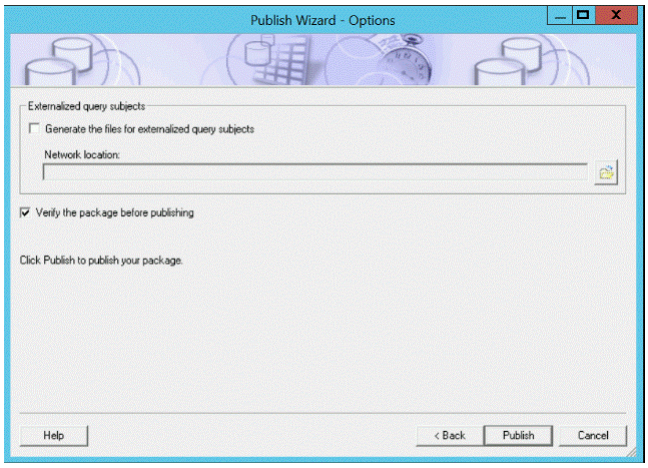
1. Download the data table mappings file in binary format from the *HLQ*.SDRLBIN library (DRLWC31M for Cognos 11), and then rename it to a zip file. For example, DRLWC31M.zip.
2. Extract this zip file content to a folder that is available for Framework Manager to access, such as `C:\CognosFM`.
3. Run Framework Manager, and then select **Open a project** and navigate to the IZPCA_Release.cpf file.
4. Navigate to the Data Sources tree, select Data Source IZDS_DRL, then click the ellipsis (**...**) next to Schema. Change the schema to the correct schema name.
5. Repeat the previous step for Data Source IZDS_DRLS.
6. Open the Packages tree, right-click and select the report package name **Publish Packages**.
7. Ensure the publish location folder is correct. Select **Team Content** > **IBM Z Performance and Capacity Analytics**.
8. Deselect **Enable model versioning**, then click **Next**.



9. Click **Next** again.



10. Ensure **Verify the package before publishing** is checked, then click **Publish**.



11. Click **Yes** to overwrite.
12. Click **Finish** to complete the process.
13. Confirm that the installation is successful by running the installed reports in the Cognos reports folders.

Step 3: Dynamic schema changing (optional)

For Administrators. Dynamic schema changing is an optional consideration if your installation has multiple schema that require different data access permissions. These instructions provide a method of limiting user access to particular schema.

Procedure

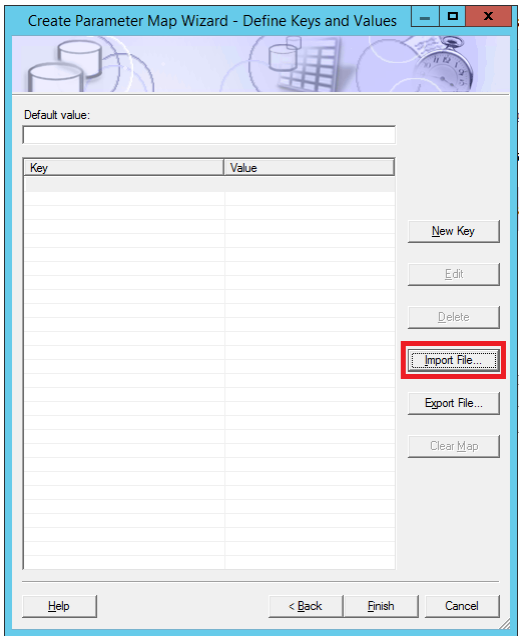
1. Download the data table mappings file in binary format from the *HLQ*.SDRLBIN library (DRLWC31M), and then rename it to a zip file. For example, DRLWC31M.zip.
2. Extract this zip file content to a folder that is available for Framework Manager to access, such as `C:\CognosFM`.
3. Run Framework Manager, and then select **Open a project** and navigate to the IZPCA_Release.cpf file.
4. Create a comma delimited file with the following columns:

   `<Cognos User ID>, <Db2 Schema>`

   This file will map each user to the Db2 schema they can access.
5. Open Framework Manager model file, right-click **Parameter Maps** and select **Create**.

a) Call the Parameter Map `UserMap` and click **Next**.

b) Import the file you just created.

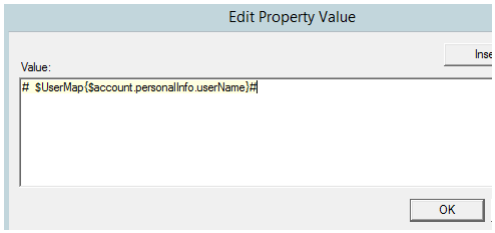


6. Click on the IZDS_DRL data source, then click the ellipsis (**...**) next to Schema.

   a) Delete the text in the box.

   b) Insert the following text, then click OK.

   ```
   # $UserMap{$account.personalInfo.userName}#
   ```



7. To publish the package, jump to step "6" on page 84 and follow the remaining steps in "Step 2: Changing the schema name in Framework Manager" on page 84 to complete the installation.

What to do next

Repeat these steps for all packages that will require dynamic schema changes.

Other considerations

To prevent problems before they occur, this is a list of potential risks and suggested mitigation strategies.

Risks

1. The comma delimited file is mapped incorrectly and users are mapped to the wrong schema.

   Mitigation:

   - Prefix the Cognos User ID with a company code. For example, *ABC-JSmith* where ABC is the company code.
   - Ensure the file is peer reviewed.

2. Users who have been given permission to create reports will be able to create custom SQL queries on any schema.

Mitigation:

- Restrict the Cognos Db2 login ID to only tables within the IZPCA schemas and deny to any Db2 system schemas.
- Turn off the ability for users to create reports using custom SQL:
  - Login to the Cognos Administration Console.
  - Click the **Security** tab, then select **Capabilities** from the left menu.
  - Browse and click **Report Studio** in the list.
  - Click the down arrow next to **User Defined SQL**, then click **Set Properties**.
  - Click the Permissions tab and remove permissions from Authors. (Note: no other roles in this list should be assigned to user logins.)

Cognos Secure Data Server connection
The IBM Z Performance and Capacity Analytics database is contained in Db2 z/OS. The connection to this database must be established for Cognos to read the application data and render reports. The communication is established via the JDBC driver connecting to DDF for the Db2 z/OS subsystem.

Your environment may have enhanced security features enabled for the DDF connections which require additional settings for the connection to be established. If encryption has been enabled and the proper setup has not been completed the following message can be found in the log when the Data Store connection is Tested: **00D30116**

Explanation - Authentication of a remote user was rejected by Db2. The TCPALVER (TCP/IP Already Verified) subsystem parameter has been set to SERVER_ENCRYPT and the user ID and password authentication that was provided is not allowed because the password could not be evaluated to be a RACF PassTicket.

Server Setup

To enable the additional security features the following should be done on the Cognos server:

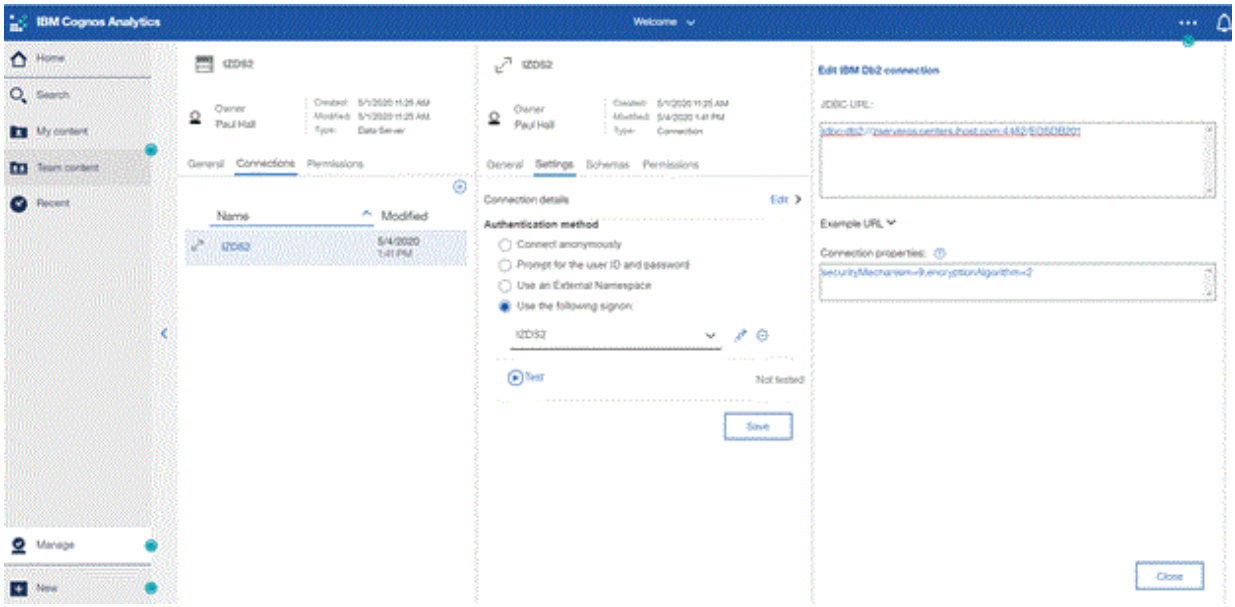
1. Download the JCE Unlimited Strength Jurisdiction Policy File for the relevant release of Java from the IBM website at https://www14.software.ibm.com/webapp/iwm/web/preLogin.do?source=jcesdk
2. Obtain a copy of db2jcc_license_cisuz.jar from your DBA
3. Extract the contents of the JCE Unlimited Strength policy file
4. Rename current files:
   a. cd <inst_dir>/jre/lib/security
   b. rename local_policy.jar to local_policy_orig.jar
   c. rename US_export_policy.jar to US_export_policy_orig.jar
5. Copy new files:
   a. cd <inst_dir>/jre/lib/security
   b. copy the local_policy.jar file to the Cognos security directory
   c. copy the US_export_policy.jar file to the Cognos security directory
   d. cd <inst_dir>/drivers
   e. copy db2jcc_license_cisuz.jar to the Cognos drivers directory
6. Restart Cognos

Define the Data Server connection in Cognos

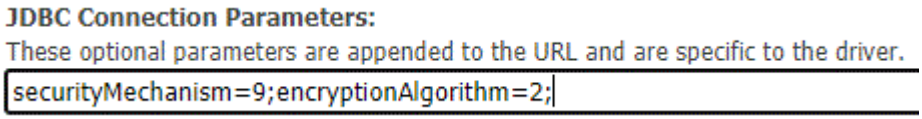
The required parameters are entered as Connection Properties in Cognos.

1. Launch the Cognos application in your browser

2. In the UI there are two ways to define the Data Server connection, either using the Admin Console or using the Data Server dialog. The Admin Console is for compatibility, but if this is a new environment use the Data Server dialog
3. Data Server Dialog (primary method) Note: a semi-colon is required between connection properties but not at the end of the parameters



4. Admin Console (alternate method) Note: a semi-colon is required between connection properties *and* at the end of the parameters



Step 4: Self-service reporting (optional)

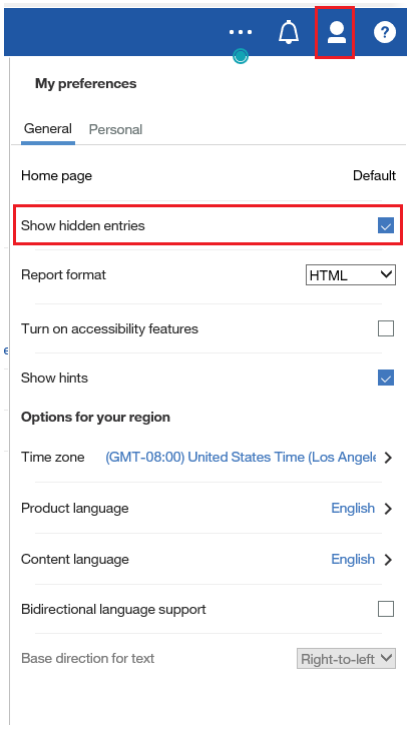
You can design your own reports using the supplied report metadata packages.

About this task

If you have authoring capability and wish to do self-service reporting, you will need to show hidden items in the Cognos folders to view the report metadata packages.

Procedure

1. Navigate to the Cognos folder, and select **My Preferences** > **General** > **Show hidden entries**.



2. Do not change the default reports folder. Any modifications made to the default reports folder are lost if a PTF is applied. Make a copy to another folder, and make customizations there. Keeping the customizations in a separate folder will allow retention of customizations when a PTF is applied.

Chapter 12. Implementing Splunk and ELK reporting

You can use Splunk and ELK, either or both, for off-platform reporting. Follow these steps to set up data streaming, and install and confgure the IBM Z Performance and Capacity Analytics dashboards for Splunk or ELK reporting.

The preliminary setup required for Splunk and ELK reporting can be found in the *Administration Guide and Reference*.

Configuring Splunk

Complete the following steps to install and configure the IBM Z Performance and Capacity Analytics dashboard components for off-platform Splunk reporting. The data is received from either the hopper of the Catcher Data Mover or from IBM Common Data Provider for z.

Before you begin

Ensure you have completed the preliminary steps for sending the IBM Z Performance and Capacity Analytics data off-platform as outlined in the *Administration Guide and Reference*

Installing and configuring the Data Receiver

Complete these steps to install and configure the Data Receiver for Splunk reporting.

Procedure

If using IBM Common Data Provider for z, refer to the IBM Common Data Provider for z Configuration documentation to install and configure the Data Receiver on the Splunk system.

For instructions, refer to the *IBM Common Data Provider for z User Guide*.

Creating a common Splunk index

Create an index in Splunk to hold the IBM Z Performance and Capacity Analytics data.

Procedure

1. Use the supplied ingestion package to create a common index in Splunk to hold the IBM Z Performance and Capacity Analytics data.

   All data will be stored in the same index, differentiated by table. The name of the index is:

   ```
   izds_data
   ```

2. To define a new index:
   a) Start the Splunk browser UI.
   b) Click **Settings** > **Indexes** > **New Index**.
   c) Specify the index name, leave the rest as default, then **Save** to create the new index.

Downloading and installing the dashboard files

IBM Z Performance and Capacity Analytics dashboards for Splunk reporting are provided by IBM Z Performance and Capacity Analytics, packaged as Splunk apps. These must be downloaded (in binary) and installed.

Before you begin

Ensure the **System** Environment variable (NOT a User Variable) CDPDR_PATH on your PC is set to a directory location to where your data is being received. If you chose the IBM Common Data Provider for z route, this should have been set in the previous configuration step.

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If you have an instance of Splunk currently installed, you will need to delete some existing folders and contents before the new install process can be completed.

1. Navigate to your Splunk install folder, then to `\etc\apps`
2. Delete the following folders:
   - IZDS_CP_CHANNEL
   - IZDS_CP_CPU
   - IZDS_CP_DISK
   - IZDS_CP_SCA
   - IZDS_CP_STORAGE
   - IZDS_CP_TAPE
   - IZDS_Data_Ingestion_Nix
   - IZDS_Data_Ingestion_Win
   - IZDS_Data_Owner
   - IZDS_KPM_CICS
   - IZDS_KPM_IMS
   - IZDS_KPM_ZOS
   - IBM_Z_Decision_Support_for_Capacity_Planning
   - IBM_Z_Decision_Support

About this task

The apps are SMP/E installed as parts into the SDRLUSS target library. The default location is:

`/usr/lpp/IBM/IZPCA/v3r1m0/IBM`

Table 3. Dashboard files for Splunk reporting

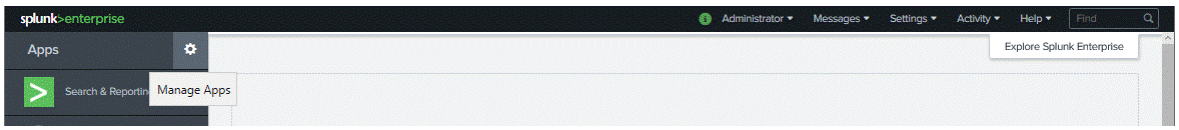
SDRLUSS part name	App file name	App description
DRLWS000	IZPCA_Data_Owner.spl	This must be installed. It contains the Data Ingestion code for Splunk and it is required for the Splunk data model mappings.
DRLWS001	IZPCA_Data_Ingestion_Nix.spl	This handles Data Ingestion to the common index on non-Windows platforms. Either this or the Windows version must be installed.
DRLWS002	IZPCA_Data_Ingestion_Win.spl	This handles Data Ingestion to the common index on the Windows platform. Either this or the non-Windows version must be installed.
DRLWSPCA	IBM_Z_Performance_and_Capacity_Analytics.tar	This must be untar'd, then the applications inside installed individually into Splunk.

Install the apps using the Splunk browser-based user interface (UI) as follows:

Procedure

1. Do a binary download of the required parts to a location accessible to the Splunk browser UI and rename each part to the corresponding App file name as listed in the table above (Table 3 on page 92).
2. Untar IBM_Z_Performance_and_Capacity_Analytics.tar to a temporary directory of your choosing. These .spl files are the homepages and dashboard files.

3. Start the Splunk browser UI and install the required apps by following these steps:
   a) Click the **Manage Apps** cog wheel next to **Apps**.



   b) On the top right, click **Install app from file**.
   c) Click the browse button, then select first the Data Ingestion app and install it.
   Install either of the following:

      For Windows: IZPCA_Data_Ingestion_Win.spl
      For non-Windows: IZPCA_Data_Ingestion_Nix.spl

   If there is data in your hopper directory, then the data should start being ingested/indexed. To view this progress, click **Settings** > **Indexes**. Observe the Event Count incrementing; Reload the page to view updates.
   d) From the browse button, select the Data Owner app and install it.

      IZPCA_Data_Owner.spl

   e) From the browse button, select the Homepage menu apps and install them.

      IBM_Z_Performance_and_Capacity_Analytics.spl
      IZPCA_KPM.spl

   f) From the browse button, select your desired dashboard apps and install them.

      IZPCA_CP_ANAL_EXCEP.spl
      IZPCA_CP_CPU.spl
      IZPCA_CP_CHANNEL.spl
      IZPCA_CP_DISK.spl
      IZPCA_CP_STORAGE.spl
      IZPCA_CP_SCA.spl
      IZPCA_CP_TAPE.spl
      IZPCA_CP_CICS.spl
      IZPCA_KPM_ZOS.spl
      IZPCA_KPM_CICS.spl
      IZPCA_KPM_IMS.spl

4. When you have installed all of the required apps, click **Settings** > **Server controls** > **Restart Now** and wait for Splunk to restart.

   Your dashboard apps are ready to be used.

Configuring ELK

Complete the following steps to install and configure the IBM Z Performance and Capacity Analytics dashboard components for off-platform ELK reporting. The data is received from either the hopper of the Catcher Data Mover or from IBM Common Data Provider for z.

Before you begin
Ensure you have completed the preliminary steps for sending the IBM Z Performance and Capacity Analytics data off-platform as outlined in the *Administration Guide and Reference*

Downloading and installing the dashboard files

IBM Z Performance and Capacity Analytics dashboards for ELK reporting are provided as archive files in the TAR format. The contents of these archives are ASCII files which must first be extracted and then used in the install process.

About this task

The files are SMP/E installed into the IBM Z Performance and Capacity Analytics ZFS. The default location is:

`/usr/lpp/IBM/IZPCA/v3r1m0/IBM`

Table 4. Dashboard files for ELK reporting

ZFS file name	Description
DRLWEING	Ingestion package for ELK
DRLWECPA	IZPCA reporting package for ELK

These members are tar files.

Procedure

Extract the contents of the tar files by using the following command where *source* is the ZFS file name listed in Table 4 on page 94 and *destination* is the location where you want the extracted contents of the tar file to reside: `tar -xvfo source -C destination`

This creates the following files:

DRLWEING (Ingestion)

B_IZPCA_Input.lsh
E_IZPCA_Filter.lsh
Q_IZPCA_Output.lsh

DRLWECPA (IZPCA reporting package)

IZPCA_Indexes.ndjson
IZPCA_Visualizations.ndjson
IZPCA_Dashboards.ndjson

When using FTP, these files are already in the required encoding, so use binary transfer.

Configuring Logstash

Complete these steps to configure the Logstash protocol for ELK reporting.

Procedure

1. Take the three Logstash configuration files and place them in your logstash configuration directory.

   Their naming convention is designed to work with the IBM Common Data Provider for z naming convention for members of the directory.

   - Edit B_IZPCA_Input.lsh to set the correct IP port that you want it to listen on for the connection from the IBM Common Data Provider for z Data Streamer. The default is '40404'.
   - Edit Q_IZPCA_Output.lsh to set the correct hostname (and port) for the elastic cluster. The default is simply 'localhost'.
2. Stop and restart Logstash to pick up the changes.

   Logstash should now be able to ingest IBM Z Performance and Capacity Analytics data sent from IBM Common Data Provider for z.

The data will be an index in Elastic, using the stream name as the index name (izpca_table_name) and a monthly index rollover (yyyy.mm).

3. You can modify the output stage to produce tables with a shorter roll over period, but be aware that if you are running a minimal ELK configuration (as you might have on a stand-alone test system), that this will place a lot of stress on the shard and possibly cause Elastic to fail.

What to do next

Wait for data

Ensure IBM Common Data Provider for z is feeding Logstash with data. Wait for a couple of hours to give it long enough to have downloaded at least one record in each of the KPMZ data tables.

Configuring Kibana

Complete these steps to configure Kibana for ELK reporting.

Procedure

1. Sign into Kibana.
2. Navigate to **Management**, then select **Saved Objects**.
3. Import the provided IBM Z Performance and Capacity Analytics newline-delimited JSON files in the following sequence:
    1. IZPCA_Indexes.ndjson
    2. IZPCA_Visualizations.ndjson
    4. IZPCA_Dashboards.ndjson

    The order is important as entries in the later files refer to entries in the earlier files. If the pre-requisite elements are not already imported, then the import of the file will fail.

    If you are missing data in any of the Elastic indexes behind the queries, the import for the Kibana Index Patterns that reference them will fail. This will lead to subsequent import failures for searches, visualizations and dashboards that depend upon them.

    Note: References between the objects are governed by identity strings that are encoded into the files. If you recreate any of the supporting entities for any reason, ensure that your recreation has the same identity as the IBM Z Performance and Capacity Analytics supplied version. If you don’t do this, then you’ll get errors about things not being found. You may be able to reimport the object from the supplied .json files.

What to do next

You shouldn’t need to restart ELK to pick up the changes.

Kibana IZPCA homepage

To access the new homepage navigate to:

```
http://XXX.XXX.XXX.XXX:5601/app/kibana#/dashboard/d4d23d00-f0bb-11ea-a417-2f876e2492bd
```

Where *XXX.XXX.XXX.XXX* is the IP address of your Kibana instance. If your browser cannot find the page, navigate to the Kibana Dashboard search window and search for 'IBM Z Performance and Capacity Analytics'.

Viewing the dashboard

The dashboards are set up like normal Kibana dashboards.

Search and Filter parameters

Time selector (top right) for the time range. This is usually an absolute range.

Filters (across the top, starting on the right) are used to frame the report.

Note:

1. The dashboards are typically designed to work with a single day and with the bulk of the filters active. Significantly expanding the search range and/or deactivating most of the filters may result in the queries behind the dashboard failing.
2. The visualizations are not designed to be viewed directly. They have search and filter parameters set on them that are critical to the correct functioning of the dashboards.

   Do not change or remove the search and filter parameters. Changing or removing them may change the nature of the output and possibly corrupt the data values displayed.
3. In addition, the visualizations return mostly unfiltered data. If you run them without the additional filters the dashboards provide, this may result in the query failing because it returned too much data.

Off-platform ad hoc reporting considerations

When ad hoc reports are created on an off-platform base, for example Splunk or ELK, be aware of potential data aggregation differences and duplicate records.

Data aggregation differences

Due to differences in rounding and computational algorithms, it is likely that data aggregated on the receiving platform, in customer written reports, will not exactly match the higher level aggregates that IBM Z Performance and Capacity Analytics creates in its Db2 tables.

Duplicate records

The IBM Z Performance and Capacity Analytics Collect engine inserts as well as updates rows in the Db2 database, and both the inserted and updated rows are streamed off-platform using the DISTRIBUTE parameter on the COLLECT statement. This could result in duplicate rows being streamed off-platform.

However, there is an ID field in each streamed record that uniquely identifies the row that it represents.

- ELK deals with this automatically, creating a new version of the updated document.
- For any user-created Splunk queries, a `dedup id` step is required in the query to allow the latest (updated) streamed row to replace the originally streamed row (which was streamed as a result of the insert).

Appendix A. Support information

If you have a problem with your IBM software, you want to resolve it quickly.

Contacting IBM Support

IBM Support provides assistance with product defects.

Before contacting IBM Support, your company must have an active IBM software maintenance contract, and you must be authorized to submit problems to IBM. The type of software maintenance contract that you need depends on the type of product you have. For more information, refer to the IBM Support website at the following links:

IBM Support
https://www.ibm.com/mysupport/s/

IBM Z Support
https://www.ibm.com/support/pages/ibm-enterprise-support-and-preferred-care-options-ibm-z

To contact IBM Support to report a problem (*open a case*), follow these steps:

1. Determine the business impact.
2. Describe the problem and gather information.
3. Submit the problem report.

Determining the business impact

When you report a problem to IBM, you are asked to supply a severity level. Therefore, you need to understand and assess the business impact of the problem that you are reporting. Use the following criteria:

Severity 1
The problem has a *critical* business impact. You are unable to use the program, resulting in a critical impact on operations. This condition requires an immediate solution.

Severity 2
The problem has a *significant* business impact. The program is usable, but it is severely limited.

Severity 3
The problem has *some* business impact. The program is usable, but less significant features (not critical to operations) are unavailable.

Severity 4
The problem has *minimal* business impact. The problem causes little impact on operations, or a reasonable circumvention to the problem was implemented.

Describing the problem and gathering information

When describing a problem to IBM, be as specific as possible. Include all relevant background information so that IBM Support specialists can help you solve the problem efficiently. To save time, know the answers to the following questions:

- What software versions were you running when the problem occurred?
- Do you have logs, traces, and messages that are related to the problem symptoms? IBM Support is likely to ask for this information.
- Can you re-create the problem? If so, what steps were performed to re-create the problem?
- Did you make any changes to the system? For example, did you make changes to the hardware, operating system, networking software, product-specific customization, and so on.

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- Are you currently using a workaround for the problem? If so, be prepared to explain the workaround when you report the problem.

Submitting the problem

You can submit your problem to IBM Support in either of the following ways:

Online
Go to https://www.ibm.com/mysupport/s/, click on **Open a case**, and enter the relevant details into the online form.

By email or phone
For the contact details in your country, go to the IBM Support website at https://www.ibm.com/support/. Look for the tab on the right and click **Contact and feedback** > **Directory of worldwide contacts** for a list of countries by geographic region. Select your country to find the contact details for general inquiries, technical support, and customer support.

If the problem you submit is for a software defect or for missing or inaccurate documentation, IBM Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible, IBM Support provides a workaround that you can implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the IBM Support website, so that other users who experience the same problem can benefit from the same resolution.

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Bibliography

IBM Z Performance and Capacity Analytics publications

The IBM Z Performance and Capacity Analytics library contains the following publications and related documents.

The publications are available online in the IBM Knowledge Center at the following link, from where you can also download the associated PDF:

https://www.ibm.com/support/knowledgecenter/SSPNK7_3.1.0

- *Administration Guide and Reference*, SC28-3211

  Provides information about initializing the IBM Z Performance and Capacity Analytics database and customizing and administering IBM Z Performance and Capacity Analytics.

- *Capacity Planning Guide and Reference*, SC28-3213

  Provides information about the capacity planning, forecasting, and modeling feature of IBM Z Performance and Capacity Analytics, intended for those who are responsible for monitoring system capacity and key performance metrics to help ensure that sufficient resources are available to run the business and meet expected service levels.

- *CICS Performance Feature Guide and Reference*, SC28-3214

  Provides information for administrators and users about collecting and reporting performance data generated by Customer Information Control System (CICS®).

- *Distributed Systems Performance Feature Guide and Reference*, SC28-3215

  Provides information for administrators and users about collecting and reporting performance data generated by operating systems and applications running on a workstation.

- *Guide to Reporting*, SC28-3216

  Provides information for users who display existing reports, for users who create and modify reports, and for administrators who control reporting dialog default functions and capabilities.

- *IBM i System Performance Feature Guide and Reference*, SC28-3212

  Provides information for administrators and users about collecting and reporting performance data generated by IBM i systems.

- *IMS Performance Feature Guide and Reference*, SC28-3217

  Provides information for administrators and users about collecting and reporting performance data generated by Information Management System (IMS).

- *Language Guide and Reference*, SC28-3218

  Provides information for administrators, performance analysts, and programmers who are responsible for maintaining system log data and reports.

- *Messages and Problem Determination*, GC28-3219

  Provides information to help operators and system programmers understand, interpret, and respond to IBM Z Performance and Capacity Analytics messages and codes.

- *Network Performance Feature Installation and Administration*, SC28-3221

  Provides information for network analysts or programmers who are responsible for setting up the network reporting environment.

- *Network Performance Feature Reference*, SC28-3222

  Provides reference information for network analysts or programmers who use the Network Performance Feature.

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- *Network Performance Feature Reports*, SC28-3223

  Provides information for network analysts or programmers who use the Network Performance Feature reports.

- *Resource Accounting for z/OS*, SC28-3224

  Provides information for users who want to use IBM Z Performance and Capacity Analytics to collect and report performance data generated by Resource Accounting.

- *System Performance Feature Guide*, SC28-3225

  Provides information for performance analysts and system programmers who are responsible for meeting the service-level objectives established in your organization.

- *System Performance Feature Reference Volume I*, SC28-3226

  Provides information for administrators and users with a variety of backgrounds who want to use IBM Z Performance and Capacity Analytics to analyze z/OS, z/VM®, zLinux, and their subsystems, performance data.

- *System Performance Feature Reference Volume II*, SC28-3227

  Provides information for administrators and users with a variety of backgrounds who want to use IBM Z Performance and Capacity Analytics to analyze z/OS, z/VM, zLinux, and their subsystems, performance data.

- *Usage and Accounting Collector User Guide*, SC28-3228

  Provides information about the functions and features of the Usage and Accounting Collector.

Glossary

A

administration
An IBM Z Performance and Capacity Analytics task that includes maintaining the database, updating environment information, and ensuring the accuracy of data collected.

asterisk length
The length of a field that extends to the end of the containing structure.

attribute
A single-word text string that can be associated with a report to categorize it.

C

case expression
An expression that specifies a value as being dependent on a given condition.

collect
A process used by IBM Z Performance and Capacity Analytics to read data from input log data sets, interpret records in the data set, and store the data in Db2 tables in the IBM Z Performance and Capacity Analytics database.

component
An optionally-installable part of an IBM Z Performance and Capacity Analytics feature. Specifically in IBM Z Performance and Capacity Analytics, a component refers to a logical group of objects used to collect log data from a specific source, to update the IBM Z Performance and Capacity Analytics database using that data, and to create reports from data in the database.

E

environment information
All of the information that is added to the log data to create reports. This information can include data such as performance groups, shift periods, installation definitions, and so on.

F

form
The template that contains the specifications for displaying or printing a report or chart.

G

graphic report
IBM Z Performance and Capacity Analytics report data displayed using a GDDM/ICU chart format.

H

HLQ
The high-level qualifier for IBM Z Performance and Capacity Analytics data set names assigned when the product is installed.

internal data type
A data type used within IBM Z Performance and Capacity Analytics during the processing of data.

I

IBM Z Performance and Capacity Analytics database
A set of Db2 tables that contain the environment information and performance data used by IBM Z Performance and Capacity Analytics to generate reports.

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internal data type
A data type used within IBM Z Performance and Capacity Analytics during the processing of data.

K

key columns
The columns of a Db2 table that together constitute the key.

key values
Values that are used to sort records into groups.

L

log
Any sequential data set used as input to IBM Z Performance and Capacity Analytics.

log collector
An IBM Z Performance and Capacity Analytics program that processes log data sets, and provides other IBM Z Performance and Capacity Analytics services.

log collector language
A collection of IBM Z Performance and Capacity Analytics statements used to supply definitions to and invoke services of the log collector.

log definition
The description of a log data set processed by the log collector.

log procedure
A program module called as a user exit to process certain log data sets.

lookup expression
Returns a value from a lookup table.

lookup table
An IBM Z Performance and Capacity Analytics Db2 table that contains grouping, translation, or substitution information.

P

private report
A report owned by a user. Only the owner or an IBM Z Performance and Capacity Analytics administrator can use a private report. Contrast with *public report*.

prompted query
A query created using QMF's prompted query language. The prompted query language is an intuitive method that non-SQL users can use to create queries.

public report
A report that is not owned by any user. There are no restrictions on who uses the report, but only the creator of the report or the IBM Z Performance and Capacity Analytics administrator can modify or delete it. Contrast with *private report*.

purge conditions
Instructions for purging old data from the IBM Z Performance and Capacity Analytics database.

Q

query
A statement that acts as a request to a database for information that meets specific conditions.

R

record definitions
The descriptions of different types of records contained in the log data sets used by IBM Z Performance and Capacity Analytics, including detailed record layout and data formats.

record procedure
A program module that is called to process some or all types of log records.

record type
The classification of records in a log data set.

repeated section
A section of a record that occurs more than once, with each occurrence adjacent to the previous one.

report definition language
IBM Z Performance and Capacity Analytics statements used to define reports and report groups.

report group
A collection of IBM Z Performance and Capacity Analytics reports that can be referred to by a single name or label.

reporting dialog
A set of host or workstation panels used to request reports.

resource group
A collection of resources that are identified as belonging to a particular department or division. Resources are organized into groups to reflect the structure of an organization.

resource information
Environment information that describes the elements in a system (for example, a network).

S

section
A structure within a record that contains one or more fields and may contain other sections.

source
The record or Db2 table that contains data used to update an IBM Z Performance and Capacity Analytics Db2 table.

Structured Query Language (SQL)
The language used to define the specific conditions that data must meet to be included in a report.

system tables
Db2 tables that store information that controls log collector processing, IBM Z Performance and Capacity Analytics dialogs, and reporting.

T

tabular report
IBM Z Performance and Capacity Analytics report data displayed using a tabular format.

target
The Db2 table in which IBM Z Performance and Capacity Analytics stores data from the source record or table.

threshold
The maximum or minimum acceptable level of utilization. Utilization measurements are compared with threshold levels.

U

update definitions
Instructions for entering data into Db2 tables from records of different types or from other Db2 tables.

updates
Instructions in IBM Z Performance and Capacity Analytics for how to process data from log data sets to Db2 tables.

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