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IBM Intelligent Operations Center V1.5 to V1.6 Migration Guide

- Understand your migration options and make the most of the new capabilities
- Plan a succesful IBM Intelligent Operations Center V1.5 to V1.6 migration
- Discover lessons learned in migration scenarios

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

First Edition (May 2014)

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Preface

IBM® Intelligent Operations Center is an integrated solution, and a continually evolving platform and set of capabilities. The platform grows as the capabilities increase over time, and new interfaces and integration points are introduced in each release.

The purpose of this IBM Redbooks® publication is to guide planners, architects, and implementers through the options that they have, to take advantage of the new capabilities and maximize the benefits of moving to the new release. This book considers what has already been deployed with IBM Intelligent Operations Center V1.5, the benefits of the new version (IBM Intelligent Operations Center V1.6.0.1), and the best way to take advantage of the new capabilities as you transition.

IBM Intelligent Operations Center has several integration and extension points for the previous and current versions of the product, which points are documented and described in this book. This IBM Redbooks publication describes options and considerations for the best way to migrate customizations and benefit from the new architecture.

Thorough details about the differences between the prior and new versions of the product are provided, to enable a clear understanding of migration choices, options, and preferred practices. This book includes descriptions of the trade-offs for each migration option, and in-depth information about data flows, available tools, and scripting changes that might affect existing IBM Intelligent Operations Center installations.

This book is targeted to the following audiences:

- Line of business managers or stakeholders who are interested in understanding the new features in IBM Intelligent Operations Center V1.6, and who are looking for information about how to plan the migration of their current IBM Intelligent Operations Center V1.5 environments.
- Architects who need to understand the effect that IBM Intelligent Operations Center V1.6 will have on the architecture of IBM Intelligent Operations Center V1.5 solutions.
- IT specialists and product specialists who are responsible for implementing the migration of a solution based on IBM Intelligent Operations Center V1.5 to a V1.6 solution.

Readers of this book will benefit from the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

Important: This edition of the book applies to IBM Intelligent Operations Center V1.6.0.1. See *IBM Intelligent Operations Center Version 1.6.0.1* at the following website:

`http://www-01.ibm.com/support/docview.wss?uid=swg24036406`

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1

What is new in IBM Intelligent Operations Center V1.6

This chapter provides an overview of the new features available in IBM Intelligent Operations Center V1.6 for the user, the administrator, and the installer. This chapter highlights the following enhancements:

- New for the user

  In IBM Intelligent Operations Center V1.6, you can use the new filter panel to filter the data that is displayed on a map, or in reports.

- New for the administrator

  In IBM Intelligent Operations Center V1.6, the Solution Administration view provides a new configuration tool for configuring data sources and standard operating procedures (SOPs). You can also configure the maps, associated filter options, and key performance indicators (KPIs).

- New for the installer

  IBM Intelligent Operations Center V1.6 provides installation enhancements and additional environment support.

This chapter summarizes the purpose of this book and its target audiences.

Important: This edition of the book applies to IBM Intelligent Operations Center V1.6.0.1. See *IBM Intelligent Operations Center Version 1.6.0.1* at the following website:

`http://www-01.ibm.com/support/docview.wss?uid=swg24036406`

This chapter includes the following topics:

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1.1 Overview

Many organizations and endeavors require efficient operational supervision and coordination. All have in common the need for the correct information to be brought together so that the correct people can make fast, accurate decisions, and track the effect of those decisions. IBM Intelligent Operations Center is a software solution that is designed to facilitate effective supervision and coordination of operations.

Authorities face common challenges in their core systems, and in making improvements to systems that are interconnected. Authorities who are forward-looking want to use the improvements in efficiency and effectiveness of smarter core systems. They adopt new ways of thinking about and using these systems. The application of advanced information technology (IT) can help authorities better understand, predict, and intelligently respond to patterns of behavior and events.

For example, IBM defines an *intelligent city* in terms of the improvements in quality of life and economic well-being that are achieved through applying IT to plan, design, build, and operate the city infrastructure. An intelligent city is not primarily about *the latest technology*. It is about finding ways to use technology to make the most effective use of the existing resources, to improve the life of the citizens of the city.

By performing the following tasks, IBM Intelligent Operations Center uses the power of the real-world data that is generated by computer systems:

- Collecting and managing the correct data
- Integrating and analyzing that data
- Facilitating easy and timely access to information
- Presenting related information in a coherent way

The following list includes some of the benefits of this solution:

- Adjust systems to achieve results that are based on the insights that are gained.
- Optimize planned and unplanned operations by using a holistic reporting and monitoring approach.
- Build convergence of domains in an organization by facilitating communication and collaboration.
- Improve quality of service (QoS) and reduce expenses by coordinating events.

An operation can be divided into individual domains, which generally match with the organizational structure and the expertise of the people involved. In a city, the expertise is held in departments, for example, in transportation, water, and public safety.

As the complexity of operations in a domain increases, a more customized solution is required. IBM Intelligent Operations Center has several different integration points where customization can take place. These integration points and the infrastructure that is included give IBM Business Partners, service providers, and clients the flexibility to build a broad and powerful solution.

1.1.1 Purpose of this document and target audiences

IBM Intelligent Operations Center is an integrated solution, and a continually evolving platform and set of capabilities. The platform grows as the capabilities increase over time, and new interfaces and integration points are introduced in each release.

The purpose of this IBM Redbooks publication is to guide planners, architects, and implementers through the options that they have, to take advantage of the new capabilities and maximize the benefits of moving to the new release. This book considers what has already been deployed with IBM Intelligent Operations Center V1.5, the benefits of the new version (IBM Intelligent Operations Center V1.6.0.1), and the best way to take advantage of the new capabilities as you transition.

IBM Intelligent Operations Center has several integration and extension points for the previous and current versions of the product, which points are documented and described in this book. This IBM Redbooks publication describes options and considerations for the best way to migrate customizations and benefit from the new architecture.

Thorough detail of differences between the prior and new versions of the product are provided to enable a clear understanding of migration choices, options, and preferred practices.

This book is targeted to the following audiences:

- Line of business managers or stakeholders who are interested in understanding the new features in IBM Intelligent Operations Center V1.6, and who are looking for information about how to plan the migration of their current IBM Intelligent Operations Center V1.5 environments. The following chapters include information relevant to this audience:
  - Chapter 1, “What is new in IBM Intelligent Operations Center V1.6” on page 1 provides an overview of the new features in IBM Intelligent Operations Center V1.6. Readers will be able to understand the business value of migrating to IBM Intelligent Operations Center V1.6, and the benefits they will gain from the new capabilities.
  - Chapter 3, “Planning the migration” on page 29 provides information that helps decision makers assess the scope of the migration effort.
- Architects who need to understand the effect that IBM Intelligent Operations Center V1.6 will have on the architecture of IBM Intelligent Operations Center V1.5 solutions. The following chapters include information relevant to this audience:
  - Chapter 1, “What is new in IBM Intelligent Operations Center V1.6” on page 1 includes information about the topologies solution components, and new features available with IBM Intelligent Operations Center.
  - Chapter 2, “Comparing IBM Intelligent Operations Center V1.5 and V1.6” on page 17 describes the differences between IBM Intelligent Operations Center V1.5 and V1.6.
  - Chapter 3, “Planning the migration” on page 29 provides information about tactical and long-term upgrade approaches that help architects plan for future changes to their solution architecture. It includes considerations for planning for your migration, migration strategy, infrastructure migration, solution migration, and required skills.
  - Chapter 4, “Migrating the solution customization” on page 67 explores the migration options for customizations performed in IBM Intelligent Operations Center V1.5 to V1.6 and provides selection guidelines. This chapter includes descriptions of the trade-offs for each migration option, and in-depth information about the data flows, and scripting changes that might affect you.
- IT specialists and product specialists who are responsible for implementing the migration of a solution based on IBM Intelligent Operations Center V1.5 to a V1.6 solution. The following chapters include information relevant to this audience:
  - Chapter 2, “Comparing IBM Intelligent Operations Center V1.5 and V1.6” on page 17 describes the differences between IBM Intelligent Operations Center V1.5 and V1.6.
  - Chapter 3, “Planning the migration” on page 29 includes information and scripts to help specialists identify changes made to the base IBM Intelligent Operations Center V1.5 environment.

– Chapter 4, “Migrating the solution customization” on page 67 explores the migration options for customizations performed in IBM Intelligent Operations Center V1.5 to V1.6. It also provides selection guidelines. This chapter includes descriptions of the trade-offs for each migration option, and in-depth information about the data flows, available tools, and scripting changes that might affect you.

– Chapter 5, “Migration use case” on page 93 provides practical examples from the experience gained migrating a solution based on IBM Intelligent Operations Center V1.5 to a V1.6 solution.

– Chapter 6, “High availability considerations” on page 119 describes the IBM Intelligent Operations Center V1.6 systems services configured for high availability (HA). It includes information about additional configurations that might be required for HA, about maintenance tasks, and special considerations for HA environments.

Note: For detailed information and use cases about IBM Intelligent Operations Center’s programming model, extension points, and customizations, see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

1.2 IBM Intelligent Operations Center components

At a high level, the structure of IBM Intelligent Operations Center can be divided into major components, subsystems, and services. Figure 1-1 on page 5 shows a high-level view of IBM Intelligent Operations Center, with the servers and the main components running on each server:

- Client

  IBM Intelligent Operations Center provides web-based, one-stop portals to event information, overall status, and details. The user interface (UI) presents customized information in common formats in various preconfigured views. All information is displayed through easy-to-use dashboards.

- Web server

  The web server manages client requests to IBM Intelligent Operations Center.

- Application server

  The application server provides a set of services for accessing and visualizing data that is managed by IBM Intelligent Operations Center:

  – The data ingest service is used to import data from disparate external sources, such as databases and files. Because of the variety of data that can be supplied from these external sources, the data is normalized into a common format that can be used to calculate KPIs, trigger SOPs and notifications, and provide spatiotemporal data.

  – The contacts and instant messaging service provides capabilities that enable effective, real-time communication.

  – The business monitoring service monitors incoming data records, and uses the information that is contained in the data records to generate KPIs. In the UI layer, which is provided by the portal service, users can view KPIs, SOPs, notifications, and reports. Users can also view spatiotemporal data on a geospatial map. Alternatively, they can view specific details that represent a building or a stadium, either on a location map or in a list view.

  – The application server provides security services that ensure that only authorized users and groups can access data.

- Data server

  The data server stores all of the databases that are used in IBM Intelligent Operations Center.

- Analytics server

  The analytics server contains the following components, which might be used by either custom solutions or other domain applications:

  – Messaging service and broker service

    The messaging service that is provided by IBM WebSphere MQ, and the broker service that is provided by IBM WebSphere Message Broker, can be used to receive and transform data in formats that IBM Intelligent Operations Center does not support. When the data is transformed, it can be written either to a database table, or to a comma-separated values (CSV) file that IBM Intelligent Operations Center can process.

  – Analytic service

    The analytic service contains IBM SPSS® WebSphere Business Modeler and IBM ILOG® CPLEX® Optimization Studio.

  – Report service

    You can use the report service that is provided by IBM Cognos® Report Studio to generate reports.

Figure 1-1 shows a high-level view of IBM Intelligent Operations Center.

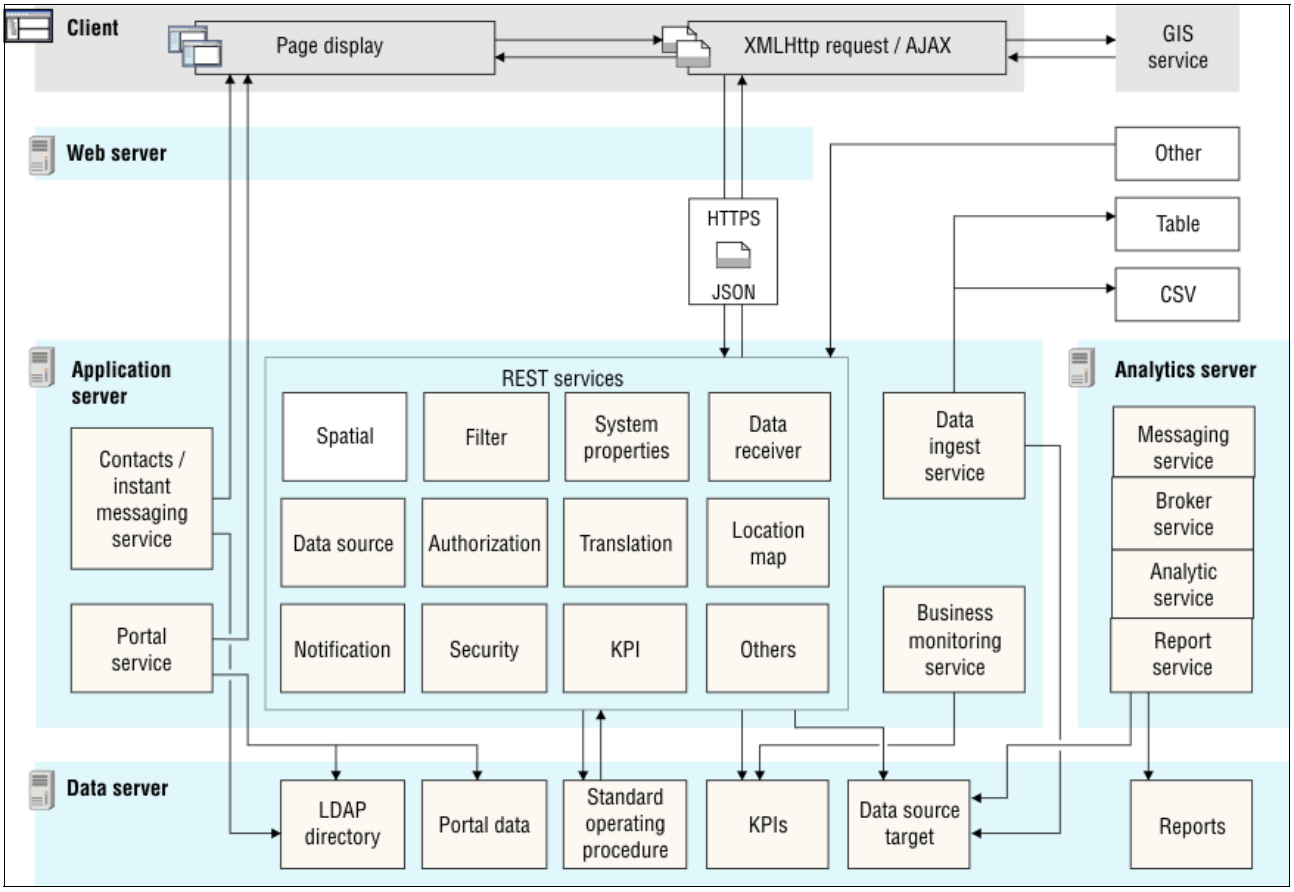

Figure 1-1 IBM Intelligent Operations Center components

For more information about the high-level structure of IBM Intelligent Operations Center, see the *Components* topic at the following website:

http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/ov_products.html

Figure 1-2 shows the architecture of the IBM Intelligent Operations Center solution imposed over the standard topology. For information about deployment options, see 1.5.1, “Simpler deployment options” on page 12.

Essential integration points for IBM Intelligent Operations Center are provided by the core components:

- IBM WebSphere Portal
- WebSphere Application Server
- IBM Business Monitor
- IBM DB2

The IBM Intelligent Operations Center data ingestion process enables you to pull information from tables and CSV (`.csv`) files. Data can also be acquired from Common Alerting Protocol (CAP) messages through a push mechanism. The Representational State Transfer (REST) application programming interfaces (APIs) are also now available, and can be used to push information into IBM Intelligent Operations Center.

WebSphere MQ is used to process CAP messages. WebSphere Message Broker is installed, but is not used in IBM Intelligent Operations Center V1.6 as part of the data ingestion process.

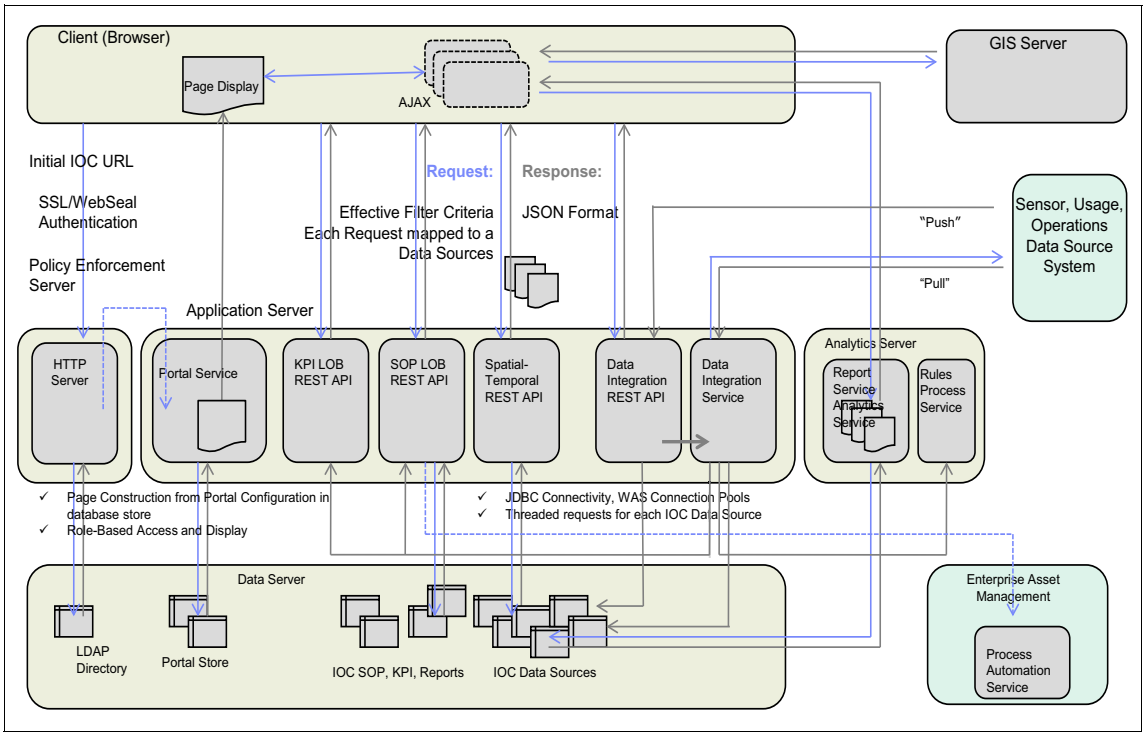

Figure 1-2 IBM Intelligent Operations Center solution request/response flow architecture

1.3 What's new for the user

IBM Intelligent Operations Center V1.6 provides a new user experience (not just a new UI) that was designed from the ground up. The result is a new UI that provides more information than in the previous release, but is simplified for ease of use. The new UI features a prominent geospatial layout, and a filter panel enabling easy querying, reporting, and filtering of available data.

The new UI is not about simply pushing information to the user, who is a recipient of data updates and changes, acting as a mere observer. The UI now supports an active interpretation of the available data. Users can determine what they want to see, and they can describe the characteristics and boundaries of the data that they want to view.

Users can see reports and *live action data points* relating to the events and dates that they care about. They can bring together disparate data sources on a single geospatial display, with bounding characteristics that they define.

1.3.1 Filtering data on the maps and in the list

IBM Intelligent Operations Center V1.6 provides a new filter panel that enables you to filter the data that is displayed on a map, or in reports, so that you can control the information you want to display. The design focuses on client efficiency, retrieving only the filtered amount of data that you requested, enabling faster interactions.

Use the new filter panel to filter data:

- Displayed on a geospatial map, on a location map, or in a list.
- Based on date and time, location, and other categories, such as the type or source of the event.
- Save your current filter settings so that you easily reapply them later.

1.3.2 Viewing the maps with added detail

Location map markers indicate positions on the map where one or more detailed maps are available with information about that location.

You can add your own data items to geospatial maps, to location maps, or to the list of data item details.

1.3.3 Filtering data in reports

You can view reports of events as either graphs, tables, or bar charts. You can customize the data that is displayed in the reports by setting the appropriate options in the filter panel.

1.3.4 Mobile applications

IBM Worklight® provides capabilities to help you respond to the fast-paced development of mobile devices. Worklight uses open standards, such as HTML, CSS, or JavaScript. In addition, Worklight uses tools, such as Apache Cordova, Eclipse Foundation, or the Android and Apple software development kits (SDKs), for delivering mobile solutions. Worklight development tools are not included with IBM Intelligent Operations Center V1.6.

IBM Worklight Consumer Edition special note

IBM Intelligent Operations Center V1.6 includes the IBM Worklight Consumer Edition software product. The IBM Intelligent Operations Center Premium User V1.6 license entitles you to accomplish the following tasks:

- Customize mobile applications delivered with IBM Intelligent Operations Center.
- Run mobile applications delivered with IBM Intelligent Operations Center if the *Prohibited Components* terms are met.

> **Prohibited Components:** Licensee is not authorized to use any of the following components or functions:
>
> - Change project structure (of IBM Worklight Consumer Edition)
> - Process data by the mobile application that does not originate directly from the Principal Program (of IBM Worklight Consumer Edition)
> - Create a new project (of IBM Worklight Consumer Edition)

The IBM Intelligent Operations Center Premium User V1.6 license does not entitle you to use the included IBM Worklight Consumer Edition software for the following purposes:

- Develop new mobile applications.
- Run mobile applications (other than those included with IBM Intelligent Operations Center).

You need to purchase an IBM Worklight license separately to be entitled to develop and run mobile applications.

1.4 What's new for the administrator

In IBM Intelligent Operations Center V1.6, the Solution Administration view provides a new configuration tool for configuring data sources and SOPs. You can also configure the maps and associated filter options, and KPIs.

1.4.1 Configuring data sources

Use the Data Sources configuration tool to configure a data source that can supply the required data to the solution. When creating a data source, ensure that you complete the following actions:

- Give basic instructions about how the data is processed (for example, how often to check for new data).
- Choose the geometry format, and indicate how to supply information about position to represent the data item on the map.
- Assign the appropriate access to data, and authorization privileges for your data source to portal groups or users.
- From the available actions, select a set of allowable actions that can be performed on the data items.

The three supported types of data acquisition are from a CSV file, from a database, or from CAP messages. Solution administrators can create a data source that can be used to supply data items through either the user interface or the REST API. Data can be routed to the solution as a whole, to KPIs, to a selected SOP, or to a predefined integration topic. Data can also be routed to a correlation topic.

1.4.2 Defining SOPs and activities

Use the tool to define SOPs and activities:

- Define and assign different types of activities to SOP definitions. Examples of activity types include a conditional activity for which you specify `if-then-else` conditions, or a REST activity that sends a call to a REST service.
- Assign owners and monitors to the activities. If an instance of an SOP is started, the activities are automatically assigned to the owners that you specify in the definition.
- Start an instance of an SOP. In a data source definition, you can specify that an SOP is started automatically, configuring the data source routing to route data items to SOPs based on an expression.

1.4.3 Configuring the geospatial map and location maps

You can use a graphical user interface (GUI) to configure the base map, pan, and zoom for the geospatial maps display.

A *base map* is a map that depicts background reference information such as landforms, roads, landmarks, and political boundaries, onto which other thematic information is placed. A base map is used for locational reference and often includes a geodetic control network as part of its structure.

A *location map* is a map or plan containing interactive areas that have been defined in the IBM Intelligent Operations Center. Events can be associated with one or more of these areas. For example, a diagram of seating areas in a major sports stadium in a city can be defined so that events that have occurred can be associated with the appropriate area.

When you are configuring a location map, you assign it to a collection and a position on the geospatial map. The collection is then represented by a marker on the geospatial map.

1.4.4 Customizing the filter panel

Customize the filter panel to make it easier for your users to view the data that is relevant to them:

- Add date and time ranges, and holiday ranges, to the Date & Time pane.
- Add your own filter panes to organize and group data sources for more efficient filter selections.
- Reorder filter panes, and reorder the data sources that they contain.

1.4.5 Customizing key performance indicators

IBM Intelligent Operations Center V1.6 introduces a new combined KPI status and drill-down interface that provides an overview of the KPIs that are relevant for a group in an organization. It also enables KPIs to be arranged in a hierarchical structure, where the status of a KPI can be combined with the status of other KPIs to provide a high-level organizational overview.

In IBM Intelligent Operations Center V1.6, KPIs are now supplied through REST services. When you customize KPIs, there is an extra option available to edit the KPI permissions in the KPI configuration tool. You can specify who is authorized to see specific KPIs.

1.4.6 Working with system properties

In the Solution Administration view, you can see all of the IBM Intelligent Operations Center system properties at a glance:

- Create, modify, and delete system properties.
- Assign system properties to groups, for easier retrieval through the REST service.

1.4.7 Translating field text

Use the translation tool to specify translated versions of fields that are displayed in the UI. The language that is displayed depends on the locale that is selected in either the user profile, or in the browser.

1.4.8 REST APIs

IBM Intelligent Operations Center provides a set of APIs that are implemented using REST services. The REST services provide a set of uniform resource identifiers (URIs) that you can use to access and edit data in IBM Intelligent Operations Center components, such as data sources, the filter panel, KPIs, and system properties. REST APIs support GET, POST, PUT, and DELETE actions. Figure 1-3 shows the interactions of the REST API call in different layers.

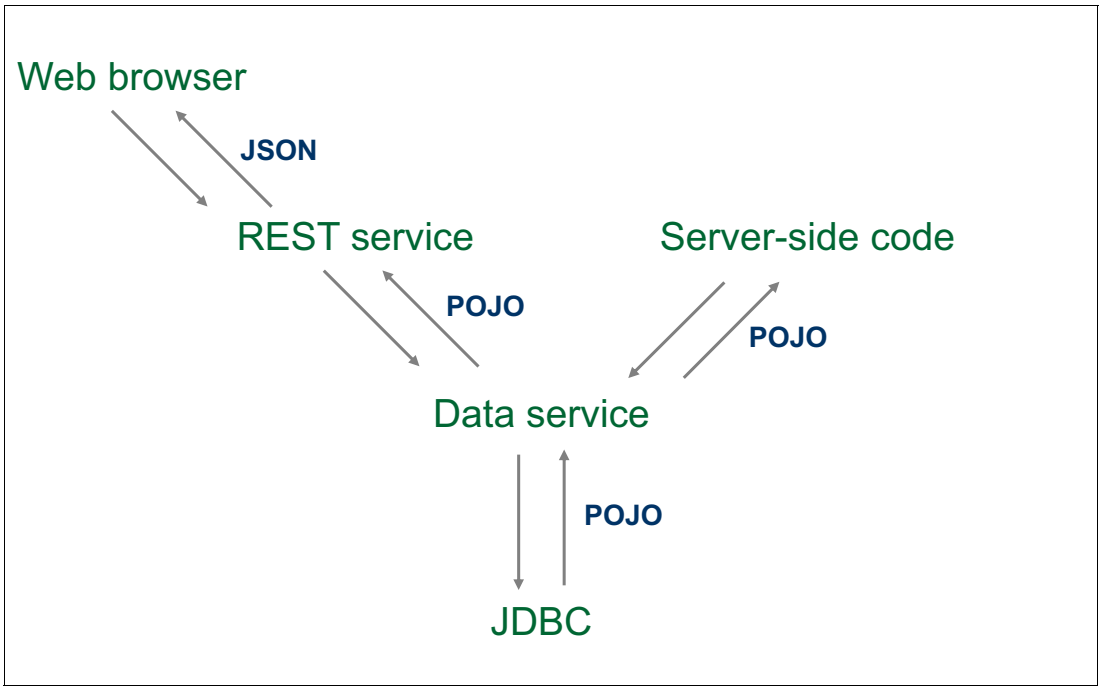

Figure 1-3 Interaction of REST API calls

1.4.9 Password management

IBM Intelligent Operations Center provides a version of IBM Security Identity Manager, enabling administrators to manage user and application IDs. The password management tool is provided to assist with password management, creating and managing user accounts on multiple systems, and auditing.

In IBM Intelligent Operations Center V1.6, IBM Security Identity Manager is only configured to manage application users' passwords (for example, database instance owner and WebSphere Portal administrator user).

IBM Security Identity Manager and the password management tool are used together to manage application users as follows:

- When the application user password is changed using IBM Security Identity Manager, the password is only updated on the target system or application. For example, if the password of the database instance owner (db2inst1) is changed, the password is only updated on the Linux systems where the user exists.

  If the password of the WebSphere Portal administration user (wpsadmin) is changed, the password is only updated in the Lightweight Directory Access Protocol (LDAP) application. Password changes are not propagated to all places where the password is used.
- The password management tool is used primarily to propagate password changes made through IBM Security Identity Manager across the IBM Intelligent Operations Center. The password management tool can also be used to synchronize changes to some passwords made outside of IBM Security Identity Manager.

The password management tool is installed on the application server for the standard topology, and the primary application server for high availability topology. Script files are located under the `/opt/IBM/PMT` directory.

For more information, see the *IBM Intelligent Operations Center Password Management* technote:

`http://www-01.ibm.com/support/docview.wss?uid=swg27039388`

1.4.10 Usage analysis

The usage analysis function in IBM Intelligent Operations Center writes usage records to a dedicated log file. Usage analysis logs events, such as session activities, including log on, log out, timeout, and login failures. The resulting log entries comply with the NCSA Combined industry standard for log formats. By analyzing the log entries, you can monitor usage of your portal site.

The usage analysis tool processes the usage data, and stores the processed data in the `SCHUSAG.USAGEDATA` database for real-time and historical reporting purposes.

For more information, see the *Logging and analyzing usage data* topic at the following website:

`http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/ba_admin_usage_ov.html`

1.4.11 Social Media Analytics

IBM Social Media Analytics software product is included as part of the extended edition, but it does not come preinstalled and configured. With IBM Social Media Analytics, you can accomplish the following functions:

- Capture consumer data from social media to understand attitudes, opinions, and trends, and to manage your online reputation.
- Grow your business by understanding and satisfying client needs.
- Gain insights to help you target new offers and products more cost-effectively.

- Improve the customer experience by responding quickly to opinions and requests expressed in social media.
- Create customized campaigns and promotions that resonate with social media participants.
- Identify the primary influencers in specific social network channels.
- Make evidence-based messaging decisions that target the correct stakeholders at the correct time.

For more information, see the IBM Social Media Analytics Information Center:

http://pic.dhe.ibm.com/infocenter/sma/v1r2m0/index.jsp

1.4.12 Asset management

The IBM SmartCloud Control Desk software product is included, but it is not preinstalled and configured by the installation scripts. It combines IBM Tivoli Service Request Manager®, IBM Tivoli Change and Configuration Management Database, and IBM Tivoli Asset Management for IT. IBM SmartCloud Control Desk provides the following capabilities:

- Service request management

  Gives you an efficient service desk for handling service requests and managing incidents.
- Change, configuration, and release management

  Provides advanced impact analysis and automated change procedures designed to reduce risk and support service integrity.
- IT asset lifecycle management

  Provides inventory management and software license compliance capabilities. Helps to manage assets throughout their lifecycle, optimizing usage of digital and physical assets and minimizing compliance risks.
- Service catalog

  Helps users solve their own problems. Provides an intuitive self-help portal and a complete catalog of services.
- Support for service providers

  Supplies service support and service delivery capabilities for multiple clients in a single deployed instance. This can help increase profitability and improve customer satisfaction.

1.5 What's new for the installer

IBM Intelligent Operations Center V1.6 provides installation enhancements and additional environment support.

1.5.1 Simpler deployment options

IBM Intelligent Operations Center V1.6 product supports three deployment options:

- Base or standard edition
- High availability edition
- Extended edition

Base or standard edition

The base or standard edition enables you to get started with smaller hardware requirements and less install time. This edition contains only the minimum set of software components required for base operations. Standard edition requires only four servers (does not include server for Semantic model which is optional). Figure 1-4 shows the standard topology.

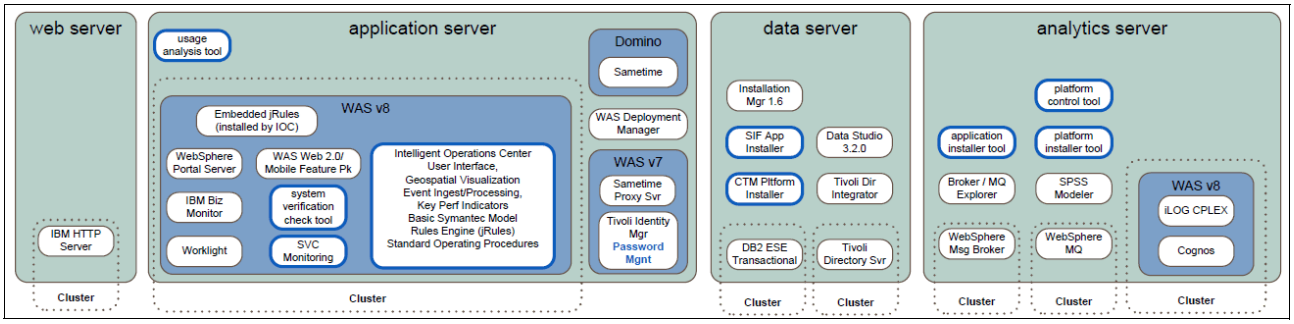

Figure 1-4 IBM Intelligent Operations Center base topology

High availability edition

The HA edition adds redundancy and improves scalability. The HA environment provides failover support to standby servers. Failover improves the availability of the overall IBM Intelligent Operations Center system. The HA topology requires eight servers. For more information about IBM Intelligent Operations Center V1.6 HA, see Chapter 6, “High availability considerations” on page 119.

Figure 1-5 shows the HA topology.

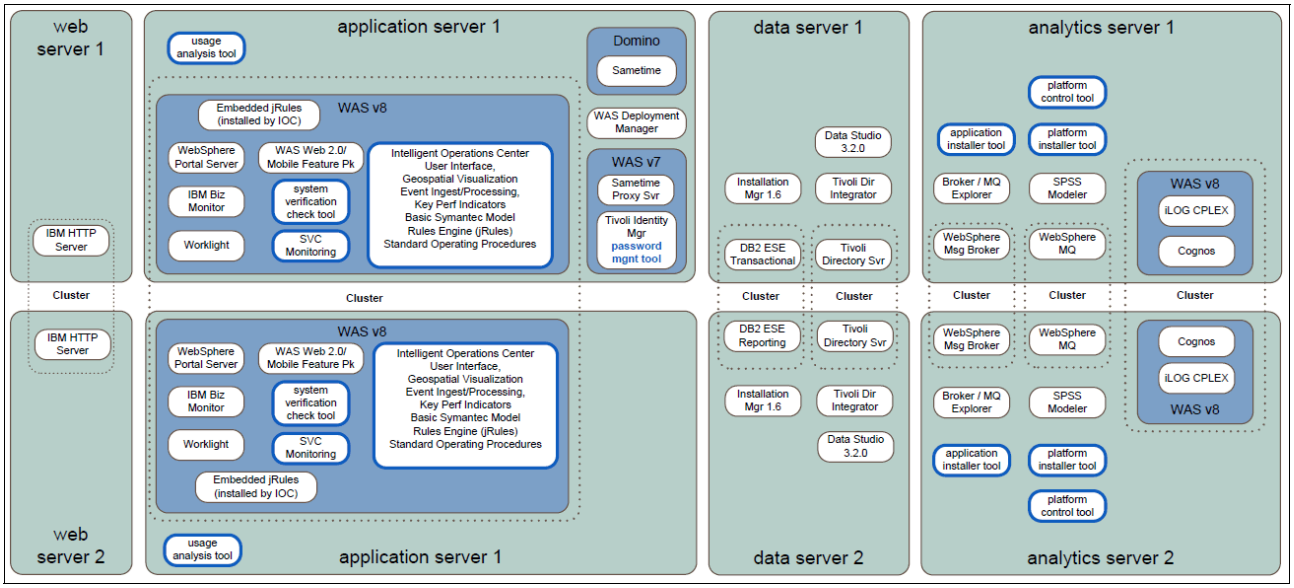

Figure 1-5 IBM Intelligent Operations Center high availability topology

Extended edition

The extended edition is also referred to as *topology extensions*. Extended edition provides additional features, as shown in Figure 1-6.

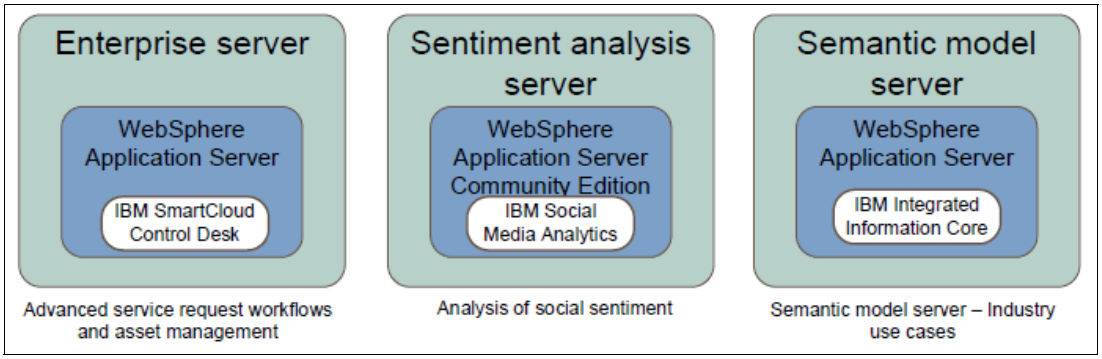

Figure 1-6 IBM Intelligent Operations Center topology extensions (extended edition)

The following optional products are included as part of the extended edition, but they are not preinstalled and configured by IBM Intelligent Operations Center installation scripts:

- IBM SmartCloud Control Desk

  Provides advanced workflow and automation. It can be used to implement advanced SOPs. For more information, see 1.4.12, “Asset management” on page 12.

- IBM Social Media Analytics

  Provides city officials with the tools that they need to view and analyze citizen sentiment on social media about city plans and projects that will affect them. For more information, see 1.4.11, “Social Media Analytics” on page 11.

- IBM Integrated Information Core

  Provides a semantic model server. Semantic modeling can help define the data and the relationships between these entities. For example, it enables the complex modeling of relationships in a city between its devices, equipment, buildings, and their relationship to each other and to less palpable items, such as maintenance records, failure history, composition, and cost.

  This modeling and association between all of the parts of a city and its processes supports complex analysis and optimization at reduced cost and with greater ease.

1.5.2 Installation options

IBM Intelligent Operations Center V1.6 provides four installation options:

- Two for a standard environment
- Two for an HA environment

For each environment, a GUI installer and command-line installer are provided. The GUI installer installs a predefined IBM Intelligent Operations Center configuration, supporting minimal customization during the installation progress. The command-line installer provides greater configuration flexibility during the installation process, and should be used where the GUI installer does not meet the environment requirements.

You no longer need a dedicated installation server, the analytics server acts as an install server. The following list describes other installation improvements in IBM Intelligent Operations Center V1.6:

- Improvements to IBM Intelligent Operations Center install times

  Install duration for each install step is provided.

- Improvements to environment pre-checks

  The pre-check utility in the installer checks the servers for hardware and software requirements. This utility also validates the installation properties, automatically applies mandatory Red Hat Enterprise Linux (RHEL) settings, and Red Hat Package Manager (RPM) packages.

- Improvements to IBM Intelligent Operations Center installation logging

  Install log files are now easier to read.

- Improvements to operating system preparation

  IBM Intelligent Operations Center includes sample RHEL V6 kickstart files to prepare the operating system for standard and HA environments on virtual or hardware servers.

- Improvements to the IOCControl tool

  The **`IOCControl`** command provides runtime management services, including the ability to start, stop, and query the status of IBM Intelligent Operations Center services and components.

- Improvements to the installation user experience

  IBM Intelligent Operations Center provides both a command-line interface (CLI), which is menu-driven, and improved GUI installers.

- Improvements to IBM Support Assistant Data Collector tool

  The IBM Support Assistant Data Collector tool is provided as an aid for troubleshooting problems with IBM software products. The tool focuses on automatic collection of problem data. It also provides symptom analysis support for the various categories of problems encountered by IBM software products. Information pertinent to a type of problem is collected and analyzed to help identify the origin of the problem under investigation.

2

Comparing IBM Intelligent Operations Center V1.5 and V1.6

This chapter describes the differences between IBM Intelligent Operations Center V1.5 and V1.6.

Note: This edition of the book applies to IBM Intelligent Operations Center V1.6.0.1. For more information, see *IBM Intelligent Operations Center Version 1.6.0.1:*

`http://www-01.ibm.com/support/docview.wss?uid=swg24036406`

This chapter includes the following topics:

Tip: For detailed information and use cases about IBM Intelligent Operations Center programming models, extension points, and customizations see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

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2.1 System services comparison

IBM Intelligent Operations Center V1.6 provides several new system services. Table 2-1 compares system services between IBM Intelligent Operations Center V1.5 and V1.6.

Table 2-1 IBM Intelligent Operations Center system services comparison

System Service	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6 (standard and high availability, or HA)
Analytics services	Provides data analysis and presentation services.	No change.
Application services	Provides Java Platform, Enterprise Edition (JEE) services supporting the solution.	No change.
Authentication and authorization services	Provides services determining if a user is authorized to use the system, and defining their privileges in the system.	Provides authentication and authorization services to the solution, applications, and other services.
Reverse proxy services supporting single sign-on (SSO)	Services provide SSO to back-end products using reverse proxy.	The software product that implements this service, IBM Security Access Manager for Web, is included, but not installed by default.
Collaboration services	Provides services to enable real-time collaboration for users and applications.	No change.
Configuration services	Manages the product configuration, including inventory and change management.	No change.
Database services	Provides the database services for the solution and applications.	No change.
Event ingestion services	Provides services to collect, aggregate, present, and handle system events.	No change.
Identity management services	System service is not implemented.	Provides services to manage the IBM Intelligent Operations Center application and user IDs.
Installation services	Provides services to install IBM Intelligent Operations Center (requires dedicated install server).	Provides services to install IBM Intelligent Operations Center (dedicated install server is not required).
Key performance indicator (KPI) services	Provides services to handle key performance indicators and associated actions.	No change.

System Service	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6 (standard and high availability, or HA)
Messaging services	Provides message and workflow services.	No change.
Mobile services	System service is not available.	Provides services enabling mobile users.
Monitoring services and agents	Provides monitoring activity in the product.	Software product which implements this service is provided ready to use, but not installed by default. The system verification check tool can be used to determine operational status of IBM Intelligent Operations Center services.
Password management services	System service is not available.	Provides services to manage solution passwords.
Platform management services	Provides runtime management services including the ability to start, stop, and query the status of IBM Intelligent Operations Center services and components.	No change.
Standard operating procedure services	Provides services handling the processing of standard operating procedures (SOPs).	No change.
Usage analysis or platform usage services	System service is not available.	Provides logging of usage data, such as user log on, log out, timeout, and log in failures.
User directory integration, including password synchronization plug-in services	System service is not available.	Provides password synchronization where password changes are intercepted at the end points and redirected to the identity management services.
User interface (UI) services	Provides services supporting user interaction with the product.	No change.
User directory and user directory integration services	Provides mapping between user and group names and values, and integration with additional directories.	No change.
Web services	Provides HTTP (all HTTP traffic is redirected to HTTPS), HTTPS, and other web services to the solution.	No change.

System Service	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6 (standard and high availability, or HA)
The following service is only available if the optional semantic model server is installed. Semantic model service is part of IBM Intelligent Operations Center V1.6 topology extension.		
Semantic model services	Provides services enabling applications to model real world objects and relationships.	Provides services enabling applications to model real world objects and relationships (software product is not installed by default).
The following service is only available if the optional IBM Data Studio is installed. Data design service is part of IBM Intelligent Operations Center V1.6 base.		
Data design services	System service is not available.	Provides data design capabilities to application builders.

2.2 Software products comparison

Table 2-2 compares the software products and versions between IBM Intelligent Operations Center V1.5 and V1.6. Software products that are marked *included* are not preinstalled and configured. Instead, the media files are provided, and can be optionally installed and configured. Software products that are marked *Not available* are not available in that IBM Intelligent Operations Center release.

Notes:

- For product license information, see the IBM Intelligent Operations Center Premium User V1.6 *License Information document*:

  http://ibm.co/1aFSv3h

- For information about downloading the IBM Intelligent Operations Center product images, including the IBM Intelligent Operations Center Developer's Toolkit eAssembly, see the *Download IBM Intelligent Operations Center Version 1.6* image files:

  http://www-01.ibm.com/support/docview.wss?uid=swg24035524

Table 2-2 IBM Intelligent Operations Center software product and version comparison

Software product and extensions	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6 (standard and high availability)
IBM DB2 Enterprise Server Edition	V9.7.0.5 with DB2 Spatial Extender	V10.1.0.1 DB2 Spatial Extender
IBM Cognos Business Intelligence	V10.1.1	V10.2
IBM Data Studio	Not available	V3.2
IBM Dojo Toolkit	V1.7	V1.8
IBM Extensions Toolkit for Dojo	Not available	V1.3.0.4
IBM HTTP Server	V7.0.0.21	V8.0.0.6

Software product and extensions	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6 (standard and high availability)
IBM ILOG CPLEX Optimization Studio	V12.4	V12.5
IBM SmartCloud Control Desk (combines IBM Tivoli Service Request Manager, Tivoli Change and Configuration Management Database (CCMDB), and IBM Maximo® Asset Management for IT Options Family)	Not available	V7.5.1 (Extended edition / included)
IBM Social Media Analytics	Not available	V1.2 (Extended edition / included)
IBM Worklight Consumer Edition	Not available	V6.0.0
IBM Lotus® Domino®	V8.5.3.1	V8.5.3.1
IBM Sametime® Entry	V8.5.2 + Interim Feature Release 1	V8.5.2.1
IBM Sametime Proxy	V8.5.2	V8.5.2 + interim fixes
IBM SPSS Modeler Server Limited	Not available	V15.0
IBM SPSS Modeler Data Access	Not available	V6.1
IBM Tivoli Access Manager for e-business or IBM Security Access Manager for Web	V6.1.1.4	V7.0 (included)
IBM Tivoli Composite Application Manager for Applications	V7.1	V7.2.0.1 (included)
IBM Tivoli Directory Integrator	V7.1.0.5	V7.1.1.2
IBM Tivoli Directory Integrator Dispatcher	Not available	V6.0.6
IBM Tivoli Directory Integrator POSIX adapter	Not available	V6.0.23
IBM Tivoli Directory Server	V6.3.0.8	V6.3.0.18
IBM Tivoli Identity Manager or IBM Security Identity Manager	V5.1	V6.0
IBM Tivoli Monitoring	V6.2.2.1	V6.3.0.1 (included)
IBM Tivoli Netcool/Impact	V5.1.1.1 + IF003	V6.1.1 (included)
IBM Tivoli Netcool/OMNIBus and XML probe	V7.3.1.2	V7.4 (included)
IBM Tivoli Service Request Manager	V7.2.1.2	Replaced by IBM SmartCloud Control Desk 7.5.1

Software product and extensions	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6 (standard and high availability)
Tivoli Widget Library	V1.0.1.0	Not available
IBM WebSphere Application Server Feature Pack for Web 2.0 and Mobile	V1.1.0.0	V1.1.0.3
IBM WebSphere Application Server Network Deployment	V7.0.0.21	V8.0.0.6
WebSphere Application Server bundled with IBM Tivoli Identity Manager	V7.0.0.21	V7.0.0.27
WebSphere Application Server bundled with IBM Tivoli Service Request Manager	V6.1.0.29	Not applicable
IBM WebSphere Business Monitor or IBM Business Monitor	V7.5.1	V8.0.1
IBM WebSphere Message Broker	V8.0	V8.0.0.1
IBM WebSphere MQ	V7.0.1.7	V7.5
IBM Operational Decision Management (Rules Engine)	V7.5.1	Not available
IBM Business Rules Embedded	Not available	V8.5
IBM WebSphere Portal	V7.0.0.2	V8.0.0.1 CF05
IBM Integrated Information Core Product Family (Semantic model services)	V1.5.0.2	V1.5.0.2 (Extended edition / included)
IBM Jazz™ Foundation Server (for Semantic model services)	V3.0.1	V3.0.1 (Extended edition / included)

Special notes

Take into account the following usage restrictions:

- IBM Business Monitor and IBM Rational® Application Developer

  IBM Business Monitor V8.0.1.1 and IBM Rational Application Developer V8.0.4 are included with IBM Intelligent Operations Center software. These products can only be used to configure KPIs to be used in the IBM Intelligent Operations Center platform.

- IBM Worklight Consumer Edition

  IBM Intelligent Operations Center V1.6 includes the IBM Worklight Consumer Edition software product. The IBM Intelligent Operations Center Premium User V1.6 license entitles you to accomplish the following tasks:

  – Customize mobile applications delivered with IBM Intelligent Operations Center.

  – Run mobile applications delivered with IBM Intelligent Operations Center if the *Prohibited Components* terms are met.

Prohibited Components: Licensee is not authorized to use any of the following components or functions:

- Change project structure (of IBM Worklight Consumer Edition).
- Process data by the mobile application that does not originate directly from the Principal Program (of IBM Worklight Consumer Edition).
- Create a new project (of IBM Worklight Consumer Edition).

The IBM Intelligent Operations Center Premium User V1.6 license does *not* entitle you to use the included IBM Worklight Consumer Edition software for the following purposes:

- Develop new mobile applications.
- Run mobile applications (other than those included with IBM Intelligent Operations Center).

You need to purchase an IBM Worklight license separately to be entitled to develop and run mobile applications.

- IBM Cognos Framework Manager and IBM Cognos Report Studio

  IBM Cognos Framework Manager and IBM Cognos Report Studio, included with IBM Cognos Business Intelligence, can only be used to create reports that use data from IBM Intelligent Operations Center data sources, and that are displayed in IBM Intelligent Operations Center.

2.3 Software products to system services mapping

Table 2-3 compares the software products that are used to implement each of the IBM Intelligent Operations Center system service. Some of IBM Intelligent Operations Center system services are implemented using multiple software products.

Table 2-3 IBM Intelligent Operations Center software products to system services comparison

System Service	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6 (standard and high availability)
Analytics services	IBM Cognos Business Intelligence	IBM Cognos Business Intelligence
Application services	► IBM WebSphere Application Server ► IBM WebSphere Application Server Feature Pack for Web 2.0 and Mobile	► IBM WebSphere Application Server ► IBM WebSphere Application Server Feature Pack for Web 2.0 and Mobile
Authentication and authorization services	IBM Tivoli Access Manager for e-business	► IBM WebSphere Portal ► IBM HTTP Server
Reverse proxy services supporting single sign-on	IBM Tivoli Access Manager for e-business	IBM Security Access Manager for Web (not installed by default)
Collaboration services	► IBM Lotus Domino ► IBM Sametime ► IBM Sametime Proxy	► IBM Lotus Domino ► IBM Sametime ► IBM Sametime Proxy

System Service	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6 (standard and high availability)
Configuration services	IBM Tivoli Service Request Manager	IBM SmartCloud Control Desk
Database services	IBM DB2 Enterprise Server Edition with DB2 Spatial Extender	IBM DB2 Enterprise Server Edition with DB2 Spatial Extender
Event ingestion services	► IBM Tivoli Netcool/Impact ► IBM Tivoli Netcool/OMNIbus and XML Probe ► IBM WebSphere MQ ► IBM WebSphere Message Broker	Integral to IBM Intelligent Operations Center
Identity management services	Not available	► IBM Security Identity Manager ► IBM Tivoli Directory Integrator ► IBM Tivoli Directory Integrator Dispatcher ► IBM Tivoli Directory Integrator POSIX adapter
Installation services	IBM Intelligent Operations Center Installer	IBM Intelligent Operations Center Installer
KPI services	IBM WebSphere Business Monitor	IBM Business Monitor
Messaging services	► IBM WebSphere MQ ► IBM WebSphere Message Broker	► IBM WebSphere MQ ► IBM WebSphere Message Broker
Mobile services	Not available	IBM Worklight Consumer Edition
Monitoring services and agents	► IBM Tivoli Composite Application Manager for Applications ► IBM Tivoli Monitoring	► IBM Tivoli Composite Application Manager for Applications (not installed by default) ► IBM Tivoli Monitoring (not installed by default)
Password management services	Not available	IBM Intelligent Operations Center Password Management Tool (see 1.4.9, “Password management” on page 10)
Platform management services	IBM Intelligent Operations Center Platform Control Tool	IBM Intelligent Operations Center Platform Control Tool
SOP services	► Integral to IBM Intelligent Operations Center ► IBM Tivoli Service Request Manager	► Integral to IBM Intelligent Operations Center ► Optionally, install and configure IBM SmartCloud Control Desk

System Service	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6 (standard and high availability)
Usage analysis or Platform usage services	Not available	IBM WebSphere Portal
User directory integration, including password synchronization plug-in services	Not available	IBM Tivoli Directory Integrator password synchronization plug-ins
User interface services	► IBM WebSphere Portal ► IBM Dojo Toolkit ► Tivoli Widget Library	► IBM WebSphere Portal ► IBM Dojo Toolkit ► IBM Extensions Toolkit for Dojo ► IBM Worklight Consumer Edition (for mobile apps)
User directory and user directory integration services	► IBM Tivoli Directory Server ► IBM Tivoli Directory Integrator	► IBM Tivoli Directory Server ► IBM Tivoli Directory Integrator
Web services	► IBM WebSphere Application Server ► IBM WebSphere Portal	► IBM WebSphere Application Server ► IBM WebSphere Portal
The following service is only available if the optional semantic model server is installed.		
Semantic model services	► IBM Integrated Information Core Product Family with Semantic Model Services ► Jazz Foundation Server (for Semantic model services)	► IBM Integrated Information Core Product Family with Semantic Model Services ► Jazz Foundation Server (for Semantic model services)
The following service is only available if the optional IBM Data Studio is installed.		
Data design services	Not available	IBM Data Studio

2.4 Changes to system services

In IBM Intelligent Operations Center V1.6, several new features and system services have been implemented. Some features and system services have been removed or redesigned. This section covers important changes to the system services in IBM Intelligent Operations Center V1.6.

2.4.1 Changes to installation service

IBM Intelligent Operations Center V1.6 provides installation enhancements and additional environment support. IBM Intelligent Operations Center V1.6 provides four installation options:

- Two for a standard environment
- Two for a high availability environment

For each environment, a graphical user interface (GUI) installer and command-line installer are provided. The GUI installer installs a predefined IBM Intelligent Operations Center configuration supporting minimal customization during the installation process. The command-line installer provides greater configuration flexibility during the installation process, and should be used where the GUI installer does not meet the environment requirements.

2.4.2 Changes to monitoring service

Monitoring service provides monitoring of system resources to detect potential problems and automatically respond to events.

In IBM Intelligent Operations Center V1.6, monitoring service components are not preinstalled and configured, but are included in the box. You can either install and configure the IBM monitoring software products, or make use of existing monitoring tools. The following monitoring software products are included with IBM Intelligent Operations Center V1.6:

- IBM Tivoli Monitoring and agents
- IBM Tivoli Composite Application Manager for Applications and IBM Tivoli System Automation

The system verification check tool tests components in IBM Intelligent Operations Center to determine if they are accessible and operational. The system verification check tool is used to determine the operational status of services comprising the IBM Intelligent Operations Center system, and can be sufficient for the needs of some clients.

For more information about the system verification test tool see *Verifying the components* at the following website:

http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/admin_verifytools.html

2.4.3 Change to event data ingestion service

In IBM Intelligent Operations Center V1.5, event data was routed through IBM WebSphere MQ, IBM WebSphere Message Broker, IBM Tivoli Netcool/OMNIbus, and IBM Tivoli Netcool/Impact before it was stored in the database.

In IBM Intelligent Operations Center V1.6, the data import architecture is simplified. Event data is routed only through the data receiver component before the data is stored in the database. Performance of the data import is considerably improved in IBM Intelligent Operations Center V1.6.

Figure 2-1 compares the data import flows between IBM Intelligent Operations Center V1.5 and V1.6.

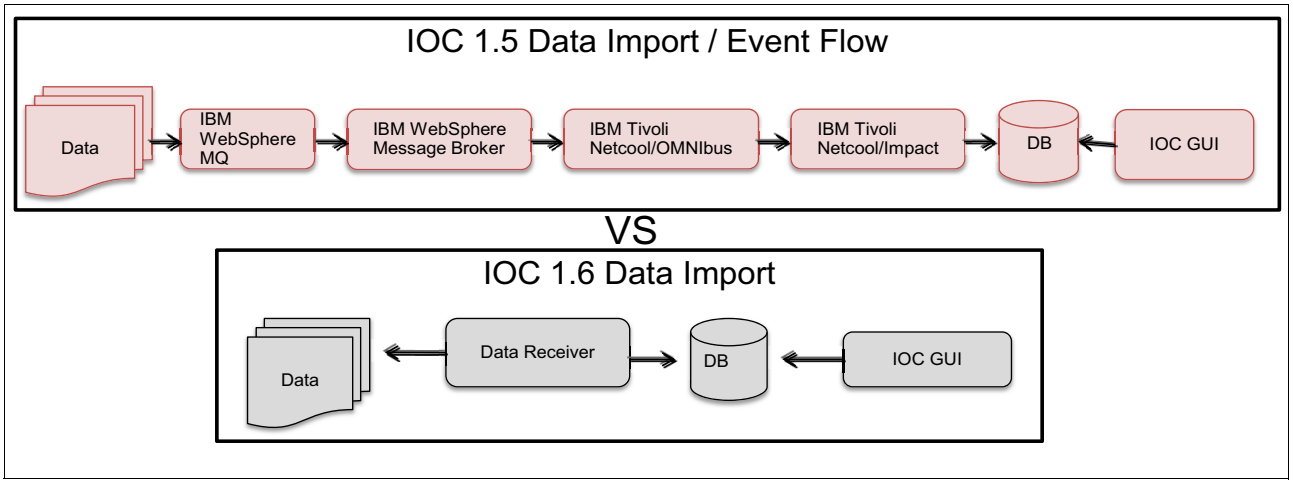

Figure 2-1 Comparison of data import flows in IBM Intelligent Operations Center V1.5 and V1.6

In IBM Intelligent Operations Center V1.6, data import is UI-driven, and data sources can now be configured using the Data Sources configuration tool from the Solution Administration view.

2.4.4 Changes to KPI service

IBM Intelligent Operations Center V1.6 still uses IBM WebSphere Business Monitor to implement KPI services. KPI services no longer use the Tivoli Widget Library. KPI services are stateless Representational State Transfer (REST) services, and message formatting is different in IBM Intelligent Operations Center V1.6. KPIs defined in IBM WebSphere Business Monitor are implemented based on routing schema.

2.4.5 Changes to standard operating procedure service

In IBM Intelligent Operations Center V1.6, IBM SmartCloud Control Desk is no longer used to implement SOPs ready to use. Built-in functionality in IBM Intelligent Operations Center V1.6 provides the SOP capabilities. If required, you can integrate the IBM Intelligent Operations Center built-in SOP support with IBM SmartCloud Control Desk. The following list includes some of the changes to the SOP implementation:

- IBM SmartCloud Control Desk is required if you want to implement complex, automated workflows. An automation activity in an IBM Intelligent Operations Center SOP can initiate and track a work order in IBM SmartCloud Control Desk.
- Without IBM SmartCloud Control Desk, you can still implement and perform manual, notification, conditional, and nested SOP activities.

2.4.6 Changes to authentication and authorization service

In IBM Intelligent Operations Center V1.5, authentication and authorization services, and SSO to back-end IBM Intelligent Operations Center web applications (including third-party web applications), are provided by the WebSEAL component of IBM Tivoli Access Manager for e-business or IBM Security Access Manager for Web. The WebSEAL component was also acting as a reverse web proxy by distributing HTTP/HTTPS requests.

In IBM Intelligent Operations Center V1.6, the IBM Security Access Manager for Web product is not preinstalled and configured by the installer, but the product is included.

In IBM Intelligent Operations Center V1.6, authentication and authorization are provided by IBM WebSphere Portal, and SSO across other IBM Intelligent Operations Center web applications is provided using the IBM Lightweight Third-Party Authentication (LTPA) mechanism. Reverse web proxy is available, but is not installed by default in IBM Intelligent Operations Center V1.6.

Note: In IBM Intelligent Operations Center V1.6, IBM Tivoli Identity Manager is referred to as *IBM Security Identity Manager*, and IBM Tivoli Access Manager for e-business is referred to as *IBM Security Access Manager for Web*.

3

Planning the migration

IBM Intelligent Operations Center is a large and complex system. Migration to IBM Intelligent Operations Center V1.6 requires careful planning and testing, as is required when performing a migration on any other large integrated application, for example an enterprise resource planning (ERP) solution or any other enterprise application.

The preferred approach is to follow a formal process that starts with evaluating the current configuration and customizations in the current IBM Intelligent Operations Center V1.5 environment, and then deciding how to migrate to the new IBM Intelligent Operations Center V1.6 environment.

The migration process should progress through ordered development, test, and production environments, avoiding issues that can be prevented by appropriately planning and implementing strategies to run the migration plan.

This chapter provides information about the general planning tasks that are involved when migrating from IBM Intelligent Operations Center V1.5 to V1.6. It includes examples to help you identify the customizations performed in the IBM Intelligent Operations Center V1.5 environment.

Remember: This edition of the book applies to IBM Intelligent Operations Center V1.6.0.1. For more information, see *IBM Intelligent Operations Center Version 1.6.0.1* on the following website:

`http://www-01.ibm.com/support/docview.wss?uid=swg24036406`

This chapter includes the following topics:

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3.1 Migration planning considerations

As you plan what to migrate, consider carefully what has been developed thus far, and its applicability to the new installation. Several factors should be considered, including new product capabilities that can replace or reduce the need for customizations, and new ways of implementing some capabilities. For information about migration options, trade-offs, and specific migration tasks see Chapter 4, “Migrating the solution customization” on page 67.

In addition to technical considerations, examine your business requirements before starting a massive migration of the functions that were implemented in IBM Intelligent Operations Center V1.5. This is a good time to re-assess your business requirements and identify lessons learned.

Consider the following sample questions to guide your migration decisions as you decide both *how* to migrate and *what* to migrate:

1. What has been successful in your implementation to date?
    a. Have the product and the modifications and customizations been well received by all?
    b. Have they worked as expected?
    c. Have other options proven more popular?
    d. Has anticipated use of some of the customizations been less than expected?
    e. Do you want to move everything that you implemented, or is some of it considered a placeholder or test exercise?
2. Where are you going? What will you do next in the project that involves IBM Intelligent Operations Center?
    a. Is there a major expansion or change underway or planned? For example, will you be implementing additional new software that might supplant or augment capabilities in the product? Will a new architecture be required?
    b. Does it make sense to move customizations, or instead learn from what you have done and re-architect?
3. Given new product abilities and direction, should you refactor? For example, as described in 4.3.1, “User interface customizations” on page 71, the user interface (UI) in IBM Intelligent Operations Center V1.6 was redesigned. Rather than migrating the pages “as is”, most likely you will need to re-design and re-implement them.

3.2 Migration planning strategy

The first steps in planning the migration strategy are to evaluate your current environment to identify the configurations that you have changed and any customizations that you have made. Determining what configurations and customizations that you have made will help you identify the scope of the migration project, and estimate the effort required. See 3.2.2, “Evaluating the current IBM Intelligent Operations Center V1.5 environment” on page 38 for more information about evaluating your current environment.

Restriction: No in-place upgrade capability is available for migrating from IBM Intelligent Operations Center V1.5 to V1.6 due to major architecture changes in IBM Intelligent Operations Center V1.6:

- The requirement for Red Hat Enterprise Linux (RHEL) V6.3, where IBM Intelligent Operations Center V1.5 only runs on RHEL V5
- Support for the high availability (HA) topology
- Major changes to some of the built-in functionalities

In-place migration is very seldom an option when migrating large and integrated enterprise applications.

You need to plan your new IBM Intelligent Operations Center V1.6 infrastructure. See 3.2.1, “Planning the new infrastructure” on page 32 for more information about planning your infrastructure.

Figure 3-1 shows an example process flow for the migration tasks.

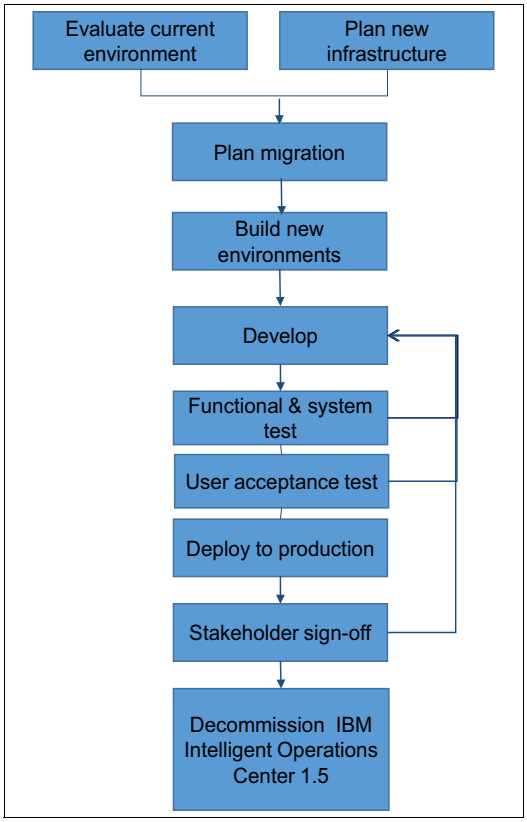

Figure 3-1 Migration flow

The following steps are depicted in Figure 3-1:

1. Evaluate your current environment and plan the new infrastructure.

   Ensure that you decide *what* needs to be migrated, and collect detailed information about the customizations and functions that will be migrated. Design the new infrastructure. You can then proceed with the migration planning.

2. Develop a migration plan. The information in this chapter will help you to build your plan.

3. Build new environments. You need to develop and test the migration in both development and test environments.
4. Develop and Test. As shown in Figure 3-1 on page 31, developing and testing your migration process is an iterative process. As you discover problems and other unexpected results during testing, go back and make adjustments in the migration development process.
5. Deploy to production. After you have completed developing and testing the migration, you can implement the migrated solution in the production environment. Depending on how exhaustive your testing was, you might also discover problems and issues in production deployments that you must resolve in your development environment. Retest all changes thoroughly.
6. Stakeholder sign-off. User acceptance and stakeholder sign-off is a required step to move forward with the migrated IBM Intelligent Operations Center V1.6 solution.
7. Decommission IBM Intelligent Operations Center V1.5. After the migration is completed in production and accepted by your users and stakeholders, you can decommission your old IBM Intelligent Operations Center V1.5 environments.

3.2.1 Planning the new infrastructure

For a period of time, you will need to manage both IBM Intelligent Operations Center V1.5 and V1.6 environments running in parallel, either in development, test, or production environments, depending on the migration strategy that you choose.

You will need to duplicate at least the development and test environments for a period of time sufficient to develop your migration procedures, apply the developed procedure to the test environment, and go through formal testing. Testing and developing might take several iterations.

When testing is complete and signed off, you will need to duplicate the production environment and complete the migration of the approved component. If the migration process has been thoroughly tested, the switch over to the IBM Intelligent Operations Center V1.6 production environment can take place immediately.

The development and test environments are shown in Figure 3-2 on page 33. You should already have development and test environments for IBM Intelligent Operations Center V1.5. You need to set up the equivalent test environments for IBM Intelligent Operations Center V1.6. When the migration is complete, you can back up and decommission your IBM Intelligent Operations Center V1.5 environments.

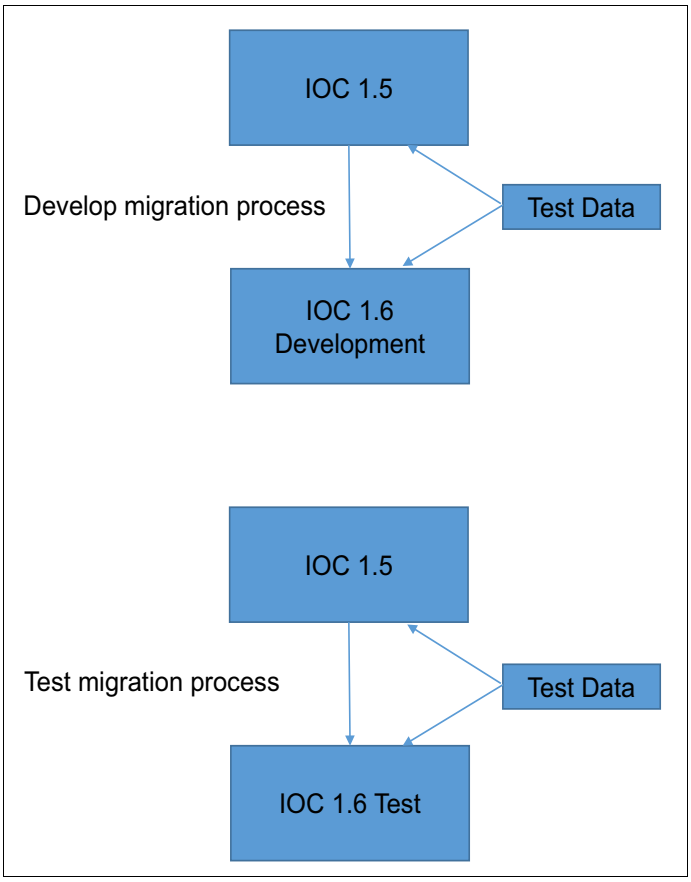

Figure 3-2 Development and test environments

Development environments

You will need an IBM Intelligent Operations Center V1.6 development environment to develop the steps required to migrate your configurations and customizations. Ideally, you should already have an IBM Intelligent Operations Center V1.5 development environment. Have a development environment separate from your IBM Intelligent Operations Center V1.5 production environment so that you can simulate conditions and events to determine their effect on your existing system without affecting your production environment.

You need to be able to simulate your system data feeds (for example, Common Alerting Protocol (CAP) events and bulk input data) to correctly determine how your old system handles incoming data, and how to configure your new system to respond in an equivalent manner. For example, a test case can be to trigger a standard operating procedure (SOP) and updating specific key performance indicators (KPIs) based on specific incoming CAP events.

Tip: You will need to upgrade your development tools to the versions compatible with IBM Intelligent Operations Center V1.6. See the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201 for details about development tools.

Even if you are intending to migrate to an HA topology in the production environment, you do not need to have HA development and test environments. Using IBM Intelligent Operations Center standard topology in the development and test environments can save resources and complexity, but it does have the risk that customized portlets or other code you are testing might not function as expected in a clustered environment.

The preferred approach is to have at least a test environment configured for HA if the target production environment is an HA topology.

Test environments

The IBM Intelligent Operations Center V1.5 and V1.6 test environments must be separate. Your test team must be able to compare and contrast the functionality of IBM Intelligent Operations Center V1.5 and V1.6. The IBM Intelligent Operations Center V1.6 test environment needs to be separate from the development environment, so that you can test the migration steps you have developed in a new environment.

You need to test both the process of migrating from IBM Intelligent Operations Center V1.5 to V1.6, and the functionality in IBM Intelligent Operations Center V1.6 after the migration. You need to test the migration process to ensure that you have fully documented and tested the procedure, so that the migration to the production environment is smooth and without surprises.

The IBM Intelligent Operations Center V1.5 test environment should be separate from the V1.5 development environment, so that testers can compare functionality from V1.5 to V1.6 when responding to the same input event or data. You can use your V1.5 development environment for testing, but you need to ensure that no changes are being made by the developers during the test phase. Again, you need to be able to simulate your system data feeds into your test environments.

Production environments

Consider whether you will run both IBM Intelligent Operations Center V1.5 and V1.6 production environments in parallel for a period of time, or whether you want to migrate to V1.6 and immediately start using the new environment.

The advantage of running IBM Intelligent Operations Center V1.5 and V1.6 production environments in parallel is that you can switch your users over to the new system in stages rather than all at once. However, running your production environments in parallel requires careful planning, and has disadvantages and complications.

The following list includes some of the disadvantages of running IBM Intelligent Operations Center V1.5 and V1.6 production environments in parallel:

- Complexity ingesting the same data

  One of the requirements for running production environments in parallel is to be able to duplicate input data, both CAP events and bulk load data, so that no data or events are missed in either environment. Keeping the data in sync between the two environments is a difficult task.

- Double triggering of SOP workflows and confusion about which environment to use

  A CAP event that triggers an SOP workflow will cause that workflow to start in both the IBM Intelligent Operations Center V1.5 and V1.6 environments. Starting two workflows for the same event is confusing for the people who are being directed to perform the tasks required to complete the SOP. The people being directed to perform actions will receive double notifications of tasks to complete, and might not be sure which environment to respond to when a task is completed.

For example, a report of smoke in a corridor from a building management system based on IBM Intelligent Operations Center might result in security personnel being notified twice for this event, which will cause confusion on how to respond.

- No changes to either environment

  During the period of time when both IBM Intelligent Operations Center V1.5 and V1.6 are running in parallel, any configuration changes made to one environment cause the other environment to be out of sync. Doing so can lead to different responses to input events in the two environments.

Considering all of the disadvantages of running both production environments in parallel, the preferred approach is to implement a migration process that has been thoroughly planned and tested, and then immediately switch over to the new environment when the migration implementation is completed.

Optional components

Based on the results of the analysis of your current configuration, you might decide to install one or more of the optional components that are provided with IBM Intelligent Operations Center V1.6, but are not installed or configured.

The following components are optional:

- IBM Security Access Manager for Web
- IBM Tivoli Composite Application Manager for Applications
- IBM Tivoli Monitoring
- IBM Tivoli Netcool/Impact
- IBM Tivoli Netcool/OMNIbus
- IBM SmartCloud Control Desk
- IBM Social Media Analytics
- IBM Integrated Information Core

See 3.4, “Solution migration planning” on page 41 for more information about deciding to use the optional components. IBM Intelligent Operations Center V1.6 does not provide installation or configuration scripts for the optional products included. You must install the optional products and integrate them with IBM Intelligent Operations Center yourself.

If you decide to use the optional components, you will need to build additional servers based on their individual hardware and software requirements, as documented in the Information Center for each component:

- IBM Security Access Manager for Web Version 7.0

  http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.isam.doc_80/welcome.html

- IBM Tivoli Composite Application Manager for Applications Version 7.2.1

  http://publib.boulder.ibm.com/infocenter/tivihelp/v24r1/topic/com.ibm.itcama.doc_7.2.1/welcome_apps721.html

- IBM Tivoli Monitoring Version 6.3

  http://publib.boulder.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.itm.doc_6.3/welcome.htm

- IBM Tivoli Netcool/Impact Version 6.1.1

  http://publib.boulder.ibm.com/infocenter/tivihelp/v8r1/topic/com.ibm.netcoolimpact.doc6.1.1/welcome.html

- IBM Tivoli Netcool/OMNIbus Version 7.4

  http://publib.boulder.ibm.com/infocenter/tivihelp/v8r1/topic/com.ibm.netcool_OMNIbus.doc_7.4.0/omnibus/wip/welcome.htm

- IBM SmartCloud Control Desk Version 7.5.1

  http://pic.dhe.ibm.com/infocenter/tivihelp/v50r1/topic/com.ibm.sccd.doc/ic-homepage.html

- IBM Social Media Analytics Version 1.2

  http://pic.dhe.ibm.com/infocenter/sma/v1r2m0/index.jsp

- IBM Integrated Information Core Version 1.5

  http://pic.dhe.ibm.com/infocenter/iicdoc/v1r5m0/topic/com.ibm.iic.doc/ic-homepage.html

High availability

Determine if you need to deploy an HA topology based on your business requirements.

The HA topology infrastructure needs are double those for the base topology, so rather than a minimum of four servers, the HA topology requires a minimum of eight servers. For more information about hardware requirements, see the *IBM Intelligent Operations Center hardware requirements for a high availability environment* topic:

http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/ba_plan_hardware_advanced.html

See Chapter 6, “High availability considerations” on page 119 for more information about migration considerations to a target HA topology.

If you decide to install any of the optional components, as described in “Optional components” on page 35, consider if you also need to configure the optional components in a cluster or with some failover capabilities, and plan for additional servers to support the optional components in an HA environment.

Be aware that an installed IBM Intelligent Operations Center V1.6 standard topology cannot be extended to add HA support. You cannot migrate to a standard topology and then convert it to an HA topology. However, if you are concerned about the extra complexities of migrating directly to an HA environment, you can migrate using a multi-phase approach:

- Phase 1

  The first phase is to migrate to an IBM Intelligent Operations Center V1.6 base topology in the development environment, and then go through a level of functional testing, as shown above the line in Figure 3-3 on page 37.

- Phase 2

  After the simpler migration and testing is complete, and all of the problems have been resolved, then you restart the migration process from the beginning. This time, migrate to an HA topology, as shown below the line in Figure 3-3 on page 37.

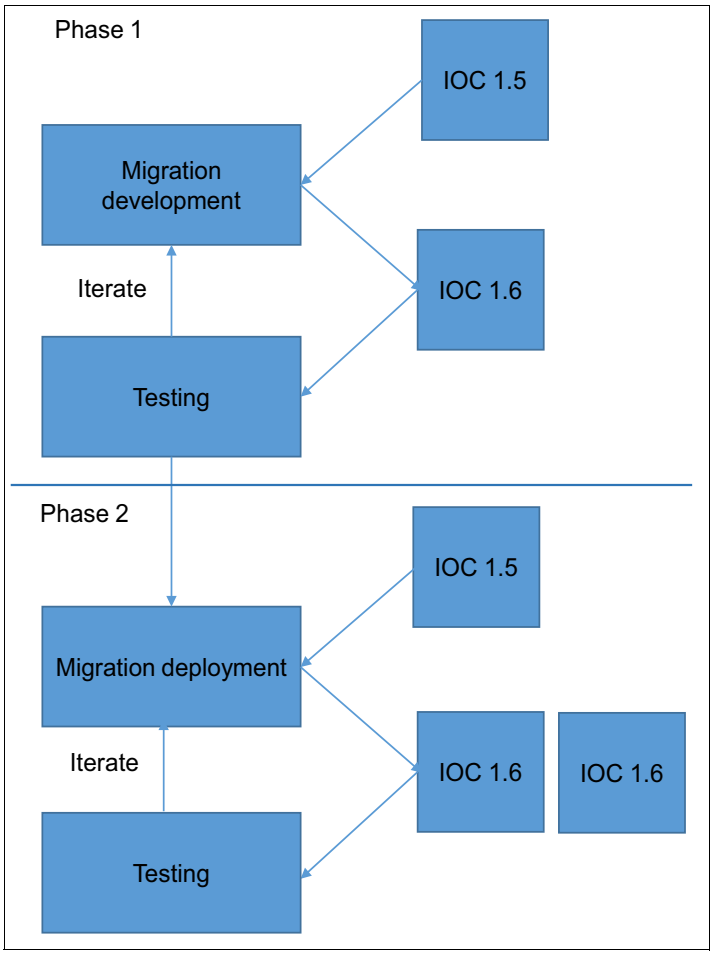

Figure 3-3 HA migration phases

A phased migration is the preferred approach if most of the functions to be migrated are not HA-dependant. This is because it minimizes the changes made in each phase, and enables you to test in a simpler environment that is closer to the IBM Intelligent Operations Center V1.5 architecture.

You still need to run the test cases in the HA test environment, with a focus on testing the HA and failover capabilities of your environment.

Ensure that any custom applications or configurations are HA-capable. You might have problems with custom portlets that were not designed with HA in mind, and might not function correctly in a clustered environment. Test extensively before migrating. See 6.6, “Programming considerations for high availability” on page 129 for more information.

Rollback strategy

It is important to have a rollback strategy in case something goes wrong when you run the migration steps to the production system, or if you encounter unexpected problems with the new system after migration.

If you experience problems when running the migration steps to the production system, there is no need to do any roll back. The users can continue to use the IBM Intelligent Operations Center V1.5 environment. You can restart the migration after you have determined the solution to the problems that you encountered.

If you encounter issues in your new IBM Intelligent Operations Center V1.6 environment after the switch over *and* after users have started to use the new system, the rollback process becomes more complicated. If you have not yet decommissioned the IBM Intelligent Operations Center V1.5 system, you can still switch your user base back to the old system. If you have decommissioned the V1.5 environment, you will need to restore it from backups to make it available again.

In either case, it is likely that newly imported data and updates made in the new environment will not be available in the restored IBM Intelligent Operations Center V1.5 environments. Lost data and events might include input data from data sources and CAP messages, KPIs, and started SOPs. It is important to develop a business strategy for dealing with data feed issues.

3.2.2 Evaluating the current IBM Intelligent Operations Center V1.5 environment

You need to evaluate your IBM Intelligent Operations Center V1.5 environment, and list in detail all of the configurations and customizations that were made to the base environment provided by IBM, including all changes:

- IBM WebSphere Portal pages or portlets you have created
- Users and groups
- KPIs
- SOPs
- Reports

Section 3.4, “Solution migration planning” on page 41 provides detailed information about the individual components of an IBM Intelligent Operations Center system that you need to consider.

After you have listed the configurations and customizations that were made to the IBM Intelligent Operations Center V1.5 environment, you can start to analyze your installation and decide how to migrate each required component.

There are several different classes of configuration or customizations to consider:

- Compatible

  These are customizations or configurations that can be migrated or re-created in the new environment with little or no effort:

  - Migrating the base map configuration
  - Users and groups in IBM Tivoli Directory Server
  - WebSphere Portal page hierarchy

- Simple

  These are customizations or configurations that can be migrated with minimal effort or rework, including custom portlets that can be recompiled and moved from one environment to the other, or custom database connections.

- Complex

  These are customizations or configurations that require an in-depth understanding of the source and target technologies to implement, new skills, and transformation to migrate:

  - Migrating SOPs from IBM Tivoli Service Request Manager to the IBM Intelligent Operations Center V1.6 SOP definitions
  - Migrating IBM Tivoli Netcool/Impact policies to IBM WebSphere Message Broker flows, IBM Intelligent Operations Center routing expressions, or IBM Operational Decision Manager rules (IBM Operational Decision Management is not included with IBM Intelligent Operations Center and must be purchased separately).
  - Migrating IBM Tivoli Monitoring configuration.

Decide whether you need to install the optional components that are provided with IBM Intelligent Operations Center V1.6 but are not installed, to maintain the functionality implemented in the IBM Intelligent Operations Center V1.5, or if you can implement the same functionality using IBM Intelligent Operations Center V1.6 components.

For example, if in your evaluation of the Netcool/Impact policies you determine that it is too hard to migrate them to WebSphere Message Broker flows, you can choose to install Tivoli Netcool/Impact, and then integrate it with your IBM Intelligent Operations Center V1.6 environment and move your policies over to the new environment.

3.2.3 Planning the migration test process

An important part of the planning process is determining how and where to test the migration. Consider how to drive the test cases:

- Automated testing using IBM Rational Functional Tester, IBM Rational Performance Tester, or similar products
- Manual testing using human testers
- A combination of manual and automated testing

Important: Rational Functional Tester and Rational Performance Tester are not included with IBM Intelligent Operations Center. They must be purchased separately.

The evaluation of the current environment will help you determine how exhaustive your testing needs to be. For example, if you have a large amount of custom code or customized configurations, you will need to test the custom functionality in detail. However if your environment is a ready-to-use IBM Intelligent Operations Center installation with little customization, your testing can be much more limited, because the product has been extensively tested before release.

Document the test cases clearly, identify what is being tested, and provide step-by-step instructions to describe how to complete each test. The test cases should also document what is considered to be a successful result for each test, and how to verify the expected results. Formalizing the test process reduces risk, and helps ensure a successful migration. Use the existing test cases from the IBM Intelligent Operations Center V1.5 environment test plan, and update them to suit the IBM Intelligent Operations Center V1.6 scenarios.

Consider how to provide test input data to your environments. Test data can take the form of sample data sets that are modeled on real production data, and are provided as inputs to IBM Intelligent Operations Center V1.6. Also consider how to generate test events for CAP data sources.

There are several possible ways of generating CAP messages:

- Use Rational Service Tester or a similar product to send test events over Java Message Service (JMS).
- Manually submit CAP events using IBM WebSphere MQ Explorer. For an alert message example and instructions about how to send the CAP message into the system, see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.
- Manually submit CAP events using the IBM WebSphere Message Broker V7 Message Display and Test Utility (rfhutils). For more information, see the *WebSphere Message Broker V7-Message display, test & performance utilities* topic:

  `http://www-01.ibm.com/support/docview.wss?uid=swg24000637`
- Write custom code to submit CAP events.

3.3 Infrastructure migration planning

Migrating the infrastructure consists of creating an IBM Intelligent Operations Center V1.6 environment to match each of the existing IBM Intelligent Operations Center V1.5 environments, so that you can develop and test the migration process.

3.3.1 System naming for co-existence

Because your IBM Intelligent Operations Center V1.5 and V1.6 environments are completely separate, you can give your new systems new host names and IP addresses. Each system can be accessed by the specific host name or IP address of the servers. If there are no host name or IP address conflicts, your environments will be separate and both accessible.

There are generally two approaches for accessing the IBM Intelligent Operations Center portal in the production environment:

- Method 1: Configure a domain name server (DNS) alias that references the IBM Intelligent Operations Center V1.5 application server directly.

  For example, the IBM Intelligent Operations Center V1.5 application server's host name is `ioc15app.<mydomain>.com`, but it is accessed using a DNS alias, such as `http://myioc.<mydomain>.com`.

  During migration testing, continue to access your IBM Intelligent Operations Center V1.5 system using the DNS alias, and access the new IBM Intelligent Operations Center V1.6 system using either the IP address or the host name of the IBM Intelligent Operations Center V1.6 web server.

  On switch over, update the DNS server so that the alias points to the IBM Intelligent Operations Center V1.6 web server. Consider shortening the DNS time to live (**TTL**) parameter to provide quicker DNS name update well in advance of the cut-over date.
- Method 2: The users enter the host name of the application server in the URL directly, for example: `http://ioc15app.<mydomain>.com`.

  During migration testing, continue using the IBM Intelligent Operations Center V1.5 application server host name to access the V1.5 environment, and use the new IBM Intelligent Operations Center V1.6 web server host name to access the V1.6 environment.

  On switchover, instruct the users to use the IBM Intelligent Operations Center V1.6 web server host name to access the new environment.

Method 1 is the preferred approach. Accessing the system using a DNS alias means that your users do not need to update any bookmarks or home pages if the host name or IP address of the web server changes.

Tip: You can add a simple HTML redirect page in your IBM Intelligent Operations Center V1.5 system to automatically redirect users to the new system until they become familiar with the new URL.

3.3.2 Duplicating data feeds

If you are only duplicating environments in test and development, there are no special considerations. The test data that you are generating will only be used for development and test, and does not need to be maintained in the long term. The same test data can be re-used across both your development and test environments, and as inputs to both the IBM Intelligent Operations Center V1.5 and V1.6 systems.

If you choose to run IBM Intelligent Operations Center V1.5 and V1.6 in parallel in production, you must be more careful with duplicating your data feeds. The effort in duplicating data feeds depends on the data. If the data to be duplicated is bulk loaded, the effort is small. The IBM Intelligent Operations Center V1.5 system will already be ingesting bulk loaded data, and duplicating the data feed can be as simple as setting up a new data source in IBM Intelligent Operations Center V1.6 using the same data feed.

CAP messages or other data that is loaded through IBM WebSphere MQ are more difficult to duplicate, because each incoming message must be duplicated to send to both IBM Intelligent Operations Center V1.5 and V1.6. For example, you can use a staging queue manager, and a custom application that reads an incoming message and sends a copy of the message to both the IBM Intelligent Operations Center V1.5 and V1.6 input queues.

In this example, the applications that are sending the CAP messages to the IBM Intelligent Operations Center need to be changed to send the messages to the staging queue manager. Further development and configuration work is required to duplicate CAP data feeds.

Important: When setting up a data source to pull event data from an IBM Intelligent Operations Center V1.5 system, make sure that the Geometry format is set to `ALL`, otherwise only the selected Geometry format data will be pulled into IBM Intelligent Operations Center V1.6.

3.4 Solution migration planning

This section provides information about the migration options for the various components of the IBM Intelligent Operations Center, and helps you decide between the options that apply to the migration of each component.

3.4.1 Identity management

IBM Intelligent Operations Center V1.5 and V1.6 both store user identity management information in IBM Tivoli Directory Server. Therefore migrating users from IBM Intelligent Operations Center V1.5 to V1.6 is relatively simple. Export the users from IBM Intelligent Operations Center V1.5 in Lightweight Directory Access Protocol (LDAP) Data Interchange Format (LDIF) format, and then import them into IBM Intelligent Operations Center V1.6.

If you have modified the standard group-to-application mappings in IBM Intelligent Operations Center V1.5 WebSphere Portal then you will need to repeat or duplicate the changes in IBM Intelligent Operations Center V1.6.

Many organizations have an automated process to synchronize users with, or import users into IBM Intelligent Operations Center from, the organization's corporate directory. For example, consider an organization that uses Microsoft Active Directory as the corporate user directory. Rather than duplicating existing users and groups in the IBM Intelligent Operations Center's directory, users and groups can be extracted from the Microsoft Active Directory and imported into IBM Intelligent Operations Center.

If you have such an import or synchronization process, examine the implementation to determine what changes are needed. In most cases, the user and group import or synchronization process is implemented through IBM Tivoli Directory Integrator. The extraction process from the external directory should not have to change, but the import process might have to change.

In the import process, users are added to IBM Intelligent Operations Center either as IBM Tivoli Access Manager for e-business users and groups, or as IBM Tivoli Directory Server users and groups. If you import directly into IBM Tivoli Directory Server, no changes are required.

If you previously imported or synchronized user and group memberships through IBM Tivoli Access Manager for e-business, decide whether to redevelop the process so that it imports user and group memberships directly into IBM Tivoli Directory Server or to install and configure IBM Security Access Manager for Web (previously IBM Tivoli Access Manager for e-business) in the IBM Intelligent Operations Center V1.6 environment.

The advantage of installing IBM Security Access Manager for Web is that it eliminates the need to redevelop the import code. However, there are disadvantages to installing IBM Security Access Manager for Web:

- It requires administration skills.
- It requires an extra server where the product is installed.
- It adds an extra step to every web page, therefore it affects performance.
- The product needs to be managed and maintained.

Important: Only install IBM Security Access Manager if you need a reverse proxy, if you want authentication in the DMZ, or if you need single sign-on (SSO) with other web applications.

For more information about identity management migration, see 4.3.7, "Identity management" on page 83.

3.4.2 Security

IBM Intelligent Operations Center V1.5 implements authorization through IBM Tivoli Access Manager for e-business junctions and access control lists (ACLs). However, by default, IBM Intelligent Operations Center V1.5 only provided junction points to the WebSphere Portal server and supporting infrastructure.

In IBM Intelligent Operations Center V1.6, the IBM Tivoli Access Manager for e-business junction points are replaced by the configuration of the WebSphere plug-in on the IBM Intelligent Operations Center V1.6 web server. You do not need to do any work to enable the required functionality.

Only one extra ACL is created in IBM Tivoli Access Manager for e-business in IBM Intelligent Operations Center V1.5. This ACL controls access to the IBM Intelligent Operations Center junctions, and restricts access to users who are members of an IBM Intelligent Operations Center group.

Equivalent access control is implemented by WebSphere Portal security in IBM Intelligent Operations Center V1.6. Therefore, if you have not made any changes to IBM Tivoli Access Manager for e-business in V1.5, you will not need to re-install IBM Security Access Manager for Web in V1.6.

However, suppose that you have used IBM Tivoli Access Manager for e-business to integrate with other components or web-based servers, or have used a more complex SSO solution. If you require the same functionality in IBM Intelligent Operations Center V1.6, you will need to install and configure IBM Security Access Manager.

For example, if your organization uses client certificates for securing access to web-based consoles on your intranet, you will need to install and configure IBM Security Access Manager as a front end to IBM Intelligent Operations Center, either rather than or in addition to the IBM HTTP Server. IBM Security Access Manager supports authentication using client certificates, and can pass the user credentials on to the WebSphere Portal.

Access control for key performance indicators

Access control for KPIs has changed. Access is now defined at the first-level KPI under an owning organization. Access to KPIs is granted to groups. If you control access to KPIs in IBM Intelligent Operations Center V1.5 by adding individual user groups to the `ioc_base` groups, for example: `ioc_base_transportation`, you need to re-create the security control in V1.6:

- Create new groups for KPI access.
- Assign users to the groups.
- Assign the required groups to the first-level KPIs.

For example, if you previously put users in the `ioc_base_transportation` group to provide access to transport-related KPIs, you need to create an equivalent group in IBM Intelligent Operations Center V1.6, and add users as members to that group. Then, add the group to the new transport-related KPIs.

For more information about migrating security, see 4.3.8, “Security” on page 86.

3.4.3 Infrastructure monitoring

IBM Intelligent Operations Center V1.6 does not provide any infrastructure monitoring capability ready to use. If you have been making extensive use of the IBM Intelligent Operations Center V1.5 monitoring through the IBM Tivoli Monitoring component, and you want to continue using it, install and configure the included IBM Tivoli Monitoring product.

You must install IBM Tivoli Monitoring on a separate server, because the existing hardware is not scaled to meet the extra requirements of IBM Tivoli Monitoring. Then, identify the agents that are installed on each server to be monitored, and proceed to install and configure the required agents on the individual server. Finally, identify what situations are relevant to the IBM Intelligent Operations Center V1.6 environment. Each situation must be migrated to the new environment.

Tip: The system verification check tool tests components in IBM Intelligent Operations Center to determine if they are accessible and operational. The system verification check tool might be sufficient for your IBM Intelligent Operations Center infrastructure monitoring requirements.

For more information about migrating the monitoring infrastructure see 4.3.9, “Infrastructure monitoring” on page 90.

3.4.4 Event data migration

Event information for past events is stored in the IBM Intelligent Operations Center V1.5. You might want to migrate IBM Intelligent Operations Center V1.5 event data into the new IBM Intelligent Operations Center V1.6 system for reference purposes, and to create reports.

Existing IBM Intelligent Operations Center V1.5 event data can be migrated into the new V1.6 environment by configuring a new data source. The data source should reference the IBM Intelligent Operations Center V1.5 IOC_COMMON.EVENTS table in the IOCDB database.

When imported into IBM Intelligent Operations Center V1.6, the events can be used in the same way as any other imported data. The event data imported from IBM Intelligent Operations Center V1.5 will be separate from any new event data ingested in IBM Intelligent Operations Center V1.6. The data will be in separate data sources, and there is no way to combine the two data sources.

If you want to display both the event data from V1.5 and the new data in V1.6 on the map, you will need to create a filter panel for each data source, and then select both sets of data from the filter panels. If you want to create Cognos reports that incorporate both the event data from V1.5 and the new data in V1.6, you will need to manually create a Cognos model that spans both data sources.

You can create a single report across both data sources using the Cognos model. For information about creating a Cognos model, see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

After you have imported your events from IBM Intelligent Operations Center V1.5, set the data source to not poll the source database, because there should be no new events to import from the old system.

Important: Do not delete the events data source in IBM Intelligent Operations Center V1.6 or your historical data will be lost.

Depending on your requirements, you might want to import only a subset of the event data from IBM Intelligent Operations Center V1.5. You can filter the incoming data with routing rules on the data source.

The IOC_COMMON.EVENT table holds the current, active events for IBM Intelligent Operations Center V1.5. The events table contains the columns shown in Table 3-1.

Table 3-1 IOC_COMMON.EVENT table columns

Column	Description
ID	Internal event ID
ExternalEventID	Reference to event in event-specific data

Column	Description
Specification	Event specification
Eventtype	Type of event
Sent	Timestamp of when the event was sent
Headline	Short description
Hover	Hover text (optional, defaults to headline)
Category	Reference to event category
Certainty	Reference to event certainty
Severity	Reference to event severity
Urgency	Reference to event urgency
URL	URL for additional information (optional)
ExternalWorkOrderID	IBM Tivoli Service Request Manager work order ID (optional)
Location	DB2 spatial value of event location (optional)
LargeIcon	Icon to display on the Map portlet
LargeHiliteIcon	Highlighted icon to display on the Map portlet
LargeGreyIcon	Grey icon to display on the Map portlet
SmallIcon	Icon to display on the Events portlet
User1…5	Five columns for any optional data

The following columns are likely to be useful for event reporting:

- Location
- Specification
- Eventtype
- Sent
- Headline
- Hover
- Severity
- Urgency

For an example of how to migrate event data, see 5.2.5, “Event data” on page 100.

3.4.5 Sametime contacts

IBM Sametime contact lists can simply be exported from the IBM Intelligent Operations Center V1.5 system and imported into IBM Intelligent Operations Center V1.6. For information about the process, see the *Migrating contact lists to a new Sametime server* IBM technote:

http://www-01.ibm.com/support/docview.wss?uid=swg21091030

For more information about migrating your IBM Sametime contact list, see 4.3.10, “Sametime Contact list” on page 92.

3.4.6 User interface

The UI in IBM Intelligent Operations Center V1.6 was completely redesigned to improve the visual experience and responsiveness. More information is available in every page, through simple and consistent actions.

IBM Intelligent Operations Center V1.6 includes the IBM Worklight Consumer Edition software product. For usage restrictions see “IBM Worklight Consumer Edition special note”.

In IBM Intelligent Operations Center V1.5, users interact primarily with the IBM WebSphere Portal. The following list includes common UI customizations performed in IBM Intelligent Operations Center V1.5 installations:

- Adding new or modifying existing portal pages

  List all of the portal pages that have been created or modified in your installation. Determine the layout of those portal pages in IBM Intelligent Operations Center V1.6.

- Adding new or modifying existing portal themes and skins

  List all of the themes and skins that have been created or modified in your installation. Because IBM Intelligent Operations Center V1.6 uses IBM WebSphere Portal 8, identify if portal themes and skins must be modified to work in WebSphere Portal 8.

- Adding new portlets

  List all of the new portlets that have been developed in your installation. Review the portlet code and identify if the portlet code must be modified to work in IBM Intelligent Operations Center V1.6. If you used Dojo application programming interfaces (APIs) in the portlets, make sure that they are still supported with the version that is included with IBM Intelligent Operations Center V1.6. IBM Intelligent Operations Center V1.6 supports IBM Dojo Toolkit V1.8 and IBM Extensions Toolkit for Dojo 1.3.

- Customizing ready-to-use portlets

  List all the ready to use portlets that have been customized. Determine how to apply those changes in IBM Intelligent Operations Center V1.6.

- Customizing other portal configurations (for example, URL mapping)

  List all other customizations that you made to WebSphere Portal. Identify if you still require those customizations in IBM Intelligent Operations Center V1.6. If required, determine how to apply those changes in IBM Intelligent Operations Center V1.6.

If you are currently supporting mobile devices or deployed custom mobile applications, and you want to use IBM Worklight in IBM Intelligent Operations Center V1.6, redesign the mobile solution and create a plan to develop and migrate the mobile applications to IBM Worklight Consumer Edition.

For more information about mobile applications in Worklight, see the IBM Worklight Information Center:

http://pic.dhe.ibm.com/infocenter/wrklight/v6r0m0/topic/com.ibm.help.doc/wl_home.html

IBM Worklight developer edition is available for evaluation purposes and can be downloaded from the following website:

http://www.ibm.com/developerworks/downloads/ws/worklight/

For more information about migrating user interface customizations, see 4.3.1, “User interface customizations” on page 71.

IBM Worklight Consumer Edition special note

IBM Intelligent Operations Center V1.6 includes the IBM Worklight Consumer Edition software product. The IBM Intelligent Operations Center Premium User V1.6 license entitles you to accomplish the following actions:

- Customize mobile applications delivered with IBM Intelligent Operations Center.
- Run mobile applications delivered with IBM Intelligent Operations Center if the *Prohibited Components* terms are met.

Prohibited Components: Licensee is not authorized to use any of the following components or functions:

- Change project structure (of IBM Worklight Consumer Edition).
- Process data by the mobile application that does not originate directly from the Principal Program (of IBM Worklight Consumer Edition).
- Create a new project (of IBM Worklight Consumer Edition).

The IBM Intelligent Operations Center Premium User V1.6 license does *not* entitle you to use the included IBM Worklight Consumer Edition software for the following purposes:

- Develop new mobile applications.
- Run mobile applications (other than those included with IBM Intelligent Operations Center).

You need to purchase an IBM Worklight license separately to be entitled to develop and run mobile applications.

3.4.7 Data, rules and events

In IBM Intelligent Operations Center V1.5, events pass through several steps and software products before they are processed and stored in the IBM Intelligent Operations Center database. The following list includes key components that process the event data:

- IBM WebSphere Message Broker flows
- IBM Tivoli Netcool/OMNIbus probes
- IBM Tivoli Netcool/Impact policies
- IBM Operational Decision Management rules

Identify all of the customizations that are implemented in the IBM WebSphere Message Broker, IBM Tivoli Netcool/OMNIbus, IBM Operational Decision Management, and IBM Tivoli Netcool/Impact components. Categorize the customizations into the following areas:

Data collection	Specifies how the data is collected and the source of the event data.
Data enrichment	Specifies how the event data is enriched.
Data transformation	Specifies how the incoming data is transformed through the event flow.
Data routing	Specifies how the event data is routed in the flow.
Business rules	Specifies what kind of business rules are applied on the event data.
Data filtering	Specifies how the data is filtered and the rules associated with data filtering.

Also, identify the format of the incoming event data and the event volume. This information will guide you to select the migration option.

For more information, see 4.3.2, “Data, rules, and events” on page 72.

3.4.8 Key performance indicators

Identify all of the KPIs that currently exist in the IBM Intelligent Operations Center V1.5 solution. The following artifacts are to be migrated:

- IBM Business Monitor artifacts
- KPI configuration tool modifications
- KPI hierarchy definitions

There are only minor changes in the KPI support in IBM Intelligent Operations Center V1.6. Some new features have been added.

IBM Intelligent Operations Center V1.5 KPI data models are applicable to IBM Intelligent Operations Center V1.6 CAP event data sources only.

As part of your planning, consider if you want to implement any of the new KPI features. For more information about the new KPI features, see 1.4.5, “Customizing key performance indicators” on page 9.

For more information about migrating KPIs, see 4.3.3, “Key Performance Indicators” on page 77.

3.4.9 Standard operating procedures

Identify all of the SOPs that currently exist in the IBM Intelligent Operations Center V1.5 solution, and then categorize them as follows:

- Manual SOPs
- Complex automated workflow SOPs
- Notification SOPs
- Conditional SOPs
- Nested SOPs

In IBM Intelligent Operations Center V1.6, you can create all of the SOP categories with the built-in SOP configuration tool, except for complex automated workflow SOPs. If you require this type of SOP, you need to install and configure IBM SmartCloud Control Desk provided in the box with IBM Intelligent Operations Center V1.6.

The migration options for SOPs vary depending on the type of SOP that you are migrating. Two types of SOPs can be created in IBM Intelligent Operations Center V1.5:

- SOPs created using the SOP tool available through the IBM Intelligent Operations Center for Emergency Response (part of IBM Intelligent Operations Center V1.5 Interim Feature 2)
- SOPs created in IBM Tivoli Service Request Manager

Identify and document all of the SOPs that were created using the SOP tool and IBM Tivoli Service Request Manager.

After all of the SOPs are identified and documented, determine which ones must be migrated, and whether you want to use the new SOP features in IBM Intelligent Operations Center V1.6.

For more information about migrating SOPs, see 4.3.4, “Standard Operating Procedures” on page 80.

3.4.10 Custom reports

Custom reports refer to the reports that were created with IBM Cognos Report Studio. Identify all of the reports that are deployed in the IBM Intelligent Operations Center V1.5 solution.

In IBM Intelligent Operations Center V1.6, the support for Cognos reports has not changed much, except for the version (IBM Cognos Business Intelligence 10.2 versus 10.1.1 in IBM Intelligent Operations Center V1.5).

However, the data structures in IBM Intelligent Operations Center have changed significantly, so any custom reports you have that access IBM Intelligent Operations Center data must be re-created. To assist you in writing new reports, you can configure a new data source to generate a Cognos model that is required for charting. If you need complex reports that span multiple data sources, then you will need to create your own model using the IBM Cognos Framework Manager.

For more information about migrating Cognos reports see 4.3.5, “Custom reports” on page 81.

IBM Intelligent Operations Center V1.6 includes support for Dojo charts as an alternative to creating Cognos reports in some situations. Use Dojo charts as a simple and flexible tool to display important information and trends using data that spans multiple data sources. The main characteristics of Dojo charts in IBM Intelligent Operations Center V1.6:

- Results are filter-driven. Charts are driven by the filter (charts react to the changes in filter configuration).
- Charts refresh instantly as a reaction to changes in filtering or data sources (refresh is data-driven).
- The charts are only suitable for a moderate number of records (hundreds).
- The charts require programming with JavaScript/Dojo.
- Data is retrieved by interacting with Dojo topics and Representational State Transfer (REST) APIs, restricted to minimal properties of the data source. The data can also be retrieved from the IBM Intelligent Operations Center Data Provider (if the report is on the same page as the Content Viewer portlet Filter Panel and it extends the IBM Intelligent Operations Center View, or it is implemented as a widget in the IBM Intelligent Operations Center Content Viewer).
- Complex filtering is not possible.

3.4.11 Integration with external systems

IBM Intelligent Operations Center V1.5 provides multiple ways to integrate with external systems. Identify all of the integration points, and for each one document the following information:

- Integration type

  Describes whether integration is done using IBM Intelligent Operations Center APIs (for example, Java service or REST APIs) or systems integration (for example, integration of IBM Tivoli Directory Server component in IBM Intelligent Operations Center with Microsoft Active Directory to provision users into Tivoli Directory Server).

- Design of the integration

  Understand how the integration is designed (for example, the interfaces used). This information will help you assess the effect of migrating the integration to IBM Intelligent Operations Center V1.6.

- Migration effect

  Describes the effect and changes required to migrate the integration from IBM Intelligent Operations Center V1.5 to V1.6. Take into consideration any effects to the design if you plan to use the HA edition of IBM Intelligent Operations Center V1.6.

After all of the integration points are identified and documented, create a migration plan to migrate the integration points to IBM Intelligent Operations Center V1.6.

For more information about migrating or implementing integration with external systems, see 4.3.6, “Integration with external systems” on page 82.

3.5 Skills planning

Because the IBM Intelligent Operations Center is an integrated solution that includes several components, it is important to ensure that the required skills are available to successfully migrate to IBM Intelligent Operations Center V1.6. For example, if custom development was done by a third-party organization, are there skilled people available to make sure that the custom development will be easily moved to the new version?

As part of the analysis of your existing environment, described in detail in 3.2.2, “Evaluating the current IBM Intelligent Operations Center V1.5 environment” on page 38, you identified the components that were customized or built. Identifying the changes helps you to identify the skills and resources that you need to implement the migration plan successfully. Also, determine if new skills must be available to support and maintain the IBM Intelligent Operations Center V1.6 solution.

Skills with some of the following products might be required to migrate to, and possibly to manage, your IBM Intelligent Operations Center V1.6 environment:

- REST programming
- Java programming
- Dojo programming
- IBM WebSphere Application Server
- IBM WebSphere Feature Pack for Web 2.0
- IBM WebSphere Portal Server
- IBM DB2 Enterprise Server Edition
- IBM Cognos Business Intelligence
- IBM Cognos Report Studio
- IBM Cognos Framework Manager
- IBM Security Access Manager
- IBM Security Identity Manager
- IBM WebSphere Message Broker
- IBM Worklight
- IBM WebSphere MQ
- IBM Operational Decision Management
- IBM Tivoli Netcool/OMNIbus
- IBM Tivoli Netcool/Impact
- IBM SmartCloud Control Desk
- IBM SPSS Modeler Limited
- IBM Social Media Analytics
- IBM Integrated Information Core

Table 3-2 cross-references the IBM Intelligent Operations Center functionality to the corresponding skills.

Table 3-2 Function to skill cross-reference

Function	Skills
Analytics services	IBM Cognos Business Intelligence
Application services	► Java Platform, Enterprise Edition (Jave EE) development ► Dojo development ► WebSphere Application Server ► WebSphere Portal
Authentication and authorization services using UI services	WebSphere Portal Enable administration
Authentication, authorization, and SSO services using reverse proxy	► IBM Security Identity Manager administration ► IBM Tivoli Access Manager for e-business ► IBM Tivoli Access Manager WebSEAL
Collaboration services	► IBM Lotus Domino ► IBM Sametime ► Sametime Proxy
Configuration services	IBM SmartCloud Control Desk
Database services	DB2 database administrator skills with DB2 Spatial Extender
Identity management services	► IBM Security Identity Manager administration ► IBM Tivoli Directory Integrator development ► IBM Tivoli Directory Server
KPI services	IBM Business Monitor development
Messaging services	► IBM WebSphere MQ administration and development ► IBM WebSphere Message Broker administration and development ► WebSphere Application Server service integration buses
Mobile services	IBM Worklight development
Monitoring services and agents	► Tivoli Composite Application Manager administration and development ► Tivoli Monitoring administration and development
Password management services	IBM Security Identity Manager administration
SOP services	IBM SmartCloud Control Desk
Usage analysis or Platform usage services	WebSphere Portal Enable administration
User directory integration, including password synchronization plug-in services	► IBM Tivoli Directory Server development ► IBM Tivoli Directory Integrator ► IBM Security Identity Manager
User interface services	► WebSphere Portal Enable development ► IBM Worklight development ► Dojo development

Function	Skills
User directory and user directory integration services	► IBM Tivoli Directory Server administration ► IBM Tivoli Directory Integrator development and administration
Web services	► Java EE development ► WebSphere Application Server application development ► IBM Rational Application Developer
The following service is only available if the optional semantic model server is installed.	
Semantic model services	► Semantic modeling ► Information management ► Ontology skills, such as Web Ontology Language (OWL) and Resource Description Framework (RDF)
The following service is only available if the optional Data Studio tool is installed.	
Data design services	IBM DB2 development and administration

High availability skills

IBM Intelligent Operations Center V1.6 HA topology uses the HA capabilities of the IBM products that are part of the solution. For example, the IBM WebSphere Portal component implements HA through standard WebSphere Application Server clustering, and IBM DB2 HA is implemented using the standard high availability disaster recovery (HADR) capabilities.

If your organization includes technical resources with skills using the HA capabilities of the products included in the IBM Intelligent Operations Center HA topology, no other special knowledge is needed. Custom applications must support the HA environment.

If you are lacking skills required for the migration process, then you can procure skills through IBM Services for the duration of the migration.

Alternatively, you can train your own resources in the IBM Intelligent Operations Center components through IBM Learning Services.

3.6 Identifying changes to the IBM Intelligent Operations Center V1.5 base installation

This section provides techniques and sample scripts to help you identify the changes made to the IBM Intelligent Operations Center V1.5 system compared to a base installation.

Appendix A, “Scripts provided with this book” on page 137 includes a summary of the sample scripts, and Appendix B, “Additional material” on page 141 includes information to download and install the sample scripts.

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The sample scripts use an IBM Intelligent Operations Center V1.5.0.0 installation, with no authorized program analysis reports (APARs) or features applied, as a baseline for the identification of standard features.

If you have installed one or more of the features that were made available in IBM Intelligent Operations Center V1.5.0.2, such as the Emergency Response or the Executive Dashboard, the sample scripts will find artifacts that were installed with those features. Analyze the reported differences carefully to determine the customizations and configurations specific to your environment.

The sample scripts cannot determine precisely what was modified, but they are intended to give you a starting point for your investigation.

Note: To run the scripts provided with this IBM Redbooks publication, you might need to convert them to make them executable scripts, depending on how you transfer the scripts to your IBM Intelligent Operations Center V1.5 servers. For example, the first command converts the line delimiters to UNIX format, and the second example makes it an executable script:

```
dos2unix list_ldap_suffixs.py
chmod 755 list_ldap_suffixs.py
```

3.6.1 Identity management

The information in this section helps you to determine if new LDAP suffixes have been created in the IBM Intelligent Operations Center V1.5 LDAP server, and if new users and groups have been created under the default `ou=SWG,o=IBM,c=US` suffix.

Suffixes

The **`list_ldap_suffixs.py`** script checks the LDAP configuration to identify if any nonstandard suffixes were defined on the LDAP instance. The **`list_ldap_suffixs.py`** script must be run on the IBM Intelligent Operations Center V1.5 data server. Example 3-1 illustrates running the **`list_ldap_suffixs.py`** script where a nonstandard suffix, `ou=ACT, o=GOV, c=AU`, is found.

Example 3-1 Running the list_ldap_suffixs.sh script

```
[root@ioc-data tmp]# ./list_ldap_suffixs.py
Checking LDAP suffixes
----------------------
     cn=configuration - Standard IOC LDAP suffix detected

     cn=schema - Standard IOC LDAP suffix detected

     cn=localhost - Standard IOC LDAP suffix detected

     cn=ibmpolicies - Standard IOC LDAP suffix detected

     cn=Deleted Objects - Standard IOC LDAP suffix detected

     ou=SWG, o=IBM, c=US - Standard IOC LDAP suffix detected

     secAuthority=Default - Standard IOC LDAP suffix detected

!!!  ou=ACT, o=GOV, c=AU - Unknown LDAP suffix detected
```

Users and groups

The **`list_ldap_users_groups.py`** script checks the LDAP configuration to identify if any users and groups not installed by IBM Intelligent Operations Center were created under the default suffix, `ou=SWG,o=IBM,c=US`. The **`list_ldap_users_groups.py`** script must be run on the IBM Intelligent Operations Center V1.5 data server.

Example 3-2 illustrates running the **`list_ldap_users_groups.py`** script.

Example 3-2 Running the list_ldap_users_groups.py script

```
[root@ioc-data tmp]# ./list_ldap_users_groups.py
Checking LDAP data
------------------
!!! Unknown entry: uid=testuser,ou=USERS,ou=SWG,o=IBM,c=US
!!! Unknown entry: uid=chinaeastuser,ou=USERS,ou=SWG,o=IBM,c=US
!!! Unknown entry: uid=paulkelly,ou=USERS,OU=SWG,O=IBM,C=US
!!! Unknown entry: uid=jimmybarnes,ou=USERS,OU=SWG,O=IBM,C=US
!!! Unknown entry: cn=security_admins,ou=GROUPS,ou=SWG,o=IBM,c=US
!!! Unknown entry: cn=sop_admin,ou=GROUPS,ou=SWG,o=IBM,c=US
!!! Unknown entry: cn=ACDM_users,ou=GROUPS,ou=SWG,o=IBM,c=US
```

Tip: The **list_ldap_users_groups.py** sample script can take a long time to run if you have many users defined under the default suffix. If you know that you have many users under the default suffix, you do not need to run this script, because you already know what the script is designed to check.

3.6.2 Security

The **list_tam_config.py** script lists any IBM Tivoli Access Manager for e-business configuration that is not created by default in IBM Intelligent Operations Center V1.5. Inspect the new configuration to determine how you can re-create this functionality in IBM Intelligent Operations Center V1.6. See 4.3.8, “Security” on page 86 for information about migrating your security configuration.

The **list_tam_config.py** script must be run as the root user on the IBM Intelligent Operations Center V1.5 application server. You will be prompted for the password of the IBM Tivoli Access Manager for e-business `sec_master` user. Example 3-3 illustrates running this script where an unexpected group-to-ACL mapping is found.

Example 3-3 Running the list_tam_config.sh script

```
Checking TAM data
------------------
Enter the sec_master user password:

Checking junctions

No unexpected junctions found

Checking ACLs

No unexpected ACLs found

Checking ACL/Group mappings for "wpsv70_ACL"

Unexpected ACL/Group mapping found: Group AirportSupervisor Tmdrx
```

3.6.3 User interface

Customizations of UI elements include new portlet modules and Java EE applications installed in IBM WebSphere Portal and WebSphere Application Server. Other customizations include new IBM WebSphere Portal pages.

WebSphere Application Server applications

The **list_was_apps.py** script queries the WebSphere Application Server Deployment Manager that manages the cluster where the IBM Intelligent Operations Center application runs, to determine if any nonstandard applications have been installed. Nonstandard applications are either stand-alone Java EE applications or custom portlets that were added to IBM Intelligent Operations Center V1.5.

The script requires a data file, `applications.data`, which is provided with this IBM Redbooks publication. Both the **list_was_apps.py** script and the `applications.data` file must be in the same directory. The sample script can only be run on the IBM Intelligent Operations Center V1.5 application server.

The **list_was_apps.py** script must be run using the WebSphere Application Server **wsadmin** scripting tool, as shown in Example 3-4.

Example 3-4 Running the list_was_apps.py script

```
/opt/IBM/WebSphere/AppServer/profiles/dmgr/bin/wsadmin.sh -lang jython -f list_was_apps.py
```

You will be prompted for the user name and password to connect to the WebSphere Application Server Deployment Manager. Use `waswebadmin` for the user ID. You need to know the password for the `waswebadmin` user to run this script.

For more information, see the *Using the wsadmin scripting tool* topic at the following website:

http://pic.dhe.ibm.com/infocenter/wasinfo/v7r0/topic/com.ibm.websphere.nd.doc/info/ae/ae/rxml_commandline.html

Example 3-5 shows the output of the **list_was_apps.py** script on the IBM Intelligent Operations Center V1.5 application server. In this example, the script detected one unknown application. Inspect the configuration of the application from the WebSphere Application Server administrative console to determine more information about this application. For example, determine if the application needs to be migrated. If so, decide whether it can be migrated, or if it needs to be redeveloped for IBM Intelligent Operations Center V1.6.

Example 3-5 Output from running the list_was_apps.py script

```
[root@ba15app01 tmp]# /opt/IBM/WebSphere/AppServer/profiles/dmgr/bin/wsadmin.sh
-lang jython -f list_was_apps.py
Realm/Cell Name: <default>
Username: waswebadmin
Password:
 WASX7209I: Connected to process "dmgr" on node DmgrNode using SOAP connector;
The type of process is: DeploymentManager

Checking WAS Applications
-------------------------

!!! unknown application name found: ACDMApp
```

Portal configurations

The **list_portal_config.py** script lists the IBM WebSphere Portal pages that are not created by default in IBM Intelligent Operations Center V1.5. Inspect the new pages to determine how you can re-create this page structure in IBM Intelligent Operations Center V1.6. See 4.3.1, “User interface customizations” on page 71 for information about migrating UI changes.

Follow these steps:

1. Export the IBM WebSphere Portal configuration to a file using the IBM WebSphere Portal XMLAccess tool so that the sample script can parse this output. To do this, run the command shown in Example 3-6 on the IBM Intelligent Operations Center V1.5 application server.

Example 3-6 Exporting the IBM WebSphere Portal configuration with XMLAccess

```
/opt/IBM/WebSphere/PortalServer/bin/xmlaccess.sh -url http://localhost:10039/wps/config -in
/opt/IBM/WebSphere/PortalServer/doc/xml-samples/Export.xml -out result.xml
```

Remember: The command shown in Example 3-6 on page 56 is a single command shown on two lines due to page width restrictions.

You will be prompted for the user name and password to connect to IBM WebSphere Portal. Use `wpsadmin` for the user ID. You must know the `wpsadmin` user's password. In this example, the `results.xml` file is created as the output file.

2. Copy the following artifacts to the same directory of your choice on the IBM Intelligent Operations Center V1.5 application server:
   - The `result.xml` file generated by the XMLAccess export
   - The **`list_portal_config.py`** sample script
   - The `portal.data` file provided with this IBM Redbooks publication
3. Run the **`list_portal_config.py`** sample script. Example 3-7 shows an example of running this sample script.

Example 3-7 Running the list_portal_config.sh script

```
[root@ba15app01 tmp]# ./list_portal_config.py

Checking Portal pages
---------------------

Unexpected Portal page found
    uniquename: acdm.portal.page.Status
     title(en): ACDM Status
```

3.6.4 Data, rules and events

Changes to data, rules, and events include custom databases, connections to external databases, custom IBM WebSphere Message Broker flows, and custom IBM Tivoli Netcool/Impact policies.

Data

This section will help you determine if you have created custom databases in the IBM Intelligent Operations Center V1.5 instances, or custom Java Database Connectivity (JDBC) data sources that reference external data sources.

Custom databases

The **`list_db2_nodes_and_databases.sh`** script loops through the eight standard IBM Intelligent Operations Center V1.5 database instances (`db2inst1` to `db2inst8`) and checks for any nonstandard databases or nodes that have been cataloged on each instance. If a nonstandard database or node is found, the script prints the details of the database or node.

The **`list_db2_nodes_and_databases.sh`** script should be run on all of the IBM Intelligent Operations Center V1.5 servers, and must be run as the `root` user.

Example 3-8 shows the output of running the **list_db2_nodes_and_databases.sh** script on the IBM Intelligent Operations Center V1.5 application server. The script detected one unknown node, ACDMNODE, and one unknown database, ACDMDB, cataloged on that node. The details listed will assist you in determining what to do with this information.

Example 3-8 Running the list_db2_nodes_and_databases.sh script

```
[root@ba15app01 tmp]# ./list_db2_nodes_and_databases.sh

Checking db2inst1 instance

Checking DB2 NODE DIRECTORY
---------------------------
 BA15DATA - Standard IOC NODE detected

 DB2NODE - Standard IOC NODE detected

 ACDMNODE - Unknown DB2 NODE detected, NODE details follow
  Comment =
  Directory entry type = LOCAL
  Protocol = TCPIP
  Hostname = acdmdb.domain.com
  Service name = 50002

Checking DB2 database DIRECTORY
-------------------------------
ACDMDB - Unknown DB2 database detected, database details follow
  Database name = ACDMDB
  Node name = ACDMNODE
  Database release level = d.00
  Comment =
  Directory entry type = Remote
  Catalog database partition number = -1
  Alternate server hostname =
  Alternate server port number =

 IOCDB - Standard IOC database detected

 CXLOGDB - Standard IOC database detected

 CXCONTDB - Standard IOC database detected
```

JDBC data sources

The **list_jdbc_data_sources.py** script queries the WebSphere Application Server Deployment Manager that manages the cluster where the IBM Intelligent Operations Center application runs, to determine if any nonstandard JDBC data sources have been created. Any nonstandard JDBC data sources will give you an indication of any external data sources that are used by custom code in your IBM Intelligent Operations Center V1.5 solution.

The **list_jdbc_data_sources.py** script must be run in the application server using the WebSphere Application Server **wsadmin** scripting tool (see Example 3-9).

Example 3-9 Running the list_jdbc_data_sources.py script

```
/opt/IBM/WebSphere/AppServer/profiles/dmgr/bin/wsadmin.sh -lang jython -f list_jdbc_data_sources.py
```

You will be prompted for the user name and password to connect to the WebSphere Application Server Deployment Manager. Use the `waswebadmin` user ID to run this script. You will need to know the password for the `waswebadmin` user.

For more information about using the **`wsadmin`** scripting tool, see the *Using the wsadmin scripting tool* topic:

http://pic.dhe.ibm.com/infocenter/wasinfo/v7r0/topic/com.ibm.websphere.nd.doc/info/ae/ae/rxml_commandline.html

Example 3-10 shows the output of running the **`list_jdbc_data_sources.py`** script on the IBM Intelligent Operations Center V1.5 application server. The script detected one unknown JDBC data source. Inspect the configuration of the data source from the WebSphere Application Server administrative console to determine to which database this data source connects.

Example 3-10 Running the list_jdbc_data_sources.sh script

```
[root@ba15app01 tmp]# /opt/IBM/WebSphere/AppServer/profiles/dmgr/bin/wsadmin.sh
-lang jython -f list_jdbc_data_sources.py
Realm/Cell Name: <default>
Username: waswebadmin
Password:
 WASX7209I: Connected to process "dmgr" on node DmgrNode using SOAP connector;
The type of process is: DeploymentManager

Checking JDBC Data Sources
--------------------------

!!! unknown data source name found: acdmDS
```

IBM WebSphere MQ objects

The **`list_mq_config.py`** script lists all of the IBM WebSphere MQ queue managers, channels, and queues configured in IBM Intelligent Operations Center V1.5. Inspect any nonstandard IBM WebSphere MQ configuration to determine if it needs to be re-created in IBM Intelligent Operations Center V1.6.

The **`list_mq_config.py`** script must be run as the `root` user on the IBM Intelligent Operations Center V1.5 event server. Example 3-11 illustrates running this script.

Example 3-11 Running the list_mq_config.py script

```
[root@ioc-event tmp]# ./list_mq_config.py

Checking WebSphere MQ config
============================

Checking Queue managers
Known queue manager: IOC.MB.QM, status: Running

Checking WebSphere MQ channels
  (not displaying SYSTEM channels)

!!!Unknown channel found: ACDM_REMOTE_TEST
Known channel found: IOC.SENDER
Known channel found: JAVA.IN.CHANNEL
```

```
Checking WebSphere MQ queues
  (not displaying SYSTEM queues)

Known queue found: DEAD.LETTER.Q
Known queue found: DEAD.MESSAGE.Q
!!!Unknown queue found: DailyFlightLoadQ
!!!Unknown queue found: FlightUpdatesQ
Known queue found: IOC.CAP.IN
Known queue found: IOC_CAP_OUT_INTERNAL_USE_ONLY_DO_NOT_MODIFY
Known queue found: IOC_JRULES_IN_INTERNAL_USE_ONLY_DO_NOT_MODIFY
Known queue found: IOC_JRULES_OUT_INTERNAL_USE_ONLY_DO_NOT_MODIFY
Known queue found: IOC_KPI_IN_INTERNAL_USE_ONLY_DO_NOT_MODIFY
Known queue found: IOC_KPI_OUT_INTERNAL_USE_ONLY_DO_NOT_MODIFY
Known queue found: IOC_KPI_UPDATE_INTERNAL_USE_ONLY_DO_NOT_MODIFY
Known queue found: IOC_NOTIFICATION_IN_INTERNAL_ONLY_DO_NOT_MODIFY
Known queue found: IOC_NOTIFICATION_OUT_INTERNAL_ONLY_DO_NOT_MODIFY
Known queue found: IOC_RESOURCE_IN_INTERNAL_USE_ONLY_DO_NOT_MODIFY
Known queue found: IOC_RESOURCE_OUT_INTERNAL_USE_ONLY_DO_NOT_MODIFY
Known queue found: IOP.CAT.REQ
Known queue found: IOP.CAT.RSP
```

IBM WebSphere Message Broker flows

The **check_wmb.sh** script lists all of the IBM WebSphere Message Broker flows configured in IBM Intelligent Operations Center V1.5. Inspect any nonstandard flows to determine how you can re-create this functionality in IBM Intelligent Operations Center V1.6. See 4.3.2, “Data, rules, and events” on page 72 for more information.

The **check_wmb.sh** script must be run on the IBM Intelligent Operations Center V1.5 event server, and run as the `root` user. Example 3-12 illustrates the output after running this script, where the results displayed are the standard IBM Intelligent Operations Center WebSphere Message Broker objects. Any results that differ form the output shown in Example 3-12 are not standard, and the additional broker flows should be considered for migration.

Example 3-12 Running the check_wmb.sh script

```
[root@ba15evt01 tmp]# ./check_wmb.sh

MQSI 8.0.0.0
/opt/IBM/mqsi/8.0.0.0

BROKER              EXECUTION GROUP     OBJECT TYPE         OBJECT NAME
==================  ==================  ==================  ==================
IOC_BROKER          IOP.CAT.BK.EG       Application         com.ibm.iop.cat.WmbIvtFlow
IOC_BROKER          IOP.CAT.BK.EG       Application         com.ibm.iop.cat.WmbPubSub
IOC_BROKER          default             File                IOCMessageJava.jar
IOC_BROKER          default             File                IOCMessageMessageSet.xsdzip
```

IBM Tivoli Netcool/OMNIbus probes

The **list_omnibus_probes.py** script lists the nonstandard Netcool/OMNIbus probes in IBM Intelligent Operations Center V1.5.

Inspect any non-standard probe to determine how you can re-create this functionality in IBM Intelligent Operations Center V1.6. See 4.3.2, “Data, rules, and events” on page 72 for more information.

The **list_omnibus_probes.py** script must be run as the root user, and can only be run on the IBM Intelligent Operations Center V1.5 event server. Example 3-13 shows an example of running this script.

Example 3-13 Running the list_omnibus_probes.sh script

```
[root@ioc-event ~]# /tmp/list_omnibus_probes.py

Checking Netcool/Omnibus Probes
-------------------------------

No unexpected probes found
```

IBM Tivoli Netcool/Impact policies

The **list_impact_policies.py** script lists the nonstandard Netcool/Impact policies in IBM Intelligent Operations Center V1.5. Inspect the nonstandard policies to determine how you can re-create this functionality in IBM Intelligent Operations Center V1.6. See 4.3.2, “Data, rules, and events” on page 72 and 5.2.1, “Data, rules, and events” on page 96 for more information.

The **list_impact_policies.py** script must be run as the root surround can only be run on the IBM Intelligent Operations Center V1.5 event server. Example 3-14 shows an example of running this script.

Example 3-14 Running the list_impact_policies.sh script

```
[root@ioc-event tmp]# ./list_impact_policies.py

Checking Netcool Impact policies
--------------------------------

Unexpected policy file found NCI_ACDM_EVENT_POLICY.ipl

Unexpected policy file found NCI_DashboardUpdatePolicy.ipl

Unexpected policy file found NCI_ACDM_TOBT_POLICY.ipl
```

3.6.5 Key performance indicators

In IBM Intelligent Operations Center V1.5, sample KPIs are provided ready to use modeled in the `icoc_sample_public_safety_monitor_model`. The following list includes the sample KPIs:

- Crime Response Time
- Crime Response Time Precinct One
- Crime Response Time Precinct Two
- EMS Department Budget
- Fire Department
- Fire Department Budget
- Firefighter Injuries
- Firefighter Injuries Fire Station One
- Firefighter Injuries Fire Station Two
- Police Department
- Police Department Budget
- Public Safety Budget

If you have modified any of the KPIs in the list, export the modified KPIs, and any new KPI that you have created, from IBM Intelligent Operations Center V1.5. Next, import them into IBM Intelligent Operations Center V1.6, as described in 4.3.3, “Key Performance Indicators” on page 77 and 5.2.6, “Key performance indicators” on page 103.

Run the **list_kpi_models.py** script to check the KPI models installed in your IBM Intelligent Operations Center V1.5 system, and the model version number. Pass the host name of the IBM Intelligent Operations Center V1.5 application server as an input parameter to the script.

Use `localhost` if you are running the script on the application server. You will be prompted for the user name and password to connect to the WebSphere Application Server Deployment Manager. Use `waswebadmin` for the user ID. You need to know the password for the `waswebadmin` user.

Example 3-15 shows the output from running the **list_kpi_models.py** script, where an unexpected IBM WebSphere Business Modeler model is found.

Example 3-15 Running the list_kpi_models.sh scripts

```
[root@IOC15_RB1 tmp]# ./list_kpi_models.py ba15app01

Checking WBM Models
-------------------

Enter the waswebadmin user password:

icoc_sample_public_safety_monitor_model
    Display name: icoc sample public safety monitor model
         Version: 20110218104946

icoc_sample_transportation_monitor_model
    Display name: icoc sample transportation monitor model
         Version: 20110218104946

!!! Unexpected model found: test_application_monitor_model
    Display name: test application monitor model
         Version: 20130519174512

icoc_sample_water_monitor_model
    Display name: icoc sample water monitor model
         Version: 20110218104946

ioc_15_weather_monitor_model
    Display name: ioc_15_weather_monitor_model
         Version: 20120928115248
```

3.6.6 Standard operating procedures

The following SOPs are provided by default in a standard IBM Intelligent Operations Center V1.5 system:

- SOPs installed by the IBM Intelligent Operations Center V1.5
  - PLUSIMITIG: Initial preparation for severe weather (Mitigate)
  - PLUSIPREPA: Prepare for severe weather evacuation (Prepare)
  - PLUSIRESPO: Evacuate impacted areas (Respond and Recover)

- SOPs installed by IBM Tivoli Service Request Manager
  - PMSC_0014A IBM Lotus Notes® - Change User Name
  - PMSC_0015A Lotus Notes - Create Account
  - PMSC_0016A Lotus Notes - Delete Account
  - PMSC_0017A Firewall Change Requests
  - PMSC_0018A Minor Site Enhancement
  - PMSC_0019A I and S Network Consulting
  - PMSC_0001A Build New Standard Server Image
  - PMSC_0002A Server Hardware Installation
  - PMSC_0003A Deploy Server to Floor
  - PMSC003A1 SB-Load OS
  - PMSC_0004A ITIM- Lotus Notes - Reset Password
  - PMSC_0020A Build New Server
  - PMSC020A11 SB-Validate Build Requirements
  - PMSC020A5 SAN-Validate SAN Requirements
  - PMSC_0021A Build New Server with Middleware
  - PMSC_0022A Lotus Notes - Change Password
  - PMSC_0005A Server Lock Down
  - PMSC_0006A DB Install and Config
  - PMSC0006A1 Validate DB Checklist
  - PMSC0006A2 Perform DBMS Install and Configure Checklist
  - PMSC_0007A Add database To Server
  - PMSC_0008A Remove database From Server
  - PMSC_0009A ITIM-Lotus Notes - Change Password
  - PMSC_0010A Middleware Install and Configure
  - PMSC0010A3 Validate WebSphere MQ Requirements
  - PMSC0010A4 Perform WebSphere MQ Install and Config
  - PMSC0010A5 Validate WebSphere App Server
  - PMSC0010A6 Perform WebSphere App Server Install and Config
  - PMSC_0011A Minor Facility Request
  - PMSC_0012A Office Move Request

You can check the SOPs in your system from the IBM Intelligent Operations Center V1.5 administrative interface:

1. Expand **Intelligent Operations** → **Customization Tools** and click **Standard Operating Procedures.**
2. In the Standard Operating Procedures pane, click **Standard Operating Procedures**.

If you have modified any of the SOPs in the list, determine how best to migrate your custom SOPs to IBM Intelligent Operations Center V1.6, as described in 4.3.4, “Standard Operating Procedures” on page 80 and 5.2.8, “Standard operating procedures” on page 111.

3.6.7 Cognos reports

You can check the Cognos reports, models, and data sources that were created in the IBM Intelligent Operations Center V1.5 environment through the Cognos administrative interface. You access the Cognos administrative interface through the IBM Intelligent Operations Center Administration interface:

1. Expand **Intelligent Operations** → **Administration Tools** and click **Administration Consoles**.
2. Under Application Server, click **Report Administration**.

Reports

See Figure 3-4 for a hierarchical list of Cognos reports installed by the IBM Intelligent Operations Center V1.5.

```
Public Folders > ioc_cap_model > reports

      CAP_events_by_type_status_and_date
      CAP_events_KPI_metrics_by_date
      CAP_events_KPI_metrics_by_department
      CAP_full_details
      IOC_Events_by_Severity_Anytime
      IOC_Events_by_Severity_In_Progress

Public Folders > ioc_cap_model > reports > User_defined_reports

      User_defined_report

Public Folders > ioc_cap_model > reports > User_defined_reports > Events

      Events_by_Category_Anytime
      Events_by_Certainty_Anytime
      Events_by_Event_Type_Anytime
      Events_by_Severity_Anytime
      Events_by_Urgency_Anytime

Public Folders > ioc_cap_model > reports > Pie_charts

      Cap_by_category
      Cap_by_certainty
      Cap_by_date_sent
      Cap_by_event_type
      Cap_by_handling_code
      Cap_by_message_type
      Cap_by_scope
      Cap_by_sender
      Cap_by_severity
      Cap_by_source
      Cap_by_status
      Cap_by_urgency
      Notification_by_category
      Notification_by_type

Public Folders > ioc_common_model > reports > Pie charts

      Event_by_category
      Event_by_certainty
      Event_by_date_sent
      Event_by_event_type
      Event_by_headline
      Event_by_severity
      Event_by_specification
      Event_by_urgency
      Event_by_url

Public Folders > ioc_common_model > reports > Table charts

      Event_list
```

Figure 3-4 List of default Cognos reports

Determine if you have modified any of the standard Cognos reports, or created new Cognos reports. You should be able to migrate any reports that access data external to the IBM Intelligent Operations Center. Any reports that access IBM Intelligent Operations Center data must be re-created in IBM Intelligent Operations Center V1.6.

See 4.3.5, “Custom reports” on page 81 and 5.2.7, “Custom reports” on page 106 for more information about migrating reports.

Data sources

To check the Cognos data sources, start the Cognos Administration interface:

1. From the upper right corner of the IBM Cognos Connection interface, click **Launch** → **IBM Cognos Administration**.
2. Click the **Configuration** tab. Only one data source, named `IOC`, is installed by the IBM Intelligent Operations Center V1.5.

If you have created new Cognos data sources, you will need to migrate the new data sources to IBM Intelligent Operations Center V1.6.

Models

If you have modified any of the standard Cognos models, or created new Cognos models, you will need to analyze the models to determine if they can be migrated to IBM Intelligent Operations Center V1.6. Models that are created on the IBM Intelligent Operations Center V1.5 database tables cannot be migrated, because the underlying database schema has changed completely in IBM Intelligent Operations Center V1.6.

Use the Cognos Modeler Framework to inspect any custom models you have created in IBM Intelligent Operations Center V1.5.

4

Migrating the solution customization

This chapter explores the options to migrate customizations performed in IBM Intelligent Operations Center V1.5 to V1.6.

Important: This edition of the book applies to IBM Intelligent Operations Center V1.6.0.1. For more information, see the *IBM Intelligent Operations Center Version 1.6.0.1* topic:

http://www-01.ibm.com/support/docview.wss?uid=swg24036406

This chapter includes the following topics:

Remember: For detailed information and use cases about IBM Intelligent Operations Center programming model, extension points, and customizations, see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

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4.1 IBM Intelligent Operations Center V1.5 versus V1.6 customization options

IBM Intelligent Operations Center provides many features ready to use, and supports an application development model (programming model) that enables clients and third parties to tailor the solution to fit their needs. The benefits of such an application development approach is that it provides a consistent way for building applications, including mobile applications, to extend the IBM Intelligent Operations Center platform.

Typically, customization involves modifying the user interface (UI) elements and configuring security. In addition, for an application to function it needs supporting content, such as data, business reports, key performance indicators (KPIs), and standard operating procedures (SOPs). Both IBM Intelligent Operations Center V1.5 and V1.6 support customization of all elements, with a few differences, as highlighted in Table 4-1. Each entry in the table is described in detail in 4.3, “Migrating customizations” on page 71.

Table 4-1 Comparing IBM Intelligent Operations Center V1.5 and V1.6 customization options

Customization type	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6	Highlights in IBM Intelligent Operations Center V1.6
UI	Use IBM WebSphere Portal to create custom portlets, customize themes, pages, labels, location maps, geographic information system (GIS) maps, help links, and globalization.	Use IBM WebSphere Portal to create custom portlets, customize themes, pages, labels, location maps, GIS maps, help links, and localization.	Extension Points provide highly customizable content viewer, filter panel, map, list, location map, charts, and custom actions.
	Custom portlets (mobile).	Use IBM Worklight Consumer Edition.	Rapidly develop mobile applications using IBM Worklight Consumer Edition.
Data and Events	The following options are available: ► IBM Tivoli Netcool/OMNIbus probes and IBM Tivoli Netcool/Impact policies ► IBM Operational Decision Management business rules ► IBM WebSphere Message Broker flows	The following options are available: ► IBM Intelligent Operations Center Data Receiver ► IBM WebSphere Message Broker flows	Having fewer components in the data flow reduces complexity and improves performance. Ability to rapidly add new data sources using configuration tools, and route them efficiently using routing expressions.

Customization type	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6	Highlights in IBM Intelligent Operations Center V1.6
KPIs	The following options are available: ► IBM Intelligent Operations Center KPI configuration tool. ► Model KPIs with the IBM Business Monitor toolkit and develop dashboard KPI's with IBM Intelligent Operations Center KPI configuration tool.	The following options are available: ► IBM Intelligent Operations Center KPI configuration tool. ► Model KPIs with the IBM Business Monitor toolkit and develop dashboard KPI's with IBM Intelligent Operations Center KPI configuration tool.	The IBM Intelligent Operations Center KPI configuration tool helps manage KPI relationships, display KPI definitions, and provide KPI access control.
SOPs	Use IBM Tivoli Service Request Manager workflow tool.	The following options are available: ► IBM Intelligent Operations Center SOP configuration tool ► IBM SmartCloud Control Desk workflow tool **Note:** IBM SmartCloud Control Desk is provided in the box, but is not installed by default.	The IBM Intelligent Operations Center SOP configuration tool provides capabilities to define and manage SOPs and related activities.
Custom reports	Use IBM Cognos Report Studio and IBM Cognos Framework Manager. **Note:** IBM Cognos Framework Manager requires the purchase of a separate license.	The following options are available: ► Use the supporting content panel to view reports of events as graphs, tables, or pie charts. ► Use extension points to construct charts with Dojo. ► Use IBM Cognos Report Studio and IBM Cognos Framework Manager.	In IBM Intelligent Operations Center V1.6, you can use the new filter panel to filter the data that is displayed on a map, or in reports. You can customize the data that is displayed in the reports by setting the appropriate options in the filter panel. Extension points enable the creation of custom charts easily using Dojo libraries.

Customization type	IBM Intelligent Operations Center V1.5	IBM Intelligent Operations Center V1.6	Highlights in IBM Intelligent Operations Center V1.6
Integration with external systems	The following options are available: ► Integrate with IBM Tivoli Service Request Manager. ► Use IBM WebSphere Message Broker and IBM WebSphere MQ. ► Use IBM Tivoli Netcool/Impact and IBM Tivoli Netcool/OMNIbus.	The following options are available: ► Integrate with IBM SmartCloud Control Desk through the Automation activity type in an SOP. ► Integrate with external systems through the Representational State Transfer (REST) activity type in an SOP. ► Use a data source routing expression to direct events to a predefined integration topic. ► Use a service uniform resource locator (URL) on the data source REST service. ► Use server-side Java services. ► Create a custom data source action from the preview card.	Integration topic supports the “push” model of integrating with external systems. Using REST application programming interfaces (APIs) you can interact with all layers of the architecture.

4.2 Migrating customizations of deprecated components

Certain components have been deprecated or removed in IBM Intelligent Operations Center V1.6. Additional effort is required to enable similar functionality to what the deprecated components provided in IBM Intelligent Operations Center V1.5.

The following list includes examples of deprecated components:

- Event correlation and notifications

  Event correlation and notifications were handled using IBM Tivoli Netcool/Impact in IBM Intelligent Operations Center V1.5. This product is included in V1.6, but is not installed and configured by default. The *correlation* topic can be used to implement similar functionality.

- Custom IBM Tivoli Netcool/OMNIbus probes

  Netcool/OMNIbus probes were used to complete routing decisions and to enrich the data. Netcool/OMNIbus probes have been deprecated, but similar functionality is provided by routing expressions. In addition, IBM WebSphere Message Broker flows can be created to handle data enrichment and routing for nonstandard data formats or complex transformation requirements.

- IBM Tivoli Monitoring

  This product is included in IBM Intelligent Operations Center V1.6, but clients can install and configure monitoring by following steps in the product documentation.

The system verification check tool can be used to test components in IBM Intelligent Operations Center to determine if they are accessible and operational. The system verification check tool is used to determine the operational status of services comprising the IBM Intelligent Operations Center system.

For more information about the system verification test tool, see the *Verifying the components* topic on the following website:

http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/admin_verifytools.html

4.3 Migrating customizations

This section provides details about each type of customization, and describes the steps that must be followed to complete the migration.

4.3.1 User interface customizations

The goal of migration is to move all content and pages from the source IBM Intelligent Operations Center V1.5 to the target V1.6 environment.

Note: Strictly speaking, the approach described in this section could be defined as *porting* rather than *migration*. It requires analyzing the implementation of the UI artifacts in IBM Intelligent Operations Center V1.5, identifying required changes, and deploying them in IBM Intelligent Operations Center V1.6.

Portal pages, themes, layout, and labels

One of the key features of IBM Intelligent Operations Center V1.6 is the new user experience, which was completely redesigned. The UI provides faster interactions that are visually enhanced, and provides more information than in the previous release, but is simplified for ease of use. It is advisable to re-create your custom pages using the new theme and layout, rather than directly migrating the pages and themes from IBM Intelligent Operations Center V1.5, to take advantage of the new features.

When you configure your IBM Intelligent Operations Center V1.6 system, you should use a method that enables you to easily apply your customizations to all of the environments (development, test, and production systems). A good approach is to export the IBM Intelligent Operations Center V1.6 pages using XMLAccess, then make changes to the exported extensible markup language (XML) to include your customizations. You can then import the XML file using XMLAccess to your various environments.

Note: XMLAccess is a command-line utility for exporting and importing various portal configuration settings in an XML format. It takes an XML file as input, and generates an output XML file that can be imported in target environments. Sample input XML files are provided in the `<portal-root>/doc/xml-samples/` directory.

For more information about migrating your pages, see the *Migrating* topic on the IBM WebSphere Portal Family wiki:

http://www-10.lotus.com/ldd/portalwiki.nsf/xpDocViewer.xsp?lookupName=IBM+WebSphere+Portal+8+Product+Documentation#action=openDocument&res_title=Migrating_wp8&content=pdcontent

Custom portlets

Custom Portlets are created using IBM Rational Application Developer , and deployed to the server using the IBM WebSphere Integrated Solutions Console (known as the *administrative console*).

The preferred approach is to re-compile the portlet projects using the most recent set of libraries, and deploy them to the target IBM Intelligent Operations Center V1.6 environment.

As an alternative, you can export the web archive (WAR) or enterprise archive (EAR) files that were deployed in the IBM Intelligent Operations Center V1.5 environment, and try importing them into the target V1.6 environment.

Note: Extension points in IBM Intelligent Operations Center V1.6 provide rich customization capabilities with relatively small effort, therefore avoiding the need to create custom portlets. For instance, the content viewer portlet can be used to display a custom Dojo widget rather than creating a custom portlet with similar functionality. Explore the use of extension points as an alternative to migration. For more information, see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

Client-side script changes

IBM Intelligent Operations Center V1.6 uses Dojo toolkit V1.8.x rather than Dojo toolkit V1.7.x used by IBM Intelligent Operations Center V1.5. Existing client-side scripting should be analyzed carefully to ensure that the incompatibilities are addressed. The following examples show some sample incompatibilities that will need to be addressed during migration:

- Any `dojo.require` declarations fail.

  For example, the `dojo.require("dijit.Calendar")` declaration must be replaced with `require(["dijit/Calendar!"]`
- Any `dojo.onLoad` functions fail.

  For example, `dojo.addOnLoad(init())` must be replaced with `require(["dojo/domReady!"], function(C){ init(); });`

4.3.2 Data, rules, and events

IBM Intelligent Operations Center V1.6 has a simplified architecture for data ingestion and routing.

Figure 4-1 depicts the data import framework in IBM Intelligent Operations Center V1.6.

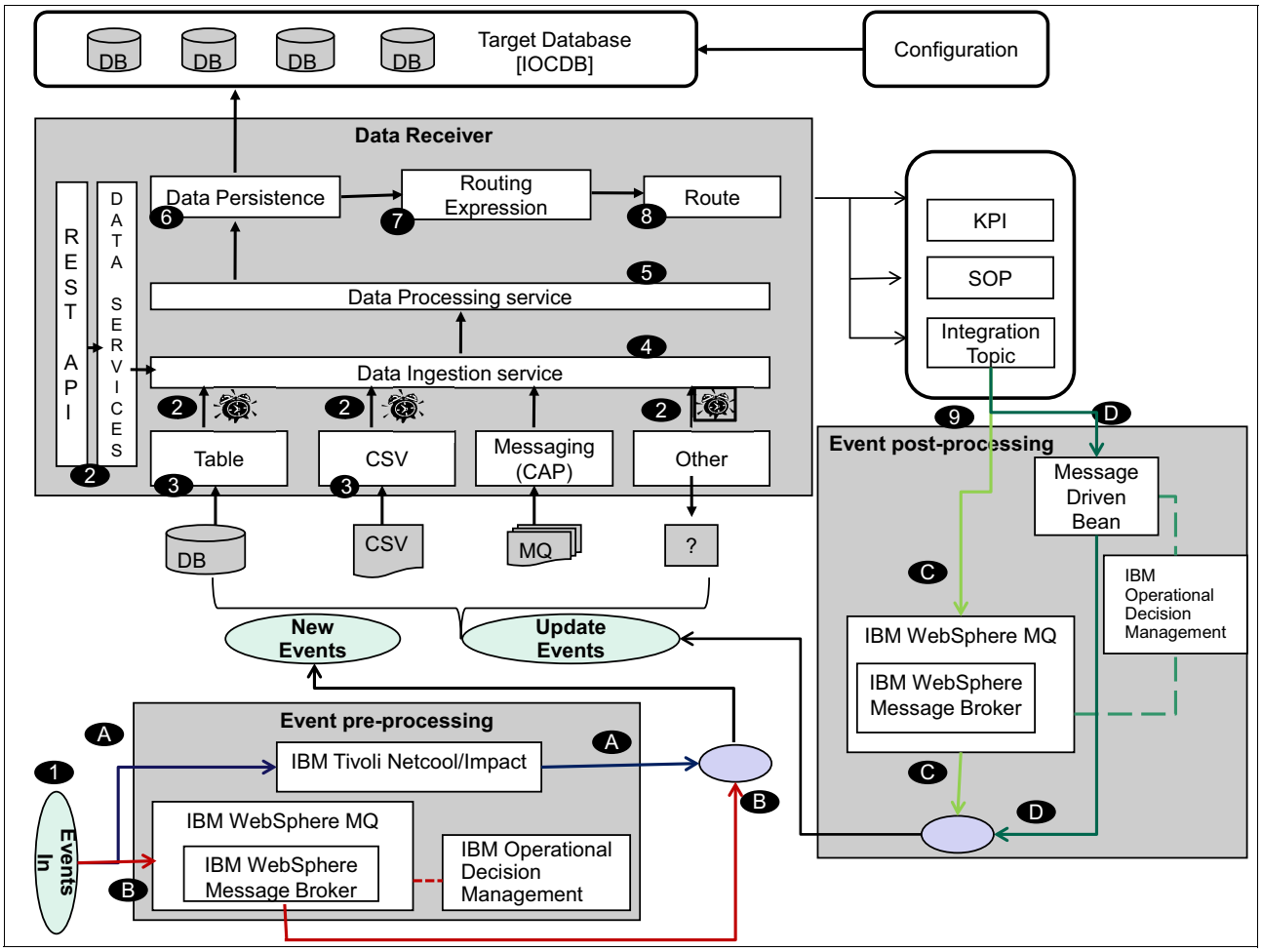

Figure 4-1 Data import framework for IBM Intelligent Operations Center V1.6

As shown in Figure 4-1, rules can be applied *before* they are imported into IBM Intelligent Operations Center (e*vent preprocessing*) or *after* they have been imported into IBM Intelligent Operations Center (*event post-processing*).

Restriction: IBM Operational Decision Management is *not* included with IBM Intelligent Operations Center V1.6. If after evaluating your specific requirements you decide to use IBM Operational Decision Management, a license for this product must be purchased separately.

Event preprocessing

Before event data is ingested (imported) into IBM Intelligent Operations Center, it can optionally be preprocessed or filtered. Preprocessing might be required in the following circumstances:

- Filtering rules are complex.
- You are unable to re-create the existing IBM Tivoli Netcool/Impact policies from IBM Intelligent Operations Center V1.5 with routing expressions.

  In IBM Intelligent Operations Center V1.6, routing expressions can either be all ANDs or all ORs, and you cannot create regular expression across multiple data sources.

- You are processing a large volume of events.
- You have a need to transform a large amount of data.

Event preprocessing involves filtering, transforming, enriching data, and storing the results in a staging area so that it can be imported into IBM Intelligent Operations Center. The following list includes some of the preprocessing tooling options:

- Use IBM Tivoli Netcool/Impact (A in Figure 4-1 on page 73).

  Event data goes through an IBM Tivoli Netcool/OMNIbus probe, and then IBM Tivoli Netcool/Impact policies are applied to the incoming event data. The final output is staged for the IBM Intelligent Operations Center import process to ingest the data. This is the preferred option for clients who are already using Tivoli Netcool/Impact policies with IBM Intelligent Operations Center V1.5.

- Use IBM WebSphere Message Broker flows (B in Figure 4-1 on page 73).

  Event data is received by IBM WebSphere Message Broker, and message flows are configured to filter, transform, or enrich the data before storing them in staging tables. One of the processing options is to call IBM Operational Decision Management rules from the IBM WebSphere Message Broker flows. IBM Operational Decision Management enables business users to create complex, externalized, and centralized rules. This is the preferred option if you have a large number of transformations.

Event post-processing

Event post-processing consists of applying additional rules to the events that have already been processed by IBM Intelligent Operations Center data processing service. Event post-processing might be required for the following actions:

- Correlation of events
- Invocation of externalized business rules

  Externalizing business rules might be needed when rules are centrally managed in the organization, or when subject matter experts need the ability to modify operational parameters in real time.

Event post-processing involves subscribing to the integration topic to receive data imported into IBM Intelligent Operations Center for post-processing. When processed, if required, the processed data can be routed back to the IBM Intelligent Operations Center data ingestion process as an update to the original event data. The following list includes some post-processing tooling options:

- Use IBM WebSphere Message Broker flows (C in Figure 4-1 on page 73).

  Configure message flow to subscribe to the integration topic, and optionally use IBM Operational Decision Management to handle business rules. This is the preferred option for high-volume data scenarios, or when there is a need for complex data transformation and enrichment.

  Restriction: IBM Operational Decision Management is not included with IBM Intelligent Operations Center V1.6. It must be purchased separately.

- Configure message-driven bean (MDB), D in Figure 4-1 on page 73.

  Configure MDB to subscribe to the topic so that you can process the data in Java code. If needed, invoke IBM Operational Decision Management rules from the code. This option is less complex, and does not introduce additional components (such as IBM WebSphere Message Broker) in the data flow.

Data import flow

The data import flow shown in Figure 4-1 on page 73 is as follows:

1. Event pre-processing (optional).
2. The time interval specified in the data source configuration expires, or data is sent through Java or REST API calls.

   In IBM Intelligent Operations Center V1.6, the data receiver component *pulls* data items from comma-separated values (CSV) files and database tables. Data can also be acquired from Common Alerting Protocol (CAP) messages through a *push* mechanism. In addition, data items can be sent (*pushed*) to IBM Intelligent Operations Center through a REST API.
3. The data receiver run time starts pulling the data from the specified source, and imports it into IBM Intelligent Operations Center. For example, if the source is a table in a DB2 database, the data receiver runs a SELECT query to get all of the data items (records) with a last update time greater than the last used one. If data is pushed into the system, as is the case for CAP data sources and REST or Java APIs, this step is skipped.
4. As the data is pulled into the system, the data ingestion service applies the filtering criteria defined in the routing expression of the data source configuration.
5. The filtered data is sent to the data processing service, which splits the data into sets of 1000 data items.

   By default, the data processing service processes 1000 data items at once. If the amount of data is larger than 1000 data items, it splits the data into data chunks of 1000 data items, to avoid possible performance and resource issues. The size of each data chunk can be configured in the **`WorkLoadSize`** system property. The value of this property determines the size of the data load that will be committed to the target database.

   To change the value of **`WorkLoadSize`**, click **System Administration** → **System Properties** in the Solution Administration view.
6. The data items are stored in the system database in target tables that correspond to the data sources.
7. Data items are prepared to be routed to components of the IBM Intelligent Operations Center, such as KPIs and integration topics, or to trigger an SOP.
8. The data items are routed according to the routing expressions defined for that data source.
9. At step 7, if you want to apply additional rules to the processed events, create a routing expression to route the data to the integration topic. The data is processed as described in “Event post-processing” on page 74.

The following sections include migration considerations for the IBM Intelligent Operations Center V1.5 components involved with processing data, rules, and events.

IBM WebSphere Message Broker flows

IBM WebSphere Message Broker flows created with IBM Intelligent Operations Center V1.5 can continue to be used with V1.6. However, in certain situations, you might choose to re-implement them using the new data receivers and routing schema, to take advantage of the simplified new architecture.

The following examples provide sample scenarios that might benefit from re-implementing using the new architecture:

- The IBM Intelligent Operations Center V1.5 flow was a straightforward ingestion of incoming CAP messages.
- The IBM Intelligent Operations Center V1.5 flow was polling an external data source (IBM DB2 or Microsoft SQL Server databases or CSV files) and replicating records into the IBM Intelligent Operations Center database.
- The IBM Intelligent Operations Center V1.5 flow was bulk loading data from an external database (DB2 or Microsoft SQL Server) at scheduled intervals.

IBM Tivoli Netcool/OMNIbus probes

Typically, Netcool/OMNIbus probes were used in IBM Intelligent Operations Center V1.5 to implement data routing, enrichment, or transformation. In IBM Intelligent Operations Center V1.6, consider using IBM WebSphere Message Broker flows to implement the data transformation or enrichment logic that used to be implemented with Netcool/OMNIbus probes.

If the probe was performing routing choices, consider using the data receiver routing schema to implement them in IBM Intelligent Operations Center V1.6.

IBM Tivoli Netcool/Impact policies

In IBM Intelligent Operations Center V1.5, typically Netcool/Impact policies had the core business logic to handle routing, enrichment, transformation, business process, and rules.

In IBM Intelligent Operations Center V1.6, there are multiple ways to implement the functionality previously provided with Netcool/Impact. The following list includes some of these options:

- Data receiver routing scheme
- IBM WebSphere Message Broker flows
- Java MDBs subscribing to integration or correlation topics

Careful analysis is required to determine the nature of the existing Netcool/Impact policy, and then to choose the appropriate migration path. Consider the following guidelines:

- If the IBM Intelligent Operations Center V1.5 existing policy was performing simple data enrichment, transformation, routing, or persistence, consider using the data receiver and routing schemas to implement them in IBM Intelligent Operations Center V1.6.
- If the IBM Intelligent Operations Center V1.5 existing policy was performing complex data enrichment, transformation, routing, or persistence, consider using IBM WebSphere Message Broker flows to implement them.
- If the IBM Intelligent Operations Center V1.5 existing policy was performing spatiotemporal correlation of data, consider using the routing expression and correlation topic to implement them.
- If the IBM Intelligent Operations Center V1.5 existing policy was handling business rules, consider using IBM Operational Decision Management rules to implement them.
- If the IBM Intelligent Operations Center V1.5 existing policies fall outside the previously mentioned scenarios, you might either choose to install and configure IBM Tivoli Netcool/Impact manually, or implement the policy using custom Java MDBs.

Table 4-2 is a decision table that shows how customizations can be implemented in IBM Intelligent Operations Center V1.5 and V1.6. The header row shows the customizations that you might have implemented in IBM Intelligent Operations Center V1.5, and want to implement in IBM Intelligent Operations Center V1.6.

Table 4-2 Positioning options for policy migration

	IBM Intelligent Operations Center customizations				
	Data transformation or enrichment	**Simple data routing**	**Data Ingestion/import**	**Business rule-based orchestration**	**Complex event processing**
IBM Intelligent Operations Center V1.5	Implemented using IBM Tivoli Netcool/Impact policies or IBM WebSphere Message Broker flows	Implemented using IBM Tivoli Netcool/Impact policies or IBM WebSphere Message Broker flows	Implemented using IBM WebSphere MQ and Publisher service	Implemented using IBM Operational Decision Management	Implemented using IBM Operational Decision Management
IBM Intelligent Operations Center V1.6	Implemented using IBM WebSphere Message Broker flows	Implemented using routing expressions or IBM WebSphere Message Broker flows	Implemented using new data receiver service	Implemented using IBM Operational Decision Manager	Implemented using one of the following options: ► IBM Operational Decision Manager ► IBM Tivoli Netcool/ Impact policies ► Integration topic and custom MDBs

Restriction: An IBM Operational Decision Manager license is not included with IBM Intelligent Operations Center. It must be purchased separately.

For more information about migrating rules and events in a use case example, see 5.2.1, “Data, rules, and events” on page 96.

4.3.3 Key Performance Indicators

To migrate KPIs, there are a few artifacts that need to be migrated from IBM Intelligent Operations Center V1.5 to V1.6:

- IBM Business Monitor artifacts
- KPI configuration tool modifications
- KPI hierarchy definitions

IBM Business Monitor artifacts

Modeled KPIs are deployed to the server as Java Platform, Enterprise Edition (Java EE) enterprise archive (EAR) files. The EAR files can be generated with the IBM Rational Application Developer with WebSphere Business Modeler Toolkit plug-in development tools, as described in *Generating Monitor Java EE projects* at the following website:

http://pic.dhe.ibm.com/infocenter/dmndhelp/v8r0mx/topic/com.ibm.wbpm.wid.tkit.doc/testing/deployingmodules.html

KPI customization tool modifications

All dashboard KPIs and modifications to modeled KPIs performed using the IBM Intelligent Operations Center V1.5 KPI configuration tool can be exported and imported performing the following steps:

1. Deploy the model EAR file, as described in “IBM Business Monitor artifacts”.
2. Use the IBM WebSphere Business Monitor **`exportKpis.jy`** jython script, which is available on the IBM Intelligent Operations Center V1.5 system, to export the KPI definitions.
3. Copy the exported XML file to the IBM Intelligent Operations Center V1.6 server.
4. Use the IBM Business Monitor **`importKpis.jy`** jython script, which is available on the IBM Intelligent Operations Center V1.6 system, to import the KPIs definitions.

Additional information about the import and export scripts can be found in the IBM WebSphere Business Modeler Information Center in the following topics:

- *Migrating KPIs:*

  http://pic.dhe.ibm.com/infocenter/dmndhelp/v8r0m1/topic/com.ibm.wbpm.mon.ref.doc/ref/kpis_migrate_script.html

- *Exporting KPIs*:

  http://pic.dhe.ibm.com/infocenter/dmndhelp/v8r0m1/topic/com.ibm.wbpm.mon.ref.doc/ref/kpis_export_script.html

- *Importing KPIs*:

  http://pic.dhe.ibm.com/infocenter/dmndhelp/v8r0m1/topic/com.ibm.wbpm.mon.ref.doc/ref/kpis_import_script.html

KPI hierarchy definitions

KPI hierarchies must be re-created using the KPI configuration tool and cannot be migrated automatically.

KPI permissions

New KPI permissions enable the specification of role-based access in IBM Intelligent Operations Center V1.6. Ensure that access rights are assigned to appropriate users and groups for viewing and modifying the migrated KPIs.

Changes to KPI samples

Sample KPIs are provided with IBM Intelligent Operations Center V1.6. The sample KPIs are designed to provide guidance for implementing different types of KPIs with the IBM Business Monitor Development Toolkit. Sample monitor models are provided for water, transportation, and public safety.

The following sample models are supplied with the IBM Intelligent Operations Center V1.6:

- ioc_sample_water_model
- ioc_sample_transportation_model
- ioc_sample_public_safety_model

The sample monitor models contain the KPIs shown in Figure 4-2.

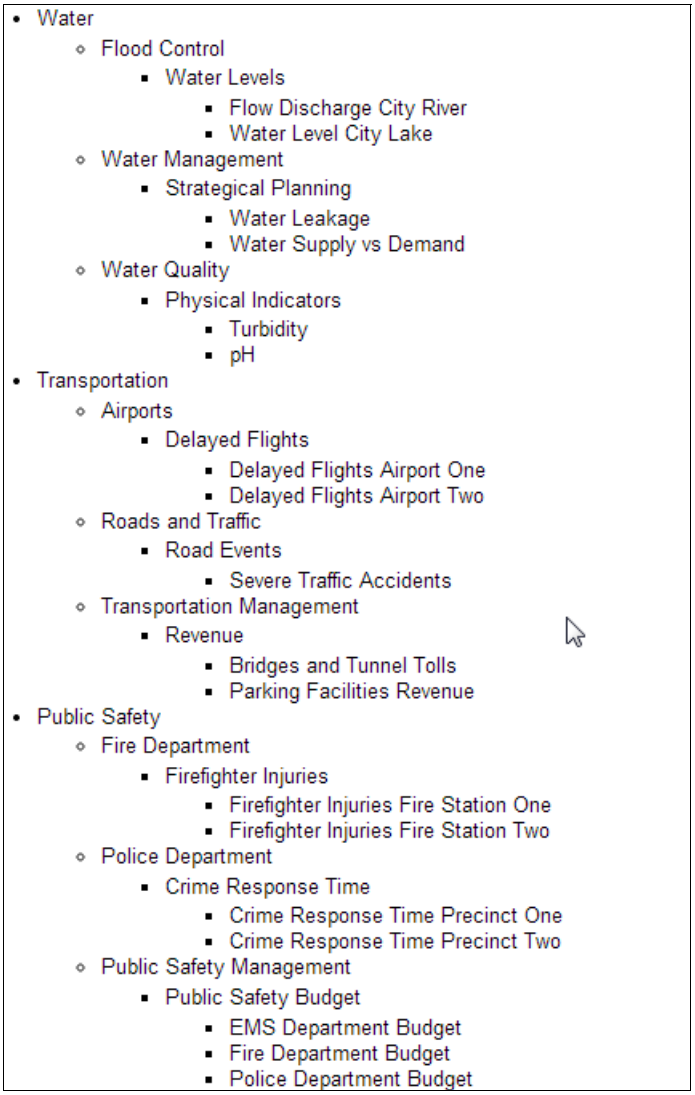

Figure 4-2 Sample KPIs

The following list includes changes to sample KPIs:

- In IBM Intelligent Operations Center V1.6, time periods are determined by the **`STARTDATETIME`** minimal property in the data source. In IBM Intelligent Operations Center V1.5, time periods were determined by **`<cap:onset>`**.
- In IBM Intelligent Operations Center V1.6, sample monitoring contexts filter incoming records using the name property, for example **`NAME='water quality'`**. In IBM Intelligent Operations Center V1.5 the **`<cap:event>Water_Quality</cap:event>`** element was used to filter.

For more information about migrating KPIs in a use case example, see 5.2.6, “Key performance indicators” on page 103.

4.3.4 Standard Operating Procedures

In IBM Intelligent Operations Center V1.5, SOPs can be created using IBM Tivoli Service Request Manager, or the built-in SOP configuration tool.

SOPs created with the IBM Tivoli Service Request Manager tool will have to be re-created using the SOP configuration tool in IBM Intelligent Operations Center V1.6. As an alternative, you can install the IBM SmartCloud Control Desk and import the existing SOPs from IBM Intelligent Operations Center V1.5.

Installing IBM SmartCloud Control Desk provides the following advantages:

- No need to manually re-create SOPs.
- IBM SmartCloud Control Desk enables you to create more complex workflows than those that can be created with the IBM Intelligent Operations Center built-in SOP configuration tool.

Installing IBM SmartCloud Control Desk introduces the following disadvantages:

- An additional server is required.
- IBM SmartCloud Control Desk must be installed, configured, and integrated with IBM Intelligent Operations Center V1.6, and managed manually.
- You still need to create an IBM Intelligent Operations Center SOP to reference each external SOP.
- IBM SmartCloud skills and resources are required.

If you have only a small number of manual SOPs, create them manually using the IBM Intelligent Operations Center SOP configuration tool. For detailed information about configuring KPIs and routing data to KPIs, see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

If you have a large number of SOPs, or rely on the automation capabilities of IBM Tivoli Service Request Manager, install and integrate IBM SmartCloud Control Desk.

You can export SOPs that were created in IBM Intelligent Operations Center V1.5 using the SOP editor provided with Fix Pack V1.5.0.2. The SOPs from IBM Intelligent Operations Center V1.5 can be imported into IBM Intelligent Operations Center V1.6 after making some changes to the exported XML.

Restriction: SOP historical data and in-progress SOP instances cannot be migrated to IBM Intelligent Operations Center V1.6. This information will be lost.

For more information about migrating SOPs in a use case example, see 5.2.8, “Standard operating procedures” on page 111.

IBM Cognos Framework Manager and IBM Cognos Report Studio usage restrictions: The license for these products included in IBM Intelligent Operations Center V1.6 only allows you to create reports that use data from IBM Intelligent Operations Center data sources, and are displayed in IBM Intelligent Operations Center.

4.3.5 Custom reports

The goal of migration is to move all of the custom reports created using IBM Cognos Report Studio in IBM Intelligent Operations Center V1.5 to the target IBM Intelligent Operations Center V1.6 environment.

There are two options to migrate the reports:

- Move one report at a time.

  Use this option if you have few (one to five) reports, or you do not have access to the physical file system of the server.

- Move all reports as a package.

  Use this option if you have more than five reports, and you are able to copy files to the file system of the server.

Any reports that use data external to the IBM Intelligent Operations Center will work as expected.

IBM Cognos Framework Manager and IBM Cognos Report Studio usage restrictions: The license for these products included in IBM Intelligent Operations Center V1.6 only allows you to create reports that use data from IBM Intelligent Operations Center data sources, and are displayed in IBM Intelligent Operations Center.

Any reports that use data in the IBM Intelligent Operations Center V1.5 Cognos model will not work on the V1.6 system, because the underlying data structures have changed considerably. These reports must be rewritten.

Important: When you import data in IBM Intelligent Operations Center V1.6, you can choose to have the data receiver generate a Cognos model in the IBM Cognos Report Studio, so that you can create reports using the ingested data. However, if you want to generate reports across multiple data sources, you will need to use the IBM Cognos Framework Manager to generate a model that models more than one data source.

Follow these steps to move one report at a time:

1. Log in to IBM Cognos Report Studio in the source IBM Intelligent Operations Center V1.5 system.
2. Open the report that you want to move in Cognos Report Studio.
3. Select **Tools** → **Copy report to clipboard**.
4. Open the text editor of your choice (for example, Notepad) and paste the contents of the clipboard into a new file.
5. Save the file for backup.
6. Log in to the Cognos Report Studio in the target IBM Intelligent Operations Center V1.6 system.
7. From the Tools menu, click **Open Report from Clipboard**.

For more information about migrating Cognos reports in a use case example, see 5.2.7, “Custom reports” on page 106.

4.3.6 Integration with external systems

IBM Intelligent Operations Center V1.6 provides multiple ways to integrate with external systems:

- REST APIs

  A comprehensive set of REST APIs that enable external systems to interact with the different components of the IBM Intelligent Operations Center V1.6 solution. See the *IBM Intelligent Operations Center V1.6 REST APIs* topic on the following website:

  `http://www.ibm.com/support/docview.wss?uid=swg27039957`

- Service APIs

  The service APIs are Java libraries that provide similar functionality to the REST APIs, but for server-side classes. See the *Java API documentation* topic on the following website:

  `http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/javadoc/overview-summary.html`

- Integration topic

  Create a data source routing expression to direct events to a predefined integration topic. The routing mechanism directs the data items fulfilling the filter criteria to the integration topic. External systems can subscribe to the integration topic and react to events arriving in IBM Intelligent Operations Center V1.6. Java MDBs, or IBM WebSphere Message Broker flows can be created to subscribe to the topic.

  To implement this integration, follow these steps:

  a. Create and deploy a MDB to listen on the integration topic and process incoming XML messages as needed. Alternatively, create an IBM WebSphere Message Broker flow to listen to the integration topic.

  b. Create an activation specification for the integration topic.

  c. Configure a data source with a routing expression to direct data items to the integration topic.

- Integrating with IBM SmartCloud Control Desk through an Automation activity type in an SOP

  An Automation activity type in an SOP can initiate and track a particular work order in IBM SmartCloud Control Desk. To configure this integration, follow these steps:

  a. Install and configure IBM SmartCloud Control Desk.

  b. Configure IBM Intelligent Operations Center V1.6 for connection to IBM SmartCloud Control Desk.

  c. Create an SOP with an Automation Activity type to trigger the job plan creation.

- Integrating with external systems through the REST service activity type in an SOP

  The REST service activity type in an SOP creates a REST service call to a remote system with the specified REST service URL.

- Service URL on the data source REST service

  When the data in an external system cannot be brought into the IBM Intelligent Operations Center because it is not in the standard form, or due to other reasons, a service can be created to pull in data from that data source in the GeoJSON format. The URL for such a service is referred to as *external Service URL*. It is specified in the **`service`** property in the **`datasource-service`** service, and the data source therefore created is referred to as external service data source.

The external Service URL on the data source REST service is used to pull in the external system data through a *custom service*. The returned records are displayed on the IBM Intelligent Operations Center visualization layer, including Maps, Location Map, List, and Charts. Routing expressions cannot be applied to external service data sources.

The external Service URL is implemented as a REST service.

For more information about integration with external systems, see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

4.3.7 Identity management

In IBM Intelligent Operations Center V1.5, user identities and groups are stored in IBM Tivoli Directory Server. User identity functions, such as create or provision users, update user, and delete user, can be performed using IBM Security Identity Manager. The following sections explain how to migrate the data from Tivoli Directory Server, and IBM Security Identity Manager.

Migrating IBM Tivoli Directory Server data

Important: This section assumes that the Lightweight Directory Access Protocol (LDAP) suffix in the IBM Intelligent Operations Center V1.5 and V1.6 environments is the same. The examples use the default `ou=SWG,o=IBM,c=US` suffix.

To migrate Tivoli Directory Server data, follow these steps:

1. Export the LDAP users (the default suffix is ou=USERS,ou=SWG,o=IBM,c=US) from IBM Intelligent Operations Center V1.5 environment running the following command on the data server:

   `/opt/ibm/ldap/V6.3/sbin/idsdb2ldif -I <instance_name> -o <filename> -s <subtree_DN>`

   This command has the following variables:

   – The **`<instance_name>`** variable specifies the name of the directory server instance to use. The default value is `dsrdbm01`.

   – The **`<filename>`** variable specifies the LDAP Data Interchange Format (LDIF) output file to contain the directory entries in LDIF. All entries from the specified subtree are written to the LDIF output file. *This option is required*. If the file is not to be created in the current directory, a full path and file name must be specified.

   – The **`<subtree_DN>`** variable identifies the top entry of the subtree that is to be written to the LDIF output file. This entry, plus all of the entries after it in the directory hierarchy, are written to the output file. If this option is not specified, all directory entries stored in the database are written to the output file based on the suffixes specified in the configuration file.

   The following example shows this command with sample values for these variables:

   `/opt/ibm/ldap/V6.3/sbin/idsdb2ldif -I dsrdbm01 -o users.ldif -s ou=USERS,ou=SWG,o=IBM,c=US)`

Tips: Run the **/opt/ibm/ldap/V6.3/sbin/idsdb2ldif -?** command to view the usage syntax. You should use the **-t** and **-k** options if you want to re-encrypt password data:

- The **-k key_seed** option specifies the destination server's encryption key seed value to use for re-encryption of password data. A question mark (**?**) value provides for separate prompting and console masking of the value. This option also requires specification of the **-t** option.
- The **-t key_salt** option specifies the destination server's encryption key salt value to use for re-encryption of password data. This option also requires specification of the **-k** option.
- The **key_seed** and **key_salt** values must be the values assigned in the IBM Intelligent Operations Center V1.6 environment.

Suppose that IBM Tivoli Directory Server in the IBM Intelligent Operations Center V1.5 environment (the directory server you are exporting data from) and IBM Tivoli Directory Server in the IBM Intelligent Operations Center V1.6 environment (the directory server into which you are importing the data) are using non-matching directory key stash files.

In this case, if you specify the encryption seed and salt values of the destination server, any AES-encrypted data is decrypted using the IBM Intelligent Operations Center V1.5 directory server's AES keys, then re-encrypted using the IBM Intelligent Operations Center V1.6 directory server's encryption seed and salt values. This encrypted data is stored in the LDIF file in IBM Intelligent Operations Center V1.6.

For more information, see the *Appendix A. Synchronizing two-way cryptography between server instances* topic on the following website:

http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.IBMDS.doc/commandref287.htm?path=8_6_7#synccryp

2. Export the LDAP groups (the default suffix is `ou=GROUPS,ou=SWG,o=IBM,c=US`) from the IBM Intelligent Operations Center V1.5 environment using the following command:

   /opt/ibm/ldap/V6.3/sbin/idsdb2ldif -I <*instance_name*> -o <*filename*> -s <*subtree_DN*>

   The following example shows this command with sample values for the variables:

   /opt/ibm/ldap/V6.3/sbin/idsdb2ldif -I dsrdbm01 -o groups.ldif -s ou=GROUPS,ou=SWG,o=IBM,c=US)

3. Remove user entries from the exported user LDIF output file that you do not want to import into the IBM Intelligent Operations Center V1.6 environment.

Tip: Remove the default application and test users that are created when IBM Intelligent Operations Center V1.5 is installed:

resAdmin1, resDeployer1, resMonitor1, maxadmin, maxreg, maxintadm, rtsAdmin, rtsConfig, rtsUser, wpsadmin, iicsystemuser, PMSCADMUSR, PMSCOAUSR, PMSCOSUSR, PMSCSDGNUSR, PMSCSDMUSR, PMSCSEMUSR, PMSCSRUUSR, PMSCSRUMUSR, PMSCUCAUSR, SRMSELFSERVICEUSR, PMUSRADMUSR, PMUSRMGRUSR, PMUSRANALUSR, PMINCADMUSR, PMINCMGRUSR, PMINCANALUSR, PMINCOWNUSR, PMPRBADMUSR, PMPRBMGRUSR, PMPRBANALUSR, PMPRBOWNUSR, PMKCS1USR, PMKCS2USR, PMSELFSERVUSR, wpsbind, taiuser, wasadmin, notesadmin, tdelorne, akelly, scollins

4. Remove group entries from that exported group LDIF output file that you do not want to import into the IBM Intelligent Operations Center V1.6 environment.

   Tip: Remove the default application and test groups that are created when IBM Intelligent Operations Center V1.5 is installed:

   wpsadmins, wpsContentAdministrators, wpsDocReviewer, wcmadmins, stadmins, CityWideExecutive, CityWideSupervisor, CityWideOperator, CityWideAdmin

5. Stop Tivoli Directory Server by running the following commands on the data server in IBM Intelligent Operations Center V1.6 environment:

   ```
   /opt/ibm/ldap/V6.3/sbin/64/ibmdiradm -I <instance_name> -k
   /opt/ibm/ldap/V6.3/sbin/ibmslapd -I <instance_name> -k
   ```

   The ***<instance_name>*** variable specifies the name of the directory server instance to use. The default value is `dsrdbm01`, as shown in the following example:

   ```
   /opt/ibm/ldap/V6.3/sbin/64/ibmdiradm -I dsrdbm01 -k
   /opt/ibm/ldap/V6.3/sbin/ibmslapd -I dsrdbm01 -k
   ```

6. Copy the user LDIF output file to the IBM Intelligent Operations Center V1.6 data server environment, and import the users with the following command:

   ```
   /opt/ibm/ldap/V6.3/sbin/idsldif2db -I <instance_name> -i <filename>
   ```

   This command has the following variables:

   – The ***<instance_name>*** variable specifies the name of the directory server instance to use. The default value is `dsrdbm01`.

   – The ***<filename>*** variable specifies the name of the LDIF input file, which contains directory entries in the LDIF format. This option is required. If the file is not in the current directory, a full path and file name must be specified.

   The following example shows this command with sample values:

   ```
   /opt/ibm/ldap/V6.3/sbin/idsldif2db -I dsrdbm01 -i users.ldif
   ```

   Tip: Run the **`/opt/ibm/ldap/V6.3/sbin/idsldif2db -?`** command to view the usage syntax.

   If the LDAP suffix is different in the IBM Intelligent Operations Center V1.6 environment, update the suffix in the LDIF input file before running the idsldif2db command.

7. Copy the group LDIF output file to the IBM Intelligent Operations Center V1.6 environment, and import the groups using the following command:

   ```
   /opt/ibm/ldap/V6.3/sbin/idsldif2db -I i<nstance_name> -i <filename>
   ```

   The following example shows this command with sample values:

   ```
   /opt/ibm/ldap/V6.3/sbin/idsldif2db -I dsrdbm01 -i groups.ldif
   ```

Migrating IBM Security Identity Manager data

You can load users and groups directly into IBM Tivoli Directory Server, and you might not require IBM Security Identity Manager. However, suppose IBM Security Identity Manager was used to manage user identities and groups in IBM Intelligent Operations Center V1.5. If you want to continue using IBM Security Identity Manager to perform identity management functions, such as password management, user provisioning, and auditing, you must migrate IBM Security Identity Manager data to IBM Intelligent Operations Center V1.6.

Unfortunately, there is no single-step way to selectively migrate IBM Security Identity Manager data from IBM Intelligent Operations Center V1.5 to the IBM Intelligent Operations Center V1.6 environment (for example, migrate only users, roles, or groups). You will need to develop scripts using the IBM Security Identity Manager API to migrate the data.

For information about migrating identity management in a use case example, see 5.2.3, “Identity management” on page 99.

4.3.8 Security

In IBM Intelligent Operations Center V1.5, user authorization and authentication was managed using IBM Security Access Manager. In IBM Intelligent Operations Center V1.6, IBM Security Access Manager is not installed by default, although the product is included. In IBM Intelligent Operations Center V1.6, user authentication and authorization is provided by IBM WebSphere Portal, which is front-ended by the IBM HTTP Server.

Remember: IBM Security Access Manager is only required in IBM Intelligent Operations Center V1.6 if you want to provide a centralized authentication, authorization, and management process for access control and single sign-on (SSO) to web-based applications, web services, and middleware.

This section explains how to migrate the data from IBM Security Access Manager.

Installing and configuring IBM Security Access Manager

In IBM Intelligent Operations Center V1.6, you must first install and configure IBM Security Access Manager, because the product is not preinstalled and configured by the installer. IBM Security Access Manager includes the following components:

- Policy Server

  The IBM Security Access Manager policy server maintains the master authorization database for the management domain, and the policy databases that are associated with other secure domains that you might decide to create. This server is key to the processing of access control, authentication, and authorization requests. It also updates authorization database replicas, and maintains location information about other IBM Security Access Manager servers.

- Authorization Server

  The IBM Security Access Manager Authorization Server provides access to the authorization service for third-party applications that use the IBM Security Access Manager authorization API in remote cache mode. The authorization server also acts as a logging and auditing collection server to store records of server activity.

- WebSEAL Server

  IBM Security Access Manager WebSEAL is a security manager for web-based resources. WebSEAL is a high-performance, multithreaded web server that applies fine-grained security policy to the protected web object space.

For detailed information about installing and configuring IBM Security Access Manager, see the IBM Security Access Manager for Web Version 7.0 Information Center:

http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.isam.doc_80/welcome.html

The following list contains the high-level steps to install and configure IBM Security Access Manager:

1. Install and configure the policy server:
   a. Install GSKit packages (gskcrypt64, gskssl64, gskcrypt32, and gskssl32).
   b. Install IBM Tivoli Directory Server packages (idsldap-license, idsldap-cltbase, idsldap-clt64bit, and idsldap-cltjava).
   c. Install the IBM Security Access Manager license.
   d. Install IBM Security Access Manager common packages (PDlic-PD, TivSecUtl-TivSec, and PDRTE-PD).
   e. Install the IBM Security Access Manager policy server package (PDMgr-PD).
   f. Configure the runtime system (configure_runtime.options).
   g. Configure the policy server (configure_policysvr.options).
2. Install and configure the authorization server. This server is usually installed on the same server where the policy server is installed:
   a. Install GSKit packages (gskcrypt64, gskssl64, gskcrypt32, and gskssl32).
   b. Install IBM Tivoli Directory Server packages (idsldap-license, idsldap-cltbase, idsldap-clt64bit, and idsldap-cltjava).
   c. Install the IBM Security Access Manager license.
   d. Install IBM Security Access Manager common packages (PDlic-PD, TivSecUtl-TivSec, and PDRTE-PD).
   e. Install the IBM Security Access Manager authorization server package (PDAcld-PD).
   f. Configure the authorization server (configure_authzsvr.options).
3. Install and configure the run time for the Java system on the WebSphere Portal nodes. This step is required to configure single SSO with IBM Security Identity Manager:
   a. Install GSKit packages (gskcrypt64, gskssl64, gskcrypt32, and gskssl32).
   b. Install IBM Tivoli Directory Server packages (idsldap-license, idsldap-cltbase, idsldap-clt64bit, and idsldap-cltjava).
   c. Install the IBM Security Access Manager license.
   d. Install IBM Security Access Manager common packages (PDlic-PD, PDJrte-PD, TivSecUtl-TivSec, PDRTE-PD, and PDWebRTE-PD).
   e. Configure the runtime system (configure_runtime.options).
   f. Configure the run time for Java system (configure_javarte.options).
4. Install and configure Web Portal Manager:
   a. Install GSKit packages (gskcrypt64, gskssl64, gskcrypt32, and gskssl32).
   b. Install IBM Tivoli Directory Server packages (idsldap-license, idsldap-cltbase, idsldap-clt64bit, and idsldap-cltjava).
   c. Install the IBM Security Access Manager license.

d. Install IBM Security Access Manager common packages (PDlic-PD, PDJrte-PD, TivSecUtl-TivSec, PDRTE-PD, and PDWebRTE-PD).

e. Install the Web Portal Manager package (PDWPM-PD).

f. Configure the run time for the Java system (configure_javarte.options).

g. Configure Web Portal Manager (configure_wpm.options).

5. Install and configure the run time for the Java system on the server where IBM Tivoli Directory Server is installed. This step is required if you want to install and configure the IBM Tivoli Directory Integrator Tivoli Access Manager Combo adapter (TAMCombo) for IBM Security Identity Manager.

   The TAMCombo adapter is designed to create and manage accounts on the IBM Security Access Manager. The adapter runs in *agentless* mode and communicates with the systems being managed using the IBM Security Access Manager API and LDAP protocol:

   a. Install GSKit packages (gskcrypt64, gskssl64, gskcrypt32, and gskssl32).

   b. Install IBM Tivoli Directory Server packages (idsldap-license, idsldap-cltbase, idsldap-clt64bit, and idsldap-cltjava).

   c. Install the IBM Security Access Manager license.

   d. Install IBM Security Access Manager common packages (PDlic-PD, PDJrte-PD, TivSecUtl-TivSec, PDRTE-PD, and PDWebRTE-PD).

   e. Configure the runtime system (configure_runtime.options).

   f. Configure run time for the Java system (configure_javarte.options).

6. Install and configure the WebSEAL server:

   a. Install GSKit packages (gskcrypt64, gskssl64, gskcrypt32, and gskssl32).

   b. Install IBM Tivoli Directory Server packages (idsldap-license, idsldap-cltbase, idsldap-clt64bit, and idsldap-cltjava).

   c. Install the IBM Security Access Manager license.

   d. Install IBM Security Access Manager common packages (PDlic-PD, TivSecUtl-TivSec, PDRTE-PD, and PDWebRTE-PD).

   e. Install WebSEAL package (PDWeb-PD).

   f. Configure runtime system (configure_runtime.options).

   g. Configure the WebSEAL server (configure_webseal.options).

   h. Create the required certificates in the WebSEAL keystore (pdsrv.kdb). Configure the certificate keyfile label in the WebSEAL configuration file.

   i. Configure the Trust Association Interceptor++ in the WebSEAL configuration file.

   j. Configure quality of protection levels.

7. Install and configure the IBM Security Access Manager language pack on the WebSEAL server:

   a. Install the language pack common package (PDJrte-PD).
   b. Install language packages for IBM Security Access Manager run time.
   c. Install language packages for IBM Security Access Manager WebSEAL.
   d. Install language packages for IBM Security Access Manager Web Security run time.

8. Configure multiple Tivoli Directory Servers in the WebSEAL configuration file. This step is only required if you have multiple Tivoli Directory Servers in your environment, and you want to support Tivoli Directory Server failover. For more information, search for “replica” in the `/opt/PolicyDirector/etc/ldap.conf` file.

9. Install language packages for IBM Security Access Manager run time on the policy/authorization server.
10. Configure SSO and junctions between WebSphere Portal nodes and IBM Security Access Manager. For more information, see the *Configuring Tivoli Access Manager for authentication, authorization, and the Credential Vault* topic at the following website:

    `http://ibm.co/18kklSG`

For more information about migrating security in a use case example, see 5.2.4, “Security” on page 100.

Migrating IBM Security Access Manager data and configuration

After IBM Security Access Manager is installed and configured you can start migrating the data and configuration. Migrate all of the IBM Security Access Manager data and configuration information in the following order:

1. Access Web Portal Manager.

   Web Portal Manager is a plug-in to the IBM WebSphere Application Server Integrated Solutions Console. The WebSphere Application Server Integrated Solutions Console is a graphical administration console that provides a framework for administering multiple products.

   The URL to access Web Portal Manager is `https://<hostname>:<portnumber>/ibm/console`, where *<hostname>* is the system where IBM Security Access Manager and WebSphere Application Server are running, and *<portnumber>* is the secured port for the WebSphere Integrated Solutions Console. The default port is 9043.
2. Export ACL policies using Web Portal Manager, and update object names (and other environment-specific information) before importing them in IBM Intelligent Operations Center V1.6 environment:
   a. Use Web Portal Manager to log on to the domain as a domain administrator.
   b. Click **ACL > Export All ACLs** to display the Export ACL to File page.
   c. Optional: In the **Encryption String** field, type the string to use to encrypt the XML file. If not specified, the exported file is in plain text.
   d. When an encryption string is provided, type the string again in the **Confirm Encryption String** field.
   e. Click **Export** to display the File Download window.
   f. Click **Save** to display the Save As window.
   g. Click **Save** to create the file that contains the exported description. The default file name is `aclExport.xml`.
3. Export protected object policies (POPs) using Web Portal Manager, and update object names (and other environment-specific information) before importing them in the IBM Intelligent Operations Center V1.6 environment:
   a. Use Web Portal Manager to log on to the domain as a domain administrator.
   b. Click **POP > Export All POPs** to display the Export POP to File page.
   c. Optional: In the **Encryption String** field, type the string to use to encrypt the XML file. If not specified, the exported file is in plain text.
   d. When an encryption string is provided, type the string again in the **Confirm Encryption String** field.
   e. Click **Export** to display the File Download window.

f. Click **Save** to display the Save As window.

g. Click **Save** to create the file that contains the exported POP description. The default file name is `popExport.xml`.

4. Re-create all of the application junctions and virtual host junctions. You can view the junctions and virtual host junctions using Web Portal Manager:

   a. Use Web Portal Manager to log on to the domain as a domain administrator.
   b. Click **WebSEAL > List Junctions** to display the junctions.
   c. Click **WebSEAL > List Virtual Host Junctions** to display the virtual host junctions.

5. Migrate all of the Tivoli Access Manager WebSEAL users. You can view the WebSEAL users using Web Portal Manager:

   a. Use Web Portal Manager to log on to the domain as a domain administrator.
   b. Click **Users > Search Users**.
   c. Click **Search** to display the users.

6. Migrate the global user policy, which contains global user settings, such as password policies, login-failure policies, access policies, and account expiration policies. You can view the global user policies using Web Portal Manager:

   a. Use Web Portal Manager to log on to the domain as a domain administrator.
   b. Click **Users > Show Global User Policy** to view the settings.

4.3.9 Infrastructure monitoring

In IBM Intelligent Operations Center V1.6, monitoring service components are not preinstalled or configured, but are included. IBM Intelligent Operations Center provides several system verification check tool tests that can be used to determine the operational status of various IBM Intelligent Operations Center services and components. For more information about the system verification test tool, see the *Verifying the components* topic on the following website:

`http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/admin_verifytools.html`

If the system verification check tools do not meet all of your requirements for monitoring, you can either install the IBM monitoring software products, or make use of your existing monitoring tools. If you have been making extensive use of the IBM Intelligent Operations Center V1.5 monitoring through the IBM Tivoli Monitoring component, and you want to continue using it, you will need to install and configure this optional component. The following monitoring software products are included with IBM Intelligent Operations Center V1.6:

- IBM Tivoli Monitoring and Agents
- IBM Tivoli Composite Application Manager for Applications and IBM Tivoli System Automation

It is advisable to install IBM Tivoli Monitoring server components on a separate server. The following list contains the high-level steps to install and configure IBM Tivoli Monitoring:

1. Install and configure IBM Tivoli Netcool/OMNIbus. This is only required if you want to configure event forwarding and synchronization between a hub Tivoli Enterprise Monitoring Server and either IBM Tivoli Netcool/OMNIbus or IBM Tivoli Enterprise Console®.
2. Install Tivoli Enterprise Monitoring Server.
3. Install Tivoli Enterprise Portal Server. Tivoli Enterprise Portal Server acts as a conduit for Tivoli Enterprise Portal clients requesting data for analysis from monitoring agents and

other components in the enterprise. The portal server connects directly to the hub monitoring server, which it queries for enterprise information, and receives updates as they occur. Tivoli Enterprise Portal Server requires a database server on the same computer system as the portal server.

4. Configure Tivoli Enterprise Portal Server to use Tivoli Enterprise Monitoring Server, and to configure database information in Tivoli Enterprise Portal Server.
5. Configure Internet Protocol version 6 (IPv6) in Tivoli Enterprise Portal Server and Tivoli Enterprise Monitoring Server if required.
6. Install Tivoli Enterprise Portal Desktop. There are two methods of deploying the desktop client:
   - Install the desktop client from the installation media, and run and maintain it on the local system.
   - Use IBM Web Start for Java to download and run the desktop client from Tivoli Enterprise Portal Server.
7. Configure Tivoli Enterprise Monitoring Server information in Tivoli Enterprise Portal Desktop.
8. Install and enable application support files on Tivoli Enterprise Portal Server, Tivoli Enterprise Monitoring Server, and Tivoli Enterprise Portal Desktop for all of the agents. Application support files provide agent-specific information for workspaces, help, situations, templates, and other data. Application support for a monitoring agent includes two types of files:
   - SQL files are required for adding product-provided situations, templates, and policies to the Enterprise Information Base (EIB) tables maintained by the hub monitoring server.
   - Catalog and attribute (`.cat` and `.atr`) files are required for presenting workspaces, online help, and expert advice for the agent in Tivoli Enterprise Portal.
9. Load agent depot. The agent depot is an installation directory on the monitoring server from which you deploy agents and maintenance packages across your environment. Before you can deploy any agents from a monitoring server, you must first populate the agent depot with bundles. A bundle is the agent installation image and any prerequisites. There are two methods to populate the agent depot:
   - Populate the agent depot from the installation image. You can use the installation image to populate the agent depot only when you are populating the depot with bundles for the same operating system as your monitoring server. If you need to add bundles for operating systems other than the one used by your monitoring server, use the **`tacmd addBundles`** command.
   - Populating the agent depot with the **`tacmd addBundles`** command.
10. Install and configure the required IBM Tivoli Monitoring agents. See the IBM Intelligent Operations Center V1.6 media pack for the list of available agents.
11. Enable security in Tivoli Enterprise Monitoring Server.

For information about installing and configuring IBM Tivoli Monitoring, see the IBM Tivoli Monitoring Information Center:

`http://publib.boulder.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.itm.doc_6.3/welcome.htm`

4.3.10 Sametime Contact list

Sametime contact lists can simply be exported from your IBM Intelligent Operations Center V1.5 system, and imported into V1.6. For detailed information see the *Migrating contact lists to a new Sametime server* IBM technote:

http://www-01.ibm.com/support/docview.wss?uid=swg21091030

5

Migration use case

This chapter provides an overview of a migration use case scenario. The migration process or migration steps described in Chapter 4, “Migrating the solution customization” on page 67 were applied to the migration of an IBM Intelligent Operations Center V1.5 customized environment, and the experience is documented in this chapter.

Important: This edition of the book applies to IBM Intelligent Operations Center V1.6.0.1. See the *IBM Intelligent Operations Center Version 1.6.0.1* topic on the following website:

`http://www-01.ibm.com/support/docview.wss?uid=swg24036406`

This chapter includes the following topics:

Tip: For detailed information and use cases about the IBM Intelligent Operations Center programming model, extension points, and customizations, see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

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5.1 Overview

The Airport Collaborative Decision Making (A-CDM) concept has evolved through the generations. The first-generation was a point-to-point interconnection between disparate airport systems. It has become a state-of-the-art current generation unified command center that is instrumented, interconnected, and intelligent. At the core of the A-CDM concept is the harmony between people, process, and infrastructure to achieve the following goals:

Punctuality A common focus to ensure on-time delivery of passenger, baggage, and aircraft processes.

Quality A drive toward excellence, with an additional benefit being the improvement of processes to prevent duplication of activities.

Sustainable improvement Aim to providing a culture of continuous improvement.

The goal of the A-CDM solution is to bring the airport stakeholders (air traffic control (ATC), airline operations, airport staff ground handlers, and so on) in line with the objective of managing efficient operations at the airport. The solution provides the capabilities of defining and integrating processes through a common collaboration platform and a unified dashboard that enables command, control, and monitor capabilities essential for management of airport airside operations.

The A-CDM solution based on IBM Intelligent Operations Center V1.5 was used to gain the migration experience documented in the use cases of this chapter.

5.1.1 System Context Diagram

Figure 5-1 shows the system context diagram (SCD) for the A-CDM solution. It describes the typical airport operational systems that the A-CDM solution interacts with. It also describes briefly the data flows between the airport operational systems and the solution.

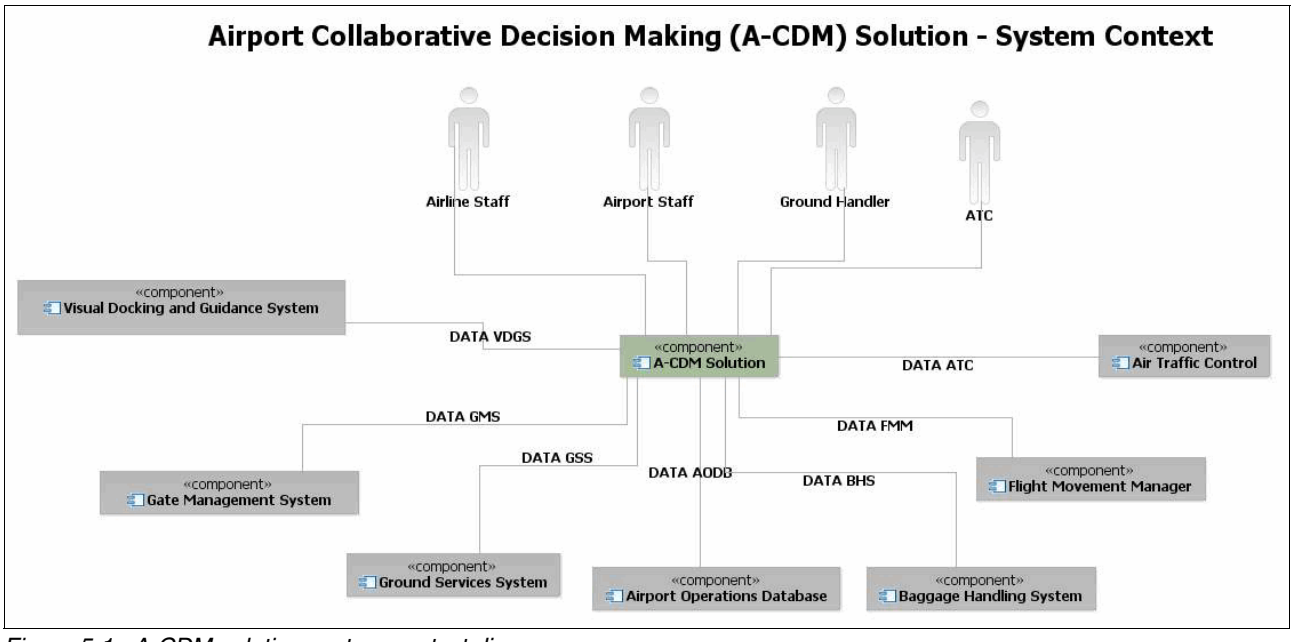

Figure 5-1 A-CDM solution system context diagram

5.1.2 Functional components

The A-CDM solution primarily consists of the following functional features:

- Flight visualization

  Provides the functionality to monitor flight arrivals and departures at the airport, including different milestones in the flight turnarounds.

- Flight target off-blocks time (TOBT) calculation

  Estimates and predicts when a certain flight is likely to be ready for takeoff, given the conditions at the airport.

- Analytics functionality

  Monitors delays in real time, and aids in the creation of historical reports.

- System integration functionality

  Captures events in real time from various airport operational systems belonging to multiple airport stakeholders.

Figure 5-2 shows the various functional components of the A-CDM solution, mapped to the provided packages running on IBM Intelligent Operations Center V1.5.

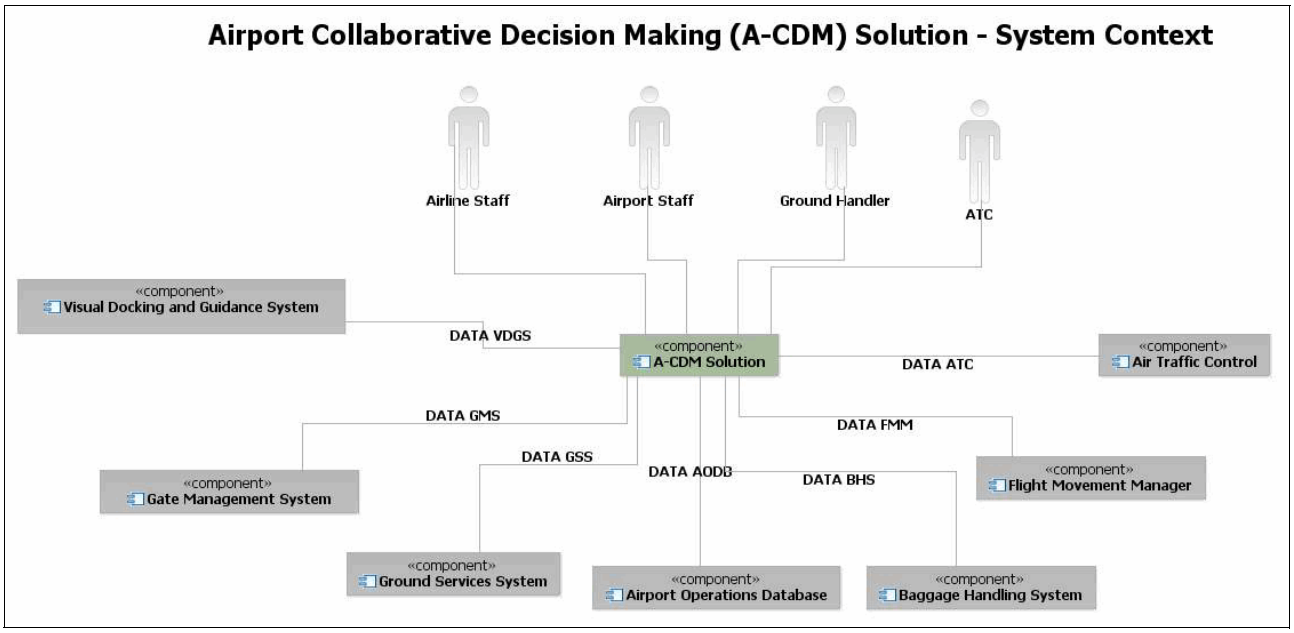

Figure 5-2 A-CDM component model diagram

The following functional components were used in the migration use cases:

Portal module	Portlets used by the A-CDM solution as part of the operational dashboards for the airside operations.
Policies module	Policies and related information that are used by the A-CDM solution to complete key calculations related to airside functional aspects.
Message broker module	Message flows that are used by the A-CDM solution to interface with the external airport systems through Aviation Information Data Exchange (AIDX) data formats.
Data stores	Database tables that are used to store event data.

Reports module	IBM Cognos Business Intelligence models and related information that are used by the A-CDM solution to display the relevant airside reports.
KPI Module	Monitor models that are used by the A-CDM solution to display the relevant airside key performance indicators.
Mobile module	Mobile standard operating procedures (SOPs) used by the A-CDM solution to serve the airside field force for the airside operations.

5.2 A-CDM solution migration tasks

This section describes the following topics for each of the customizations in the A-CDM solution use case:

Description of the customization	Describes the type of functionality customized in IBM Intelligent Operations Center V1.5.
Migration options	Describes options available to migrate the customization to IBM Intelligent Operations Center V1.6.
Preferred migration option	Describes the selected option to migrate the customization to IBM Intelligent Operations Center V1.6.

5.2.1 Data, rules, and events

In the A-CDM solution, data ingestion and routing functionalities are implemented using message flows in IBM WebSphere Message Broker and policies in IBM Tivoli Netcool/Impact. Message flows are used to interface with external airport systems through AIDX data formats. Policies are used to complete key calculations related to airside functional aspects.

In the A-CDM solution, business rules are implemented as a set of policies in Tivoli Netcool/Impact. The first policy is used for processing incoming updates from mobile devices, and the second policy is used to calculate the TOBT parameter for a given flight.

For general migration guidelines, see 4.3.2, “Data, rules, and events” on page 72.

IBM Intelligent Operations Center V1.6 migration options

The following migration options are available in IBM Intelligent Operations Center V1.6:

- Option 1: Use IBM WebSphere Message Broker for data ingestion and routing, and use IBM Tivoli Netcool/Impact to apply business rules to the imported data. In this use case, the business rules complete TOBT calculations.

  Because the difference between the versions of IBM WebSphere Message Broker included with IBM Intelligent Operations Center V1.5 and V1.6 is minor, WebSphere Message Broker flows migration is straight forward. Flows are migrated to the IBM Intelligent Operations Center V1.6 environment after importing, and are recompiled in WebSphere Message Broker toolkit.

  In IBM Intelligent Operations Center V1.6, because IBM Tivoli Netcool/Impact is included but not installed by default, you must install and configure Netcool/Impact. After the product is installed and configured, you can migrate the Netcool/Impact policies. Very little to no changes to the code are required. The disadvantage of this approach is that you need to install and configure IBM Tivoli Netcool/Impact.

- Option 2: Use IBM WebSphere Message Broker for data ingestion, routing, and business rules.

  WebSphere Message Broker flows and business rules are migrated to IBM Intelligent Operations Center V1.6 environment after importing and recompiling them in the WebSphere Message Broker toolkit. Rewrite Netcool/Impact policies as WebSphere Message Broker flows.

  The main advantage of this approach is that WebSphere Message Broker is already installed and configured in IBM Intelligent Operations Center V1.6 by default. The disadvantage of this approach is that you must rewrite the existing Netcool/Impact policies, and it is not possible to dynamically update the WebSphere Message Broker policies if the business rules are changed.

  Any change to the business rules requires editing the code in the WebSphere Message Broker toolkit, recompiling, and redeploying, which is usually a developer's task and not a business user's task.

- Option 3: Use IBM WebSphere Message Broker for data ingestion and routing, and use IBM Operational Decision Management to process business rules.

  With this approach, WebSphere Message Broker flows are migrated to the IBM Intelligent Operations Center V1.6 environment, and business rules are implemented in IBM Operational Decision Management. This option requires you to rewrite the Netcool/Impact policies as IBM Operational Decision Manager rules.

  The disadvantage of this approach is that you need to purchase, install, and configure IBM Operational Decision Manager (IBM Operational Decision Manager is not included with IBM Intelligent Operations Center V1.6). The advantage of this approach is that it is possible to dynamically update the policies if the business rules change.

  IBM Operational Decision Manager provides a powerful business rules engine that provides numerous benefits to externalize such rules, and provides more control for the business operators to change the rules.

  The following list includes some of the benefits of moving IBM Tivoli Netcool/Impact policies to IBM Operational Decision Manager in the context of the A-CDM solution:

  – Reduce the time to implement changes through a configurable, non-technical rule language, and capabilities enabling business users to directly access and maintain decision logic.

    This is an essential benefit and stands out when compared to the IBM Tivoli Netcool/Impact rules engine. The rules engine in IBM Operational Decision Manager provides an easy-to-use interface, which supports natural language-based rules definition.

    An airport operations control center operator can define and edit the TOBT threshold violation rule, adjusting it to plus or minus 10 or 15 minutes as required by, for example, the winter day operations. The operator can put the rule in effect immediately, with minimal technical knowledge (unlike the Netcool/Impact rules engine, which requires specific skills).

  – Improve communication and collaboration between IT and line-of-business functions through a centralized decision management repository and shared governance controls.

    Governance and collaboration are two key factors in defining and putting the rules in effect, especially in the context of the A-CDM use case. In a typical airport environment, A-CDM rules need to be accepted and approved across the airport stakeholder community, consisting of ATC, airport staff, airline staff, ground handling company, and other groups.

– Respond to business situations requiring action with precision through business events and rules integration to decide when and what to do.

  In the context of airport operations, many things can go wrong based on airport incidents and emergencies, or environmental conditions (such as winter conditions). The best example is deicing the planes. In normal operational conditions, deicing might not be needed, but it needs to be considered for TOBT calculations, in case of extreme winter conditions. In such cases, this benefit certainly comes to aid, considering all possible business situations to ensure smooth airport operations.

Selected option

In this case, option 3 is selected. IBM Operational Decision Manager is used to migrate A-CDM Netcool/Impact policies to business rules, and the existing broker flows are imported into WebSphere Message Broker in IBM Intelligent Operations Center V1.6.

Restriction: An IBM Operational Decision Manager license is not included with IBM Intelligent Operations Center. It must be purchased separately.

5.2.2 User interface customizations

In the A-CDM solution, the following user interface (UI) customizations are implemented in IBM WebSphere Portal:

- Portal portlets
- Portal pages

The A-CDM solution uses the following custom portlets:

- The airport map portlet, which is based on the IBM Intelligent Operations Center V1.5 map portlet, is used to display airport map images. A-CDM implemented additional layers to display flight and other related information.
- Flight arrivals and departures portlet. Operators interact with this portlet to update flight arrival and departure information.

For general migration guidelines, see 4.3.1, “User interface customizations” on page 71.

UI customization migration options

Only one migration option is available to migrate the UI customizations in the A-CDM solution to IBM Intelligent Operations Center V1.6. Portlets must be migrated first before you can migrate portlet pages.

Selected option

To migrate the custom portlets, complete the following tasks:

1. Configure the development environment with the same version of IBM WebSphere Portal included with IBM Intelligent Operations Center V1.6, WebSphere Portal version 8.0.0.1, combined cumulative fix 05 (CF05).
2. Review and update the portlets’ code to use the version of Dojo and Portal application programming interfaces (APIs) in IBM Intelligent Operations Center V1.6 (verify that none of the APIs in use have been deprecated).
3. Recompile the portlets using the required IBM WebSphere Portal libraries.
4. Deploy the portlets to the target IBM Intelligent Operations Center V1.6 environment using the IBM WebSphere Integrated Solutions Console.

For more information about Dojo support, see the *Dojo 1.8 Release Notes*:

http://dojotoolkit.org/reference-guide/1.9/releasenotes/1.8.html

For IBM WebSphere Portal programming interfaces, see the I*BM WebSphere Portal 8 API and SPI Reference*:

http://ibm.co/1jpKVBE

The UI in IBM Intelligent Operations Center V1.6 was completely redesigned to improve the visual experience and responsiveness. Therefore, the A-CDM portal pages were redesigned before they were migrated to the IBM Intelligent Operations Center V1.6 environment, to take advantage of the new UI features and extension. The XML configuration interface in IBM WebSphere Portal can be used to exchange portal configurations between development, test, and production environments.

For more information, see*The XML configuration interface* topic on the following website:

http://www-10.lotus.com/ldd/portalwiki.nsf/xpDocViewer.xsp?res_title=The_XML_configuration_interface_wp8&content=pdcontent

5.2.3 Identity management

In the A-CDM solution, user identities and groups are stored in IBM Tivoli Directory Server. They are created using the WebSphere Portal administration interface, or loaded directly into Tivoli Directory Server.

User and group migration options

The following migration options are available in IBM Intelligent Operations Center V1.6:

- Option 1: Migrate users and groups using the **idsdb2ldif** and **idsldif2db** Tivoli Directory Server commands. The **idsdb2ldif** command is used to dump entries from a directory into a text file in Lightweight Directory Access Protocol (LDAP) Directory Interchange Format (LDIF). The **idsldif2db** command is used to load LDIF file entries into Tivoli Directory Server. For general migration guidelines see “Migrating IBM Tivoli Directory Server data” on page 83.
- Option 2: Load users and groups using IBM Security Identity Manager. This is the preferred option if you want to implement identity management functions using IBM Security Identity Manager. For general migration guidelines see “Migrating IBM Tivoli Directory Server data” on page 83.

Selected option

In this use case, option 1 was selected because IBM Security Identity Manager was not implemented in IBM Intelligent Operations Center V1.5. This option provides a simple migration. Users and groups are exported from IBM Tivoli Directory Server in IBM Intelligent Operations Center V1.5, and imported in IBM Tivoli Directory Server in IBM Intelligent Operations Center V1.6.

Tip: Consider implementing the identity management solution using IBM Security Identity Manager after you have completed the migration process.

5.2.4 Security

In the A-CDM solution, authentication and authorization functionalities are provided by the WebSEAL component in IBM Tivoli Access Manager for e-business. The A-CDM solution uses ready-to-use authentication and authorization functionality in IBM Intelligent Operations Center V1.5.

For general migration guidelines, see 4.3.8, “Security” on page 86.

Security migration options

The following migration options are available in IBM Intelligent Operations Center V1.6:

- Option 1: Use IBM Security Access Manager for Web to provide authentication and authorization functionalities. Because IBM Security Access Manager is included, but not installed by default, you must install and configure IBM Security Access Manager components. For more information see 4.3.8, “Security” on page 86.
- Option 2: Use ready-to-use authentication and authorization functionalities in IBM Intelligent Operations Center V1.6, which are provided by IBM WebSphere Portal.

Selected option

In this case, option 2 was selected (use ready-to-use authentication and authorization functionalities provided in IBM Intelligent Operations Center V1.6), because there is no requirement to use IBM Tivoli Access Manager.

5.2.5 Event data

In the A-CDM solution in IBM Intelligent Operations Center V1.5, there is a large amount of event data that is useful to migrate, for example, to keep statistics on flight arrival and departure timings and events. The event data can be imported from the IBM Intelligent Operations Center V1.5 environment for historical reference purposes. You will be able to display these events on your map, and you can generate reports on the data using the IBM Cognos Report Studio.

Event data migration options

There are no options to choose from. Your only choice is to import the event data from your IBM Intelligent Operations Center V1.5 system as an IBM Intelligent Operations Center V1.6 data source.

Selected option

To import the event data from IBM Intelligent Operations Center V1.5 into IBM Intelligent Operations Center V1.6, create a data source in IBM Intelligent Operations Center V1.6 by following these steps:

1. Log in to the IBM Intelligent Operations Center as an administrator.
2. Click **Administration** → **Solution Administration**.
3. In the navigation pane, expand **Configuration Tools** and click **Data Sources**.
4. In the Add and configure data sources in the system pane, click **Create** to start the Create New Data Source configuration tool.
5. On the Acquire tab, choose **Connect to a database** in the How to acquire the data drop-down list.

6. In the Connection Information pane, enter the connection details for the IBM Intelligent Operations Center V1.5 IOCDB database. Enter the following information:
   - Host name or IP address of the IBM Intelligent Operations Center V1.5 data server.
   - Port: Accept the default value (`50000`).
   - User ID: `db2inst1.`
   - Password: Enter the password for the db2inst1 user in the IBM Intelligent Operations Center V1.5 data server.
   - Database name: `IOCDB.`
   - Database table: `IOC_COMMON.EVENT.`

   Click **Next**.
7. On the Basics tab, in the Names and Description pane, enter a Data source label and Data source unique text identifier.
8. On the Basics tab, in the General tab, set Report model to **yes** so that an IBM Cognos Business Intelligence model is generated when the data source is created. Set Polling interval unit to **0** so that the data is imported only once. In the Archive interval field, specify the number of months that you want to keep this data in the database, and then click **Next**.
9. On the Minimal properties tab, select the Name & Location tab:
   a. On the Name Properties pane, select a field from the table to use for the Name (for example, HEADLINE).
   b. On the Location Properties pane, click **Shape** and choose LOCATION from the shape list.
10. On the Minimal properties tab, select the Time Zone & Other tab. From there, select the Shape & Geometry tab, and click **All** to select the Geometry format.

    Selecting **All** as the geometry format enables the location data to be imported from IBM Intelligent Operations Center V1.5, regardless of the format in which the location data is stored.

    Click **Next**.
11. On the Key & Full Properties tab, for each property in your data source, define details as required. For example, you might want to make the following selections:
    - Set the ID field to be used as an ID (enter `ID` in the Used as an ID field).
    - Set the SENT field to be a Key property, so that an index is created.
    - Set the EVENTTYPE field to be a Key property, so that an index is created.

    Click **Next**.
12. On the **Security** tab, choose the security access to the data for each of your user groups and click **Next**.
13. On the **Routing** tab, enter any routing expressions that you require to filter your data.

For example, if you only want to import events that have a category field equal to `ACDM`, set the routing expressions as shown in Figure 5-3.

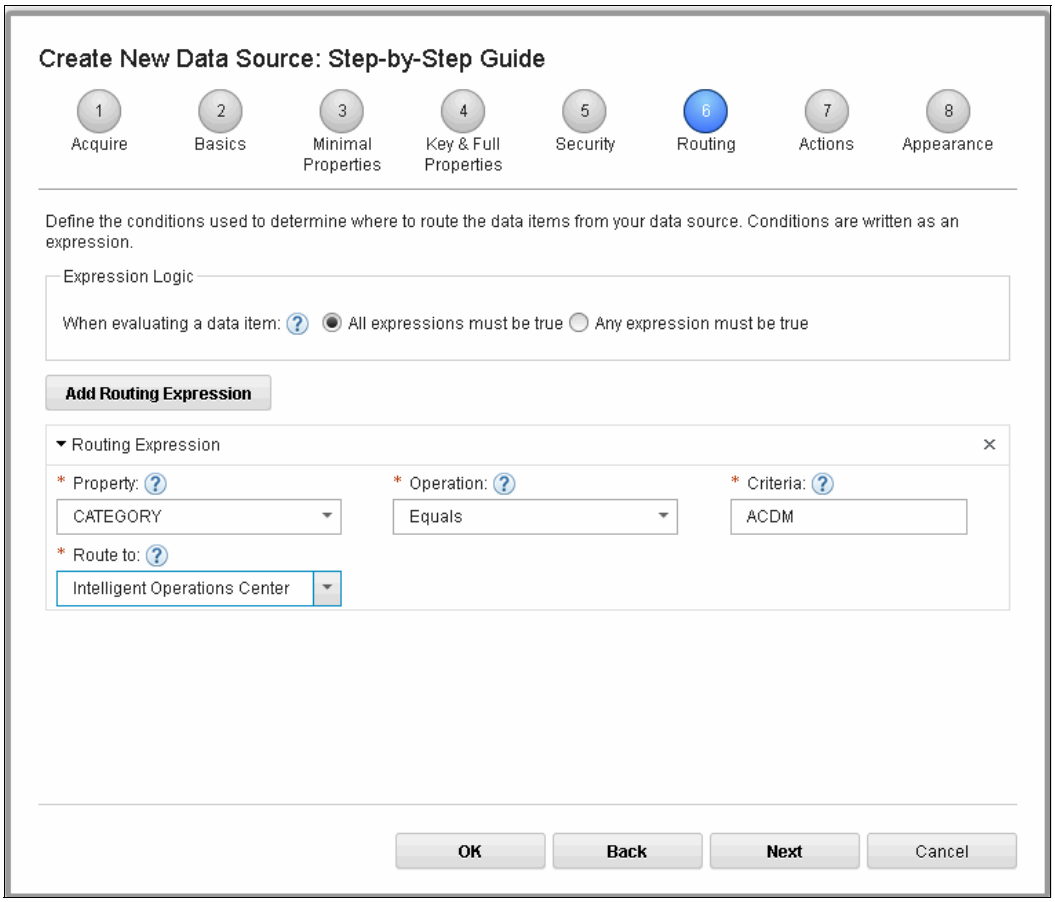

Figure 5-3 Data source routing expression

Click **Next.**

14. On the Actions tab, configure what actions you want to be available for this data and click **Next**.
15. On the appearance tab, choose the icons to represent your events and click **OK**.

The event data will be imported from IBM Intelligent Operations Center V1.5. You will receive a notification when the IBM Cognos Business Intelligence model creation has completed. Your events can now be displayed on the maps, and you can use the report studio to create reports against that data.

Use the IBM Cognos Report Studio to generate the reports. To access Report Studio from the IBM Intelligent Operations Center Solution Administration interface, follow these steps:

1. Log in to the IBM Intelligent Operations Center as an administrator.
2. Click **Administration** → **Solution Administration**.
3. In the navigation pane, expand System Administration and click **Administration Consoles**.
4. Click **Report administration** to start the IBM Cognos Connection 10.2 console.
5. Click **Launch** → **Report Studio**.

Note: If you want to create Cognos reports that incorporate both the event data from IBM Intelligent Operations Center V1.5 and the new data in IBM Intelligent Operations Center V1.6, you will need to manually create a Cognos model that spans both data sources. You can create a single report across both data sources with the Cognos model. See the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201 for information about creating a Cognos model.

For more information about creating reports, see the *Report Studio User Guide*:

http://pic.dhe.ibm.com/infocenter/cbi/v10r1m0/topic/com.ibm.swg.im.cognos.ug_cr_rptstd.10.1.0.doc/ug_cr_rptstd.html

To display the Cognos reports in the IBM Intelligent Operations Center portal, create a reports page and deploy the reports portlet on the page. For detailed instructions, see the *Displaying Cognos reports* topic on the following website:

http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/extend_cognos.html

5.2.6 Key performance indicators

IBM Intelligent Operations Center V1.6 supports the key performance indicator (KPI) calculations using IBM Business Monitor models.

For general migration guidelines, see 4.3.3, “Key Performance Indicators” on page 77.

KPI migration options

Because the architecture has not changed, there are no options for KPI migration. The existing KPIs from A-CDM can be recompiled and installed in IBM Intelligent Operations Center V1.6. They will work as expected for the same Common Alerting Protocol (CAP) events that were ingested in IBM Intelligent Operations Center V1.5.

The KPI hierarchy needs to be manually re-created.

Selected option

There are three types of artifacts that need to be migrated:

- IBM Business Monitor artifacts
- Customization tool modifications
- Hierarchy definitions

The following sections explain how to migrate the KPI artifacts.

IBM Business Monitor artifacts

The modeled KPIs are deployed to the server as Java Platform, Enterprise Edition (Java EE) enterprise archive (EAR) files. The EAR files need to be generated using the IBM WebSphere Business Modeler toolkit.

Phase 1

The first phase is accomplished by performing the following steps:

1. Using the IBM Business Monitor toolkit, compile the modeled KPIs and export them as an EAR file. The EAR file name for this use case example is `ACDM_MMApplication.ear`.
2. The developers who created the KPI model in IBM Intelligent Operations Center V1.5 can provide you with the compiled model EAR file. Alternatively, obtain the source code for the model from the developers as a project interface file (PIF) and import it into the IBM Business Monitor toolkit.

Phase 2

Deploy the `ACDM_MMApplication.ear` file on the WebSphere Portal cluster in IBM Intelligent Operations Center V1.6:

1. Log on to the WebSphere Application Server administrative console.
2. In the navigation tree, expand the **Applications** and click **Monitor Models** → **Install**.
3. Specify the location of the EAR file that you compiled and exported from the IBM Business Monitor toolkit in Phase 1, and click **Next**.
4. On the How do you want to install the application? pane, leave **Fast Path** selected and click **Next**.
5. On the Select installation options pane, leave all of the default settings and click **Next**.
6. On the Map modules to servers pane, select the check box next to the module, and select **WebSphere:cell=cell1,cluster=WBM_DE.AppTarget** from the Clusters and servers pull-down list. Click **Apply** and then click **Next**.
7. On the Metadata for modules pane, click **Next**.
8. On the Configure security for the monitor model, leave the default values selected and click **Next**.
9. Click **Finish** to complete the installation and save your changes.

Customization tool modifications

After deploying the IBM Business Monitor monitor model, the next step is to export the KPI file from the IBM Intelligent Operations Center V1.5 environment, and import it into the IBM Intelligent Operations Center V1.6 environment.

Follow these steps:

1. Log in to the WebSphere Application Server administrative console in the IBM Intelligent Operations Center V1.5 application server.
2. Determine the model name and model version from the WebSphere Application Server administrative console:
   a. In the navigation tree, expand the **Applications** and click **Monitor Models**.
   b. Note the names and version numbers of the models that you want to export.

Figure 5-4 shows an example of a listing showing the model names and versions.

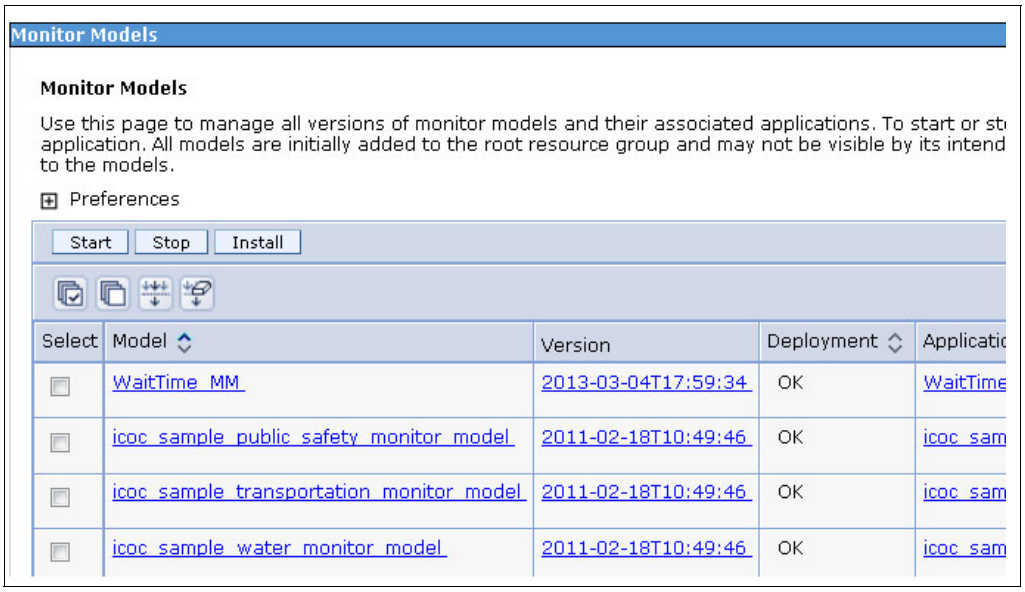

Figure 5-4 Determine the monitor model name and version

3. Log in to IBM Intelligent Operations Center V1.5 application server as the root user.
4. Navigate to the following file system path:

   `/opt/IBM/WebSphere/AppServer/profiles/wbmProfile1/bin`
5. Use the **`ExportKpis`** script to export the KPIs to an extensible markup language (XML) file, so that the XML file can be imported in IBM Intelligent Operations Center V1.6. Run the **`wsadmin`** scripting tool command shown in Example 5-1.

   The first parameter is the export file name and path, the second parameter is the model name, and the third parameter is the model version of the KPI model that you are exporting.

   Example 5-1 The wsadmin kpi export command

```
./wsadmin.sh -wsadmin_classpath
"../../../plugins/com.ibm.wbimonitor.lifecycle.spi.jar:../../../plugins/com.ibm
.wbimonitor.repository.jar" -lang jython -f
"../../../scripts.wbm/kpi/exportKpis.jy" /tmp/model_export.xml
icoc_sample_public_safety_monitor_model 2011-02-18T10:49:46 ALL
```

6. Copy the export file to the IBM Intelligent Operations Center V1.6 application server.
7. Log in to the IBM Intelligent Operations Center V1.6 application server console as the root user.
8. Navigate to the following file system path:

   `/opt/IBM/WebSphere/AppServer/profiles/wbmProfile1/bin`

9. Use the **ImportKpis** script to import the KPIs that were defined in the previously exported XML file. Run the **wsadmin** scripting tool command shown in Example 5-2. The only parameter is the name of the export file copied over from the export operation in IBM Intelligent Operations Center V1.5.

Example 5-2 The wsadmin kpi import command

```
./wsadmin.sh -wsadmin_classpath
"../../../plugins/com.ibm.wbimonitor.lifecycle.spi.jar:../../../plugins/com.ibm
.wbimonitor.repository.jar" -lang jython -f
"../../../scripts.wbm/kpi/importKpis.jy" /tmp/model_export.xml
```

Hierarchy definitions

The KPI hierarchy definition must be configured using the IBM Intelligent Operations Center V1.6 Solution Administration KPI configuration tool.

Follow these steps:

1. Log in to IBM Intelligent Operations Center V1.6 as an administrator.
2. Click **Administration** → **Solution Administration**.
3. In the navigation tree, expand **Configuration Tools** and click **Key Performance Indicators**.
4. On the Relationships and Display tab, click **Add Owning Organization**.
5. In the Add Owning Organization window, enter a Name for your owning organization, select the Model that you imported in “Customization tool modifications” on page 104, and choose an Icon. Click **Add**.
6. Click **Save**.

Remember: If you have any custom icons to represent your organization, ensure that you install them in IBM Intelligent Operations Center V1.6 the same way that you did for IBM Intelligent Operations Center V1.5.

5.2.7 Custom reports

Custom reports that access data outside of the IBM Intelligent Operations Center can be exported from the Cognos tooling on the original IBM Intelligent Operations Center V1.5 system, and imported into the new IBM Intelligent Operations Center V1.6 system.

IBM Cognos Framework Manager and IBM Cognos Report Studio usage restrictions: The license for these products included in IBM Intelligent Operations Center V1.6 only allows you to create reports that use data from IBM Intelligent Operations Center data sources and are displayed in IBM Intelligent Operations Center.

For general migration guidelines, see 4.3.5, “Custom reports” on page 81.

Custom report migration options

In A-CDM, the custom reports access external data in the application database. The existing custom reports can be imported into IBM Intelligent Operations Center V1.6, and they will work as expected.

Selected option

To move the reports into the new environment, the first step is to export from the old environment.

Exporting reports in IBM Intelligent Operations Center V1.5

Follow these steps:

1. Log in to the Cognos Report administration interface on the IBM Intelligent Operations Center V1.5 system. Access the Cognos Report administration interface through the IBM Intelligent Operations Center Administration interface. Expand **Intelligent Operations**/ **Administration Tools** and click **Administration Consoles**. Under Application Server, click **Report Administration**.
2. From the upper right corner of the IBM Cognos Connection interface, click **Launch** → **IBM Cognos Administration** as shown in Figure 5-5.

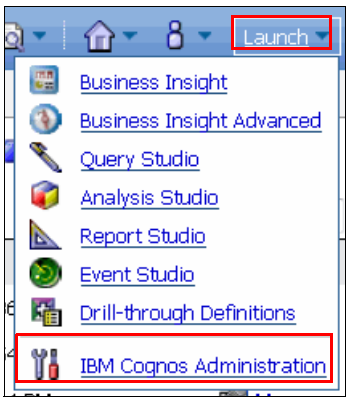

Figure 5-5 Start IBM Cognos Administration

3. Click the **Configuration** tab, and then click **Content Administration** from the navigation pane.
4. From the toolbar at the upper right of the IBM Cognos Administration window, click the **New Export** icon, as shown in Figure 5-6.

Figure 5-6 New export icon

5. On the Specify a name and description pane in the New Export tool, enter a name for the export and click **Next**.
6. On the Deployment pane, select **Select public folders and directory content** and click **Next**.
7. If the Public folders content pane is empty, or if your report folders do not display:
   a. Click **Add** on the lower right of the Public folders content pane.
   b. From the Available entries Public Folders pane, select the report group that you are interested in migrating, and use the arrow button to move that group from the Available entries Public Folders pane to the Selected entries pane.
   c. Click **OK**.
8. On the Public folders content pane, select the report group that you want to export, and click **Next**.

9. On the Directory content pane, select Include data sources and connections and click **Next**.
10. Leave the default values for Access permissions, External namespaces, Set the owner to, and Apply to values, and then click **Next**.
11. On the Deployment archive pane, enter a name for the export archive in the New Archive text box, and click **Next**.
12. Review the summary of the export (see the example in Figure 5-7) and click **Next**.

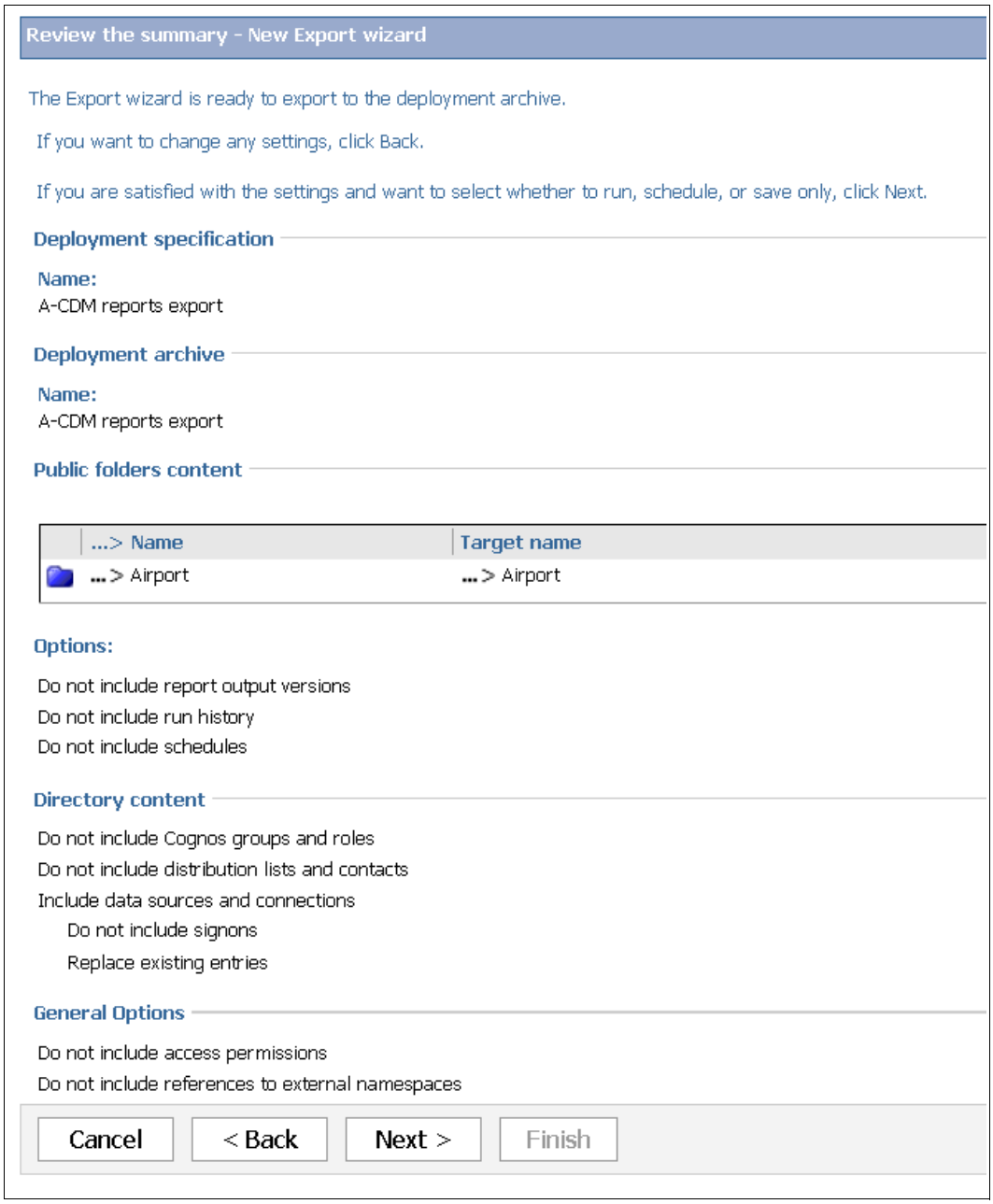

Figure 5-7 New report export summary

Note: This export/import process assumes that the external data source details and the user name and password remain the same. By including these details in the export, you avoid the need to re-create them. If your external data source or user details change, you will need to manually create or update the data source in the IBM Intelligent Operations Center V1.6 system.

13. On the Select an action pane, ensure that **Save and run once** is selected for the Action, and click **Finish**.
14. On the Select when you want to run this export pane, ensure that **Now** is selected for Time, and click **Run**.
15. On the You selected to run 'A-CDM reports export' as follows pane, ensure that **View the details of this export after closing this dialog** is selected, and click **OK** to confirm.
16. On the View run history details pane, monitor the job status until it completes.

Importing reports in IBM Intelligent Operations Center V1.6

The export job creates an export archive under the `/opt/IBM/cognos/c10_64/deployment/` directory on the IBM Intelligent Operations Center V1.5 application server with the name that you specified in step 5 on page 107.

Copy the exported archive to the analytics server on the IBM Intelligent Operations Center V1.6 system and place it under the `/opt/IBM/cognos/c10_64/deployment/` directory. You can now import the reports into the Report Studio on IBM Intelligent Operations Center V1.6.

Follow these steps:

1. Log in to the Cognos Report administration interface on the IBM Intelligent Operations Center V1.6 system. Access the Cognos Report administration interface through the Solution Administration interface. Expand **System Administration/Administration Consoles**. Under Analytics Server, click **Report Administration**.
2. From the upper right corner of the IBM Cognos Connection interface, click **Launch** → **IBM Cognos Administration** as shown in Figure 5-5 on page 107.
3. Click the **Configuration** tab and then click **Content Administration** from the navigation pane.
4. From the toolbar at the upper right of the IBM Cognos Administration window, click the **New Import** icon as shown in Figure 5-8.

Figure 5-8 New import icon

5. In the Deployment archive pane, select the export archive that you copied from IBM Intelligent Operations Center V1.5 from the list, and click **Next**.
6. In the Specify a name and description pane, enter a name for the deployment specification, and click **Next**.
7. In the Public folders content pane, select your folder, and click **Next**.
8. Accept the defaults for Access permissions, External namespaces, Entry ownership, and Deployment record, and click **Next**.

9. Review the summary of the import (see the example in Figure 5-9) and click **Next**.

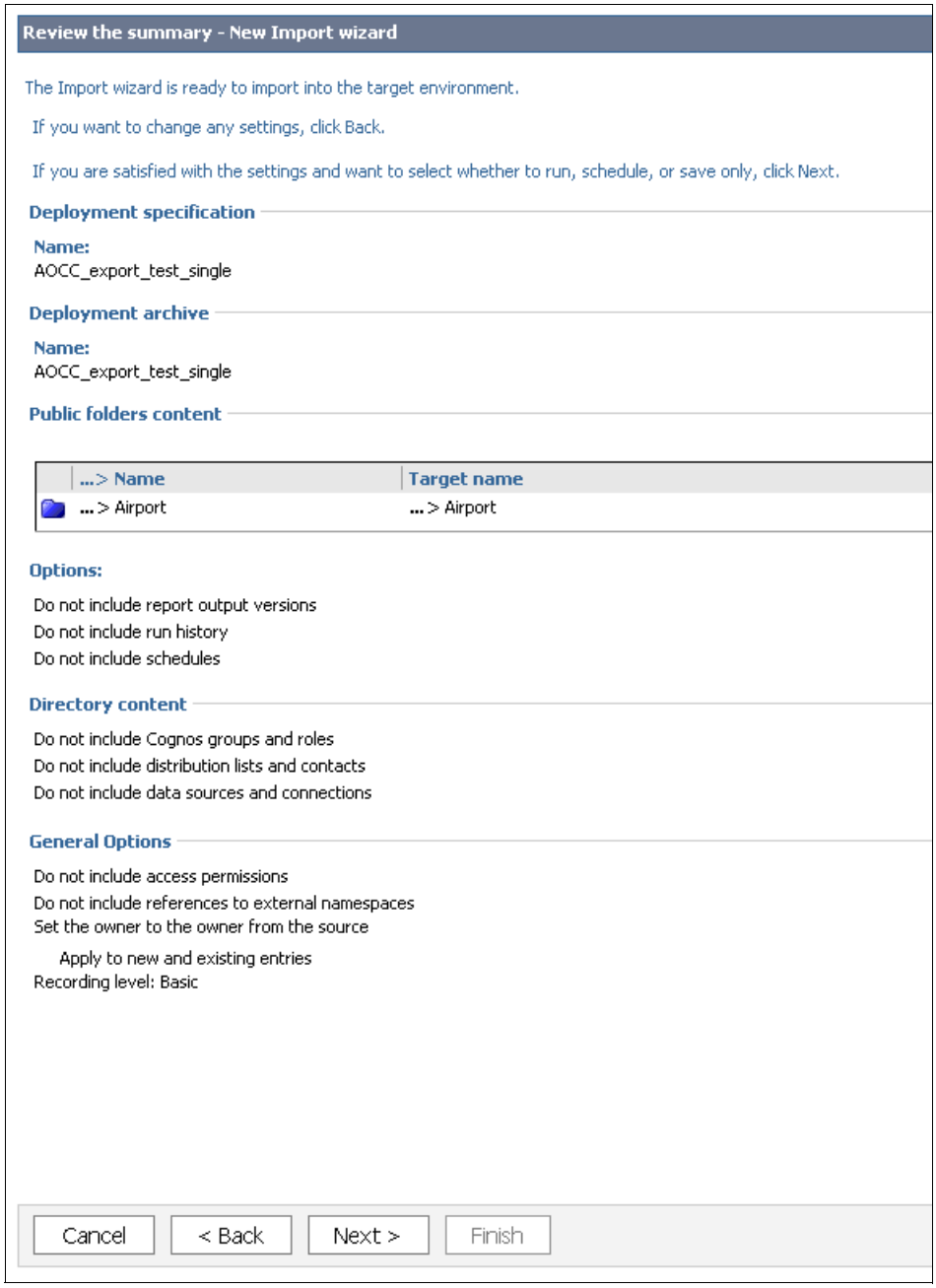

Figure 5-9 New report import summary

10. On the Select an action pane, ensure that **Save and run once** is selected for the Action, and click **Finish**.
11. On the Select when you want to run this import pane, ensure that **Now** is selected for Time, and click **Run**.
12. On the You selected to run 'A-CDM reports export' as follows pane, ensure that **View the details of this export after closing this dialog** is selected, and click **OK** to confirm.
13. On the View run history details pane, monitor the job status until it completes.

Testing Cognos reports

The Cognos Report Studio requires access to the database using the IBM DB2 command-line interface (CLI). To enable this access you need to catalog the IBM DB2 node and database at the IBM DB2 CLI:

1. Log in to the analytics server as the database administrator user `db2inst1`.
2. Run the catalog command:

   ```
   db2 CATALOG TCPIP NODE EXTNODE REMOTE dbserver.ibm.com SERVER 50000
   db2 CATALOG DATABASE ACDMDB AT NODE EXTNODE
   ```

   In this case, **`EXTNODE`** is a logical node name for the database server, **`dbserver.ibm.com`** is the name of your database server host name, **`50000`** is the port that the database server listens on, and **`ACDMDB`** is the external database name. Your database administrator will be able to provide these details for your system.

You can now test your report:

1. Log in to the Cognos Report administration interface on the IBM Intelligent Operations Center V1.6 system. In the Solution Administration interface, expand S**ystem Administration**/**Administration Consoles**. Under Analytics Server, click **Report Administration**.
2. In the IBM Cognos Connection window, your report group should now display in the Public folders pane. Click your report group name.
3. In the Public Folders/Report Group pane, click the **Run** icon for one of your reports from the toolbar on the right as shown in Figure 5-10.

Figure 5-10 Run the report icon

4. On the Select how you want to run and receive your report window, click **Run**.

Displaying Cognos reports

Follow these steps:

1. Create a page in IBM Intelligent Operations Center Portal Administration.
2. Set the page theme to `IOC Portal 8 Reports Theme`.
3. Then, add the IOC Reports portlet `ioc_ui_reports_portlet` to that page.

   For more information, see the *Displaying Cognos reports* topic on the following website:

   `http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/index.jsp?topic=%2Fcom.ibm.ioc.doc%2Fextend_cognos.html`

> **Tip:** You can not apply the IBM Intelligent Operations Center V1.6 IOC Portal 8 Reports Theme to an existing page. You must create a new page and apply the theme.

5.2.8 Standard operating procedures

In IBM Intelligent Operations Center V1.5, you can create SOPs either in IBM Tivoli Service Request Manager or in the SOP configuration tool that was introduced in the Emergency Response feature pack.

For general migration guidelines, see 4.3.4, “Standard Operating Procedures” on page 80.

SOP migration options

The migration options for SOPs vary depending on the type of SOP that you are migrating.

You can export SOPs that were created in IBM Intelligent Operations Center V1.5 using the SOP configuration tool that was introduced in the Emergency Response feature pack. Exported SOPs can be imported into IBM Intelligent Operations Center V1.6 after making some changes to the exported XML file.

If you have SOPs that were created in IBM Tivoli Service Request Manager, you will not be able to migrate them into the standard IBM Intelligent Operations Center V1.6 SOP configuration tool. In this case, you have the following options:

- Manually re-create the SOPs with the IBM Intelligent Operations Center V1.6 SOP configuration tool.
- Install and integrate IBM SmartCloud Control Desk (the replacement for IBM Tivoli Service Request Manager). You will be able to migrate your SOPs as part of the installation and upgrade process from IBM Tivoli Service Request Manager to IBM SmartCloud Control Desk. For more information, see the *IBM SmartCloud Control Desk Upgrade Guide*:

  `http://ibm.co/1bhezEO`

Selected option

In the A-CDM use case, there is only one manual SOP defined in IBM Tivoli Service Request Manager in the application, `STANDCLASH Handle stand clash events`. Therefore, it is much simpler to manually re-create that SOP.

Another SOP is defined in the IBM Intelligent Operations Center V1.5 SOP configuration editor, and can be exported from V1.5 and imported into V1.6.

Both methods are shown in the following sections.

Capture existing SOP definition from IBM Tivoli Service Request Manager

Follow these steps:

1. Log in to IBM Intelligent Operations Center V1.5 as an administrator.
2. Click **Administration**.
3. In the navigation pane, expand **Intelligent Operations**/**Customization Tools** and click **Standard Operating Procedures**.
4. From the list of links in the content pane, click **Standard Operating Procedures**. You will be redirected to the IBM Tivoli Service Request Manager console.
5. Use the search tools to find the SOPs that you want to re-create and click each SOP to display the SOP details.

6. For each of the SOPs that you need to migrate, note the configuration, as shown in Figure 5-11. You also need to expand each of the activities and record the steps required to re-create the activity.

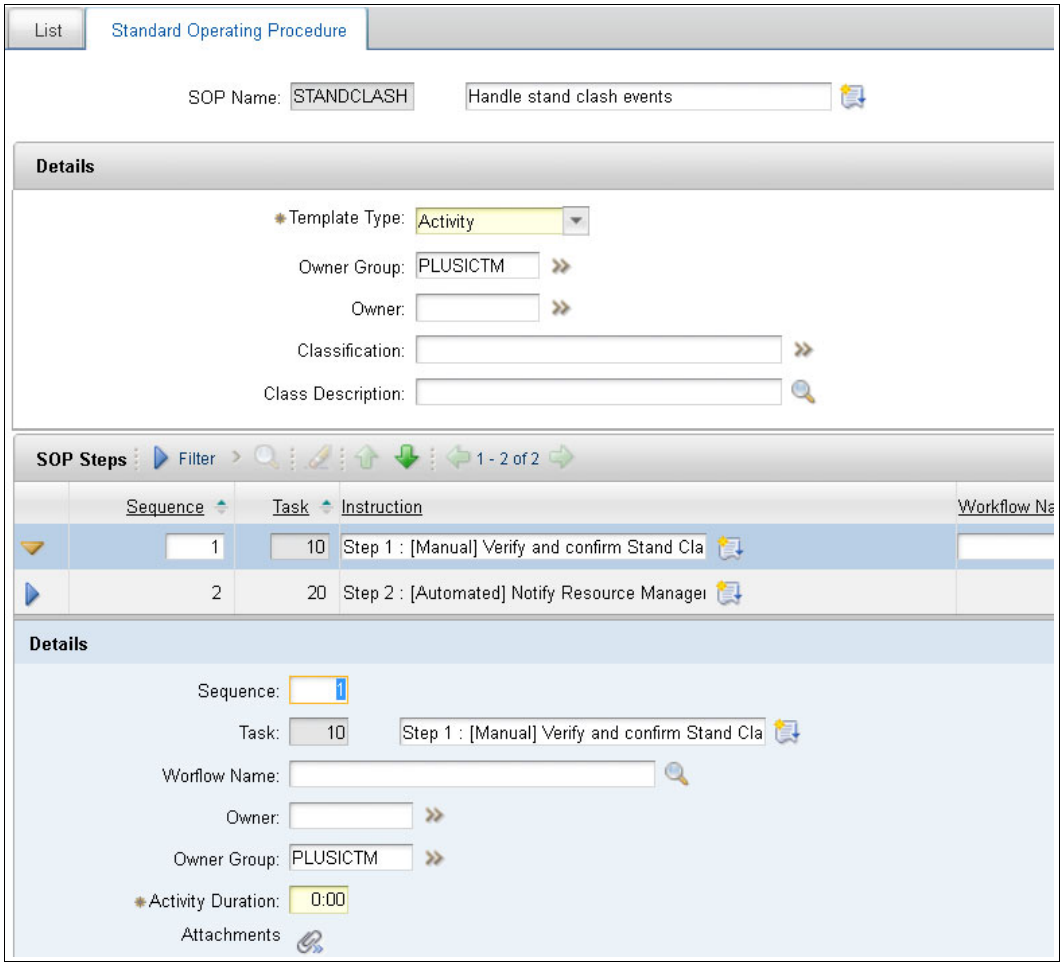

Figure 5-11 Existing SOP configuration

Create the equivalent SOP in IBM Intelligent Operations Center V1.6

Create a new SOP for each one that you documented in “Capture existing SOP definition from IBM Tivoli Service Request Manager” on page 112:

1. Log in to IBM Intelligent Operations Center V1.6 as an administrator.
2. Click **Administration** → **Solution Administration**.
3. In the navigation pane, expand **Configuration Tools**/**Standard Operating** procedure and click **Definition**.
4. On the Standard Operating Procedures: Definition pane, click **Create**.
5. In the Create Standard Operating Procedure Definition tool, on the Basics tab, enter the SOP name and a description. If SOP activities are to be run in order, select the **Activities are done in order** check box.

6. Include any reference material, and click **Next**. Figure 5-12 shows an example SOP definition.

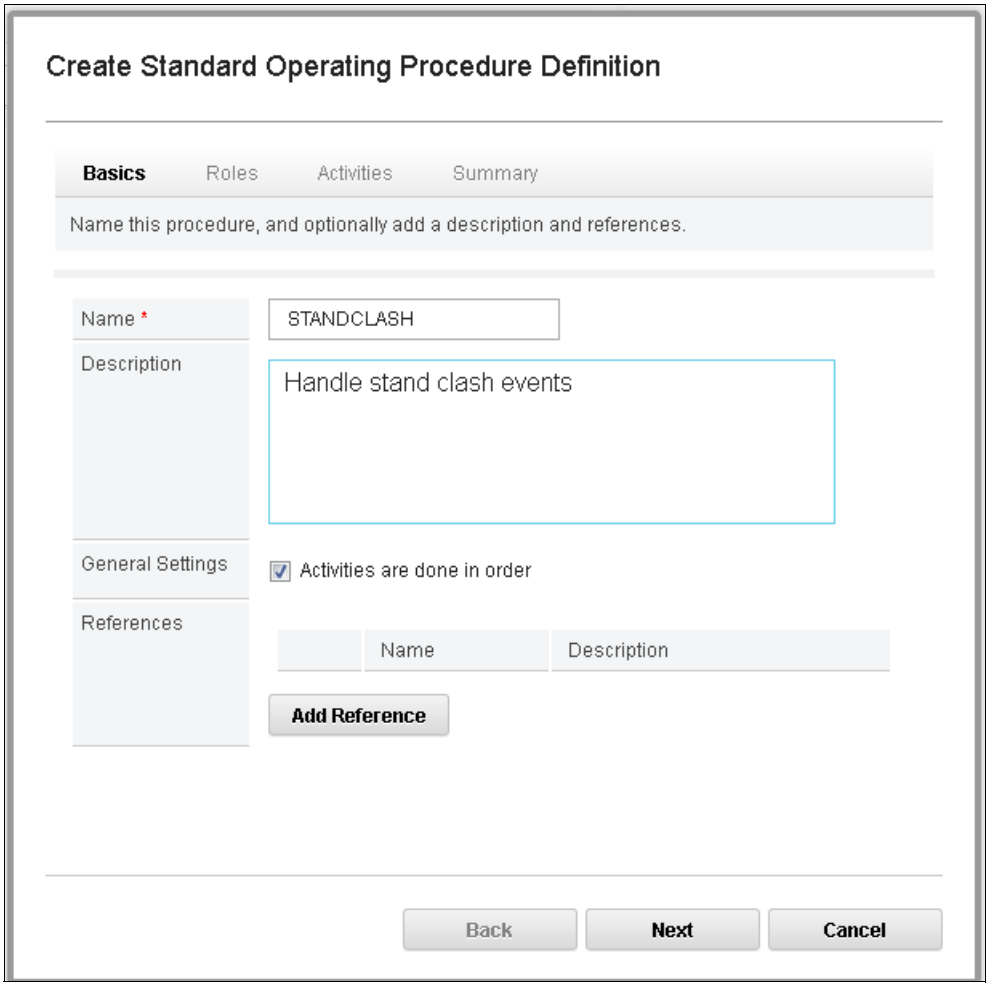

Figure 5-12 New SOP definition

7. On the Roles tab, select the roles that are responsible for monitoring the execution and completion of the SOP, and click **Next**.

8. On the activities tab, use the **Add** button to define the activities that you captured in the “Capture existing SOP definition from IBM Tivoli Service Request Manager” on page 112, and click **Next**. See Figure 5-13 for an example.

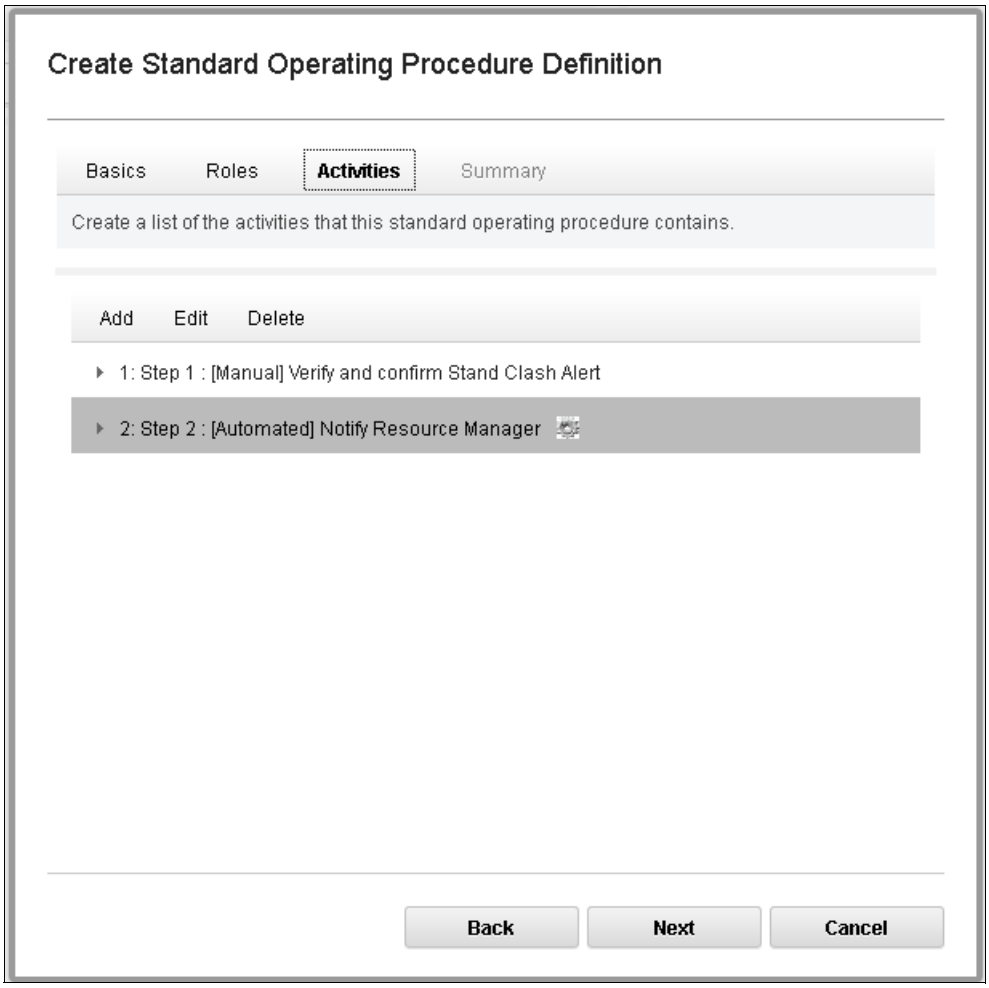

Figure 5-13 New SOP activities

9. On the Summary tab, review the configuration and save the SOP.
10. The new SOP is now saved and in a draft state. The next step is to approve the SOP for use. On the Standard Operating Procedures: Definition pane, click the new SOP and review the activities you created. If it is all correct, click **Submit for Approval**.

Important: Other administrators should review the SOP and, if they agree that it is correct, they should click **Approve** to enable the SOP for use. There should be a well-defined process for selecting required reviewers, sending comments to the originator, and approving the SOP draft. Staff responsible for approving the SOP should include a representative of the group of individuals who will be affected by the SOP.

For information about configuring SOPs in IBM Intelligent Operations Center V1.6, see the *Configuring standard operating procedures* topic on the following website:

http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/use_sopconfig.html

Export existing SOP definition from the SOP Editor

Follow these steps to export SOPs that were created with the IBM Intelligent Operations Center V1.5 SOP editor:

1. Log in to IBM Intelligent Operations Center V1.5 as an administrator.
2. The SOP Editor will not be in the WebSphere Portal administration interface. There should be a WebSphere Portal page defined in your system that contains the SOP Editor portlet. Navigate to that page.
3. On the Standard Operating Procedures pane, select Export from the drop-down menu, as shown in Figure 5-14.

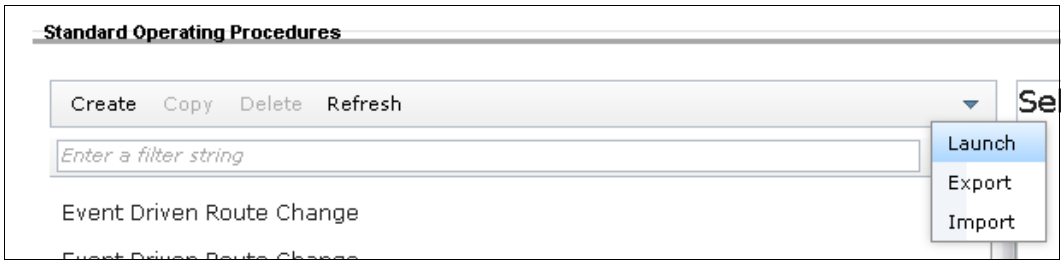

Figure 5-14 SOP export menu item

4. An export XML file is generated. You will be prompted for a location to save the file.
5. Edit the exported XML file so that it can be imported into IBM Intelligent Operations Center V1.6:
   a. Remove the **`ActivityTypeProperty`** called `templateName` from the **`ActivityType`** definition called `notificationActivity`. For example, an export file that contains the **`ActivityType`** definition called `notificationActivity` might look similar to Figure 5-15.

```
<ActivityType>
   <ExportID>4</ExportID>
   <Name>notificationActivity</Name>
   <Description>Activity to send email notifications.</Description>
   <Widget>NotificationActivityTypePanel</Widget>
   <ActivityTypeProperties>-
      <ActivityTypeProperty>
         <ExportID>5</ExportID>
         <Name>uid</Name>
      </ActivityTypeProperty>
      <ActivityTypeProperty>
         <ExportID>6</ExportID>
         <Name>templateName</Name>
      </ActivityTypeProperty>
   </ActivityTypeProperties>
</ActivityType>
```

Figure 5-15 Export file before modification

After removing the **ActivityTypeProperty** for templateName, there should be only one **ActivityTypeProperty**, as shown in Figure 5-16.

```
<ActivityType>
   <ExportID>4</ExportID>
   <Name>notificationActivity</Name>
   <Description>Activity to send email notifications.</Description>
   <Widget>NotificationActivityTypePanel</Widget>
   <ActivityTypeProperties>-
      <ActivityTypeProperty>
         <ExportID>5</ExportID>
         <Name>uid</Name>
      </ActivityTypeProperty>
   </ActivityTypeProperties>
</ActivityType>
```

Figure 5-16 Export file after modification

b. Ensure that the string length of the name or description fields does not exceed the limits for IBM Intelligent Operations Center V1.6. Name fields must have a maximum length of 128 characters, and description fields must have a maximum length of 512 characters.

   These limits apply to all of the entity types:

   - ActivitityDefinitions
   - SOPDefinitions
   - References

6. Copy the exported and edited XML file to the IBM Intelligent Operations Center V1.6 application server to a directory of your choice.

You can now import the SOP definitions into IBM Intelligent Operations Center V1.6.

Import the SOP definition into IBM Intelligent Operations Center V1.6

Follow these steps:

1. Log in to IBM Intelligent Operations Center V1.6 as an administrator.
2. Click **Administration** → **Solution Administration**.
3. In the navigation pane, expand **Configuration Tools**/**Standard Operating Procedures** and click **Definition**.
4. On the Standard Operating Procedures pane, select **Import** from the drop-down menu, as shown in Figure 5-17.

Figure 5-17 SOP import menu item

5. In the Import Standard Operating Procedures window, click **Choose file**, and then locate the file that you exported from IBM Intelligent Operations Center V1.5 and edited in step 5 on page 116.
6. In the Import Standard Operating Procedures window, click **Import**.

All of the SOP definitions from IBM Intelligent Operations Center V1.5 are now imported into IBM Intelligent Operations Center V1.6.

6

High availability considerations

IBM Intelligent Operations Center V1.6 provides installation options to install the IBM Intelligent Operations Center environment and application in a high availability (HA) topology. After installing the HA environment, some additional configuration and maintenance tasks are required.

This chapter describes the IBM Intelligent Operations Center V1.6 systems services configured for HA. It includes information about additional configurations that might be required for HA, maintenance tasks, and special considerations for HA environments.

Important: This edition of the book applies to IBM Intelligent Operations Center V1.6.0.1. For more information, see the *IBM Intelligent Operations Center Version 1.6.0.1* topic on the following website:

`http://www-01.ibm.com/support/docview.wss?uid=swg24036406`

This chapter includes the following topics:

Tip: For detailed information and use cases about IBM Intelligent Operations Center programming model, extension points, and customizations see the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

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6.1 Overview

In IBM Intelligent Operations Center V1.6, you can install and configure an HA environment using the HA topology. IBM Intelligent Operations Center is installed on eight servers in an HA topology environment. For information about the servers installed in an HA topology, and the services running on each, see the I*BM Intelligent Operations Center servers in the high availability topology* topic on the following website:

http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/ba_plan_topology_advanced.html

HA is primarily built on native software product capabilities. When you install the IBM Intelligent Operations Center HA topology, the following system services support HA:

Analytics services	Supports active-active mode.
Application services	Supports active-active mode.
Authentication services	Supports active-active mode.
Business monitoring services	Supports active-active mode.
Database services	Supports active-standby mode.
Event ingestion services	Supports active-active mode.
Messaging services	Supports active-standby mode.
Mobile services	Supports active-active mode.
KPI services	Supports active-active mode.
Reporting services	Supports active-active mode.
Standard operating procedure services	Supports active-active mode.
Usage analysis services	Supports active-active mode.
User directory services	Supports peer-peer mode.
User interface services	Supports active-active mode.
Web server services	Supports active-active mode.

Remember: *Active-active* and *peer-peer* indicates that both nodes are available and providing workload balancing. *Active-standby* indicates that only one node is available at any given time.

6.2 Planning for high availability

The following list includes some of the considerations that you should take into account when planning for the installation and maintenance of IBM Intelligent Operations Center V1.6 in an HA environment:

- Applications that are deployed in an HA environment must be designed and coded to take advantage of platform HA. For example, you must configure client reroute parameters in the WebSphere Application Server Java Database Connectivity (JDBC) data source. Client reroute for IBM DB2 enables you to provide an alternative server location in case the connection to the database server fails.
- For server setup requirements, see the *Preparing the servers for high availability* topic on the following website:

  http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/ba_install_prep_4ha.html
- Ensure that the time is synchronized, and that it stays synchronized on all of the IBM Intelligent Operations Center V1.6 servers. IBM Intelligent Operations Center V1.6 installer checks, enforces, and configures the time during the installation.

- For information about the clustering topology properties that must be defined before installing IBM Intelligent Operations Center V1.6 in an HA environment, see the *Clustering properties* topic on the following website:

  http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/ba_instal_tp_ha.html

- When IBM Intelligent Operations Center V1.6 is deployed in an HA environment, the installation of IBM WebSphere Message Broker and IBM WebSphere MQ uses a Network File System (NFS) file share on the primary analytics server to store IBM WebSphere Message Broker and IBM WebSphere MQ data.

  If you are planning to use IBM WebSphere Message Broker and IBM WebSphere MQ in an HA environment, you should configure both primary and backup analytics servers to use a highly available NFS or storage area network (SAN) server to store IBM WebSphere Message Broker and IBM WebSphere MQ data. This is required to support high availability of the IBM WebSphere Message Broker and IBM WebSphere MQ data.

6.3 User Directory Services high availability

User Directory Services in IBM Intelligent Operations Center V1.6 HA topology consists of two IBM Tivoli Directory Server servers that are configured for peer-to-peer replication. In peer-to-peer replication, both IBM Tivoli Directory Server servers act as masters for directory information, with each master responsible for updating other master servers and replica servers. This topology is referred to as peer-to-peer replication. Conflict resolution for add and modify operations in peer-to-peer replications is based on a time stamp.

For more information about the peer-to-peer replication topology see the *Peer-to-peer replication* topic on the following website:

http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.IBMDS.doc/admin_gd237.htm?path=8_4_4_10_2_2#wq745

For more information about replication conflict resolution see the *Replication conflict resolution* topic on the following website:

http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.IBMDS.doc/admin_gd240.htm?path=8_4_4_10_2_5#confres

6.3.1 Special considerations

There are some administrative tasks that you need to perform on a regular basis, and some that are performed only once. They are required for the peer-to-peer replication to work without failures:

- Ensure that the data and time on both the peer servers are synchronized.
- Periodically perform replication maintenance. See 6.4.3, “Replication maintenance” on page 124 for more information.
- If the directory schema is modified, replication of the data that is using the new schema attributes will fail if the schema changes are not propagated to the peer server.

  Make sure that the <*instance_home*>/<*idsslapd-instance_name*>/etc/V3.modifiedschema schema file is identical on both IBM Tivoli Directory Server servers:

  – In this directory, <*instance_home*> is the home directory of the instance.
  – In this directory, <*idssladpd_instance_name*> is the name of the instance.

- Tune directory replication and configure directory replication properties based on the usage characteristics of Directory Services in your environment.

  For more information about replication tuning techniques, see the *Replication tuning* topic on the following website:

  http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.IBMDS.doc/tuning72.htm?path=8_5_8_1#wq120

  For more information about replication properties, see the *Modifying replication properties* topic on the following website:

  http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.IBMDS.doc/admin_gd274.htm?path=8_4_4_10_17_3#modrepprops

6.3.2 Peer-to-peer replication

When user directory objects are added, updated, or deleted on one of the directory servers, changes are automatically replicated to the peer server. The following default suffixes are configured in IBM Intelligent Operations Center V1.6 for replication:

- The CN=IBMPOLICIES suffix, which contains global policy configuration.
- OU=SWG,O=IBM,C=US is the default IBM Intelligent Operations Center V1.6 Lightweight Directory Access Protocol (LDAP) suffix, which contains LDAP users and groups objects.
- O=PWDSTORE is the default IBM Intelligent Operations Center V1.6 password synchronization store.

If IBM Tivoli Directory Server peer nodes go out of sync for some reason, you can re-synchronize them using the instructions provided in the *Syncing data between two servers* technote:

https://www.ibm.com/support/docview.wss?rs=767&uid=swg21396012

6.3.3 Replication maintenance

Periodically, the administrator needs to take some actions to monitor the replication status. After replication is correctly configured, it continues to automatically propagate updates to all defined replica servers. However, if errors occur, human intervention might be required to fully correct the problem.

You can use the IBM Tivoli Directory Server Web Administration Tool to view information about updates queued for replication, and to take actions, such as suspending or resuming replication to a specific replica.

Access the IBM Tivoli Directory Server Web Administration Tool on the following website:

`http://<ioc_app_server>:9081/IDSWebApp/IDSjsp/Login.jsp`

In this case, <*ioc_app_server*> is the host name of the IBM Intelligent Operations Center application server 1.

Tip: You can access the IBM Tivoli Directory Server Web Administration Tool by selecting **Solution Administration** → **Administration Consoles** → **Data Server** → **Directory**.

6.4 Database services high availability

Database services in IBM Intelligent Operations Center V1.6 HA topology consist of two IBM DB2 Enterprise Server Edition servers. In IBM Intelligent Operations Center V1.6, HA of database servers is provided using high availability disaster recovery (HADR). HADR provides an HA solution for both partial and complete site failures. HADR protects against data loss by replicating data changes from a source database, called the *primary database*, to one or more target databases, called the *standby databases*.

For more information about the HA of IBM DB2 servers, see the *High availability with DB2 server* topic on the following website:

http://pic.dhe.ibm.com/infocenter/db2luw/v10r1/topic/com.ibm.db2.luw.admin.ha.doc/doc/c0051346.html

6.4.1 HADR replication

HADR uses database logs to replicate data from the primary database to the standby database. Some activities can cause the standby database to fall behind the primary database as logs are replayed on the standby database. Some activities are so heavily logged that the large number of log files they generate can cause storage problems.

Although replicating data to the standby database using logs is at the core of availability strategies, logging itself can potentially have a negative effect on the availability of the solution. Design your maintenance strategy wisely, configure your system to minimize the negative effect of logging, and enable logging to protect your transaction data.

For information about operations that are replicated from the primary to the standby database, see the *DB2 High Availability Disaster Recovery (HADR) replicated operations* topic on the following website:

http://pic.dhe.ibm.com/infocenter/db2luw/v10r1/topic/com.ibm.db2.luw.admin.ha.doc/doc/c0011764.html

For information about operations on the primary database that are not replicated to the standby database, see the *DB2 High Availability Disaster Recovery (HADR) non-replicated operations* topic on the following website:

http://pic.dhe.ibm.com/infocenter/db2luw/v10r1/topic/com.ibm.db2.luw.admin.ha.doc/doc/c0011765.html

6.4.2 Automatic HADR failover

IBM Tivoli System Automation is a cluster management software that facilitates automatic switching of users, applications, and data from one database system to another database system in the event of network and server failures.

IBM Tivoli System Automation is bundled with IBM DB2 and installed as part of IBM Intelligent Operations Center V1.6. IBM Tivoli System Automation is configured using DB2 HA instance configuration utility (`db2haicu`). The `db2haicu` utility is a text-based utility that can be used to configure and administer highly available databases in a clustered environment.

For more information about `db2haicu`, see the *DB2 high availability instance configuration utility (db2haicu)* topic on the following website:

`http://pic.dhe.ibm.com/infocenter/db2luw/v10r1/topic/com.ibm.db2.luw.admin.ha.doc/doc/c0051371.html`

When the primary database server fails in the event of network or server failures, IBM Tivoli System Automation intercepts the failure after consulting with the quorum device, and automatically activates the databases on the standby server. A *quorum device* helps a cluster manager make cluster management decisions when the cluster manager's normal decision process does not produce a clear choice.

Figure 6-1 shows the data servers' HA environment with DB2 HADR and IBM Tivoli System Automation.

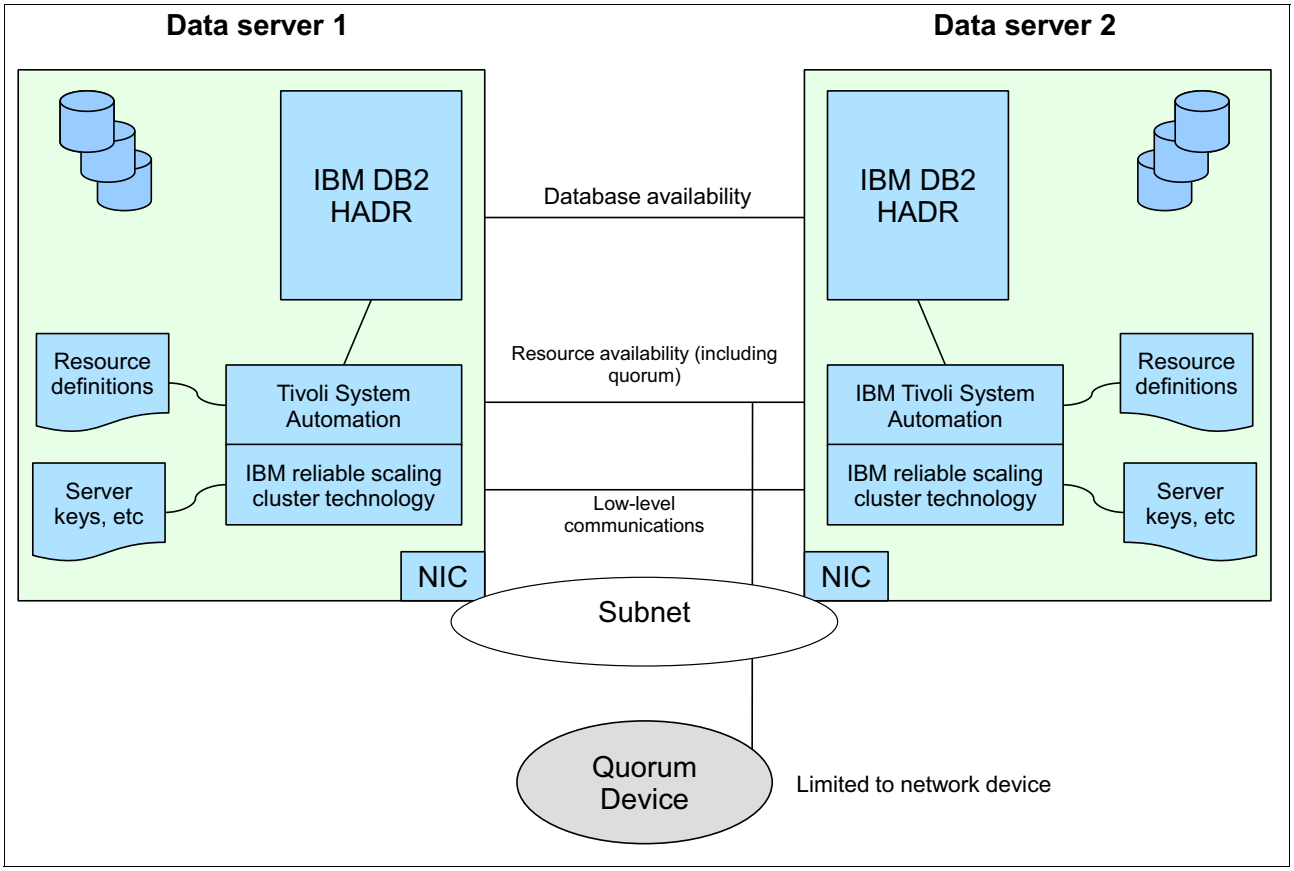

Figure 6-1 IBM DB2 HADR failover using IBM Tivoli System Automation

Using DB2 maintenance scripts you can switch database failover back to the primary database server. For information about sample scripts, see 6.4.3, "Replication maintenance" on page 124.

6.4.3 Replication maintenance

Several sample scripts are provided with IBM Intelligent Operations Center V1.6 to maintain and manage HADR. The sample scripts are located under the `/opt/IBM/iop/tools/db2` directory on data servers 1 and 2.

Table 6-1 lists the sample scripts and descriptions. All of the scripts must be run as the IBM Intelligent Operations Center database instance owner: `db2inst1` or `db2inst2`.

Table 6-1 Sample IBM DB2 HADR scripts

Script name	Script description	Script options
iop.chkalldbhadr.sh	Checks the database state and connection of all of the databases that exist in a given DB2 database instance for the specified database role. The **iop.chkalldbhadr.sh** script internally calls the **iop.chkdbhadr.sh** script.	**-s <HADR state>** is the state of the database. The default is `PEER`. **-r <HADR role>** is the role of the database, which can either be `primary` or `standby`. **-c <HADR connection status>** is the connection status of the HADR. The default is `CONNECTED`. **-p <HADR primary server>** is the host name of the primary database server. Use a short name and not the fully qualified host name. **-b <HADR backup server>** is the host name of the standby database server. Use a short name and not the fully qualified host name.
iop.chkdbhadr.sh	Checks the database state and connection of a specified database that exists in a given DB2 database instance for the specified database role.	**-s <HADR state>** is the state of the database. The default is `PEER`. **-r <HADR role>** is the role of the database, which can either be `primary` or `standby`. **-c <HADR connection status>** is the connection status of the HADR. The default is `CONNECTED`. **-p <HADR primary server>** is the host name of the primary database server. Use a short name and not the fully qualified host name. **-b <HADR backup server>** is the host name of the standby database server. Use a short name and not the fully qualified host name. **-d <database name>** is the name of the database.
iop.ctlalldbhadr.sh	Starts or stops (specified in the **-a** option) all of the databases, as specified by the HADR mode (specified in the **-m** option) in a specified DB2 database instance (specified in the **-i** option). The **iop.ctlalldbhadr.sh** script internally calls the **iop.ctldbhadr.sh** script.	**-a <action>** is the action to perform on the databases, which can be either `start` or `stop`. **-m <HADR mode>** is the mode of the database, which can be either `primary` or `standby`. **-i <instance name>** is the name of the DB2 instance name. The default is `db2inst1`.

Script name	Script description	Script options
iop.ctldbhadr.sh	Starts or stops (specified in the **-a** option) specified middleware database (specified in the **-d** option) as specified by the HADR mode (specified in the **-m** option) in a specified DB2 database instance (specified in the **-i** option).	**-a <action>** is the action to perform on the databases, which can be either `start` or `stop`. **-m <HADR mode>** is the mode of the database, which can be either `primary` or `standby`. **-i <instance name>** is the name of the DB2 instance name. The default is `db2inst1`. **-d <database name>** is the name of the middleware database.
iop.dspalldbstatus.sh	Displays the status of all HADR-enabled IBM Intelligent Operations Center databases.	No options are required.
iop.dspdbstatus.sh	Displays the status of a specified HADR-enabled IBM Intelligent Operations Center database.	**-d <database name>** is the name of the database.
iop.logmaint.sh	Prunes all of the archived HADR log files before the current active log file for a specified database.	**-d <database name>** is the name of the database.
iop.takeoveralldb.sh	Runs the takeover HADR command on all of the middleware databases. The **iop.takeoveralldb.sh** script internally calls the **iop.takeoverdb.sh** script.	No options are required.
iop.takeoverdb.sh	Runs the takeover HADR command on a specified database.	**-d <database name>** is the name of the database.

6.4.4 Configuring HADR

When new DB2 instances are created, or new databases are created in an existing DB2 instance, HADR must be configured before they can be highly available. Refer to authorized program analysis report (APAR) PO02148 for instructions and scripts to configure HADR. You can download the APAR from IBM Support: Fix Central on the following website:

https://www.ibm.com/support/fixcentral/

6.5 Messaging services high availability

In IBM Intelligent Operations Center V1.6, IBM WebSphere MQ and IBM WebSphere Message Broker are configured to support multi-instance queue manager. IBM WebSphere MQ and IBM WebSphere Message Broker are installed on the analytics servers 1 and 2.

Multi-instance queue managers improve availability by automatically switching to a standby server if the active server fails. The active and standby servers host instances of the same queue manager, and share the same queue manager data.

The default shared directory is `/opt/ioc/wmq/shared`, and the default mount directory is `/opt/ibm/ioc/shared/wmq/`. IBM WebSphere MQ and IBM WebSphere Message Broker logs and messages are stored under the shared directory.

By default, both analytics server 1 and 2 point to the same shared directory, located on the analytics server 1. The shared directory is exported or mounted using NFS V4 on both analytics servers, as shown in Figure 6-2, which shows the default multi-instance queue manager configuration in IBM Intelligent Operations Center V1.6 HA topology.

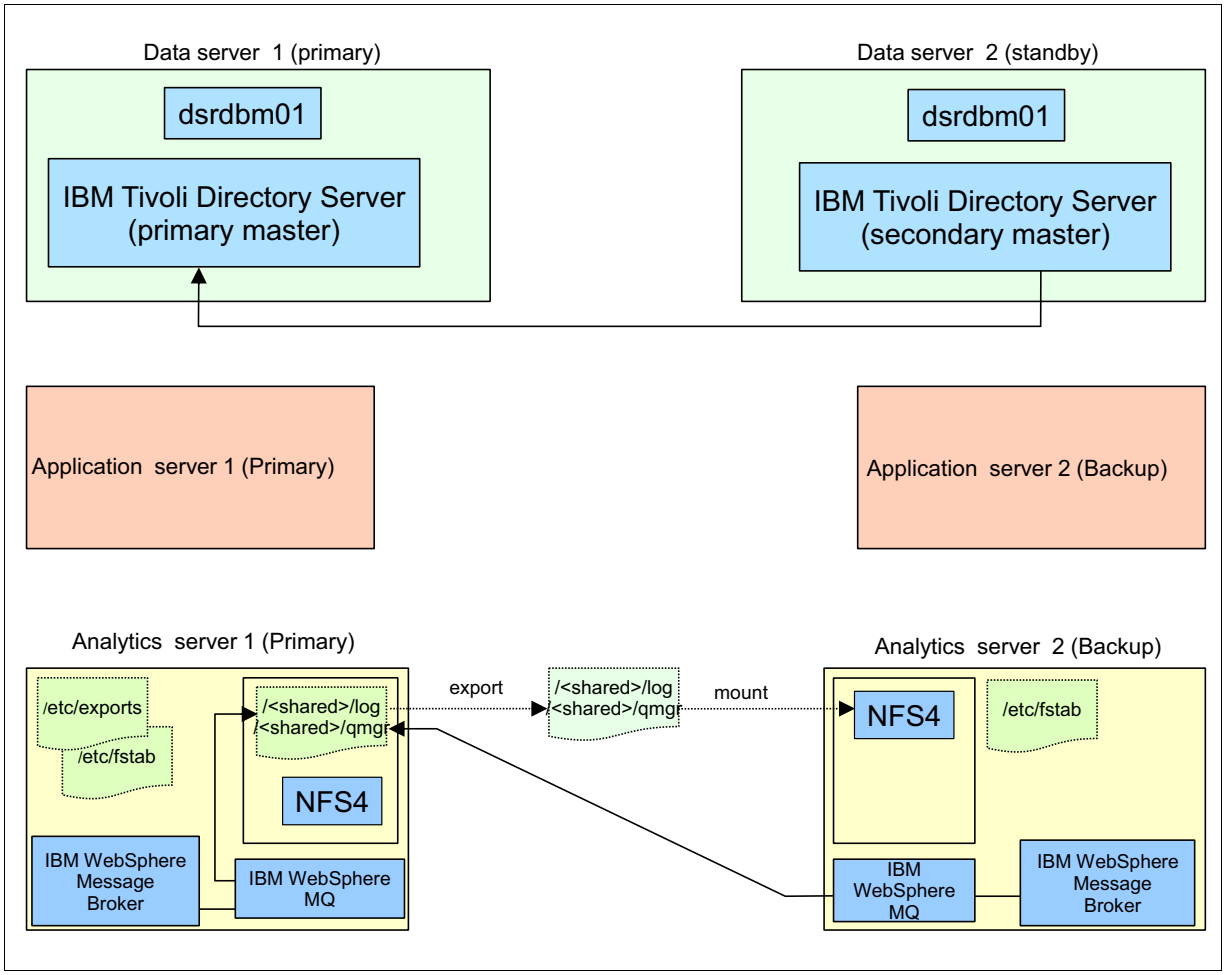

Figure 6-2 Ready to use multi-instance queue manager configuration

The disadvantage of this approach is that the shared directory is not highly available. If the analytics server 1 fails, the shared directory is no longer available to analytics server 2. A better approach is to use a highly available stand-alone or external NFS server or SAN server, and reconfigure the multi-instance queues to use the highly available NFS or SAN server, as shown in Figure 6-3 on page 128.

IBM Intelligent Operations Center V1.6 does not use IBM WebSphere Message Broker, and only uses IBM WebSphere MQ to process CAP messages. Highly available stand-alone or external NFS server or SAN server configuration is only required if you plan to use those components.

Figure 6-3 shows a standalone HA server configuration.

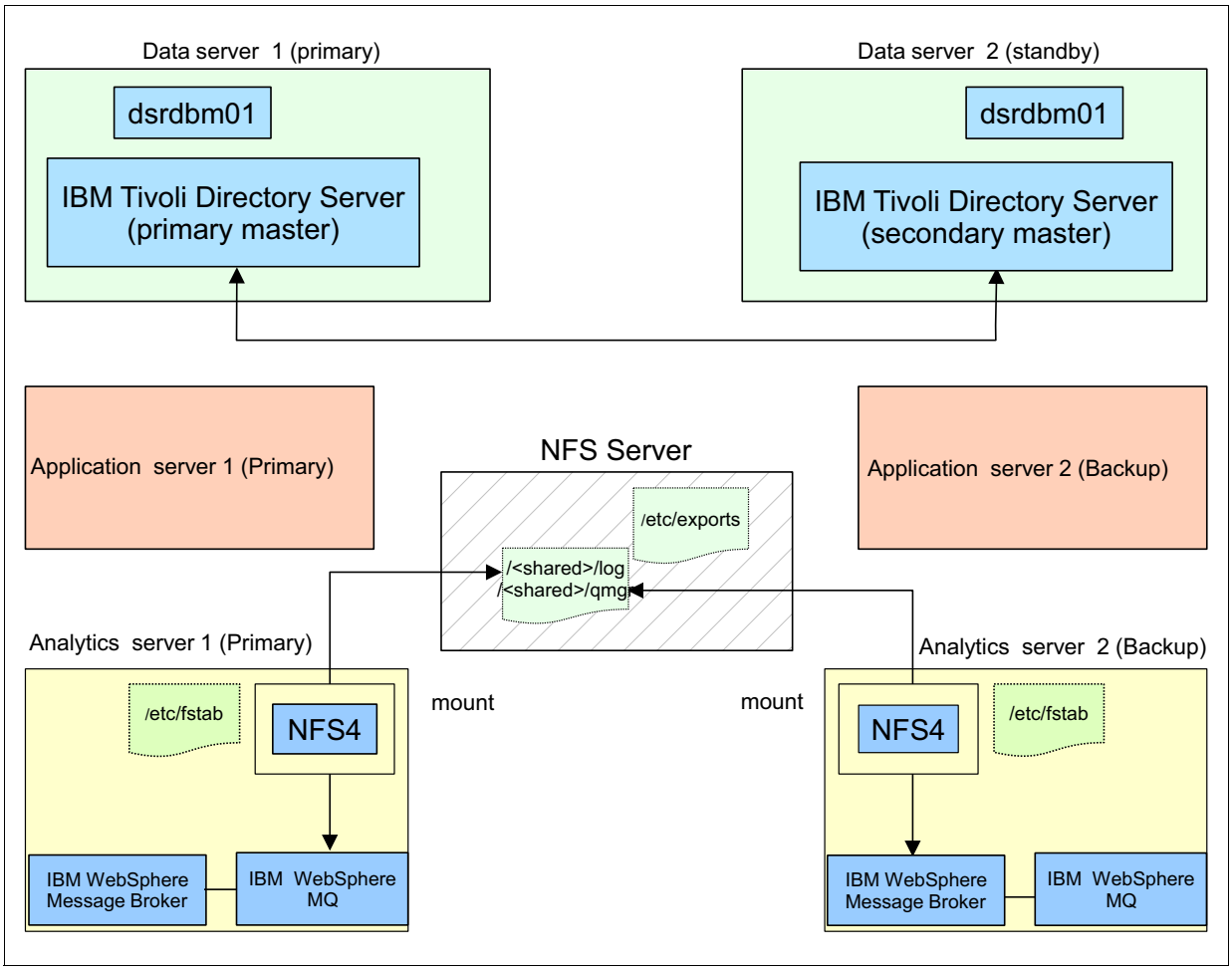

Figure 6-3 Highly available multi-instance queue manager configuration

Configure your messages as persistent so that they are reliably maintained, and are not lost in the event of a failure. Similarly, clients using message-driven beans (MDBs) to subscribe to the topics (correlation and integration topics) must ensure that they use durable subscription.

6.5.1 The problem with the default configuration

Multi-instance queue managers require shared storage to store logs and message data. This shared storage must be available to all of the multi-instance queue managers. In IBM Intelligent Operations Center V1.6, the primary queue managers are hosted on the primary IBM Intelligent Operations Center analytics server (analytics server 1). The standby queue managers are hosted on the standby IBM Intelligent Operations Center analytics server (analytics server 2).

Where to host the shared storage is problematic, because the IBM Intelligent Operations Center installation process is unaware of the customer environment or the preferred shared storage implementations. To provide a working reference implementation, the IBM Intelligent Operations Center V1.6 installation process uses an NFS implementation using the primary IBM Intelligent Operations Center analytics server as the file system host.

Obviously, this is not an optimal solution, because losing the primary server (which is hosting the exported NFS directory) renders the messaging component of the standby server inoperable as well. Multi-instance queue managers should be reconfigured to conform to local shared storage practices.

A set of installation and configuration scripts are provided with IBM Intelligent Operations Center V1.6. The scripts can be used to reconfigure the multi-instance queue managers to use the reliable shared network storage.

Tip: For information about reconfiguring multi-instance queue managers and brokers to support an HA messaging solution, see the *Reconfiguring multi-instance queue managers for the high availability configuration* IBM technote on the following website:

`http://www.ibm.com/support/docview.wss?uid=swg27040402`

6.6 Programming considerations for high availability

When designing and implementing custom applications to be deployed in an IBM Intelligent Operations Center HA topology, consider the following points:

- Applications must be designed and coded to take advantage of HA. For example, applications must use state and data in the user session, so that it can be replicated to the other cluster members.
- Not all application HA requirements are supported by the platform HA. For example, messaging clients, such as Java Message Service (JMS) and WebSphere MQ Telemetry Transport (MQTT), must implement a connection retry.
- Ensure that the application is designed with clustering in mind. Careful considerations are needed to identify volatile resources and how they might behave in a clustered environment (for example, file system files and semaphores).
- The availability of resources that are external to IBM Intelligent Operations Center, such as map providers that are included from an external service provider URL and third-party databases, is out of the IBM Intelligent Operations Center solution provider control.
- Ensure that all file-based artifacts are available on a highly available shared file system that is accessible from all nodes. Examples of file-based artifacts include data source comma-separated values (CSV) files and image files.
- Ensure that external databases used by data sources are highly available and accessible from all nodes.
- Create messaging artifacts like topics with the “Reliable Persistent” option. Ensure that the corresponding activation specifications that are created are durable and shareable across the clusters.
- *In memory* programming artifacts, such as cache instances, should be in a shared global cache, accessible across clusters, with replication set as needed. All Java objects should implement synchronization.
- When developing a new widget or portlet, use the `com/ibm/ioc/SessionData` JavaScript application programming interface (API) to store and retrieve your own session preferences.

- If the data is acquired from a data source uploading a CSV file, and the connection to the file is lost during the ingestion process (for example, lost connection to the file system where the CSV file is), follow these steps to recover from the failure:
  a. Set the polling interval of the CSV data source to zero.
  b. If one of the columns in the CSV file is marked as an ID field during the data source creation, duplicates are ignored. So, reload the data source after placing a file with the original name in the directory on the application server.
  c. If no ID field was designated during data source creation, determine how many data items were ingested into the database. Remove records already imported from the CSV file (to avoid duplicates), and replace the updated CSV file in the directory on the application server (the default location is `/opt/IBM/ioc/csv`).
  d. Set the polling interval of the CSV data source to the wanted value.
- If the data is acquired from a database (DB2 or Microsoft SQL), and the connection to the database is lost during the ingestion process, no special handling is required. In the case of a database node failure, the scheduler will automatically redirect to the backup database node.
- For service uniform resource locators (URLs) and any external Representational State Transfer (REST) services, the availability level of the external services determines the availability level of visualization of the data items from that service.

6.7 Application deployment in HA environments

When you deploy a custom application or portlet module web archive (WAR) file, you do not have to do anything special for that application to participate in HA.

When you deploy a portlet web module through the IBM Intelligent Operations Center Portal Administration interface, the module is deployed by the WebSphere Application Server Deployment Manager and mapped to the portal cluster. The new module is then automatically distributed to the cluster members.

When you deploy an application through the WebSphere Application Server administrative console, the deployment is managed through the Deployment Manager and automatically distributed to the cluster members. You need to map that application to the cluster.

In IBM Intelligent Operations Center V1.5 and V1.6 standard topology, there is only one cluster member. In IBM Intelligent Operations Center V1.6 HA topology, there are two cluster members to support HA.

6.7.1 Module mapping

Use the WebSphere Application Server administrative console to deploy an application. Ensure that you map that application to a cluster so that the application is distributed to the cluster members. The cluster named `PortalCluster` hosts IBM Intelligent Operations Center V1.6, and it is the preferred cluster to also map any custom applications you want to be highly available.

How module mapping works

The WebSphere Application Server Deployment Manager automatically distributes the application and any related configuration to the application servers that run the code. Requests to the application are directed to one of the cluster members by the WebSphere plug-in, as described further in 6.7.5, “Load balancing with the web server plug-in” on page 133.

WebSphere Application Server allocates a session ID to the user request, and manages the session to maintain user state. The WebSphere Application Server and the WebSphere plug-in work together to ensure that subsequent user requests are directed to the same cluster member, so that the user state is available in memory. The user session data is also replicated to the other cluster member so that it is available in the event of a cluster member failure.

If one of the cluster members fails, user requests are directed to the other cluster member, and the users will be able to continue working. Users are automatically logged in to the second cluster member, and their user session data is available due to the session data replication.

For more information about WebSphere Application Server clustering, see the *Clusters and workload management* topic on the following website:

http://pic.dhe.ibm.com/infocenter/wasinfo/v8r0/topic/com.ibm.websphere.nd.multiplatform.doc/info/ae/ae/crun_srvgrp.html

6.7.2 JDBC data sources

When you set up a connection with an HADR-enabled IBM DB2 database, you must configure the data source with the primary and secondary DB2 server information. The secondary database server information is configured as additional properties on the data source. To configure the secondary database server, follow these steps:

1. Log in to the WebSphere Application Server administrative console.
2. In the navigation pane, expand **Resources**/**JDBC** and click **Data Sources**.
3. Set the scope to be **Cluster=PortalCluster**.
4. Click your data source name.
5. Under Additional Properties, click **WebSphere Application Server data source properties**.
6. Under Advanced DB2 features, set the DB2 automatic client reroute options as follows:
   a. `Alternate server names`: The name of the secondary database server.
   b. `Alternate port numbers`: The port number for the secondary database instance.
   c. `maxRetriesForClientReroute`: Limits the number of times to try to connect to the primary database server again.
   d. `retryIntervalForClientReroute`: Specifies the number of seconds to sleep before trying to connect to the primary server again.

      Note: The `maxRetriesForClientReroute` and `retryIntervalForClientReroute` properties are only used if both are specified.

How JDBC data sources work

When a primary database server for an IBM DB2 HADR-managed database goes offline, the IBM DB2 reroute logic checks to see if the secondary database server is available. Even if the secondary database server is available, the reroute first checks the connection to the failed primary server before rerouting the connection to the secondary server. After the connection to the secondary server completes, the transaction is rolled back and run again on the secondary database server.

Considerations

Tune the reroute parameters to minimize downtime. See the *How to configure the JDBC driver for automatic client re-route* technote on the following website:

`http://www-01.ibm.com/support/docview.wss?uid=swg21593442`

6.7.3 Node synchronization

After an application is successfully installed, you need to ensure that all of the cluster member nodes are synchronized before you can start the application. Synchronization is the process of pushing the changes made to the WebSphere Application Server configuration out from the Deployment Manager to the nodes where the cluster members run.

To check or to start synchronization, follow these steps:

1. Log in to the WebSphere Application Server deployment manager for IBM Intelligent Operations Center at the following URL:

   `https://<ioc_app_server>:9044/ibm/console`

   Tip: This console can also be accessed by selecting **Solution Administration** → **Administration Consoles** → **Application Server** → **Application server** (WebSphere Application Server 8.0 Deployment Manager console for WebSphere Portal, IBM Business Monitor, IBM Worklight, IBM Cognos Business Intelligence, IBM ILOG CPLEX, and Sametime Proxy).

2. In the navigation pane, expand **System Administration** and click **Nodes**.
3. All of the WebSphere Application Server nodes are listed, along with the synchronization status. You can select one or more nodes and click **Synchronize** to start synchronization.

For more information, see the *Node collection* topic on the following website:

`http://pic.dhe.ibm.com/infocenter/wasinfo/v8r0/topic/com.ibm.websphere.nd.doc/info/ae/ae/uagt_rnodes.html`

How node synchronization works

The WebSphere Application Server Deployment Manager manages the configuration in XML files and applications in enterprise archive (EAR), Java archive (JAR), WAR, and extensible markup language (XML) files maintained on disk. The synchronization process uses the WebSphere Application Server file transfer service to push any changes to the master configuration to the nodes that make up the cluster.

Considerations

Synchronization is automatic by default, and occurs at one-minute intervals. You do not need to manually synchronize, but be aware that you should wait at least one minute before trying to start a new application.

6.7.4 Plug-in regeneration

If your application needs to be accessible through the IBM HTTP Server, you also need to regenerate and propagate the WebSphere plug-in. The WebSphere plug-in is a component that runs with the IBM HTTP Server and routes requests from the web server to the WebSphere Application Server cluster members. It performs request load balancing across the available cluster members.

If your application needs to be accessible through the IBM HTTP Server, you must also map the application to the web servers in addition to the `PortalCluster` cluster. You can map the modules to the web servers when deploying the application, as described in 6.7.1, "Module mapping" on page 130. Alternatively, you can map the application to the web servers after deployment. After updating the application mapping, regenerate and propagate the WebSphere plug-in. To regenerate and propagate the plug-in, follow these steps:

1. Log in to the WebSphere Application Server administrative console.
2. In the navigation pane, expand **Servers**/**Servers types** and click **Web servers**.
3. Select both web servers, and then click **Generate Plug-in** to generate a plug-in configuration file with new mappings.
4. Select both web servers again and click **Propagate Plug-in** to distribute the new plug-in configuration file to the two web servers.

How plug-in regeneration works

The WebSphere Application Server Deployment Manager manages the plug-in configuration in an XML file. The synchronization process uses the WebSphere Application Server file transfer service to push the new plug-in configuration file to the web server nodes.

Considerations

After a plug-in configuration file is propagated to a web server, it can take up to 60 seconds for the new configuration to take effect.

6.7.5 Load balancing with the web server plug-in

The web server plug-in performs request load balancing across the cluster members in the WebSphere Application Server cluster.

Requests to a web server plug-in can be routed to either cluster member. A request to either of the web servers can be directed to either cluster member, as shown in Figure 6-4.

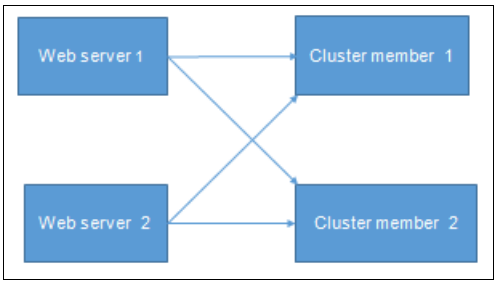

Figure 6-4 Plug-in load balancing

For example, a request to Web server 1 can be routed to either Cluster member 1 or Cluster member 2.

You also need a load balancer in your environment to distribute requests across the two web servers.

Load balancing: To ensure that your system is highly available, you need to be able to distribute requests to both web servers, and to automatically detect if one of the web servers goes down. Use a separate highly available load balancer to distribute requests to the web servers.

How web server load balancing works

The web server plug-in runs on the web server as part of the IBM HTTP Server. When a request comes in to the web server, the plug-in intercepts the request and examines it to determine if it should be routed to a WebSphere Application Server cluster member to serve the request. The plug-in determines which cluster member to which to route the request based on the entries in the plug-in configuration file.

If a request is to be routed to a WebSphere Application Server cluster member, the plug-in chooses a cluster member based on several rules:

- If the request contains a session ID that was previously routed to a particular cluster member, the plug-in will try to route the incoming request to that same cluster member.
- Otherwise, it will choose a cluster member based on the default round-robin routing policy.

There is an alternative routing policy that randomly chooses a server. However, in most cases the default routing policy is used. If a cluster member does not respond to the request routed by the plug-in, that cluster member is marked unavailable and the request is routed to another cluster member. A server that becomes available will automatically be detected, so there is no need for user action after restoring a server.

For more information about web server plug-in routing, see the *Plug-ins: Resources for learning* topic on the following website:

http://pic.dhe.ibm.com/infocenter/wasinfo/v8r0/topic/com.ibm.websphere.nd.multiplatform.doc/info/ae/ae/rwsv_plugin_rlinks.html

Considerations

It is important to perform request load balancing across multiple web servers. Directing all user requests to only one specific web server makes access to the IBM Intelligent Operations Center solution unavailable if that web server is down.

6.7.6 Load balancing with WebSEAL

IBM Security Access Manager for Web WebSEAL can also perform load balancing. WebSEAL is included with IBM Intelligent Operations Center V1.6, but it is not installed or integrated. You have the option of installing and configuring it, as described in 3.4.1, “Identity management” on page 41.

You can use WebSEAL as a load balancer for distributing requests to the IBM Intelligent Operations Center web servers, as described in 6.7.5, “Load balancing with the web server plug-in” on page 133.

How WebSEAL load balancing works

In IBM Security Access Manager for Web WebSEAL, you define junctions that reference back-end servers. For IBM Intelligent Operations Center V1.6, you can define a junction that references the two web servers and distributes incoming requests to either web server. The web server then sends the request on to one of the cluster members.

Alternatively, you can bypass the web servers and create a junction for request load balancing across the two WebSphere Application Server cluster members directly.

To maintain HA, you need to implement two separate WebSEAL servers configured in active-passive mode, in case one WebSEAL server fails.

For more information about WebSEAL and implementing failover, see the *IBM Security Access Manager for Web Version 7.0 Information Center* topic on the following website:

http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.isam.doc_80/welcome.html

Considerations

Additional skills and two additional servers are required to implement WebSEAL for load balancing:

- Skills required to install and administer IBM Security Access Manager for Web
- Extra servers required to run IBM Security Access Manager for Web
- An extra layer of security administration

A

Scripts provided with this book

This appendix includes the summary information for the scripts provided with this IBM Redbooks publication. The sample scripts help you identify the changes made to the IBM Intelligent Operations Center V1.5 system compared to a base installation. The output of the sample scripts can be used to identify the customizations to the IBM Intelligent Operations Center V1.5 environment that can be migrated to IBM Intelligent Operations Center V1.6.

For information about downloading the sample scripts, see Appendix B, “Additional material” on page 141.

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Migration planning scripts

Table A-1 lists the scripts used to assist with migration planning activities. All of the scripts listed in Table A-1 must be run in the IBM Intelligent Operations Center V1.5 environment.

Table A-1 Scripts used for planning

Script name	Description	Notes
check_wmb.sh	Lists all of the IBM WebSphere Message Broker flows configured in IBM Intelligent Operations Center V1.5.	Run on the event server.
list_db2_nodes_and_databases.sh	Loops through the eight standard IBM Intelligent Operations Center V1.5 database instances (`db2inst1` through `db2inst8`), and checks for any nonstandard databases or nodes that have been cataloged on each instance.	Run on all IBM Intelligent Operations Center V1.5 servers under root user.
list_impact_policies.py	Lists the nonstandard IBM Tivoli Netcool/Impact policies in IBM Intelligent Operations Center V1.5.	Run on the event server under the root user.
list_jdbc_data_sources.py	Queries the WebSphere Application Server Deployment Manager that manages the cluster where the IBM Intelligent Operations Center V1.5 application runs to determine if any nonstandard JDBC data sources have been created.	Run on the application server. Use the waswebadmin user ID.
list_kpi_models.py	Checks the key performance indicator (KPI) models installed in the IBM Intelligent Operations Center V1.5 system, and checks the model version number.	Pass the host name of the application server as an input parameter, or localhost if running the script in the application server.
list_ldap_suffixs.py	Checks the LDAP configuration for nonstandard suffixes.	Run on the data server.
list_ldap_users_groups.py	Checks the LDAP configuration to identify if any users and groups not installed by IBM Intelligent Operations Center were created under the default suffix, ou=SWG,o=IBM,c=US.	Run on the data server.
list_mq_config.py	Lists all of the IBM WebSphere MQ queue managers, channels, and queues configured in the IBM Intelligent Operations Center V1.5 system.	Run on the event server under the root user.
list_omnibus_probes.py	Lists the nonstandard Netcool/OMNIbus probes in IBM Intelligent Operations Center V1.5.	Run on the event server under the root user.

Script name	Description	Notes
list_portal_config.py	Lists the IBM WebSphere Portal pages that are not created by default in IBM Intelligent Operations Center V1.5.	► The IBM WebSphere Portal XMLAccess tool must be run before running this sample script. ► The output file from XMLAccess must be in the same directory as the sample script. ► The `portal.data` file provided with this IBM Redbooks publication must be in the same directory as the sample script. ► Use wpsadmin for the user ID when running the sample script.
list_tam_config.py	Lists any IBM Tivoli Access Manager for e-business configuration that is not created by default in IBM Intelligent Operations Center V1.5.	► Run on the application server under the root user. ► You will be prompted by IBM Tivoli Access Manager for the e-business sec_master user's password.
list_was_apps.py	Queries the WebSphere Application Server Deployment Manager that manages the cluster where the IBM Intelligent Operations Center application runs to determine if any nonstandard applications have been installed. Nonstandard applications are either stand-alone Java Platform, Enterprise Edition (Java EE) applications, or custom portlets that were added to IBM Intelligent Operations Center V1.5.	► Run on the application server under user ID waswebadmin. ► Requires the `applications.data` file to be installed in the same directory.

Remember: To run the scripts provided with this IBM Redbooks publication, you might need to convert them to make them executable scripts, depending on how you transfer the scripts to your IBM Intelligent Operations Center V1.5 servers. For example, the first command converts the line delimiters to UNIX format, and the second command makes it an executable script:

```
dos2unix list_ldap_suffixs.py
chmod 755 list_ldap_suffixs.py
```

B

Additional material

This book refers to additional material that can be downloaded from the Internet, as described in the following sections.

Locating the web material

The web material associated with this book is available in softcopy on the Internet from the IBM Redbooks web server. You can access this material from the following website:

`ftp://www.redbooks.ibm.com/redbooks/SG248202`

Alternatively, you can go to the IBM Redbooks website:

ibm.com/redbooks

Select **Additional materials**, click **Access additional materials**, and open the directory that corresponds with the IBM Redbooks form number, SG248202.

Using the web material

The additional web material that accompanies this book includes the following files:

File name	Description
`SG248202.zip`	Compressed scripts and supporting files

System requirements for downloading the web material

The web material requires the following workstation configuration:

Hard disk space	100 KB minimum
Operating System	Microsoft Windows or Linux

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Downloading and extracting the web material

Follow these steps:

1. Create a subdirectory (folder) on your workstation.
2. Download the `SG248202.zip` file from the location described in “Locating the web material” on page 141 into the folder created in step 1.
3. Extract the contents of the web material `SG248202.zip` file into the folder created in step 1.
4. Transfer the sample scripts to the IBM Intelligent Operations Center servers specified in Table A-1 on page 138.
5. Run the sample scripts as described in the examples in 3.6, “Identifying changes to the IBM Intelligent Operations Center V1.5 base installation” on page 52.

Remember: To execute the scripts provided with this IBM Redbooks publication, you might need to convert them to make them executable scripts, depending on how you transfer the scripts to your IBM Intelligent Operations Center V1.5 servers. For example, the first command converts the line delimiters to UNIX format, and the second command makes it an executable script:

```
dos2unix list_ldap_suffixs.py
chmod 755 list_ldap_suffixs.py
```

Related publications

The publications listed in this section are considered particularly suitable for providing more detailed information about the topics covered in this book.

IBM Redbooks

The following IBM Redbooks publications provide additional information about the topic in this document. Note that some publications referenced in this list might be available in softcopy only.

- *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201

  http://www.redbooks.ibm.com/redpieces/abstracts/sg248201.html
- *IBM Intelligent Operations Center for Smarter Cities Administration Guide*, SG24-8061

  http://www.redbooks.ibm.com/abstracts/sg248061.html
- *IBM Intelligent Operations Center for Smarter Cities*, REDP-4939

  http://www.redbooks.ibm.com/abstracts/redp4939.html

You can search for, view, download, or order these documents and other Redbooks, Redpapers, Web Docs, drafts, and additional materials, at the following website:

http://ibm.com/redbooks

Online resources

These websites are also relevant as further information sources:

- IBM Intelligent Operations Center V1.6 Information Center

  http://pic.dhe.ibm.com/infocenter/cities/v1r6m0/topic/com.ibm.ioc.doc/ic-homepage.html
- IBM Intelligent Operations Center publication library

  http://www-01.ibm.com/support/docview.wss?uid=swg27039133
- IBM Intelligent Operations Center Version 1.6.0.1 updates

  http://www-01.ibm.com/support/docview.wss?uid=swg24036406

Help from IBM

IBM Support and downloads

ibm.com/support

IBM Global Services

ibm.com/services

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IBM Redbooks

IBM Intelligent Operations Center V1.5 to V1.6 Migration Guide

(0.2”spine)
0.17”<->0.473”
90<->249 pages

IBM Intelligent Operations Center V1.5 to V1.6 Migration Guide

Understand your migration options and make the most of the new capabilities

Plan a succesful IBM Intelligent Operations Center V1.5 to V1.6 migration

Discover lessons learned in migration scenarios

IBM Intelligent Operations Center is an integrated solution, and a continually evolving platform and set of capabilities. The platform grows as the capabilities increase over time, and new interfaces and integration points are introduced in each release.

The purpose of this IBM Redbooks publication is to guide planners, architects, and implementers through the options that they have, to take advantage of the new capabilities and maximize the benefits of moving to the new release. This book considers what has already been deployed with IBM Intelligent Operations Center V1.5, the benefits of the new version (IBM Intelligent Operations Center V1.6.0.1), and the best way to take advantage of the new capabilities as you transition.

IBM Intelligent Operations Center has several integration and extension points for the previous and current versions of the product, which points are documented and described in this book. This IBM Redbooks publication describes options and considerations for the best way to migrate customizations and benefit from the new architecture.

Thorough details about the differences between the prior and new versions of the product are provided, to enable a clear understanding of migration choices, options, and preferred practices. This book includes descriptions of the trade-offs for each migration option, and in-depth information about data flows, available tools, and scripting changes that might affect existing IBM Intelligent Operations Center installations.

This book is targeted to the following audiences:

- Line of business managers or stakeholders who are interested in understanding the new features in IBM Intelligent Operations Center V1.6, and who are looking for information about how to plan the migration of their current IBM Intelligent Operations Center V1.5 environments.
- Architects who need to understand the effect that IBM Intelligent Operations Center V1.6 will have on the architecture of IBM Intelligent Operations Center V1.5 solutions.
- IT specialists and product specialists who are responsible for implementing the migration of a solution based on IBM Intelligent Operations Center V1.5 to a V1.6 solution.

Readers of this book will benefit from the IBM Redbooks publication *IBM Intelligent Operations Center 1.6 Programming Guide*, SG24-8201.

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