IBM Cognos BI Administration (v10.2.2)

Student Guide Volume 1
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Course Overview

Course Overview

This course provides training to new administrators on the fundamental tasks of installing and configuring IBM Cognos BI, and administering servers and content in the environment. In the course, participants will install and configure the IBM Cognos BI software, implement security, and manage the server components. Students will also monitor and schedule tasks, create data sources, and manage and deploy content in IBM Cognos Connection and IBM Cognos Administration.

Intended Audience

This course is recommended for Administrators.

Topics Covered

Topics covered in this course include:

- Introduction to IBM Cognos BI Administration
- Identify IBM Cognos BI Architecture
- Secure the IBM Cognos BI Environment
- Administer the IBM Cognos BI Server Environment
- Manage Run Activities
- Manage Content in IBM Cognos Administration
- Additional Configuration and Customization
- Overview of IBM Cognos BI (Optional)
- IBM Cognos BI for Consumers (Optional)
- Drill Through Definitions (Optional)
- End-to-end Workshop (Optional)

Course Prerequisites

Participants should have:

- Knowledge of or experience with:
 - Web application server architectures
 - security systems administration
 - using basic Windows functionality
 - using a Web browser
 - your business requirements

Document Conventions

Conventions used in this guide follow Microsoft Windows application standards, where applicable. As well, the following conventions are observed:

Bold

Bold style is used in demo and workshop step-by-step solutions to indicate either:

· actionable items

(Point to **Sort**, and then click **Ascending**.)

text to type or keys to press

(Type Sales Report, and then press Enter.)

 UI elements that are the focus of attention (In the Format pane, click Data)

Italic

Used to reference book titles.

CAPITALIZATION

All file names, table names, column names, and folder names appear in this guide exactly as they appear in the application.

To keep capitalization consistent with this guide, type text exactly as shown.

Workshops

Workshop Format

Workshops are designed to allow you to work according to your own pace. Content contained in a workshop is not fully scripted out to provide an additional challenge. Note: workshops in this course are not based on tasks performed in previous demos, and are designed to provide students with a meaningful hands-on experience that forces them to complete the task without prior knowledge. With that in mind, the task descriptions have been scripted to include sufficient detail to allow students to be successful. The workshops are structured as follows:

The Business Question Section

This section presents a business-type question followed by a series of tasks. These tasks provide additional information to help guide you through the workshop. Within each task, there may also be numbered questions relating to the task. It is highly recommended that you refer to the Task and Results section for more detailed instruction to help you complete each task, and answer questions in this section.

The Task and Results Section

This section provides a task based set of instructions that presents the question as a series of numbered tasks to be accomplished. The information in the tasks expands on the business case, providing more details on how to accomplish a task. Screen captures are also provided throughout and at the end of tasks to show the expected results.

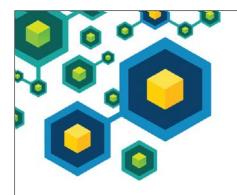
Additional Training Resources

Bookmark <u>Business Analytics Product Training</u> http://www-01.ibm.com/software/analytics/training-and-certification/ for details on:

- Instructor-led training in a classroom or online
- Self-paced training that fits your needs and schedule
- Comprehensive curricula and training paths that help you identify the courses that are right for you
- IBM Business Analytics Certification program
- Other resources that will enhance your success with IBM Business Analytics Software

IBM Product Help

Help type	When to use	Location
Task- oriented	You are working in the product and you need specific task-oriented help.	IBM Product - Help link
Books for Printing (.pdf)	You want to use search engines to find information. You can then print out selected pages, a section, or the whole book.	Start/Programs/IBM Product/Documentation
	Use Step-by-Step online books (.pdf) if you want to know how to complete a task but prefer to read about it in a book.	
	The Step-by-Step online books contain the same information as the online help, but the method of presentation is different.	
IBM on the Web	You want to access any of the following:	
	 Training and Certification Web site 	 http://www-01.ibm.com/ software/analytics/training- and-certification/
	• Online support	 http://www-947.ibm.com/ support/entry/portal/ Overview/Software
	• IBM Web site	• http://www.ibm.com





Introduction to IBM Cognos BI Administration

IBM Cognos BI 10.2.2



Business Analytics software

Business Analytics software

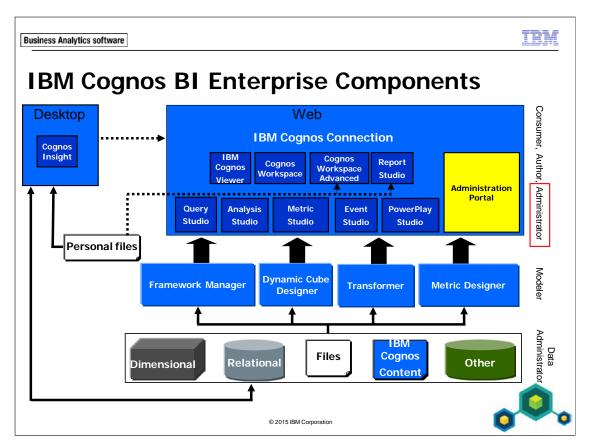
TRW

Objectives

- At the end of this module, you should be able to identify and explain:
 - the IBM Cognos BI enterprise components
 - the role of the Administrator in relation to the IBM Cognos BI administration workflow process
 - the role of IBM Cognos Administration and IBM Cognos Configuration

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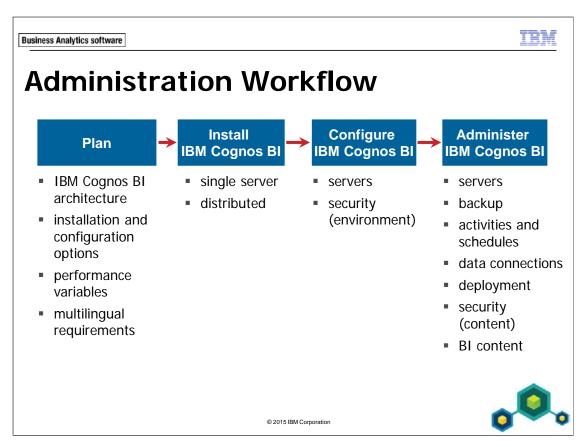




IBM Cognos BI capabilities provide reporting, analysis, scorecarding, workspace creation, business event management, and data integration from a wide array of corporate and personal data sources. IBM Cognos BI includes:

- IBM Cognos Connection, which is the Web a portal for BI content presentation, management, and administration.
- Web and desktop reporting and analysis tools to author and analyze corporate data.
- Metadata modeling tools, including Framework Manager, Dynamic Cube Designer, and Transformer.

You can access IBM Cognos Administration from the Launch menu in IBM Cognos Connection or from the Welcome to Cognos Software page. You must have the required permissions to access IBM Cognos Administration.



The administration workflow process describes the high-level tasks involved in understanding and administering the IBM Cognos BI environment.

Business Analytics software

TH W

IBM Cognos Administration Portal

- Provides the access point to administration functionality.
- Monitor and manage activities, including schedules.
- Monitor performance using system metrics.
- Modify server properties.
- Implement object security.
- Manage content.

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IBM Cognos Administration is a central management interface that contains the administrative tasks for IBM Cognos BI. It provides easy access to the overall management of the IBM Cognos BI environment.

IBM Cognos Administration is organized primarily into 7 tabs:

- Status: monitor activities, server status, and system metrics, and change some system settings.
- Security: define users, groups, and roles for security purposes, configure capabilities for the interfaces and studios, and set properties for the user interface profiles (professional and express) that are used in Report Studio.
- Configuration: set up data source connections, deploy IBM Cognos BI content from one content store to another, create distribution and contact lists, add printers, set styles, manage portlets and portal layout, start or stop dispatchers and services, and change system settings.
- Library: import, store, and manage reusable resources such as visualizations and user interface profiles.

- Multitenancy: view and manage all tenants that are registered in the current Cognos BI environment. Only members of the System Administrators role can access the Multitenancy tab. Note: Multitenancy is the capability of an application to support multiple tenants from a single deployment. It ensures that within each tenant users can access only the data that they are authorized to use.
- Index Search: control the scope of the content store index activity.
- Mobile: provides centralized administration and management capabilities for the delivery of the Cognos BI content to mobile devices that are using IBM Cognos Mobile.

The IBM Cognos Administration user interface will be covered in more detail in the upcoming demo.

Business Analytics software

IBM Cognos Configuration

- Set the initial configuration of IBM Cognos BI components.
- Modify component properties.
- Start or stop the IBM Cognos BI services.

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IBM Cognos Configuration is a client-based application that can be installed on either Windows or UNIX platforms.

Demo 1: Explore IBM Cognos Administration

To complete the demos in this module, you should be using the B5A55_1567ABCD image.

Before doing this demo, in the BI environment, in the **Taskbar**, click **Services** to ensure that the following services are started:

- Apache Directory Server default
- DB2 DB2COPY1 DB2
- DB2DAS -DB2DAS00
- Lotus Domino Server (CProgramFilesx86IBMLotusDominodata)
- World Wide Web Publishing Service
- IBM Cognos

Purpose:

To become familiar with IBM Cognos BI, you will navigate through IBM Cognos Administration and identify some of the administrative tasks that can be performed on the Status, Security, Configuration, Library, Index Search, Multitenancy, and Mobile tabs.

Task 1. Explore the Status tab.

- 1. Open **Internet Explorer**, and then navigate to **http://vclassbase:88/ibmcognos**, and then press **Enter**.
- 2. In the **User ID** box, type **admin**, in the **Password** box, type **Education1**, and then click **OK**.

3. Click **Administer IBM Cognos content**.

IBM Cognos Administration opens displaying the following tabs: Status, Security, Configuration, Library, Multitenancy, Index Search, and Mobile. The Status tab is displayed by default and can be used to monitor and manage current, past, and upcoming run activities, administer dynamic cubes, monitor system metrics, manage schedules, and administer personal data sets. The default view is set to Current Activities, where you can:

- monitor pending, executing, suspended, and waiting activities in either a graph or in a list
- filter the view by activity type (background or interactive), user, status, or priority
- perform actions such as canceling, suspending, releasing, or overriding the priority of jobs

4. Click Past Activities.

Here you can:

- monitor past run activities, including those that have succeeded, failed, or were cancelled
- filter the view by period, user, or status
- filter the view using advanced options including by owner, by type, by dispatcher, or by scope (folder location)

5. Click **Upcoming Activities**.

Here you can:

- monitor all upcoming activities that are scheduled for a specific day
- filter the view by day, hour, user, status, or priority
- filter the view using advanced options including by owner, by type, or by scope (folder location)
- perform actions such as canceling a job, modifying the schedule for a job, overriding the priority of a job, or suspending activities indefinitely or to a later time.

For more information on managing activities see the *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 21: Activities Management.

6. Click **Dynamic Cubes**.

Here you can set query service properties for dynamic cubes that have been published to IBM Cognos BI.

7. Click **System**.

You can monitor performance using system metrics.

The System page has three panes, which you use to evaluate system status: Scorecard, Metrics, and Settings. You can refresh each pane independently.

Use the Scorecard pane to monitor entries such as system, servers, server groups, dispatchers, and services. For each entry, a metric score and operational status are displayed. The Scorecard pane is organized hierarchically so that you can navigate to different levels in the system. The default view shows the System node and all IBM Cognos BI servers in the system. Currently, there is only one server installed. There are no system metrics configured at this point so there are no metric scores to display.

8. Click the server name instance, vclassbase.

The dispatchers registered on the server are displayed. Metric score and operational status can be displayed for each of the dispatchers. The dispatcher name is taken from a property defined in IBM Cognos Configuration.

9. Click http://vclassbase:9300/p2pd.

The services under the control of the dispatcher are displayed. Metric score and operational status can be displayed for each service.

10. Beside **BatchReportService**, click the **Actions** list.

A list of actions that can be performed on the service is displayed. Note: the available actions will depend on what entry you have selected. The actions available for a service are different from those for a dispatcher.

You are now at the lowest level in the Scorecard pane. You can navigate back up the hierarchy using the navigation path at the top of the pane.

11. In the navigation path in the **Scorecard** pane, click **vclassbase**.

You are back to the same view as in Step 8.

12. In the navigation path, click **All servers**.

You are back to the same view as in Step 7.

13. Maximize the **Scorecard** pane.

The view changes to display details about individual servers. This provides a side-by-side comparison of components and their current details.

Only the Scorecard pane can be maximized.

14. Beside **All servers**, click the **Change view** list.

You can change the view of the Scorecard pane to display details for groupings of entries.

15. Click **All dispatchers**.

You can view details for all dispatchers in the environment. There is currently only one dispatcher installed in the environment.

16. Click the dispatcher http://vclassbase:9300/p2pd.

You can view details for all services under control of this dispatcher.

17. Beside **All dispatchers**, in the **Change view** list, click **All servers**, and then restore the **Scorecard** pane.

The view changes back to displaying all panes. The Scorecard pane is in context with the last selections you made when it was maximized.

18. Beside **All servers**, click the **Change view** list.

With Scorecard pane restored, you can again change the view to display groupings of entries.

- 19. Click All dispatchers, and then click http://vclassbase:9300/p2pd.
- 20. In the **Scorecard** pane, click **BatchReportService**.

The content in the Metrics and Settings panes change interactively, depending on what you select in the Scorecard pane.

In the Metrics pane, you can view metric groupings. The available groups will depend on what you have selected in the Scorecard pane. You can view metric scores for each grouping broken down by indicator (green square, yellow triangle, red circle). There are currently no metric scores because you have not set any thresholds.

21. In the **Metrics** pane, click + to expand **Request**.

The metric scores and values for the request metrics of the BatchReportService are displayed. You can set thresholds for these metrics.

22. Beside Number of failed requests, click Edit thresholds



To set the threshold, you must define a performance pattern.

23. Click High values are good.

In this case, performance is deemed to be improving or good when values for this metric increase. Notice that there are two boxes available for setting thresholds. One is for defining when the metric score indicator changes from yellow to green (and vice versa), and one for defining when it changes from red to yellow (and vice versa).

24. Click Middle values are good.

In this case, performance is deemed to be improving or good when values for this metric are at or move toward a middle value (often a range). Notice that there are four boxes available for setting thresholds. There are two for defining when the metric score indicator changes from green, to yellow, to red as values move up and away from the middle. There are two more for defining when the metric score indicator changes from green, to yellow, to red for values moving down and away from the middle.

25. Click Low values are good.

In this case performance is deemed to be improving or good when values for this metric decrease. Notice that there are two boxes available for setting thresholds. One is for defining when the metric score indicator changes from red to yellow (and vice versa), and one for defining when it changes from yellow to green (and vice versa).

Default thresholds are not provided because every organization will be different in how they want to monitor metrics and set thresholds

Thresholds for metrics will be set during a demo in the module titled *Administer* the IBM Cognos BI Server Environment.

26. Click Cancel.

27. In the **Scorecard** pane, click **ContentManagerService**, and then in the **Metrics** pane, expand **Request**.

Notice the value for the Number of processed requests metric.

28. At the top of the **Metrics** pane, click **Refresh**

The value for the Number of processed requests metric has increased.

There is no automatic refresh for any of the panes on the System page. This is because monitoring the metrics is an active process. In other words the administrator needs to identify the previous metric scores and statuses before initiating a manual refresh. An automatic refresh would not allow this.

29. At the top of the **Settings** pane, click **Minimize**, and then refresh the **Metrics** pane.

The value for the Number of processed requests metric increases again. This indicates that metric values can be gathered continuously regardless of any thresholds being set.

This also indicates that every action in the portal is a request; this is important in understanding how requests operate. More details on request processing are provided in the modules titled *Identify IBM Cognos BI Architecture*, and *Administer the IBM Cognos BI Server Environment*.

30. Restore the **Settings** pane.

In the Settings pane, you can view categories of current property settings. The available categories will depend on what you have selected in the Scorecard pane.

31. In the **Scorecard** pane, click **BatchReportService**, and then in the **Settings** pane, expand **Tuning**.

This is a read-only pane. You can view the current tuning settings provided for the BatchReportService.

32. Collapse **Tuning**, and then click **Set properties**



You can modify the settings for the BatchReportService. You will modify the number of high affinity connections and low affinity connections, and examine them later in this demo.

- 33. Set the following property:
 - Number of low affinity connections for the batch report service during non-peak period: change 4 to 3
- 34. Click **OK**.

35. Click **Schedules**.

Here you can:

- view scheduled entries as a list, which shows the name, status, priority, date and time the schedule was modified, and the user who scheduled the entry
- view scheduled entries as a bar chart which shows an overview of activities broken down by enabled and disabled schedules
- filter the entries by status, priority, type, scope, user that scheduled the entry, and by entry owner
- set properties, run the schedule once, disable and enable scheduled entries, modify the schedule, remove the schedule, set the priority, and view the run history

For more information on managing schedules see the *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 22: Schedule Management.

36. Click Data Sets.

Here you can manage the personal data sets of all users. You can view the following information for each data set:

- Name the name of the data set. The default name is the name of the file that the user imported.
- Owner the name of the user who created the data set.
- Refreshed the date and time when the data set was last replaced with a data set from an updated file.
- File size (KB) the size of the uploaded file. Note: The total size of each user's imported data set files cannot exceed 100 MB.
- Rows the number of rows in the data set table.
- Tenant the tenant, if one exists, that is associated with the data set.

You can filter the view based on when data sets were last refreshed, by owner, and scope.

Task 2. Explore the Security tab.

1. Click the **Security** tab.

Use the Security tab to manage users, groups and roles and control access to functionality. The default view is set to Users, Groups, and Roles, where you can:

- manage the Cognos namespace
- create and manage groups and roles in the Cognos namespace
- manage users from third-party authentication providers

Security is covered in more detail in the module titled *Secure the IBM Cognos BI Environment*.

2. In the **Directory** section, under **Name**, click **Cognos**.

Here you can:

- create user-defined groups and roles
- add users to predefined and user-defined groups and roles
- manage predefined and user-defined groups and roles
- edit the default user profile
- 3. In the left pane, click **Capabilities**.

Here you can control access to functionality in the IBM Cognos BI environment. Note: A capability defined as a hyperlink, includes subcapabilities. Access must be assigned at all levels in the capabilities hierarchy.

- 4. Beside **Administration**, in the **Actions** list, click **Set properties**.
- 5. Click the **Permissions** tab.

You can assign access to IBM Cognos Administration. Notice that there is default access assigned to multiple predefined groups and roles.

6. Click **Cancel**, and then in the left pane click **User Interface Profiles**.

You can control access to the authoring functionality in Report Studio (Professional) and IBM Cognos Workspace Advanced (Express). For more information on the Professional and Express authoring modes, see Chapter 16 "Secured Functions and Features", in the section titled "Set Access to User Interface Profiles for Report Authors" of the *IBM Cognos Software Version 10.2.2 Administration and Security Guide.*

Task 3. Explore the Configuration tab.

1. Click the **Configuration** tab.

Use the Configuration tab to:

- create and manage data source connections
- manage content in the environment
- create and manage distribution lists, and contacts, printers, styles, and portlets
- manage dispatchers and services
- administer query service caching

The default view is set to Data Source Connections.

2. In the left pane click **Dispatchers and Services**.

This view displays the dispatchers installed in the environment. This is the same view that is presented when you click Set properties in the Settings pane of the System view on the Status tab. You can configure settings using either view.

3. Click the dispatcher http://vclassbase:9300/p2pd.

This view displays all the services managed by this dispatcher.

4. In the **Actions** column for the **BatchReportService**, click **Set properties**, and then click the **Settings** tab.

You can view default settings and configure settings for the BatchReportService. Notice the change you made for the low affinity connections property that was set in Task 1.

- 5. Set the property back to its default values:
 - Number of low affinity connections for the batch report service during nonpeak period: 4
- 6. Click **OK** to close the **Set properties** page.

Task 4. Explore the Library tab.

- 1. Click the **Library** tab.
- 2. On the toolbar, click **Import Visualizations**
- 3. Above the **Selected Visualizations** window, click **Browse**.

You must navigate to the file system to locate the visualization file that you want to import.

Note: populating the library with visualizations is covered in more detail in the module titled *Manage Content in IBM Cognos Administration*.

- 4. **Cancel**, and then click **Close**.
- 5. Beside the **vis.sample.areachart.smooth** visualization, click the **Actions** list (down arrow).

You can:

- Set properties: Visualizations are assigned default properties, including access permissions, when they are imported. Library administrators can change the default settings, including access permissions, for a visualization resource.
- View my permissions: Administrators can view their own permissions for each visualization.
- Delete: You can delete individual or multiple visualizations from the content store database.
- Download: You can download an existing visualization to your hard drive or network share to modify the visualization.

Task 5. Explore the Multitenancy tab.

- 1. Click the **Multitenancy** tab.
- 2. Place the cursor over each of the toolbar buttons:

New Tenant - specify the name and tenant id.

Export - export tenant content to make it available to different content store.

Create Content Utilization Info - content store utilization tasks provide insight into the content store usage. You can determine how many instances of each object type users from your tenants have in the content store and the amount of space that those instances are taking. You can also determine more detailed information, such as the size of every object.

Disable/Enable - disable or enable tenants making them inaccessible or accessible to tenant users.

Terminate Sessions — terminate sessions for tenants.

Edit Default User Profile - edit the default user profile for tenant users. Note: each tenant can have its own default user profile that is shared by all tenant users.

Delete Tenant User Profile - delete the user profile for one or more tenants.

Task 6. Explore the Index Search tab.

1. Click the **Index Search** tab.

Use the Index Search tab to specify settings for index creation and update, including:

- control the scope of the index
- manage data collection
- limit index by language
- adjust results relevance
- suggest content
- integrate with another search engine

Other administrative tasks include integrating with, and publishing, index content to third-party search engines.

Search results depend on the access permissions of the person who indexes the content, as well as the user who searches the content. For more information on Indexing, see the *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 34: Managing Index Search.

Task 7. Explore the Mobile tab.

1. Click the **Mobile** tab.

Use the Mobile tab to administer and manage the delivery of the Cognos BI content to mobile devices that are using IBM Cognos Mobile.

2. In the left pane, click Remote Configuration.

Use these properties to configure the IBM Cognos Mobile application to streamline the setup for users and control how the application works on iOS and Android devices.

• IBM Cognos BI server URL - url to the IBM Cognos server hosting the content, such as http://cognos_bi_server/ibmcognos

- Pass-Through Authentication users can navigate to the Cognos BI server through the different intervening web pages that are displayed to them. By default, IBM Cognos Mobile requires direct connectivity with the IBM Cognos BI server. If direct connectivity is not possible because of intervening security products or third-party portals, this setting must be enabled. The intervening products could include CA SiteMinder, Tivoli Access Manager, Microsoft ISA Server, or landing pages in public WiFi networks.
- Automatic Downloads allows the IBM Cognos Mobile app to automatically download new report outputs from the user's inbox and from reports pushed to the user.
- Display Sample Server allows the Cognos Mobile app to access the Cognos Mobile sample server. The sample server contains sample IBM Cognos reports that illustrate the capabilities of IBM Cognos software.
- Maintain Application State allows the application to restore its latest content space after the application is restarted. For example, if the application is closed while viewing a report in the content space "My Reports", the application reopens the content space "My Reports" after a restart. If this setting is disabled, the application displays the main panel after a restart.
- Generate Mobile Configuration Code a base64-encoded URL is generated that includes the specified configuration settings. The following is an example of the generated URL:
 cmug://aHR0cDovL3ZvdHRtb2IxL2NzcDI-dmVyc2lvbj0xLjAmcGFzcz1vZmYmYXV0b2R3bj1vZmYmZGlzcHNhbXA9b24mcHdkPW9uJnNhbHQ9UWlzQVJoTTNPaFVfJmhhc2g9QVFnQUFBQkliV0ZqVTBoQk1iV2U3SEJiUjhkczJBV2wrKzI0Y2d6cWxLMi8.

 Copy the configuration URL and provide it to the Cognos Mobile application users by email, chat, or by other methods.

In the left pane, click **Server Configuration**. 3.

These settings are used to administer the delivery of IBM Cognos Business Intelligence content to mobile applications. For more information on these properties, see Chapter 41. IBM Cognos Mobile administration/Configuring Cognos Mobile services/Cognos Mobile service configuration settings of the IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide.

Click Mobile UI Configuration. 4.

> Use these settings to define the appearance of the IBM Cognos Mobile application welcome page.

On the toolbar, click **New Theme** 5.



Specify a name for the theme, browse for a zip file that contains the theme resources, and then specify the groups or roles that need to use the theme. Note: you can choose groups and roles from the Cognos namespace or from other active namespaces.

Click Cancel, log off, and then close Internet Explorer.

Results:

You have familiarized yourself with IBM Cognos BI by navigating through IBM Cognos Administration. You identified some of the administrative tasks that can be performed on the Status, Security, Configuration, Library, Index Search, Multitenancy, and Mobile tabs.

Demo 2: Explore IBM Cognos Configuration

Purpose:

To become familiar with IBM Cognos BI, you will navigate through IBM Cognos Configuration. You will identify some of the configuration tasks that can be performed to set the initial startup properties for the IBM Cognos BI environment.

Task 1. Explore properties.

- 1. From the **Start** menu, navigate to **All Programs** > **IBM Cognos 10 64**, and then click **IBM Cognos Configuration**.
- 2. In the **Explorer** pane, click **Environment**. Set these properties to:
 - Facilitate communication between IBM Cognos components installed on remote computers. For example, the Content Manager URI property is used by the dispatchers and services to send requests to the Content Manager, depending on where it is installed.
 - Define settings that are specific to the computer. For example, the Deployment files location property is used to specify the location where deployment archives are stored. Note: deployment and deployment archives are covered in the module titled *Manage Content in IBM Cognos Administration*.
- 3. In the **Explorer** pane, click **Logging**.

Set these properties to facilitate communication to the log server and to specify where log messages are sent. Log server configuration and logging are covered in more detail in the modules titled *Identify IBM Cognos BI Architecture* and *Administer the IBM Cognos BI Server Environment*.

4. Click **IBM Cognos services**.

Set these properties to enable or disable individual services. IBM Cognos services are covered in more detail in the modules titled *Identify IBM Cognos BI Architecture* and *Administer the IBM Cognos BI Server Environment*.

5. Click **IBM Cognos**.

Set these properties to configure settings for the default servlet container, which for IBM Cognos BI is the Websphere Liberty Profile. For example, the Maximum memory for Websphere Liberty Profile in MB sets the amount of memory used by the Java Virtual Machine and is dependent on available memory. Servlets used by IBM Cognos BI are covered in more detail in the module titled *Identify IBM Cognos BI Architecture*.

6. Click **Portal Services**.

Set these properties to allow users the ability to navigate, search, and view IBM Cognos reports in other portals. Other users can view IBM Cognos information without needing to know how to use IBM Cognos products. Portal Services is installed automatically with IBM Cognos components, and includes the deployment files for:

- SAP Enterprise Portal (SAP EP)
- IBM WebSphere Portal
- Oracle WebCenter Interaction Portal
- SharePoint Portal

Portal Services configuration is not covered elsewhere in the course. For more information see *Chapter 10 Configuring Portal Services from the IBM Cognos Business Intelligence Version 10.2.2 Installation and Configuration Guide.*

7. Under Security > Authentication, click Cognos, and then in the Cognos - Namespace - Resource Properties pane, click Allow anonymous access.

Set this property to enable or disable anonymous access when logging on to IBM Cognos. Disabling anonymous access forces users to log on to a configured authentication namespace (see the Authentication node) when they attempt to access IBM Cognos BI. Enabling anonymous access does not force users to log on and authentication is obtained through a pre-defined account, which includes all users.

8. Under Security, click IBM Cognos Application Firewall.

Set these properties to facilitate prevention of penetration vulnerabilities. IBM Cognos Application Firewall is covered in more detail in the module titled *Identify IBM Cognos BI Architecture*.

9. Under **Data Access** > **Content Manager**, click **Content Store**.

Set these properties to facilitate communication to the external database that is used to store IBM Cognos BI application content and security information.

10. Under **Data Access**, click **Notification**.

Use these properties to configure a mail server and account from which all notifications are sent. The Notification component requires access to a database to store Notification content. By default, the content store database is used, but you can also configure a connection to a separate database. Notification configuration is covered in more detail in the module titled *Identify IBM Cognos BI Architecture*.

Task 2. Explore additional configuration tasks.

- 1. From the **File** menu, click **Export As**.
- 2. Click **Yes** to export decrypted content.

This lets you export all of the configuration data from IBM Cognos Configuration. This may be helpful in a distributed environment when you need to replicate the environment on multiple computers. By default, all configuration data is stored in the cogstartup.xml file, which is located at <IBM Cognos BI install drive>:\Program Files\IBM\cognos\c10_64\configuration (for a 64 bit installation).

- 3. Click Cancel.
- 4. Click the **Actions** menu.

You can Start, Stop, and Restart the IBM Cognos service. Note: any configuration changes made in IBM Cognos Configuration do not take effect until the IBM Cognos service is started or restarted.

5. Click **Edit the Global Configuration**.

Set these properties for:

- Product and Content Locales
- Product and Content Locale Mappings
- Currencies
- Fonts
- General properties, for example the Archive Location File System Root property sets an existing file system location for the archiving of IBM Cognos content.

Note: global configuration data is stored in the coglocale.xml file, also located at <IBM Cognos BI install drive>:\Program Files\IBM\ cognos\c10_64\configuration.

6. Click **Cancel**, and then from the **Actions** menu, click **Build Application Files**.

This lets you build a set of IBM Cognos BI application files that can be used to deploy the application to a 3rd party application server, such as IBM Websphere. 3rd party application server configuration is not covered elsewhere in the course. For more information see *Chapter 14 Deploy IBM Cognos to another application server from the IBM Cognos Business Intelligence Version 10.2.2 Installation and Configuration Guide.*

7. Click **Cancel**, click **Yes**, and then close **IBM Cognos Configuration**.

Results:

To become familiar with IBM Cognos BI, you navigated through IBM Cognos Configuration. You identified some of the configuration tasks that can be performed to set the initial startup properties for the IBM Cognos BI environment.

IRM

Summary

- At the end of this module, you should be able to identify and explain:
 - the IBM Cognos BI enterprise components
 - the role of the Administrator in relation to the IBM Cognos BI administration workflow process
 - the role of IBM Cognos Administration and IBM Cognos Configuration

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Identify IBM Cognos BI Architecture

IBM Cognos BI 10.2.2



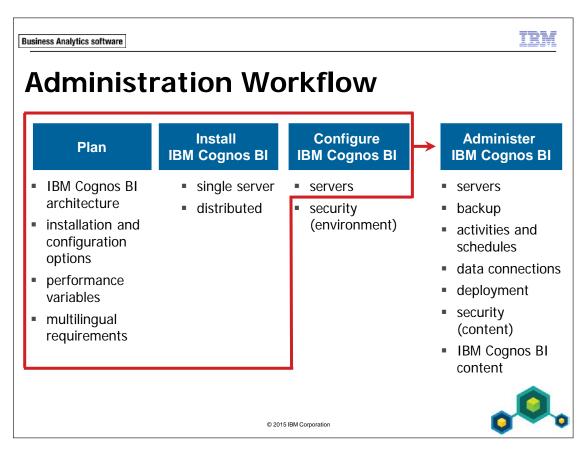
Business Analytics software



Objectives

- At the end of this module, you should be able to identify and explain:
 - the features of the IBM Cognos BI architecture
 - the three architectural tiers
 - IBM Cognos BI servlets and services
 - the default servlet container and alternatives to its use
 - an example of IBM Cognos BI request processing
 - installation options
 - load balancing mechanisms
 - configuration options
 - the IBM Cognos Application Firewall

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This module provides you with an understanding of the IBM Cognos BI sever components and how they work together to process requests. You will identify different installation and configuration options for IBM Cognos BI server components.

The outline in the slide indicates the tasks that will be discussed and/or performed in this module.



Identify Features of the Architecture

- Features of the IBM Cognos BI architecture include:
 - zero footprint Web administration
 - a common dispatcher
 - scalability
 - support for leading RDBMS for content management
 - integration with Web farms
 - platform independence
 - openness and extensibility
 - support for multiple languages
 - 32 bit and 64 bit components



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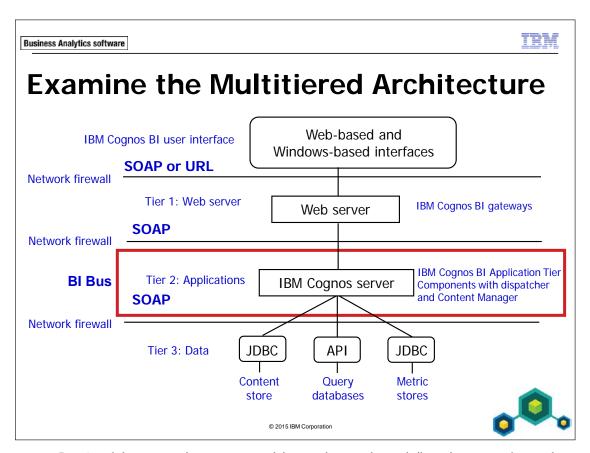
IBM Cognos BI components share a single, fully distributable architecture. IBM Cognos BI provides high scalability, robustness, and ease of integration with your infrastructure.

The IBM Cognos BI architecture provides:

- no client install required to perform day-to-day administration of the application
- central dispatcher awareness through Content Manager, and dynamic load balancing
- scalability, up to larger servers or out by adding more processing capacity
- support of IBM DB2, Oracle, MICROSOFT SQL, Sybase for content management
- integration with Web farms and support for multiple Web server types, such as, IIS, Apache
- platform independence, including support on Windows, UNIX, Linux, and IBM System Z
- extensibility through a documented API that uses industry standard, Web services technologies (SOAP, XML, WSDL, JAVA) for application integration (portals, browsers, applications, application servers); the XML report spec is also provided allowing for vast customization.
- the IBM Cognos BI user interface in English, French, German, Japanese, Italian, Dutch, Swedish, Finnish, Spanish, and Simplified Chinese
- 32 bit and 64 bit components, which must be installed in separate directories

IBM Cognos BI was developed using the UNICODE encoding system to prevent corruption of data during the interchange, processing, and display of data in the written texts of the multiple languages of the world. This is a common issue with other encoding systems.

For more information see the supported software environments at http://www-01.ibm.com/support/docview.wss?uid=swg27014782.



IBM Cognos BI Architecture is separated into three tiers. The tiers are based on component function, and are typically separated by firewalls. IBM Cognos BI user interfaces sit above the tiers.

Communication between components is SOAP on HTTP protocol.

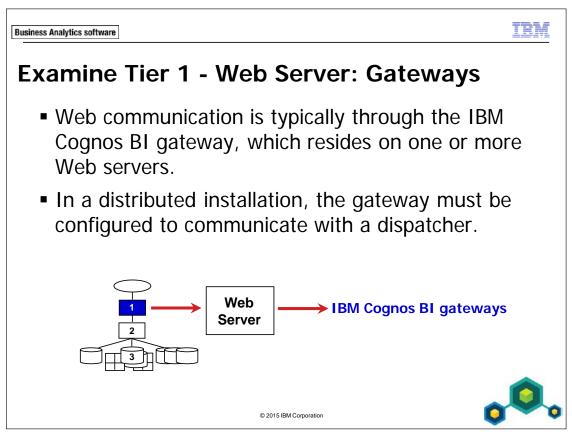
To communicate with IBM Cognos BI, third-party applications can use either a URL (get or post) API or the SOAP (BI Bus) API.

IBM Cognos BI components communicate with each other, and with any 3rd party applications integrated with IBM Cognos BI, using the BI Bus. The BI Bus is an open, documented, Simple Object Access Protocol (SOAP) API that supports Web Services Definition Language (WSDL). SOAP is encoded in XML. SOAP is a lightweight XML-based messaging protocol used to encode the information in Web service request and response messages before sending them over a network. WSDL is an XML-formatted language used to describe a Web service's capabilities as collections of communication endpoints capable of exchanging messages.

As the dispatcher supports an HTTP protocol (as required by SOAP), there is no need for a Web server in the application tier. Applications using the SOAP API can interact with either the Web gateway or the dispatcher. The decision to use one or the other will be based on whether the application lives inside the Web server tier or the application tier.

For more information on communication between components, see the *IBM Cognos Business Intelligence Version 10.2.2 Architecture and Deployment Guide*, Chapter 3: Communications.

IBM Cognos BI user interface components are presented in the module Appendix A: Overview of IBM Cognos BI in this course.



The function of the IBM Cognos BI gateway is to pass requests from the browser to the IBM Cognos dispatcher for processing.

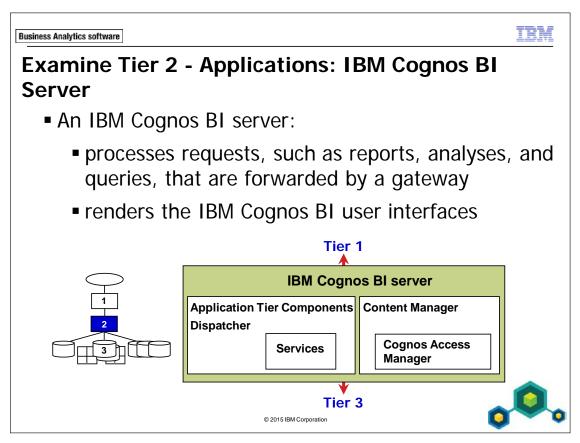
For failover protection, you can configure more than one dispatcher for a gateway computer.

Web communication can also occur directly with an IBM Cognos BI dispatcher although this option is less common than using gateways.

IBM Cognos BI supports many Web servers including IBM HTTP Server, Microsoft IIS, Apache, and Sun One Web server software.

IBM Cognos BI supports several types of Web gateways, including CGI, ISAPI, apache_mod, and Servlet. For more information on IBM Cognos BI gateways see the IBM Cognos Business Intelligence Version 10.2.2 Architecture and Deployment Guide, Chapter 2: The Multitiered Architecture.

You can configure IBM Cognos BI gateways to know the location of multiple dispatchers in order of most to least preferred. If the primary dispatcher fails, requests are routed to the next dispatcher on the list. The primary dispatcher status is monitored by the gateway, and requests are routed back to this component when it returns to service. The gateway components scan their associated dispatchers to ensure that requests are routed to dispatchers that are in service and responding correctly. You can set the frequency with which these scans are executed. See the *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 7: Server Administration, in the section titled Dispatchers and Services, sub-section titled Failover for Multiple Dispatchers, under the heading Set the Frequency of Dispatcher Status Scans.



The second tier of the IBM Cognos BI architecture is the applications tier, which hosts the IBM Cognos BI server and its associated services.

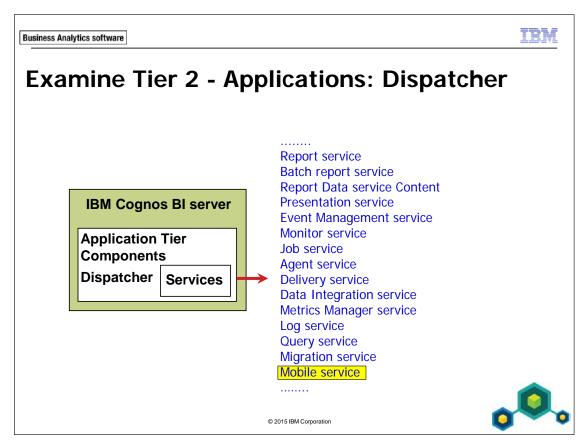
Each IBM Cognos BI server installation includes:

- Application Tier Components include the dispatcher and the local services managed by the dispatcher.
- Content Manager stores application data, including report specifications, report output, security, and configuration data.

There can be multiple instances of the IBM Cognos server distributed across multiple computers.

Application Tier Components can be installed for reporting, analysis, event management, and mobile capabilities, as part of the IBM Cognos BI server installation. Other capabilities, such as metrics management capabilities are available through separate installations.

An additional service that is not exposed through the IBM Cognos BI user interface is the Bootstrap service. This service starts, monitors, and stops the dispatcher. It is a native C++ executable that runs as an NT service under Windows, and as a daemon under UNIX. If the dispatcher fails, the bootstrap service restarts it.



The dispatcher is a Java servlet that starts all IBM Cognos services configured and enabled on a computer, and routes requests from the gateway to local services for execution.

If a dispatcher fails or is unavailable, it can route requests to other dispatchers because all dispatchers are aware of one another.

Which dispatcher receives the routed request depends on the load-balancing strategy you are employing. This could include internal load-balancing mechanisms offered by IBM Cognos BI or an external load-balancing technique, such as a router.

The dispatcher is a multithreaded application that uses one or more threads per request.

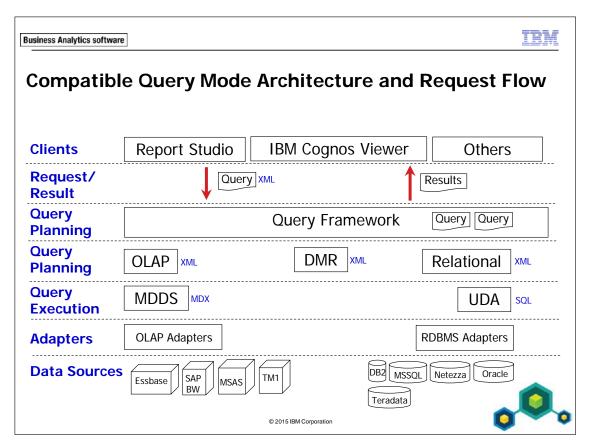
Dispatchers are aware, through registration with Content Manager, when the dispatcher starts. Configuration changes are routinely communicated to all running dispatchers.

The dispatcher includes Cognos Application Firewall to provide security for IBM Cognos BI.

Load-balancing mechanisms are discussed later in this module.

For more information about services managed by the dispatcher, refer to the *IBM* Cognos Business Intelligence Version 10.2.2 Architecture and Deployment Guide, Chapter 2: The Multitiered Architecture, in the section Tier 2. Applications: IBM Cognos BI Servers.

The services that are available to the dispatcher depend on what components have been installed. For example, the Metrics Manager service will only be available if the Metrics Server application tier components are installed.

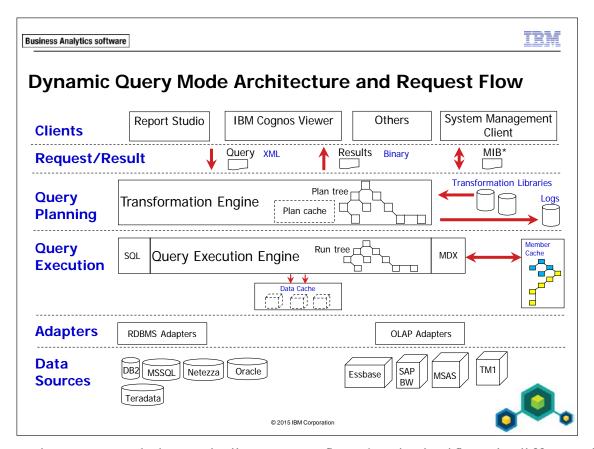


The architecture of both the compatible query mode and the dynamic query mode consists of several layers.

In the compatible query mode, when a report request is received from one of the authoring studios, the report viewer, or from any other source like the IBM Cognos Software Development Kit (SDK), it will first be processed by the Query Planning layer.

The upper part of the Query Planning layer is the Query Framework (QFW). QFW will inspect the report request and determine if it contains one or more queries, and where the queries should be processed. OLAP style queries will go to the OLAP query planner; relational style queries will go to the relational query planner; dimensionally modeled relational (DMR) style queries go to the DMR query planner.

Each query planner generates the appropriate query language and sends the request on to the respective query execution layer. For OLAP, the query planner generates an MDX (Multidimensional Expressions) query and sends it to the multidimensional data service (MDDS); for relational queries, it generates SQL and sends it to the universal data access (UDA) module. For DMR, if there is no cache, SQL queries are sent to the database to retrieve data results. A cube build request is then processed to create and load a temporary cube which is populated with the retrieved data. OLAP style queries are then generated and sent to be processed against the temporary cube. Then a new OLAP style query is generated and sent to be processed against that temporary cube. The lowest layer of the architecture represents the individual data source types and data sources that IBM Cognos BI supports. Queries processed through MDDS or UDA will be converted to a query language dialect that the data source understands and then sent to the data source using either a direct proprietary interface, or through generic interfaces like ODBC or XMLA.



The dynamic query mode has a similar request flow, but is significantly different from the compatible query mode. The Client layer at the top has a systems management client which interacts with the query mode to show metrics and statistics, and also to change configuration settings, such as logging for a running query.

There is only a single planning layer in this mode, the Transformation layer. This layer provides an environment for the application of query transformations, which are kept in separate libraries called transformation libraries. This keeps the planning logic separate from the planning layer. The transformation libraries provide query planning logic for all supported OLAP queries and also support all functionality that the query framework provides in the compatible query mode.

In the compatible query mode, the Query Execution layer supplies similar query execution capabilities to MDDS and UDA, but for the dynamic query mode, it is consolidated so that it can execute any query request, independent of the type of query or target data source, all within a single environment, which allows for much higher flexibility and query performance.

The data source adapter layer for DQM relational only supports JDBC as a data source for a fixed set of data sources.



Examine DQM and the QueryService

- Dynamic Query Mode (DQM) is an enhanced Java based query mode which offers the following key capabilities:
 - query optimizations
 - performance improvement through balanced local query processing facilities
 - security-aware caching
 - ability to take full advantage of a 64-bit environment
 - ease of maintenance with query visualization

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Dynamic Query Mode (DQM) is also known as QueryService. DQM is coded in Java and runs within its own JVM. By default this JVM is configured to start with 1GB of memory and displays as a separate Java process on the operating system. 1GB is less than what is typically required when DQM is used to house dynamic cubes. Although there can be many QueryService services in a multiple server installation, you can only have one QueryService per IBM Cognos 10 dispatcher.

Dynamic cubes are also configured and administered within the QueryService in IBM Cognos Administration.

For more information about DQM, refer to the Redbook titled *IBM Cognos Dynamic Query Cookbook* available on at http://publib-b.boulder.ibm.com/abstracts/sg248121.html? for more information about DQM.

Query Optimizations: The optimization of the queries is achieved through the advanced application of strict query planning rules. These planning rules incorporate the next generation planning approach which is more streamlined and produces higher quality and faster-to-execute queries. The query planning process is also in itself optimized to make better use of metadata and expression level caches, including plan caches which provide higher application throughput.

Performance Improvement through Balanced Local Processing Facilities: The Dynamic Query Mode makes intelligent, rules-based and system load-based decisions on which parts of a query should be executed locally in the application server versus remotely in the database server. This ensures that users have the highest functionality possible, regardless of whether the underlying data source supports the business intelligence report intent. In addition, the Dynamic Query Mode contains a fine grained metadata and cell data cache, which is trickle fed, and a higher cache hit ratio than was previously possible. As well, the queries which are sent to remote data sources are further optimised by the execution layer based on cache content and advanced null suppression logic.

Security-Aware Caching: The caching logic available in Dynamic Query Mode is able, when connected to secured metadata sources, to determine the secured access capabilities of each user as they access the data source. This information is then used to optimize the memory usage and internal representation of that user's secured view of the data source metadata. Security can also be setup so that entire OLAP dimensions can be shared providing cache reuse and performance gains.

Ability to take Full Advantage of a 64-bit Environment: The Dynamic Query Mode is able to fully take advantage of a 64-bit environment. When an IBM Cognos 10 64-bit install is deployed to a 64-bit Java Virtual Machine (JVM), the Dynamic Query Mode is substantiated in its own 64-bit JVM. This allows DQM to leverage the 64-bit address space for query processing, metadata caching and data caching. The 64-bit DQM also has the ability to leverage the 64-bit data source client libraries when performing non-JDBC Type 4 connections.

Ease of Maintenance with Query Visualization through IBM Cognos Dynamic Query Analyzer: Query visualization allows system administrators to analyse the queries generated by the Dynamic Query mode and visually see how they will be processed. These visualizations include cost based information derived from the query execution. This information permits the rapid identification of model and query optimizations which could be applied in order to achieve better performance. The visualizations are consumed as a log file by the stand-alone IBM Cognos Query Analyzer application. DQA also supports the Aggregate Advisor for dynamic cubes, which is used to suggest in-database and in-memory aggregates to boost performance. It can either do so using a cube model, or better, workload log loads produced from the running of reports and analyses.

The dynamic query mode is recommended for new applications of IBM Cognos Business Intelligence. You can choose to enable the dynamic query mode only for new Framework Manager projects. Before you begin to migrate existing applications to the dynamic query mode, you must plan carefully and prepare accordingly. For more information, refer to the IBM Cognos Business Intelligence Version 10.2.2 Dynamic Query Guide, and the IBM Cognos 10 Dynamic Query Cookbook in the Proven Practices section of the IBM Cognos Customer Center

(http://www.ibm.com/software/data/cognos/customercenter/).



DQM for Dimensionally Modeled Relational (DMR) Packages

- DQM provides users with a true OLAP experience over relational data
- improved ad-hoc analysis capabilities through
 - default member sorting
 - improved suppression
 - aggregate limitations removed
 - nulls as zeros in arithmetic operations
 - FIRST / LAST aggregate rules respect presence of NULL values

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DQM applies advanced OLAP caching techniques to enhance performance of dimensionally modeled relational packages. The use of caching reduces the frequency of database queries, thus minimizing the database server workload required to service the IBM Cognos application.

With OLAP over Relational, DQM specifies a natural order to all result sets. If no specific ordering is specified in the Framework Manager model, the members are sorted by default in ascending order by the member caption. If there are duplicate captions, then those are sorted by business key.

With DQM, suppression is pushed to the OLAP provider. Queries which are sent to remote data sources are optimized by the execution layer based on cache content and advanced null suppression logic. Suppressing rows and columns that contain only null values makes a report easier to read. For example, a product that has no sales for a given quarter may result in a very large report with thousands of cells that contain no data. The time required to evaluate a table to determine which rows and columns contain only null values is mainly determined by the number of cells in the table. Other factors such as the nesting levels on the axes and the use of complex calculated columns might also affect the time.

OLAP over Relational provides the ability to perform complex aggregate computations, and lifts previous aggregation limits which resulted in '--' or 'unknown' being displayed, such as when using Count Distinct as a summary.

Regarding First and Last aggregation rules to respect empty cells, previously, if you asked for the sales from the last period of a quarter and there were no sales for a product in that period, there would be no result to return. Instead of reporting zero, for the period in question, the sales for the last period in which there were sales would have been reported. With DQM, the query will return a zero for the specified period.



Dynamic Query Mode Connectivity

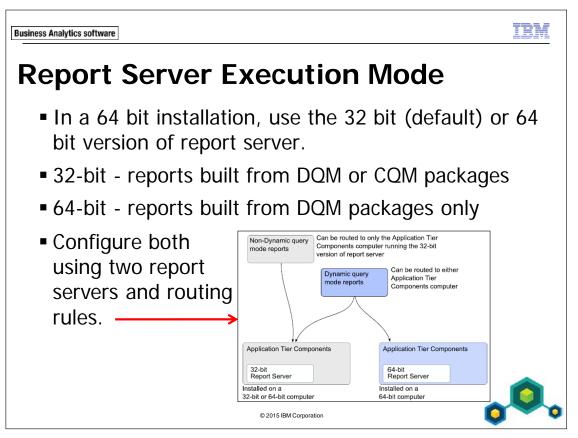
- Supports connectivity to supported OLAP and relational data sources.
- OLAP connectivity is done through the native client libraries of the data source vendor.
- Supported relational data sources can remain in compatible query mode or further modeled dimensionally to provide an OLAP-style experience as dynamic query mode.
- Relational connectivity is done through JDBC.

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OLAP data source connections through DQM require a native client install. These native client installs can be either 32-bit or 64-bit as long as they match the bit depth of the DQM. For instance a 32-bit DQM requires a 32-bit SAP BW client library install while a 64-bit DQM would require a 64-bit SAP BW library, if that was the vendor database used.

Relational data source connectivity is done as a JDBC Type 4 connection with the exception of Oracle connections, which can be established as either Type 2 or Type 4 JDBC connections. Type 4 JDBC connections do not require the install of any native client libraries. Connectivity is established through the vendor JDBC driver which is copied to the c10_locationp2pd\WEB-INF\lib directory. The Oracle Type 2 JDBC connection also requires the Oracle native library install in conjunction with the Oracle JDBC driver. Supported OLAP data sources for DQM connectivity include: IBM Cognos TM1, SAP BW, Microsoft SSAS (SQL Server Analysis Services), Oracle Essbase.



Using the 64-bit version of the report server allows more addressable memory for rendering report outputs. For example, out-of-memory conditions during the rendering stage of running a report can be avoided. It is only large report outputs that require the 64-bit version of the report server component, for example PDF reports with more than 1 thousand pages.

You must use the 32-bit version of the report server for packages that do not use dynamic query mode. For example, if your package is based on IBM Cognos PowerCubes, you must use the 32-bit version of the report server.

If you have multiple Application Tier Components instances in your environment, you can set one instance to use the 32-bit version of the report server. You can then use routing rules so that report requests for non-dynamic query mode packages are routed to the instance that is running the 32-bit version of the report server.

To enable the 64-bit version, you must install the 64-bit version of the Application Tier Components on a 64-bit computer. If you install the 32-bit version of the Application Tier Components or are using a 32-bit computer, do not enable the 64-bit report server. Selecting which version you use is done using IBM Cognos Configuration.



Describe IBM Cognos Dynamic Cubes

- designed for interactive analytics over large data warehouses
- dimensional view of a star or snowflake schema based on a single fact table; defines relationships between dimensions and measures
- a dynamic cube can be deployed as an OLAP data source to Content Manager

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Dynamic cubes have managed caches, support for dimensional calculated members/measures, relative time, virtual cubes, and can handle large volumes of data.

Dynamic cubes introduces a performance layer in the Cognos query stack to allow low-latency, high-performance OLAP analytics over large relational data warehouses. By using the power and scale of a relational database, dynamic cubes can provide OLAP analytics over terabytes of warehouse data.

Dynamic cubes are created in IBM Cognos Cube Designer, and are published as data sources in Content Manager. Dynamic cubes are listed as data sources in IBM Cognos Administration, and are configured and administered within the QueryService in IBM Cognos Administration.

To work with a deployed dynamic cube in the IBM Cognos studios, you must also publish a package for it, configure the cube as a data source, and start the cube.

Dynamic Cube Caches

I result set cache
Expression cache
data cache
aggregate cache
member cache

When building dynamic cubes, the database administrator and modeler can use aggregate tables to accelerate performance. To end users, this will be transparent.

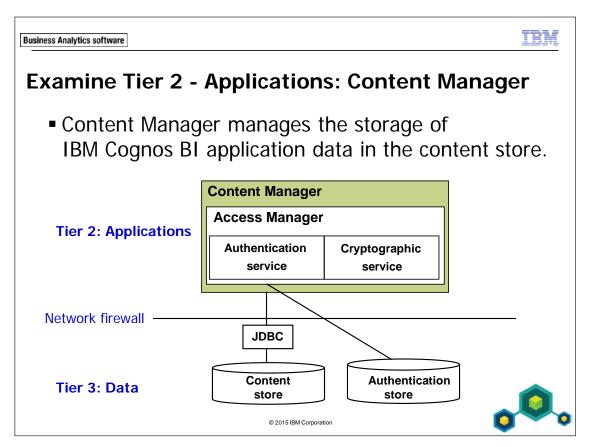
A dynamic cube resides on one dispatcher only (in the memory on one server); if you want to distribute a dynamic cube, you need to replicate the cube (create an instance of a dynamic cube on a dispatcher). Note that because a dynamic cube resides on one Dispatcher (and report server) only, routing rules have to be used to route queries appropriately; this is explicitly required in a multi-server environment.

Conceptually, once a dynamic cube is started it caches query results; by default it does not go to the source dynamic cube for changes. When a new query is issued, a server will respond from the cache with the assumption that everything is up to date.

However, with a virtual cube (which is two or more merged cubes), you can configure one of the merged cubes to cache data as long as possible, while another merged cube in the virtual cube can be configured to not use cache. Administrators should be aware that they will likely have virtual cubes in the system, and they may be directly configured to run against source data every single time, depending on the design of the virtual cube.

If a virtual cube contains a source dynamic cube deployed as a data source to the content store, the data source must be started before you can deploy the virtual cube.

For more information on dynamic cube caches and virtual cubes, refer to *IBM Cognos Dynamic Cubes Version 10.2.2 User Guide*.



The Content Manager service is a Java servlet that stores and retrieves IBM Cognos BI application data in a content store database.

Multiple Content Manager components can be installed to ensure failover.

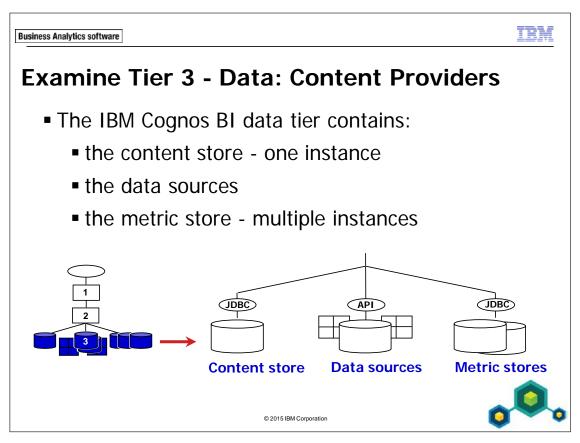
Content Manager contains Access Manager (AM), which is the security component used to implement authentication, authorization, and encryption.

Application data that the Content Manager service manages includes security, configuration data, models, metric packages, agents, personal user information, language information, report specifications, and report output.

Content Manager uses a JDBC API to access the content store. The JDBC driver for Microsoft SQL Server is included with IBM Cognos BI. The JDBC drivers for Oracle and DB2 are available from their vendors. You will use DB2 drivers in the upcoming workshop.

Content Manager performs general functions, such as add, query, update, delete, move, and copy. It performs content store management functions, such as export and import. It is needed to publish models, retrieve or store report specifications, manage scheduling information, and manage the Cognos namespace. Content Manager stores information in a content store database, which is typically located in the data tier of the architecture. For maximum security you can choose to install and configure Content Manager in the data tier. More information on installing multiple instances of Content Manager is included on the slide titled Install a Standby Content Manager in this module.

For information on the role of Access Manager within Content Manager, refer to the *IBM Cognos Business Intelligence Version 10.2.2 Architecture and Deployment Guide*, Chapter 2: The Multitiered Architecture.



The third tier of the IBM Cognos BI architecture is the data tier, which hosts:

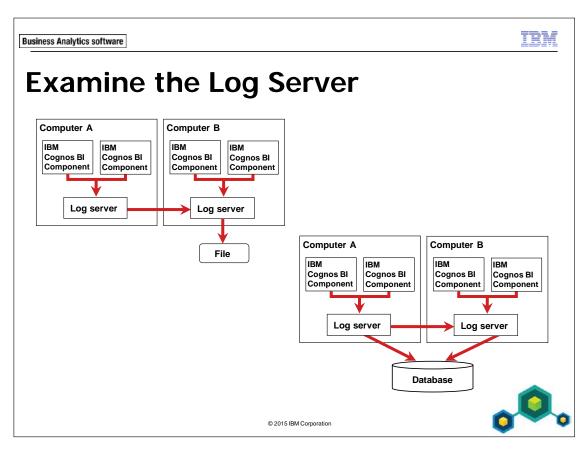
- Content store: relational database that stores IBM Cognos BI application data
- Data sources: relational databases, dimensional cubes, files, or other physical data stores that can be accessed through IBM Cognos BI
- Metric store: relational database that stores content for metric packages and Metric Studio settings, such as user preferences

Supported database vendors for the content store include IBM DB2, Oracle, Microsoft SQL Server, and Sybase.

For IBM Cognos BI, the only service that accesses the query database (also known as the reporting database) is the reporting engine that runs reports. The reporting engine is installed with Application Tier Components. To support queries, you must install the database clients for your data sources.

To access additional data sources, you can use IBM Cognos Virtual View Manager, which provides heterogeneous query access by retrieving data from different data sources (LDAP, JDBC, Open XML and WSDL) using a single connection. The data sources are managed by IBM Cognos Virtual View Manager, and the connections to it from IBM Cognos BI are made using an ODBC system DSN.

There can be more than one instance of the metric store. Each one can represent a separate scorecard application. For example, one metric store may contain content for a sales application and another metric store may contain content for a finance application. Supported database vendors for the metric store include IBM DB2, Oracle, and Microsoft SQL Server.



As part of the installation, a log server is installed and log files are written to the c10_location\logs folder on every IBM Cognos BI computer that contains Content Manager or Application Tier Components. Because the log server uses a different port from the other IBM Cognos BI components, it continues to process events even if other services on the local computer, such as the dispatcher, are disabled.

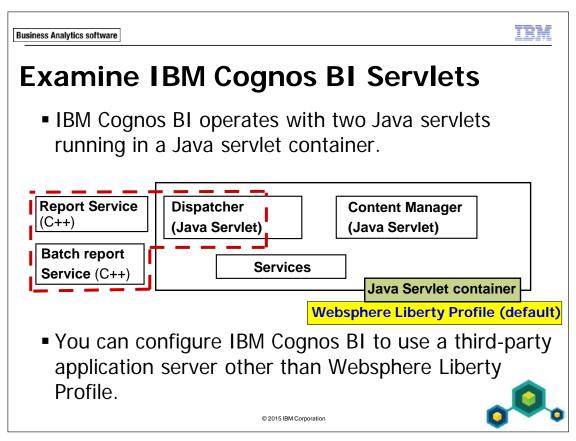
Use log messages to investigate and diagnose the behavior of the IBM Cognos BI system. Log messages are generated by the various components, filtered by level, and directed to one or more destinations by the log server. Determine the logging configuration that is suitable for your environment.

All the IBM Cognos BI services send events to the log server, which directs messages to a log file. After an error or problem occurs, you can review the log messages to obtain clues as to what happened. In addition to error messages, log messages provide the status of components and a high-level view of important events, such as successful completions and fatal errors.

You setup Audit logging exclusively in IBM Cognos Configuration. To perform trace and/or performance logging, you must add appenders to the Ipfclientconfig.xml file, which is found at c10_location\configuration. This file can be edited so that the output for trace or performance log messages can be a log file, remote server, or database.

The log server includes a failover and recovery mechanism. When a remote log server is not available, log information is directed to the local computer. When the remote log server is available again, an automatic recovery process moves all log information to the remote log server and deletes the local log files.

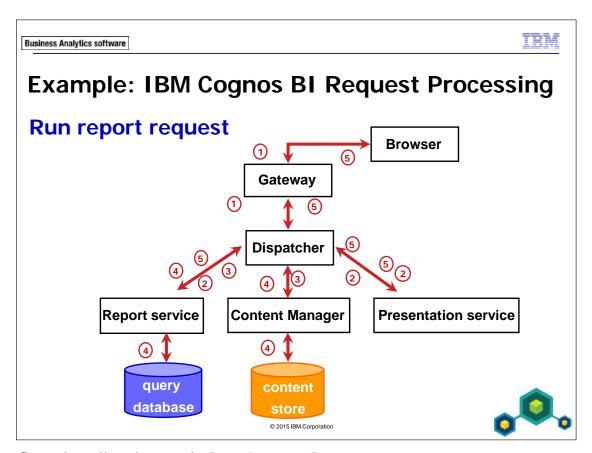
If you are using a database to capture audit log messages, performance may be improved if you route all audit log messages to a single log server that sends messages to the database. If a single log server is not used, the local log server on each IBM Cognos BI computer would require its own connection to the database.



The Content Manager servlet and dispatcher servlet run within the Java servlet container configured for IBM Cognos BI. By default, IBM Cognos BI installs and uses IBM Websphere Liberty Profile as the default servlet container. You can also configure IBM Cognos BI to use another Java application server, such as JBoss Application Server, Oracle/BEA WebLogic Server, or Websphere Application Server. For more information on supported third-party application servers, refer to the supported environments available on http://www-01.ibm.com/support/docview.wss?uid=swg27014782#sw_env.

The report and batch report services are C++ applications running as child processes of the dispatcher, but do not run within the servlet container. All other services are Java based and run within the servlet container.

Content Manager runs in the same Java process as the dispatcher. Both components are multithreaded, and the threads are isolated from each other. If a failure occurs, it affects only a single request thread. If that thread is lost, no other threads are affected, and the failure does not affect the service as a whole.



Request flow describes internal IBM Cognos BI responses to user requests. In general, browser requests go through the gateway and are sent to a dispatcher.

There are hundreds of types of requests in IBM Cognos BI, including viewing a report or analysis, running a report or analysis, running a scheduled task, or opening an IBM Cognos Connection folder.

The steps in the slide are explained on the next page.

- 1. The gateway receives the HTTP request from the user's browser, and passes it to the dispatcher.
- 2. The dispatcher receives the request to run a report, sends it to the presentation service, which sends the report execution request back through the dispatcher to the report service for execution.
- 3. The report service receives the request from the dispatcher, and then communicates with Content Manager (again through the dispatcher) to get report specifications, that determine report content and layout to execute the report.
- 4. Content Manager(s) communicate with the content store to retrieve report specifications, and then passes those specs back to the report service (via the dispatcher), where it is executed by querying the database based on the report specifications, and retrieves the data, and formats the output into the requested style.
- 5. The report service generates the HTML page and sends a return message (via the dispatcher) to the presentation service, and then the presentation service renders the report in the Cognos Viewer UI, and sends the completed HTML page (via the dispatcher) for return through the gateway to the user's browser.

TRN

Performance Planning

- System performance:
 - measured by effectiveness in completing tasks
 - a function of processing capacity and workload
- Performance variables to consider:
 - capacity
 - scalability
 - availability

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To ensure that IBM Cognos BI performs optimally, plan your IBM Cognos BI implementation with performance in mind. Variables that affect performance include:

- capacity: decide how much hardware you need to run IBM Cognos BI, given your expected processing workload
- scalability: decide how to install and configure IBM Cognos BI components to take advantage of the ability of IBM Cognos BI to scale to meet increasing demand
- availability: decide how to implement IBM Cognos BI to take advantage of its ability to provide failover support

To determine capacity, gather information about the following:

- IBM Cognos BI users: numbers and when you expect them to use IBM Cognos BI
- application complexity: assess the complexity of required processing (large queries, PDF, etc.)
- infrastructure: environment/infrastructure characteristics (network, Web servers, application servers, content store)

Scalable IBM Cognos BI components: gateway, IBM Cognos BI server, services IBM Cognos BI components designed for failover: gateway, IBM Cognos BI server, content manager

For more information refer to the *IBM Cognos Business Intelligence Version 10.2.2* Architecture and Deployment Guide, Chapter 7: Performance Planning.



Installation Planning

- Examine installation options.
 - Install all server components on one computer.
 - Perform a distributed installation; multiple options are available.
 - Install modeling components with, or separately from, the server components.
 - Separate the content store from other IBM Cognos BI components.
 - 32 bit vs 64 bit components

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To ensure that IBM Cognos BI performs optimally, plan your IBM Cognos BI implementation with installation in mind.

When you install IBM Cognos BI, you can determine the location of each of the three architectural layers. You can install the components using any of the above scenarios.

Install all IBM Cognos BI components on the same computer, or perform a distributed installation based on your environment. For the latter, multiple options are available. Some considerations for a distributed installation include capacity and expected performance, hardware and network availability, firewalls (security), and failover.

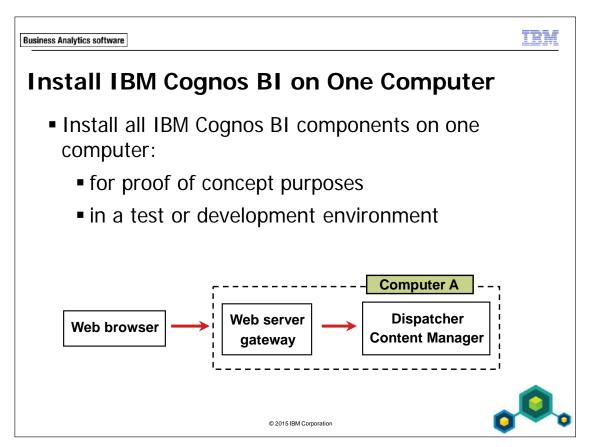
In addition to installing the IBM Cognos BI server components, you must install Framework Manager, the metadata modeling application. You can install Framework Manager on a computer that is separate from the server components. It must be installed on a Windows platform.

You can choose to install Metric Designer, an optional metadata modeling application for scorecarding. It must be installed on a Windows platform.

You must also create and configure a content store for IBM Cognos BI data. The content store database can be on a separate computer or on the same computer as other IBM Cognos BI components.

After installing the IBM Cognos BI components, you must configure them so that they can communicate with each other.

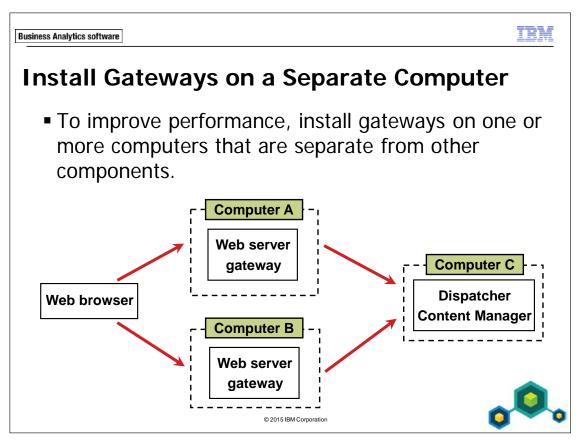
Whether you are installing all server components together on a single server or on multiple servers, the 32-bit and 64-bit components must be in separate directories.



Install IBM Cognos BI components on a single computer if the user load is expected to be small.

Because the IBM Cognos BI gateway must be located with the Web server, the single computer must also be running a Web server. If your Web server is on UNIX, you must install Framework Manager and optionally Metric Designer on a separate computer that runs under Windows.

The diagram shows all IBM Cognos BI components, except Framework Manager and Metric Designer, installed on one computer. Assume that content store, Framework Manager, and Metric Designer are located on separate computers.



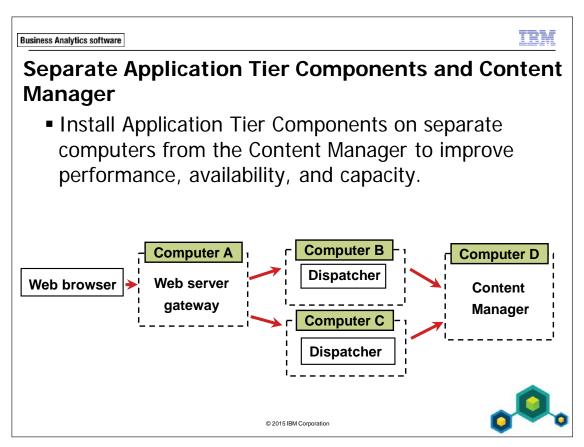
You can install the gateway component on one or more computers, each hosting Web servers, and install the remaining IBM Cognos BI components on other computers.

In the slide, two Web servers, running on separate computers, each have a gateway installed. Incoming requests are passed to either gateway and forwarded to a separate report server computer. If request information is not saved, the result is returned from the Application Tier Components. If request information is saved, it is saved in Content Manager. In this scenario, there is no load balancing mechanism at the level of the gateway. To process requests, each Web server/gateway would have to use different URLs, thus eliminating the advantage of having multiple instances of the gateway and achieving load balancing. Load balancing at the level of the Web server/gateway will be discussed in an upcoming slide.

If you have a Web farm, you may want to install IBM Cognos BI gateway on each Web server. Using multiple Web servers to manage incoming requests provides a better level of service.

If you install only the IBM Cognos BI gateway component on the same computer as the Web server, your Web server manages the core Web services and does not process user requests. This separation of processing may be required if for security purposes, you have a firewall between the Web server and your IBM Cognos BI server.

Separating the gateways also improves security in addition to improving performance. This is the more likely reason for customers to split these for relatively small installations. Offloading the Web Server only makes a minor percentage reduction in server load.



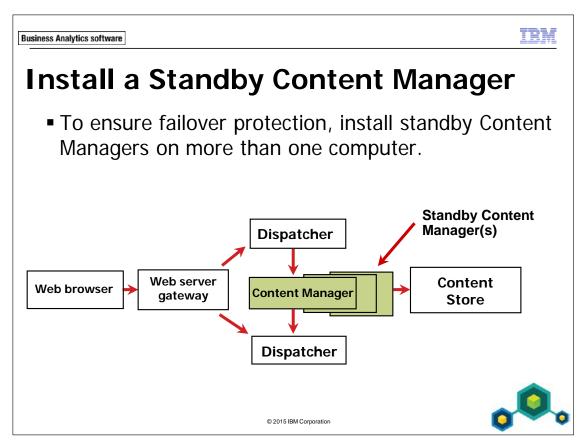
You can install multiple instances of the application tier components on separate computers.

You can install Content Manager on a different computer from the other IBM Cognos BI server components.

Installing IBM Cognos BI server components on different computers can improve performance (faster response due to shorter queues), availability (achieve failover), and capacity (add more users).

There are two installation packages available for the Application Tier Components. One is for Metric Studio called Application Tier Components for metrics management and one is for the remainder of IBM Cognos BI called Application Tier Components for reporting, analysis, event management, and mobile. If you are installing to a distributed installation, you would typically install Application Tier Components for metrics management on the same machine as you would install Application Tier Components for reporting, analysis, event management, and mobile.

If you are separating Application Tier Components from the Content Manager Component, you must configure a database resource for the Notification service on machines hosting Application Tier Components.



The distributed installation can include more than one Content Manager computer where one is active and others are on standby. If the active Content Manager computer is not available because of a software or hardware failure, a standby Content Manager computer becomes active and requests are directed to it.

A standby Content Manager can also be manually activated, or if it is currently in standby mode, you can specify it as the default active service at startup.

It is recommended that you use the computer with the highest processor speed for the default active Content Manager.

In a distributed installation, at least one of the computers where you installed Content Manager must be configured, running and accessible before other Content Manager computers are configured.

The first Content Manager computer to be started becomes the default active Content Manager. This locks the content store, denies access to other Content Managers, and causes them to go in stand-by mode. When the active Content Manager fails, unsaved session data is lost. When another Content Manager becomes active, users may be prompted to log on.

For more information on configuring Content Manager computers, refer to the *IBM Cognos Business Intelligence Version 10.2.2 Architecture and Deployment Guide*, Chapter 7: Performance Planning.

Install Modeling Tools

Considerations:

configuring communication to the IBM Cognos server: gateway or dispatcher

- firewalls
- size of models
- Web server

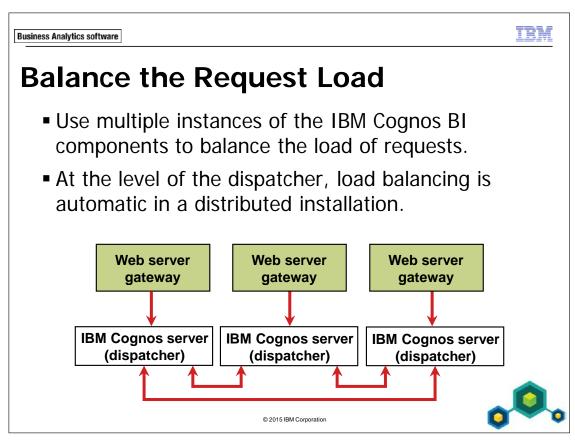
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No matter where you install the IBM Cognos BI server components, you must also install and configure the IBM Cognos BI modeling tools.

Decide where to install the modeling tools and how you will configure them based on your environment and your reporting requirements.

For more information on how to install and configure modeling tools refer to the *IBM Cognos Business Intelligence Version 10.2.2 Architecture and Deployment Guide*, Chapter 6: Installation Options.

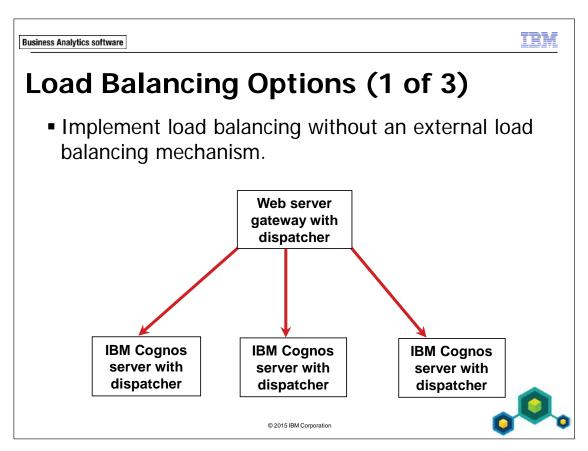


In the IBM Cognos BI architecture, load balancing can occur at the level of the gateway and/or at the level of the report server if multiple instances of each component are installed.

Load balancing gateways: If you have a Web farm, an IBM Cognos BI gateway can be installed on each Web server. Using multiple Web servers to manage incoming requests provides a better level of service. In the configuration shown in the slide, where a load balancing mechanism is not shown, each gateway will be accessed via its own URL and there will be no load balancing at this level. To increase scalability, you can also run your Web server on a larger computer.

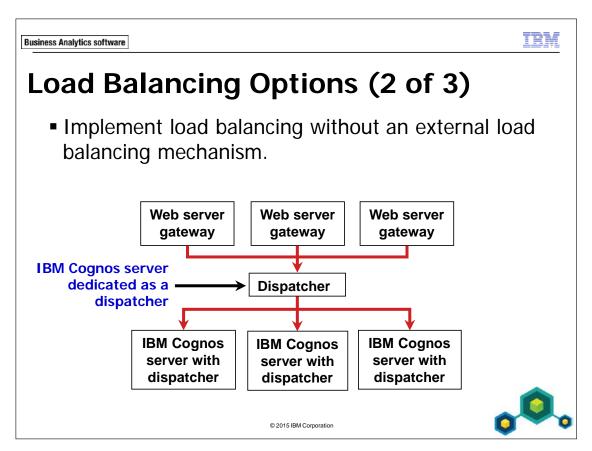
Load balancing dispatchers: Use one or more groups of dispatchers to balance the load of requests. At the level of the dispatcher, load balancing is automatic in a distributed install. If there is more than one instance of a report service, the dispatcher will distribute requests to all enabled instances of the service that are registered in Content Manager. Automatic load balancing may be appropriate when hardware resources are identical throughout a server topology. It may not be ideal in environments containing a mix of hardware resources with different capacity characteristics. In a hardware environment that contains servers with varying degrees of processing capacity, it is desirable to balance the processing load according the each server's capacity. Setting processing capacity will be discussed in the module titled Administer the IBM Cognos BI Server Environment.

For more information on setting processing capacity and load balancing refer to the *IBM Cognos Business Intelligence Version 10.2.2 Architecture and Deployment Guide*, Chapter 7: Performance Planning.



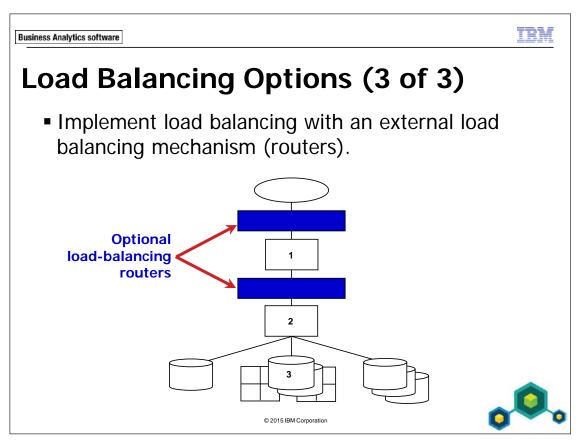
Because gateway servers often have lesser load than IBM Cognos BI servers, you may achieve better performance by configuring dispatchers together with the gateways.

This configuration ensures that the processing capacity of the IBM Cognos BI servers is directed toward serving report requests rather than load balancing requests.



You can also achieve load balancing by having gateways direct all traffic to an IBM Cognos server computer that is dedicated to dispatching.

This configuration also removes dispatching load from the IBM Cognos servers, but it requires separate dispatching computers.



In addition, IBM Cognos BI supports load-balancing routers or other network technologies that distribute requests across multiple Web or application servers, ensuring that each dispatcher is given the same workload.

You can use external load-balancing mechanisms in either or both of these locations:

- between the browser and Tier 1: Web Server
- between Tier 1: Web server and Tier 2: IBM Cognos server

Between the browser and Web server gateway: Requests from browsers are distributed evenly across available Web servers, balancing the request load among the servers. Because the IBM Cognos BI gateway runs on the Web server, this serves to distribute the load across the IBM Cognos BI servers as well, provided there are the same number of Web servers and IBM Cognos BI servers. In this case, browser requests will be sent to a single URL. The Web server/gateways are hidden within this URL.

Between the Web server/gateway and report server: Requests from Web servers are distributed evenly across the available IBM Cognos BI servers, balancing the request load among the servers.

To avoid conflicts with load balancing software or hardware, IBM Cognos BI provides a local preferred dispatch setting. This setting forces IBM Cognos BI to run a request on the server that initially received it if the required service is available locally. This setting is discussed in the module titled Administer the IBM Cognos BI Server Environment.



Examine Request Affinity

- Affinity: requests assigned to a specific server or load-balanced to another server
- IBM Cognos BI request affinity:
 - high
 - low
 - absolute
 - not configurable, but you can specify the number of connections that a dispatcher can open, based on the affinity type of the requests

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To ensure that requests are managed efficiently and load is balanced, IBM Cognos BI uses request affinity to route some requests. Affinity between request and server ensures that requests are routed to an appropriate computer for execution. The use of one or more load-balancing mechanisms does not disrupt request affinity processing.

TH W

Specify Advanced Dispatcher Routing

- Define routing rules so that report requests are processed by specific servers.
- Rules are defined and enforced based on which:
 - package is being accessed by the report
 - group or role that the user belongs to

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For report requests, you may want to have more control over which server will be responsible for processing them. You create routing rules that define conditions for determining which servers will process the requests. The routing rules you define are based on packages and/or group or role.

When you run a report that requires access to a given package, and a routing rule has been defined for the package, the report will be processed by the server defined in the routing rule.

When a report is run by a user who is a member of a given group or role, and a routing rule has been defined for the group or role, the report will be processed by the server defined in the routing rule.

All dynamic cube queries must have routing rules in place to ensure that they are directed to the correct server. To load-balance dynamic cube queries you must have two or more servers with dynamic cubes in a single server group. This is different than the method commonly used with non-dynamic cube queries.

TRM

Configure IBM Cognos BI

- For all installations, the following components must be configured:
 - Web server aliases
 - database connection properties for the content store
 - Web browsers

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When you install IBM Cognos BI components, the installation uses default configuration settings.

Perform additional configuration depending on your environment and reporting requirements. Perform additional configuration for:

- modifying default property settings
- distributed installations
- installing the modeling tools on a separate computer

To make the system functional, you must perform a minimum level of configuration on both IBM Cognos BI and non-IBM Cognos BI components. After that, the degree of configuration required will vary depending on multiple factors.

Web server: Setup virtual directories, also known as Web aliases, for the directories that contain the HTML and Web files for IBM Cognos BI. Of note, so that Report Studio authors can browse to and insert graphics in their reports, directory browsing must be set on the c10_location\images folder under the Web alias. System administrators must copy their corporate graphic files (like company logos) into this folder in the c10_location install directory if they want to use them in reports.

Database connection: Create the content store database (IBM DB2, Oracle, Microsoft SQL, Sybase) and specify the connection properties (server name, database name, port number, etc.).

Browsers: Ensure that settings are enabled for cookies and Java scripts. Additional required settings are specific to the browser. For a complete list of these settings, refer to the *IBM Cognos Business Intelligence Version 10.2.2 Installation and Configuration Guide*, Chapter 3: Preparing to install, in the section Configure Web Browsers.

Perform configuration for security, logging, and notifications. Perform advanced configuration such as configuring IBM Cognos BI to use an alternate application server (WebSphere, WebLogic, SAP Web, Oracle 10g), use a third-Party certificate authority (iPlanet or Microsoft), change the Java Virtual Machine (JVM) that IBM Cognos BI uses, or to deploy Cognos portlets to present IBM Cognos BI content in your IBM Websphere or SAP Enterprise portals instead of using IBM Cognos Connection.

Modify the Default Configuration

- Change port numbers.
- Use a different gateway interface.
- Implement security, a source control system, or notification services.
- Use an alternate auditing destination.
- Use a different cryptographic provider.
- Configure the gateway to point to a namespace.

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Initially, default property settings are used to configure the components. However, you may want to change these default settings to better suit your environment.

You can modify the default configuration using IBM Cognos Configuration.

In addition to the configurable items in the slide, you can also:

- enable and disable services to setup dedicated processing
- control the resources available to the IBM Cognos service

For a complete list of configuration options, refer to *IBM Cognos Business Intelligence Version 10.2.2 Installation and Configuration Guide*, Chapter 9: Configuration options.

Modify the Global Configuration

- You change global settings to:
 - customize language support for the user interface
 - customize currency support
 - customize content locale support
 - map the language used in the product user interface
 - map content locales
 - add fonts to your IBM Cognos BI environment

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In addition to the items mentioned in the slide, you can also change global settings to:

- customize the default time zone
- change the encoding for email messages
- customize cookie settings
- configure a file system location for saving report output outside IBM Cognos BI

For more information on configuring global settings refer to the *IBM Cognos Business Intelligence Version 10.2.2 Installation and Configuration Guide*, Chapter 9: Configuration options in the section titled Changing Global Settings.



Configure for a Distributed Installation

- In a distributed installation, you must configure:
 - Content Manager(s)
 - Application Tier Components computer(s)
 - Gateway computer(s)
 - Cryptographic properties
- After configuration, you must start the services on the Content Manager computer first.

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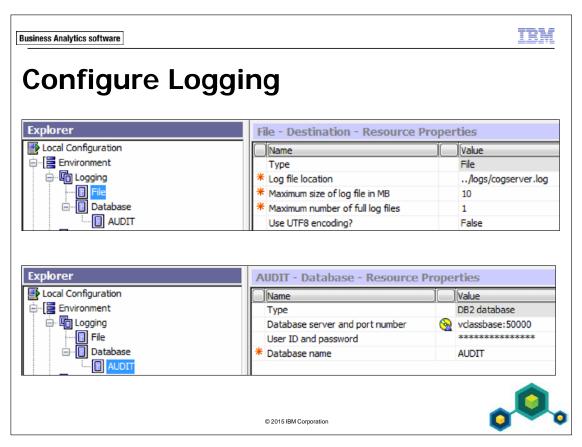
For distributed installation, you must perform the following configuration:

- on the computer(s) hosting the Content Manager, configure the location of the content store
- on the computer(s) hosting the Application Tier components, configure the location of the Content Manager(s) by setting the Content Manager URIs
- on the computer(s) hosting the gateway, configure the location of the dispatcher(s) by setting the External Dispatcher URI
- cryptographic properties so that they are the same on all computers

In a distributed environment, you must configure and start the services on a Content Manager computer before you configure other IBM Cognos BI computers. This ensures that the certificate authority service, which is installed with Content Manager, is available to issue certificates to other IBM Cognos BI computers.

If you have modified cryptographic properties on the computer(s) hosting the Content Manager, you must modify the properties accordingly on the remaining computers hosting other IBM Cognos BI components.

The External Dispatcher URI is also used to register a dispatcher with Content Manager. Therefore the External Dispatcher URI must be specified as the computer name or IP address of the computer hosting a dispatcher, so that it can be registered in Content Manager. URI properties will be defined and configured in the upcoming workshop.

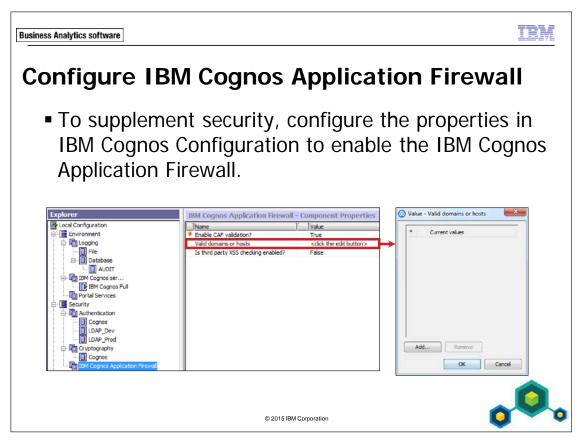


By default, the message logging facility is configured to send messages to a comma delimited flat file called cogserver.log, located in c10_location\logs. You can alter the default configuration in IBM Cognos Configuration by specifying the properties of the log server, the location of the log messages, and the size and number of log files. In a distributed installation, there are two or more log servers. You can configure the distributed installation to direct log information to a common remote log server. The common log server directs the log information to a single destination.

If multiple log files get created, then the name of the files would be cogserver.1.log, cogserver.2.log, and so forth. If log files are full and IBM Cognos BI cannot create any new files, then it will go back to the first file and start removing old data and putting new data in the last crn log file.

To provide additional options for storing and accessing the log message information, you can configure a log server to direct messages to an alternate destination, such as a third-party database, the UNIX syslog, or the Windows NT Event log.

In a distributed installation, you can configure the log message facility so that the log message handling is centralized. You can configure so that all log servers direct their log messages to a single destination, such as a database, or a common remote log server, which then directs messages to a single destination, such as a database.



By default, IBM Cognos Application Firewall is enabled and is an essential component of IBM Cognos BI security helping to provide protection against penetration vulnerabilities.

It acts as a smart proxy for the IBM Cognos gateways and dispatchers and works to prevent the IBM Cognos BI from processing malicious data. HTTP and XML requests are analyzed, modified, and validated before the gateways or dispatchers process them, and before they are sent to the requesting client or service. Security features of the IBM Cognos Application Firewall include, data validation and protection, logging and monitoring, and output Protection.

Cognos Application Firewall also validates domain and host names to protect URLs that are created. By default, it considers domain names, derived from environment configuration properties, to be safe domain names. You can also add names manually to the list of valid domains and hosts. This is useful when you need to redirect to non-IBM Cognos BI computers using the Back or Cancel functions within the Web browser.

You can also track firewall activity by checking the log file, which contains rejected requests. By default, log messages are stored in the c10_location\logs\cogserver.log file.

For more information on configuring the IBM Cognos Application Firewall refer to the IBM Cognos Business Intelligence Version 10.2.2 Architecture and Deployment Guide, Chapter 10: Security Architecture and Chapter 11: Securing the Deployment; IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide, Chapter 13: Security Model; and IBM Cognos Business Intelligence Version 10.2.2 Installation and Configuration Guide, Chapter 9: Configuration options.

TEM

Summary

- At the end of this module, you should be able to identify and explain:
 - the features of the IBM Cognos BI architecture
 - the three architectural tiers
 - IBM Cognos BI servlets and services
 - the default servlet container and alternatives to its use
 - an example of IBM Cognos BI request processing
 - installation options
 - load balancing mechanisms
 - configuration options
 - the IBM Cognos Application Firewall

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Workshop 1: Perform a Distributed Installation and Configuration of IBM Cognos BI

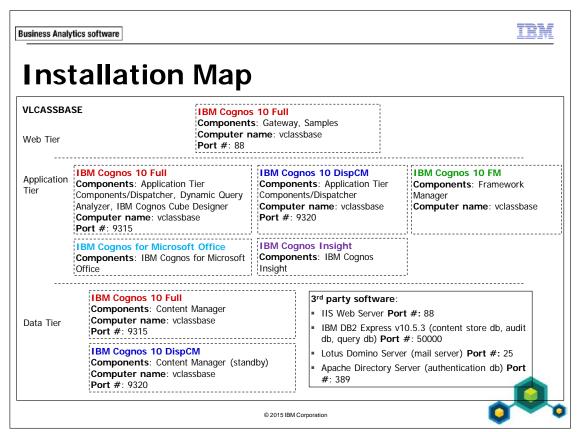
To complete this workshop, you should be using the B5A55_234 image.

After planning and designing your application, you are now ready to install IBM Cognos BI components. To become familiar with the installation and architectural components of IBM Cognos BI, you will perform a multi-server distributed installation. You will use a technique that will allow you to simulate the distributed environment on a single computer.

For information about how to accomplish this workshop and the workshop results, refer to the Tasks and Results section that follows.

Workshop 1: Tasks and Results

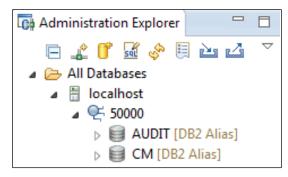
An installation map is provided to give you a virtual topology of where IBM Cognos BI components are installed in the environment used in this course.



The tiers are logical. There is no physical separation of components. All installations are on the same OS, however the components have been virtually separated by installing to different directories and by configuring using different port numbers. Apache Directory Server, IBM DB2 Express 10.5.3, IBM Data Studio 4.1.0, Lotus Domino Server, and IIS Web Server are also installed and configured.

- Task 1. Start the required services for the server hosting the content store, audit, and notification store databases, and the mail server.
 - From Start > Control Panel > Administrative Tools > Services, ensure the following services are started:
 - Apache Directory Server default
 - DB2-DB2COPY1 DB2
 - DB2DAS DB2DAS00
 - Lotus Domino Server (CProgramFilesx86IBMLotusDominodata)
 - World Wide Web Publishing Service
- Task 2. Create the databases for the content store and auditing.
 - In Windows Explorer, from C:\Edcognos\B5A55\02- Identify_IBM_ Cognos_BI_Architecture, open Win7_DB2 Script - Create & Config C10 Content Store.txt in Notepad, and then copy contents to clipboard.
 - This script creates a DB2 database named CM.
 - From Start > All Programs > IBM DB2 DB2COPY1 (Default), open DB2 Command Line Processor, at the prompt paste contents of clipboard, and then when the script completes, press Enter and close the command window.
 - Repeat above subtasks to create an additional database using Win7_DB2 Script Create & Config C10 Audit.txt.
 - This script creates a DB2 database named AUDIT.

- From Start > All Programs > IBM Data Studio, open Data Studio 4.1.0.0 Client.
 - Accept default for the workspace
 - Navigate the Administration Explorer to identify the CM and AUDIT databases. The result appears as follows:



- Use right-click menu to **Connect** to the **CM** database using **C10User/Education1** credentials. Select the **Save password** check box.
- Expand the **CM** database, select **Tables**, and then scroll through the tables in the right pane.
- Repeat for the **AUDIT** database.

At this point only system tables are available. The IBM Cognos BI content store and audit database will be populated with additional tables once IBM Cognos BI is installed and configured.

- Task 3. Install Content Manager, Gateway, and Application Tier Components.
 - In Windows Explorer, from C:\Edcognos\B5A55\
 02-Identify_IBM_Cognos_BI_Architecture\IBM Cognos BI Install Files\
 bisrvr\winx64h, run issetup.exe.
 - In the **IBM Cognos Business Intelligence Server** installation wizard:
 - Ensure that the installation directory is **C:\Program Files\ibm\ cognos\c10_64full**, and **Server Use Type** is **Production**. You are installing more than one instance of IBM Cognos BI, and each instance needs to be identified separately. This one will be referred to as 'full', as it is considered to be a full install, installing all components for BI Server.

• Leave the default selection of components, including **Application Tier Components**, **Content Manager**, and **Gateway**.

In the Component Selection window, you have the option to choose specific components or to choose the **IBM Cognos Quicksetup**. The Quick Setup option installs all components (application tier, gateway, Content Manager), installs and configures a servlet gateway, installs and configures IBM DB2 Advanced Workgroup Server Edition as the content store database, populates Content Manager configuration information within Cognos Configuration, configures a personal data set, and starts all services. This option is only available for 64-bit Microsoft Windows, and if DB2 is not already installed.

You have chosen to install specific components.

- Change the **Shortcut** name to **IBM Cognos 10 64 Full** so that this instance is descriptive in the Program Shortcuts.
- Complete the setup and do not configure.

Task 4. Install IBM Cognos BI samples.

- In Windows Explorer, from C:\Edcognos\B5A55\
 02-Identify_IBM_Cognos_BI_Architecture\IBM Cognos BI Install Files\
 bisamples\win64h, run issetup.exe.
- In the **IBM Cognos Business Intelligence Samples** installation wizard:
 - Ensure that the installation directory is **C:\Program Files** ibm\cognos\c10_64full.
 - Ensure **IBM Cognos 10 64 Full** appears in the **Program folder** box.
 - Complete the setup.

Task 5. Create the DB2 Samples database.

- In Windows Explorer, from C:\Edcognos\B5A55\
 02-Identify_IBM_Cognos_BI_Architecture\
 IBM Cognos BI Install Files\GS_DB\win, double-click setupGSDB.bat.
- In the **DB2 CLP DB2COPY1** command window:
 - Accept the default database name (GS_DB), and accept to create the database.
 - DB2 admin user name prompt: db2admin.
 - Accept default database creation settings.
 - Enter current password for db2admin prompt: Education1.
 - After the script completes, close the **DB2 CLP DB2COPY1** command window and **Windows Explorer**.

Task 6. Configure Web server alias in IIS 7.

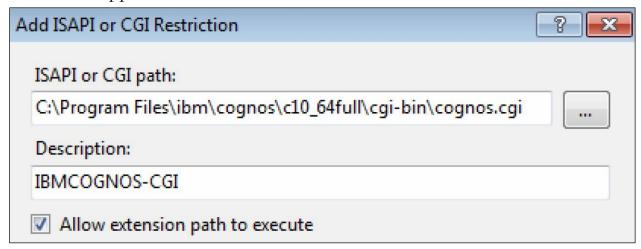
Tasks 6 through 10 pertain to configuring the Web server environment for users to log in to and navigate the portal used by IBM Cognos.

- From Start > Control Panel > Administrative Tools > Internet Information Services (IIS) Manager:
 - From VCLASSBASE (VCLASSBASE\Student) > Sites, right-click **Default Web Site**, and add a virtual directory
 - Alias: C10Full
 - Physical path C:\Program Files\IBM\cognos\c10_64full\webcontent.
 - For **C10Full**, open **Handler Mappings** (under IIS in the middle pane), and then under **Actions** (in the right pane), edit the feature permissions to be **Read** only.

Task 7. Configure the CGI restrictions for the Web server.

- Select VCLASSBASE (VCLASSBASE\Student), and then open ISAPI and CGI Restrictions.
 - Under **Actions**, click **Add**.
 - Under ISAPI or CGI path, browse to: C:\Program Files\IBM\cognos\c10_64full\cgi-bin, and select cognos.cgi. (Note: beside File name, in the list, click All files (*.*))
 - Description: **IBMCOGNOS-CGI**
 - Allow extension path to execute: selected

The results appear as follows:

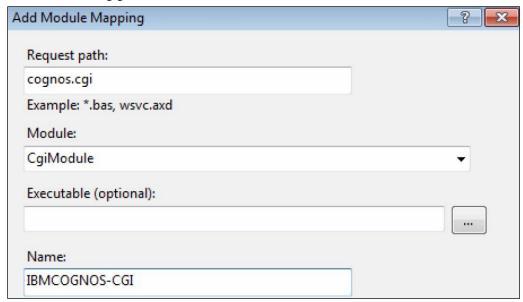


Task 8. Create an application for cgi-bin and configure IIS 7 for IBM Cognos CGI

- From VCLASSBASE (VCLASSBASE\Student) > Sites > Default Web Site > C10Full, and add an application (use right-click menu):
 - Alias: cgi-bin
 - Physical path C:\Program Files\IBM\cognos\c10_64full\cgi-bin.
- Select **cgi-bin**, and then open **Handler Mappings** (under IIS in the middle pane)

- Under Actions, add a Module Mapping
 - Request path: cognos.cgi
 - Module: **CgiModule**
 - Name: IBMCOGNOS-CGI.

The results appear as follows:



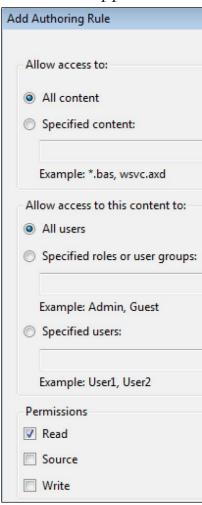
- Select **IBMCOGNOS-CGI** (in the middle pane), and then under **Actions**, **Edit Feature Permissions** to include **Read**, **Script**, and **Execute**.
- Task 9. Enable directory browsing for images and start the service.

To browse images on the Web server you must first enable Web-based Distributed Authoring and Versioning (WebDAV).

- From VCLASSBASE (VCLASSBASE\Student) > Sites > Default Web Site, open WebDAV Authoring Rules (under IIS in the middle pane), and then under Actions, Enable WebDAV.
- Under Actions > WebDAV Settings, set Allow Anonymous Property Queries to True, and then Apply the setting.

- Under Actions > WebDAV Authoring Rules, and Add Authoring Rule.
 - Allow access to: **All content**
 - Allow access to this content to: **All users**
 - Permissions: Read

The results appear as follows:



- From VCLASSBASE (VCLASSBASE\Student) > Sites > Default Web Site > C10Full > samples, and Add Virtual Directory.
 - Alias: images
 - Physical path: C:\Program Files\IBM\cognos\c10_64full\ webcontent\samples\images.

- From VCLASSBASE (VCLASSBASE\Student) > Sites > Default Web Site > C10Full > samples, select the images folder.
 - Open **Directory Browsing** (under IIS in the middle pane).
 - Under Actions, Enable directory browsing.
 Directory browsing is enabled to allow users to browse this directory, for example, when inserting images into their Report Studio reports.
- Select VCLASSBASE (VCLASSBASE\Student) > Sites > Default Web Site, and then under Actions, Restart the service.
- Close all open windows.

Task 10. Configure environment properties for IBM Cognos BI.

- From Start > All Programs > IBM Cognos 10 64 Full > IBM Cognos Configuration > Environment:
 - Change the Gateway URI property to http://vclassbase:88/C10Full/cgi-bin/cognos.cgi.

The Gateway URI property specifies the URI used by the gateway component and which is passed by Web server.

- Change all instances of **localhost** to **vclassbase** (computer name) and port # **9300** to **9315** for the following entries:
 - Dispatcher URIs for gateway

This property is used by the gateway component to identify a dispatcher to which it can forward requests.

• External dispatcher URI

This property is used to register the dispatcher in the Content Store and identify it to other server components.

• Internal dispatcher URI

This property is used to identify the dispatcher to local services which are running on the same server as the dispatcher.

• Dispatcher URI for external applications

This property is used by modeling components when communicating directly with the dispatcher. For example, when models are published from Framework Manager. Framework will be installed in a later task.

• Content Manager URIs

This property is used to register the ContentManager service in the Content Store, and to identify the service to other server components.

- Change Report Server execution mode from 32-bit to 64-bit.
- Task 11. Configure and test the connections from Content Manager to the content store and audit databases, and edit the global configuration.

To facilitate access to the DB2 content store and audit databases that have been configured in this environment, IBM Cognos BI uses JDBC connectivity. By default, the installation of IBM Cognos BI does not include the required DB2 drivers to create these connections. You must copy these drivers from the DB2 installation directory to the IBM Cognos BI installation directory to facilitate data access.

• From Windows Explorer:

Copy DB2 drivers (db2jcc_license_cu.jar and db2jcc4.jar) from
 C:\Program Files\IBM\SQLLIB\java to C:\Program Files\IBM\cognos\c10_64full\webapps\p2pd\WEB-INF\lib.

You can now configure the connections to the Content Store and AUDIT databases.

- From IBM Cognos Configuration > Data Access > Content Manager > Content Store:
 - Set the following properties:
 - Database server and port number: vclassbase:50000
 - User ID and password: C10User\Education1
 - Database name: cm
- Test the **Content Store**.

- From **IBM Cognos Configuration** > **Environment** > **Logging**:
 - Create a new **Destination** resource (use right-click menu) named **Database** of type **Database**.
 - Create a new **Database** resource (use right-click menu) named **AUDIT** of type **DB2** database.
 - Set the following properties:
 - Database server and port number: vclassbase:50000
 - User ID and password: C10User\Education1
 - Database name: AUDIT
 - Test the **AUDIT** database

You now want to edit the global configuration. This lets users save content to the file system when they run a report.

- From IBM Cognos Configuration > Data Access > Content Manager:
 - Change the **Save report outputs to a file system?** property to **True**
- From Actions > Edit Global Configuration > General tab:
 - Set the **Archive Location File System Root** property to **file://C:/Edcognos**. Note: The directory **C:\Edcognos** must already exist.
 - Test the **Archive Location File System Root** settings.

Task 12. Configure properties for the mail server.

You can configure IBM Cognos BI to send reports, tasks, and notifications to users by specifying a connection to a mail server.

- From IBM Cognos Configuration > Data Access > Notification:
 - Set the following properties:
 - SMTP mail server: vclassbase:25
 - Account and password
 - User ID: Admin Person
 - Password : Education1
 - Default sender: admin@grtd123.com
 - Test the **Notification** connection.

- Task 13. Configure the IBM Cognos service, save the configuration, start the services, and then test IBM Cognos BI and IBM Cognos Mobile.
 - From IBM Cognos Configuration > Environment > IBM Cognos services > IBM Cognos:
 - Rename **IBM Cognos** to **IBM Cognos Full** (use right-click menu).

 You are renaming the service from this instance to something more
 - You are renaming the service from this instance to something more descriptive. This will be the name of the service registered with Windows.
 - From **IBM Cognos Configuration** > **File** menu:
 - Save the configuration.
 - From **IBM Cognos Configuration** > **Actions** menu:
 - Start the service (click Allow access if a Windows Firewall message appears).
 - Close **IBM Cognos Configuration**.
 - From **Internet Explorer**:
 - Navigate to the IBM Cognos Software page at http://vclassbase:88/C10Full.
 - From Welcome to IBM Cognos Software > Administer IBM Cognos content (IBM Cognos Administration) > Configuration > Dispatchers and Services:
 - Confirm the registration of the dispatcher (http://vclassbase:9315/p2pd).
 - Drill down on the dispatcher to confirm the presence of the **ContentManagerService** service. Note: later there will be a second instance of ContentManagerService service added to the environment.
 - Leave **IBM Cognos Administration** open.
 - Open an **InPrivate Browsing** instance of **Internet Explorer** (right-click the Internet Explorer icon on the taskbar):
 - Navigate to http://vclassbase:88/C10Full/m/index.html.

 You have accessed the Web application for IBM Cognos Mobile

Task 14. Install and configure Framework Manager.

- In Windows Explorer, from C:\Edcognos\B5A55\
 02-Identify_IBM_Cognos_BI_Architecture\IBM Cognos BI Install Files\
 bimodel\win32, run issetup.exe.
- In the **IBM Cognos Framework Manager** installation wizard:
 - Ensure that the installation directory is C:\Program Files (x86)\ibm\cognos\c10FM, and Server Use Type is Production.
 - Leave the default selection of components.
 - Ensure **IBM Cognos 10 FM** appears in the **Program folder** box, so that this instance is descriptive in the **Program Shortcuts**.
 - Complete the setup, and then open **IBM Cognos Configuration**.
- From **IBM Cognos Configuration** > **Environment** node:
 - Set Gateway URI property to: http://vclassbase:88/C10Full/cgi-bin/cognos.cgi.
 - Set **Dispatcher URI for external applications** property to http://vclassbase:9315/p2pd/servlet/dispatch.
 - Save the configuration, and then close **IBM Cognos Configuration**.

Task 15. Deploy content.

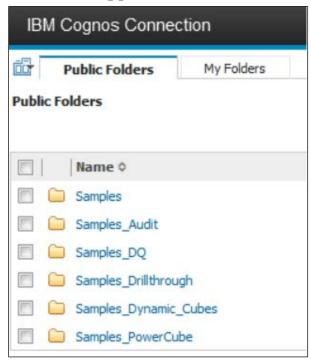
- In Windows Explorer, copy the following files from C:\Program Files\IBM\cognos\c10_64full\webcontent\samples\content, and paste to C:\Program Files\IBM\cognos\c10_64full\deployment:
 - IBM_Cognos_Audit.zip
 - IBM_Cognos_DrillThroughSamples.zip
 - IBM_Cognos_DynamicCube.zip
 - IBM_Cognos_PowerCube.zip
 - IBM_Cognos_Samples.zip
 - IBM_Cognos_Samples_DQ.zip

These files contain sample packages that can used by report authors to create reports in the various IBM Cognos BI studios. They are included as a result of the samples installation performed in Task 4. Note: the IBM_Cognos_Audit.zip file is included as a result of the BI server installation performed in Task 3. You are pasting these files to the deployment folder because that is the default directory from which IBM Cognos BI content is imported into the content store. The default directory can be configured in IBM Cognos Configuration.

- From **IBM Cognos Administration** > **Configuration** > **Content Administration**:
 - Import the following files (use the **New Import** button on the toolbar), accepting default selections and selecting the appropriate deployment folder for import in the import wizard:
 - IBM_Cognos_Audit.zip
 - IBM_Cognos_DrillThroughSamples.zip
 - IBM_Cognos_DynamicCube.zip
 - IBM_Cognos_PowerCube.zip
 - IBM_Cognos_Samples.zip
 - IBM_Cognos_Samples_DQ.zip

• From **IBM Cognos Connection** (use the **Launch** menu) > **Public Folders**, verify the import of content.

The results appear as follows:



At this point you can navigate the various folders to examine the content. Some folders include metadata packages, such as GO Sales (query) and GO Data Warehouse (analysis). These have a different folder icon, and are used:

- at runtime for reports to run
- to create new reports

Task 16. Create and test data source connections.

At runtime, IBM Cognos BI data sources are required so that reports and packages can run and query the underlying data sources (i.e. DB2 database). You will now create an IBM Cognos BI data source.

- From **IBM Cognos Administration** (use the **Launch** menu) > **Configuration** > **Data Source Connections** > **New Data Source** wizard (toolbar icon):
 - Create a compatible query mode and dynamic query mode data source for the GO Sales (analysis) and GO Sales (query) packages:
 - Name: great_outdoors_sales
 - Type: IBM DB2
 - Configure JDBC connection check box: selected Selecting the JDBC connection check box allows you to configure additional connection parameters that will use the dynamic query mode.
 - DB2 database name: GS_DB
 - **Signon > Signons** (select the **Password** check box):
 - User ID: GOSALES
 - Password: Education1

The signon you are creating is a database signon that is used by the underlying data source to ensure appropriate access to data.

- Test the compatible query mode connection. Notice that the Type/Query Mode is Compatible. This means that Dynamic Query Mode has not been configured for this data source at this point. This connection will be used by both the GO Sales (query) and GO Sales (analysis) packages.
- Configure JDBC connection:

• Server name: VCLASSBASE

• Port number: 50000

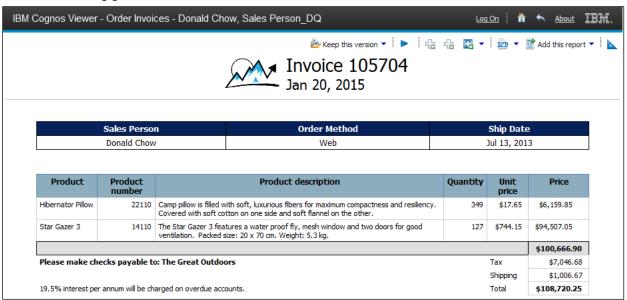
• Database name: GS_DB

- Test the dynamic query mode connection.
 Notice that the Type/Query Mode is Dynamic.
- Complete the configuration by clicking **Finish**.
- Create data source with compatible query mode and dynamic query mode connections, for the GO Data Warehouse (analysis) and GO Data Warehouse (query) packages, and test both connections:
 - Name: great_outdoors_warehouse
 - Type: IBM DB2
 - Configure JDBC connection check box: selected
 - DB2 database name: GS_DB
 - **Signon > Signons** (select the **Password** check box):
 - User ID: GOSALESDW
 - Password: Education1
 - Test the compatible query mode connection.
- Configure JDBC connection:
 - Server name: VCLASSBASE
 - Port number: 50000
 - Database name: GS_DB
 - Test the dynamic query mode connection

- Create a compatible query mode and dynamic query mode data source for the AUDIT database, and test both connections:
 - Name: AUDIT
 - Type: IBM DB2
 - Configure JDBC connection check box: selected
 - DB2 database name: AUDIT
 - **Signon > Signons** (select the **Password** check box):
 - User ID: C10User
 - Password: Education1
 - Test the compatible query mode connection.
- Configure JDBC connection:
 - Server name: VCLASSBASE
 - Port number: 50000
 - Database name: AUDIT
 - Test the dynamic query mode connection.

- Task 17. Test the connection for the GO Sales (query) package.
 - From IBM Cognos Connection > Samples_DQ > Models > GO Sales
 (query) > Report Studio Report Samples, run the Order Invoices Donald
 Chow, Sales Person_DQ report.

The results appear as follows:



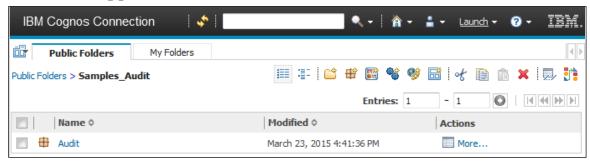
• Close all open windows.

Task 18. Publish a package from Framework Manager.

- From Start > All Programs > IBM Cognos 10 FM > IBM Cognos
 Framework Manager, open Audit.cpf project located at C:\Program Files\IBM\cognos\c10_64full\webcontent\samples\models\Audit.
- From IBM Cognos Framework Manager > Project Viewer > Packages:
 - Publish (use the right menu) the **Audit** package to verify communication with the server components.
 - Set the publish location to **Public Folders\Samples_Audit**.
 - Do not set security, do not **Verify the Package before publishing**, select the **Use Dynamic Query Mode** check box.
 - Close IBM Cognos Framework Manager without saving.

• From Internet Explorer > IBM Cognos Connection (http://vclassbase:88/C10Full) > Public Folders > Samples_Audit, verify the presence of the Audit package and the timestamp in the Modified column.

The results appear as follows:



• Close Internet Explorer.

Task 19. Install and configure a second instance of the dispatcher and content manager.

At this point you have installed a limited distributed environment with server components in one environment and Framework Manager in another. All installations have been tested successfully.

Now, you will install and configure redundant components for failover and load balancing purposes, including a dispatcher and Content Manager. Typically these would be installed to separate physical servers; however in this workshop you will simulate this by installing to a separate directory.

- In Windows Explorer, from C:\Edcognos\B5A55\02 Identify_IBM_Cognos_BI_Architecture\IBM Cognos BI Install Files\bisrvr\winx64h, run issetup.exe.
- In the IBM Cognos Business Intelligence Server installation wizard:
 - Ensure that the installation directory is **C:\Program Files\ibm** cognos\c10_64DispCM, and Server Use Type is Production.
 - Ensure that only the following components are selected:
 - Content Manager
 - Application Tier Components

- Change the **Program folder** name to **IBM Cognos 10 64 DispCM** so that this instance is descriptive in the **Program Shortcuts**.
- Complete the setup without opening **IBM Cognos Configuration**.
- From Start > All Programs > IBM Cognos 10 64 DispCM > IBM Cognos Configuration > Environment:
 - Set Gateway URI property to: http://vclassbase:88/C10Full/cgi-bin/cognos.cgi. You did not install a gateway on this backup installation, so you will use the previously configured gateway in this instance
 - For External dispatcher URI, and the Internal dispatcher URI properties, change the instances of:
 - localhost to vclassbase (computer name)
 - port # 9300 to 9320 The first installation used port 9315 to configure the dispatcher components. This installation will use port 9320.
 - Change **Report Server Execution mode** from **32-bit** to **64-bit**.
 - For the **Dispatcher URI for external applications** property, change:
 - localhost to vclassbase (computer name)
 - port # 9300 to 9315
 - For **Content Manager URI** property, remove or modify the existing property, and add the following URIs (click **Edit**):

Note: You should have two values when you complete this task.

- http://vclassbase:9315/p2pd/servlet
 This is the URI for the first installed instance of Content Manager. You are pointing to this instance because the first installed instance will be the active Content Manager.
- http://vclassbase:9320/p2pd/servlet
 This URI points to the second installed instance of Content Manager.
 Because it is second in the list it will become the backup Content Manager in the case of failover. All instances of Content Manager must know the location of all other instances of Content Manager.

Again, to facilitate connections to the DB2 content store and audit databases that have been configured in this environment you must also copy DB2 to the installation directory of the second instance of IBM Cognos BI.

- In Windows Explorer, copy DB2 drivers (db2jcc_license_cu.jar and db2jcc4.jar) from C:\Program Files\IBM\SQLLIB\java to C:\Program Files\IBM\cognos\c10_64DispCM\webapps\p2pd\WEB-INF\lib.
- From IBM Cognos Configuration > Data Access > Content Manager > Content Store:
 - Set the following properties for the connection to the content store:
 - Database server and port number: vclassbase:50000
 - User ID and Password:
 - User ID: C10User
 - Password: Education1
 - Database name: cm
 - Test the **Content Store** connection.
- From **IBM Cognos Configuration** > **Environment** > **Logging**:
 - Change the value for the **Local log server port number** to **9376**.
 - Create a new **Destination** resource named **Database** of type **Database**.
 - Create a new **Database** resource named **AUDIT** of type **DB2** database.
 - Set the following properties:
 - Database server and port number: vclassbase:50000
 - User ID and Password:
 - User ID: C10User
 - Password: Education1
 - Database name: AUDIT
 - Test the **AUDIT** database connection

You now want to edit the global configuration for the second instance to facilitate saving content to the file system.

- From IBM Cognos Configuration > Data Access > Content Manager:
 - Change the **Save report outputs to a file system?** property to **True**
- From **Actions** > **Edit Global Configuration** > **General** tab:
 - Set the **Archive Location File System Root** property to **file://C:/Edcognos**. Note: The directory **C:\Edcognos** must already exist.
 - Test the archive location settings.

Now you will rename the IBM Cognos service to a more descriptive name.

 From Environment > IBM Cognos services > IBM Cognos, rename IBM Cognos to IBM Cognos DispCM.

You must also configure the mail server connection for the second installed instance of IBM Cognos BI.

- From **Data Access** > **Notification**:
 - Set the following properties for the mail server connection:
 - SMTP mail server: vclassbase:25
 - User ID: Admin Person
 - Password: Education1
 - Default sender: admin@grtd123.com
 - Test the notification connection.
 - Save the configuration.

- Task 20. Configure the first instance of IBM Cognos 10 BI to know the location of the backup dispatcher and Content Manager, and then start services on both instances.
 - From Start > All Programs > IBM Cognos 10 64 Full > IBM Cognos Configuration > Environment:
 - Add the following to the list of URIs(click Edit) for Dispatcher URIs for gateway property:
 - http://vclassbase:9320/p2pd/servlet/dispatch/ext
 This represents the dispatcher from the second installed instance of IBM
 Cognos BI.

Note: You should now have two values in the list.

- Add the following to the list of URIs (click Edit) for Content Manager URIs property:
 - http://vclassbase:9320/p2pd/servlet
 This represents the Content Manager from the second installed instance of IBM Cognos BI.

Note: You should now have two values in the list.

- Save the configuration, restart services, and then close **IBM Cognos Configuration** (IBM Cognos 10 64 Full instance).
- From **IBM Cognos Configuration** (IBM Cognos 10 64 DispCM instance), save the configuration, start services, and then close **IBM Cognos Configuration**. Note: if a **Windows Firewall** message appears, click **Allow** access.

- Task 21. Verify the second instance of the dispatcher and ContentManager service in IBM Cognos Administration.
 - From Internet Explorer > IBM Cognos Connection (http://vclassbase:88/C10Full) > IBM Cognos Administration > Configuration > Dispatchers and Services:
 - Confirm the registration of two dispatchers.
 - http://vclassbase:9315/p2pd
 - http://vclassbase:9320/p2pd
 - Drill down on http://vclassbase:9320/p2pd (the second installed dispatcher) to confirm the presence of the backup ContentManager Service. Notice the icon next to the service, indicating it is in backup mode.
 - Close **Internet Explorer**.
 - From Start > Control Panel > Administrative Tools > Services:

To have control over when the IBM Cognos services start or stop in this environment, you will set the Startup type. Also, you will stop the IBM Cognos services that are currently running so that you can install other IBM Cognos products.

- Change the **Startup type** for **IBM Cognos DispCM:9320** from **Automatic** to **Manual**, and then **Stop** the **IBM Cognos DispCM:9320** service.
- Change the **Startup type** for **IBM Cognos Full:9315** from **Automatic** to **Manual**, and then **Stop** the **IBM Cognos Full:9315** service.

Task 22. Install Dynamic Query Analyzer.

- In Windows Explorer, from C:\Edcognos\B5A55\
 02-Identify_IBM_Cognos_BI_Architecture\IBM Cognos BI Install Files\
 dqa\winx64h, run issetup.exe.
- In the IBM Cognos Dynamic Query Analyzer installation wizard:
 - Ensure that the installation directory is **C:\Program Files\ibm** cognos\c10_64full, and that **Server Use Type** is **Production**.

- Change the **Program folder** to **IBM Cognos 10 64 Full** so that this instance is descriptive in the **Program Shortcuts**.
- Complete the setup, and do not configure.

Task 23. Install IBM Cognos for Microsoft Office.

You can use IBM Cognos for Microsoft Office with other products, such as IBM Cognos Business Intelligence and IBM Cognos Business Insight. The integration of these products makes it possible to share useful data across the organization, connecting the business strategy with business execution.

- In Windows Explorer, from C:\Edcognos\B5A55\
 02-Identify_IBM_Cognos_BI_Architecture\IBM Cognos BI Install Files\
 coc\winx64h\winx64h, run issetup.exe.
- In the **IBM Cognos for Microsoft Office** installation wizard:
 - Ensure that the installation directory is **C:\Program Files\ibm** cognos\Cognos for Microsoft Office.
 - For the **Program folder**, leave the default name of **IBM Cognos for Microsoft Office**.
 - Complete the setup.

Task 24. Install IBM Cognos Cube Designer.

- In Windows Explorer, from C:\Edcognos\B5A55\
 02-Identify_IBM_Cognos_BI_Architecture\IBM Cognos BI Install Files\
 dcubemodel\winx64h, run issetup.exe.
- In the **IBM Cognos Cube Designer** installation wizard:
 - Ensure that the installation directory is **C:\Program Files** ibm\cognos\c10_64full, and that **Server Use Type** is **Production**.
 - Ensure that **IBM Cognos 10 64 Full** appears in the **Program folder** box.
 - Complete the setup.

Task 25. Install IBM Cognos Insight on the desktop.

There are different methods to install IBM Cognos Insight and you will use the install method to have it available to users on their desktop. This must be done on each desktop for users to have access to the application.

- In Windows Explorer, from C:\Edcognos\B5A55\
 02-Identify_IBM_Cognos_BI_Architecture\IBM Cognos BI Install Files\
 cogdesktop, run IBMCognosInsightSE64_10.2.2.msi.
- In the **IBM Cognos Insight Setup** wizard, accept the terms of the license agreement, and then click **Install** to complete the setup.
- Task 26. Complete configuration, and then restart the IBM Cognos services.
 - From Start > All Programs > IBM Cognos 10 64 Full > IBM Cognos Configuration > Environment > IBM Cognos services:
 - Review the services that are enabled.
 - Save the configuration.
 - Start the service.
 - Close **IBM Cognos Configuration**.
 - From Start > All Programs > IBM Cognos 10 64 DispCM > IBM Cognos Configuration > Environment > IBM Cognos services:
 - Review the services that are enabled.
 - Save the configuration.
 - Start the service.
 - Close **IBM Cognos Configuration**.

Task 27. Configure IBM Cognos Dynamic Query Analyzer to access IBM Cognos BI content (Windows).

To configure IBM Cognos Dynamic Query Analyzer on Windows, you must provide a server name and the port number on which the IBM Cognos BI server, which contains the reports that you want to analyze, is running. After you specify the connection settings, you can test the connection between Dynamic Query Analyzer and the IBM Cognos BI server.

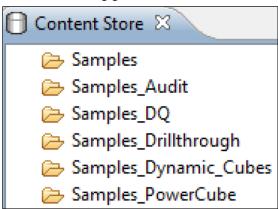
- From Start > All Programs > IBM Cognos 10 64 Full > IBM Cognos
 Dynamic Query Analyzer
 - Use **Anonymous Logon**.
- Window (menu) > Preferences > Cognos Server:
 - Next to Dispatcher URI: http://vclassbase:9315/p2pd/servlet/dispatch, click Test.

This is the name of the computer with the dispatcher for your IBM Cognos BI server, which contains the reports to analyze. If you installed Dynamic Query Analyzer on the same computer as your IBM Cognos BI server, you can use localhost. Otherwise, enter the server name or IP address of the server. Include the port number that the IBM Cognos BI server is running on. For example, in a default installation, the port number is 9300.

• Ensure Gateway URI is set to http://vclassbase:88/C10Full/cgi-bin/cognos.cgi.

- From Windows (menu) > Show View > Navigation > Content Store:
 - Review the IBM Cognos content from the server. If the configuration is correct, in the Content Store pane, the IBM Cognos content from the specified server is displayed.

The results appear as follows:



Next, you will create a virtual directory on your Web server, to reference the logs directory.

- From Start > Control Panel > Administrative Tools > Internet Information Services (IIS) Manager > VCLASSBASE > Sites > Default Web Site > C10Full:
 - Add a virtual directory.
 - Alias: **XQElogs**
 - Physical path: C:\Program Files\IBM\cognos\c10_64full\logs\XQE
- From Start > Control Panel > Administrative Tools > Internet Information Services (IIS) Manager > VCLASSBASE > Sites > Default Web Site > C10Full > XQElogs, enable Directory Browsing.

- From Start > Control Panel > Administrative Tools > Internet Information Services (IIS) Manager > VCLASSBASE > Sites > Default Web Site:
 - **Restart** the service.
 - Close Internet Information Services (IIS) Manager, Administrative Tools, and Control Panel.

Another component to configure in Dynamic Query Analyzer, is to reference the log location.

- From IBM Cognos Dynamic Query Analyzer > Window (menu) > Preferences > Logs:
 - Set Logs directory URL to http://vclassbase:88/C10Full/XQElogs.
 - Close IBM Cognos Dynamic Query Analyzer.

Task 28. Deploy and publish a dynamic cube.

Dynamic cube definitions are saved in a project by a modeler. You will open a saved project, and then deploy and publish a dynamic cube. You will not create or edit a dynamic cube in this task, as that is beyond the scope of this course.

- From Start> All Programs > IBM Cognos 10 64 Full > IBM Cognos Cube Designer:
 - Open model.fmd from C:\Program Files\IBM\cognos\c10_64full\ webcontent\samples\models\great_outdoors_dynamiccube\db2.

There are four panes displayed: Source, Project Explorer, Model, and Properties/Issues.

You can validate each object as you create it by right-clicking it in the Project Explorer and selecting Validate. You cannot deploy a dynamic cube that contains errors. It is possible to deploy a valid cube when the project contains unrelated objects that are not valid. When you finish modeling a dynamic cube in IBM Cognos Cube Designer, you can deploy it as an OLAP data source to Content Manager. To work with a deployed dynamic cube in the IBM Cognos studios, you must also publish a Framework Manager package for it, configure the cube as a data source, and start the cube.

- From Project Explorer > Project > Model:
 - Validate the **gosldw_sales** dynamic cube.
 - Publish the **gosldw_sales** dynamic cube.
 - Under **Additional Options**, select the **Select all options** check box.
 - Deselect the **Associate my account and signon with the cube** datasource check box.
 - Complete the publish, ignoring any warnings, and then close **IBM Cognos Cube Designer** without saving.
- From Internet Explorer > IBM Cognos Connection
 (http://vclassbase:88/C10Full) > IBM Cognos Administration > Configuration > Data Source Connections:
 - Locate the dynamic cube data connection that you deployed.
 - From **Actions** > **Set properties**, review the properties of the dynamic cube, including the **Access Account**.
 - In the module titled "Administer the IBM Cognos BI Server Environment", you will explore the administration of dynamic cubes.
- Close all open windows.





Secure the IBM Cognos BI Environment

IBM Cognos BI 10.2.2



Business Analytics software

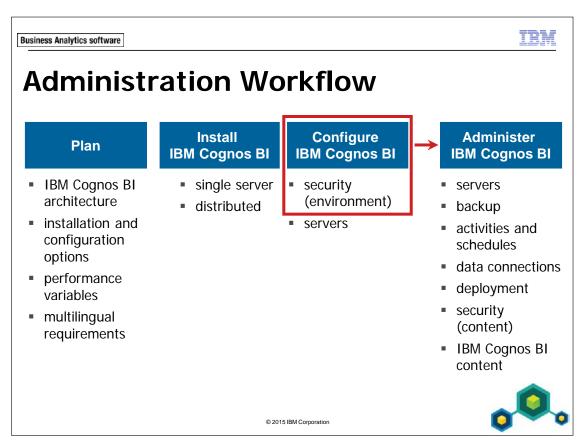
Business Analytics software



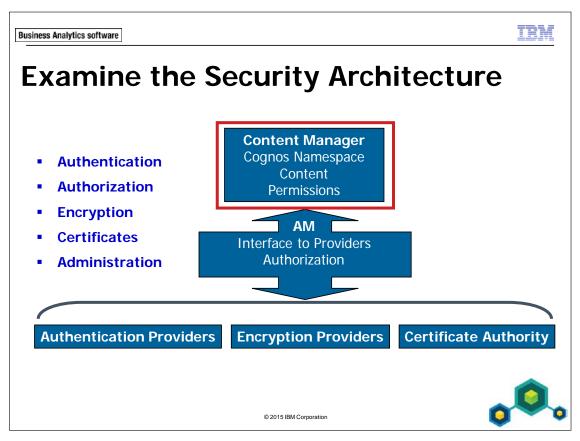
Objectives

- At the end of this module, you should be able to:
 - identify the IBM Cognos BI security model
 - define authentication in IBM Cognos BI
 - define authorization in IBM Cognos BI
 - identify security policies
 - secure the IBM Cognos BI environment

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This module provides you with an understanding of the IBM Cognos BI security model and its implementation.



The IBM Cognos BI security model allows you to use your existing user repositories for authentication while maintaining a granular authorization model.

Content Manager stores security information in the content store for IBM Cognos BI, including the Cognos namespace, content, and permissions.

AM (Access Manager runtime) is part of the content manager service and provides authentication between IBM Cognos BI and authentication providers. Also used for cryptography, certificate authority, and authorization.

Authentication ensures that individuals provide valid credentials to log on to IBM Cognos BI. IBM Cognos BI does not provide a built-in user definition or authorization mechanism, but relies on one or more third-party authentication providers.

Authorization grants or denies users access to folders, reports, and other IBM Cognos BI data objects based on their signon identity. IBM Cognos BI authorization assigns permissions to users and groups that allow them to perform actions, such as read or write, on content store data objects, such as folders and reports.

Encryption ensures that IBM Cognos BI communications and sensitive data are secure. The default cryptographic provider for IBM Cognos BI uses keys up to 40 bits in length for data encryption and secure sockets layer (SSL) protocol. You can configure other cryptographic providers, which use key sizes greater than 40 bits, such as the Enhanced Encryption Module for OpenSSL or the Enhanced Encryption Module for Entrust, available from Cognos.

Certificate authority: IBM Cognos BI uses its own certificate authority (CA) service to establish the root of trust in the security infrastructure. This encryption solution uses digital certificates, which can also be issued by external certificate authorities. You can configure IBM Cognos BI to use another certificate authority, such as iPlanet or Microsoft.

Security is optional. Without security enabled, all user access is anonymous. If you enable security, set permissions, and then disable security, those objects with permissions set will be inaccessible. You set permissions to ensure that one cannot bypass security by hacking the configuration to disable security.

Business Analytics software



Use Authentication Providers

- IBM Cognos BI uses third-party authentication providers to facilitate user authentication.
- Authentication providers define users, groups, and roles used for authentication (log on) and authorization (access to content).
- You can define multiple providers concurrently.

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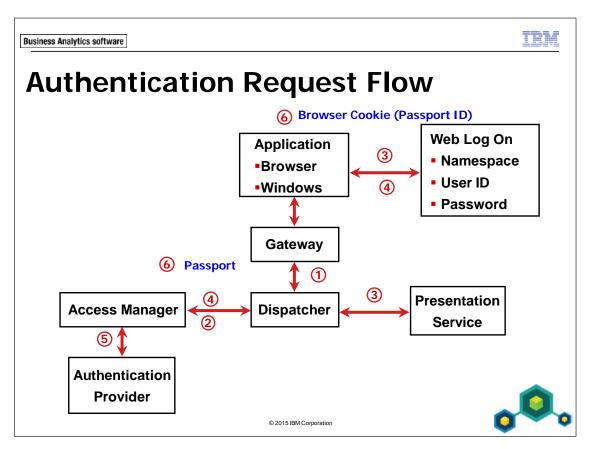
You can configure authentication providers to leverage your existing user and group repositories, which means that you do not have to replicate your existing repositories for use with IBM Cognos BI.

You can permanently delete references to an authentication provider in the content store by first deleting it in IBM Cognos Configuration and then deleting it in IBM Cognos Administration. Authentication providers define users, groups, and roles used for authentication. User names, IDs, passwords, regional settings, and personal preferences are some examples of information stored in the providers. If you set up authentication for IBM Cognos BI, users must provide valid credentials, such as user ID and password, at logon time. IBM Cognos BI does not replicate the users, groups, and roles defined in your authentication provider. However, you can reference them in IBM Cognos BI when you set access permissions to content.

You can configure multiple user and group repositories from your existing security infrastructure so that you can make use of it in your IBM Cognos BI solution. If you configure multiple namespaces for your system, at the start of a session, you must select one namespace. This does not prevent you from logging on to other namespaces later in the session. For example, if you set access permissions, you may want to reference entries from different namespaces.

The IBM Cognos Configuration user interface uses the term namespace to reference a third-party authentication provider. This term is also used in IBM Cognos Connection when a user logs on to IBM Cognos BI.

Out of the box, IBM Cognos BI supports LDAP, Active Directory Server, SAP, IBM Cognos Series 7, and Custom Java Provider, eTrust SiteMinder, and RACF® security sources. IBM Cognos BI also provides an API to create custom adaptors to proprietary or unsupported authentication providers. For more information refer to the *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 13: Security Model.



The external security provider manages authentication. If anonymous access is disabled, and a user is not already authenticated, the login process works as shown in the slide example.

- 1. A request to access IBM Cognos BI is received.
- 2. The dispatcher, not finding a passport in the request header, calls Access Manager (AM).
 - The passport contains account credentials, user identity (which user, groups, roles), expiration time, and optional trusted credentials.

- 3. AM determines that anonymous login is disabled, and then calls the presentation service through the dispatcher with a set of required information to prompt the user for login credentials (namespace, user ID, and password).
 - If anonymous login is enabled, AM issues a passport for the user session without authentication.
 - The log on for IBM Cognos BI reporting tools (Report Studio, Query Studio, and Cognos Connection) and Framework Manager is through a Web browser logon page generated by the Presentation service, which returns the page through the dispatcher and the gateway to the user.
 - The user is prompted to select a namespace if IBM Cognos BI is configured to use multiple namespaces and provide credentials.
 - The user's password is encrypted by the IBM Cognos BI Web gateway before being passed to the dispatcher.
- 4. The dispatcher then calls AM with the information received.
- 5. AM calls the security provider to authenticate the user receiving authentication information in return.
- 6. AM issues a passport for the user session, which is sent to the user as a session temporary cookie.
 - The passport ID is attached to the header of subsequent requests during the user session.

Workshop 1: Configure Authentication Providers

To begin the implementation of IBM Cognos BI security, you will configure two authentication providers to serve as the sources of namespace authentication information for users logging on to the application. Users will be able to log on to either namespace or both of them concurrently.

To complete the workshop, you must perform the following high-level tasks:

- Start the following services:
 - Apache Directory Server services
 - DB2-DB2COPY1 DB2
 - DB2DAS DB2DAS00
 - Lotus Domino Server (CProgramFilesx86IBMLotusDominodata)
 - World Wide Web Publishing Service
- IBM Cognos 10 64 Full:
 - Add LDAP namespaces called LDAP_Dev and LDAP_Prod.
 - Disable anonymous access.
 - Save the configuration and restart services.
- Repeat above tasks for IBM Cognos 10 64 DispCM.

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows.

Workshop 1: Tasks and Results

- Task 1. Ensure that the required service for the LDAP authentication provider and other services have been started.
 - From **Start > Control Panel > Administrative Tools > Services**, start the following services:
 - Apache Directory Server default
 - DB2-DB2COPY1 DB2
 - DB2DAS DB2DAS00
 - Lotus Domino Server (CProgramFilesx86IBMLotusDominodata)
 - World Wide Web Publishing Service
 - Close Services, Administrative Tools, and Control Panel windows.

In a distributed installation over multiple physical machines, you would ensure that all relevant services are started for each separate machine. Here, you are simulating a distributed installation, so you only have start the services on one machine.

- Task 2. Add and configure an authentication provider and disable anonymous access in the IBM Cognos 10 64 Full instance.
 - From Start > All Programs > IBM Cognos 10 64 Full > IBM Cognos Configuration > Explorer > Security > Authentication:
 - Right-click **Authentication** to create a new resource for the namespace:
 - Name: LDAP_Dev
 - Type: LDAP- General default values
 - Set the following properties:
 - Namespace ID: LDAP_Dev_ID
 - Host and port: vclassbase:389
 - Base Distinguished Name: dc=Cognos, dc=com
 - User lookup: uid=\${userID}, ou=People
 - Unique Identifier: entryUUID
 - **Test** the namespace with **admin/Education1** credentials.

The results appear as follows:

LDAP_Dev - Namespace - Resource Properties						
	Name		Value			
	Type		LDAP - General default values			
*	Namespace ID		LDAP_Dev_ID			
*	Host and port		vdassbase:389			
*	Base Distinguished Name		dc=Cognos, dc=com			
	User lookup	<u> </u>	uid=\${userID}, ou=People			
	Use external identity?		False			
	External identity mapping		\${environment("REMOTE_USER")}			
	Bind user DN and password		**********			
	Size limit		-1			
	Time out in seconds		-1			
	Use bind credentials for search?		False			
	Allow empty password?		False			
	Unique identifier	<u>⊗</u>	entryUUID			
	Data encoding	_	UTF-8			

- Repeat to create another **LDAP** namespace with the following properties:
 - Name: LDAP_Prod
 - Type: LDAP- General default values
 - Set the following properties:
 - Namespace ID: LDAP_Prod_ID
 - Host and port: vclassbase:389
 - Base Distinguished Name: dc=Cognos, dc=com
 - User lookup: uid=\${userID}, ou=People
 - Unique Identifier: entryUUID
- **Test** the namespace with **admin/Education1** credentials.

The results appear as follows:

LI	LDAP_Prod - Namespace - Resource Properties					
	Name		Value			
	Туре		LDAP - General default values			
*	Namespace ID		LDAP_Prod_ID			
*	Host and port		vclassbase:389			
*	Base Distinguished Name		dc=Cognos, dc=com			
	User lookup	<u>⊗</u>	uid=\${userID}, ou=People			
	Use external identity?		False			
	External identity mapping		\${environment("REMOTE_USER")}			
	Bind user DN and password		***********			
	Size limit		-1			
	Time out in seconds		-1			
	Use bind credentials for search?		False			
	Allow empty password?		False			
	Unique identifier	<u> </u>	entryUUID			
	Data encoding		UTF-8			

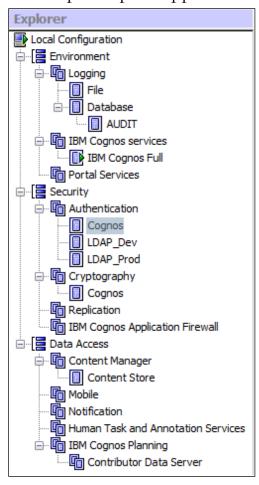
In a distributed installation, the LDAP_Dev_ID would likely be configured on one server, and the LDAP_Prod_ID would be configured on a separate server, such as in the example of using one as your development environment, and one as your production environment. However, in this simulated distributed installation, you will have both authentication providers on one physical machine in one installation instance. This is so that you can experience logging on to two different authentication sources.

• From Authentication > Cognos, set Allow anonymous access to False.

This will force users to log on to IBM Cognos BI.

• Save the configuration, and then **Restart** the services.

The Explorer pane appears as follows:



• Close **IBM Cognos Configuration**.

- Task 3. Add and configure an authentication provider and disable anonymous access in the IBM Cognos 10 64 DispCM instance.
 - From Start > All Programs > IBM Cognos 10 64 DispCM > IBM Cognos
 Configuration > Explorer > Security > Authentication:
 - Create a new resource for the namespace:
 - Name: LDAP_Dev
 - Type: LDAP- General default values
 - Set the following properties:
 - Namespace ID: LDAP_Dev_ID
 - Host and port: vclassbase:389
 - Base Distinguished Name: dc=Cognos, dc=com
 - User lookup: uid=\${userID}, ou=People
 - Unique Identifier: entryUUID
 - **Test** the namespace with **admin/Education1** credentials.

The results appear as follows:

LDAP_Dev - Namespace - Resource Properties					
	Name		Value		
Г	Туре		LDAP - General default values		
*	Namespace ID		LDAP_Dev_ID		
*	Host and port		vdassbase:389		
*	Base Distinguished Name		dc=Cognos, dc=com		
	User lookup	⊗	uid=\${userID}, ou=People		
	Use external identity?		False		
	External identity mapping		\${environment("REMOTE_USER")}		
	Bind user DN and password		**********		
	Size limit		-1		
	Time out in seconds		-1		
	Use bind credentials for search?		False		
	Allow empty password?		False		
	Unique identifier	⊗	entryUUID		
	Data encoding		UTF-8		

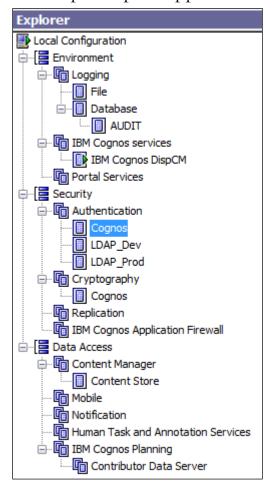
- Repeat to create another **LDAP** namespace with the following properties:
 - Name: LDAP_Prod
 - Type: LDAP- General default values
 - Set the following properties:
 - Namespace ID: LDAP_Prod_ID
 - Host and port: vclassbase:389
 - Base Distinguished Name: dc=Cognos, dc=com
 - User lookup: uid=\${userID}, ou=People
 - Unique Identifier: entryUUID
- **Test** the namespace with **admin/Education1** credentials.

The results appear as follows:

LI	LDAP_Prod - Namespace - Resource Properties					
	Name		Value			
	Туре		LDAP - General default values			
*	Namespace ID		LDAP_Prod_ID			
*	Host and port		vclassbase:389			
*	Base Distinguished Name		dc=Cognos, dc=com			
	User lookup	<u>⊗</u>	uid=\${userID}, ou=People			
	Use external identity?		False			
	External identity mapping		\${environment("REMOTE_USER")}			
	Bind user DN and password		**********			
	Size limit		-1			
	Time out in seconds		-1			
	Use bind credentials for search?		False			
	Allow empty password?		False			
	Unique identifier	<u>⊗</u>	entryUUID			
	Data encoding		UTF-8			

- From Authentication > Cognos, set Allow anonymous access to False.
- Save the configuration, and then **Restart** the services.

The Explorer pane appears as follows:



• Close **IBM Cognos Configuration**.

IBM

Authorization

- Initially, all users have authorized access to all objects.
- Security is implemented and authorization is performed based on:
 - IBM Cognos BI objects
 - users and groups from authentication providers
 - groups and roles from the Cognos namespace
 - policies
- Content Manager controls authorization.

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The initial security policies grant unrestricted authorized access to all objects in the content store to all users through an anonymous user account.

After security is enabled, and the authentication process has been performed, IBM Cognos BI authorization is achieved by verifying both:

- the security policies (permissions and policy rules) applied to the IBM Cognos BI object that is being accessed
- the access rights that have been assigned for the user attempting to access the object

IBM Cognos BI objects include entries in the IBM Cognos Connection and IBM Cognos Administration portals.

Groups and roles from the Cognos namespace: when a content store is initialized, a set of default security objects (groups and roles) is created and stored in the Cognos namespace. Use these objects to simplify the administration of IBM Cognos BI security.

A policy consists of a set of permissions and policy rules.

Access rights are assigned for individual users or to the groups or roles, of which users can be members. These access rights allow users to perform actions, such as read or write, on content store objects, such as folders and reports.

TRM

Control Access to Content

- Use the groups and roles defined in the Cognos namespace to control access to content in IBM Cognos BI.
- The Cognos namespace contains security entries, which are:
 - built-in groups or roles
 - predefined groups or roles
 - user-defined groups or roles

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The Cognos namespace is not used for authentication. It contains the IBM Cognos BI security entries, which are pre-defined and user-defined groups and roles.

Use the Cognos namespace to create groups and roles specific to your IBM Cognos BI application, to repackage security data available from authentication providers, and to avoid cluttering authentication providers.

The Cognos namespace always exists in IBM Cognos BI, but the use of Cognos groups and roles it contains is optional. You can implement security using users, groups, and roles, directly from the authentication providers.

Built-in and predefined security entries are created in this namespace during the content store initialization. You can use the Cognos namespace groups and roles and create your own groups and roles to implement security that is specific to the IBM Cognos BI application. The difference between a group and a role is that a group can contain other groups or users. A role can contain other groups, users, or other roles.

These groups and roles can be used to repackage the users, groups, and roles existing in the authentication providers to optimize their use in the IBM Cognos BI environment. For example, you may want to create an Human Resources (HR) Reporting Application Administrator group that does not exist in your corporate user/group repository, and then add specific users and groups to it from your IT and HR organizations defined in your authentication provider. Later, you can set access permissions for the HR Reporting Application Administrator group.

For more information on the Cognos namespace, refer to the *IBM Cognos Software Version 10.2.2 Administration and Security Guide*, Chapter 13: Security Model.



Use Cognos Namespace Built-in Entries

- Built-in security entries:
- include:
 - All Authenticated Users: dynamic membership of all users in system, excluding anonymous user
 - Anonymous: provides access without authentication
 - Everyone: Dynamic membership of all users in system including anonymous user
 - System Administrators: root or super user has complete access to all IBM Cognos BI functions and content
- cannot be deleted

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The Cognos namespace includes several built-in security entries in addition to the Anonymous user account.

The anonymous authentication process does not require a user to provide credentials. Built-in security entries are those that cannot be deleted in the Cognos namespace.

The Anonymous account grants public access without authentication. This is the only user account defined by IBM Cognos BI; and it is enabled by default. It can be disabled in IBM Cognos Configuration.

All Authenticated Users group: inclusive membership of all users (excluding the Anonymous user) in the IBM Cognos BI system, regardless of the type or number of security providers configured.

Everyone group: specifies inclusive membership of all users in the IBM Cognos BI system, regardless of the type or number of security providers configured. This means that users in external security providers are included as well as the Anonymous user.

System Administrators role: specifies which users or groups are super users within IBM Cognos BI. Members of this group have access to all functions and content within the IBM Cognos BI application.

After installation, the default security set up is such that the Everyone group is a member of the System Administrators role.



Use Cognos Namespace Predefined Entries

- Predefined entries, such as Consumers, Authors, Analysis Users, Query Users, Report Administrators, Server Administrators:
 - are associated with default access to functionality:
 - For example, the Authors role has access to Report Studio, while the Query Users role has access to Query Studio but not Report Studio
 - can be deleted

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In addition to the built-in entries defined in the Cognos namespace, several predefined entries are present by default.

The difference between the built-in and pre-defined entries is that the former cannot be deleted while the latter can be deleted.

These predefined entries are provided in order to simplify the application of security. These entries are also associated with default access to functionality, which you can modify as required.

For more information on each of the predefined entries, refer to the *IBM Cognos Software Version 10.2.2 Administration and Security Guide*, Chapter 18: Initial Security.

TEM

Define Security Policies

- Security policies are:
 - assigned to IBM Cognos BI portal entries
 - assigned to Framework Manager objects and data represented by these objects
 - assigned to custom views in a Transformer model or Dynamic Cubes project which are then associated to PowerCubes or Dynamic Cubes

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Each IBM Cognos BI portal entry, Framework Manager object, Transformer cube, and Dynamic cube has a security policy associated with it.

For IBM Cognos BI portal entries and Framework Manager objects, a policy consists of the entry itself and a permissions list.

For PowerCubes and Dynamic cubes, a policy consists of a custom view created in the model and associated with the cube.

TRM

Define Permissions

- You can assign one or more permissions to IBM Cognos BI portal entries.
- Each permission has three aspects:
 - security object
 - capability
 - access rights

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Security object: user, group, or role from an authentication provider or the Cognos namespace.

Capability: grant the access right or deny the access right.

Access rights: the actions that can be performed, including read, write, execute, set policy, and traverse.

Read: View all the properties of an entry. For example, granting this permission to a report also grants access to the report specification, report output, and so on, which are also properties of the report.

Write: Modify any of the properties of an entry, delete an entry, create entries in a container, such as a package or a folder, modify reports created in Report Studio and Query Studio, and create new outputs.

Execute: Process an entry. For entries such as reports, agents, and metrics, the user can run the entry. For data sources, connections, and signons, the entries can be used to retrieve data from a data provider. The user cannot read the database information directly. The report server can access the database information on behalf of the user to process a request. IBM Cognos BI verifies whether users have execute permissions for an entry before they can use the entry. For credentials, users can permit someone else to use their credentials.

Set Policy: Read and modify the security settings for an entry.

Traverse: View the contents of a container entry, such as a package or a folder, and view general properties of the container itself without full access to the content.

Note: Users can view the general properties of the entries for which they have any type of access. The general properties include name, description, creation date, and so on, which are common to all entries.

For permissions on Framework Manager objects, individual access rights are not applied. It is all or nothing.

TRM

Security Policy Rules

- The following policy rules govern the IBM Cognos BI authorization process:
 - acquired policies
 - traversing to view child entries
 - group inheritance
 - implicit deny
 - explicit deny versus grant
 - union of permissions
 - ownership
 - deleting Cognos groups and roles

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Acquired Policies: If a policy has not been explicitly defined for an IBM Cognos BI object, then the policy that is applied to its parent object will be used to evaluate if the object can be accessed. If a policy has been defined for an object, then only that policy will be evaluated to determine access to the object. By default, new objects inherit privileges from their parent object. Objects that exist only as children of other objects always acquire permissions from their parents. Examples of such objects are report specifications and report outputs. They are visible through the SDK. You cannot set permissions specifically for those objects.

Traverse to view child entries: The parent entries include container objects such as folders, packages, groups, roles, and namespaces.

Group inheritance: Permissions granted to a group will be granted to all of its members.

Implicit deny: After access is granted for specific users, groups, or roles, all others automatically have no access.

Explicit Deny vs. Grant: If a user attempts to access an IBM Cognos BI object, and if any of the rules deny access to that user, then access will be subsequently refused. In other words, if a policy contains a permission that grants access to a user and it also contains a policy that denies access to the user, then that user will be denied access to the object. Deny always takes precedence over Grant, in the event of a conflict. For example, a user belongs to two groups; one group has access granted to a report and the other group has access denied to the same report. Access to this report is denied for the user.

Union of permissions: Access to an object will be granted based on the union of permissions of a user. The user's access rights are the union of all of the rights of the user themselves as well as the groups or roles to which the user belongs.

Ownership: If a user is an owner of an entry, the user has full access rights for the entry. This ensures that users can always access and modify the entries they own. By default, the owner of the entry is the user who creates the entry. However, any other user who has set policy permissions for the entry can take ownership of the entry.

Deleting Cognos groups and roles: Access permissions based on the group or role are also deleted. You cannot restore them by creating a new group or role with the same name because this entry has a different internal ID.

Policy Rule - Implicit Deny vs. Explicit Deny

- Implicit Deny: the user, group, or role does not appear on the permissions list for the entry and therefore access is implicitly denied.
- Explicit Deny: select Deny for an individual access right for a selected user, group, or role and therefore access is explicitly denied.

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Why use explicit deny versus implicit deny?

Example: The IBM Cognos BI security plan for an organization includes an Executive Managers group that consists of members/named users representing two functional categories of employees. These categories are called Directors and Managers. The security administrator needs to secure content (such as reports) using the Executive Managers group. Approximately 90% of the content is non-sensitive and will be accessed by all members of the group. Approximately 10% of the content is sensitive in nature (such as financial data) and as a business rule is only to be accessed by Directors and not by Managers.

To secure the sensitive content, the security administrator has two options:

- 1. Remove the named users functionally categorized as Managers from the Executive Managers group. Then, create a separate group, and add those named users as members. To secure the non-sensitive content, include both groups on the permissions list of the non-sensitive entries. To secure the sensitive content, include only the Executive Managers group on the permissions list of those sensitive entries, and do not include the new group (implicit deny for the new group).
- 2. For the sake of efficiency, and to avoid having to remove these named users from an existing group and create a separate group for them, you can apply explicit denies for each named user on the permissions list of the sensitive entries (explicit deny). Using explicit denies provides flexibility and is efficient when it is required that you deny access for a few named users. At some point, if the number of named users who require explicit denies becomes unmanageable, it may be more efficient to choose the first option and create another group that contains these named users, and then grant or deny access as required.



Credentials

- Credentials are:
 - created manually after a user logs on to the system
 - stored as part of the account object in the namespace
- Users can assign their credentials to other users to run activities (trusted credentials).

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To create credentials manually, in IBM Cognos Connection, in the upper-right corner, click the My Area Options button, and then click My Preferences. On the Personal tab, under Credentials, if you have not created credentials before, click Create the Credentials.



Trusted Credentials

- Trusted credentials are used:
 - for users who must perform a task or process, but do not have sufficient access permissions for entries that contain sensitive data
 - to run scheduled requests when users are not logged on to IBM Cognos BI, for example, overnight
- If a user's credentials change, they are renewed automatically at the next log in.
 - this ensures that trusted credentials will always be valid

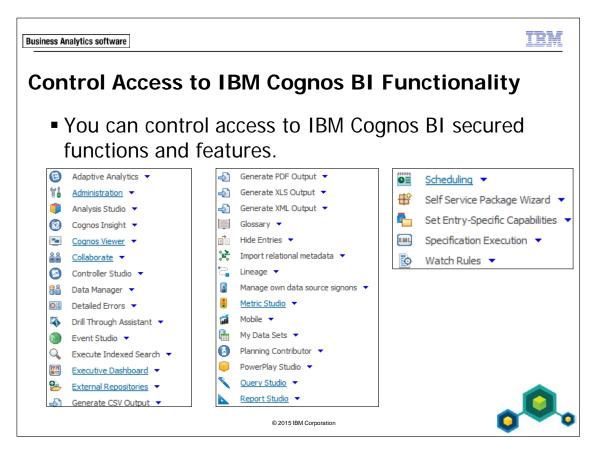
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Users with more extensive access permissions, who own the entries, can authorize a trusted user to use their credentials to access the entries.

For scheduled requests, when the request runs, a user session is created. The trusted credential is used to log on to IBM Cognos BI as the user the trusted credential represents, and the user's access permissions are used to run the report or the job.

After a user successfully logs in, and they have stored credentials already defined as part of their profile, the stored credentials will be replaced with the ones that were just used to authenticate into the product. This will always ensure that the trusted credentials being used to authenticate when activities are executed, will be valid.

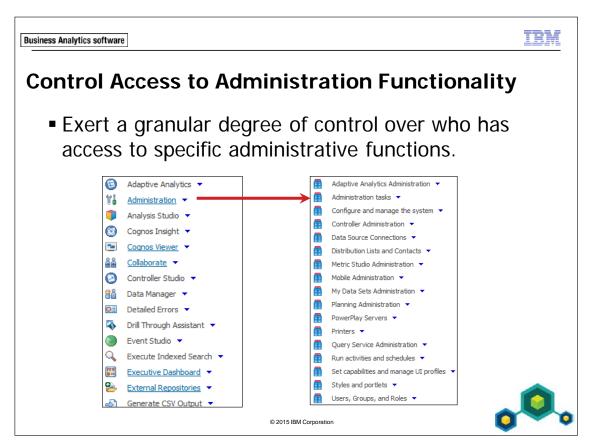


The secured functions and features control access to different administration tasks and different functional areas of the user interface in IBM Cognos BI. Administrators can set up access to the secured functions and features using the Capabilities page on the Security tab in IBM Cognos Administration.

If you do not use the Cognos namespace pre-defined entries, you will have to specify access to functionality. As mentioned earlier, the pre-defined entries are, by default, provided with access to various functions/features (for example; the Authors role by default has access to Report Studio and Query Studio).

You set access to the secured functions and features by granting execute permissions for them to specified namespaces, users, groups, or roles. If you set permissions for a secured feature, you must grant execute permissions for the feature and traverse permissions for its parent secured function. For example, to grant access to Report Studio and all its functionality, you grant execute permissions for the Report Studio secured function. If you want to grant access only to the Create/Delete secured feature within Report Studio, grant traverse permissions for the Report Studio secured function and execute permissions for the Create/Delete secured feature. You must have set policy permissions to administer secured functions and features. Typically, this is done by directory administrators.

For more information on each of the secured functions and features, refer to the *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 16: Secured Functions and Features.



The Administration secured function contains the secured features that control access to the administration pages that are used to administer IBM Cognos BI.

TRM

Control Access to Report Studio User Interfaces

- You can control access to custom user interfaces that contain reporting features relevant to both professional report authors and business users.
 - Professional Authoring Mode
 - Report Studio
 - Express Authoring Mode
 - IBM Cognos Workspace Advanced

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To support the different authoring modes, IBM Cognos Administration provides two User Interface Profiles named Professional and Express. Use the Professional profile to set access to the Professional mode, and the Express profile to set access to the Express mode.

Users must have the Report Studio capability to use the custom interfaces for report authoring.

The Professional authoring mode gives users access to a full range of functionality. In this mode, you can create any report type, including charts, maps, lists, and repeaters, using any data source (relational or multi-dimensional). Professional authoring mode supports the use of external data.

The Express authoring mode provides an interface that is designed for the business user. Users can create list, crosstab, and chart reports to explore and analyze data according to specific information needs. Express authoring mode supports the use of external data, and both dimensional and relational data sources.

Users can have access to both the Professional and Express authoring modes, however, they must use Report Studio for Professional authoring mode and Cognos Workspace Advanced for Express authoring mode. To switch from Professional authoring mode to Express authoring mode, the user must exit Report Studio and launch Cognos Workspace Advanced. Similarly, if a user wants to switch from Express authoring to Professional authoring, they must exit Cognos Workspace Advanced and launch Report Studio. For more information, refer to the *IBM Cognos Report Studio Version* 10.2.2 User Guide and the *IBM Cognos Workspace Advanced Version* 10.2.2 User Guide.

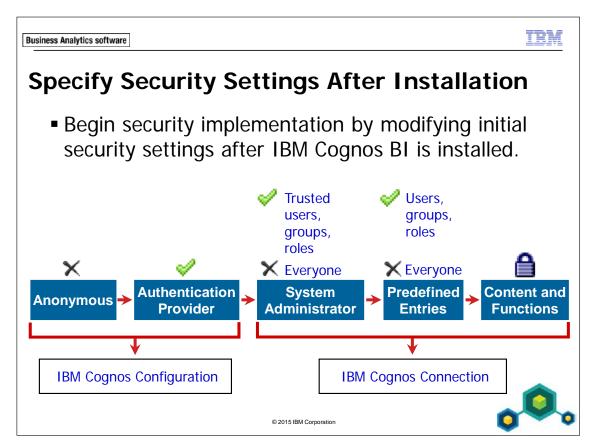
TRM **Business Analytics software** Object Capabilities Specify the capabilities that are available on packages and folders for a given user, group, or role. • Example: **Deny Access:** to Capability: Query Studio, Analysis Studio Package A • for Roles: Query Users, Analysis Users Reason: package A is DMR which queries a large data set without proper filtering system performance can be degraded only Authors should have access Access to the "Set Entry-Specific Capabilities" capability must be granted. © 2015 IBM Corporation

You have granular control over capability settings in IBM Cognos BI. You can specify user capabilities at the package and folder levels in Public Folders.

The secured functions and their features, also referred to as global capabilities, control access to the different components and functionality in IBM Cognos BI. For object capabilities to function, you must combine them with applicable global capabilities. For example, when setting up object capabilities for a package that contains Report Studio and Query Studio reports, ensure that the user also has access to the Report Studio and Query Studio secured functions and their applicable secured features.

Access must be granted to the Set Entry-Specific Capabilities capability in the IBM Cognos Administration console before a user can configure object capabilities for objects in IBM Cognos Connection. The exception to this rule is the System Administrators role. Users belonging to this role will have access to this capability.

It is a current best practice to replicate IBM Cognos Administration console capability settings on the root of Public Folders capabilities. This enables users who configure package capability settings in IBM Cognos Connection to know who actually has access at the global level. If a user's access to a capability in the Administration Console is restricted, you cannot override this setting in IBM Cognos Connection (Public Folders, My Folder, etc.). This will help users configure in a predictable way since they can view the capability setting in the properties of Public Folders to see who has access to what.



- 1. Remove anonymous access to the content store and thus the entire application.
- 2. Specify one or more authentication providers.
- 3. Add trusted users, groups, or roles to the System Administrators role, and then remove the Everyone group.
- 4. Add users, groups, or roles to the predefined entries, such as Authors and Query Users, and then remove the Everyone group.
- 5. Specify permissions on content and access to functionality using groups or roles from the Cognos namespace or users, groups, or roles from authentication providers.

When you set access permissions, you should not explicitly deny access to entries for the Everyone group. Denying access overrides any other security policies for the entry. If you denied access to the entry for the Everyone group, the entry would become unusable.

The System Administrators role, as a rule, cannot be empty. However, if the only entry on the permissions list, is a group that does not have any members, you will effectively lock yourself out of the administration functionality of IBM Cognos BI. Note: if this occurs, there is a script you can run from<C10.2.2 install directory>\c10 (or C10_64)\configuration\schemas\content\<data source specific folder>\AddSysAdminMember.sql. This will add the "Everyone" group back into the System Administrators role. This will require a restart of the IBM Cognos service.



Framework Manager Security

- In Framework Manager, security is implemented by:
 - specifying access to packages
 - specifying access to folders, namespaces, query subjects, query items
 - creating security filters

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To implement security in Framework Manager, you can:

- specify which users, groups, and roles have access to the published package
- specify which users, groups, and roles have access to objects such as folders, namespaces, query subjects, and query items
- create filters that control the data that is shown to report authors when they set up their reports, and when users run reports

When specifying package access, you can apply various access rights including Read, Write, Traverse, Execute, and Set Policy.

When you create a security filter, you apply it to a query subject, and then add the groups and roles to which the security filter will be applied. For each group or role, you can create a filter expression that will be used to filter data for that group or role.

When you specify security on objects such as such as folders, namespaces, query subjects, and query items, you are specifying whether these objects visible (Allow) or not visible (Deny) for selected users groups, or roles.

For more information on setting security in Framework Manager, refer to the *IBM Cognos Software IBM Cognos Framework Manager Version 10.2.2 User Guide*, Chapter 7: Publishing packages, in the Security section.



Transformer Security

- In Transformer, security is implemented by:
 - assigning security objects to custom views, and then combining custom views with dimension filtering
 - associating custom views with PowerCubes before they are delivered to the portal

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You can add custom views to each PowerCube to grant or deny access to sensitive business intelligence information. These access controls can be customized down to the query object level: not merely to reports and cubes, but to the specific levels, categories or members, and measures within them.

When you create a custom view, you select security objects (users, groups, and roles) configured in your Cognos namespaces, and then define a specific view of the data for those security objects using dimension filtering methods, including:

- removing dimensions and measures
- Apex, which omits ancestors and siblings of a category
- Exclude, which omits a category, its descendants, and their data
- Cloak, which omits a category and its descendants, but retains the rollup values in ancestor categories
- Summarize, which omits descendants, but retains their rollup values
- Suppress, which omits a category from reports based on the cube, but retains its rollup value in ancestor categories

For more information on setting security in Transformer, refer to the *IBM Cognos Transformer Version 10.2.2 User Guide*, Chapter 7: Adding Security.

Dynamic Cube Security

- In IBM Cognos Cube Designer, security is implemented by:
 - defining one or more security filters for hierarchies to be secured
 - defining one or more security views

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Security for dynamic cubes is used to control the metadata available to specific users or user groups in the IBM Cognos studios. The security views are defined for a dynamic cube in the Cognos Cube Designer. You can define which dimensions, attributes, and measures to secure in a dynamic cube by adding them to the security views. You can secure a time hierarchy, unless that time hierarchy has relative time support enabled.

After the dynamic cube is published to the content store, the Administrator uses IBM Cognos Administration to assign users, groups and roles to the security views, and refreshes the security settings of the dynamic cubes on the query service.

If you make further changes to security after publishing a dynamic cube, such as if you change the security view definitions, you need to republish and restart the dynamic cube. If you change the users, groups, or roles assigned to the views, then you can refresh the security definitions of a cube while it is running.

You define security in source cubes as required. Every hierarchy in Cognos Cube Designer contains a default security filter named All Members Granted. This option explicitly grants access to all hierarchy members. If you do not want to apply the default security filter, you can delete it from a security view.

For more information on setting security in Cognos Cube Designer, refer to the *IBM Cognos Dynamic Cubes Version 10.2.2 User Guide*, Chapter 11: Defining security.



Roles and Capabilities Used for Dynamic Cube Tasks

- model dynamic cubes
- secure dynamic cubes
- configure dynamic cubes
- optimize dynamic cubes
- manage dynamic cubes
- prime dynamic cubes

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Each role requires specific administration capabilities and/or permissions. For example, the data access account requires the ability to run scheduled jobs to prime the dynamic cubes; this requires read, traverse, and execute access permissions.

Dynamic cube modelers require read, write, traverse, and execute permissions for the Data Source Connections administration capability. For more information on the capabilities and permissions assigned to required roles and tasks for dynamic cubes, refer to the *IBM Cognos Dynamic Cubes Version 10.2.2 User Guide*, Chapter 12: Cognos Dynamic Cubes administration.



Summary

- At the end of this module, you should be able to:
 - identify the IBM Cognos BI security model
 - define authentication in IBM Cognos BI
 - define authorization in IBM Cognos BI
 - identify security policies
 - secure the IBM Cognos BI environment

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Workshop 2: Secure the IBM Cognos BI Environment

To continue with the security implementation, you will use the groups and roles available in the Cognos namespace to lock down the environment.

To complete this workshop, you must perform the following high-level tasks:

- As user Admin Person with User ID admin, password Education1, add yourself as a trusted member from the LDAP_Dev namespace to the System Administrators role in the Cognos namespace.
- As user Admin Person with User ID admin, password Education1, add yourself as a trusted member from the LDAP_Prod namespace to the System Administrators role.
- Remove the Everyone group as a member from the System Administrators, Adaptive Analytic Users, Analysis Users, Authors, Consumers, Controller Users, Data Manager Authors, Express Authors, Metrics Authors, Metrics Users, Mobile Users, Planning Contributor Users, PowerPlay Users, Query Users, Readers, and Statistics Authors roles, and then test the security.
 - When removing the Everyone group from the Consumers role, add Bart Scott and Donald Chow as members of this role.
 - When removing the Everyone group from the Query Users role, add Sally White as a member of this role.
- Add the following groups to the Cognos namespace, and add the listed members to the groups:
 - Australia: John Sinden
 - Italy: Alessandra Torta
 - US: Bart Scott

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows.

Workshop 2: Tasks and Results

Task 1. Add a user from the LDAP_Dev namespace as a member of the System Administrators role.

By default, the Everyone group is a member of the System Administrators role. This also means that all users have full access to the content store. To limit that access, you must add trusted users as members of this role, and then remove the Everyone group from its membership.

- In Internet Explorer, navigate to http://vclassbase:88/C10Full, and then log on to the LDAP_Dev namespace as admin/Education1.
- From **IBM Cognos Administration** > **Security**:

In the **Directory** list, notice that you do not have access to the LDAP_Prod namespace, because you are not currently logged onto that namespace.

From Cognos > Set properties - System Administrators > Members, add the Admin Person user from the LDAP_Dev namespace, as a member to this role (Note: users are found in the People folder inside the LDAP_Dev namespace.)

Notice that the **LDAP_Prod** namespace is not available, from which to add users.

Task 2. Add a user from the LDAP_Prod namespace as a member of the System Administrators role.

• Log on to the **LDAP_Prod** namespace as **admin/Education1** (Note: use the Log On button at the top of the page).

The results appear as follows:



Notice that you did you not have to log off first and that you are not prompted to select the LDAP_Prod namespace. This is because the only other namespace available is the LDAP_Prod namespace.

• Add the **Admin Person** user, from the **LDAP_Prod** namespace, as a member of the **System Administrators** role.

Task 3. Remove the Everyone group from built-in and predefined security entries

In a real world IBM Cognos BI security implementation, this task will be specific to your environment. For example, you may want the Everyone group to remain as a member in some of these roles.

- From **Cognos** > **Set properties**:(Note: use the Set properties page for each of the entries)
- Remove **Everyone** group from membership in the following roles:
 - System Administrators
 - Adaptive Analytic Users
 - Analysis Users
 - Authors
 - Cognos Insight Users
 - Consumers (Note: from the LDAP_Dev namespace add Donald Chow and Bart Scott as members)
 - Controller Users
 - Data Manager Authors
 - Express Authors
 - Metrics Authors
 - Metrics Users
 - Mobile Users
 - Planning Contributor Users
 - PowerPlay Users
 - Query Users (Note: from the LDAP_Dev namespace add Sally White as a member)
 - Readers

• Log off, and then log on to **LDAP_Dev** namespace as **scottb/Education1**.

The results appear as follows:



Bart Scott does not have access to the administration tools or the studios, because he, or the group or role to which he belongs, does not have access to this functionality.

- Task 4. Create Groups in the Cognos namespace and add users to Groups.
 - Log off, and then log on to the LDAP_Dev namespace as admin/Education1.
 - From **IBM Cognos Administration** > **Security** > **Cognos**:
 - Create the following new groups with users from the LDAP_Dev namespace: (Note: use the **New Group** button on the toolbar)
 - Australia: John Sinden
 - Italy: Alessandra Torta
 - US: Bart Scott
 - Log off.

Workshop 3: Secure the Portal

To further secure the environment, you will limit access to functionality in the portal by adding users to the Cognos namespace security entries. You will test this security by examining the default portal functionality associated with these entries.

To complete this workshop, you must perform the following high-level tasks:

- As the System Administrator from the LDAP_Dev namespace, add user Jeff Waters from the LDAP_Dev namespace to the Directory Administrators role.
 - Test security log on using the LDAP_Dev namespace as Jeff Waters (User ID: watersj, Password: Education1). Questions: Can this user create content in the studios? Can this user access content in the Public Folders area of IBM Cognos Connection? Can this user access Administration functionality?
- Add user Branka Hirsch from the LDAP_Dev namespace to the Report Administrators role. Question: Can the current user modify the security entries in the Cognos namespace?
 - Test security log on as Branka Hirsch (User ID: hirschb, Password: Education1). Questions: Can this user create content in the studios? Can this user access Administration functionality? Which tabs does this user have access to in IBM Cognos Administration, and what functionality do they have access to on these tabs? Can this user administer content in Public Folders of IBM Cognos Connection?

- Add user Tim Meyers from the LDAP_Dev namespace to the Server Administrators role.
 - Test security log on as Tim Meyers (User ID: meyerst, Password: Education1). Questions: Can this user create content in the studios? Can this user access Administration functionality? Which tabs does this user have access to in IBM Cognos Administration, and what functionality do they have access to on these tabs? Can this user access content in the Public Folders area of IBM Cognos Connection?
- Secure the gosldw_sales dynamic cube log on as Jeff Waters (User ID: watersj, Password: Education1.
 - In IBM Cognos Administration\Configuration\Data Source Connections, click gosldw_sales, and review the properties (General tab) for the access account.
 - Override the access permissions, and add Authors, with Read, Execute, and Traverse permissions. Remove Everyone. Log off Jeff Waters.

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows.

Workshop 3: Tasks and Results

Task 1. Add a user to the Directory Administrators role.

- Log on to the **LDAP_Dev** namespace as **admin/Education1**.
- From IBM Cognos Administration > Security > Cognos > Directory Administrators > Set properties:
 - Add **Jeff Waters** from the **LDAP_Dev** namespace as a member.
- Test security by logging off and then logging on to the **LDAP_Dev** namespace, as **Jeff Waters** (watersj/Education1).

The results appear as follows:



Jeff Waters cannot access any of the studios, but can access the administration functionality.

• Click **IBM Cognos content**.

The results appear as follows:



Jeff Waters cannot access Public Folders content in IBM Cognos Connection.

• From the Launch menu, open IBM Cognos Administration.

The results appear as follows:



Jeff Waters has access to the Security and Configuration tabs but does not have access to other tabs in IBM Cognos Administration.

Task 2. Add a user to the Report Administrators role.

Because Jeff Waters has access to the Security tab he can implement security in IBM Cognos BI, including adding a user to the Report Administrators role.

- From Security > Cognos > Report Administrators > Set properties:
- Add Branka Hirsch from the LDAP_Dev namespace as a member (Note: use Search to locate Branka Hirsch (hirshb).)
- Test security by logging off and then logging on to the LDAP_Dev namespace as Branka Hirsch (hirschb/Education1).

The results appear as follows:



Branka Hirsch has access to the studios to create content. This is default functionality associated with the Report Administrators role, of which this user is a member. She also has access to administration functionality.

• Click Administer IBM Cognos content.

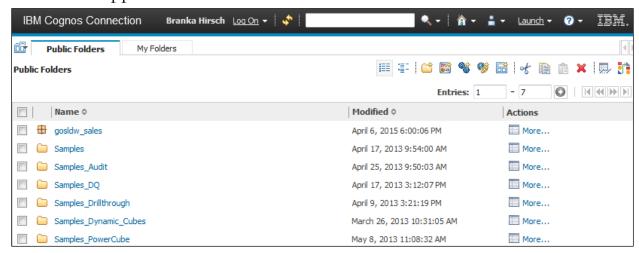
The results appear as follows:



Branka Hirsch cannot administer security.

• From the **Launch** menu, open **IBM Cognos Connection**.

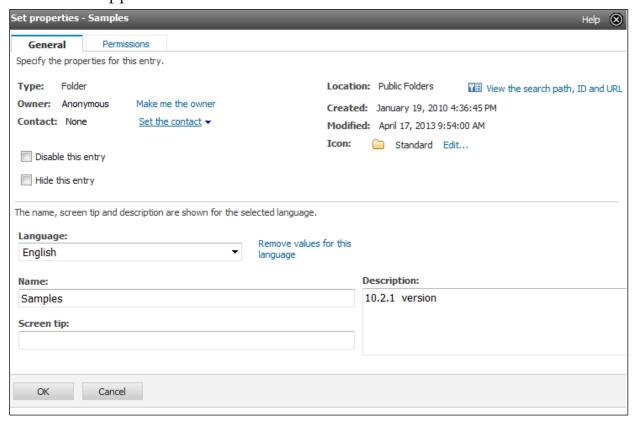
The results appear as follows:



Branka Hirsch has access to public content in IBM Cognos Connection

• Beside **Samples**, under **Actions**, open the **Set properties** page.

The results appear as follows:



Branka Hirsch has access to the properties of the entries, including Permissions. This is default functionality associated with the Report Administrators role.

Click Cancel, and then log off.

Task 3. Add a user to the Server Administrators role.

- Log on as **Jeff Waters** to the **LDAP_Dev** namespace.
- Add user **Tim Meyers** from the **LDAP_Dev** namespace as a member of the **Server Administrators** role.

 Test security by logging off and then logging on to the LDAP_Dev namespace, as Tim Meyers (meyerst/Education1).

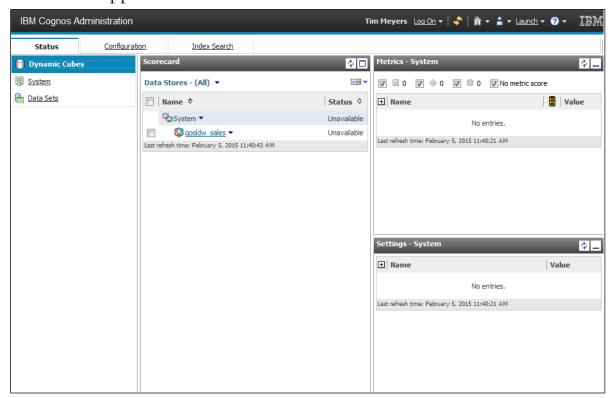
The results appear as follows:



Tim Meyers does not have access to the IBM Cognos BI studios, but does have access to administration functionality.

• Open IBM Cognos Administration.

The results appear as follows:

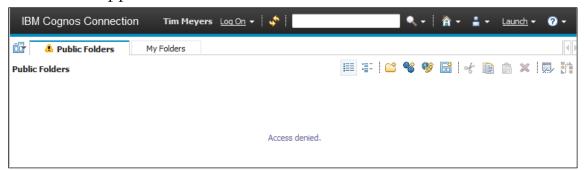


Tim Meyers can only access the:

- Status tab for monitoring system metrics, dynamic cubes, and data sets
- Configuration tab for making changes to the server configuration
- Index Search tab for configuring indexing of the content store

• Open **IBM Cognos Connection**.

The results appear as follows:



Tim Meyers does not have access to content in the Public Folders area of IBM Cognos Connection.

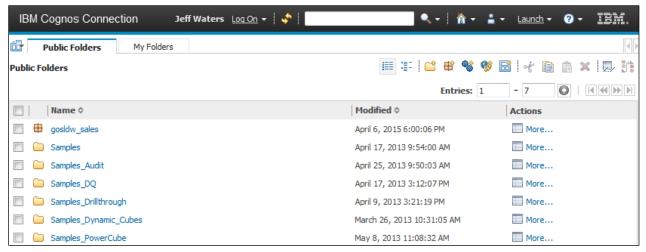
• Log off.

Task 4. Add a user to the Consumers role.

Earlier, you added Jeff Waters as a member of the Directory Administrators role, which has access to IBM Cognos Administration for security and configuration only, and does not have access to the portal content. Jeff requires the ability to see the content for tasks that he will be assigned. Because Directory Administrators have access to security implementation, Jeff Waters can assign access to portal content to himself.

- Log on as **Jeff Waters** to the **LDAP_Dev** namespace.
- Add user Jeff Waters from the LDAP_Dev namespace as a member of the Consumers role.
- Log off, log on as **Jeff Waters** to the **LDAP_Dev** namespace, and then open **IBM Cognos Connection**.

The results appear as follows:



Jeff Waters can now access Public Folders content in IBM Cognos Connection.

Task 5. Add users to the Authors role.

- In **IBM Cognos Administration**, add **Frank Bretton** from the **LDAP_Dev** namespace as a member of the **Authors** role.
- Test security by logging off and then logging on to the LDAP_Dev namespace as Frank Bretton (brettonf/Education1).

The results appear as follows:



Frank Bretton has access to the IBM Cognos BI studios, but does not have access to administration functionality.

Log off.

Task 6. Secure the gosldw_sales dynamic cube.

- Log on as **Jeff Waters** to the **LDAP_Dev** namespace.
- Navigate to IBM Cognos Administration > Configuration > Data Source
 Connections > Set properties gosldw_sales > Permissions.

By default, the cube has inherited security from the parent entry, which in this case is the Cognos namespace. Directory Administrators and Everyone are currently in the permissions list.

- Override the access rights from the parent entry, add the **Authors** role and assign it **Read**, **Execute** and **Traverse** access rights.
- Remove the **Everyone** group, and then review rights assigned to the **Authors** role.

The results appear as follows:



• Click **OK**, and then log off.

Workshop 4: Set Object Capabilities

A modeler has created and published a dimensionally modeled relational (DMR) package that queries an extensive data set. If this package is used improperly, for example, without the proper filtering, it can severely impact system performance. Sally White is a member of the Query Users role and thus has access to Query Studio. Because she has little experience working with a package of this type, you want to prevent her from opening this package in Query Studio.

To complete this workshop, you must perform the following high-level tasks:

Note: All users belong to the LDAP_Dev namespace.

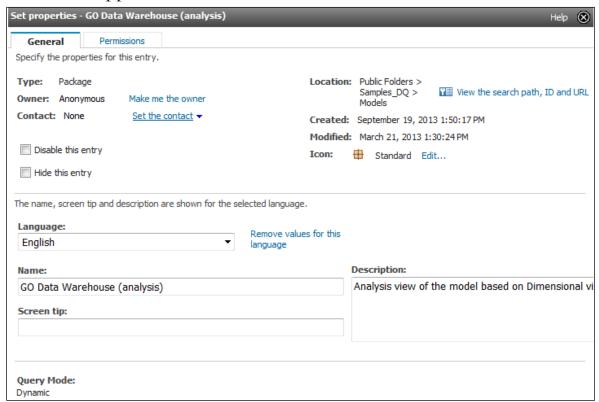
- Log on as Branka Hirsch to identify that she has no access to setting object capabilities.
- Log on as Jeff Waters and grant access to the Set Entry-Specific Capabilities capability for Branka Hirsch.
- Log on as Branka Hirsch to deny Query Studio capability to the GO Data Warehouse (analysis) package for Sally White.
- Log on as Sally White and open the GO Data Warehouse (analysis) package in Query Studio.
- Examine the best practices for configuring capability settings at the level of Public Folders.
- Assign the Drill Through Assistant Capability to the Report Administrators role; grant Execute and Traverse permissions.

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows.

Workshop 4: Tasks and Results

- Task 1. Grant a user access to the Capabilities tab for portal objects.
 - Log on to the **LDAP_Dev** namespace as **hirschb/Education1**.
 - Navigate to IBM Cognos Connection, > Samples_DQ > Models > Set properties - GO Data Warehouse (analysis).

The results appear as follows:



Branka Hirsch does not have access to the Capabilities tab and therefore cannot set capabilities for this package.

- Click Cancel, and then log off.
- Log on to the **LDAP_Dev** namespace as **watersj/Education1**.
- Navigate to IBM Cognos Administration > Security > Capabilities > Set Entry-Specific Capabilities (use Next Page button) > Actions > Set properties > Permissions.

 Add Branka Hirsch from the LDAP_Dev namespace to the Permissions list, and then grant Execute and Traverse access rights.

The results appear as follows:



• Click **OK**, and then log off.

Task 2. Set object capabilities in Public Folders.

- Log on to the **LDAP_Dev** namespace as **hirschb/Education1**.
- Navigate to IBM Cognos Connection, > Samples_DQ > Models > Set properties - GO Data Warehouse (analysis).

Branka Hirsch now has access to the Capabilities tab.

- On the **Capabilities** tab, override the capabilities acquired from the parent entry, and then add **Sally White** from the **LDAP_Dev** namespace to the **Capabilities** list.
- Deny Sally White access to Query Studio.

The results appear as follows:



Click **OK**, and then log off.

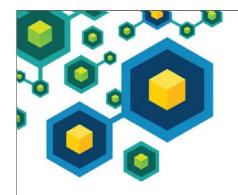
- Task 3. Verify user access to the GO Data Warehouse (analysis) package in Query Studio.
 - Log on to the **LDAP_Dev** namespace as **whites/Education1**.
 - Open Query Studio (Query my data) using the Samples_DQ > Models > GO Data Warehouse (analysis) package.

The GO Data Warehouse (analysis) entry is not a hyperlink, so Sally White cannot access it using Query Studio.

- Click **Cancel**, and then log off.
- Task 4. Examine the best practice for configuring capability settings at the level of Public Folders.
 - Log on to the **LDAP_Dev** namespace as **hirschb/Education1**.
 - In **IBM Cognos Connection**, examine the **Capabilities** currently set for **Public Folders** (use Set properties on the toolbar).

Review the current settings. It is recommended that you modify the capabilities settings to match the global capability settings set up through the Capabilities link in IBM Cognos Administration. This way the global capability settings will be inherited by all new child objects created in the portal. It also indicates what the global settings are and helps to avoid conflicts between global and object capability settings.

• Click Cancel, log off, and then close Internet Explorer.





Administer the IBM Cognos BI Server Environment

IBM Cognos BI 10.2.2



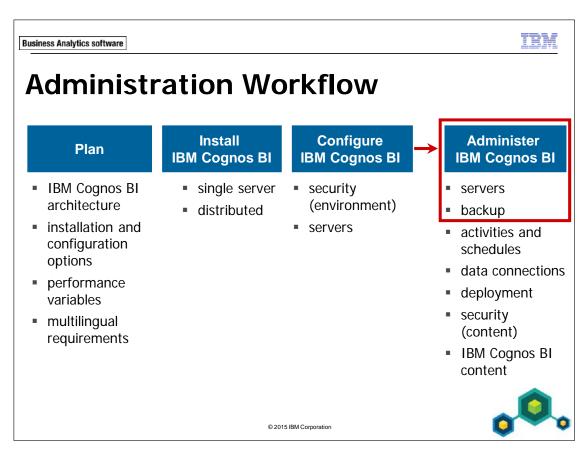
Business Analytics software



Objectives

- At the end of this module, you should be able to:
 - describe the tasks required to administer the IBM Cognos BI server environment
 - perform administrative tasks using IBM Cognos Administration
 - manage dispatchers and services
 - examine the log message facility
 - tune performance of servers
 - identify issues while troubleshooting the server environment
 - identify the IBM Cognos BI backup strategy
 - administer dynamic cubes

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This module covers how to manage the IBM Cognos BI server components and IBM Cognos BI data.



Administer IBM Cognos BI Servers

- In IBM Cognos Administration, use the System and Configuration tabs to:
 - monitor system performance
 - manage dispatchers and services
 - manage Content Managers
 - tune server performance
 - configure how to save report output to a file location
 - set the logging level for log messages

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Use IBM Cognos Administration to manage, monitor, and tune the IBM Cognos BI dispatchers and services.

You should be familiar with the IBM Cognos BI components and how IBM Cognos BI is installed and configured. For distributed installations, you control all functionality through IBM Cognos Administration.

Changes made in IBM Cognos Administration are run time and take effect immediately. Changes made in IBM Cognos Configuration require a refresh of the IBM Cognos services. Some tasks are performed outside of IBM Cognos Administration or IBM Cognos Configuration. Additional administrative tasks include:

- overriding the (default) locale processing in the prompt cache
- migrating PowerPlay reports published to IBM Cognos BI
- enabling concurrent query execution
- setting query prioritization
- reducing decimal precision
- configuring a custom lineage solution
- configuring the IBM WebSphere Business Glossary URI
- enabling job, task, and SMTP queue metrics
- disabling session caching

For information on these tasks, refer to *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 7: Server Administration.



Monitor System Performance

- Monitor performance using system metrics.
- For the system, servers, server groups, dispatchers, and services, you can monitor:
 - metrics, including their associated scores and current values
 - status

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To diagnose and fix problems, you can monitor system performance using metrics in IBM Cognos Administration. For example, you may want to know if there is a high number of items in a queue, or if certain items have been waiting in a queue for longer than a specified amount of time.

You can assess the status of the system as a whole, along with the status of individual servers, dispatchers, and services.

You can view metric scores that are based on thresholds that you set. You can also view the operational status of system components.

Each metric score is represented by a symbol:

- a green circle for good
- a yellow diamond for average
- a red square for poor

Status is one of the following:

- available if all components are available
- partially available if at least one component is available and at least one component is unavailable or partially unavailable
- unavailable if all components are unavailable

For more information on proven practices for System Metrics, refer to the content on System Management Methodology which is available as a download from the IBM developerWorks Web site at

http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos_sp ecific/page592.html.

How Metrics Data is Gathered

- Data for metrics is gathered differently depending on the:
 - metric change type
 - time scope
 - gathering time associated with the metric

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Metric Change Type: the value that is displayed for a metric depends on the change type.

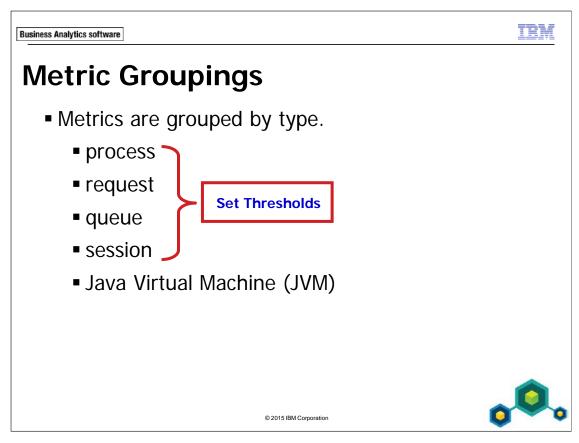
- Counter: The value is a sum that increases with each change. For example, number of requests is a counter change type.
- Gauge Metric: The value may increase or decrease over time, depending on events. For example, the number of processes running at any time is a gauge change type.

Metric Time Scope: the interval over which a metric value is gathered differs by metric.

- Point in time: The value is gathered at a specific point in time, such as when you reset a metric group or restart a service.
- Since reset: The value is gathered over the interval since the last reset of the metric.

Metric Gathering Time: the time at which a metric value is gathered differs by metric.

- On change: The value is collected when a change occurs, such as when the number of requests changes.
- On demand: The value is gathered when you select a new item in the Scorecard pane, or reset a metric group.
- Unknown: The gathering time is unknown.



You can use the metrics within the process metrics grouping to monitor Report service processes. They apply only to the Report and Batch Report services.

You can use the metrics within the request metrics grouping to monitor volume of requests, operational status of services, response times, and processing times.

You can use the metrics within the queue metrics grouping to determine if the system is keeping up with demand. For example, if requests spend too long in a queue, you may not have enough resources to meet demand.

General request metrics include data for all services and are a consolidation of metrics for all dispatchers. Request metrics specific to a service include only data for that service. At the system, server, and server group levels, the metrics include data from all associated dispatchers. At the dispatcher level, metrics include all associated services.

There are queue metrics for services that use queues: report service and report data service. There are also queue metrics at the system level for the following:

- Job queue, which contains metrics related to the internal queue used by all event management services.
- Task queue, which contains metrics related to the internal queue used by all monitor services. This queue contains tasks until they are successfully completed.
- SMTP queue, which contains metrics related to the internal queue used by all delivery services. This queue contains emails until they are sent.



Set Metric Thresholds

- Set a threshold value for a metric, so that when the value is crossed, the state of the metric score changes.
- Values depend on your operating environment.
- Set the performance pattern of the metric:
 - high values are good
 - middle values are good
 - low values are good

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Along with setting threshold values, the performance pattern helps determine how the score is calculated. They include:

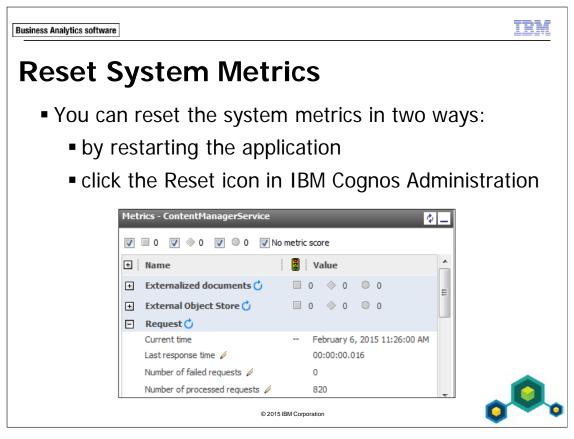
- High values are good example: Percentage of successful requests metric.
- Middle values are good example: Number of processed requests metric. Too many requests might indicate a need for adding dispatchers, too few might indicate a need for removing a dispatcher.
- Low values are good example: Time in queue metric.

You can apply the same threshold setting to multiple entries using a template. You can also reset metrics and refresh report service connections.

You can view the attributes for each metric score, including the last time a metric was reset and updated, and the current threshold setting for each metric score for which a threshold is set. For metrics that are collected at regular intervals, you can also view the period of time to which the value applies.

For more information on managing system metrics refer to *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 6: System Performance Metrics.

Log entries occur when metric thresholds are violated and when enumerated metrics, such as operational status, change. Logging occurs automatically without logging being enabled in IBM Cognos Configuration.



As the metrics are dynamic and reside as part of the dispatcher, they are volatile and thus will be reset every time the service or server is restarted. In certain situations it may be desired to have the metrics reset without restarting the entire application. This is possible by using the Reset button that is part of the Metrics fragment toolbar. When the Reset button is clicked, all of the metrics that belong to the service in context will be reset. If a higher level is in context, such as a server or the system, all of the metrics that pertain to that object will also be reset.



Percentage Metrics (Failed and Successful)

- These are excellent metrics to monitor when resetting the metrics is:
 - not possible
 - not going to be done
- With no reset, once threshold is reached on a:
 - count metric, the metric value will not change over time (once it is red, it will always be red)
 - percentage metric, the metric value may change over time (red, yellow, green)

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Thresholds on the percentage metrics will always be in play regardless of when the last reset has occurred.

With count metrics for failed and successful requests (NumberOfFailedRequests and NumberOfSuccessfulRequests) thresholds will only occur after a period of time. For example, if the threshold score is set to turn red after 50 failed requests, once the threshold is exceeded (one day, one week, one month, etc.) the threshold score will always be red until the service is restarted or the metrics are reset.

Thresholds on the percentage metrics will change over time. Using the previous example, if the failed requests hit 50 after the first 50 requests, the value would be 100% and more than likely would result in a threshold score of red. From that point forward, if every request was successful, the metric value would decrease thus moving the red score to yellow and then eventually green. Due to this, if only the percentage metrics were being monitored via thresholds, no resetting of metrics would ever need to occur.



Successful Requests Per Minute

■ The value does not indicate an ongoing average from minute to minute, rather it is an indication of how many requests have been processed during the amount of time the system has spent processing them.

Formula:

(number of successful requests * service time for successful requests)/60 seconds

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An example to consider: 10 requests are executed successfully and the server has spent 30 seconds executing the request. When looking at the metric after a minute, the traditional definition would indicate the average is 10 requests per minute. After the second minute, the value would be 5, etc. The actual use of this metric would be 20 after one minute and would still be 20 after 2 minutes. This algorithm shows that the average successful requests is based on the amount of processing time it took to execute them and not the actual time. This is done to provide a real value that isn't impacted by periods of inactivity.

Demo 1: Set Thresholds on a System Metric and Monitor System Performance

Purpose:

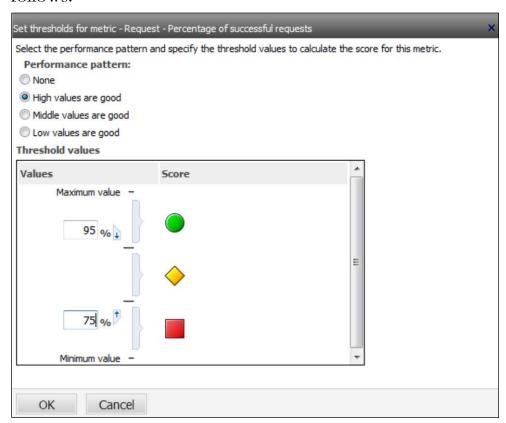
To begin monitoring system performance, you will set thresholds on the Percentage of successful requests metric. To identify how this metric can be used to monitor performance, you will run a report repeatedly with and without errors and then monitor the metric score in the Metrics pane.

- Task 1. Set thresholds for the Percentage of successful requests metric.
 - 1. Open **Internet Explorer**, and then navigate to http://vclassbase:88/C10Full.
 - 2. Log on to the **LDAP_Dev** namespace as **meyerst/Education1**. Tim Meyers is a member of the Server Administrators role.
 - 3. Click Administer IBM Cognos content.
 - 4. In the left pane, on the **Status** tab, click **System**.
 - 5. In the **Scorecard** pane, click **vclassbase**, and then click **http://vclassbase:9315/p2pd**.
 - 6. Click **QueryService**, and then in the **Metrics** pane, expand the **Request** metrics grouping.
 - 7. Beside **Request**, click **Reset**, and then click **OK** when you have viewed that the reset was successful.
 - 8. In the expanded **Request** section, for the **Percentage of successful requests** metric, click **Edit thresholds**.

 You can choose the performance pattern and set the thresholds for this metric.
 - 9. In the **Performance pattern** section, click **High values are good**.

10. Beside the upper range box, click the **up arrow**, set the **upper range value** to **95**, and then set the **lower range value** to **75**.

A section of the Percentage of successful requests metric dialog box appears as follows:



11. Click **OK**.

A green circle appears beside the metric. It may take a minute for the display to refresh and display the icon.



The indicator light will remain green when the value for Percentage of successful requests is between 100 and 95. Values less than 95 and greater than 75 will be indicated as yellow and any value equal to 75 or less will be indicated as red. When a metric exception occurs (indicator values change) the exception will be logged to the audit database if the audit database is configured. The recording of thresholds will occur even at the lowest level of auditing (level 1 or minimal). This means that it is possible to audit the threshold exceptions without having to enable all of the reporting auditing.

For the purposes of this demo, you will perform the following:

- Disable one of the dispatchers so that all requests are sent to a single available dispatcher. This avoids having to run reports multiple times to see changes in metric status.
- Disable the Content Manager Cache Service on the available dispatcher. The Content Manager Cache Service enhances the overall system performance and Content Manager scalability by caching frequent query results in each dispatcher. You do not want to cache query results.
- 12. From the **Task Bar**, click **Services**, and stop the **IBM Cognos DispCM** service, and then close the **Services** window.
- 13. In **IBM Cognos Administration**, in the navigation path at the top of the Scorecard pane, click http://vclassbase:9315/p2pd.
- 14. Beside **ContentManagerCacheService**, in the **Actions** list, click **Stop immediately**, and then click **OK**.
- 15. Click **Query Service**, and then in the **Metrics** pane, expand **Request**.

Task 2. Run a report to gather metric values.

You will log on to a new instance of IBM Cognos BI, without logging off the Tim Meyers instance.

Note: In this task, you will have 3 active instances of IBM Cognos BI. Due to browser functionality, while navigating between these instances, the user may change and you will have to log in as the correct user again.

- 1. On the taskbar, right-click **Internet Explorer**, click **Start InPrivate Browsing**, and then navigate to **http://vclassbase:88/C10Full**.
- 2. Log on to the **LDAP_Dev** namespace as **hirschb/Education1**.
- 3. Click **IBM Cognos content**, and then navigate to **Public Folders** > **Samples_DQ** > **Models** > **GO Sales (query)** > **Report Studio Report Samples**.

Leave this window open without running the report.

4. Repeat step 1 to open a third instance of IBM Cognos BI, and log on to the **LDAP_Dev** namespace as **watersj/Education1**.

A new session may open with Branka Hirsch logged in; you may log off this second instance of this user.

- 5. Click **Log Off**, click **Log on again**, and then log on as **watersj/Education1**.
- 6. Click **Administer IBM Cognos content**, and then click the **Configuration** tab.
- 7. In the **Action** column for the **great_outdoors_sales** data source, click **Set properties**.
- 8. Change the **Name** property to **great_outdoors_sale**, and then click **OK**.
- 9. Return to the second instance of **IBM Cognos BI** (Branka Hirsch), and click the **Order Invoices Donald Chow, Sales Person_DQ** report.

The report fails to run and an error message is returned, indicating that the data source could not be found in Content Manager.

10. Click **OK**, and then return to the first instance of **IBM Cognos BI** (Tim Meyers session).

The second browser instance is now also logged in as Jeff Waters. Do not log off the second instance until instructed in step 14.

- 11. In the **Metrics** pane, at the top right corner, click **Refresh** .

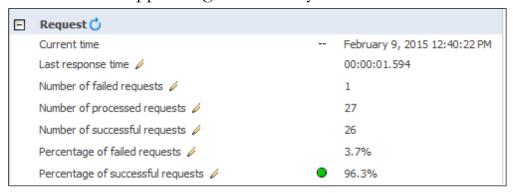
 For the Number of failed requests, the Value column shows a value of 1. A red square appears as the metric score beside the Percentage of successful requests metric along with a value of 66.67% in the Value column. This value falls below the lower range threshold you set in Task 1.
- 12. Return to the third instance of **IBM Cognos BI** (Jeff Waters) to change the **Name** property of the **great_outdoors_sale** data source to **great_outdoors_sales**, log off, and then close that instance of **Internet Explorer**.
- 13. Return to the second instance of **IBM Cognos BI** (Branka Hirsch). The second instance has Jeff Waters logged on. You want to log into the second instance as Branka Hirsch.
- 14. Log off, log on as hirschb/Education1, and run the Order Invoices Donald Chow, Sales Person_DQ report again, this time expecting success. The report runs successfully.
- 15. Click **Return**, and then return to the first instance of **IBM Cognos BI** (Tim Meyers).
- 16. At the top of the **Metrics** pane, click **Refresh**.

 A yellow diamond appears beside the Percentage of successful requests metric. The percentage of successful requests is at 90.91%, which falls between the upper and lower range thresholds you set in Task 1.
- 17. Return to the second instance of **IBM Cognos BI** (hirschb/Education1), and run the **Order Invoices Donald Chow, Sales Person_DQ** report again (successfully).
- 18. Click **Return**, and then return to the first instance of **IBM Cognos BI** (Tim Meyers).
- 19. At the top of the **Metrics** pane, click **Refresh**.

 A yellow diamond appears as the metric score beside the Percentage of successful requests metric and the Value is at 94.74%, which falls between the upper and lower range thresholds you set in Task 1.

- 20. Return to the second instance of **IBM Cognos BI** (hirschb/Education1), and run the **Order Invoices Donald Chow, Sales Person_DQ** report again (successfully).
- 21. Click **Return**, log off, and then close that instance of **Internet Explorer**.
- 22. At the top of the Metrics pane, click Refresh.

A green circle appears as the metric score beside the Percentage of successful requests metric along with a value of 96.3% in the Value column. This value falls above the upper range threshold you set in Task 1.



- 23. For the **Percentage of successful requests** metric, click **Edit thresholds**, under **Performance pattern**, click **None**, and then click **OK**.
- 24. At the top of the **Scorecard** pane, in the navigation path, click http://vclassbase:9315/p2pd.
- 25. Beside **ContentManagerCacheService**, in the **Actions** list, click **Start**, and then click **OK**.
- 26. From the **Task Bar**, click **Services**, and start the **IBM Cognos DispCM** service.

Results:

You began the process of monitoring system performance by setting thresholds on the Percentage of successful requests metric. You identified how this metric can be used to monitor performance by running reports both successfully and unsuccessfully, and by monitoring changes in metric scores in the Metrics pane.



Manage Dispatchers and Services

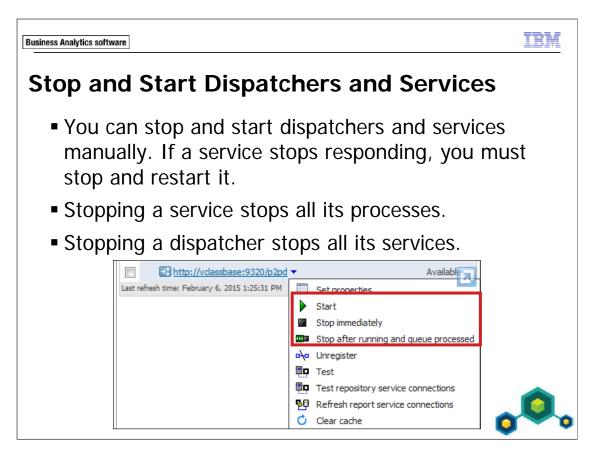
- Perform maintenance on dispatchers and services.
 - start and stop dispatchers and services
 - activate a Content Manager service
 - remove dispatchers from the environment
 - move dispatchers
 - rename dispatchers
 - test dispatchers
 - administer failover for multiple dispatchers

6

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The dispatcher is the entry point for IBM Cognos BI service requests sent by a Web server gateway or third-party software.

The dispatcher handles the routing requests and balances the load of user requests to the various IBM Cognos BI services.

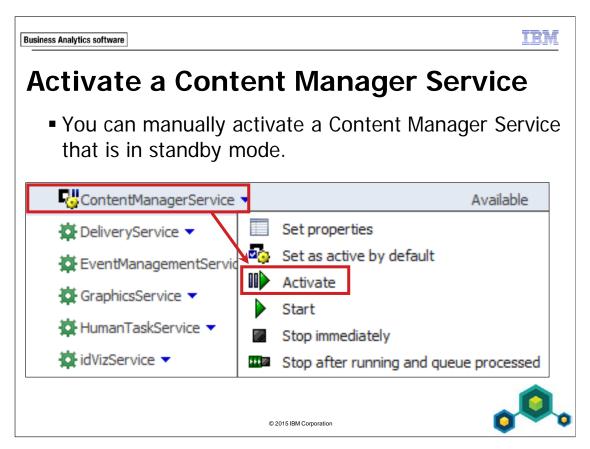


You can stop and start dispatchers and services manually. If a service stops responding, you must stop and restart it.

Each dispatcher and service can be:

- started
- stopped immediately, deleting all the requests that are running or queued, without completing those requests
- stopped after running, processing all queued requests

A dispatcher or service does not appear in the Scorecard pane if it is disabled in IBM Cognos Configuration.



Although only one Content Manager service can be active at any time, you can manually activate a Content Manager service that is in standby mode. When you activate a service, any currently active service switches to standby mode.

You can also specify which Content Manager service will be the active service at start up.



Perform Dispatcher Administration

- Remove a dispatcher if you no longer need it in the IBM Cognos BI environment.
- Rename a dispatcher to secure the system.
- Test a dispatcher to ensure that it is responding appropriately.
- Administer failover for multiple dispatchers.

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You can perform administrative tasks on dispatchers including removing, testing, and renaming them.

Remove a Dispatcher: If you no longer need it in the IBM Cognos BI environment. To remove a dispatcher, you must first unregister it to remove it from the content store. You must then uninstall the dispatcher from the computer where it is installed. If you do not uninstall a dispatcher after unregistering it, it will reregister itself and restart the next time that IBM Cognos BI is restarted.

Test Dispatchers: To evaluate how IBM Cognos BI is performing, and ensure that the dispatchers are responding; view the uptime, which is the time in seconds during which the dispatchers are working without failure. When you test a dispatcher, you also test the services that belong to that dispatcher. After testing a results page appears and shows the status of the test, the dispatcher version, uptime, and any messages. If dispatchers are not performing as they should, you can tune server performance by changing their configuration settings.

As a security measure, you can rename dispatchers if you do not want to reveal the host computer name, port number, or path of the dispatcher. Only Server Administrators can view and change the name of dispatchers. When renaming a dispatcher, do not use any information that reveals the host computer name or port, or other system or path information. However, it is important to remember where the dispatcher is installed, for monitoring purposes.



Manage Content Managers

- You can set advanced Content Manager parameters for the following:
 - database connection pool settings
 - sorted entries for non-English locales
 - Content Manager synchronization
 - control browsing of external namespaces

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Database connection pool settings: to increase performance, you can change content store database connection pool settings for Content Manager.

Sorted entries for non-English locales: when using a locale other than English, you can correct irregular sorting of entries in IBM Cognos Connection by using the CM.SortCollation setting.

Content Manager synchronization: you can set parameters that specify standby Content Manager activities.

Control browsing of external namespaces: you can control whether users can browse external namespaces by using the CM.SecurityQueryRequiresRead setting.

For more information on setting advanced Content Manager parameters refer to the *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 7: Server Administration.



Tune Server Performance

- Tune configuration settings and services to optimize the speed and efficiency of the IBM Cognos BI system.
- Consider:
 - tuning to meet peak usage times
 - scaling up if necessary
 - the logging level
 - optimizing Framework Manager models
 - the operating system

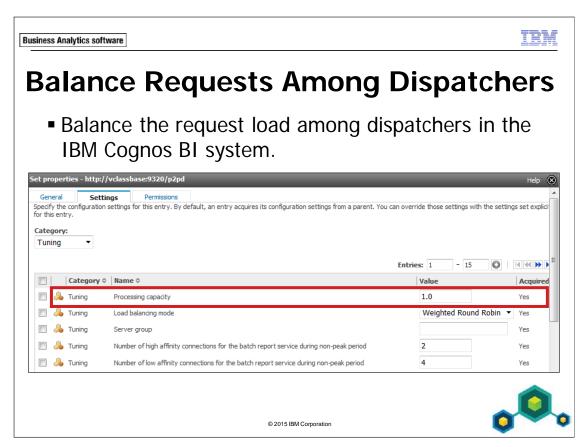
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By tuning the configuration settings of dispatcher and services, you can optimize the speed and efficiency of IBM Cognos BI. For users, optimal performance means that their reports run fast and without errors. For you, it means that IBM Cognos BI is stable and that the users are satisfied with performance.

Options for tuning performance of the server environment include grouping dispatchers, specifying advanced dispatcher routing, balancing the request load, setting the load balancing mode, setting number of processes and connections, maximizing usage during peak periods, and setting queue time limits.

For more information on tuning refer to the *IBM Cognos Business Intelligence Version* 10.2.2 Administration and Security Guide, Chapter 7: Server Administration.

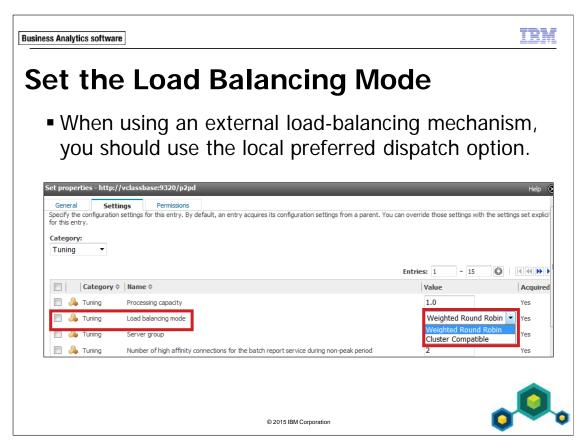


If your IBM Cognos BI installation includes more than one dispatcher, you can specify the proportion of requests that each dispatcher handles by changing their processing capacity. This is referred to as automatic load balancing.

If all servers in your environment are of equal or near-equal processing capacity (for example, number of CPUs, CPU clock rates, memory), the default processing capacity of 1.0 should be sufficient.

Be sure to monitor system utilization metrics to determine if resource consumption is being distributed appropriately.

Affinity settings take precedence over balance request settings and advanced routing settings.



The Load Balancing Mode property can be set to:

- Weighted Round Robin: dispatcher distributes requests in a weighted round fashion, according to the processing capacity set for the dispatcher. This is the default mode.
- Cluster Compatible: low affinity requests are processed locally if the required service is available, thus disabling the IBM Cognos BI internal load balancing mechanism.

With an external load balancing mechanism in use, such as a network router, having additional load balancing at the dispatcher will duplicate the load balancing effort and can degrade performance. To respect what is achieved from your own load-balancing infrastructure, you can disable load balancing at the dispatcher by setting the Load Balancing Mode property to Cluster Compatible.

In clusterCompatible mode, if the required service is not available, the request fails.



Tune for Peak Demand

- Determine the start and end hours of the peak demand period for your organization.
- During the peak period you may want to:
 - set the number of connections and processes lower than during non-peak period
 - set the number of jobs lower than during non-peak period

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Most organizations have a period of peak demand. This period is usually during business hours when employees are at work and run interactive reports.

You can determine the start and end hours of the peak demand period for your organization.

During the peak period, you may want to set the number of connections and processes low enough so that jobs can run faster and system resources can process interactive requests from users.

During the non-peak period, you can set the number of connections and processes higher because demands on the system are lower.

The default peak period is from 07:00 to 18:00. The default number of connections for each service during the peak period and during the non-peak period is four.



Specify the Number of Processes and Connections

- For peak and non-peak periods, specify:
 - the number of processes for the report, batch report, and data movement services
 - the number of connections for the agent, Content Manager, delivery, and job services

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For the report service, the batch report service, and the data movement service, you can specify the maximum number of processes that can start at one time. The number of processes that are active for each deployed instance of a service is dependent on the number of report processing requests received by that instance.

For the agent, Content Manager, data movement, delivery, job, and report data services, you can set the maximum number of connections. Connections handle one request from one service at a time.



High Affinity Requests

- High affinity requests:
 - benefit from the labors of previously processed requests
 - are routed to the same process that was initially invoked, if it is available
- Examples:
 - run report again (IBM Cognos Viewer)
 - HTML report navigation top/bottom, next page
 - report delivery email, save, save as, print

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IBM Cognos BI attempts to route high affinity requests back to the executing process on a specific server regardless of the load balancing used, thus attempting to minimize resource consumption.

For example, when a pageDown command is executed while reading a report, the command is executed most efficiently using the report process that displayed the existing page. If the same report process is used, the system scrolls the existing database cursor, retrieves the data, and renders the next page. In other words, when the first page is rendered, information is cached by the report process so that a subsequent high affinity request (pageDown) avoids overhead activities.



Low Affinity Requests

- A low affinity request:
 - has no affinity for a particular process
 - performs equally well regardless of which process handles the request
- Examples:
 - administrative test data source connections, add objects, refresh
 - authoring metadata retrieval, query validation
 - running reports (interactive and batch) querying, processing, prompting

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A low affinity request has no affinity for a given report process. With multiple IBM Cognos BI server components installed, the request will be distributed to any report process on any computer in the IBM Cognos BI system, subject to the IBM Cognos BI load-balancing mechanism.



Affinity Connections (1 of 2)

- For the report service, the batch report service, and the data movement service, you can also specify the maximum number of high affinity and low affinity connections that the dispatcher can open to handle requests.
- Affinity connections:
 - are used to process requests
 - remain unavailable for the duration of a request
- Once a connection is completed, it is pooled, and is ready to be consumed by another request.

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Each connection handles one request at a time.

Affinity connections remain assigned or unavailable for the duration of a request, from user submission to request completion.

Do not confuse the affinity of a request to a report process with the affinity of a request to a connection. There is no affinity between a request and a connection. Once a connection is completed, it is pooled and is available to be consumed by any other request.



Affinity Connections (2 of 2)

- Low affinity connections process low affinity requests.
- High affinity connections process high affinity requests.
- A high affinity request may be processed using a low affinity connection.
- For peak and non-peak periods, specify the number of low and high affinity connections (threads) for the report and batch report services.

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Configure affinity connections to reserve a specified number of connections that are available for processing high affinity and low affinity requests.

In most cases, high affinity requests are processed using high affinity connections. If the specific report server is not available or busy, then the report is rerun (low affinity request) on any report server and the next page (high affinity request) is directed to that server.

The Process/Thread Model (1 of 3)

- IBM Cognos BI report processes manage the allocation of high and low affinity connections.
- There is direct relationship between the settings for the report, batch report and data movement service processes and those for high and low affinity connections.

Default settings for the report service during nonpeak period

Report Processes	Low Affinity Connection Setting	High Affinity Connection Setting	Total Low Affinity Connections	Total High Affinity Connections
2	8	2	16	4

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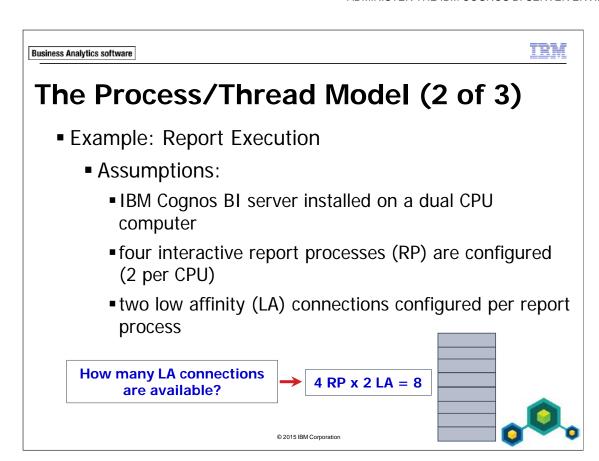
The actual number of high or low affinity connections available to handle requests, is the product of the values provided for:

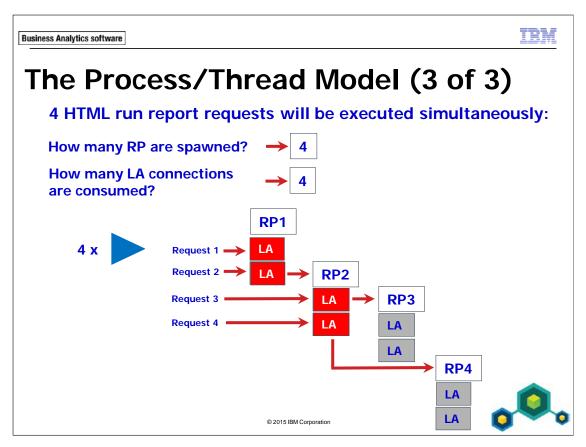
- Maximum number of processes setting, and
- Number of high affinity or low affinity connections settings

It is recommended that you configure the number of affinity connections only if the need arises. If these values need to be adjusted for performance reasons, in the visible properties of the service, do not specify the presumed total number of connections you want. The number you supply here is used to calculate the total number of high and low connections. It is recommended that the sum of the supplied values does not exceed 10. As such you could set these properties as follows:

- High = 2, Low = 8 (default)
- High = 4, Low = 6
- High = 6, Low = 4
- High = 8, Low = 2

In most cases, it is more likely that you will need fewer High and more Low affinity connections as per bullets 1 and 2. In the event there is request queuing and there is available capacity on the applicable systems, then you should first tweak the number of processes. Adding processes will also give you more affinity connections. However, if the maximum number of processes or connections is set too high, and there isn't sufficient capacity, many concurrent requests compete for system resources, requests take longer to complete, and a bottleneck can occur.





Using the previous slide and this slide as an example, where:

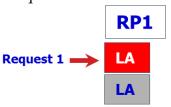
- 4 report processes and 2 low affinity connections per process (total of 8 LA connections available) are configured.
- 4 HTML run report requests are executed simultaneously

The result is that 4 report processes will be spawned and 4 low affinity connections will be consumed. How is this derived?

New report processes are spawned when half the number of connections for a given report process become allocated, depending on if the configured maximum number of processes has not been reached yet.

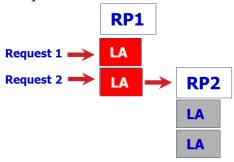
By default, one report process is running in memory. Therefore, in this example, a pool of 2 LA connections is available when the 4 requests are executed.

• Request 1 consumes 1 LA connection from the pool of 2 connections.



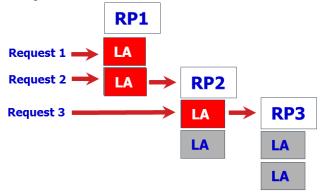
Therefore, 50% of the connections in the pool have been consumed. 1 is consumed and 1 is available.

• Request 2 consumes another LA connection from the pool of 2 connections.



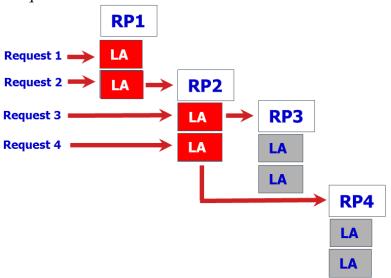
Therefore >50% of the connections in the pool have been consumed, and another report process is spawned, raising the number of connections in the pool to 4 (2 are consumed and 2 are available).

• Request 3 consumes another LA connection from the pool of 4 connections.



Now, 3 connections are consumed from the pool of 4, which is again >50% of the connections in the pool. Therefore, another report process is spawned, raising the number of connections in the pool to 6 (3 are consumed and 3 are available).

• Request 4 consumes another LA connection from the pool of 6 connections,



Now 4 connections are consumed from the pool of 6, which is again >50% of the connections in the pool. Therefore, another report process is spawned, raising the number of connections in the pool to 8 (4 are consumed and 4 are available).

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IBM Cognos BI and Java

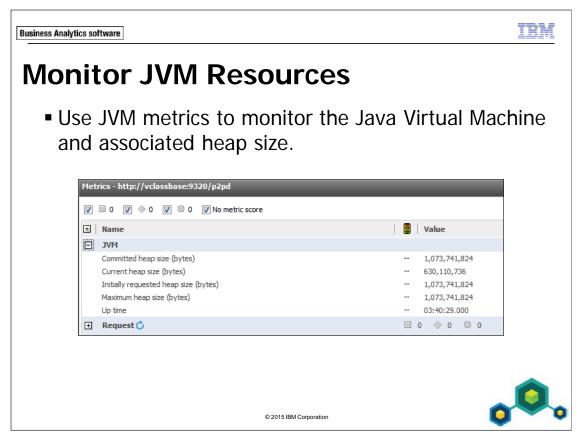
- Java Runtime Environment (JRE) :
 - is required by IBM Cognos components to operate
 - is provided with IBM Cognos BI (Windows only)
 - includes the Java Virtual Machine (JVM)

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IBM Cognos BI components use the JRE referenced by the JAVA_HOME environment variable. On Windows, if JAVA_HOME is not set, the JRE that is packaged with IBM Cognos BI components is used by default.

For more information on configuring the JRE refer to the *IBM Cognos Business Intelligence Version 10.2.2 Installation and Configuration Guide*, Chapter 9: Configuration Options, in the section Changing the version of Java used by IBM Cognos BI Components.



The current heap size lets you know if available memory is being used.

The maximum heap size tells you if you have allocated a suitable amount of memory to the JVM based on the amount of hardware memory available.

If current heap size is close to the maximum heap size, you may want to adjust tuning settings to reduce the load on a particular JVM.

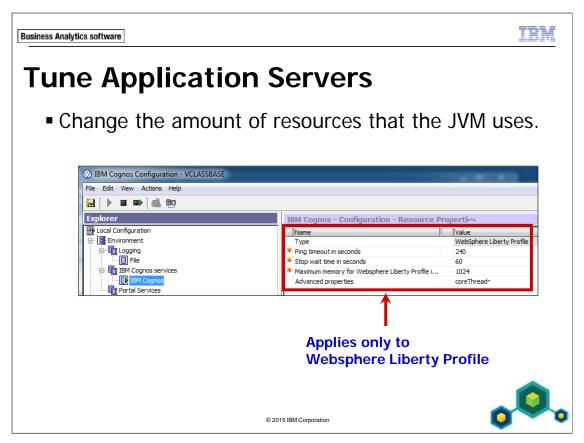
Keep in mind that current heap size may vary widely depending on the current load on the system.

Thresholds for monitoring metric scores cannot be set on the JVM metrics groupings. Only the metric values can be monitored.

Initially requested heap size: The initial amount of memory Gauge Point in time On demand that the JVM requests from the operating system during startup (in bytes).

Up time: The length of time that the JVM has been running (in days, hours, minutes, and seconds).

IBM Cognos Administration can be used to monitor Java usage when either Tomcat or a third party application server is configured.



The memory settings of your application server dictate the memory that is available to IBM Cognos BI dispatchers and services.

In IBM Cognos Configuration, the default memory allocation is 768 MB. The memory allocation strategy for your application server depends on the available hardware capacity, and on the resource needs of other applications running on the server.

The memory settings in IBM Cognos Configuration apply only to Websphere Liberty Profile. If you want to configure IBM Cognos BI to run on another application server, configure the resources within that application server environment.

Configuration templates:

- Small configuration: optimize the startup time, memory footprint, and resources used
- Medium configuration: balance between fast startup time and quick operating speeds
- Large configuration: maximize operating speeds, if performance is more important than fast startup time, and if your computer has a lot of resources.

By default, the JVM is configured to use Small configuration. In general, it is recommended that you configure your application server with a minimum of 512 Megabytes of memory for multi-user applications. You may be able to reduce application server memory to 256 Kilobytes, but you should only consider this for single users, or for proof of concept or demonstration applications.

For Windows platforms, use small or medium configuration. This is because, by default, the Windows operating system can only allocate 2 GB per process. With Java running this is reduced to approximately 1.5 GB per process, which is lower than the large configuration setting in IBM Cognos Configuration. IBM Cognos BI has not been developed to take advantage of a switch to allocate up to 3 GB of ram per process, which would allow using the large configuration. UNIX and Linux do not have the limitation by default, but the system administrator can force a limit using ulimit and SHMMAX parameters.

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Additional Tuning (1 of 2)

- Specify queue time limits.
- Modify PDF file settings.
- Set maximum execution time.
- Specify how long to keep Watch List report output.

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Specify queue time limits: This is the maximum number of seconds that interactive requests made by users wait in the queue for an available report service or data movement connection.

PDF file settings: Determine the speed at which PDF files are created and the size of PDF files.

Maximum execution time: If the time limit is exceeded for requests sent to the report service, batch report service, and data movement service, the execution is cancelled. Keep watch list report output: Specify number of runs or number of days or months.

If a request cannot be processed within the time limit, the request fails and users receive an error message. If your operating system has adequate resources and IBM Cognos BI is properly configured, requests should not take longer than the time limit. When you specify a time limit, consider the maximum number of seconds that you want users to wait for a response. The default queue time limit is 240 seconds. Requests for the batch report service stay in the queue indefinitely.

Ideal settings for PDF files are different for different environments. For example, if you create PDF files as part of batch jobs overnight, you may not care about speed. You may choose settings that create small files that can be easily distributed but take longer to generate. If you create ad hoc PDF files or complex PDF files with many charts and graphics, you may care more about speed than file size. You can use different PDF file settings for report service and for batch report service.

Users can add themselves to a watch list for a report. They will receive an email notification when new versions of the report output are saved. In this way, they can monitor changes in the output of reports that are of interest to them.

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Additional Tuning (2 of 2)

- Limit hotspots that are generated in an Analysis Studio or a Report Studio Chart report.
- Set the report size limit for the report data service.

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A hotspot in a chart appears when you pause your mouse cursor over it. Response time increases with the number of hotspots. You may want to limit the number of hotspots that are generated for Analysis Studio and Report Studio charts to improve performance.

To limit the resources that are used by Report data service, IBM Cognos BI restricts the size of the report data that can be sent out. If you receive errors in IBM Cognos BI for Microsoft Office indicating that a report result is too large, you can increase the size limit for report data by changing the Governor limit setting.

When you limit the number of hotspots, priority is given to items such as axis labels and legend labels before individual graphical elements such as bars, pie slices, and so on. Depending on the number of items in a chart and the setting for maximum number of hotspots, some axis items may have hotspots while other axis items and all graphical elements do not, or all axis items and some graphical elements may have hotspots while other graphical elements do not. The maximum hotspot setting in Report Studio overrides this setting.

For more information on these settings refer to the *IBM Cognos Business Intelligence* Version 10.2.2 Administration and Security Guide, Chapter 7: Server Administration, in the Tune server Performance section.

Demo 2: Examine Dispatchers and Services

Purpose:

To assist you in administering the server environment, you will use IBM Cognos Administration to examine the properties of the dispatchers and services based on the installed components.

- Task 1. Log in as a member of the Server Administrators role and examine dispatchers.
 - 1. Logged on to **IBM Cognos Administration** as **Tim Meyers** (meyerst/Education1), click the **Configuration** tab, and then click **Dispatchers and Services**.

The right pane lists the two dispatchers installed in the environment. The user interface represents these entries as dispatchers, which are the configurable instances of the services of the installed components, as they are registered in Content Manager.

If you have a gateway installed on a separate computer, there is no entry in this UI to represent it, because it hosts the gateway only. The gateway is registered; however, it has no configurable services associated with it.

You can navigate to the properties of a dispatcher to modify settings that include all services associated with that dispatcher.

- 2. Beside http://vclassbase:9315/p2pd, in the Actions column, click Set properties, and then click the Settings tab.
 - All of the properties available for modification for this dispatcher are displayed.
- 3. In the **Category** list, click **Tuning**.
 Only the properties associated with tuning the dispatcher are displayed.
- 4. Click **Cancel**, and then navigate to the **Settings** tab and the **Tuning** properties of the other dispatcher **http://vclassbase:9320/p2pd**.

- 5. Identify any differences between the properties of each dispatcher, using the following questions as guidelines:
 - Which dispatchers host the:
 - Content Manager service?
 - Metadata service?
 - Report service?
 - Batch Report service?
- 6. Click Cancel.

Task 2. Examine services.

You can also navigate to the properties of an individual service of a dispatcher to modify the properties of that service.

- 1. Click http://vclassbase:9315/p2pd.
 - All the services associated with the dispatcher are displayed.
- 2. Click **Next Page**, in the **Actions** column for **ReportService**, click **Set properties**, and then click the **Settings** tab.
 - Only properties for the ReportService are available for modification.
- 3. Click **Cancel**, click **Previous Page**, and then in the **Actions** column for **BatchReportService**, click **Set properties**.
- 4. Click the **Settings** tab.
 - Only properties for the BatchReportService are available for modification.
 - Question: How is this set of properties different from those seen for the report service?
 - Answer: The batch report service does not include a property for setting the queue time limit. Requests processed by the batch report service do not wait in a queue. Their processing is controlled by properties set for the monitor service.
- 5. Click **Cancel**, and then log off.
 - Tim Meyers does not have the ability to schedule items, which is done in the next task.

Task 3. Examine the QueryService service.

The Query Service supports the dynamic query mode (DQM). It manages dynamic query requests and returns the result to the requesting batch or report service.

You can add a dynamic cube to an instance of the Query Service and then configure its properties. After you add dynamic cubes to the Query service, you can monitor the state and metrics for each cube, and view the settings for each cube. You can also manage dynamic cubes on the Query Service.

- 1. Log on to the **LDAP_Dev** namespace as **admin/Education1**, and then click **Administer IBM Cognos content**.
- 2. On the **Status** tab, click **System**, and then in the **Scorecard** pane, click **vclassbase**.
- 3. Click http://vclassbase:9315/p2pd, and then beside QueryService, in the Actions list, click Set properties.
- 4. Click the **Settings** tab.

Notice the entries related to dynamic cubes: Dynamic cube configurations, Do not start dynamic cubes when service starts, Dynamic cube administration command timeout (seconds), and so on. Dynamic cubes are administered in the QueryService service. The dynamic cube entries in the query service section pertain to all cubes running within the query service. It is also important to note the JVM heap and nursery sizes; these are extremely important for dynamic cubes since more memory is required to run dynamic cubes.

5. In the **Category** list, click **Environment**, and then beside **Dynamic cube configurations**, in the **Value** column, click **Edit**.

You can add new configurations for dynamic cubes here.

6. In the **Properties** column for the **gosldw_sales** entry, click **Edit** configuration .

Of the various cube properties, the three most important are those which control the size of a cube's caches (aggregate, result set, and data caches).

- 7. Click **Cancel** to close each open page, without saving changes, and returning to the **System** pane.
- 8. Click the **QueryService** entry.

The gosldw_sales dynamic cube is displayed within the QueryService.

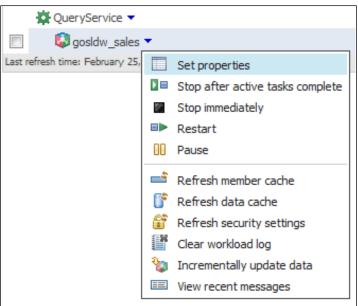
9. Click **gosldw_sales**.

The Metrics pane is populated with dynamic cube metrics that you can monitor, such as the following items:

- Aggregate table hit rate
- Data cache hit rate
- In-memory aggregate cache hit rate
- Percentage of time spent retrieving data
- Result set cache hit rate

For more information on these metrics and others, refer to the table Additional Information: Understand Cube Metrics, at the end of this module.

10. For the **gosldw_sales** entry, click **Actions** (if necessary, click Start).



For Dynamic Cube maintenance you have the options to refresh the member cache, refresh the data cache, clear the workload log, and incrementally update data. The same options are available to be scheduled for execution on the Configuration tab\Content Administration (except for the View recent messages option).

There are also virtual cubes which are built up from source or base dynamic cubes and other virtual cubes; these cubes have a different icon, have a shorter list of properties, and have less applicable commands on the System page.

- 11. Click the **Configuration** tab, and then click **Content Administration**.
- 12. On the toolbar click **New Query service administration task** , and then click **Dynamic cube**.
 - You will configure tasks later in this module, when working with the dynamic cubes administration workflow process.
- 13. Click **Cancel**, and then log off.

Results:

Using IBM Cognos Administration, you examined the properties of the dispatchers and services based on the installed components. You can now continue with administering the server environment.

Demo 3: Tune the IBM Cognos BI Dispatchers and Services

Purpose:

To enable load balancing of the system and improve system performance, you will set dispatcher properties and modify the configuration of the system. You will set processing capacity and specify the number of processes and connections available for each dispatcher.

- Task 1. Modify dispatcher properties for the dispatcher on port 9315.
 - 1. Log on to the **LDAP_Dev** namespace as **meyerst/Education1**, and then launch **IBM Cognos Administration**.
 - 2. Click the **Configuration** tab, and then click **Dispatchers and Services**.
 - 3. Beside http://vclassbase:9315/p2pd, in the Actions column click Set properties.
 - 4. Click the **Settings** tab, and then in the **Category** list, click **Tuning**.
 - 5. In the **Value** column, change **Processing capacity** from **1.0** to **2.0**. You have set the capacity to 2.0 to allocate more processing power to this instance of the report server. On a true distributed installation where report servers are on separate physical machines, set the capacity according to the processing power of each particular machine. In a later task, you will set the Processing capacity to 1.0 for the other dispatcher. The result is that the first dispatcher will handle two-thirds of the requests while the second will handle one-third of the requests.
 - 6. Click **OK**.

Task 2. Modify properties for the report service on port 9315.

- 1. Click http://vclassbase:9315/p2pd, click Next Page, and then beside ReportService, in the Actions column, click Set properties.
- 2. Click the **Settings** tab, and then in the **Category** list, click **Tuning**.
- 3. Beside Maximum number of processes for the report service during peak period, in the Value column, change 2 to 4.
 - You are setting this value on the assumption that the computer on which this dispatcher resides has dual CPUs. The recommendation is to set the value to 2 per CPU. Ensure that you change the property for peak period, not the property for non-peak period.
- 4. Beside Number of high affinity connections for the report service during peak period, in the Value column, change 2 to 1.
- 5. Beside Number of low affinity connections for the report service during peak period, in the Value column, change 8 to 2.
- 6. Click **OK**.

Task 3. Modify properties for the batch report service.

- 1. Click **Previous Page**, and then beside **BatchReportService**, in the **Actions** column, click **Set properties**.
- 2. Click the **Settings** tab, and then in the **Category** list, click **Tuning**.
- 3. Beside Maximum number of processes for the batch report service during peak period, in the Value column, change 2 to 4.
 - You set this property value to 4 because the same recommendation (as in Task 2, step 3) applies to the batch report service.
- 4. Change the Number of high affinity connections for the batch report service during peak period from 2 to 1.
- 5. Change the Number of low affinity connections for the batch report service during peak period from 4 to 2.
- 6. Click **OK**.

Task 4. Modify dispatcher properties.

- 1. In the navigation path, click **Configuration**, and then beside http://vclassbase:9320/p2pd, in the **Actions** column, click **Set properties**.
- 2. Click the **Settings** tab, in the **Category** list, click **Tuning**, and then ensure that the **Processing capacity** value is **1.0**.
- 3. Click **OK**.

Task 5. Modify properties for the report service.

- 1. Click http://vclassbase:9320/p2pd, click Next Page, and then beside ReportService, in the Actions column, click Set properties.
- 2. On the **Settings** tab, set the following **Tuning** properties:
 - Maximum number of processes for the report service during peak period: 2
 - Number of high affinity connections for the report service during peak period: change 2 to 1
 - Number of low affinity connections for the report service during peak period: change 8 to 2
- 3. Click **OK**.

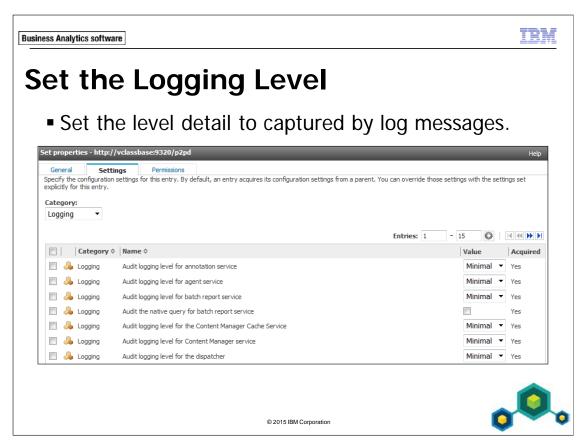
Task 6. Modify properties for the batch report service.

- 1. Click **Previous Page**, and then beside **BatchReportService**, in the **Actions** column, click **Set properties**.
- 2. On the **Settings** tab, set the following **Tuning** properties:
 - Maximum number of processes for the batch report service during peak period: 2
 - Number of high affinity connections for the batch report service during peak period: change 2 to 1
 - Number of low affinity connections for the batch report service during peak period: change 4 to 2
- 3. Click **OK**.

Leave Tim Meyers logged on to IBM Cognos Administration for the next demo.

Results:

To enable load balancing of the system and improve system performance, you set dispatcher properties and modified the configuration of the system. You set processing capacity and specified the number of processes and connections available for each dispatcher.



Five levels of logging are available:

- Minimal: system and service startup and shutdown, and runtime errors
- Basic: minimal + user account management, runtime usage of IBM Cognos BI, and use requests
- Request: basic + service requests and responses
- Trace: basic + all requests (- service requests and responses) to all components with their parameter values
- Full: request + all requests to all components with their parameter values

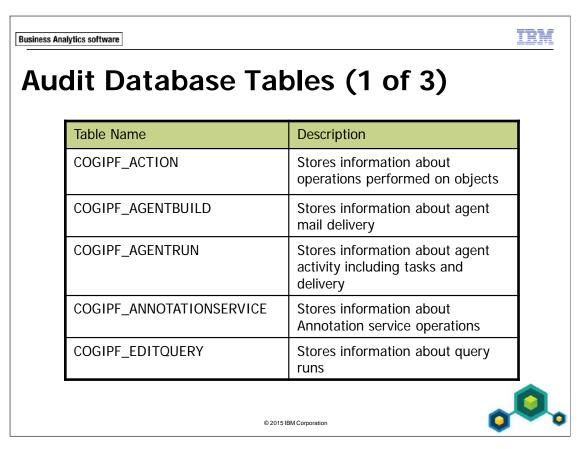
By setting the logging level, you specify what detail of events and messages to record in the log file or in the log database. An event is an occurrence in your IBM Cognos BI environment that is significant enough to be tracked, such as starting or stopping a service. When the logging level is set for a dispatcher or a configuration folder, all the services associated with that dispatcher or folder, inherit that logging level. You can set a different logging level for each dispatcher service. You can do this for each dispatcher or for all dispatchers in the same folder. By setting different logging levels for different services you can reduce the amount of irrelevant logging information.

Trace and Full should only be used under guidance for troubleshooting purposes.

You can use logs to diagnose a problem that is occurring only for a specific user. You temporarily set logging to occur for that user only. For more information, refer to the *IBM Cognos Software Version 10.2.2 Administration and Security Guide*, Chapter 5: Setting up Logging.

The standard auditing features available with IBM Cognos 10 BI cover many aspects of operation. However, some areas such as the auditing of users and capability assignments are not included. To perform this type of auditing you can install and run the c10AuditExtension application, which is an IBM Cognos 10 SDK application that provides additional auditing, including Role Auditing, for IBM Cognos 10 BI. For more information on this application see

http://www.ibm.com/developerworks/data/library/cognos/development/utilities/page574.html.



The audit database tables are generated after audit logging has been configured in IBM Cognos Configuration, the configuration has been saved, and the local services have been restarted.

In a distributed installation, the tables are generated by the component which has its services started first.

When a user logs on to IBM Cognos BI, a session ID is assigned and recorded in all log messages. You can use the session ID to identify all actions performed by a user.

To avoid name conflicts with database keywords, all column names in the log database have the prefix "COGIPF". If you have created your own log database model, you must add the prefix "COGIPF" to the column names of the logging database tables in the model.

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Audit Database Tables (2 of 3)

Table Name	Description
COGIPF_HUMANTASKSERVICE	Stores audit information about Human Task service operations (tasks and corresponding task states)
COGIPF_HUMANTASKSERVICE_ DETAIL	Stores additional details about Human Task service operations (not necessarily required for every audit entry, for example, notification details and human role details)
COGIPF_NATIVEQUERY	Stores information about queries that IBM Cognos BI makes to third-party components
COGIPF_PARAMETER	Stores parameter information logged by a component

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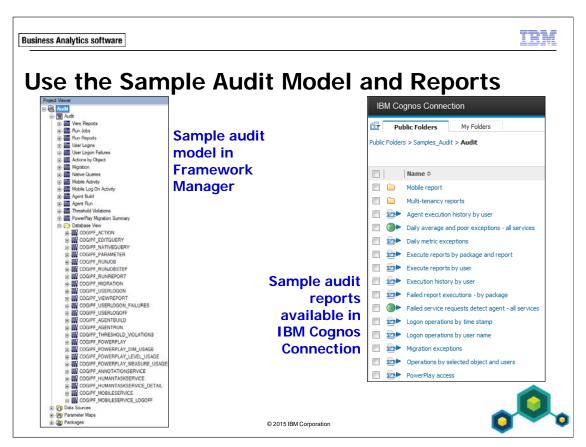


Audit Database Tables (3 of 3)

Table Name	Description
COGIPF_RUNJOB	Stores information about job runs
COGIPF_RUNJOBSTEP	Stores information about job step runs
COGIPF_RUNREPORT	Stores information about report runs
COGIPF_THRESHOLD_VIOLATIONS	Stores information about threshold violations for system metrics
COGIPF_USERLOGON	Stores user logon and logoff information
COGIPF_VIEWREPORT	Stores information about report view requests



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IBM Cognos BI includes a sample audit model and audit reports that you can use to identify activity. To use the sample audit reports in their current state or to meet your own audit reporting requirements, you can:

- modify the existing reports
- create your own audit reports based on the sample model
- modify the sample model, and then create your own audit reports

You could also use IBM Cognos Framework Manager to create your own audit model that uses the audit database as a data source. You could then create your own reports based on this model. Before you can create audit reports or use the sample audit reports that come with IBM Cognos BI, you must set up audit reporting as follows:

- Direct log messages to a database: in IBM Cognos Configuration, set up a logging database and configure log messages to be sent to the database.
- Set the logging level for audit reports: set the logging level to Basic or higher.
- Enable native query logging: If you want to create audit reports that include the queries that are run against your reporting data source, you must enable native query logging. You can use native query logging to learn what kinds of information users want or whether a report is running efficiently. Native query logging is part of the Request level logging. However, if you are using audit reports, you can enable native query logging independently from the Request level logging.

For a list and descriptions of the sample audit reports, refer to *IBM Cognos Software Version 10.2.2 Administration and Security Guide*, Chapter 5: Setting up Logging, in the section Audit Reports.

Demo 4: Set the Logging Level for the Dispatcher, Examine the Audit Log Database, and Review Audit Reports and Agents

Purpose:

You will use IBM Cognos Administration to set the logging level for the log message facility. You will then perform multiple actions in the IBM Cognos BI application, examine data in the audit log database, and review the sample audit reports and agents.

Task 1. Set the logging level for the log message facility.

An Audit log database was configured in a workshop in the module titled "Identify IBM Cognos BI Architecture".

- 1. In the navigation path, click **Configuration**.
- 2. Beside http://vclassbase:9315/p2pd, in the Actions column, click Set properties, and then click the Settings tab.
- 3. In the **Category** list, click **Logging**.
- 4. In the **Value** column, change the logging level from **Minimal** to **Basic** for the following services and the dispatcher, and then click **OK** to close the **Set properties** page:
 - Audit logging level for the Content Manager service
 - Audit logging level for the dispatcher
 - Audit logging level for query service
 - Audit logging level for report service

There are two pages of entries to change. It is not required that you set logging on all services and all dispatchers all of the time. You can set these as required for troubleshooting purposes and then set back to minimal when the system returns to normal operation.

- 5. Repeat steps 2 and 3 to set the same logging levels for the services on http://vclassbase:9320/p2pd.
- 6. Log off **Tim Meyers**.

Task 2. Generate log messages.

- 1. Log on to the **LDAP_Dev** namespace as **hirschb/Education1**.
- 2. Click **IBM Cognos content**, navigate to **Samples_DQ > Models > GO Sales (analysis) > Report Studio Report Samples**, and then click **2011 Sales Summary_DQ** to run the report.

The report may take an extended time to run. With the higher the logging level setting for each logging category, there is a higher number of resources that are used when a report is run.

Task 3. Examine the tables in the audit log database.

The Audit log database is created in DB2 as part of the course environment. The tables in the audit log database are generated after the destination has been configured (which you did in the Identify IBM Cognos BI Architecture module), the configuration is saved, and services are restarted in IBM Cognos Configuration.

- 1. From the **Start** menu, navigate to **All Programs > IBM Data Studio**, and then click **Data Studio 4.1.0.0 Client**.
- 2. Click **OK** to accept the default workspace location.
- 3. In the left pane, expand **All Databases** > **localhost** > **DB2**.
- 4. Right-click **AUDIT**, click **Connect**, and then click **Tables**.
- 5. In the right pane, right-click the **COGIPF_ACTION** table, point to **Data**, and then click **Browse Data**.

Columns and rows from the table appear. Notice the COGIPF_LOCALTIMESTAMP column, which stores date/time values for the actions you just performed in IBM Cognos BI. The COGIPF_ACTION table stores data about all actions performed in IBM Cognos BI.

Scroll to the right to locate the COGIPF_SESSIONID,
 COGIPF_COMPONENTID, COGIPF_OPERATION,
 COGIPF_TARGET_TYPE and COGIPF_TARGET_PATH columns.

The COGIPF_SESSIONID column stores the ID number of the session. This column is used to join to the COGIPF_USERLOGON table.

The COGIPF_COMPONENTID column stores the ID of the component that is the target of the request; for example, CM for content manager service, or RSVP for report and presentation service.

The COGIPF_OPERATION column stores the type of operation the target component is accepting based on the request, for example QUERY, ADD or END SESSION.

The COGIPF_TARGET_TYPE column stores the object type which the request is targeting, as it appears in the content store, for example, account, model, package, query, or report.

The COGIPF_TARGET_PATH column stores the path to the object in the content store. For example, the report you just ran is located in Public Folders GO Sales (analysis)\2011 Sales Summary. Not: scroll to the bottom of the pane to locate this entry.

- 7. Return to **IBM Cognos Viewer**, and then log off **Branka Hirsch**.
- 8. In **IBM Data Studio**, close the **COGIPF_ACTION** table, and then repeat step 5 to browse the **COGIPF_USERLOGON** table.
 - The COGIPF_USERLOGON table stores data about user logon sessions, as well as log off information.
- 9. Scroll to the right to locate the **COGIPF_LOGON_OPERATION** and **COGIPF_USERNAME**, and **COGIPF_USERID** columns.

The COGIPF_LOGON_OPERATION column has recorded the log on and log off operations that were performed in IBM Cognos BI. The COGIPF_USERNAME column has recorded the user name of the user who performed these operations, in this case Branka Hirsch. The COGIPF_USERID column has recorded the user ID of the user who performed these operations, in this case hirschb. Optionally, you can examine other tables and the data stored within them. You can also modify the logging levels to see what additional information is logged. Be aware that as you increase the logging level, there will be a performance impact due to the high number of messages being logged.

10. Close **IBM Data Studio**.

Task 4. Review audit reports.

There are many sample audit reports provided for your convenience, that you may find helpful when reporting on your environment. To use the reports requires setting up an xml-based data source connection (url_xml), which is documented in the *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 5: Setting up Logging\Audit Reports\Sample Audit Model and Audit Reports.

- 1. Log on to the **LDAP_Dev** namespace as **hirschb/Education1**.
- 2. Click **IBM Cognos content**, navigate to **Samples_Audit > Audit**.

Below is a listing of some of the reports that you may find useful in reporting on your system. Consult the product documentation for a complete listing and description of the reports.

Audit report name	Description
Daily average and poor exceptions - all services	Shows how to monitor daily average and poor exceptions of thresholds set in IBM Cognos Administration for all services using an agent.
	An email with attached report output is sent to the administrator when average and poor exceptions occur.
Report usage	Lists reports by frequency of use. For each report, it lists the user and the number of times it was run by the user since the logging database was created. This report can help you determine if there are any reports that are not being used. If so, you may want to remove them, or in the case of dynamic cube queries, populate the cache with frequently used reports.

Task 5. Reset the logging and tuning to the original state.

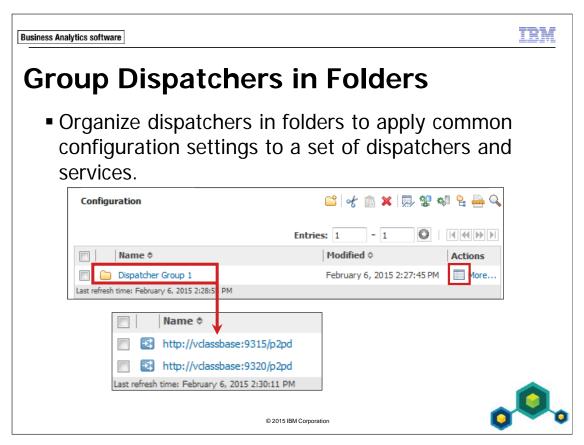
When you no longer need logging, it is advisable to reset the properties to the Minimal settings, so that fewer resources are needed. You will also return the tuning settings to the default, as the remainder of the course has been tested against these default settings.

- 1. Log off, and then log on to the **LDAP_Dev** namespace as **meyerst/Education1**, and launch **IBM Cognos Administration**.
- 2. Click the **Configuration** tab, and then click **Dispatchers and Services**.
- 3. Beside http://vclassbase:9315/p2pd, in the Actions column, click Set properties, and then click the Settings tab.
- 4. In the **Category** list, click **Logging**.
- 5. In the **Value** column, change the logging level from **Basic** to **Minimal** for the following services and the dispatcher:
 - Audit logging level for the Content Manager service
 - Audit logging level for the dispatcher
 - Audit logging level for query service
 - Audit logging level for report service
- 6. In the **Category** list, click **Tuning**.
- 7. Set the following property values on these pages (sort on the **Name** column):
 - Maximum number of processes for the report service during peak period: 2
 - Number of high affinity connections for the report service during peak period: 2
 - Number of low affinity connections for the report service during peak period: 8
 - Maximum number of processes for the batch report service during peak period: 2
 - Number of high affinity connections for the batch report service during peak period: 2
 - Number of low affinity connections for the batch report service during peak period: 4
 - Processing capacity: **1.0**

- 8. Click **OK** to close the **Set properties** page.
- 9. Repeat steps **3** through **7** to reset the same logging and tuning levels for the services on http://vclassbase:9320/p2pd.
- 10. Log off.

Results:

You used IBM Cognos Administration to set the logging level for the log message facility. You performed multiple actions in the IBM Cognos BI application, examined data in the audit log database, and then reviewed some of the sample audit reports and agents.

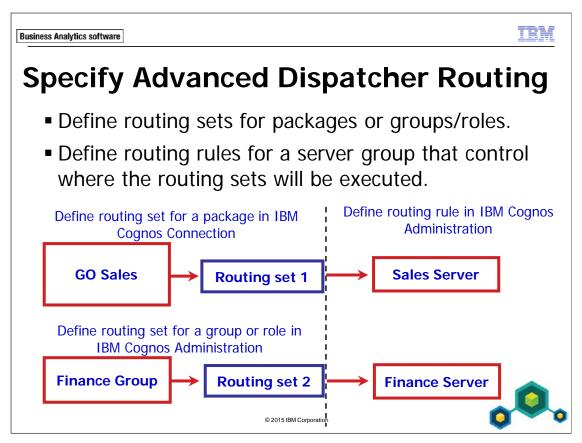


If your installation includes many dispatchers, you can group them into configuration folders. You can create a new configuration folder at the root of the Configuration area or in an existing configuration folder.

You group dispatchers to apply the same configuration settings to all the dispatchers and services in the folder. When you add a dispatcher to a configuration folder, it automatically inherits the configuration settings of the folder. However, if you previously changed the default values of that dispatcher or service, the changed values are kept.

When you change the configuration settings of a dispatcher or configuration folder, the services for the dispatcher and any child entries for the folder automatically acquire the new values. However, if you change the values of the services, the changed values are kept.

To view and edit the configuration properties of the parent of an entry shown in the path on the toolbar, click the Set properties button. You can change and apply configuration settings for all the dispatchers and services in the Configuration area when you are in the root of the Configuration area.



To determine which server groups process certain reports, you must associate keywords with packages, user roles, or groups, and then specify how the keywords are distributed among the dispatchers in your environment.

The distribution is controlled by routing rules that you create for the routing keywords. Report requests will be processed by a specific server depending on the keywords associated with the package from which the report was created or the user or group running the report.

Advanced routing is almost always required when dynamic cubes are used since specific servers are typically used to support dynamic cubes.

Depending on how your system is set up, you may want to control how reports are distributed among servers. For example, you have different departments that maintain their own servers, or you have specific servers set up for specific data access, such as Windows servers for Microsoft SQL Server databases and Linux servers set up for DB2 access. You can set up IBM Cognos BI so that report requests are processed by specific servers by applying routing rules.

When you create the routing rules, you create conditions that determine the server groups by which the reports are to be processed. For example, you can set up routing rules so that reports from a Finance package made by a user in the Finance group are processed by Finance servers. Alternatively, you can set up routing rules so that reports by any Sales users, regardless of which package was used to create the report, are processed by Sales servers. In the first example, you would specify keywords for both user role or group and package, but in the second you would only specify a keyword for user role or group and leave the package keyword blank. You do not have to specify a keyword for both package and user role or group in your routing rules.

In an environment where there are compatible query mode (CQM) packages that require using the 32-bit ReportServer service, and dynamic query mode (DQM) packages that require using the 64-bit ReportServer service, you can use package routing to separate server groups to handle the requests. The 32-bit ReportServer uses BI Bus processes, whereas the 64-bit ReportServer uses Java and does not launch BI Bus processes. By having one server group use the 32-bit ReportServer and another server group use the 64-bit ReportServer, you can accommodate the different querying needs of your users within one environment.

You can also deploy multiple dynamic cube servers, either to create a failover scenario, or to balance report requests across several servers, either for the same content, or different content.

Affinity settings take precedence over advanced routing settings.

For more information on dispatcher routing refer to the *IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide*, Chapter 7: Server Administration.

Demo 5: Define Server Groups and Routing Sets

Purpose:

Currently, your environment has two dispatchers, and both are configured with 64-bit ReportServer service enabled. Your environment has packages published with compatible query mode and packages published with dynamic query mode. To accommodate this, you will create routing sets, and configure one dispatcher to enable 32-bit ReportServer service, so that it can process the queries from packages which are published with compatible query mode. Packages published with dynamic query mode will be routed to a server that has 64-bit ReportServer service enabled.

Task 1. Test the current environment.

- Log on to the LDAP_Dev namespace as watersj/Education1, launch IBM Cognos Connection, and then navigate to Public Folders > Samples > Models > GO Sales (query) > Report Studio Report Samples.
- 2. Click the **Order Invoices Donald Chow, Sales Person** report. The following message displays:

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QFS-ERR-0141



This report service is configured as 64-bit and only supports packages published with the dynamic query mode.

Currently, your environment has two dispatchers, and both are configured with 64-bit ReportServer service enabled. You will create routing sets, and configure one dispatcher to enable 32-bit ReportServer service, so that it can process the queries from packages which are not published with dynamic query mode.

3. Click **OK** to close the message, and then log off **Jeff Waters**, as he does not have permission to change the dispatcher configuration, which is required for the next task.

Task 2. Define server groups.

- Log on to the LDAP_Dev namespace as meyerst/Education1, launch IBM Cognos Administration, click the Configuration tab, and then click Dispatchers and Services.
- 2. Beside http://vclassbase:9315/p2pd, in the Actions column, click Set properties.
- 3. Click the **Settings** tab, and then from the **Category** list, click **Tuning**.
- 4. For the **Server group** property, in the **Value** column box, type **Group 64**. This server group will handle the 64-bit ReportServer requests.
- 5. Click **OK**.
- 6. Repeat steps 2 to 5 to define a server group named **Group 32** for the http://vclassbase:9320/p2pd dispatcher.
 - You can use these server group names when you define routing rules.
- 7. Log off **Tim Meyers**, as he does not have permission to change security, which is required for the next task.

Task 3. Define package routing sets.

A routing set is a label assigned to a set of requests based on different purposes. A package routing set is based on packages. You will create sets that will route requests for different packages to the correct server group, according to whether the package should use 32-bit ReportServer service, or use 64-bit ReportServer service.

- 1. Log on to the **LDAP_Dev** namespace with **admin/Education1** credentials.
- Launch IBM Cognos Connection, and navigate to Public Folders > Samples > Models.
 - The Model folder contains four package folders, GO Data Warehouse (analysis). GO Data Warehouse (query), GO Sales (analysis), and GO Sales (query).
- 3. Beside **GO Data Warehouse (analysis)**, in the **Actions** column, click **Set** properties.

- 4. Under Advanced routing, select the Override the routing sets acquired from the parent entry check box, and then under Routing sets, click Set.
- 5. Under **Type routing sets**, delete the current entry, type **32**, and then click **Add new routing sets** (lower yellow arrow) to add it to the **Assigned routing sets** pane.
- 6. Click **OK**.

The routing set 32 is displayed on the Set properties page.

- 7. Click **OK**.
- 8. Repeat steps 3 to 7 for the remaining three packages in the **Models** folder, except at step 5, you can add the existing **32** routing set from the upper left pane, rather than typing it.
- 9. Navigate to **Public Folders** > **Samples_PowerCube** > **Cubes**, and then change the properties of the following packages to use the 32 routing set:
 - Great Outdoors Sales (cube)
 - Sales and Marketing (cube)

Note: The PowerCube packages have been deployed in this environment, but data source connections will be set up later in this course, so do not test reports from these packages in this demo.

10. Delete all non-English packages in **Public Folders > Samples_PowerCube > Cubes** except the **Great Outdoors Sales (cube)** and **Sales and Marketing (cube)** packages that were configured as part of the **32** routing set in step **9**. To do this, click the package check box, and then on the toolbar, click Delete. The following packages are available after deleting non-English packages:



- 11. Change the properties of the following packages to use a routing set named 64:
 - Public Folders > Samples_Audit
 - Audit
 - Public Folders >Samples_DQ >Models
 - GO Data Warehouse (analysis)
 - GO Data Warehouse (query)
 - GO Sales (analysis)
 - GO Sales (query)
 - Public Folders > Samples_Dynamic_Cubes
 - GO Data Warehouse Sales

Task 4. Define the routing rules.

- 1. From the Launch menu, click IBM Cognos Administration, click the Configuration tab, and then click Dispatchers and Services.
- 2. On the toolbar, click **Specify Routing Rules** , and then click **Add a rule**.
- 3. In the **Package routing set** column, expand the **(Any package)** list, click **32**, and in the **Server group** column, click **Group 32**.
- 4. Click **Add a rule**, and for rule 2, in the **Package routing set** column, expand the **(Any package)** list, and then click **64**.
- 5. In the **Server group** column, click **Group 64**.

A section of the result appears as follows:



6. Click **OK**, and then log off.

- Task 5. Reconfigure the dispatcher for the IBM Cognos 10 DispCM instance to enable 32-bit ReportServer service.
 - 1. From the **Start** menu, navigate to **All Programs** > **IBM Cognos 10 64 DispCM**, and then click **IBM Cognos Configuration**.
 - 2. Click the **Environment** node, and then in the **Group Properties** pane, under **Dispatcher Settings**, change the **Report Server execution mode** property from **64-bit** to **32-bit**.
 - Because you will be directing all dynamic queries to a different server, you can disable the QueryService, to free up some memory on this server instance. QueryService is only used for dynamic queries.
 - 3. Under Environment, click IBM Cognos services.
 - 4. In the **Component Properties** pane, change the **Query service enabled?** property to **False**.
 - 5. On the toolbar click **Save configuration**, and then click **Close**.
 - On the toolbar click **Restart**, wait a few minutes for the services to start, and then close any open messages.
 Leave IBM Cognos Configuration open.

Task 6. Test the updated environment.

- 1. Log on to the **LDAP_Dev** namespace as **watersj/Education1**, and then launch **IBM Cognos Connection**.
- 2. Navigate to Public Folders > Samples > Models > GO Sales (query) > Report Studio Report Samples, and then click the Order Invoices Donald Chow, Sales Person entry to run the report.
 - The report runs without error, with the query now routed to a 32-bit ReportServer service.
- 3. Log off.

Results:

You created routing sets, and configured server groups, so that queries from packages which are published with compatible query mode are routed to a server that has 32-bit ReportServer service enabled, and packages published with dynamic query mode are routed to a server that has 64-bit ReportServer service enabled.



Troubleshoot the Server Environment

- Issues to troubleshoot:
 - unable to log on
 - cannot access data
 - excessive execution times
- Areas to troubleshoot:
 - servers and server properties
 - configuration
- Resources when troubleshooting include:
 - error messages
 - log files
 - configuration files
 - IBM Cognos Configuration component test



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Before you can troubleshoot IBM Cognos BI effectively, you must be familiar with its components and the process used to author reports.

Resolve common troubleshooting issues by investigating areas that impact the server environment, including server properties and configuration.

Use the resources available to you to investigate and resolve issues.



Troubleshooting Resources

- Use log and configuration files to track the operations performed in IBM Cognos BI.
 - transfer log file (.txt)
 - transfer summary-error log file (.txt)
 - gateway.log file
 - cogserver.log file
 - cogstartup.xml file
 - coglocale.xml file
 - metricdump.xml

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Configuration and log files can help you troubleshoot problems by providing a record of the activities that take place when you work with IBM Cognos BI, including those associated with installation, administration, and run-time.

You may also want to consider taking the IBM Cognos BI Administration: Architecture and Logging course, which provides more information on using configuration and log files.

For more information on troubleshooting resources, refer to the *IBM Cognos Business Intelligence Version 10.2.2 Installation and Configuration Guide*, Appendix E: Troubleshooting.

TH W

Back Up Data

- Regularly back up IBM Cognos BI data, including:
 - content store
 - configuration (for example, cogstartup_<date/time stamp>.xml)
 - the directory that contains the encryption and signing key settings (if changed from the default location)
 - Framework Manager projects:
 - •file system
 - version control system

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It is recommended that you regularly back up your IBM Cognos BI data, configuration settings, and your Framework Manager projects.

If you use a version control system to store your Framework Manager project source files, you do not need to back up your projects. If you do not use a version control system, you should backup the directory that contains the projects.



Dynamic Cube Data Source Administration Workflow

- 1. Assign a Cognos account to the relational database with the data for the dynamic cube.
- 2. Secure the dynamic cubes in IBM Cognos Administration (assign users and groups to security views).
- 3. Add one or more dynamic cubes to the Query Service and configure properties.
- 4. Define routing rules to direct queries to the dynamic query server(s).
- 5. Edit query service configuration, such as modify the JVM heap size.
- 6. Manage dynamic cubes in the Query Service.
- 7. Start the dynamic cubes in the Query Service.

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In IBM Cognos Administration, you can view the general properties for dynamic cube data sources, such as the Access account property (assign one Cognos account), tasks and permission requirements.

To configure a dynamic cube for the Query Service:

- add a dynamic cube to an instance of the Query Service and configure its properties
- monitor the state and metrics for each cube, and view cube settings
- delete a dynamic cube from the Query Service

Dynamic cubes can be managed in the Query Service; administrators can create and schedule query service tasks for IBM Cognos Dynamic Cubes, DMR, Oracle Essbase, and SAP BW data sources.

After the dynamic cubes are used in reports and log files are analyzed, you might perform the following tasks:

- use Aggregate Advisor to view aggregate recommendations
- monitor the metrics of the dynamic cubes added to the Query Service
- tune the dynamic cubes in the Query Service to improve performance

For information about system performance metrics, refer to the IBM Cognos Business Intelligence Version 10.2.2 Administration and Security Guide.

Demo 6: Administer a Dynamic Cube Data Source

Purpose:

You will review the workflow of administering dynamic cubes in IBM Cognos Administration.

Task 1. Assign a Cognos account to the relational database with the data for the dynamic cube.

You need to add an access account to the dynamic cube data source and then create a credential for the data source access account user. You must do this before starting the cube, or you will get an error message regarding the access account.

- 1. Log on to the **LDAP_Dev** namespace as **admin/Education1**, and then navigate to **IBM Cognos Administration > Configuration > Data Source Connections**.
- 2. Beside **gosldw_sales**, in the **Actions** column, click **Set properties**.
- Under Access Account, click Select the access account, navigate to LDAP_Dev > People, select Jeff Waters, and then click OK.
 You could configure and use a DynamicCube signon, if you have multiple

cubes to administer, rather than use the credentials of a user. In this demo, you will use the credentials of Jeff Waters.

- 4. Click **OK**, and then log off.
- 5. Log on to the **LDAP_Dev** namespace as **watersj/Education1**, and then launch **IBM Cognos Connection**.
- 6. On the toolbar click **My Area Options**, and then click **My Preferences**.
- 7. Click the **Personal** tab, and then under **Credentials**, click **First**, you must create the credentials.

If the link says You can also renew the credentials, click Renew the credentials. After clicking the hyperlink, the page will refresh and your credentials will be displayed.

You want to include Authors to use the credentials when logging on to use the dynamic cube.

8. Click **Add**, click **Cognos**, and then select the **Authors** check box.

- 9. Click **Add** (yellow arrow), and then click **OK**. The Authors role is now included in the list of credentials.
- 10. Click **OK**, and then log off.
- Task 2. Secure the dynamic cubes in IBM Cognos

 Administration (assign users and groups to security views).
 - 1. Log on to the LDAP_Dev namespace as admin/Education1, and navigate to IBM Cognos Administration > Configuration > Data Source Connections.
 - 2. Beside **gosldw_sales**, in the **Actions** column, click **Set properties**, and then click the **Permissions** tab.

Ensure that Authors have Read, Execute, and Traverse permissions. This was configured in the module titled "Secure the IBM Cognos BI Environment", Workshop 3: Secure the Portal, Task 6: Secure the gosldw_sales dynamic cube.

3. Click **OK**.

- Task 3. Add one or more dynamic cubes to the Query Service.
 - 1. In **IBM Cognos Administration**, click the **Status** tab, navigate to **System** > vclassbase > http://vclassbase:9315/p2pd.
 - 2. Click **QueryService**.

Notice that the dynamic cube gosldw_sales is unavailable. This dynamic cube was added to the QueryService in Workshop 1, in the task Deploy and Publish a Dynamic Cube, in the module titled "*Identify IBM Cognos BI Architecture*". Refer to this earlier task for steps to do this.

You will restart cube due to security being set.

- 3. Beside **gosldw_sales**, in the **Actions** list, click **Start**.
- 4. Read the message that displays a status of **Succeeded**, and then click **OK**. The request was submitted successfully.
- 5. After waiting two minutes, beside **gosldw_sales**, in the **Actions** list, click **View** recent messages.

If the dynamic cube was given enough time to start, a message will be displayed indicating that the cube start succeeded.

6. Click **OK**.

Notice the status of the gosldw_sales dynamic cube is now Available.

Task 4. Define routing rules to direct queries to the dynamic query server(s).

Earlier in this module, in Demo 5: Define Server Groups and Routing Sets, in Task 2 you defined the server groups Group 64 (to handle 64-bit Report Server service requests), and Group 32 (to handle 32-bit Report Server service requests). Dynamic cube requests would require the 64-bit Report Server to also make use of the QueryService service.

In Task 3 of the same demo, you defined package routing sets. You created sets to route requests for different packages to the correct server group, according to whether the package should use 32-bit ReportServer service, or use 64-bit ReportServer service. You configured the GO Data Warehouse Sales dynamic cube package to use a routing set named 64.

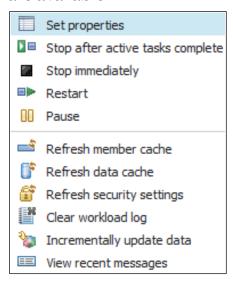
Refer to Demo 5, Tasks 2 and 3, for detailed steps on defining routing rules to direct dynamic cube package queries to the dynamic query server(s).

Task 5. Edit query service configuration, such as modify the JVM heap size.

Initially, you may want to use the default configurations that are set when installing the product. However, depending on your specific hardware and the size of your enterprise, you may benefit from adjusting some configuration settings for dynamic cubes. While this topic is well beyond the scope of this course, it is recommended that you visit the IBM Web site to review hardware sizing guidance documentation, to help you determine what might work best in your environment. For more information on hardware requirements, see the document entitled *Understanding Hardware Requirements for Dynamic Cubes* in the Business Analytics Proven Practices Web location at http://www.ibm.com/developerworks/library/ba-pp-performance-cognos10-page635/.

Task 6. Manage dynamic cubes in the Query Service.

1. Beside **gosldw_sales**, click the **Actions** list, and then review the options that are available.

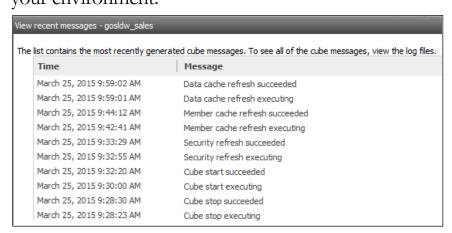


Some of the options include basic operations such as Start, Stop (immediately/after active tasks complete), Refresh member cache, Refresh data cache, and View recent messages, which will help you to monitor the health of a dynamic cube.

Security settings and data cache are closely associated with and dependent on the member cache. Because of this the member cache refresh operation implies that the data caches and security setting refreshes. Refreshes require exclusive access to the internal administrative data structures, and will wait for the configured period of time (2 minutes by default) for the opportunity to perform. If the system is too busy that command may time out and not complete. In order to perform the refresh properly you can create a new version of the resource internally, and as soon as it is ready, make it available to all new incoming queries. Once the old copy of the resource is no longer being used by any query, you can delete it.

- 2. Beside **gosldw_sales**, in the **Actions** list, click **Refresh security settings**, as you have recently made changes to the dynamic cube security.
- 3. Click **OK**.
- 4. After waiting two minutes, in the **Actions** list, click **View recent messages**. The refresh of the security settings succeeded.
- 5. Click **OK** to close the **View the results** message box.

- 6. In the **Actions** list, click **Refresh member cache**, and then click **OK**.
- 7. After waiting two minutes, in the **Actions** list, click **View recent messages**. The refresh of the member cache succeeded.
- 8. Click **OK** to close the **View the results** message box. If your data changes frequently, you may want to refresh the data points in the cache.
- 9. In the **Actions** list, click **Refresh data cache**, and then click **OK**.
- 10. After waiting two minutes, in the **Actions** list, click **View recent messages**. The cache refreshes were successful. Depending on the size of your caches, and your hardware\system configuration, the time to refresh can be different in your environment.



11. Click **OK** to close the **View recent messages** box.

Task 7. Start the dynamic cubes in the Query Service and configure a Query Service administration task

In previous tasks, you started the dynamic cube and executed commands to assist you in managing dynamic cubes. It is important to ensure, as a last step in the administration workflow, that the cube is available to users.

- 1. Click the **Configuration** tab, and then click **Content Administration**.
- 2. On the toolbar, click **New Query service administration task** , and then click **Dynamic cube**.
- 3. In the **Name** field, type **Stop gosldw_sales dynamic cube**, and then click **Next**.
- 4. In the **Operation** list, review the options available, and then click **Stop after** active tasks complete.

- 5. In the **Server Group** list, click **Group 64**, under **Cubes**, select the **gosldw_sales** check box, and then click **Next**.
- 6. Click **Save only**, and then click **Finish**.

On the Schedule page, you can define frequency, date, and time for the task to run. You will create other query service administration tasks that can be called up in a job, rather than creating a schedule at this time.

Note: You will work with schedules in more detail in the module title "Manage Run Activities".

- 7. Repeat steps 2 to 6 to create the following tasks:
 - Name: Refresh gosldw_sales dynamic cube, Operation: Refresh data cache
 - Name: Start gosldw_sales dynamic cube, Operation: Start
- 8. On the toolbar, click **New Job**.
- 9. In the **Name** box, type **gosldw_sales Dynamic Cube Refresh**, and then click **Next**.
- 10. Under **Steps**, click **Add**, select the check boxes for the three Query Service tasks that you just created, click **Add** (yellow arrow).
- 11. Click **OK**.
- 12. Click **Modify the sequence**, and place the tasks in the following order: stop, refresh, start.

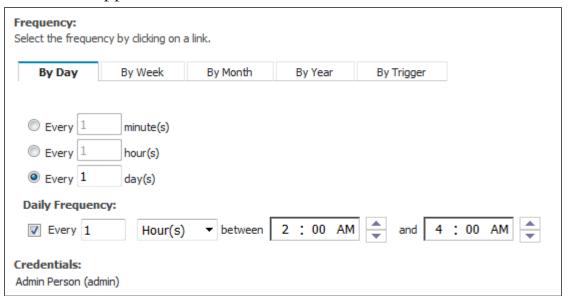
Steps:

Stop gosldw_sales dynamic cube (Administration)
Refresh gosldw_sales dynamic cube (Administration)
Start gosldw_sales dynamic cube (Administration)

- 13. Click **OK**, and then on the **Select the steps** page, click **Next**.
- 14. Click Save and schedule, and then click Finish.
- 15. Click the **By Day** tab, and then under **Daily Frequency**, select the check box.

16. Change the hours to between 2:00 AM and 4:00 AM.

The results appear as follows:



17. Click **OK**, and then log off.

Results:

You reviewed the workflow of administering the dynamic cubes in IBM Cognos Administration.

Trigger a Cube Event

- Define a startup trigger name.
- Define a job of reports to run when the trigger is initiated.
- Populate the cube cache with data.

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When a cube is available for query processing, the startup trigger event is initiated for execution against the server which triggered the event. The purpose of the event is to run reports to populate the cube cache with data. Every cube has a trigger property.

For a startup trigger you can type the trigger name that will be assigned to a job, and when the cube is started, the job will be run. When you start the cube it loads up all of the dimension members right away, but it does not load the facts. Facts are loaded only when a query is submitted, and thereby start populating the in-memory cache. You can run three reports for example, to populate the cache. Then, the first user will have some cached data and faster performance, using the fact data loaded into memory. Keep in mind tuning parameters; you would want to use large servers with large memories.

Demo 7: Set Up a Dynamic Cube Startup Trigger

Purpose:

With dynamic cubes, there is a recommendation to populate the caches by running one or multiple reports or jobs. This will improve the efficiency with which the reports load for the consumer. You will create a startup trigger to initiate a job that will run three reports, and will thereby populate the cache.

As an administrator, you will define a trigger name in the dynamic cube configuration for the startup trigger property. When the cube is started, restarted or refreshed, the trigger initiates and the runnable job(s) is run.

The job runs under the account that holds the schedule credential, so it is important that the dynamic cube data source Access Account property must be set for this to work. If the Access Account is set to None or if the user entered does not have a credential created, an error will be encountered. The Access Account was configured in an earlier demo in this module.

Task 1. Set a By Trigger schedule on a job.

- 1. Log on to the **LDAP_Dev** namespace as **admin/Education1**, and then launch **IBM Cognos Connection**.
- 2. In **Public Folders**, create a folder named **Jobs**.
- 3. Click the **Jobs** folder entry, and then on the toolbar, click **New Job**.
- In the Name box, type
 PopulateDynamicCubeCache_gosldwSamples_Job, and then click Next.
 You will add multiple reports to the job.
- 5. Click Add, navigate to Cognos > Public Folders > Samples_Dynamic_ Cubes > GO Data Warehouse Sales, and add the following reports:
 - Profit by Product Brand
 - Revenue by retailer and product line
 - Sales by Region

- 6. Click **OK** to close the **Select entries (Navigate)** page.
- 7. On the **Select the steps** page, click **Next**.
- 8. On the **Select an action** page, click **Save and schedule**, and then click **Finish**.
- 9. In the **Frequency** section, click the **By Trigger** tab, in the **Trigger name** box type **gosldw_cacheTrigger**, and then click **OK**.
- Task 2. Configure the Startup trigger name for the dynamic cube.
 - 1. Launch **IBM Cognos Administration**, and then navigate to **Status > System >** vclassbase > http://vclassbase:9315/p2pd.
 - The QueryService, where you will configure the startup trigger, is at this level.
 - 2. Beside **QueryService**, in the **Actions** list, click **Set properties**.
 - 3. Click the **Settings** tab, and in the **Value** column for the **Dynamic cube configurations** entry, click **Edit**.
 - 4. Beside **gosldw_sales**, in the **Properties** column, click **Edit configuration**You will provide a name for the startup trigger.
 - 5. Beside **Startup trigger name**, in the **Value** column, type **gosldw_cacheTrigger**.
 - 6. Click **OK** to close the **Set properties** page, click **OK** to close the **Set dynamic cube configurations** page, and then click **OK** to close the **Set properties** page.
 - Now the system is configured to fire the trigger whenever the following cube actions are initiated: start, restart, refresh member cache, refresh data cache. Refresh security settings will not initiate the trigger.
 - 7. Click **QueryService**, and then beside **gosldw_sales**, in the **Actions** list, click **Restart**.
 - 8. Click **OK** to close the **View the results** message, and then wait two minutes.
 - 9. Beside **gosldw_sales**, in the **Actions** list, click **View recent messages**.
 - 10. Ensure that the dynamic cube started successfully, close the **View recent** messages box, and then log off.

Task 3. Run reports to test that the trigger ran successfully.

 Log on to the LDAP_Dev namespace as watersj/Education1, launch IBM Cognos Connection, and then navigate to Samples_Dynamic_Cubes > GO Data Warehouse Sales.

Notice that each of the reports have saved output (see the icon in the Actions column). This is because the trigger has run the reports and output has been saved.

You will now run each of the reports to ensure that the trigger ran the job successfully when the dynamic cube was restarted and that the cache was populated.

2. Beside **Profit by Product Brand**, in the **Actions** column, click **Run with options**, and then click **Run**.

Take note of how long it takes for the report to run.

- 3. On the toolbar, click **Return**, and then repeat step 2 to run the **Revenue by retailer and product line** report, and notice how quickly the results are returned.
- 4. On the toolbar, click **Return**, and then repeat step 2 to run the **Sales by Region** report.
- 5. On the toolbar, click **Return**, and then repeat step 2 to run the **Revenue by order method and region**.

This report takes the longest to run, as it was not populated into the cache.

6. Log off.

Results:

You created a startup trigger to initiate a job that will populate the cache before users access the reports.



Run the Aggregate Advisor Wizard

- workload log file must be enabled on the dynamic cube
- log file allows Aggregate Advisor to suggest aggregates (in-database or in-memory) corresponding to the reports contained in the log file
- re-run if:
 - non-trivial changes are made to the model
 - there are significant data changes
 - query performance seems degraded
 - workload characteristics change significantly





The IBM Cognos Dynamic Cube solution is aggregate-aware, and able to identify and use both in-memory and in-database aggregates to achieve optimal performance.

Aggregate awareness (aggregates tables that are created in the database and modeled into a dynamic cube) uses specialized log files to allow the dynamic query mode server to decompose queries to take advantage of the aggregate tables. The Aggregate Advisor also optimizes aggregates (in-memory and in-database) using workload-specific analysis.

Aggregate Advisor, part of IBM Cognos Dynamic Query Analyzer, analyzes the performance of dynamic cubes using log files and provides suggestions for improving cube performance.

Demo 8: Run the Aggregate Advisor Wizard (Optional)

Purpose:

You can run the Aggregate Advisor wizard in IBM Cognos Dynamic Query Analyzer to generate performance recommendations for a dynamic cube. To do this, you want to enable workload logging to capture information about queries that are sent to the dynamic query engine processes. You will then run the Aggregate Advisor, available in Dynamic Query Analyzer, to determine aggregate recommendations.

Task 1. Enable workload logging on the dynamic cube.

Before running Aggregate Advisor, you must have deployed the dynamic cube to the Content Manager, and enabled workload logging. The gosldw_sales dynamic cube is currently deployed and running in your BI environment. As well, for the purpose of this demo, you can stop the IBM Cognos DispCM service, because it is not configured to use use Dynamic Query Mode.

- 1. Return to the Cognos 10-64 DispCM instance of IBM Cognos Configuration, stop the IBM Cognos DispCM service, and then close IBM Cognos Configuration.
- 2. Log on to the **LDAP_Dev** namespace as **admin/Education1**, and then open **IBM Cognos Administration**.
- 3. Click the **Status** tab, navigate to **System > vclassbase >** http://vclassbase:9315/p2pd, and then click **QueryService**.
- 4. Beside **gosldw_sales**, in the **Actions** column, click **Set Properties**.
- 5. Beside **Enable workload logging**, in the **Value** column, select the check box, and then click **OK**.
- 6. Beside **gosldw_sales**, in the **Actions** column, click **Restart**.
- 7. Click **OK**.
 - Leave this window open.
- 8. From the **Start** menu, click **All Programs > IBM Cognos 10 64 Full**, and then click **IBM Cognos Dynamic Query Analyzer**.
 - The Content Store tab displays the items available at the Public Folders level.

- 9. From the **Window** menu, click **Preferences**, in the left pane, click **General**, and then under **Generating Logs**, select the **Dynamic query logging** check box.
- 10. In the left pane click **Cognos Server** and then ensure that the following properties are set:
 - Dispatcher URI: http://vclassbase:9315/p2pd/servlet/dispatch
 - Gateway URI: http://vclassbase:88/C10Full/cgi-bin/cognos.cgi
 - Name: admin
 - Password: Education1
 - Namespace: LDAP_Dev

If you receive a NullPointerException message, close this window and then try step 5 again.

- 11. Click **OK** to close the **Preferences** dialog box.
- 12. Switch to **IBM Cognos Administration**, and then beside **gosldw_sales** dynamic cube, in the **Actions** list, click **Restart**.
- 13. Click **OK** to close the **View the results** message box, and wait for the status to display **Available**.

Notice in the Metrics pane, that the Cube state will display Starting, and will update when the state changes to Running. You can also click Refresh on the Scorecard pane or the Metrics pane, and View recent messages to view the successful cube restart.

Task 2. Run Aggregate Advisor.

- 1. Switch to **IBM Cognos Dynamic Query Analyzer**, and then from the **File** menu, click **Run Aggregate Advisor**.
- 2. On the Select the cube page, click gosldw_sales, and then click Next. On the Specify General Options page, you can specify options to include workload logging information and to include recommendation for in-memory and in-database aggregates.

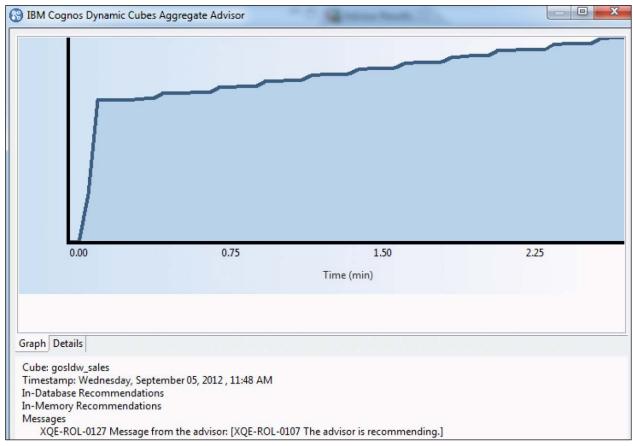
You can set the duration for the Advisor to run. The default is one hour.

3. Under Query Workload Information, click Query Workload Information Only, change the Advisor run time limit to 3 minutes, and then click Next. On the Filter Workload Information page, you can specify which reports to consider when making recommendations.

4. Click **Finish**.

While running, a message (maximize the window to see this) indicates that the Aggregate Advisor is recommending. You can expand the window to see the messages as they are displayed.

Results similar to the following will display:



If you are working with a small data set, you may need to run the Aggregate Advisor for a short time only; the graph will show if there are recommendations being made. You will see a change in how steep the graph is; the steeper the graph, the more the recommendation is expected to make a difference in the application. Some recommendations can come back in a few minutes. You can try to run without a time limit, see if the curve changes and then levels off within a few minutes, stop the Advisor, and see what recommendations came back.

When the Aggregate Advisor wizard finishes, the Advisor results view displays a summary of the Aggregate Advisor recommendations. If there are previous Aggregate Advisor results, the new results are displayed after the previous results.

5. In the Advisor Results tab view, double-click the gosldw_sales (<Weekday, Month Day, Year, Time>) link for the entry with the latest results.

A more detailed result is displayed in the center pane. The General tab (tabs are located at the bottom of the pane) describes the recommendations in detail for the items in the Advisor results view. The In-database tab describes the displays the details of the run. The Options tab lists the options used for the Aggregate Advisor wizard run.

6. To apply the in-memory recommendations, from the **File** menu, click **Apply Selected In-Memory Recommendations**.

In this demo, you will cancel the recommendation.

- 7. Click **Cancel**.
- 8. To save the in-database recommendations, from the **File** menu, click **Save In-Database Recommendations**, navigate to **C:\Edcognos\B5A55**, in the **File name** field type **gosldw_sales indatabase recommendations.txt**, and then click **Save**, to save the recommendations.

If you open this text file, you will see the contents of the In-database tab. The database administrator creates the aggregate tables and the modeler models the aggregate cube for the in-database aggregate and redeploys the dynamic cube.

9. Click the **File** menu, and notice the option to **Clear Saved In-Memory Recommendations**.

This will clear the in-memory aggregate from the content store, but can be re-applied from the current results later.

- 10. Click Exit to close IBM Cognos Dynamic Query Analyzer.
- 11. In **IBM Cognos Administration**, log off, and then close the browser.

Results:

You reviewed the workflow of administering the dynamic cubes in IBM Cognos Administration, and used the Aggregate Advisor in Dynamic Query Analyzer.

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Summary

- At the end of this module, you should be able to:
 - describe the tasks required to administer the IBM Cognos BI server environment
 - perform administrative tasks using IBM Cognos Administration
 - manage dispatchers and services
 - examine the log message facility
 - tune performance of servers
 - identify issues while troubleshooting the server environment
 - identify the IBM Cognos BI backup strategy
 - administer dynamic cubes

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Additional Information: Understand Cube Metrics

Metric	Description and Guidance to Interpret the State of a Dynamic Cube			
Aggregate table hit rate/ Aggregate table hit rate in last hour	Of the queries posed to a dynamic cube's query strategy for data, the percentage of those requests which obtain data from a relational aggregate (summary) table.			
	Subsequent requests for the same data will most likely be serviced from the cube's data (query) cache, unless the data is evicted from the data cache, which would indicate the data cache is near its capacity.			
	One value of this metric is for the last hour, the other since the cube started/restarted, allowing you to discern if there is a recent change in behavior.			
Average successful request time	The average amount of time required for a cube's query strategy to respond to a request for data. As time progresses, the amount of time required should decline as more and more data is available in the cube's various caches.			
	An increase in the time required to service data requests would indicate that requests are being made for data not in the cache, which may occur if users begin to report or explore data which has not been previously accessed.			
	One value of this metric is for the last hour, the other since the cube started/restarted, allowing you to discern if there is a recent change in behavior.			
Cube state	This is the current state of the cube. The possible states are: Stopped, Stopping, Starting, Running, Disabled.			

Metric	Description and Guidance to Interpret the State of a Dynamic Cube			
Data cache hit rate	Of the queries posed to a dynamic cube's query strategy for data, the percentage of those requests which obtain data from a cube's data (query) cache.			
	As time proceeds, the data cache hit rate should increase as more and more data is loaded into the cache. If the hit rate shows a decline over time, this is indicative that either users have begun to explore data not previously viewed, or that the data cache is near its capacity. A continual low hit rate may also indicate that the data cache is not large enough for the size of queries or the number of users, or the range of data being explored within the cube.			
	One value of this metric is for the last hour, the other since the cube started/restarted, allowing you to discern if there is a recent change in behavior.			
Dependent cubes	This is the list of virtual cubes which are dependent upon the cube.			
In-memory aggregate cache hit rate	The percentages are the number of non null cells solved by the in-memory aggregates. That means that if you have reports that access a wildly varying number of cells, these numbers can be skewed by a single large report. For example 1,000 reports each accessing 1,000 cells have the same influence as one report accessing 1,000,000 cells.			
Last metadata load time	This is the time it took to load the members the last time the cube was started or refreshed.			
Last response time	Specifies processing time for the most recent successful or failed cube request (in days, hours, minutes, and seconds).			

Metric	Description and Guidance to Interpret the State of a Dynamic Cube			
Loaded/defined in- memory aggregates	Loading of the in-memory aggregates can be expensive so it is important to understand that the following administrator actions will results in the aggregates being loaded: Start, Refresh Data Cache, Refresh Member Cache.			
	Loading of the aggregates executes asynchronously, and will not prevent the command from completing. As each individual aggregate finishes loading, it becomes available for use. Queries can be run against the cube while the aggregates are loading, but may experience reduced performance due to the load.			
Number of processed requests	This is the total number of requests processed by a cube since it was started or re-started.			
Percentage of time spent retrieving data	Displays the percentage of the time spent retrieving data.			
Result set cache hit rate	Of the total number of queries posed to a dynamic cube, this is the percentage of queries which were serviced by the result set cache. A high hit rate is indicative of a group of users assigned the same set of security views running the same report or analysis. Hits also occur when users drill up after performing a drill down.			

Metric	Description and Guidance to Interpret the State of a Dynamic Cube		
Time spent loading in- memory aggregates	This is the amount of time required to load in-memory aggregates. In-memory aggregates are proposed by the Aggregate Advisor and the recommendations must be saved to the content store in order for them to be used the next time a cube is started.		
	If the all of the aggregates are loaded (examine the 'loaded/define in-memory aggregates' metric) then this is the time required to load all of the aggregates, otherwise it reflects the time required to load the specified number of aggregate tables and the loading is still occurring.		
	The loading of in-memory aggregates begins once a cube has successfully started. As each in-memory aggregate is loaded, it is immediately available for use.		
	See Loaded/defined in-memory aggregates.		
Up time	The amount of time a cube has been available since its last start or re-start.		

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