

COGNOS^(R) 8 BUSINESS INTELLIGENCE

ARCHITECTURE AND
PLANNING GUIDE



Product Information

This document applies to Cognos^(R) 8 Version 8.1 and may also apply to subsequent releases. To check for newer versions of this document, visit the Cognos support Web site (<http://support.cognos.com>).

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Introduction

This document is for the business intelligence solutions architect who oversees the setup, administration, and use of Cognos 8, a Web-based business intelligence solution with integrated reporting, analysis, scorecarding, and event management features.

Part 1 describes the Cognos 8 architecture from the perspectives of structure, communications, workflow, and security. Part 2 provides information to help you plan to install and configure Cognos 8 and to maximize its performance.

To use this guide effectively, you should already be familiar with your information technology infrastructure and with the business needs of the people in your organization who will use Cognos 8.

For more information about using this product, visit the Cognos support Web site (<http://support.cognos.com>).

The following documents contain related information, and may be referred to in this document. Note that the availability of the studios described in these documents depends on your licensing permissions. To change your licensing permissions, see your administrator.

Document	Description
<i>Cognos 8 Installation and Configuration Guide</i>	Installing, upgrading, configuring, and testing Cognos 8, changing application servers, and setting up samples
<i>Cognos 8 Administration and Security Guide</i>	Managing servers, security, reports, and Portal Services; setting up Cognos samples; and customizing Cognos 8
<i>Cognos 8 Getting Started</i>	Teaching new users how to use Cognos 8
<i>Framework Manager User Guide</i>	Creating and publishing models using Framework Manager
<i>Metric Studio User Guide for Authors</i>	Authoring scorecard applications and monitoring the metrics within them
<i>Metric Designer User Guide</i>	Creating extracts that map and transfer information from relational and dimensional data sources to Metric Studio
<i>Report Studio User Guide</i>	Authoring reports that analyze corporate data according to specific needs
<i>Query Studio User Guide</i>	Creating ad hoc business intelligence reports
<i>Analysis Studio User Guide</i>	Exploring, analyzing, and comparing dimensional data
<i>Event Studio User Guide</i>	Creating and managing agents that monitor data and perform tasks when the data meets predefined thresholds
<i>Cognos Configuration User Guide</i>	Using Cognos Configuration to configure Cognos 8

Document	Description
Cognos Connection <i>User Guide</i>	Using Cognos Connection to publish, find, manage, organize, and view Cognos content, such as scorecards, reports, analyses, and agents
Cognos 8 Software Development Kit <i>Developer Guide</i>	Managing Cognos 8 processes and implementing custom reporting solutions by using a collection of cross-platform Web services, libraries, and programming interfaces provided with the Cognos 8 SDK
Cognos Enhanced Encryption Module for Open SSL <i>Installation and Configuration Guide</i>	Installing and configuring the Cognos Enhanced Encryption Module for Open SSL on Windows or UNIX
Cognos Enhanced Encryption Module for Entrust <i>Installation and Configuration Guide</i>	Installing and configuring the Cognos Enhanced Encryption Module for Entrust on Windows or UNIX
Cognos 8 <i>Troubleshooting Guide</i>	Helping administrators to quickly identify and solve problems

This document is available as online help and as an online book.

From within the online help, you can click the following link to open a printable version of this document (*PDF*).

Our documentation includes user guides, tutorial guides, reference books, and other materials to meet the needs of our varied audience.

Online Help

All information is available in online help. Online help is available from the help button in a Web browser, or the **Help** menu and help button in Windows products. You can also download the online help from the Cognos support Web site (<http://support.cognos.com>).

Books for Printing

The information in each online help system is available in online book format (PDF). However, the information from a given help system may be divided into more than one online book. Use online books when you want to print a document or when you want to search the whole document.

You can print selected pages, a section, or the whole book. Cognos grants you a non-exclusive, non-transferable license to use, copy, and reproduce the copyright materials, in printed or electronic format, solely for the purpose of providing internal training on, operating, and maintaining the Cognos software.

Online books are available from the introduction to the online help for each component.

All online books are available on the Cognos documentation CD.

You can also read the product readme files and the installation guides directly from Cognos product CDs.

PART 1: Architecture

Chapter 1: Cognos 8

Cognos 8 is a solution designed to address the challenges of enterprise-scale reporting, analysis, scorecarding, and event notification.

The Web-based Cognos 8 architecture was designed for scalability, availability, and openness. It uses platform independent, industry proven technology, such as Extensible Markup Language (XML), Simple Object Access Protocol (SOAP), and Web Services Definition Language (WSDL). For this reason, Cognos 8 can integrate with and leverage your existing technology infrastructure on multiple platforms.

The Cognos 8 architecture features a consistent, zero footprint, Web-based user interface for viewing, creating, and administering reports, analyses, scorecards, and events. It has a common dispatcher and supports leading relational databases as well as OLAP (Online Analytical Processing) and dimensionally modeled relational cubes. It ensures dynamic load balancing and provides failover recovery for 24 x 7 operation. It also provides a single point of administration, as well as Web-based delegated administration. Cognos 8 is fully open to third-party products and custom development. It also integrates with Web farms and supports multilingual reporting and scorecarding.

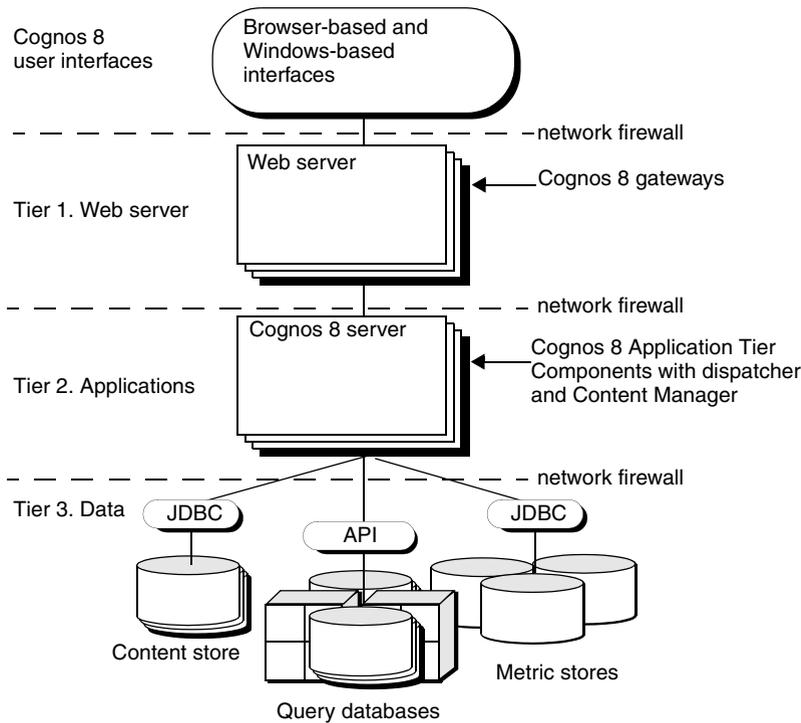
Cognos 8 Data Manager

This document describes the architecture of the Web-based Cognos 8 products. Cognos 8 also includes Data Manager for data integration. With Data Manager, you can extract data from source systems and data files, transform the data, and load it into a data warehouse, conformed data mart, or report staging area.

For information about the Data Manager architecture, see the Data Manager *Installation and Configuration Guide* and the Data Manager *User Guide*.

Chapter 2: The Multitiered Architecture

Cognos 8 has a multitiered architecture. For description purposes, it can be separated into three tiers: Web server, applications, and data. The tiers are based on business function, and are typically separated by network firewalls. Cognos 8 user interfaces sit above the tiers.



This information describes a single-server Cognos 8 configuration. To meet your requirements, you can choose a different configuration. For more information, see "[Installation Options](#)" (p. 49).

User Interfaces

Cognos 8 is configured using Cognos Configuration. You also use Cognos Configuration to start and stop Cognos 8 services.

In addition to Cognos Configuration, Cognos 8 has Web-based and Windows-based user interfaces.



Web-based User Interfaces

The zero footprint, Web-based interfaces include

- Cognos Connection (p. 14)
- Query Studio (p. 15)
- Report Studio (p. 15)
- Analysis Studio (p. 15)
- Event Studio (p. 15)
- Metric Studio (p. 15)

The interfaces that are available to users depend on user permissions and on the Cognos 8 packages that your organization purchased.

Cognos Connection

Cognos Connection is a Web portal provided with Cognos 8, providing a single access point to the corporate data available to its products. It provides a single point of entry for querying, analyzing, and organizing data, and for creating reports, scorecards, and events. Users can run all their Web-based Cognos 8 applications through Cognos Connection. Other business intelligence applications, and URLs to other applications, can be integrated with Cognos Connection.

Like the other Web browser interfaces in Cognos 8, Cognos Connection uses the default configurations of your browser. It does not require the use of Java, ActiveX, or plug-ins, and does not install them.

In addition to selections for analyzing and organizing data and creating reports, Cognos Connection includes

- portal pages
Users can use portal pages to see content on a customizable page that uses portlets to show different types of content at the same time.
- Public Folders
Public Folders store shared Cognos 8 content, such as packages (p. 38), reports, agents, shortcuts, and jobs.
- My Folders
My Folders store personal Cognos 8 content, such as reports, shortcuts, and jobs.
- preferences
Preferences can be used to customize the Cognos Connection interface.
- directory
Directory is used to specify Cognos 8 data sources and their connections; define groups and roles for security purposes; and specify distribution lists, contacts, and printers. In a distributed environment, you can delegate directory tasks.
- Drill-through Definitions
Drill-through Definitions are used to navigate through related data when querying or analyzing data.
- Portal Administration
Portal Administration is used to manage your portlets and portal layout.
- Capabilities
Capabilities are used to control access to administrative interfaces, the Cognos 8 studios, and advanced functionality, such as edit SQL.
- Schedule Management
Schedule Management is used to manage and monitor current and scheduled reports and jobs.
- Server Administration
Server Administration is used to administer the Cognos 8 environment, including monitoring dispatchers and services, configuring and fine-tuning performance-related parameters, and customizing auditing and logging.
- Content Administration

Content Administration is used to deploy Cognos 8 applications from one content store (p. 20) to another.

For information about using Cognos Connection, see the *Cognos Connection User Guide* or the online Quick Tour.

The open Cognos 8 architecture means that you can choose to integrate Cognos 8 into your organization's existing Web portal. You can use Portal Services, provided with Cognos 8, to integrate Cognos 8 with a number of portals, including

- SAP Enterprise
- IBM WebSphere
- Plumtree

For more information, see the *Administration and Security Guide*.

Query Studio

Query Studio is an ad-hoc reporting tool that lets users with little or no training quickly design, create and save reports to meet reporting needs not covered by the standard, professional reports created in Report Studio.

For information about using Query Studio, see the *Query Studio User Guide* or the online Quick Tour.

Report Studio

Report Studio lets report authors create, edit, and distribute a wide range of professional reports. They can also define corporate-standard report templates for use in Query Studio, and edit and modify reports created in Query Studio or Analysis Studio.

For information about using Report Studio, see the *Report Studio User Guide* or the online Quick Tour.

Analysis Studio

In Analysis Studio, users can explore, analyze, and compare dimensional data. Analysis Studio provides access to dimensional, OLAP (online analytical processing), and dimensionally modeled relational data sources. Analyses created in Analysis Studio can be opened in Report Studio and used to build professional reports.

For information about using Analysis Studio, see the *Analysis Studio User Guide* or the online Quick Tour.

Event Studio

In Event Studio, you set up agents to monitor your data and perform tasks when business events or exceptional conditions occur in your data that must be dealt with. When an event occurs, people are alerted to take action. Agents can publish details to the portal, deliver alerts by email, run and distribute reports based on events, and monitor the status of events. For example, a support call from a key customer or the cancellation of a large order may trigger an event, sending an email to the appropriate people.

For information about using Event Studio, see the *Event Studio User Guide* or the online Quick Tour.

Metric Studio

In Metric Studio, you can create and deliver a customized scorecarding environment for monitoring and analyzing metrics throughout your organization. Users can monitor, analyze, and report on time-critical information by using scorecards based on cross-functional metrics.

For information about using Metric Studio, see the *Metric Studio User Guide for Authors*.

Windows-based User Interfaces

The Windows-based Cognos 8 interfaces are the modeling components: Framework Manager, Metric Designer, Transformer, and Map Manager.

Framework Manager

Framework Manager is the Cognos 8 modeling tool for creating and managing business-related metadata for use in Cognos 8 analysis and reporting. Metadata is published for use by reporting tools as a package, providing a single, integrated business view of any number of heterogeneous data sources.

OLAP cubes are designed to contain sufficient metadata for business intelligence reporting and analysis. Because cube metadata may change as a cube is developed, Framework Manager models the minimum amount of information needed to connect to a cube. Cube dimensions, hierarchies, and levels are loaded at run time.

For information about using Framework Manager, see the Framework Manager *User Guide*.

Metric Designer

Metric Designer is the Cognos 8 modeling tool used to create extracts for use in Cognos 8 scorecarding applications. Extracts are used to map and transfer information from existing metadata sources such as Framework Manager and Impromptu Query Definition (.iqd) files.

For information about using Metric Designer, see the Metric Designer *User Guide*.

Transformer

Transformer is a modeling tool for creating PowerCubes for use with Cognos Series 7 and Cognos 8.

For information about installing and configuring Transformer, see the documentation provided with your edition of Transformer.

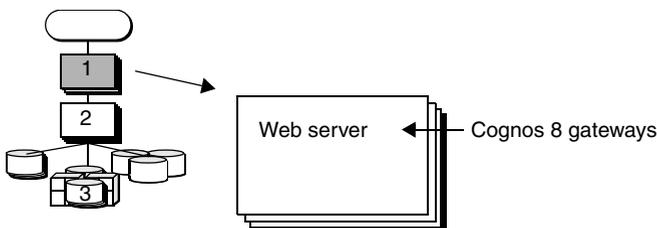
Map Manager

Administrators and modelers use a Windows utility named Map Manager to import maps and update labels for maps in Report Studio. For map features such as country and city names, administrators and modelers can define alternative names to provide multilingual versions of text that appears on the map.

For information about using Map Manager, see the Map Manager *Installation and User Guide*.

Tier 1. Web Server: Cognos 8 Gateways

The Cognos 8 Web server tier contains one or more Cognos 8 gateways.



Web communication in Cognos 8 is typically through gateways, which reside on one or more Web servers. A gateway is an extension of a Web server program that transfers information from the Web server to another server.

Web communication can also occur directly with a Cognos 8 dispatcher (p. 17), although this option is less common than using gateways.

If you install the gateway component on a different computer from Content Manager or Application Tier Components, you must configure the gateway computer so that it knows the location of a dispatcher, preferably one on an Application Tier Components computer. For failover protection, you can configure more than one dispatcher for a gateway computer (p. 17).

Cognos 8 supports several types of Web gateways, including

- CGI

The default gateway, CGI can be used for all supported Web servers. However, for enhanced performance or throughput, you may choose one of the other supported gateway types.

- ISAPI
ISAPI can be used for the Microsoft Internet Information Services (IIS) Web server. It delivers faster performance for IIS.
- apache_mod
You can use an apache_mod gateway with the Apache Web server.
- servlet
If your Web server infrastructure supports servlets or you are using an application server, you can use a servlet gateway.

When a Cognos 8 gateway receives a request, it

- encrypts passwords to ensure security
- extracts information needed to submit the request to a Cognos 8 server
- attaches environment variables for the Web server
- adds a default namespace to the request to ensure that the server authenticates the user in the correct namespace
- passes requests to a Cognos 8 dispatcher for processing

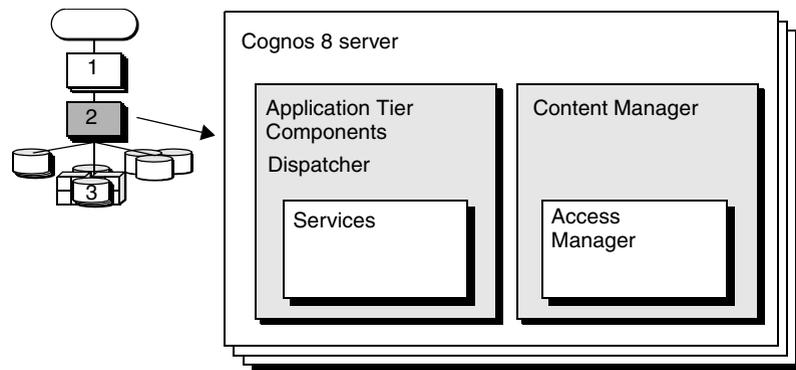
For information about configuring Cognos 8 gateways, see the *Installation and Configuration Guide*.

Tier 2. Applications: Cognos 8 Servers

The Cognos 8 applications tier contains one or more Cognos 8 servers. A Cognos 8 server runs requests, such as reports, analyses, and queries, that are forwarded by a gateway. A Cognos 8 server also renders the Cognos Connection and Metric Studio interfaces.

Each Cognos 8 installation includes

- Application Tier Components, which include a dispatcher ([p. 17](#)), that operates services and routes requests
- Content Manager ([p. 19](#)), which manages Cognos 8 information



Dispatcher

The dispatcher starts all Cognos 8 services configured and enabled on a computer, and routes requests. The dispatcher is a multithreaded application that uses one or more threads per request. Configuration changes are routinely communicated to all running dispatchers. The dispatcher includes Cognos Application Firewall to provide security for Cognos 8. For more information, see "[Cognos Application Firewall](#)" ([p. 41](#)).

The dispatcher can route requests to a local service, such as the report service, presentation service, job service, or monitoring service.

A dispatcher can also route requests to a specific dispatcher to run a given request. Requests can be routed to specific dispatchers based on load-balancing needs, or package or user group requirements. For example, if a particular OLAP data source is available for only one Cognos server group, you specify that all requests for the data source be routed to that Cognos server group. For more information about routing requests based on packages or user groups, see the *Administration and Security Guide*.

When a dispatcher starts, it registers itself with Content Manager. As a result, each dispatcher is aware of the other dispatchers. If a dispatcher fails or is unavailable, requests for that dispatcher are routed to the next available dispatcher until the failed dispatcher reregisters itself.

When you configure Cognos 8 gateways, you can list the universal resource identifiers (URIs) of target dispatchers in order of most to least preferred. If a dispatcher fails, requests are routed to another dispatcher based 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. For more information, see the *Installation and Configuration Guide*.

The dispatcher managers various services.

Presentation Service

The presentation service handles requests for Cognos Connection, Query Studio, and Event Studio.

Report Service

The report service handles interactive requests to run reports and provides output for a user in Cognos Connection or a studio.

Batch Report Service

The batch report service handles background requests to run reports and provides output on behalf of the monitoring service.

Job Service

The job service runs jobs by signaling the monitoring service to run job steps in the background. Steps include reports, other jobs, import, exports, and so on.

Monitoring Service

The monitoring service assigns a target service to handle a scheduled task. For example, the monitoring service may ask the batch report service to run a report, the job service to run a job, or the agent service to run an agent. The monitoring service will monitor the running of the task and collect and save history information for the task. The monitoring service can also take control of asynchronous service conversations on behalf of the client, such as if a user asks to run an interactive report in the background.

Log Service

The log service manages all logs generated by the dispatcher and other services. You can configure the log service to record log information in a file, a database, a remote log server, Windows Event Viewer, or a UNIX system log. For more information, see "[Log Message Processing](#)" (p. 24).

Content Manager Service

The Content Manager service performs object manipulation functions in the content store, such as add, query, update, delete, move, and copy.

Metrics Manager Service

The Metrics Manager service provides the Metric Studio user interface for monitoring and entering performance information.

Data Integration Service

The data integration service controls the loading of metrics data and the calculation of metrics status for scorecarding in Metric Studio.

Delivery Service

The delivery service sends emails on behalf of other services, such as the report service, job service, agent service, or data integration service.

Event Management Service

The event management service manages scheduled tasks. When a scheduled task begins to run, the event management service asks the monitoring service to begin running the task.

Agent Service

The agent service runs agents. If the conditions for an agent are met when the agent runs, the agent service asks the monitoring service to run the tasks.

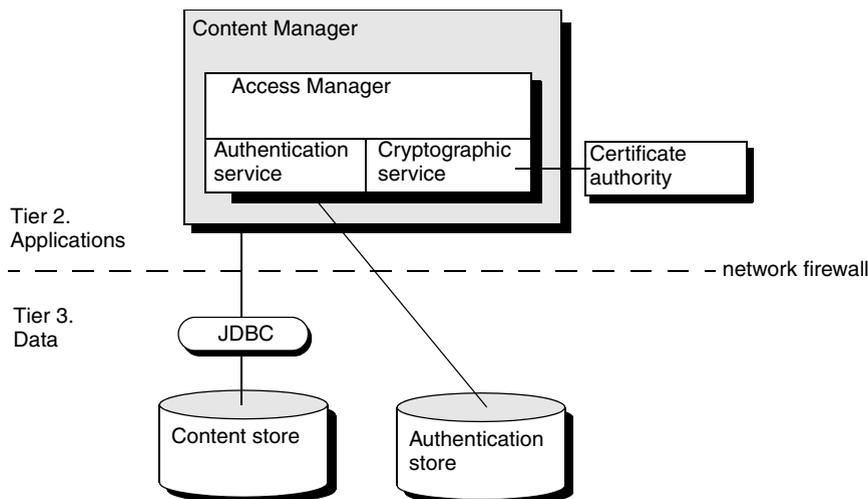
System Service

The system service defines the Business Intelligence Bus API-compliant service used to obtain application-wide Cognos 8 configuration parameters. It also provides methods that normalize and validate locale strings and map locale strings to locales supported by your application.

Content Manager

Content Manager is the Cognos 8 service that manages the storage of customer application data, including security, configuration data, models, metrics, report specifications, and report output. Content Manager 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 (p. 20) database, which is typically located in Tier 3 of the architecture.



Your installation may include more than one Content Manager, each on a different computer. One Content Manager computer is active and one or more Content Manager computers are on standby. The standby Content Manager computers are for failover protection. 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.

When the active Content Manager fails, unsaved session data is lost. When another Content Manager becomes active, users may be prompted to log on.

Although we describe Content Manager as part of the applications tier, for maximum security you can choose to configure Cognos 8 with Content Manager in the data tier.

The information stored by Content Manager includes

- reports
 - Reports contain specifications, properties, security settings, and outputs. This includes analyses created in Analysis Studio, queries created in Query Studio, and reports created in Report Studio.

- report packages
Packages contain metadata, reports, and folders.
- metric packages
Metric packages contain metadata, scorecards, and folders.
- agents
Agents include the conditions, schedules, and tasks used to monitor events and deliver notifications. This includes the list of recently detected instances of an event.
- server configuration
Server configuration contains directory information, the Cognos namespace (p. 43), and information about contacts, distribution lists, data sources, and printers.
- personal user information
Personal user information consists of My Folders and My Pages.
- language information
Language information includes names, descriptions, and tool tips in different languages to support Cognos 8 multilingual capabilities.

Content Manager performs general functions, such as add, query, update, delete, move, and copy. It also performs content store management functions, such as export and import.

Access Manager

Content Manager contains Access Manager, the primary security component of Cognos 8. Access Manager leverages your existing security providers for use with Cognos 8. It provides Cognos 8 with a consistent set of security capabilities and APIs, including user authentication (p. 42), authorization (p. 42), and encryption (p. 43). It also provides support for the Cognos namespace (p. 43).

Some security capabilities, such as user authentication, are external to Cognos 8 but are exposed to Cognos 8 by Access Manager. Other capabilities, such as authorization, are internal to Cognos 8, and are implemented by Access Manager.

For many security-related functions, Access Manager requires certificates, and interacts with a certificate authority. By default, Cognos 8 uses its own certificate authority service to establish the root of trust in the Cognos 8 security infrastructure. If you use a third-party certificate authority, you can configure Cognos 8 to use it instead of the default Cognos 8 certificate authority. For more information, see "Security" (p. 41).

Tier 3. Data: Content Providers

The Cognos 8 data tier contains the

- content store (p. 20)
- data sources (p. 21)
- metric store (p. 22)

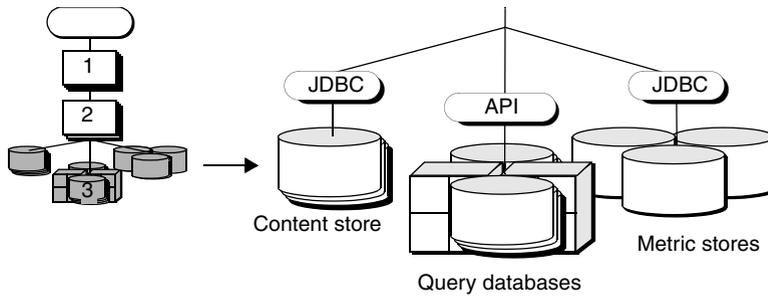
Content Store

The content store is a relational database that contains data that Cognos 8 needs to operate, such as report specifications, published models, and the packages that contain them; connection information for data sources; information about the external namespace, and the Cognos namespace itself; and information about scheduling and bursting reports.

Design models and log files are not stored in the content store.

The Cognos 8 service that uses the content store is named Content Manager.

Content Manager uses a JDBC (Java DataBase Connectivity) API to access the content store and metric stores. Cognos 8 comes with the JDBC drivers for MS SQL Server access from both Windows and UNIX. Oracle, IBM, and Sybase JDBC drivers, which are required for their respective databases, are available from their vendors.



Cognos does not publish the content store schema, but updates the schema periodically, isolating changes from the user through stable user interfaces and APIs.

Much of the information in the content store, such as report results and XML report specifications, is stored as binary large object (BLOB) fields.

PDF results are compressed from creation, to storage, to serving, to the browser. The PDF format does not allow the main body of a report to be compressed, but the page contents, fonts, and images are compressed. Adobe Acrobat Reader uncompresses PDF files at view time.

Report results in other formats, such as HTML, XML, and CSV (comma separated values), are stored in compressed form and are uncompressed by Content Manager before they are sent to a user.

Data Sources

Data sources are relational databases, dimensional cubes, files, or other physical data stores that can be accessed through Cognos 8.

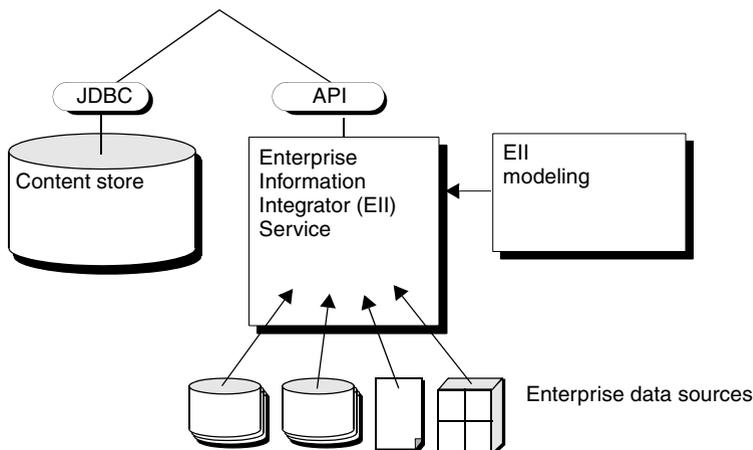
Application Tier Components use data source connections to access data sources.

Enterprise Information Integrators

Cognos 8 can be used with Enterprise Information Integration (EII) products such as the Composite Information Server.

Composite Information Server provides access to additional data sources such as LDAP, JDBC, Open XML and WSDL, and improves performance when querying data from different data sources.

In the following scenario, the EII product models a set of databases, producing a unified view as a single virtual data source. Cognos 8 accesses the EII service as though it were a single database, and the EII service joins data from the various enterprise data sources as needed.



Metric Store

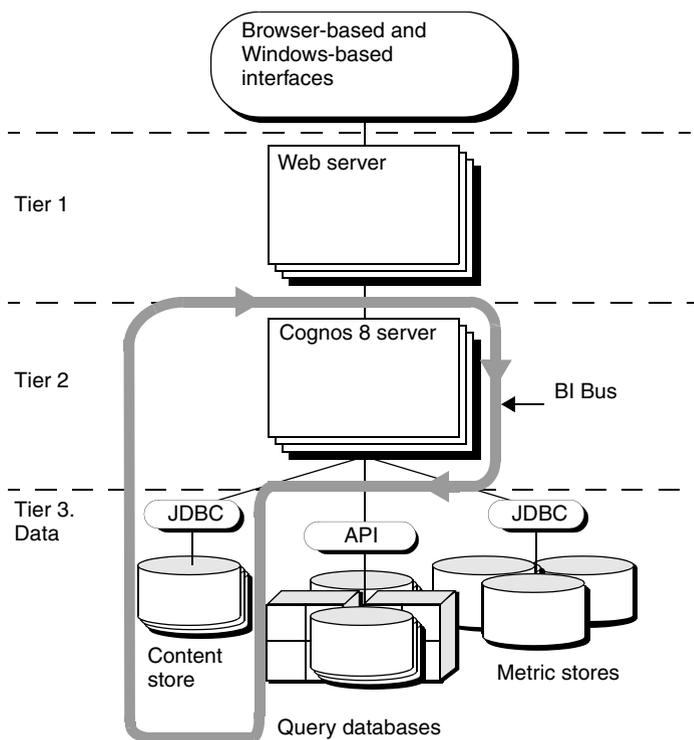
A metric store is a relational database that contains content for metric packages. A metric store also contains Metric Studio settings, such as user preferences.

More than one metric store may be created. For example, one metric store may contain content for a sales application and another metric store may contain content for a finance application.

Chapter 3: Communications

Cognos 8 components communicate with each other, and with any additional applications integrated with Cognos 8, using the BI Bus. The BI Bus is an open, documented, Simple Object Access Protocol (SOAP) API that supports Web Services Definition Language (WSDL).

The BI Bus is not a software component like Content Manager or a Cognos 8 server, but a set of protocols that govern communications among Cognos 8 services. It also defines how third-party industry standards and protocols are used with Cognos 8, enabling Cognos 8 to be a fully open system.



Everything that is managed through Cognos Connection (p. 14) or your third-party portal is exposed through the BI Bus. This includes packages, folders, reports, analyses, events, directory objects, servers, deployment objects, and metadata. Through the API, you can create, read, update, and delete these objects, and set security and other properties.

The processes enabled by the BI Bus protocol include

- [messaging and dispatching](#)
- [log message processing](#)
- [database connection management](#)
- [port usage](#)
- [request flow processing](#)
- [portal pages](#)

Messaging and Dispatching

The Cognos 8 architecture is tuned to minimize dispatch time. Cognos 8 can use network capabilities, such as load-balancing routers, to ensure that dispatchers and Web gateways are used evenly. Load-balancing routers distribute requests across multiple Web or application servers, ensuring that all dispatchers share the workload.

The dispatcher load-balancing scheme is a static algorithm. You can specify a weight for each dispatcher. A dispatcher with a weight of 2 can do twice the work of a dispatcher with a weight of 1, and so on. Each dispatcher spreads work among all the dispatchers using a weighted round-robin algorithm.

Local Preferred Dispatching

When using any sort of external load-balancing mechanism, you should use the local preferred dispatch option. By using this option, the dispatcher does not perform load balancing. Requests that can be processed locally will be processed locally. If the external load balancing mechanism sends a request to a computer on which the required service is not available, the dispatcher routes the request to an appropriate computer.

For more information, see "[Load Balancing](#)" (p. 62).

Log Message Processing

Log messages are an important diagnostic tool for investigating the behavior of Cognos 8. In addition to error messages, log messages provide information about the status of components. Log messages also provide a high-level view of important events, such as successful completion of processing requests and fatal errors.

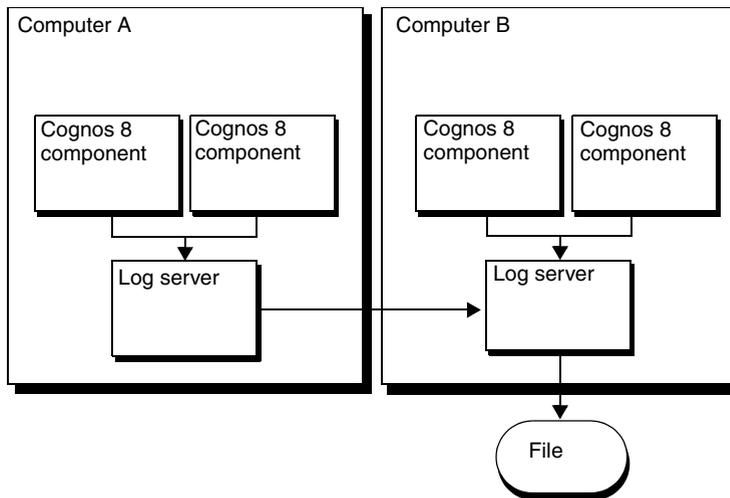
A log server is installed when you install Content Manager or the Cognos 8 server. The log server uses a different port from the other Cognos 8 components, and continues to process events even if other services on the local computer, such as the dispatcher, are disabled.

By default, all local Cognos 8 services send events to the local log server. When you configure a log server, you can

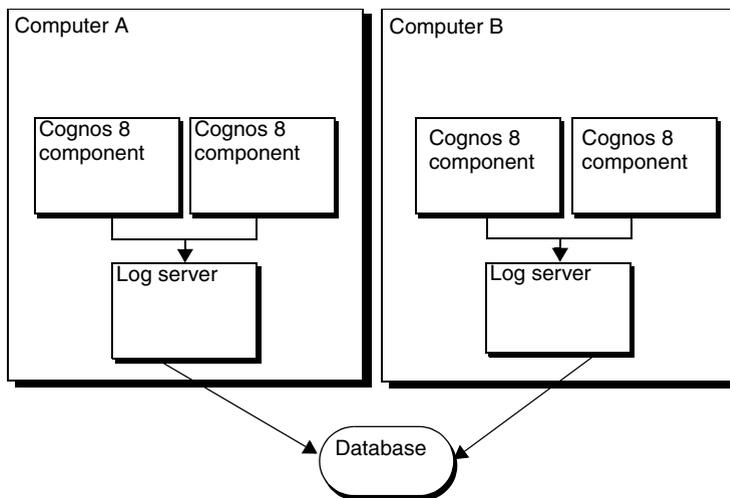
- specify the level of detail to log for each logging category.
For more information, see the *Administration and Security Guide*.
- provide additional security for log messaging, by using SSL protocol for communication between Cognos 8 components and the log server.
For more information, see the *Installation and Configuration Guide*.
- direct messages to an alternative destination, such as a third-party database, the UNIX syslog, or the Windows Event Viewer (p. 24).

Sending Log Information in a Distributed Installation

Distributed installations of Cognos 8 have more than one log server. With distributed installations, you can send log information to a central location. For example, you can configure Cognos 8 to send log information to a common log server. This log server sends the log information to a single destination on the same or a different computer.



You can also configure Cognos 8 to send log information from each log server to a common database. The common database can be on the same computer as one of the log servers, or on a different computer.



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

For information about specifying where to send log messages, see the *Installation and Configuration Guide*.

Database Connection Management

Cognos 8 uses databases for several purposes: content store database, query database, or metric store database.

For some types of databases, such as Oracle, API client software must be installed and configured on each Cognos 8 server.

Content Store Database

The Content Manager service accesses the content store. Content Manager uses one database connection per request. Content Manager creates new database connections as required, pools connections, and reuses existing connections when possible. Content Manager maintains all database connections for the duration of the Content Manager operation. The theoretical maximum number of concurrent Content Manager requests equals the number of requests accepted by the Java application server or Tomcat.

When other Cognos 8 services are on the same computer as Content Manager, requests may be divided between Content Manager and the other services. In this case, the number of connections available to Content Manager may be fewer than the maximum possible connections.

Query Databases

The Cognos 8 server computer accesses the query databases. You can configure the maximum number of query database connections available to the Cognos 8 server computer, and the duration that connections are retained. A cleanup thread examines the connections every minute. Any connection that has been inactive longer than the timeout value is removed.

Inactive query database connections can be claimed by a new request. This occurs when the maximum number of connections has been reached and none of the inactive connections can be used by the new request. In this case, the oldest inactive connection is terminated and a new connection is created. A query database connection is only reused when the database credentials of the connection match those of the new request.

If the maximum number of connections is reached, and all are active, additional requests fail.

Metric Store Databases

A metric store database is a special case of a query database. A metric store database is used to store the information associated with metrics that appear in scorecards, including

- targets
- performance metrics
- thresholds
- membership in scorecards
- links to related reports, initiatives, and counter measures

Metric Studio accesses the metric store database. Metric Designer is used to define jobs that extract data from other query databases and populate the metric store database, although you can also manually create processes to do this.

Port Usage

All communication between Cognos 8 components, except for log server communication, can take place through one incoming port. This is true whether components are on the same computer or on different computers and whether communication is all non-SSL protocol or all SSL protocol. The default port number is 9300.

If Cognos 8 is configured to use a combination of non-SSL protocol and SSL protocol, communication takes place through two ports. You can use the default port for the non-SSL protocol communication and use a different port, such as 9334, for the SSL protocol communication.

Log server communication must take place through a unique port. The default port is 9362. You can configure log server communication to use either non-SSL or SSL protocol.

Framework Manager and Metric Designer can communicate with the Cognos 8 server using either of two routes: through the Web server gateway, or directly to the Application Tier Components dispatcher. For more information see "[Modeling Tool Installation Options](#)" (p. 55).

Communications with third-party software products, such as databases and authentication providers, use the ports required by those products.

For information about using SSL and specifying where to send log messages, see the *Installation and Configuration Guide*.

Request Flow Processing

Request flow describes internal Cognos 8 responses to user requests. In general, browser requests go through the Cognos 8 Web gateway (p. 16) and are sent to a dispatcher. Before any processing is performed by the dispatcher, the request is validated by Cognos Application Firewall. A passport is attached to each request as a record of a valid user session.

Simple Object Access Protocol (SOAP) requests can be directed to either the Cognos 8 Web gateway or the dispatcher. For more information, see the *Installation and Configuration Guide*.

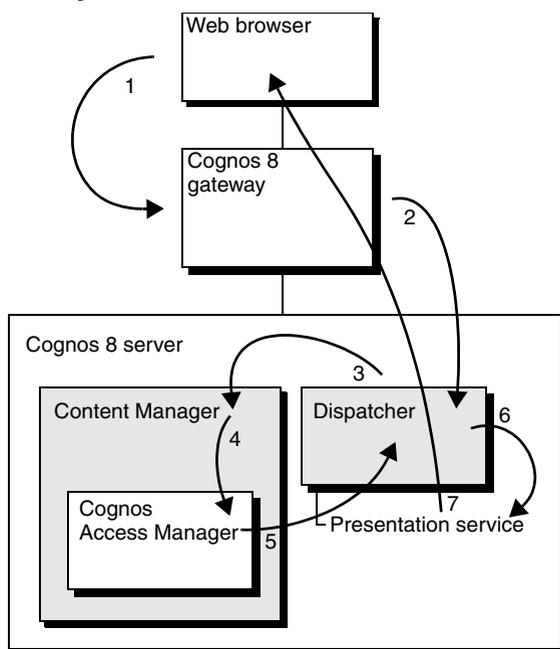
There are hundreds of types of requests and responses in Cognos 8. To illustrate request flow, this section describes how Cognos 8 responds to a request:

- to access Cognos 8 (p. 27)
- to view a report or analysis (p. 29)
- to run a report or analysis (p. 29)
- to run a scheduled task (p. 31)
- to open a Cognos Connection folder (p. 32)
- to run an agent (p. 33)

Accessing Cognos 8

A user can request anonymous or authenticated access to Cognos 8. Anonymous access can be enabled or disabled for Cognos 8. For more information see "[Cognos Authentication Services](#)" (p. 42).

Anonymous Access

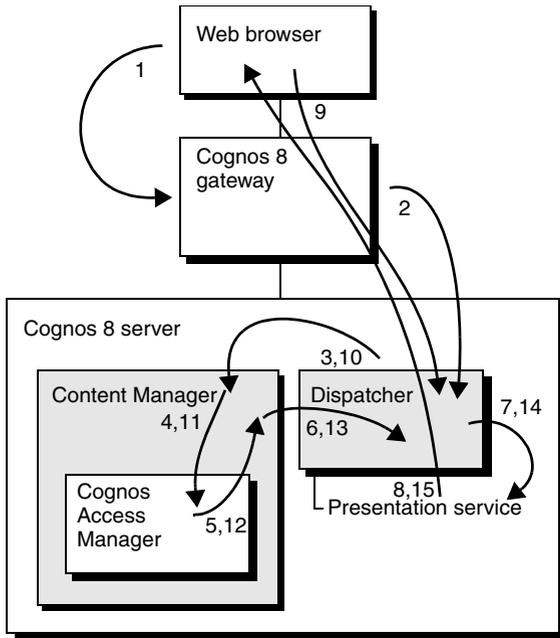


When a user requests anonymous access to Cognos 8, the following occurs:

- (1) The user attempts to access the Cognos 8 Welcome page or any other Cognos 8 user interface from a Web browser, sending a request to the Cognos 8 gateway.
- (2) The Cognos 8 gateway accepts the request and sends it to a dispatcher.
- (3) The dispatcher notes that there is no passport attached to the request, and sends the request to Content Manager.
- (4) Content Manager sends the request to Access Manager.
- (5) Anonymous access is enabled in this Cognos 8 system, so a passport is attached to the request and the request is returned through Content Manager to the dispatcher.
- (6) The dispatcher processes the request and sends it to the presentation service.

- (7) The presentation service sends the Welcome page back through the dispatcher and the gateway to the user.

Authenticated Access

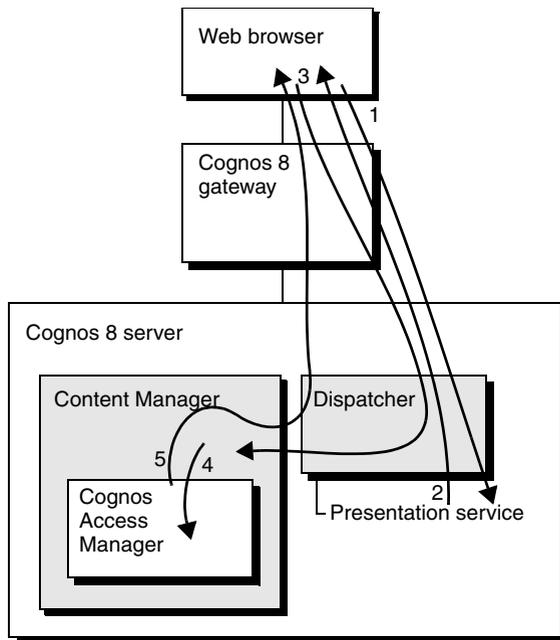


When a user requests authenticated access to Cognos 8, the following occurs:

- (1) The user attempts to access the Cognos 8 Welcome page or any other Cognos 8 user interface from a Web browser, sending a request to the Cognos 8 gateway.
- (2) The gateway accepts the request and sends it to a dispatcher.
- (3) The dispatcher notes that there is no passport attached to the request and sends the request to Content Manager.
- (4) Content Manager sends the request to Access Manager.
- (5) Anonymous access is disabled in this Cognos 8 system, so Access Manager sends the request back to Content Manager with a fault attached. The fault contains information about what is needed to log on. For example, if there are multiple namespaces, the user may be required to select a namespace. If there is only one namespace, the user may be required to provide a user ID and password.
- (6) Content Manager returns the request with the attached fault to the dispatcher.
- (7) The dispatcher sends the request to the presentation service.
- (8) The presentation service creates the appropriate logon page for the user, and returns the page through the dispatcher and the gateway to the user.
- (9) The user enters the required information, such as a user ID and password. The information is attached to the original request and sent through the gateway to the dispatcher.
- (10) The dispatcher sends the request to Content Manager.
- (11) Content Manager sends the request to Access Manager.
- (12) If all the required information is correct, Access Manager issues a passport, attaches it to the original request, and sends the request back to Content Manager. If the required information is incorrect or incomplete, then the request faults back to step 9.
- (13) Content Manager sends the request to a dispatcher.
- (14) The dispatcher processes the request and sends it to the presentation service.
- (15) The presentation service sends the Welcome page back through the dispatcher and the gateway to the user.

Viewing a Report or Analysis

Reports and analyses can be viewed in Cognos 8 in different formats, including HTML and PDF.



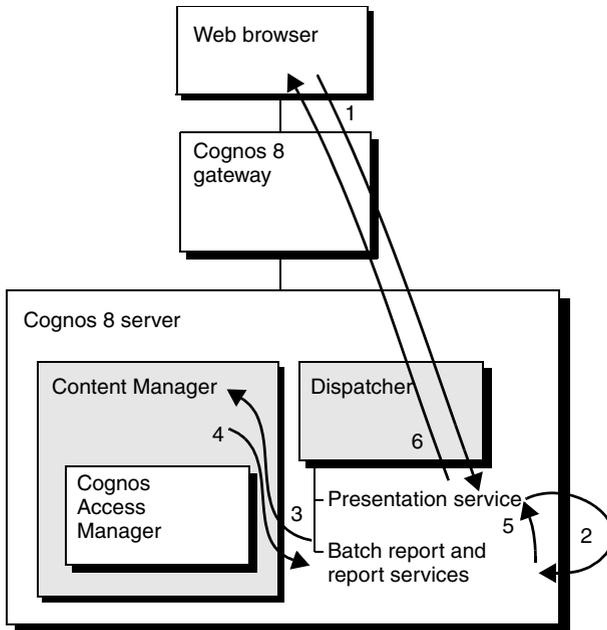
When a user views a saved HTML or PDF report or analysis through Cognos Connection, the following occurs:

- (1) The user clicks a report or analysis to view it, and the request goes through the gateway and the dispatcher to the presentation service.
- (2) The presentation service returns the Cognos Viewer through the dispatcher and gateway to the browser. The Cognos Viewer has an HTML frame that shows the report or analysis page. The data view of the page contains a URL to a Content Manager object to be displayed.
- (3) The browser sends the URL through the gateway and dispatcher to Content Manager.
- (4) Content Manager checks with Access Manager to see whether the user has view privileges for the report or analysis. To do this, Content Manager sends Access Manager the access control lists for the report or analysis, the attempted action (read), and the user information.
- (5) Access Manager determines that the user can perform the action, and Content Manager sends the report or analysis in the form of an HTML page or PDF document through the dispatcher and gateway to the user. When serving a PDF report or analysis, byte serving is used.

Running a Report or Analysis

You can run a report or analysis in HTML or PDF format.

Running an HTML Report

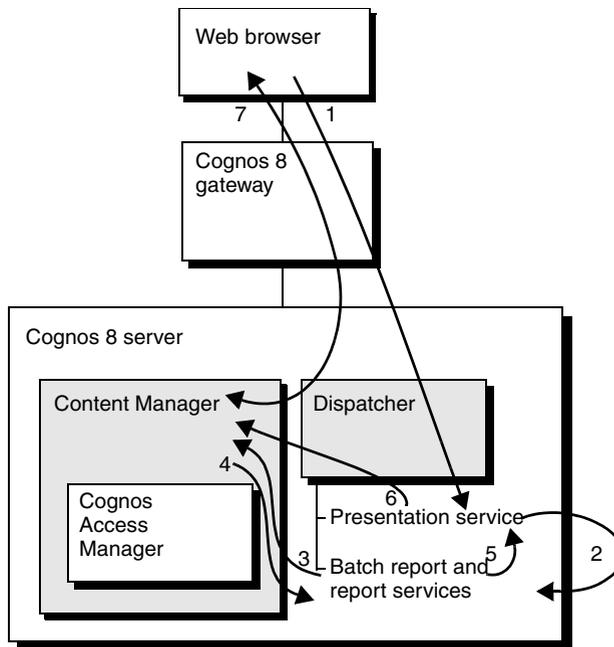


When a user runs an HTML report or analysis through Cognos Connection, the following occurs:

- (1) The user clicks a report or analysis to run it, and the request goes through the gateway and the dispatcher to the presentation service.
- (2) The presentation service sends the request to the report service through the dispatcher.
- (3) The report service requests the report or analysis and metadata from Content Manager, through the dispatcher.
- (4) Content Manager sends the report or analysis XML specifications and metadata to the report service. Content Manager refetches metadata only when Cognos 8 is stopped and restarted or the model is updated and republished.
- (5) The report service returns one of these results to the presentation service:
 - an error page
 - a not ready page
 - a page of an HTML report or analysis
- (6) The presentation service sends one of these results through the dispatcher and gateway to the browser:
 - an error page
 - a wait or cancel page
 - a page of a completed HTML report or analysis in the Cognos Viewer interface

When the user presses page down or page bottom in the browser, the same path is followed again. The request has a high state of request affinity to ensure that it is routed to the same report service for additional rows of data.

Running a PDF Report or Analysis

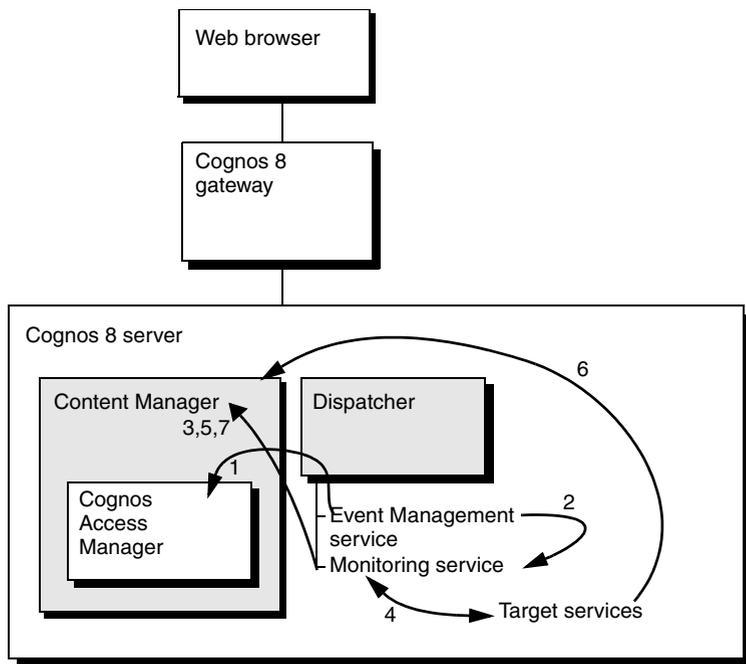


When a user runs a PDF report or analysis through Cognos Connection, the following occurs:

- (1) The user clicks a report or analysis to run it, and the request goes through the gateway and the dispatcher to the presentation service.
- (2) The presentation service sends the request to the report service through the dispatcher.
- (3) The report service requests the report XML specification and metadata from Content Manager, through the dispatcher.
- (4) Content Manager sends the report XML specification and metadata to the report service. Content Manager refetches metadata only when Cognos 8 is stopped and restarted or the model is updated and republished.
- (5) The report service returns one of these results to the presentation service:
 - an error page
 - a not ready page
 - a PDF report or analysis
- (6) The presentation service sends the PDF result to Content Manager for storage in the user's session temporary area. Byte serving is used.
- (7) The wait/cancel page polls every few seconds to see if the report or analysis is complete. When it is complete, the Cognos Viewer HTML frame content is replaced with the PDF. A request is sent through the gateway and the dispatcher to the Content Manager and back with the PDF.

Scheduling a Task to Run

You can schedule a task to run for a report, query, analysis, data integration, agent, job, import, export, or content management.

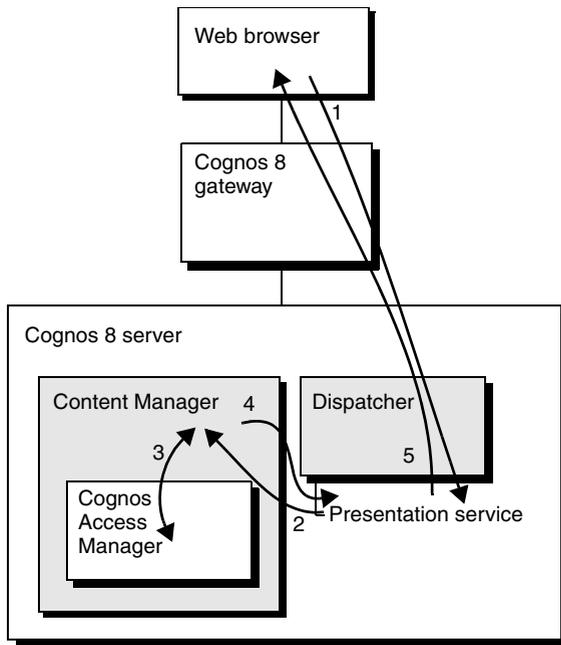


When a scheduled task runs, the following occurs:

- (1) At the scheduled time, the event management service sends a trusted request to Content Manager, via the dispatcher, to retrieve the user credentials, and then logs on as the user to obtain the user passport.
- (2) The event management service sends a request to the monitoring service to run the scheduled task through the dispatcher. This request is a background request, and the conversation between the event management service and the monitoring service ends.
- (3) The monitoring service sends a request to Content Manager through the dispatcher to create a history object. This object is required to ensure that the correct status appears in the user interface.
- (4) The monitoring service forwards the run request to the relevant service through the dispatcher and maintains the asynchronous protocol with the target service.
- (5) The monitoring service updates the status of the history as "execution".
- (6) When the task completes, the target service stores any relevant information in Content Manager and ends communication with the monitoring service. Information stored in Content Manager may include report output, agent event lists, and so on.
- (7) The monitoring service detects the final state of the task run and updates the history object with a status that indicates whether the task was successful.

Opening a Cognos Connection Folder

Cognos Connection is a Web portal that comes with Cognos 8 (p. 16). You can also integrate Cognos 8 with your corporate Web portal.

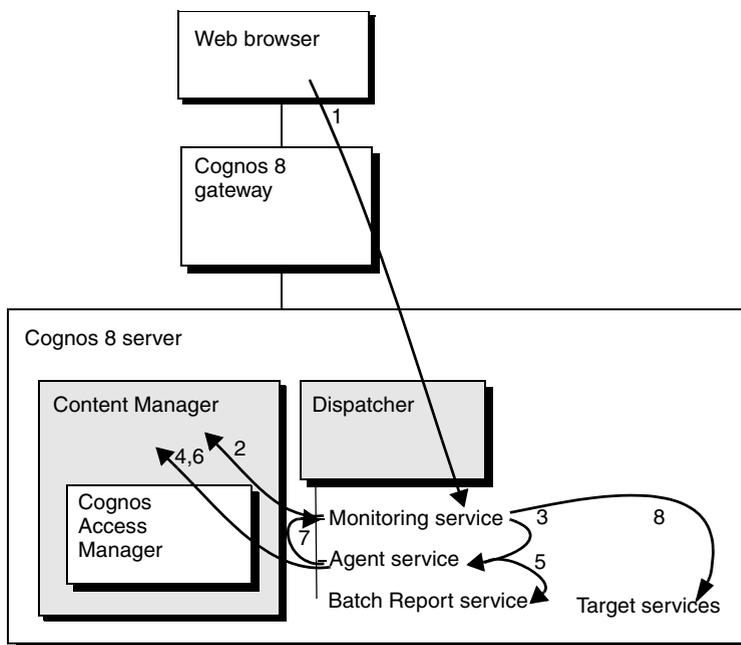


When a user opens a folder in Cognos Connection, the following occurs:

- (1) The user clicks a folder to open it, and the request goes through the gateway and the dispatcher to the presentation service.
- (2) The presentation service sends the request to Content Manager through the dispatcher.
- (3) Content Manager checks with Access Manager to determine whether access is granted.
- (4) Content Manager sends the folder contents or an error message to the presentation service.
- (5) The presentation service formats the appropriate HTML page and sends it through the dispatcher and the gateway to the user.

Running an Agent

You can run agents to monitor your data and detect occurrences of business events.



When the user clicks an agent's run link, the following occurs:

1. The request goes through the gateway and the dispatcher to the monitoring service.

2. The monitoring service authenticates the request and creates a history in Content Manager for the agent run.
3. The monitoring service forwards the request to the agent service. The monitoring service maintains the asynchronous protocol (wait/cancel) on behalf of the gateway.
4. The agent service requests the agent definition and the previous agent event list from Content Manager.
5. The agent service executes the agent condition through the batch report service.
6. The agent service compares the generated result set with the previous event list, and creates and stores the updated agent event list in Content Manager.
7. Based on the authored agent tasks, the agent service executes its tasks through the monitoring service.
8. The monitoring service creates a history in Content Manager for each step and forwards the request (maintaining the asynchronous protocol) to the relevant service. For example, email messages are forwarded to the delivery service, reports are forwarded to the batch report service, and jobs are forwarded to the job service.

Portal Pages

Whether you are using Cognos Connection or a third-party portal, all Cognos functionality is available on the BI Bus. You can search for reports and view them in the portal and perform additional analysis, if needed. You can also monitor, configure, and administer Cognos users and content using the portal. Whether you are working with reports or performing administration tasks, requests are sent to the BI Bus and then forwarded to the appropriate Cognos 8 component for processing.

The following Cognos functions are commonly provided through portlets:

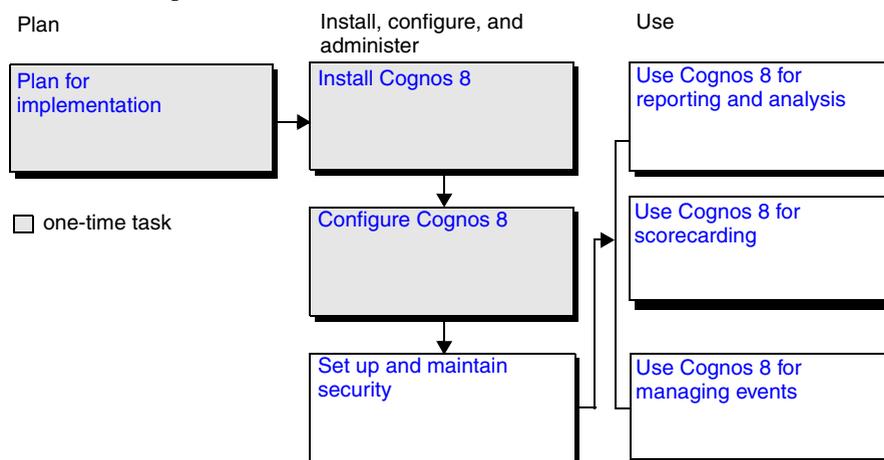
- Cognos Navigator retrieves selected Cognos 8 content.
- Cognos Search finds and opens published Cognos content.
- Cognos Viewer shows content selected in Cognos Navigator or Cognos Search.

For each portlet, all security permissions and credentials are inherited and passed along through the request. For example, if you go to a particular folder or search for a particular object, only those objects that you have permission to view are returned. Similarly, if you click a report in the Cognos Navigator or Search portlet, the report identifier and security credentials are included with the request. You can view the report in either the same portlet or a new portlet, but only the data that you have access to will appear.

Chapter 4: Workflow

The series of tasks that people in your organization will perform to understand, install, configure, and use Cognos 8 include the following:

- [planning for implementation \(p. 35\)](#)
Implementation planning should be done before installing and configuring Cognos 8. It is typically carried out by a team assembled and led by the business intelligence solutions architect.
- [installing and configuring \(p. 36\) Cognos 8](#)
Technical personnel install and configure Cognos 8, typically under the direction of the business intelligence solutions architect.
- [administering Cognos 8 \(p. 37\)](#)
Administrators establish and maintain security, set up multilingual capabilities, install fonts, manage report distribution, and perform ongoing administration.
- [working with models and packages to author reports and analyses for viewing \(p. 38\)](#)
Modelers create one or more metadata models, and use those models to publish packages that can be used to author reports and analyses [\(p. 38\)](#).
Authors use published models to create and maintain reports and analyses [\(p. 39\)](#).
Report users view and print reports and analyses through Cognos Connection. For more information, see the Cognos Connection *User Guide*.
- [creating scorecarding applications and monitoring metrics \(p. 40\)](#)
Scorecard authors create packages that contain connection, report, and maintenance task information [\(p. 40\)](#). Authors then deploy, maintain, and access scorecard applications in Metric Studio [\(p. 40\)](#).
Business users use metrics to monitor and analyze performance in key business areas. For more information, see the Metric Studio *User Guide for Authors*.
- [managing events \(p. 40\)](#)
Users create agents to monitor data and detect occurrences of business events.



Planning for Implementation

Implementing Cognos 8 means installing and configuring it to integrate effectively with your existing infrastructure.

To ensure that Cognos 8 is implemented effectively, it is important to plan your implementation carefully. For information about implementation planning, including an implementation planning checklist, see "[Planning](#)" (p. 45).

Installing Cognos 8

Installing Cognos 8 is typically done by Information Technology personnel under the direction of the business intelligence solutions architect.

When you install Cognos 8 using the **Installation** wizard, you specify where to install each of these components:

- gateways ([p. 16](#))
- Application Tier Components ([p. 17](#))
- Content Manager ([p. 19](#))

You can install the components on one computer, or distribute them across a network. Before installing Cognos 8, choose the appropriate installation and configuration option ([p. 49](#)).

You must also install Framework Manager ([p. 16](#)), a Windows-based metadata modeling tool. The studio interfaces are HTML- and JavaScript-based, and do not require installation.

If you plan to use Cognos 8 for scorecarding, you can choose to install Metric Designer ([p. 16](#)), an optional Windows-based metadata modeling tool.

Unattended Installation

If you plan to install an identical Cognos 8 configuration across several computers on a network, or to install multiple configurations, you can set up and run an unattended installation. This is a noninteractive method of installing and configuring Cognos 8 in which all the tasks run automatically, without user intervention. You can run the unattended installation as part of a script, or from the command line.

An unattended installation is useful if you must install Cognos 8 at different geographic locations, some of which have no technical personnel to perform the installation.

For more information, see the *Installation and Configuration Guide*.

Configuring Cognos 8

One of the tools installed with Cognos 8 is Cognos Configuration. You use it immediately after installation to set the initial Cognos 8 configuration. Some of the things you can configure are

- logging
You can specify the destination log for messages generated by Cognos 8 ([p. 24](#)).
- security
You can run Cognos 8 with or without security. By default, the only security that is enabled is Cognos Application Firewall. If you want to set up security, you should configure security settings immediately after installing Cognos 8 ([p. 41](#)).
- data access
You must specify database connection information for the Cognos 8 content store ([p. 27](#)).

Following initial configuration, if a property changes or components are added, you can use Cognos Configuration to reconfigure Cognos 8.

For information about initial configuration, see the *Installation and Configuration Guide*. For information about using Cognos Configuration, see the *Cognos Configuration User Guide*.

Monitoring Configuration Changes

Each time you save a configuration after making changes, date-stamped versions of these two configuration files are automatically saved in the `c8_location/configuration` directory:

- cogstartup.xml
This file records configuration settings. An example is `cogstartup_200211231540.xml`

- coglocale.xml
This file records locale settings used for multilingual reporting. An example is coglocale_200211261401.xml

If you are unable to save a configuration, or you have problems with a configuration, you can revert to a previous configuration file. You can use the files to review your configuration history. Before calling Cognos Support for help, print a history of the configuration changes made in Cognos 8.

For more information about the cogstartup.xml and coglocale.xml files, see the *Installation and Configuration Guide*. For information about troubleshooting, see the *Troubleshooting Guide*.

Configuring Security

Cognos 8 integrates with an existing security infrastructure to provide user authentication. Cognos 8 can secure content by using the user and group definitions from your security system, without any changes required. A Cognos namespace is included to provide the optional ability to define additional groups for securing content. These groups can simplify security administration by including users and groups from one or more authentication providers.

Cognos 8 includes Cognos Application Firewall, which is included with the dispatcher to validate and filter incoming and outgoing traffic at the dispatcher layer. By default, Cognos Application Firewall is enabled.

Cognos 8 also provides an authorization facility for assigning permissions to users defined in the authentication provider. It also provides a standard certificate authority (CA) for setting up encryption. Enhanced capabilities are available separately from Cognos.

If you intend to set up security for Cognos 8, it should be the first thing you do after installation (p. 41). For information about setting up and maintaining security, see the *Administration and Security Guide*.

Configuring Cognos 8 for Multilingual Reporting

Cognos 8 is a Unicode product capable of querying data in many languages and encodings. To facilitate multilingual reporting in Cognos 8, you may have to install additional fonts and configure your users' Web browsers.

Installing Fonts

Cognos 8 uses fonts to render PDF reports and to render charts used in PDF and HTML reports. To show output correctly, fonts must be available where the report or chart is rendered. This may involve installing additional fonts on the Cognos 8 server, and on the personal computers of Cognos 8 users. If users specify a font that is not installed, Cognos 8 substitutes a default font. For more information, see "[Adding Fonts to the Cognos 8 Environment](#)" (p. 80).

Configuring Browsers

Cognos 8 uses the default browser configurations of supported browsers. To ensure that Cognos 8 operates effectively, you should check your browser configuration settings and modify them if necessary. For information, see "[Globalization Considerations](#)" (p. 79).

Administering Cognos 8

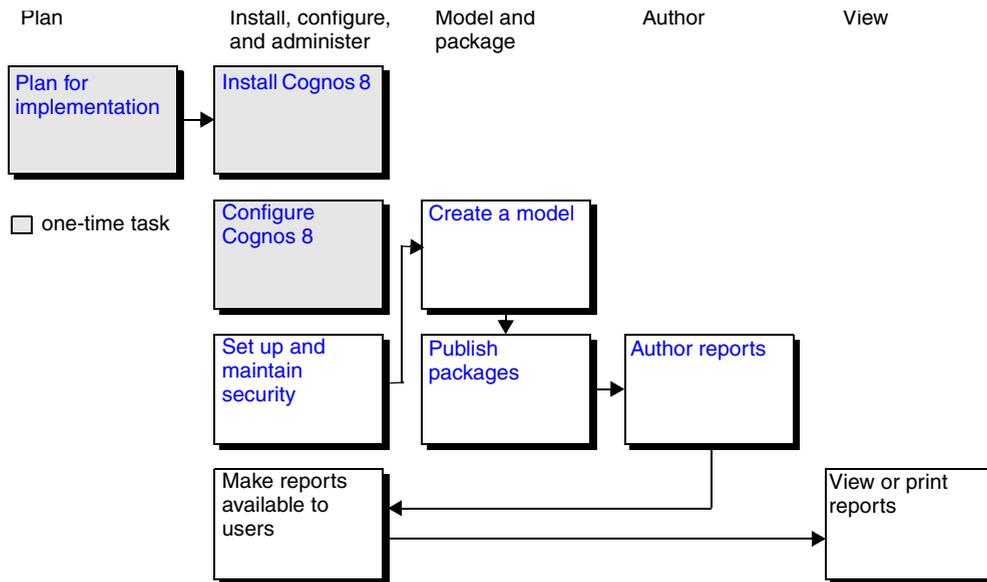
After Cognos 8 is installed and configured, you can use Cognos Connection (p. 14) or your third-party portal to

- set up folders where reports are stored
- make reports available to business users
- monitor and administer servers
- back up data
- maintain security
- deploy Cognos 8 from one environment to another

For information about using Cognos Connection, see the *Cognos Connection User Guide*. For information about administration, including setting up sample report projects and models, see the *Administration and Security Guide*. For information about troubleshooting problems, see the *Troubleshooting Guide*.

Using Cognos 8 for Reporting and Analysis

The following diagram shows the complete reporting and analysis workflow for Cognos 8.



Creating Reporting Models and Packages

A model serves as an insulating layer between Cognos 8 reporting users and the database. Packages are model subsets that ensure users are provided with data appropriate for the reporting they need to do, and that the data is structured in ways that make sense from a business perspective.

Creating models and publishing packages are tasks that should be planned carefully. Models and packages that are well-designed from the start ensure that user requirements are met, data is secure, and your Cognos 8 application can be easily administered.

To understand the modeling and packaging process, users can study the sample models, packages, and reports provided with Cognos 8. For information about setting up the samples, see the *Administration and Security Guide*.

For Cognos 8 reporting, models and packages are created using Framework Manager. The following topics provide an overview. For more information, see the *Framework Manager User Guide*.

Modeling

Framework Manager is used to create a model that provides users with a single, integrated, business view of the database, and to provide Cognos 8 with information about how data is accessed, related, and secured.

A model that is designed to meet user requirements adds significant value to your data. It structures, adds to, and manages the data in ways that make sense to business users. Creating a model is an important task that should be planned and executed by a modeler or a modeling team familiar with both the database structure and the needs of your business users.

When you create a model, you

- specify the metadata to import from data sources defined in the Cognos 8 content store
- refine the metadata by adding business names, descriptions, multilingual values, calculations, filters, and other components

- specify joins and relationships
- organize the data for presentation in ways that make sense to business users and add value to your databases
- add security to the metadata to determine who can use the metadata and for what purposes

Packaging

After a model is created, packages are published to locations on the Cognos 8 server where report authors can use them to create reports. A different package, containing only the necessary information, can be published for each group of users.

Reports cannot contain data from more than one package. When publishing a package, it is important to ensure that the package contains all the data required to meet the needs of the intended users.

The hierarchical structure of a package controls the way in which folders, reports, and other data objects are structured in the interface used by the report author. It also controls how security is applied to the objects, and how easy it is to deploy the package to other environments. As a result, it is important to ensure that the structure of a package makes sense from the perspective of a business user, and not just from an administrative perspective.

Authoring Reports

Cognos 8 can be used to create many different types of reports, including lists, crosstab reports, charts, master and detail reports, dashboards, and user-designed reports. You create planned, professional reports in [Report Studio](#), and ad hoc reports in [Query Studio](#). You can explore and analyze data in [Analysis Studio](#).

The Cognos 8 architecture is fully open to third-party products and to custom development. Cognos 8 can be integrated with existing transaction-based Web products or portals. For information about custom development, see the *SDK Developer Guide*. For information about integrating Cognos 8 with other enterprise portals, see the *Administration and Security Guide*.

Query Studio

Report authors and users create ad hoc reports using Query Studio. Ad hoc reports, also called ad hoc queries, can be created quickly, with little or no training, to meet reporting needs not covered by standard, professional reports.

Authors can save query specifications for future revision, or as templates for other new reports. Reports can be made available in interactive mode, so that users can expand them, or in read-only mode. Reports created in Query Studio can be viewed and edited in Report Studio.

Before creating ad hoc queries, users should complete the tutorial provided to familiarize themselves with best practices in report creation. For more information, see the *Getting Started Guide*.

For information about Query Studio, see the *Query Studio User Guide*.

Report Studio

Report authors create professional reports using Report Studio. Planned reports are standard, professional reports designed to meet specific, recurring needs of business users. Authors can also use Report Studio to edit reports generated in Query Studio.

To create a report in Report Studio, an author specifies the model that will provide data for the report. The author then builds a report specification that defines the queries and prompts used to retrieve the data. The author also creates the layouts and styles used to present the data. In addition to creating new reports, authors can modify existing reports.

Before creating reports for corporate use, report authors should use the tutorial provided to familiarize themselves with best practices in report creation. For more information, see the *Getting Started Guide*.

For information about Report Studio, see the *Report Studio User Guide*.

Analysis Studio

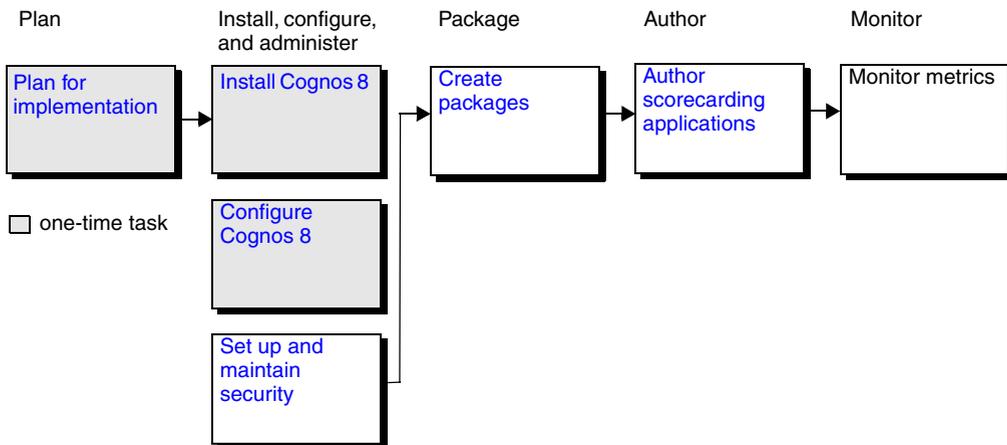
In Analysis Studio, users can explore, analyze, and compare dimensional data. Analysis Studio provides access to dimensional, OLAP (online analytical processing), and dimensionally modeled relational data sources. Analyses created in Analysis Studio can be opened in Report Studio and used to build professional reports.

Before creating an analysis, the administrator must have created a package in Framework Manager and published it to a location in the Cognos Connection portal for user access. Users can then select the package and find the data they require for the analysis. Users may also choose to share findings with others.

For information about using Analysis Studio, see the Analysis Studio *User Guide* or the online Quick Tour.

Using Cognos 8 for Scorecarding

The following diagram shows the complete scorecarding workflow for Cognos 8.



Packaging in Metric Studio

A metric package is a Cognos Connection representation of a Metric Studio scorecarding application. A metric package contains connection information, reports, and metric management tasks for that application. The metric package content is stored in a metric store.

You must create a package the first time you access Metric Studio. You can create other packages in Cognos Connection or Metric Studio. For more information, see the Metric Studio *User Guide for Authors*.

Authoring Scorecarding Applications

A scorecarding application is a set of scorecards, metrics and projects used to monitor the performance of a specific aspect of an organization.

You create scorecarding applications using Metric Studio. You use a Metric Studio package to deploy, maintain and access a scorecarding application. For more information, see the Metric Studio *User Guide for Authors*.

Managing Events

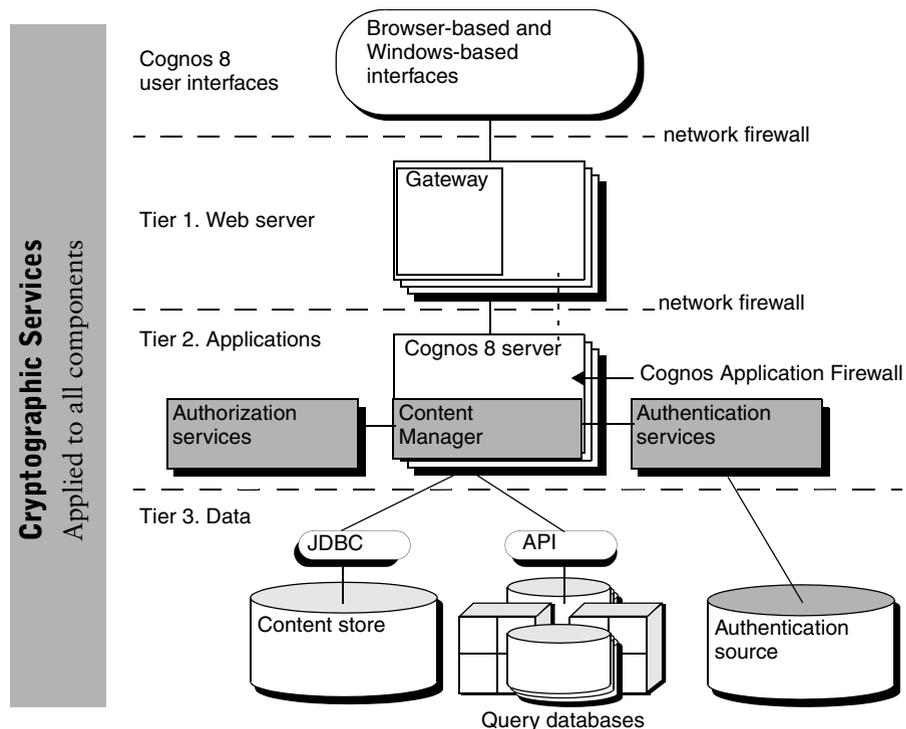
An event is any situation that can affect the success of your business. To ensure that the appropriate personnel are made aware of an event, you create agents in Event Studio to monitor your data and detect occurrences of business events.

Chapter 5: Security

Cognos 8 provides a security architecture that is flexible and compatible with your existing security model. It is easily integrated with authentication and cryptographic providers.

Cognos 8 security involves the following:

- Cognos Application Firewall
- Cognos authentication services
- Content Manager authorization services
- Cryptographic services



Cognos Application Firewall

Cognos Application Firewall validates and filters incoming and outgoing traffic at the dispatcher layer.

Cognos Application Firewall features include request validation, SecureError, and parameter signing. It also has a flexible architecture that can be updated to keep your Cognos 8 security posture current.

Cognos Application Firewall is an essential component of Cognos 8 security, helping to provide protection against penetration vulnerabilities such as cross-site scripting. Disabling the Cognos Application Firewall will remove this protection, and should not be done under normal circumstances.

For information about configuring Cognos Application Firewall, see the *Installation and Configuration Guide*.

Cognos Authentication Services

Authentication is the process of identifying individuals before allowing them to log on.

Authentication in Cognos 8 is managed by third-party authentication providers. Authentication providers access users, groups, and roles used for authentication. User names, IDs, passwords, regional settings, and personal preferences are some examples of information stored in the authentication source accessed by the provider. An authentication namespace is an instance of a configured authentication provider.

To set up authentication for Cognos 8, you must configure Cognos 8 using one or more of these authentication providers:

- LDAP
- Windows NT LAN Manager (NTLM)
- Microsoft Active Directory
- Cognos 7 namespaces created using Cognos 7 Access Manager and available with other Cognos products
- SAP
- Netegrity SiteMinder
- Custom Java provider

For information about configuring third-party authentication providers, see the *Installation and Configuration Guide*. For information about creating a custom authentication provider, see the *SDK Developer Guide*, available when you purchase the Cognos 8 software development kit.

For information about anonymous access and authenticated access, see "[Request Flow Processing](#)" (p. 27).

Cognos Namespace

Cognos 8 has its own namespace, which is in addition to the external namespaces that represent third-party authentication providers. The Cognos namespace does not replicate the groups and roles defined in your authentication provider. Instead, you may want to use the Cognos namespace to define groups and roles that can span multiple third-party authentication providers. This practice can add value to your existing groups and roles by reorganizing them for Cognos 8 without changing them in your authentication provider.

You can use the Cognos namespace to set up security that links easily with client security systems. For more information, see the *Administration and Security Guide*.

Single Signon

You can configure Cognos 8 for single signon. Users can then sign on once to an environment that includes Cognos 8 and other programs, without having to sign on each time they move between programs. Implementation of a single signon solution depends on the environment and authentication provider configuration.

For more information, see the *Installation and Configuration Guide*.

Content Manager Authorization Services

Authorization services are provided in Content Manager.

Authorization is the process of granting or denying access to data, and specifying the actions that can be performed on that data, based on a user identity. For example, Cognos 8 administrators can set up folders in which reports are stored. They can then secure those folders so that only authorized users can view, change, or perform other tasks using the reports in the folder.

Distributed Administration

The Cognos 8 security model supports the distribution of security administration. Because objects in Content Manager, such as folders and groups, can be secured separately, security administration can be assigned to individuals in separate functional areas of the organization. Security administration does not have to be centralized with an Information Technology group or other overall administration group.

Permissions

Permissions are related to the users, groups, and roles defined in third-party authentication providers. Permissions define access rights to objects, such as directories, folders, and other content, for each user, group, or role. Permissions also define the activities that can be performed with these objects.

Cognos 8 authorization assigns permissions to

- groups and roles created in the Cognos namespace in the Content Manager for Cognos 8. These groups and roles are referred to as Cognos groups and Cognos roles.
- entire namespaces, users, groups, and roles created in third-party authentication providers.

Users

A user entry is created and maintained in a third-party authentication source to uniquely identify an account belonging to a person or a computer. You cannot create user entries in Cognos 8.

The user entry stored in the authentication source may include information such as first and last names, passwords, IDs, locales, and email addresses. However, Cognos 8 may require additional information, such as the location of the users' personal folders or their format preferences for viewing reports in the portal. This additional information is stored in Cognos 8.

You can assign users to groups and roles defined in the authentication provider and in Cognos 8. A user can belong to one or more groups or roles. If users are members of more than one group, their access permissions are merged.

For more information about users, see the *Administration and Security Guide*.

Groups and Roles

Groups and roles represent collections of users who perform similar tasks, or have a similar status in an organization. Examples of groups are Employees, Developers, or Sales Personnel. Members of groups can be users and other groups. Group membership is part of a user basic identity. Users always log on with all the permissions associated with the groups to which they belong.

Roles differ from groups in several ways. Members of roles can be users, groups, and other roles. Role membership is not part of the user basic identity.

For more information about groups and roles, see the *Administration and Security Guide*.

Cryptographic Services

Cryptographic services ensure that Cognos 8 communications and sensitive data are secure. Encryption is used to secure

- static data
- temporary data
- transient data

Two categories of encryption strength are available for Cognos 8. Basic encryption is the [standard Cognos cryptographic service](#) included with Cognos 8. If an assessment of your security risks indicates a need for stronger cryptographic services, you can replace the standard Cognos cryptographic services with one of the [Enhanced Encryption modules](#).

Using a Third-party Certificate Authority

For Cognos 8 to provide encryption, certificates are required. When you implement the standard or enhanced Cognos encryption provider, the Cognos 8 certificate authority (CA) is used by default. You can also use any third-party CA that generates Base-64 encoded X.509 certificates. For more information, see the *Installation and Configuration Guide*.

Standard Cryptographic Provider

The Cognos standard cryptographic provider, which uses Standard OpenSSL, is included with Cognos 8. It includes the following:

- secure sockets layer (SSL) services
The SSL protocol is used to secure communication between Cognos 8 components installed on the same computer or on different computers.
- trusted requests on BI bus messages
Signatures are used to digitally sign some messages to ensure that they come from a recognized Cognos 8 service.
- encryption of the deployment process
Symmetric algorithms are used to encrypt and decrypt data in the export and import processes.
- encryption of temporary files
Symmetric algorithms are used to encrypt and decrypt temporary files.

Data stored in the database depends on database security to protect it.

The standard Cognos cryptographic provider uses a 56-bit encryption mechanism. Use it either with the built-in Cognos 8 certificate authority (CA), or with a supported third-party CA.

Enhanced Cryptographic Providers

If you require stronger security, you can replace the standard Cognos cryptographic provider with a module that provides enhanced encryption.

Enhanced encryption modules are available from Cognos. They are packaged separately to adhere to government regulations controlling the export of cryptographic software.

You can add enhanced encryption after you start using Cognos 8 with standard encryption. However, after you install enhanced encryption and configure Cognos 8 to use it, you cannot return to standard encryption.

The Enhanced Encryption Module for OpenSSL

This module uses encryption algorithms with a key size up to 168 bits for symmetric encryption operations.

You can use the Enhanced Encryption Module for OpenSSL either with the built-in Cognos 8 certificate authority (CA) or with a supported third-party CA. To use a third-party CA, you must purchase and install appropriate software before you install and configure the Enhanced Encryption Module for OpenSSL.

For more information, see the Enhanced Encryption Module for OpenSSL *Installation and Configuration Guide*.

The Enhanced Encryption Module for Entrust

This module uses encryption algorithms with a key size up to 168 bits for symmetric encryption operations.

If you choose the Enhanced Entrust encryption provider, you must purchase and install an Entrust Public Key Infrastructure (PKI), which includes its own CA. The PKI must be available before you install and configure the Enhanced Encryption Module for Entrust.

For more information, see the Enhanced Encryption Module for Entrust *Installation and Configuration Guide*.

PART 2: Planning

Chapter 6: Implementation Planning Checklist

To get the most from Cognos 8, you must implement it effectively. This means installing and configuring Cognos 8 so that it integrates with your information technology infrastructure and meets your reporting requirements.

To plan an effective Cognos 8 implementation, do the following:

- Familiarize yourself with the Cognos 8 architecture.
Read Part 1 of this book (p. 9). It will help you understand the components that make up Cognos 8, their functions, and the ways in which they interact with each other, your infrastructure, and your authors and users.
- Decide how to install and configure Cognos 8 (p. 49).
Know what your options are for installing and configuring Cognos 8, and decide which best meet your needs.
- Decide how to maximize Cognos 8 performance in your environment (p. 57).
Understand the factors that can affect Cognos 8 performance, and plan to ensure and maintain adequate capacity, scalability, and availability for Cognos 8 in your environment.
- Decide how to configure Cognos 8 multilingual capabilities (p. 79).
If you will use Cognos 8 in a global environment, decide how to configure Cognos 8 so that interface elements and report contents appear in the languages that users need.

When you complete your planning and are ready to install and use Cognos 8, refer to the other Cognos 8 documents for step-by-step instructions (p. 7).

Chapter 7: Installation Options

Before implementing Cognos 8, decide how you will install and configure it to provide the best possible performance. The installation and configuration choices that produce the best performance depend on your reporting requirements, resources, and preferences.

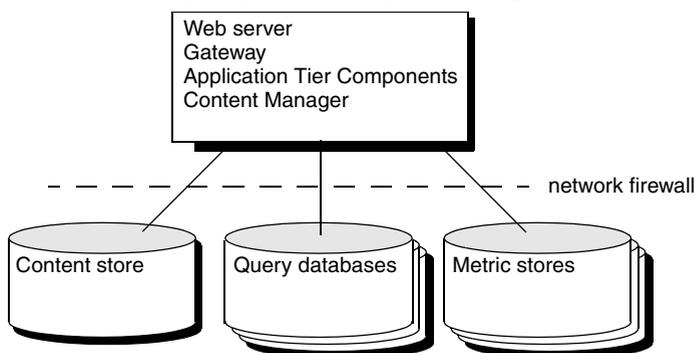
When you install Cognos 8, you specify where to install the gateways, Application Tier Components, and Content Manager. You can install all Cognos 8 components on one computer, or distribute them across a network.

You must install Framework Manager, the metadata modeling application for business intelligence. You can choose to install Metric Designer, an optional metadata modeling application for scorecarding.

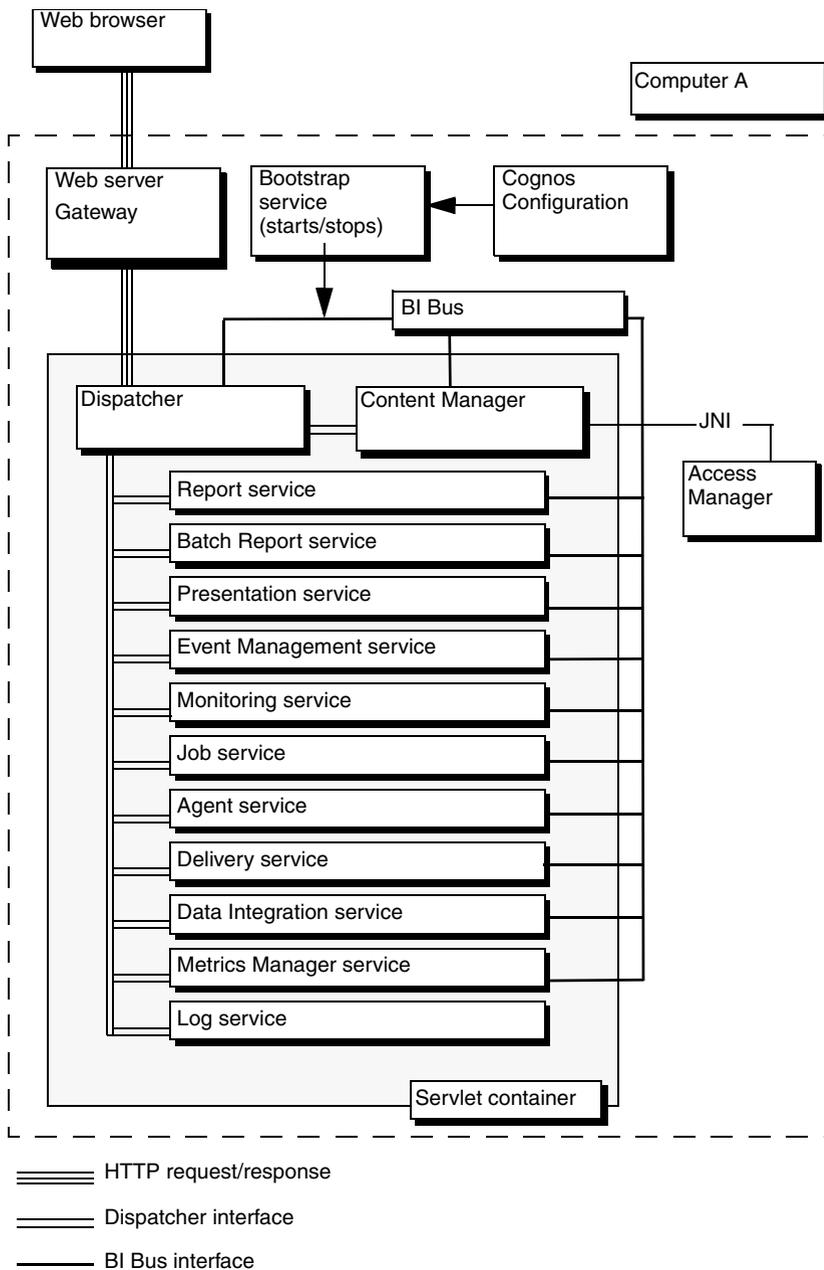
Installing All Components on One Computer

Install all components on one computer only for proof of concept or in demonstration environments where the user load is small. Because the gateway must be located with the Web server, the single computer must also be running a Web server.

In the following diagram, all Cognos 8 components are installed on one computer.



The following diagram provides a more detailed view of a Cognos 8 installation in which all server components are installed on a single computer. The modeling components, such as Framework Manager and Metric Designer, can be installed on different computers.



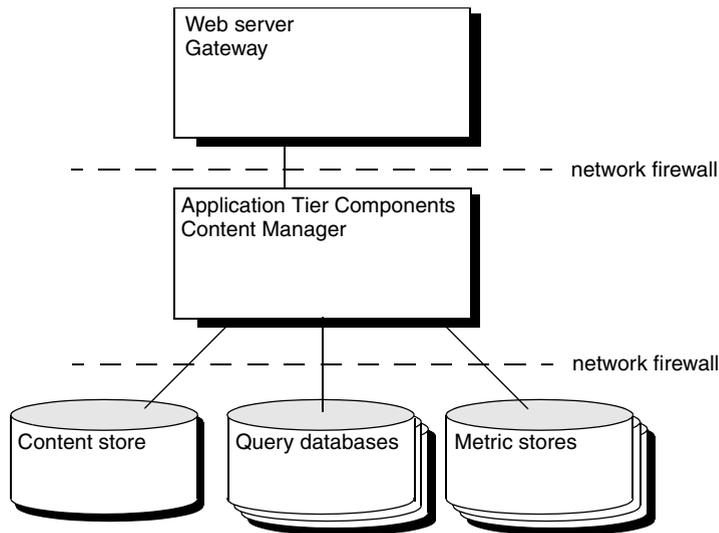
If Cognos 8 is installed on a Windows platform, you can install the modeling tools on the same computer. If Cognos 8 is installed on a UNIX platform, you must install the Windows-based modeling tools on a separate computer that runs under Windows.

Installing the Gateway on a Separate Computer

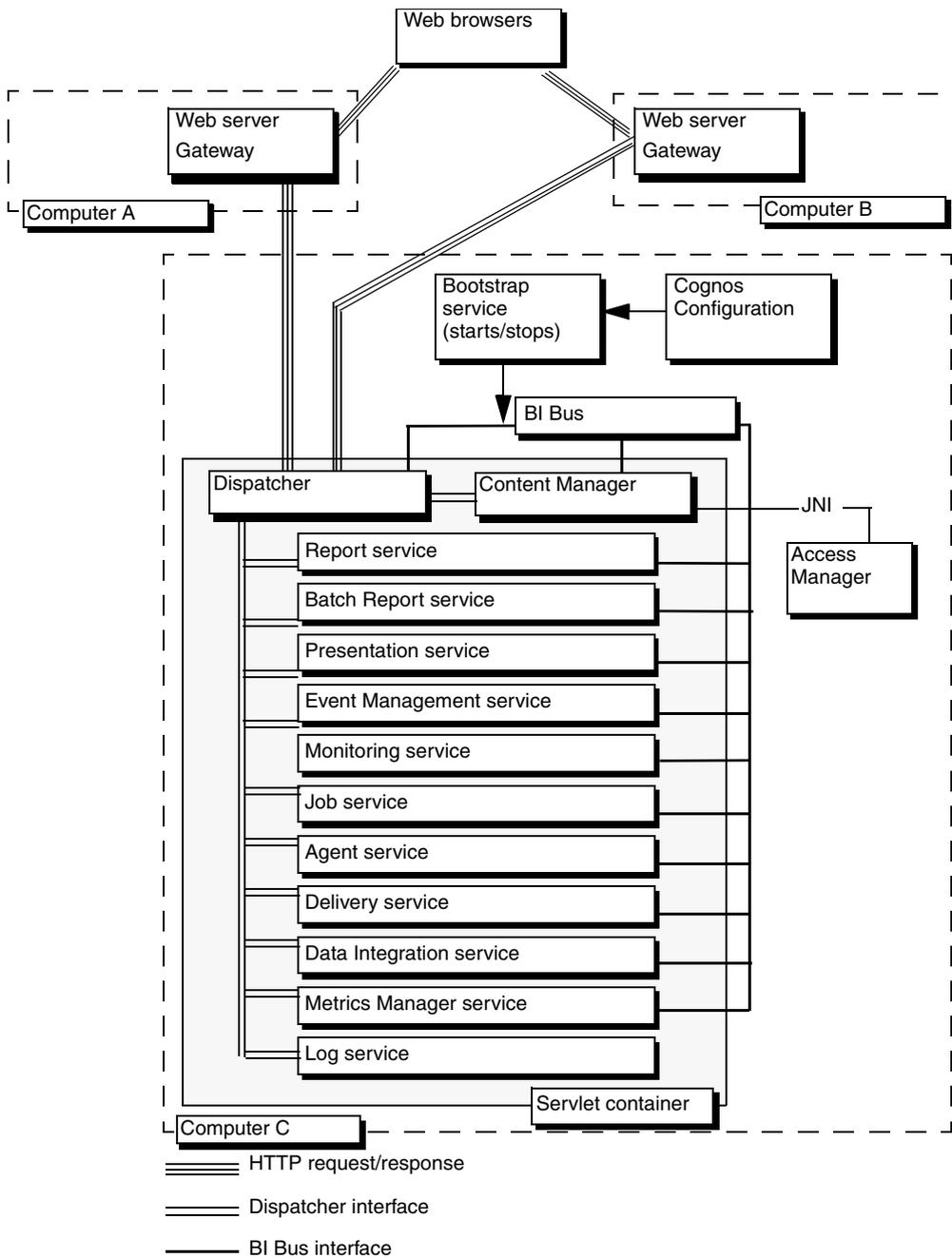
You can install the gateway and a Web server on one computer, and install the remaining Cognos 8 components on other computers. If you have a Web farm, you may want to install a Cognos 8 gateway on each Web server. Using multiple Web servers to manage incoming requests provides a better level of service.

If you install only the 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 you have a network firewall between the Web server and your Application Tier Components computers.

In the following diagram, the Web server has a gateway installed. Incoming requests are passed to the gateway and forwarded to the Application Tier Components computer. If request information is not saved, the result is returned from the Application Tier Components computer. If request information is saved, it is saved in Content Manager.



The following diagram provides a more detailed view of an installation in which the gateway is on a separate computer from other Cognos 8 components. In this example, two Web servers are used, each with a gateway.



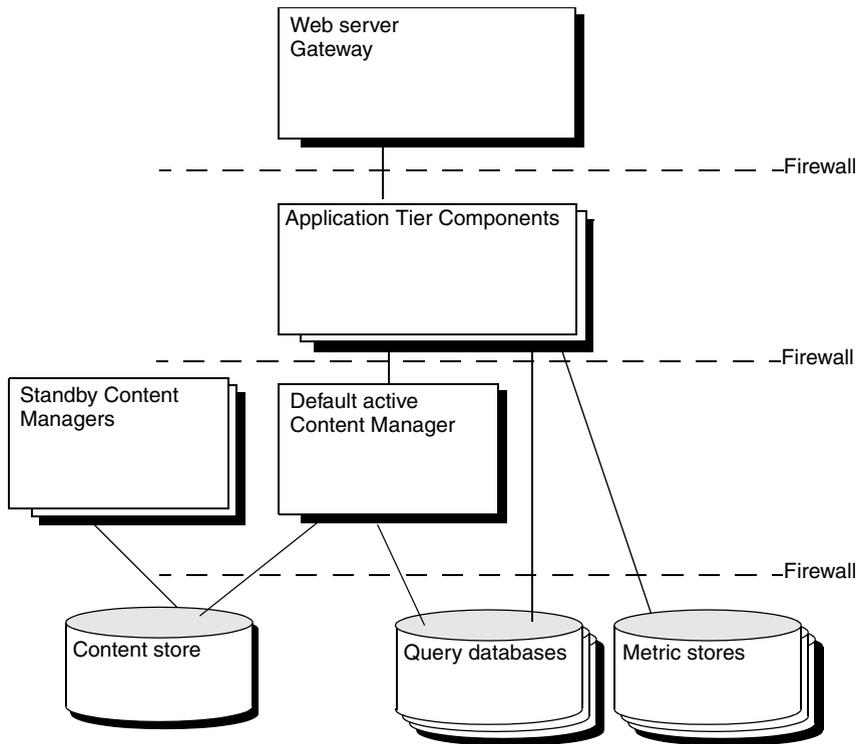
Installing Application Tier Components and Content Manager on Separate Computers

Installing Application Tier Components on separate computers from the Content Manager can improve performance, availability, and capacity.

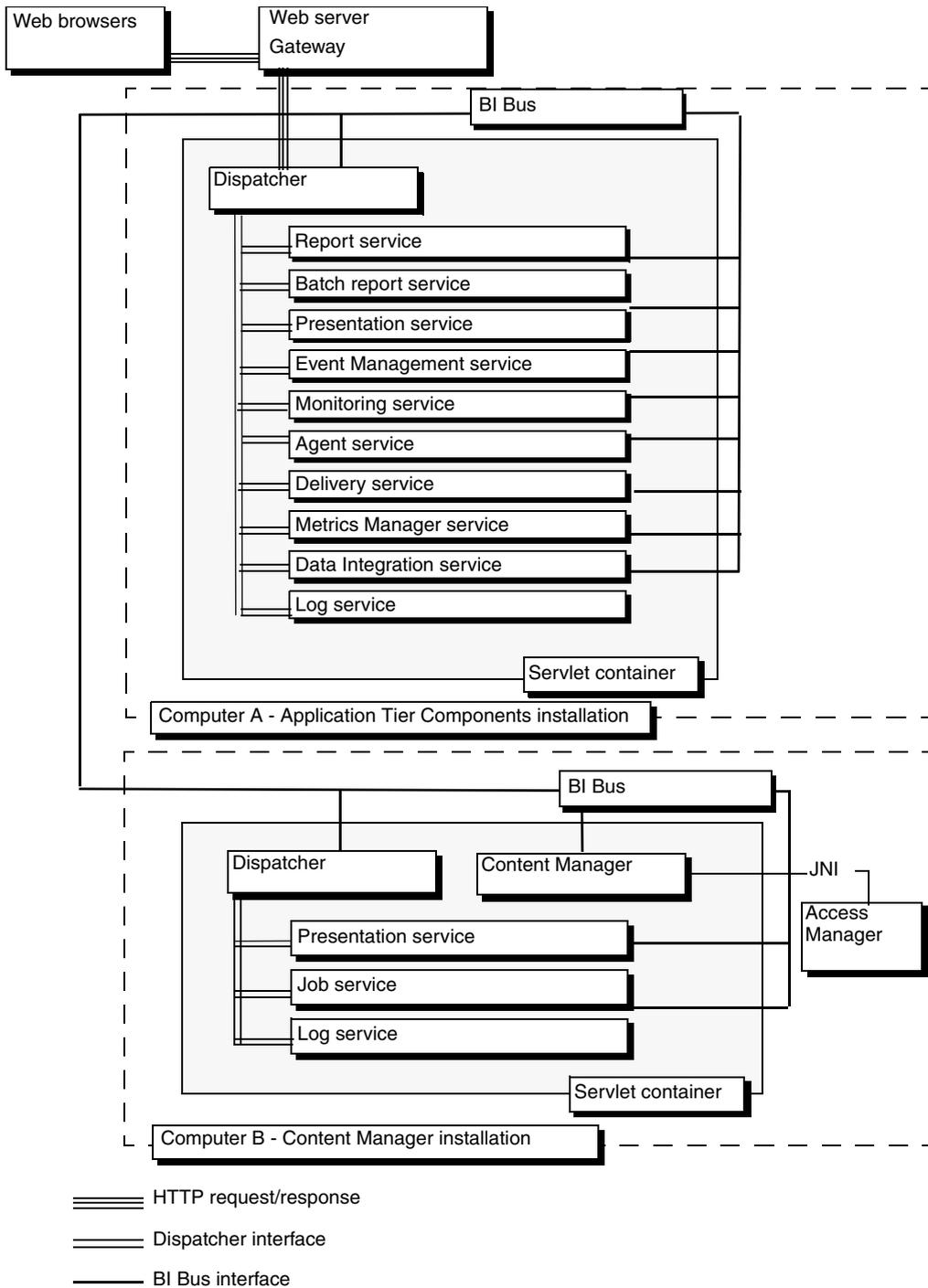
You may choose to install Content Manager separately from the Application Tier Components if your content store data contains sensitive information. Data is then stored in the data tier along with your security information.

You may also choose to install Content Manager on a separate computer if large volumes of data are managed by Content Manager. In this type of environment, Cognos 8 scalability can be improved by increasing the size of the processor on which Content Manager is installed.

In the following diagram, incoming requests are routed to a gateway. The gateway forwards the request to one of the Application Tier Components computers. The Application Tier Components computer that receives the request forwards it to the active Content Manager, which queries the content store and sends the results back to the Application Tier Components computer for rendering.



The following diagram shows a more detailed view of a Cognos 8 installation in which separate computers are used for Application Tier Components and the Content Manager. This example shows only one installation of Application Tier Components, however the Cognos 8 environment can include multiple Application Tier Components computers.



Multiple Installations of Content Manager

Your installation may include more than one Content Manager, each on a different computer. One Content Manager computer is active and one or more Content Manager computers are on standby. The standby Content Manager computers are for failover protection. 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.

When the active Content Manager fails, unsaved session data is lost. When another Content Manager becomes active, users may be prompted to log on.

Multiple Application Tier Components

To improve scalability in an environment in which there is typically a large volume of report requests to process, you can install Application Tier Components on multiple computers dedicated to processing incoming requests. By installing Application Tier Components on multiple computers, you distribute and balance loads among the computers. You also have better accessibility and throughput than on a single computer, as well as failover support.

Modeling Tool Installation Options

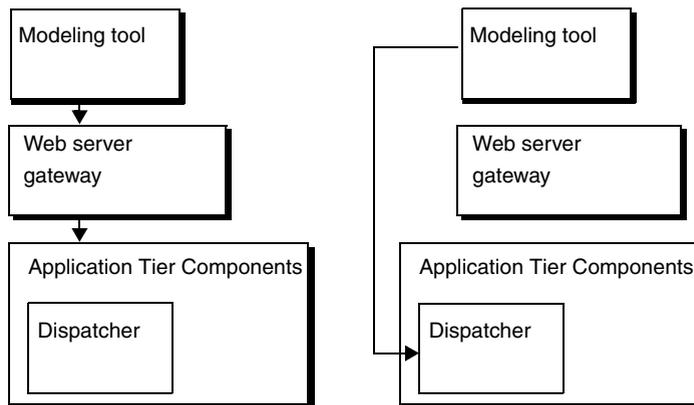
The Cognos 8 modeling tools, Framework Manager and Metric Designer, can be installed either on a computer containing other Cognos 8 components, or on a computer that is separate from these other components.

The modeling tools communicate with the Application Tier Components, which can be installed on one or more Web servers. Modeling tools can communicate with Application Tier Components using one of these routes:

- Route 1: through the Web server gateway
- Route 2: directly to the Application Tier Components dispatcher

Route 1.

Route 2.



To publish models, you must configure Framework Manager to communicate with a dispatcher, either through the gateway or directly. This is done by configuring the Dispatcher URI for external applications.

To ensure that the modeling tool can communicate with Cognos 8 components, on the computer where the tool is installed, configure cryptographic properties and the following environment properties:

- Gateway URI
- Dispatcher URI for external applications

For more information, see the *Installation and Configuration Guide*.

Web Servers Other Than Microsoft IIS

For Web servers other than Microsoft Internet Information Services (IIS), no functional difference exists between the two communication routes between the modeling tool and the Application Tier Components dispatcher. For either route, the modeling tool uses the BI Bus SOAP API. If you use the Web server route, and you have medium-sized and large models (approaching 1 MB in size), the models are broken into smaller pieces (chunked) for transmission.

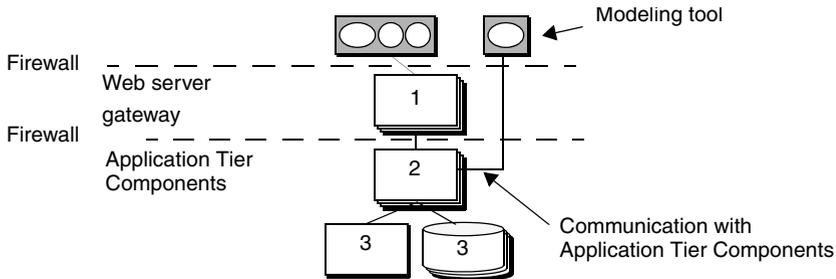
If you use a Web server other than Microsoft IIS, we recommend that you configure the modeling tool to communicate through your Web server gateway (Route 1). This eliminates the need to set up additional communications channels if you use firewalls to separate the modeling tool, your Web server, and your Application Tier Components.

Microsoft IIS Web Servers

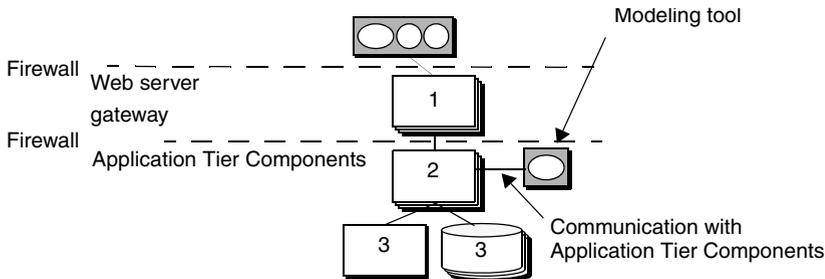
Microsoft IIS does not support chunking. As a result, if you use Microsoft IIS, and you build medium-sized or large models (approaching 1 MB in size), you must configure the modeling tool to communicate directly with the Application Tier Components dispatcher.

Network Firewall Considerations

When the modeling tool communicates directly with the dispatcher, communications issues can arise. If the modeling tool is installed outside a network firewall that protects the Application Tier Components, measures must be taken to ensure that communication can occur through the network firewall.



To avoid this requirement, you can install the modeling tool in the same architectural tier as the Application Tier Components.



Chapter 8: Performance Planning

Performance is a measure of how effectively a system completes the tasks it was designed to accomplish. It is a function of processing capacity and workload. A system that performs well

- has the capacity to process requests quickly
- scales to accommodate an increasing workload
- is available, even in exceptional situations

To ensure that Cognos 8 performs optimally, plan your Cognos 8 implementation with performance in mind. Planning for performance is part science, part art. It involves assessing the needs of different types of users, making decisions based on available resources, and developing a solution that considers security, application integration, and other factors.

This section does not provide absolute rules for planning Cognos 8 performance. It describes variables that affect performance, and ways to consider them when implementing Cognos 8. The variables include the following:

- capacity ([p. 57](#))
Decide how much hardware you need to run Cognos 8, given your expected processing workload.
- scalability ([p. 61](#))
Decide how to install and configure Cognos 8 components to take advantage of the ability of Cognos 8 to scale to meet increasing demand.
- availability ([p. 66](#))
Decide how to implement Cognos 8 to take advantage of its ability to provide failover support in the event of a hardware failure or another system anomaly.

Maintaining Cognos 8 performance is an ongoing task. After implementing Cognos 8, monitor and tune performance regularly. For information, see "[Performance Tuning](#)" ([p. 69](#)).

Capacity Planning

Planning for capacity means determining the hardware needed for your system to perform well under its anticipated workload.

Capacity planning is a challenge, because it involves many variables, some of which are difficult or impossible to measure. It is the science of measuring known variables and developing an educated estimate of resource requirements on the basis of those measurements. It is also the art of allowing for unknown variables and assessing their impact on the estimates derived from the known variables.

To determine your Cognos 8 capacity requirements, gather information about the following:

- Cognos 8 users
Estimate the number of Cognos 8 users you expect to have, and when you expect them to use Cognos 8.
- application complexity
Assess the complexity of the processing that your users will demand of Cognos 8.
- your infrastructure
The characteristics of your environment and infrastructure.

Capacity planning is an ongoing process. After implementing Cognos 8, monitor and modify your capacity as necessary to meet your performance expectations.

Estimating Cognos 8 User Load

In general, the greater the number of users, and the more concentrated their requests over time, the more hardware you need for a system to perform effectively. As a result, when planning adequate capacity for Cognos 8, you should estimate the number of people who will use Cognos 8 and determine when they will use Cognos 8. This can help you decide not only how much hardware you need, but also how to make the best use of the hardware you have.

Estimating Concurrent Users

The only users placing load on Cognos 8 are those who are actually performing processing. These are concurrent users. You can estimate the number of concurrent users, based on your total user population, by distinguishing between named, active, and concurrent users:

- named users
Named users are all of the users authorized to use Cognos 8; that is, your total user population.
- active users
A subset of named users, active users are logged on to Cognos 8 and can demand system resources.
- concurrent users
A subset of active users, concurrent users are simultaneously demanding system resources. This includes users submitting requests and users waiting for a response to a request.

As a general rule, the ratio of named to active to concurrent users for business intelligence applications is about 100:10:1. In other words, for every 1000 named users there are 100 active users and 10 concurrent users.

The concurrency ratio can vary over time, and is affected by many factors. For example, the number of concurrent users relative to active and named users tends to be higher when the user population is small. However, the most important determinant of the concurrency ratio is how processing demand is distributed over time.

Estimating Load Distribution

In Cognos 8, load is generated by

- user navigation and processing requests, such as requests to run or view reports
- requests made through automated or event-driven processes, including scheduled and burst reports

By determining when users are most likely to be using Cognos 8 and submitting processing requests, you can decide when to schedule automated processes. This allows you to distribute the processing load evenly over time, so that you make the best use of your system resources to maintain optimal performance. The key to doing this is estimating the number of concurrent users that will be applying load to your Cognos 8 system at any time.

Factors such as business hours, business practices, and the geographic distribution of users can determine how the concurrency rate changes over time, and how you choose to ensure adequate capacity.

A business intelligence application in which requests are spread evenly throughout the day has a lower peak concurrency ratio than an application in which the majority of requests are limited to a specific time of day. For example, if users are concentrated in one time zone, there will likely be heavy demand during business hours, followed by a period of low demand after hours. In this situation, you may be able to manage peak and non-peak time periods by sharing hardware resources between interactive and noninteractive processes. You would schedule automated activity to run in non-peak times to produce content for retrieval by interactive users in peak times.

On the other hand, if your user population is distributed across several time zones, user load on the system tends to be spread out over more hours, and there are fewer available non-peak hours for scheduled activities. In this situation, you may choose to dedicate separate hardware resources for interactive and noninteractive use.

Scheduling Processing to Distribute Load

Knowing how user load is distributed helps you decide when to schedule automated processes. Scheduling can be applied to two types of reports:

- scheduled reports
These reports often depend on updated, event-driven information, such as sales data for the previous day.
- burst reports
These are reports for which multiple users require filtered data based on a predetermined schedule. Burst reports are used when a common report format is applicable to more than one recipient, but each recipient requires customized information.

Scheduling is most useful for reports based on data that is updated on a predictable and cyclical basis. For example, an organization may need to produce sales reports based on information from the previous day, and make them available to users at the start of each business day. If users generate these reports at the beginning of each day, it creates considerable load on the system. By scheduling the reports to be triggered by data refresh, and run during non-peak times, the capacity required at peak times is reduced.

For information about tuning report scheduling and bursting after Cognos 8 is implemented, see "[Cognos 8 Tuning](#)" (p. 71). For information about how to schedule reports, see the *Administration and Security Guide*.

Assessing Application Complexity

Load is not only determined by the number of concurrent users, but by the complexity of their processing requests. The greater the complexity of a request, the more time is needed to process the request. In general, hardware resources can process more requests in a given time period when the requests are simple rather than complex. As a result, application complexity is an important determinant of the number of concurrent users that can be supported on a given hardware infrastructure.

The complexity of a Cognos 8 application depends on such things as the amount of work required to process the result set returned from the database query, and the size and layout of the report output. Size is determined by the number of pages in a report and the presence of elements, such as charts.

By identifying reports run at peak times, and improving their efficiency while meeting user requirements, you can improve performance during peak times. Because reporting patterns change over time, assessing application complexity, and improving reporting efficiency, should be ongoing activities. For more information, see "[Performance Tuning](#)" (p. 69).

Planning Infrastructure Components

Cognos 8 performance also depends on the characteristics of your infrastructure.

Ideally, Cognos 8 server components should be connected by a network with 100 Mb of available capacity. Network bandwidth between a Web browser and a Web server does not affect system scalability, but does affect user performance.

Use true server computers, rather than fast workstations. True server computers run business applications faster and provide systems that are less likely to fail.

Will Web and application servers be dedicated solely for use by Cognos 8, or shared by other software products? If other applications are sharing the resources, these applications must be taken into account when determining capacity requirements.

Install only gateway components on server computers that are dedicated to Web server processing. Web servers are designed to handle many small requests. Application servers often handle larger requests.

Use the gateway type most appropriate for your environment. For example, for some environments, ISAPI or Apache may provide better performance than CGI.

The complexity of your security infrastructure can increase response time. As your security infrastructure becomes more complex, a user request must be validated more frequently. For example, if you implement multiple network firewalls, each firewall must validate every request that passes through it. This can increase the time taken to complete the request. In addition, if you use SSL, the overhead of SSL encryption adds both processing overhead and size to the response.

Because notification service generates additional email traffic, ensure that your mail server can scale to support the increased load.

Sizing Your Content Store

The content store is used by Content Manager to store all Cognos 8 information that is visible in, or managed through, Cognos Connection or your third-party portal. The content store is at the heart of Cognos 8, and must have sufficient resources to operate effectively. To maximize Cognos 8 performance and scalability, ensure that your content store has the resources required to ensure that it does not become a bottleneck.

The size of the Cognos 8 content store you need depends on the number and size of the Cognos 8 items, such as reports, packages, and schedules, that you will create and store. Over time, as users create more items, the amount of space needed for the content store typically increases.

When determining the amount of space to allocate for your content store, consider the following:

- number of users
The greater the number of users, the greater the number of reports typically run and stored, and the larger the content store needed.
- number of saved reports
The greater the number of reports saved, the larger the content store needed. Reports designed for use throughout an organization, and stored in public folders, are often duplicated by users in private folders. This increases the number of reports stored and the space required for them.
- number of saved views
The greater the number of report views saved, the greater the space required.
- number of folders
Cognos 8 typically uses public folders as well as one or more private folders for each user. The number of characters in the name and description of each folder can increase the folder size.
- number of schedules
Schedules can exist for daily, weekly, and monthly print runs. The greater the number of schedules, the greater the content store space required.
- number of Framework Manager packages
The greater the number of packages, and the number of tables and query subjects in those packages, the greater the space required.
- additional storage items
Additional storage items, such as transaction logs and temporary space requirements, increase the size of the content store required.

Example - Estimating Content Store Size

The size of an empty content store hosted in a MS SQL Server database is approximately 2 to 3 Mb. Depending on your size allocation strategy, this may vary for other supported databases.

The number of concurrent users affects the size of the content store because temporary disk space is allocated to serve report run requests, even if the requests are not saved.

Out of 50 concurrent users, approximately 25% will be executing reports and 75% will be viewing saved outputs. As a result, approximately 12.5 of the 50 users will be running reports (50 concurrent users * 0.25 executing reports = 12.5 concurrent users).

The following table provides an example of how to estimate the size of the content store you need.

Factor	Number	Estimate of content store requirements (Kb)
Named users	1000*	not applicable
Active users	250*	not applicable
Concurrent users (temp space requirements)	50*	5,000,000
Saved reports: 1-10 pages (2 per user for Public and Myfolder copies at 340 Kb per report)	1001	340,340
Saved reports: 10-100 pages (9 per user for 4 Public and 5 Myfolder copies at 440 Kb per report)	5,004	2,201,760
Saved custom views: 1-100 rows (3 per user, all Myfolders at 250 Kb per view)	3,000	750,000
Saved custom views: 100-1000 rows (8 per user, all Myfolders at 350 Kb per view)	8,000	2,800,000
Folders (Public and Myfolders)	1,025	500
Framework Manager models	15	100,000
Framework Manager models (tables)	25	--
Framework Manager models (query subjects)	50	--
Schedules (day and week)	175	5,000
Empty content store	--	3,000
Database transaction logs	--	3,000,000
Total	--	14,200,600

*As a rule of thumb, the ratio of named to active to concurrent users is 100:10:1. However, the ratio varies with the environment. For more information, see ["Estimating Concurrent Users" \(p. 58\)](#).

For more information about capacity planning, visit the Cognos Support Web site (<http://support.cognos.com>).

Scalability Planning

Scalability is the ability of a system to adapt to increased processing demands in a predictable way, without becoming too complex, expensive, or unmanageable. As you deploy a system to larger numbers of users, often in different locations and time zones and with different language requirements, scalability becomes increasingly important.

Cognos 8 was designed for scalability. It scales vertically using more powerful computers, and horizontally using a greater number of computers. How you install and configure Cognos 8 components can enhance its scalability.

Web Server and Gateway Scalability

All Web communication in Cognos 8 is through a Cognos 8 gateway installed on a Web server. To increase the scalability of your Cognos 8 system, you can run your Web server on a larger computer. You can also install the Cognos 8 gateway on more than one Web server and configure your servers to leverage load balancing features.

Load Balancing

Load balancing spreads tasks among all available processors. It is important in any system, and is a key to processing capacity and scalability. In Cognos 8, load balancing means ensuring that processing requests are distributed appropriately among all the available Cognos 8 servers. Cognos 8 does this automatically, but you can configure load balancing as well.

Automatic Load Balancing

In a distributed environment, Cognos 8 balances request load automatically. By default, as servers are added to the system, each server dispatcher processes the same number of requests. If there is more than one instance of a given service, the dispatcher distributes requests to all the enabled instances of the service that are registered in Content Manager.

Configuring Load Balancing

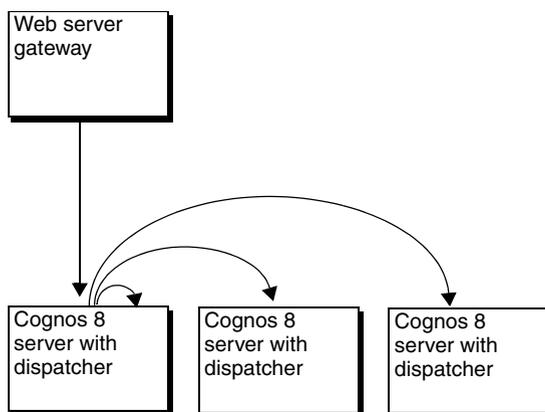
While automatic load balancing may be appropriate when hardware resources are identical throughout a server topology, it may not be ideal in environments containing a mix of hardware resources with different capacity characteristics. In a hardware environment that contains servers with varying degrees of processing capacity, it is desirable to balance the processing load according to each server's capacity.

In Cognos 8, you can set process capacity settings using the server administration tool in the Cognos Connection portal. For example, if you have two servers, one of which has twice the capacity of the other, you might assign the more powerful server a weight of two and the less powerful server a weight of one. Cognos 8 then submits twice as many requests to the more powerful server.

For more information about Cognos 8 dispatcher settings, see the *Administration and Security Guide*.

Load Balancing Dispatchers

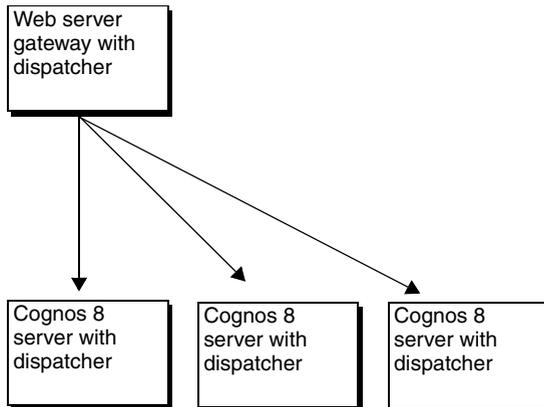
Without a software or hardware load balancing mechanism, each Cognos 8 gateway is aware of only one dispatcher, and distributes all requests to that dispatcher. The dispatcher then distributes the requests among Cognos 8 servers. Because every request initially goes through the same dispatcher on one server, the load on that server is increased. An extra step is needed to automatically balance the load, as shown in the following diagram.



This extra step can be avoided by either implementing load balancing without an external load balancing mechanism, or by using a router or other load balancing mechanism.

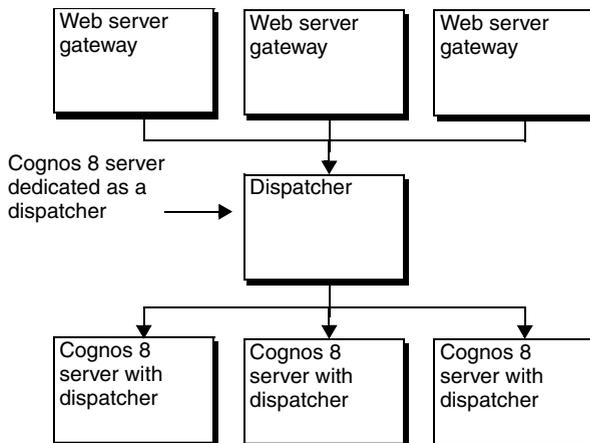
Load Balancing Without an External Mechanism

Since gateway servers often have less load than Cognos 8 servers, you may achieve better performance by configuring dispatchers together with the gateways, as shown in the following diagram.



This ensures that the processing capacity of the Cognos 8 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 a Cognos 8 server computer that is dedicated to dispatching, as shown in the following diagram.

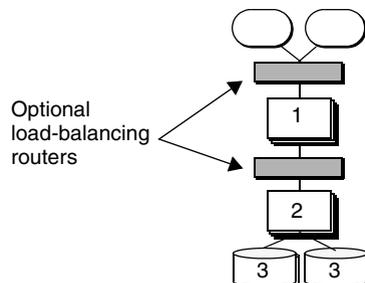


This configuration also removes dispatching load from the Cognos 8 servers. However, it does require separate dispatching computers.

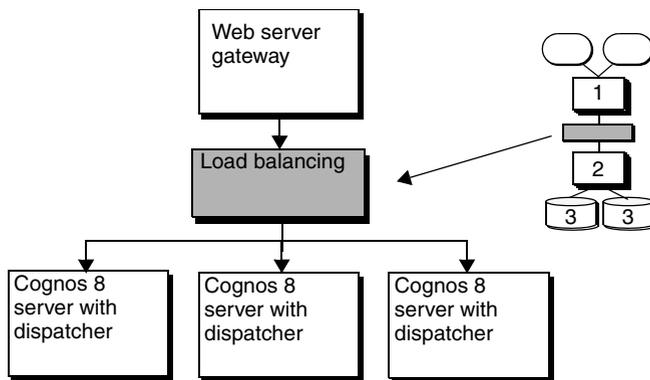
Using External Load-Balancing Mechanisms

You can use external load-balancing mechanisms, such as routers, to further distribute tasks in Cognos 8. Load-balancing routers can be used in either or both of these locations:

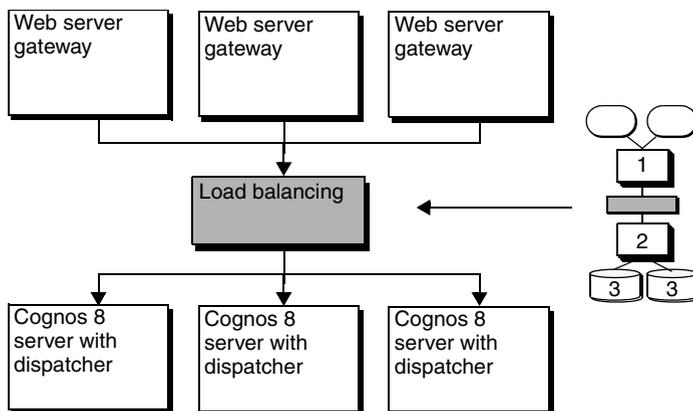
- between the browser and Tier 1: Web Server
- between Tier 1: Web Server and Tier 2: Cognos 8 Server



You can use an external load-balancing mechanism to distribute requests to dispatchers across all available servers, as shown in the following diagram.



You can also use routers with multiple gateways, as shown in the following diagram.



An ideal load-balancing mechanism provides the same capacity awareness as a Cognos 8 dispatcher.

To ensure that requests are not distributed by both an external load-balancing mechanism and the dispatcher, you must configure the dispatchers to not use their built-in load balancing for low affinity requests (p. 64). This ensures that requests remain at the server where the hardware load balancer directed them.

Request Affinity

Affinity refers to whether a request is assigned to a specific server or whether a load-balancing mechanism can assign it to another server. Affinity between request and server ensures that requests are routed to an appropriate computer for processing. There are three types of affinity: absolute, high, and low. The cancel operation is handled with a dedicated connection and does not have an affinity type.

To ensure that requests are managed efficiently and load is balanced, Cognos 8 uses request affinity to route some requests. For example, requests are routed back to the Cognos 8 server that handled earlier, related requests. Cognos 8 does this automatically. The use of one or more load-balancing mechanisms does not disrupt request affinity processing.

ReportService connections can be defined as `AffineConnections` or `NonAffineConnections`. `AffineConnections` accept only absolute and high affinity requests. `NonAffineConnections` accept all types of reportService requests.

Absolute Affinity

Absolute (control) affinity requests are always routed back to the server that processed the original request. For example, when a user cancels a running report, absolute affinity routes the cancel request back to the executing process. Absolute affinity is used to create an association between the client and the executing server to ensure that long-running requests do not time out.

Cognos 8 routes absolute affinity requests to a specific server, regardless of the load balancing used. An absolute affinity request is used with the following operations: `wait`, `getOutput`, and `release`.

High Affinity

High affinity requests can be processed on any of a number of servers, but resource consumption is minimized if the request is routed back to the executing process.

For example, when a `pageDown` command is run while reading a report, the command can be run most efficiently by using the process that served up the page that is shown. If that process is not available because the administrator shut down the computer or there was a network failure, the request is routed to another available process. The next page can still be served up, although the process will be slower.

Cognos 8 routes high affinity requests to a specific server regardless of the load balancing used. A high affinity request is used with the following operations: `back`, `email`, `firstPage`, `forward`, `lastPage`, `nextPage`, `previousPage`, `print`, `render`, `save`, and `saveAs`.

Low Affinity

Low affinity requests will operate just as efficiently on any computer. For example, a report request can run on any computer in the Cognos 8 system.

A low affinity request is used with the following operations: `add`, `collectParameterValues`, `execute`, `getMetadata`, `getParameters`, `query`, `testDataSourceConnection`, `update`, and `validate`.

For more information about affinity in Cognos 8, see ["Tuning the Report Service and Batch Report Service" \(p. 72\)](#).

Cognos 8 Server Scalability

The Cognos 8 application server has one or more Cognos 8 servers. Each Cognos 8 installation contains Content Manager to manage data stored in the content store. Each Cognos 8 server contains a dispatcher that runs the Cognos 8 presentation service, batch report and report services, job and schedule monitoring service, and log service.

Only one Content Manager is active at a time. The others are on standby. A standby Content Manager becomes active only if the computer on which the active Content Manager is installed fails.

To improve scalability, you can enable or disable Content Manager and the dispatcher services on individual application servers to balance the load for a given computer by request type. For example, if you have three application server computers, you might dedicate one to running interactive report requests, another to Content Manager, and the third to the other Cognos 8 services.

By targeting processing at specific computers in this way, you can control the load on each computer. For example, putting Content Manager on its own computer ensures that other requests do not downgrade its performance by competing for resources. Because report runs tend to be resource intensive, we recommend that you isolate the report services from other activities, especially in larger Cognos 8 deployments. However, before making this type of tuning configuration, analyze your user requirements carefully.

Cognos 8 Services Scalability

Cognos 8 services operate as threads within the dispatcher. The report services differ from the other services in the way they contribute to scalability.

Report and Batch Report Services

The report and batch report services are multi-instance components of Cognos 8. As a result, one or more instances can be configured to operate on each Cognos 8 computer.

The same program is used for both the report service, which handles interactive requests, and the batch report service, which handles scheduled tasks. For information about configuring the number of instances of the report services and the number of threads that each instance handles, see the *Administration and Security Guide*.

Content Manager

Content Manager, which can be installed in Tier 2 or 3 of Cognos 8, stores information in the content store. To allow fast retrieval, Content Manager builds an in-memory cache to service many requests. This ensures optimal performance and enhances scalability by limiting the number of database reads required to meet user requests.

In the single Content Manager process, multiple threads can concurrently service requests for content. Content Manager creates one or more threads for each user request. Performance depends on the power of the central processor unit (CPU) of the computer on which Content Manager is installed.

To increase scalability, use a larger computer capable of managing more concurrent request threads. When scaling up Content Manager, be sure to scale up the content store relational database management system so that it does not impede Content Manager performance.

Other Services

The scalability of the presentation service, job and schedule monitoring service, and log service, is primarily dependant on the CPU size and the available memory. These components can be scaled in two ways:

- vertically, by using a larger computer capable of managing more concurrent request threads
- horizontally, by running the services on additional computers

There is no specific configuration to tune these components. However, you can view the load-balancing configuration set by the server administrator to determine how much load is given to each computer running these services.

Availability Planning

Availability is the ability of a system to withstand or recover from exceptional situations, such as a computer failure. All Cognos 8 components have built-in failover features to ensure that Cognos 8 handles exceptions well.

You can configure components in each of the Cognos 8 tiers to enhance availability. As a general rule, make all Cognos 8 components available on at least two computers. If the computer on which a Cognos 8 component is running fails, another computer takes over.

If, for tuning reasons, you are not running all Cognos 8 components on every Cognos 8 server, ensure that each component is running on at least two servers. In the event of a computer failure, the remaining component processes requests. Performance may degrade, but there will be service.

Cognos 8 Gateway Availability

All Web communication in Cognos 8 is through a Cognos 8 gateway installed on a Web server. Each gateway can communicate with a single dispatcher in the applications tier.

We recommend that you use two or more Web servers with Cognos 8. This ensures that the failure of a single server does not result in the loss of Cognos 8 service. You can also use an external load-balancing mechanism, such as a router, to distribute requests across all available dispatchers (p. 62).

In the unlikely event of a failure, the Cognos 8 gateway and Cognos Application Firewall are restarted automatically by the Web server.

Cognos 8 Server Availability

The Cognos 8 server contains Content Manager to store and manage information, and a dispatcher to start Cognos 8 services and route requests.

The dispatcher manages the Cognos 8 presentation service, batch report and report services, job and schedule monitoring service, and log service. To ensure that the failure of one computer or service does not cause Cognos 8 to become unavailable, install two or more Cognos 8 servers. You can distribute services across Cognos 8 servers, and you do not need to enable all services on all Cognos 8 servers.

The Java technology of the Cognos 8 server provides Content Manager and the dispatcher with built-in failover support. 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.

If Content Manager or the dispatcher fails, the Cognos 8 server restarts it automatically. If you use the Apache Tomcat servlet container provided with Cognos 8, the Cognos 8 service monitors and restarts Tomcat. If you use an application server rather than Tomcat, the administration services for that application server restart it.

Content Manager Availability

Your installation may include more than one Content Manager, each on a different computer. One Content Manager computer is active and one or more Content Manager computers are on standby. The standby Content Manager computers are for failover protection. 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.

When the active Content Manager fails, unsaved session data is lost. When another Content Manager becomes active, users may be prompted to log on.

By default, the first Content Manager installed with Cognos 8 is the active one. A Cognos 8 server administrator can change the default Content Manager and the active Content Manager at any time. When Cognos 8 is started, the default Content Manager locks the content store from access by all other installations of Content Manager. These other Content Manager installations enter standby mode.

This failover mechanism works because dispatchers and the active Content Manager routinely communicate with each other. If a dispatcher can no longer reach Content Manager, the dispatcher signals a standby Content Manager, which becomes the active Content Manager. The other installations of Content Manager remain in standby mode for continuing failover support.

Content Store Availability

Content Manager stores Cognos 8 information in the content store RDBMS. Content Manager writes to the content store using proper relational transactions. You can use standard database tools for backing up and restoring the content store, and standard database availability mechanisms to protect the content store from failure.

Chapter 9: Performance Tuning

Over time, a Cognos 8 environment changes. User populations grow, processing requests tend to increase in number and complexity, and network capacity and other aspects of infrastructure may be modified.

These changes can affect Cognos 8 performance. As a result, it is important to monitor and tune performance regularly. Monitoring performance means regularly gathering data about your reporting usage and response times. Tuning can involve adjustments in the following areas:

- [databases \(p. 69\)](#)
Keep your databases optimized for querying and reporting.
- [application servers \(p. 70\)](#)
Adjust your application server memory and connection settings as required for better performance.
- [web servers \(p. 70\)](#)
Tune your Web server for maximum performance.
- [Cognos 8 \(p. 71\)](#)
Monitor and tune various aspects of your Cognos 8 system.

Perform additional tuning as required. This can involve modifying [PDF rendering settings](#), [changing low bandwidth connections](#), [performing regular disk maintenance](#), and other tasks.

After a certain point, performance tuning efforts yield diminishing returns. A growing user population, and increased processing demands, will eventually require you to consider increasing system capacity. To improve Cognos 8 performance, you can scale vertically by using more powerful servers, or scale horizontally by adding servers and balancing the processing load among your servers. For more information about determining Cognos 8 capacity requirements, see "[Capacity Planning](#)" (p. 57).

Database Tuning

The data source used by Cognos 8 is usually a relational database management system, such as IBM DB2, Microsoft SQL Server, or Oracle. To ensure that Cognos 8 continues to perform well, it is important to maintain the performance of your database. This means optimizing it for querying, reporting, and analyzing. If Cognos 8 and other applications demand more of a database than it can provide, or queries are too large for a database to handle efficiently, you may experience increased response times and degradation in Cognos 8 performance and scalability.

For information about tuning your database, see the documentation provided by your database vendor.

Tuning a DB2 Content Store

If you use a DB2 database for the content store ([p. 20](#)), you can take steps to improve the speed with which requests are processed.

By default, DB2 assigns tables that contain large objects (LOBs) to a database-managed tablespace. As a result, the LOBS are not managed by the DB2 buffer pools. This results in direct I/O requests on the LOBS, which affects performance. By reassigning the tables that contain LOBS to a system-managed tablespace, you reduce the number of direct I/O requests.

Before changing a DB2 content store, allocate sufficient log space to restructure the database. To reconfigure the DB2 content store, do the following:

- ❑ Export the data from the tables that contain at least one large object (LOB).

- ❑ Create the tables in a system-managed table space.
- ❑ Import the data into the tables.

Application Server Tuning

The Cognos 8 Java application server contains the Content Manager servlet and dispatcher servlet. By default, Cognos 8 installs and uses Tomcat as the default application server. You can also configure Cognos 8 to use another Java application server.

Regardless of the application server you use, to enhance and maintain Cognos 8 performance, you should monitor memory settings and connection limits and tune them based on Cognos 8 usage characteristics.

Changing Memory Settings

The memory settings of your application server dictate the memory that is available to Cognos 8 dispatchers and services managed by the Java servlet.

In Cognos Configuration, the default memory allocation is 768 Megabytes. If you expect many users and report requests, you may want to increase the memory allocation beyond the default.

The memory allocation strategy for your application server depends on the available capacity of your resources, and on the resource needs of other applications running on the server. In general, we recommend 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.

To configure Apache Tomcat memory settings, use Cognos Configuration or alternative methods. For information about using Cognos Configuration, see the *Installation and Configuration Guide*. If you use an application server other than Tomcat, consult the documentation for that product.

Setting Connection Limits

For the Cognos 8 dispatcher to service the expected number of requests, it is important to configure the connection limits of your application server. Depending on your application server, connections may be referred to as threads. The setting applied will determine the number of available connections, or threads, that can be handled simultaneously by the application server process.

To configure Apache Tomcat connection settings, use the `\conf\server.xml` file located in the Tomcat directory in your Cognos 8 installation location. Cognos 8 uses the settings for the coyote connector.

If the value of this application server setting is too low, users may encounter difficulties when making Cognos 8 requests. It is a good practice to monitor the application server process and its use of connections.

Web Server Tuning

The default Cognos 8 gateway is CGI, which can be used with all supported Web servers. For improved performance, consider using a scalable gateway, such as Apache mod for Apache and IBM HTTP servers, or ISAPI for IIS Web servers.

For information about Web server scalability in Cognos 8, see "[Web Server and Gateway Scalability](#)" (p. 62). For information about tuning your Web server, see the documentation provided by your Web server vendor.

Cognos 8 Tuning

The way that you use and configure Cognos 8 can affect its performance. For example, you can design models and reports with performance in mind, configure Cognos 8 dispatchers and services for performance, and schedule jobs to make the best use of system resources.

Designing Models and Reports for Performance

Designing and creating models in Framework Manager is an important step in the Cognos 8 workflow (p. 38). A model specifies, structures, adds to, and manages the metadata used to create reports. For optimal Cognos 8 performance, a modeler can design models that specify default prompting, and that set the query processing type.

Specifying Default Prompting

Models can include reports that prompt the user with a descriptive name while filtering on a code or key value for improved query performance.

You can modify a model to ensure that queries sent to the data source are efficient, well formed, and secure. To ensure optimal performance, the Framework Manager modeler can

- specify the rules governing query generation
- restrict user access to specific rows or columns of data
- model data relationships to hide the complexity of data from report authors

For more information, see the Framework Manager *User Guide*.

Setting Query Processing Type

For relational metadata, you can improve performance by selecting the right type of query processing.

There are two types of query processing:

- limited local
 - The database server does as much of the SQL processing and execution as possible. However, some reports or report sections use local SQL processing.
- database only
 - The database server does all the SQL processing and execution. An error appears if any reports or report sections require local SQL processing.

Although the database server can usually run the SQL and run reports much faster, local processing is sometimes necessary. For example, choose limited local processing if you want to create cross database joins or if you want report authors to use unsupported SQL99 functions.

Some complex queries, such as a query that must generate an `At` clause to avoid double-counting, require limited local processing. In this case, the query automatically uses limited local processing even if the package was published with database only processing.

For more information, see the Framework Manager *User Guide*.

Tuning Cognos 8 Dispatchers

Cognos 8 dispatchers manage the distribution of requests. The Server Administration selection in Cognos Connection (p. 14) provides settings for monitoring Cognos 8 dispatchers.

In a distributed Cognos 8 environment, there are two or more servers, each with a dispatcher to manage the Cognos 8 request flow. The dispatcher is responsible for routing requests to the services configured on a particular Cognos 8 server.

A Cognos 8 server can be configured to handle a specified proportion of requests. This is especially important if you have servers of different capacity and must make granular changes to specific servers in your environment.

Setting the Process Capacity

Each Cognos 8 dispatcher is assigned a process capacity. It dictates the number of requests that will be handled by a server. By default, request distribution uses a weighted round-robin algorithm that distributes requests equally among all configured dispatchers. In this case, the process capacity for each dispatcher is assigned a weight of 1.0.

The process capacity should be configured according to the relative performance of each server. For example, consider a two-server topology. If all other variables are constant, a quad-processor server should be configured with a processor capacity of 2.0, and a dual-processor server given a processing capacity of 1.0. This means that in the two-server topology, one server receives twice the number of requests as the other.

For more information, see the *Administration and Security Guide*.

Tuning the Report Service and Batch Report Service

The report service and batch report service have several settings that can be configured to optimize the use of resources. These can be set by using the Server Administration Tool in the Cognos Connection portal (p. 14).

There are a number of processes associated with the report service (p. 18) and the batch report service (p. 18). When these services receive requests from the dispatcher, they start processes to handle the requests. You can specify the maximum number of processes that these services can start at any one time.

The number of processes should be configured based on the amount of available capacity provided by Cognos 8 servers. In general, report processing is a CPU-bound process. As a result, the number of CPUs in a server, and the clock rates of those CPUs, are the main variables to keep in mind when adjusting this setting from the default value of 2.

For example, a server with four available CPUs should generally be configured to use more batch report service processes than a server with only two available CPUs. Similarly, given two servers with an equal number of CPUs, the server with a significantly faster CPU clock rate should be configured to use more batch report and report service processes.

For more information, see the *Administration and Security Guide*.

Setting Affinity Connections

You can specify the maximum number of high affinity and low affinity connections that the dispatcher can open to handle requests. High affinity connections are used to process absolute and high affinity requests from the report services, while low affinity connections are used to process low affinity requests.

High Affinity Connections

High affinity requests apply to the report service only, and not to the batch report service. A high affinity connection is used to handle a high affinity request, and each connection handles one request at a time. A high affinity request is a transaction that can benefit from a previously processed request. It can be processed on any of a number of servers, but resource consumption is minimized if the request is routed back to the report service process that was used to execute the original process.

Each report process has a configurable number of high affinity connections. The number of high affinity connections to set should be based on the number of low affinity connections set for each report process, as well as the capacity required for other services on the same server.

The distribution decision between high and low affinity connections per batch report process should be a function of the anticipated distribution of request types. For example, an HTML reporting application may have a greater likelihood of high affinity requests than a PDF reporting application. The page down request for an HTML report uses a high affinity connection whenever possible.

In general, we recommend that the number of batch report service and report service processes should be the primary parameter to be optimized when deploying a Cognos 8 application. After system resource use is configured to operate efficiently, the number of affinity connections can be tuned for further optimization.

Note: If the number of affinity connections per process is set too high, the process may be overburdened with managing connections. This will result in competition for system resources, and requests will take longer to complete due to inefficient use of server resources.

Low Affinity Connections

A low affinity connection is used to handle a low affinity request. Each connection handles one request at a time. A low affinity request will operate just as efficiently on any server.

Both the report service and batch report service are capable of handling low affinity requests. Low affinity requests that have been initiated by scheduled activity will make use of the low affinity connections configured for a batch report service. Low affinity requests that have been initiated by user-driven activity will make use of the low affinity connections configured for a report service.

Each report and batch report process has a configurable number of low affinity connections. The number of low affinity connections per report service process should be set in coordination with the settings specified for the batch report service.

The distribution decision between high and low affinity connections per process should be a function of the anticipated distribution of request types. For example, an HTML reporting application may have a greater likelihood of high affinity requests than a mainly PDF reporting application. The page down request for an HTML report uses a high affinity connection whenever possible.

In general, we recommend that the number of report service and batch report service processes should be the primary parameter to be optimized when initially deploying a Cognos 8 application. Once system resource use is configured to operate efficiently, the number of affinity connections can be tuned for further optimization.

Note: If the number of affinity connections per process is set too high, the process may be overburdened with managing connections. This will result in competition for system resources and requests will take longer to complete due to inefficient use of server resources.

Affinity Level of Cognos 8 Activities

Cognos 8 includes the following low affinity activities:

- Report Viewer links
 - Run again
 - Return
- HTML report navigation
 - Top page
 - Page up
 - Page down
 - Bottom page
- delivery options
 - Save
 - Save As
 - Print
 - Email
 - Viewing

Cognos 8 includes the following low affinity activities:

- reporting
 - report querying
 - report processing
- report authoring
 - metadata retrieval

- query validation
- administrative
 - testing data source connections
 - adding objects (folders, jobs, schedules, etc.)
 - refreshing portal page

For more information about affinity, see "[Request Affinity](#)" (p. 64). For information about setting affinity connections, see the *Administration and Security Guide*.

Best Practices for Scheduled Reporting

The Cognos 8 architecture differentiates between the processing of interactive and noninteractive requests. All requests that are initiated through user activity are processed by the report service, while scheduled or event-driven activity is processed by the batch report service.

Scheduled reporting is a critical aspect of any large-scale enterprise reporting solution. The effective management of low or noninteractive usage time periods, in combination with an organization's data refresh cycles, provides an opportunity for administrators to prepare as much information as possible during off-peak times for later retrieval by the greater business intelligence user community.

Using Jobs to Schedule Reports

Reports can be scheduled on an individual basis. However, if you have many reports to schedule, scheduling on a one-by-one basis can become burdensome. As an alternative, you can use jobs to execute scheduled activities.

A job is a container of scheduled processing activities that operates in a coordinated manner. Instead of scheduling individual reports, a job allows multiple reports to execute using the same schedule. Each activity within a job is given a sequence ordering, which is based on how the job was selected.

Jobs can be submitted to run as follows:

- all at once
All activities in a job will execute simultaneously. This execution strategy is particularly useful when the number of activities within a job (or multiple jobs) is less than the total number of low affinity connections available during the execution period.
- in sequence
The activities in a job will execute one at a time, based on their sequence ordering. This execution strategy is particularly useful when the number of activities within a job (or multiple jobs) is more than the total number of low affinity connections available during the execution period. In this case, batch report throughput can be maximized by setting an equal number of jobs as available for low affinity connections. The number of activities per job would be set up so that the total number of activities results in the completion of the batch reporting requirements.

Job and Scheduling Service Settings

All scheduled activity is managed by the job and scheduling service. The job and scheduling service is directly related to the batch report service, and should be considered in tandem with that service.

Settings for the job and scheduling service include the following:

- **Maximum Jobs During Non-Peak Period**
The maximum number of jobs during non-peak periods identifies a configurable limit to the number of jobs that can simultaneously execute during the specified non-peak period range.
- **Maximum Jobs During Peak Period**
The maximum number of jobs during peak periods identifies a configurable limit to the number of jobs that can simultaneously execute during the specified peak period range. If an application does not perform scheduled activity during the specified peak period range, this setting is inapplicable.

For information about these and other job and schedule service settings, see the *Administration and Security Guide*.

Best Practices for Report Bursting

Report bursting is a method of producing a set of reports containing personalized content that is based on a common report definition. Bursting performs a single execution of a report; sections the content as required, typically based on security access; and distributes the sections to the appropriate users based on report content.

Bursting is a critical aspect of any large-scale enterprise reporting solution. The effective management of low or noninteractive usage time periods, in combination with an organization's data refresh cycles, provides an opportunity for administrators to prepare as much information as possible for later retrieval by the greater business intelligence user community. Report bursting in Cognos 8 streamlines information distribution. A report is created once, and separated out into multiple filtered report outputs that contain individualized content.

Report bursting offers scalability benefits and helps in the effective management of resources. It also reduces network traffic, minimizes database queries, and enables Cognos 8 to process multiple personalized reports in parallel.

Report bursting can be driven interactively or through batch activity. By default, report bursting is configured to use one thread for querying and three threads for report assembly using the raw data returned from a report bursting query. Depending on the amount of hardware available, resource use during a burst is influenced by the number of threads configured. Each thread used for assembling personalized reports can typically use one processor.

Depending on the available capacity of a server, and on the overlap of burst reporting with other forms of processing, it may be beneficial to adjust the default report bursting thread model. For example, if a single report is being burst, and no other processing activity is being performed on a server, it is best to allocate as many threads for report assembly as there are available processors.

The report bursting assembly thread model can be configured to optimize resource use. In the `rsvpproperties.xml` file located in the `c8_location/configuration` directory, edit the `BurstThreadPoolSize` property:

```
<property>BurstThreadPoolSize</property>
<value type="long">3</value>
```

For information about using the `rsvpproperties.xml` file, see "[Advanced Report Processing Configuration Settings](#)" (p. 76).

PDF Rendering

You can change PDF rendering settings to improve response time. If a user views a one-page document on an idle system, the CPU time is often less than one second. However, PDF files vary in size, and response time is limited by your network speed.

To improve response time, you can do the following:

- Turn off font embedding.
Embedding fonts can add 100 Kilobytes or more to each report. Where connection speeds are 56 Kbps or less, we recommend that you turn off font embedding.
- Avoid uncommon fonts.
When you turn off font embedding, report authors should avoid using any fonts that report consumers may not have installed on their computers. If report consumers do not have the font set used by report authors installed on their computers, a default font is substituted (p. 81).
- Enable linearized PDF documents.
You can enable linearized PDF viewing, known as byte serving, which delivers documents to your users as the pages become available. This is enabled by default in the PDF rendering settings and Adobe Acrobat Reader.

For more information about PDF documents, see the documentation provided with Adobe Acrobat.

Low Bandwidth Connections

If you have users who access Cognos 8 using a dial-up connection, we recommend that you change PDF rendering settings to improve performance.

You can also reduce default page sizes in Query Studio and Report Studio. In heavy volume installations, the amount of HTML generated can be high. You can improve performance by lowering the default page size to reduce the amount of HTML initially passed back to the Web server and on to your users.

Disk Maintenance

Over time, data on a physical disk becomes fragmented, which can cause performance degradation when writing to or accessing from the disk. Disk defragmentation should be a regular system maintenance activity.

Monitoring Cognos 8 Servers

You should conduct regular and targeted monitoring of the Cognos 8 servers. This is important to assess the occurrence and impact of paging, memory use, and other measures of an efficient system.

Temporary Space for Cognos 8 Servers

Cognos 8 servers use a variety of directory access depending on the type and amount of activity. For running reports, Cognos 8 servers frequently use temporary space. We recommend that the Cognos 8 temporary space be hosted on a physical disk that is separate from other Cognos 8 directory locations. This maximizes parallel disk access and avoids the unnecessary sequential access that is common when only a single disk device is used.

Reducing Disk Use

Depending on the size of reports and the amount of available memory, Cognos 8 may access a physical disk when processing reports. To improve performance, you can ensure that report processing uses available memory rather than disk space.

Using memory instead of disk space is particularly beneficial in cases where temporary files are created on Cognos 8 servers, causing information transfer from memory to disk. You can monitor the occurrence of temporary files using the `c8_location\temp` directory. Monitor this folder during report processing periods to determine whether temporary files are created as `cclvpage*.tmp`.

To ensure that Cognos 8 uses memory instead of disk space, in the `rsvpproperties.xml` file, edit the `VirtualMemoryDiagnostics` property to use unlimited memory (value = 2) rather than limited memory (value = 0):

```
<property>VirtualMemoryDiagnostics</property>  
<value type="long">2</value>
```

Note: Remove the comment to enable the `VirtualMemoryDiagnostics` property.

For information about using the `rsvpproperties.xml` file, see "[Advanced Report Processing Configuration Settings](#)" (p. 76).

Advanced Report Processing Configuration Settings

By default, Cognos 8 is configured to process reports and other business intelligence transactions using a standard model applicable to all applications. You can change the default processing behavior for the Cognos 8 server by modifying entries in the `rsvpproperties` file.

Setting `rsvpproperties.xml` properties

The `rsvpproperties.xml.sample` file is located in the `c8_location/configuration` directory. Depending on your specific Cognos 8 application and on the demands placed on it, changing settings in the `rsvpproperties.xml` file may benefit performance. Examples of settings that can be modified to enhance performance include prompt application, the burst thread model, and virtual memory.

To enable the `rsvpproperties.xml.sample` file, you must rename the file `warproperties.xml` and restart Cognos 8. This activity must be conducted on all Cognos 8 servers.

Settings in the `rsvpproperties.xml` file are very sensitive to change. Changing these properties may greatly impact the behavior of Cognos 8. As a result, you should use discretion when changing these values. For more information, contact Cognos support.

Chapter 10: Globalization Considerations

Many businesses perform transactions in the global market. In this environment, users speak different languages, work in different currencies, use different date and time formats, and expect different sorting orders.

Cognos 8 provides a multinational reporting environment in which users can create reports and access data in different languages. Users can work in the Cognos 8 user interface using their preferred supported language and regional settings, or any combination of supported languages.

Cognos 8 supports both Unicode and non-Unicode data sources. A single installation of Cognos 8 supports multiple languages, and reports can be generated once for use in different languages.

If you will use Cognos 8 in a global environment, decide how to configure Cognos 8 so that interface elements and report contents appear in the languages that users need.

To configure Cognos 8 for a global environment, do the following:

- Ensure that all strings that appear in the Cognos 8 user interface are translated into the required languages.
- Add fonts to your Cognos 8 environment.
Ensure that the appropriate language packs were installed on all computers in the distributed installation to support the character sets you use.
- Customize language support to the user interface.
Add or remove user interface language support. You can also specify the language used in the user interface when the language specified in the user locale is not available.
- Ensure that users see reports, data, or metadata in their preferred language.
You can also specify the language a report is viewed in if the preferred language of the user is not available.
- Customize currency, numbers, dates, and times.
Ensure that these variables are formatted correctly for users in different locations.
- Configure your database.
Certain databases require specific configuration of the client or server software to enable multilingual reporting.

For information about installing and configuring Cognos 8, see the *Installation and Configuration Guide*.

Locales

Cognos 8 supports various types of locale. By default, Cognos 8 ensures that all locales, which may come from different sources and in various formats, use a consistent format. That means that all expanded locales conform to a language and regional code setting.

In Cognos 8, a locale specification consists of the following parts, separated by a dash (-):

- The first part is a two-character-set code, such as en, that specifies a language.
- The second part is a two-character-set code, such as us, that specifies a regional setting.

A locale specifies linguistic information and cultural conventions for character type, collation, format of date and time, currency unit, and messages. More than one locale can be associated with a particular language, which allows for regional differences.

Product Locale

The product locale controls the language of the user interface and all messages, including error messages.

Content Locale

The content locale consists of the language and region combinations that are supported for Content Manager objects, Framework Manager objects, Content Manager data formatting, report data formatting, report text (titles), and database data (if the database tool is configured to use locale).

Server Locale

The server locale ensures that all log messages are in one language. It is configured during installation. In a distributed environment, each Cognos 8 server obtains the server locale from Content Manager.

Author Locale

The author locale is based on content locale and is the locale used when a report or query specification is created. It determines model binding and literal data formats. Author locales must be supported by the metadata model on which the report is based.

User Locale

Determining the language and locale preferences of users and enforcing an appropriate response locale are important issues when you distribute reports in different languages.

A user locale specifies the default settings that a user wants to use for formatting dates, times, currency, and numbers. Cognos 8 uses this information to present data to the user.

Cognos 8 obtains a value for user locale by checking these sources, in the order listed:

1. authentication provider
If the authentication provider has locale settings that are configured, Cognos 8 uses these values for the user product and content locale.
2. user preference settings
If the user sets the user preference settings in Cognos Connection, Cognos 8 uses these settings for the user product and content locale and for default formatting options. The user preference settings override the values obtained from the authentication provider.
3. browser cookie
Anonymous and guest users cannot set user preference settings. For these users, Cognos 8 obtains a user locale from the browser cookie stored on the computer.

Run Locale

Run locale refers to a user product and content locales for a specific Cognos 8 session. Cognos 8 obtains a value for run locale by checking these sources, in the order listed:

1. URL
2. user account object in the content store
3. account information from the authentication provider
Product locale is used, if specified. Otherwise, content locale is used.
4. language settings in the browser
Each entry in the locale list for the browser is checked against the product mapping table, and then against the content locale mapping table ([p. 82](#)).
5. server locale for the Content Manager computer

Adding Fonts to the Cognos 8 Environment

Cognos 8 uses fonts to render PDF reports on the Cognos 8 server and to render charts used in PDF and HTML reports

To show output correctly, fonts must be available where the report or chart is rendered.

In the case of charts and PDF reports, the fonts must be installed on the Cognos 8 server. For example, if a Cognos Report Studio user selects the Arial font for a report, Arial must be installed on the Cognos 8 server to properly render charts and PDF files. If a requested font is not available, Cognos 8 substitutes a different font.

Because HTML reports are rendered on a browser, the required fonts must be installed on the personal computer of each Cognos 8 user who will read the HTML report. If a requested font is not available, the browser substitutes a different font.

When creating reports, you must select fonts that your Cognos server or users have installed. Microsoft delivers a broad selection of fonts with different language packs, so this will likely not be an issue in Windows. However, UNIX servers rarely have fonts installed. You should be prepared to purchase and install the fonts you need on both the server and browser clients.

When generating a PDF, Cognos 8 embeds only the glyphs that are used in the report.

If you plan to use different fonts, you must license and install those fonts on each server computer in your authoring environment and production system. You must also ensure that the fonts used in the authoring environment match the fonts used on your Windows and UNIX server computers.

For information about configuring fonts and about mapping substitute fonts, see the *Installation and Configuration Guide*.

Cognos 8 Default Font

If a requested font is not found, the Cognos server renders PDF files and charts using a default font. The default font, Andale WT, is a sans serif font. While it has most of the Unicode characters for many languages, it is not necessarily complete for all languages and does not have the attractive appearance of most purchased fonts. Also, this font has no Glyph Substitution (GSUB) and Ligature support in most languages.

Cognos Report Studio Fonts

Cognos Report Studio is an HTML and JavaScript application that runs in a browser. Because of the browser design, Cognos Report Studio operates within the browser security sandbox and has no access to the list of fonts installed on the local computer. As a result, the list of fonts presented in Cognos Report Studio depends on the fonts installed in the `c8_location\bin\fonts` directory of the Cognos 8 server. If the Cognos 8 server is installed on a Windows computer, Cognos Report Studio also uses the fonts installed in the Windows font directory.

Changing the Language of the User Interface

In Cognos 8, the product locale controls the language of the user interface and all messages, including error messages. By default, the language you choose to run the installation program becomes the product language. Users can choose another language at run time.

The product locale is different from the content locale. The language in the user interface does not control the language or content of reports, or the object names, descriptions, or tips in Content Manager.

To change the language of the user interface, do the following:

- Determine which languages will be supported in the user interface
- Ensure that translations exist for all strings that appear in the Cognos 8 user interface, in the languages you require.
- Install language files on all computers in your distributed environment.
- Add or remove user interface language support using the Product Locale table on each Content Manager computer.

By default, the user sees the product interface in the language that matches the language setting of the user locale.

For more information, see the *Installation and Configuration Guide*.

- ❑ Map unsupported languages to supported languages using the Product Locale Mappings table on each Content Manager computer.

You can then select the language to be used in the user interface when the language specified in the user locale is not available.

You can ensure that all regions for a locale use the same language, or that a specific, complete locale (language-region) uses a particular language.

Changing the Language of Reports, Data, or Metadata for Users

To ensure that users see reports, data, or metadata in their preferred language, or in a language specific to their region, add and remove partial locales (language) or complete locales (language-region) in the Content Locales table.

Adding incomplete locales (languages) to the Cognos 8 environment does not guarantee that your computer has a font that can show Web pages in your preferred languages. Ensure that you install the appropriate language packs to support the character sets you use. For more information, see ["Adding Fonts to the Cognos 8 Environment" \(p. 80\)](#).

Content locale consists of the language and region combinations that are supported for the following:

- Content Manager objects
- Framework Manager objects
- Content Manager data formatting
- report data formatting
- report text (titles)
- database data, if the database tool is configured to use locale

If you have a multilingual model, you can specify the content locale of query data.

Users can create reports and access data using one of the supported languages, which include: English, French, German, Japanese, Dutch, Finnish, Swedish, Spanish, Italian, Portuguese, Traditional and Simplified Chinese, Korean, Czech, Hungarian, Polish, Romanian, Slovak, Greek, Turkish, Norwegian, Danish, and Russian.

The architecture is capable of supporting locales as well as additional languages. Therefore, it is possible to show data in two versions of English, each using a locale, such as en-us (English, United States) and en-ca (English, Canada).

User preferences allow the user to specify a locale or use the Web browser locale for both the product and content locale.

Mapping Content Locale

Some content is language-specific, such as names, and is called a partial locale. Some content is specific to language and region, such as date formats, and is called a complete locale. Use the Content Locale Mappings table to do the following:

- Ensure that users can access content that is language sensitive, but not locale sensitive.
For example, map a complete locale, such as en-us (English, United States), to a partial locale, en, to ensure that users can access content in English that is not subject to regional variation. For example, names and descriptions are usually specified by language, not locale.
- Ensure that users can access content that is locale sensitive.
For example, map a partial locale, such as en, to a complete locale, en-us, to ensure that users can access content that is locale sensitive, such as data format of dates and numbers. Data formatting is set by the combination of language and region and so requires a complete locale.
- Map a user-preferred language to another language.
For example, a report is not available in the preferred language, Vietnamese, but is available in French and German. You can use the Content Locale Mappings table to map Vietnamese to French or German. You then see the report in the mapped language.

- Map unsupported content locales to supported locales.

When you map partial locales, Cognos 8 does the mapping after checking for a user locale. If all users are using the same Web browser types, mappings behave the same way for all users. However, if you have multiple browsers, results vary.

For example, on Internet Explorer, locale identifiers for many European regions do not exist. In other words, the user locale of fr-fr (French, France) cannot be selected. Only the fr (French language identifier) is available. To correct the problem, fr can be mapped to fr-fr, so that the language-region value is returned. Netscape provides region identifiers, so locale mapping is not required to return a value of fr-fr. This distinction may produce inconsistent results for different browser users. On Internet Explorer, where fr is mapped to fr-fr, users receive content that is region specific (fr-fr). On Netscape, where fr does not return a value of fr-fr, users receive content that is not region specific.

User Choices

In a Framework Manager model, users can specify the column titles and column descriptions that they want to see in their own language. A report automatically switches to the user preferred language. No action is required by the author.

In Report Studio, users can specify a language or locale for

- report data items, such as calculations, that do not exist in the metadata model
- text in a report, such as the page title
- report layouts

Customizing Currency, Numbers, Dates, and Times

Cognos 8 provides a complete set of default locale formats for number, dates (short, long, complete, and abbreviated), times, intervals, and currencies across almost 200 locales. You can control whether all formatting or a selected subset of data is linked to the user locale.

For example, data in US currency can be shown with the US currency symbol (\$) and the format that is appropriate for the user locale. A French user may see 123,45 \$, and a US user \$123.45.

By default, Cognos 8 shows only a subset of supported currencies in the user interface. You add or remove currencies in the Currency table on each Content Manager computer.

When users are prompted for numerical data, Cognos 8 automatically accepts the data in the user locale format.

Support for Japanese Users

Dates in an Imperial calendar are entered and shown using the year, which can be specified as a year or a given emperor's reign.

Users have the option of using English year and month names for either the Imperial or Gregorian calendar.

Cognos 8 supports Sankaku negative signs. A triangle is used in place of the western negative sign (-).

Symbol	Shift-JIS	Unicode
△	0x81A2	U+25B3
▲	0x81A3	U+25B2
▽	0x81A4	U+25BD
▼	0x81A5	U+25BC

Setting up a Multilingual Cognos 8 Environment

You can create reports that show data in more than one language and use different regional settings. This means that you can create a single report that can be used by report consumers anywhere in the world.

The samples databases provided with Cognos 8 store a selection of text fields, such as names and descriptions, in more than 25 languages to demonstrate a multilingual reporting environment. For information about how data is stored in the samples databases and how the samples databases are set up to use multilingual data, see the *Administration and Security Guide*.

Here is the process for creating a multilingual reporting environment:

- Use multilingual metadata.

The data source administrator can store multilingual data in either individual tables, rows, or columns.

For more information about configuring your database for multilingual reporting, see the *Administration and Security Guide*.

- Create a multilingual model.

Modelers use Framework Manager to add multilingual metadata to the model from any data source type except OLAP. They add multilingual metadata by defining which languages the model supports, translating text strings in the model for things such as object names and descriptions, and defining which languages are exported in each package. If the data source contains multilingual data, modelers can define queries that retrieve data in the default language for the report user.

For more information, see the Framework Manager *User Guide*.

- Create multilingual maps.

Administrators and modelers use a Windows utility named Map Manager to import maps and update labels for maps in Report Studio. For map features such as country and city names, administrators and modelers can define alternative names to provide multilingual versions of text that appears on the map.

For more information, see the Map Manager *User Guide*.

- Create a multilingual report.

The report author uses Report Studio to create a report that can be viewed in different languages. For example, the report author can specify that text, such as the title, appears in German when the report is opened by a German user. Report authors can also add translations for text objects, and create other language-dependent objects.

For more information, see the Report Studio *User Guide*.

- Specify the language in which a report is viewed.

You can use Cognos Connection to do the following:

- Define multilingual properties, such as a name, screen tip, and description, for each entry in the portal.
- Specify the default language to be used when a report is run.
Tip: You can specify the default language on the run options page, in the report properties, or in your preferences.
- Specify a language, other than the default, to be used when a report is run.

For more information, see the Cognos Connection *User Guide*.

The data then appears in the language and with the regional settings specified in

- the user's Web browser options
- the run options
- the Cognos Connection preferences

Any text that users or authors add appears in the language in which they typed it.

Configuring a Database for Multilingual Reporting

Cognos 8 is a Unicode product capable of querying and encoding data in many languages. Cognos 8 typically queries the database using the native data encoding of the database, such as Latin-1, Shift-JIS, and Unicode. Cognos 8 translates this data to Unicode as required.

When querying databases with two or more data encodings, Report Studio requests the data in Unicode. Some databases require specific configuration of the client or server software to enable this capability. For more information, see your database vendor documentation.

Round Trip Safety Configuration of Japanese Characters

Shift-JIS is the Japanese character encoding system. If characters are converted from Unicode to Shift-JIS and back to Unicode, round trip safety issues can arise. These can be avoided by using the Round Trip Safety Configuration utility. This utility is located in *c8_location\bin* and is named *rtsconfig.exe*.

The Round Trip Safety Configuration utility ensures the round trip safety of Shift-JIS characters only when it is used to convert the characters both from Shift-JIS to Unicode and from Unicode to Shift-JIS. If data is requested from a database that has its own conversion mechanism to convert the Shift-JIS characters to Unicode automatically, Cognos 8 does not call the Round Trip Safety Configuration utility to convert the characters back to Shift-JIS. In this situation, the round trip safety of characters in the data cannot be ensured.

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