

# BOE330

## **SAP BusinessObjects Business Intelligence Platform: Designing and Deploying a Solution**

*SAP BusinessObjects - Business Intelligence*

Date \_\_\_\_\_  
Training Center \_\_\_\_\_  
Instructors \_\_\_\_\_  
Education Website \_\_\_\_\_

### **Participant Handbook**

Course Version: 96  
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*An SAP course - use it to learn, reference it for work*

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# About This Handbook

This handbook is intended to complement the instructor-led presentation of this course, and serve as a source of reference. It is not suitable for self-study.




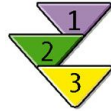

## Typographic Conventions

American English is the standard used in this handbook. The following typographic conventions are also used.

| Type Style              | Description  |
|-------------------------|--|
| <i>Example text</i>     | Words or characters that appear on the screen. These include field names, screen titles, pushbuttons as well as menu names, paths, and options.<br><br>Also used for cross-references to other documentation both internal and external. |
| <b>Example text</b>     | Emphasized words or phrases in body text, titles of graphics, and tables   |
| EXAMPLE TEXT            | Names of elements in the system. These include report names, program names, transaction codes, table names, and individual key words of a programming language, when surrounded by body text, for example SELECT and INCLUDE.            |
| Example text            | Screen output. This includes file and directory names and their paths, messages, names of variables and parameters, and passages of the source text of a program.  |
| <b>Example text</b>     | Exact user entry. These are words and characters that you enter in the system exactly as they appear in the documentation.   |
| < <b>Example text</b> > | Variable user entry. Pointed brackets indicate that you replace these words and characters with appropriate entries.   |

## Icons in Body Text

The following icons are used in this handbook.

| Icon   | Meaning  |
|--|--|
|   | For more information, tips, or background                              |
|   | Note or further explanation of previous point                          |
|   | Exception or caution   |
|   | Procedures   |
|  | Indicates that the item is displayed in the instructor's presentation. |

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# Course Overview

This four-day instructor-led course teaches system administrators the skills and knowledge required to design and deploy a SAP BusinessObjects Business Intelligence platform. In this course, students will learn how to analyze and identify customer requirements in order to design a solution using the concepts of High Availability, Scalability, Sizing, Disaster Recovery and Lifecycle Management. Using a case study, students will design, build and troubleshoot a system and then produce a content management plan using advanced security and replication techniques.

The business benefit of this course is that it provides system architects/administrators with an understanding of the concepts necessary to effectively design and deploy a Business Intelligence solution using the SAP BusinessObjects Business Intelligence platform.

## Target Audience

This course is intended for the following audiences:

- The target audience for this course is system architects/administrators who are experienced with SAP BusinessObjects Business Intelligence platform and will be responsible for designing and deploying solutions for their organization.

## Course Prerequisites

### Required Knowledge

- SAP BusinessObjects Business Intelligence Platform: Administration and Security
- SAP BusinessObjects Business Intelligence Platform: Administering Servers – Windows

### Recommended Knowledge

- Windows conventions
- Familiarity with Windows Server 2000/2003 administration
- Windows Server 2000/2003 security concepts (global/local groups, and directory structure)



## Course Goals

This course will prepare you to:

- Analyze and identify customer requirements in order to design a SAP BusinessObjects BI solution using the concepts of High Availability, Scalability, Sizing, Disaster Recovery and Lifecycle Management
- Produce a content management plan using advanced security and replication techniques
- Design and deploy a SAP Business Intelligence solution using the SAP BusinessObjects BI platform



## Course Objectives

After completing this course, you will be able to:

- Explain SAP BusinessObjects BI platform architecture, administration, and security
- Ensure availability of your SAP BusinessObjects BI solutions
- Design a scalable system
- Size a SAP BusinessObjects BI deployment
- Deploy a SAP BusinessObjects BI platform
- Manage content across BI deployments.



# Unit 1

## Reviewing Architecture, Administration, and Security in SAP BusinessObjects BI Platform,

### Unit Overview

This first unit covers the architecture and security model in SAP BusinessObjects Business Intelligence platform.



### Unit Objectives

After completing this unit, you will be able to:

- Define SAP BusinessObjects BI platform architecture terms
- Describe key architectural process flows
- Understand how rights work in SAP BusinessObjects BI platform
- Describe how access levels are used
- Understand top-level, folder-level and object-level security
- Understand inheritance

### Unit Contents

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## Lesson: SAP BusinessObjects BI Platform Architecture

### Lesson Overview

This lesson provides a review of the SAP BusinessObjects BI platform architecture including certain key process flows and some terminology used throughout this course.



### Lesson Objectives

After completing this lesson, you will be able to:

- Define SAP BusinessObjects BI platform architecture terms
- Describe key architectural process flows

### Business Example

This lesson outlines the overall platform architecture, system, and service components that make up the SAP BusinessObjects Business Intelligence platform. This information helps administrators understand the system essentials and help to form a plan for the system deployment, management, and maintenance.

### Overview of SAP BusinessObjects BI platform

SAP BusinessObjects Business Intelligence platform is the business intelligence platform that supports a range of performance management (Dashboard and Analytics), reporting, querying, and analysis applications. It also provides an industry-standard, proven architecture and platform-support for semantic layers, data integration, and security. SAP BusinessObjects Business Intelligence platform provides for web-based administration and configuration of the entire system.

### Architecture overview

SAP BusinessObjects Business Intelligence platform is designed for high performance across a broad spectrum of user and deployment scenarios. For example, specialized platform services handle either on-demand data access and report generation, or report scheduling based on times and events. You can offload processor intensive scheduling and processing by creating dedicated servers to host specific services. The architecture is designed to meet the needs of virtually any BI deployment, and is flexible enough to grow from several users with a single tool, to tens of thousands of users with multiple tools and interfaces.

End users can access, create, edit, and interact with reports using specialized tools and applications that include:

- Clients installed by SAP BusinessObjects Business Intelligence Platform Client Tools installation program:
  - Web Intelligence
  - Business View Manager
  - Report Conversion Tool
  - Universe design tool
  - Web Service query tool (formerly Query as a Web Service)
  - Information design tool
  - Translation Management Tool (formerly Translation Manager)
  - Widgets for SAP BusinessObjects Business Intelligence Platform (formerly BI Widgets)
- Clients available separately:
  - SAP Crystal Reports
  - SAP Crystal Reports for Enterprise
  - SAP BusinessObjects Dashboard Design (formerly Xcelsius)
  - SAP BusinessObjects Analysis (formerly Voyager)
  - BI Workspaces (formerly Dashboard Builder)
- IT departments can use data and system management tools that include:
  - Report Viewers
  - Central Management Console (CMC)
  - Central Configuration Manager (CCM)
  - Repository Diagnostic Tool (RDT)
  - Data Federation Administration Tool
  - Upgrade management tool (formerly Import Wizard)
  - Universe design tool (formerly Universe Designer)
  - SAP BusinessObjects Mobile

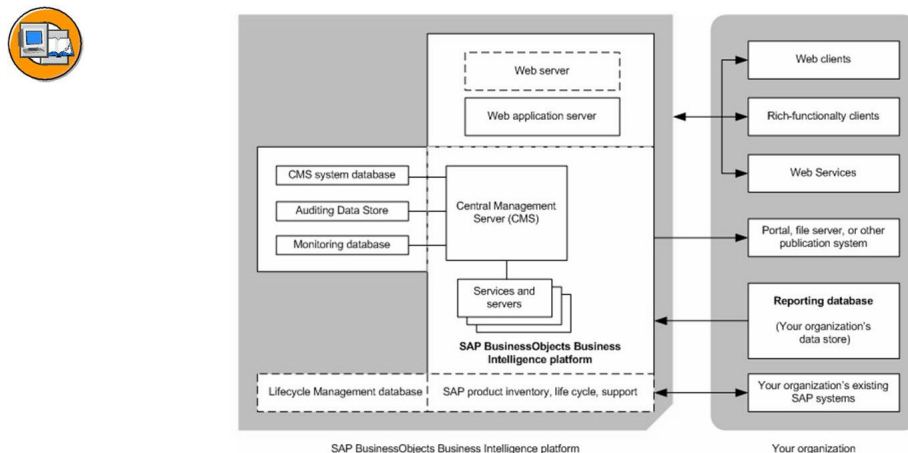
To provide flexibility, reliability, and scalability, SAP BusinessObjects Business Intelligence platform components can be installed on one or across many machines. You can even install two different versions of SAP BusinessObjects Business Intelligence platform simultaneously on the same computer, although this configuration is only recommended as part of the upgrade process or testing purposes. Server processes can be “vertically scaled” (where one computer runs several, or all, server-side processes) to reduce cost, or “horizontally scaled” (where server processes

are distributed between two or more networked machines) to improve performance. It is also possible to run multiple, redundant, versions of the same server process on more than one machine, so that processing can continue if the primary process encounters a problem.

## System overview

SAP BusinessObjects Business Intelligence platform provides enterprise level analysis and reporting tools. Data can be analyzed from any of a large number of supported database systems (including text or multi-dimensional OLAP systems) and BI reports can be published in many different formats to many different publishing systems.

The following diagram illustrates how SAP BusinessObjects Business Intelligence platform fits in with your organization's infrastructure.



**Figure 1: System overview**

SAP BusinessObjects Business Intelligence platform reports from a read-only connection to your organization's databases, and uses its own databases for storing its configuration, auditing, and other operational information. The BI reports created by the system can be sent to a variety of destinations, including file systems, and email, or accessed through web sites or portals.

SAP BusinessObjects Business Intelligence platform is a self-contained system that can exist on a single machine (for example, as a small development or pre-production test environment) or can be scaled up into a cluster of many machines that run different components (for example, as a large-scale production environment).

## **SAP BusinessObjects BI platform architecture basic terminology**

### **Services and Servers**

SAP BusinessObjects BI platform uses the terms server and service to refer to the two types of software running on an SAP BusinessObjects BI platform machine.

#### **Host**

A host can be a physical computer or virtual machine.

#### **Service**

A service is a server subsystem that performs a specific function. The service runs within the memory space of its server under the process id of the parent container (server). For example, the SAP BusinessObjects Web Intelligence Scheduling and Publishing Service is a subsystem that runs within the Adaptive Job Server.

## Server

The term server is used to describe an operating system level process hosting one or more services. For example, the Central Management Server (CMS) and Adaptive Processing Server are servers. A server runs under a specific operating system account and has its own PID.

SAP BusinessObjects Business Intelligence platform consists of collections of servers running on one or more hosts. Small installations (such as test or development systems) can use a single host for a web application server, database server, and all SAP BusinessObjects Business Intelligence platform servers.

Medium and large installations can have servers running on multiple hosts. For example, a web application server host can be used in combination with an SAP BusinessObjects Business Intelligence platform server host. This frees up resources on the SAP BusinessObjects Business Intelligence platform server host, allowing it to process more information than if it also hosted the web application server.

Large installations can have several SAP BusinessObjects Business Intelligence platform server hosts working together in a cluster. For example, if an organization has a large number of SAP Crystal Reports users, Crystal Reports processing servers can be created on multiple SAP BusinessObjects Business Intelligence platform server hosts to ensure that there are plenty of resources available to process requests from clients.

The advantages of having multiple servers include:

- Improved performance

Multiple SAP BusinessObjects Business Intelligence platform server hosts can process a queue of reporting information faster than a single SAP BusinessObjects Business Intelligence platform server host.

- Load balancing

If a server is experiencing a higher load than the other servers in a cluster, the CMS automatically sends new work to a server with better resources. • Improved availability If a server encounters an unexpected condition, the CMS automatically re-routes work to different servers until the condition is corrected.

- Improved availability

If a server encounters an unexpected condition, the CMS automatically re-routes work to different servers until the condition is corrected.

## Node

A node is a collection of SAP BusinessObjects BI platform servers running on the same host. One or more nodes can be on a single host.

**Server Intelligence Agent (SIA)**

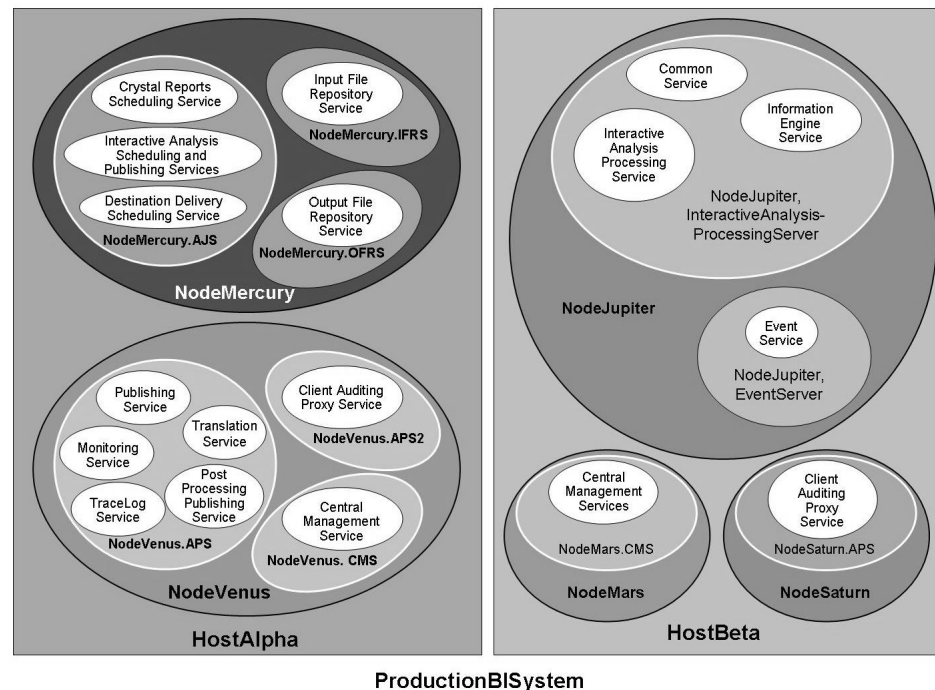
Server Intelligence Agent is a component of the Central Management Console (CMC) to manage a collection of server processes, collectively known as a node. Changes to server processes applied in the CMC are propagated to affected servers by the Server Intelligence Agent. The SIA is also used for the automatic restart or shutdown of a server if it encounters an unexpected condition, and is used by the Central Management Server (CMS) to manage nodes.

The Agent (SIA) server archives server information in the CMS system database so you can easily restore default server settings, or create redundant instances of server processes with the same settings.

SAP BusinessObjects BI platform consists of collections of servers running on one or more hosts. Small installations (such as test or development systems) can use a single host for a web application server, database server, and all SAP BusinessObjects BI platform servers.

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**Figure 2: Services and servers**

➔ **Note:** The nodes, servers, and services shown are for illustrative purposes only. The number of hosts, nodes, servers and services, as well as the type of servers, and services, will vary in real-world installations.

In this figure two hosts form the cluster named ProductionBISystem, with two hosts:

- The host named HostAlpha has two nodes:
  - NodeMercury: contains an Adaptive Job Server (NodeMercury.AJS) with services to schedule and publish reports, an Input File Repository Server (NodeMercury.IFRS) with a service to store input reports, and an Output File Repository Server (NodeMercury.OFRS) with a service to store report output
  - NodeVenus: contains an Adaptive Processing Server (NodeVenus.APS) with services to provide publishing, monitoring, and translation features, an Adaptive Processing Server (NodeVenus.APS2) with a service to provide client auditing, and a Central Management Server (NodeVenus.CMS) with a service to provide the CMS services.
- The host named HostBeta has three nodes:



- NodeMars: contains a Central Management Server (NodeMars.CMS) with a service to provide the CMS services.
- NodeJupiter: contains an Web Intelligence Processing Server (NodeJupiter.WebIntelligence) with a service to provide Web Intelligence documents, and an Event Server (NodeJupiter.EventServer) to provide report monitoring of files.
- NodeSaturn: contains an Adaptive Processing Server (NodeSaturn.APS) with a service to provide client auditing.

## Architecture

The architecture of SAP BusinessObjects Business Intelligence platform is designed to meet the needs of virtually any BI deployment, and is flexible enough to grow from several users with a single tool, to tens of thousands of users with multiple tools and interfaces.

Developers can integrate SAP BusinessObjects BI into your organization's other technology systems by using web services, Java, or .NET application programming interfaces (APIs).

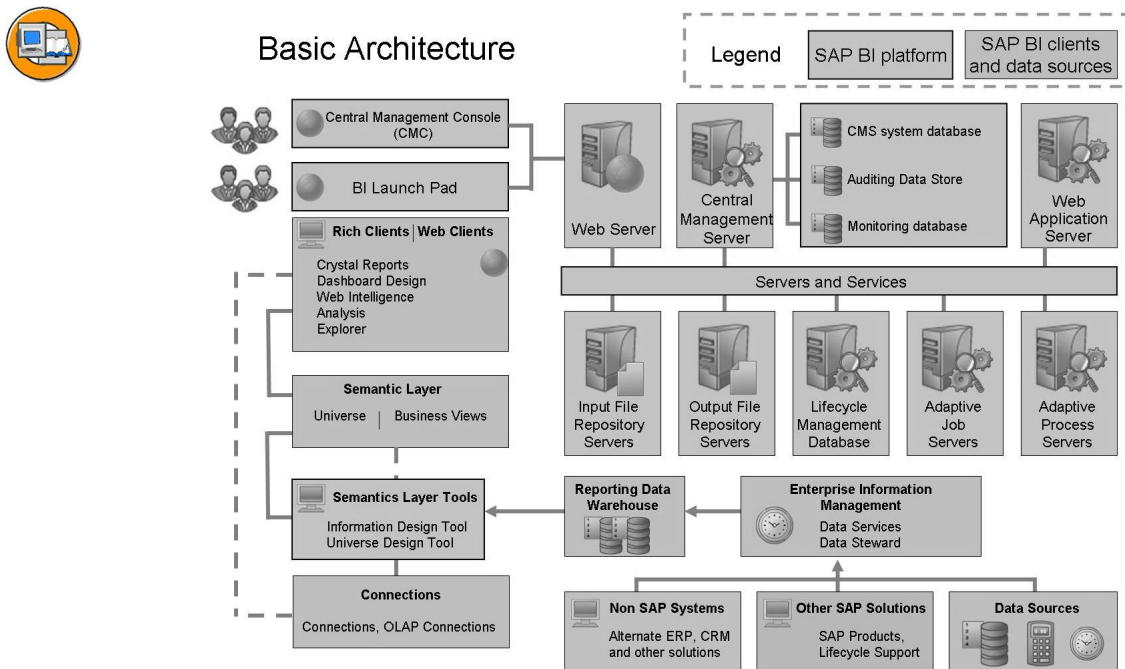


Figure 3: Architecture

## Tiers

SAP BusinessObjects Business Intelligence platform can be thought of as a series of conceptual tiers:

### Client

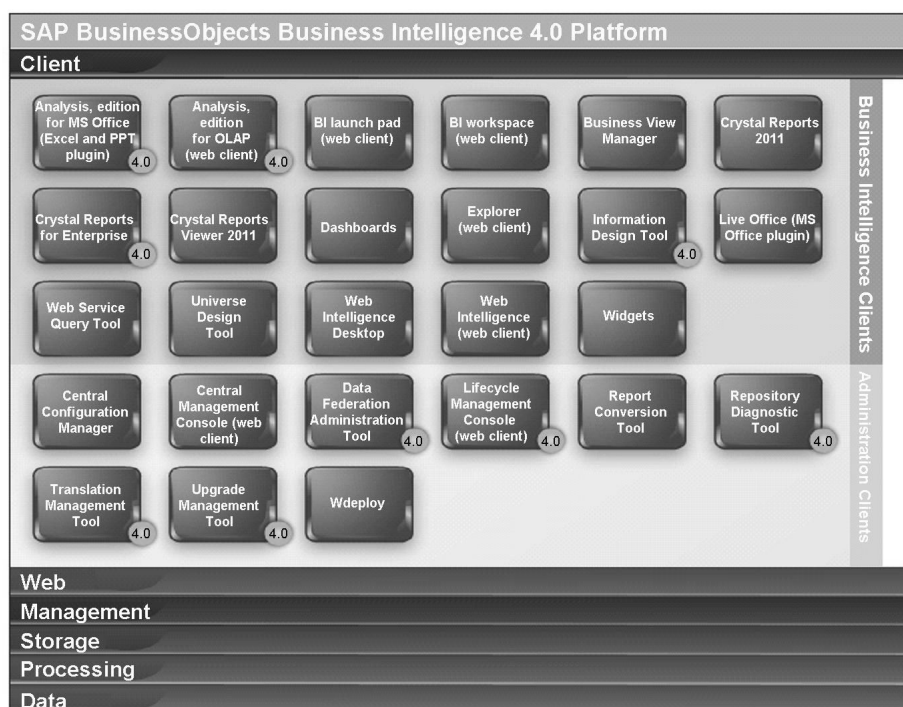


Figure 4: Client

| Group     | Tool   |
|-----------|--|
| BI Client | <b>Analysis, edition for MS Office (Excel and PPT plugin)</b><br>SAP BusinessObjects Analysis, edition for Microsoft Office, is a plugin that integrates into Microsoft Excel and Microsoft PowerPoint to be used as an online analytical processing (OLAP) tool. It provides access to a range of OLAP data sources, and also allows users to combine information from different systems within a single workspace. |
|           | <b>Analysis, edition for OLAP (web client)</b>   |

| Group | Tool  |
|-------|---|
|       | <p>SAP BusinessObjects Analysis, edition for OLAP (formerly Voyager) is an online analytical processing (OLAP) tool for working with multi-dimensional data. It provides access to a range of OLAP data sources, and can also combine information from different OLAP data sources within a single workspace.</p> <p><b>BI launch pad (web client)</b></p> <p>BI launch pad (formerly InfoView) is the main web interface for business users to view, schedule, and keep track of published business intelligence documents. BI launch pad can access, interact with, and export, any type of business intelligence including reports, analytics, dashboards, scorecards, and strategy maps. It simplifies information delivery and delivers secure access to BI content and tools, such as BI workspaces, SAP BusinessObjects Web Intelligence, SAP BusinessObjects Explorer, and SAP BusinessObjects Analysis, edition for OLAP.</p> <p><b>BI workspaces (web client)</b></p> <p>BI workspaces (formerly Dashboard Builder) helps you track your business activities and performance using modules (templates for data) and Business Intelligence (BI) workspaces (for viewing data in one or more modules). Modules and BI workspaces provide information needed to adjust business rules as conditions change. It helps you track and analyze key business data. It also supports group decision-making and analysis via integrated collaboration and workflow capabilities. BI workspaces enables you to organize content in pages, create mash-ups of Business Intelligence content, and present the information in a way that is tailored to the role of the user, either for personal use or for sharing with others</p> <p><b>Business View Manager</b></p> <p>Business View Manager allows users to build semantic layer objects that simplify underlying database complexity. Business View Manager can create data connections, dynamic data connections, data foundations, business elements, business views, and relational views. It also allows detailed column and row-level security to be set for the objects in a report. Designers can build connections to multiple data sources, join tables, alias field names, create calculated fields, and then use the simplified</p> |

| Group | Tool  |
|-------|---|
|       | <p>structure as a Business View. Report designers and users can then use the business view as the basis for their Crystal reports, rather than building their own queries from the data directly.</p> <p><b>Crystal Reports 2011</b></p> <p>SAP Crystal Reports 2011 is a Windows-based report design tool used to create powerful reports that can be published in the SAP BusinessObjects Business Intelligence platform.</p> <p><b>Crystal Reports for BI platform</b></p> <p>SAP Crystal Reports for Enterprise is a Java-based report design tool used to create and integrate powerful reports in the SAP BusinessObjects Business Intelligence platform.</p> <p><b>Crystal Reports Viewer 2011</b></p> <p>SAP Crystal Reports Viewer 2011 is a Java-based tool to view Crystal reports.</p> <p><b>Dashboards</b></p> <p>SAP BusinessObjects Dashboards (formerly Xcelsius) is a tool for data visualization and the creation of dynamic, interactive dashboards. Data can be updated dynamically from the SAP BusinessObjects Business Intelligence platform, and exported to a variety of different formats that can be viewed by data consumers in standard formats, such as PowerPoint, PDF, or Flash.</p> <p><b>Explorer</b></p> <p>SAP BusinessObjects Explorer is an information-discovery tool that empowers everyone in an organization with fast, easy access to information, so they can explore data, spark new ideas, and find new insights.</p> <p><b>Information Design Tool</b></p> <p>The Information Design Tool is an SAP BusinessObjects metadata design environment that enables a designer to extract, define, and manipulate metadata from relational and OLAP sources to create and deploy UNX universes.</p> <p><b>Live Office</b></p> |

| Group | Tool   |
|-------|--|
|       | <p>SAP BusinessObjects Live Office integrates with the Microsoft Office environment, allowing dynamically updated data to be embedded within Microsoft PowerPoint, Excel, and Word documents. In addition, you can share your documents with others over the web for collaborative decision-making.</p> <p><b>Web Service Query Tool</b></p> <p>The Web Service Query Tool (formerly Query as a Web Service) allows Business Intelligence queries to be used in custom web applications. Business users create their own queries from a universe connection and publish them as web services so they can be incorporated into client applications.</p> <p><b>Universe Design Tool</b></p> <p>The Universe Design Tool (formerly Universe Designer) allows data designers to combine data from multiple sources in a semantic layer (UNV universe) that hides database complexity from end users. It abstracts the complexity of data by using business rather than technical language to access, manipulate, and organize data.</p> <p>Universe design tool provides a graphical interface to select and view tables in a database. The database tables are represented as table symbols in a schema diagram. Designers can use this interface to manipulate tables, create joins between tables, create alias tables, create contexts, and solve loops in a schema. You can also create universes from metadata sources. Universe design tool is used for the universe generation at the end of the creation process.</p> <p><b>Web Intelligence Desktop</b></p> <p>SAP BusinessObjects Web Intelligence Desktop is an ad-hoc analysis and reporting tool for business users with or without access to the SAP BusinessObjects Business Intelligence platform. It allows business users to access and combine data from relational, online analytical processing (OLAP), spreadsheet, or text file sources, using familiar business terms in a drag-and-drop interface. Workflows allow very broad or very narrow questions to be analyzed, and for further questions to be asked at any point in the analysis workflow. Web Intelligence</p> |

| Group        | Tool   |
|--------------|--|
|              | <p>Desktop users can continue working with Web Intelligence document files (.wid) even when unable to connect to a Central Management Server (CMS).</p> <p><b>Web Intelligence (web client)</b></p> <p>SAP BusinessObjects Web Intelligence is an ad-hoc analysis and reporting tool for business users with access to the SAP BusinessObjects Business Intelligence platform. It allows business users to access and combine data from relational, online analytical processing (OLAP), spreadsheet, or text file sources, using familiar business terms in a drag-and-drop interface. Workflows allow very broad or very narrow questions to be analyzed, and for further questions to be asked at any point in the analysis workflow.</p> <p><b>Widgets</b></p> <p>SAP Widgets (formerly BI Widgets) ) are mini-applications that allow easy and fast access to frequently used functions and provide visual information from your desktop. SAP Widgets allow your organization to provide access to existing BI content on the SAP BusinessObjects Business Intelligence platform. Or you can add Web Dynpro applications, that are registered as Extensible Business Client Markup Language (XBCML) widgets on the SAP NetWeaver Application Servers, as desktop widgets.</p> |
| Admin Client | <p><b>Central Configuration Manager</b></p> <p>The Central Configuration Manager (CCM) is a server troubleshooting and node management tool provided in two forms. In a Microsoft Windows environment, the CCM allows you to manage local and remote servers through its graphical user interface (GUI) or from a command line. In a Unix environment, the CCM shell script (ccm.sh) allows you to manage servers from the command-line. The CCM allows you to create and configure Server Intelligence Agent (SIA) nodes and start or stop your web application server. On Windows, it also allows you to configure network parameters, such as Secure Socket Layer (SSL) encryption. These parameters apply to all servers within a node. Note: Most server management tasks are now handled through the Central Management Console (CMC), not through the CCM. The CCM is now used for troubleshooting and node configuration.</p>  |

| Group | Tool  |
|-------|---|
|       | <p><b>Central Management Console (web client).</b></p> <p>The Central Management Console (CMC) is the main web interface to perform administrative tasks in the SAP BusinessObjects Business Intelligence platform, including user, content, and server management. It also allows you to publish and organize content, and configure security settings.</p> <p><b>Data Federation Administration Tool</b></p> <p>The Data Federation Administration Tool (formerly Data Federator) is a rich client application that offers easy-to-use features to manage your data federation service. Tightly integrated in the SAP BusinessObjects Business Intelligence platform, the data federation service enables multi-source universes by distributing queries across disparate data sources, and lets you federate data through a single data foundation. The Data Federation Administration tool lets you optimize data federation queries and fine-tune the data federation query engine for the best possible performance.</p> <p><b>Lifecycle Management Console (web client)</b></p> <p>The Lifecycle Management Console provides a centralized view to monitor the progress of the entire lifecycle process. It is used to promote content from one SAP BusinessObjects Business Intelligence platform to another of the same version.</p> <p><b>Report Conversion Tool</b></p> <p>The Report Conversion Tool converts Desktop Intelligence reports to Web Intelligence format, and publishes them to a Central Management Server (CMS). The Report Conversion Tool also lets you audit your converted reports. This helps identify reports that cannot be fully converted, and explains why.</p> <p><b>Repository Diagnostic Tool</b></p> <p>The Repository Diagnostic Tool scans, diagnoses, and repairs inconsistencies that may occur between the Central Management Server (CMS) system database and the File Repository Servers (FRS) filestore. It can also report the repair status and completed actions.</p> <p><b>Translation Management Tool</b></p> |

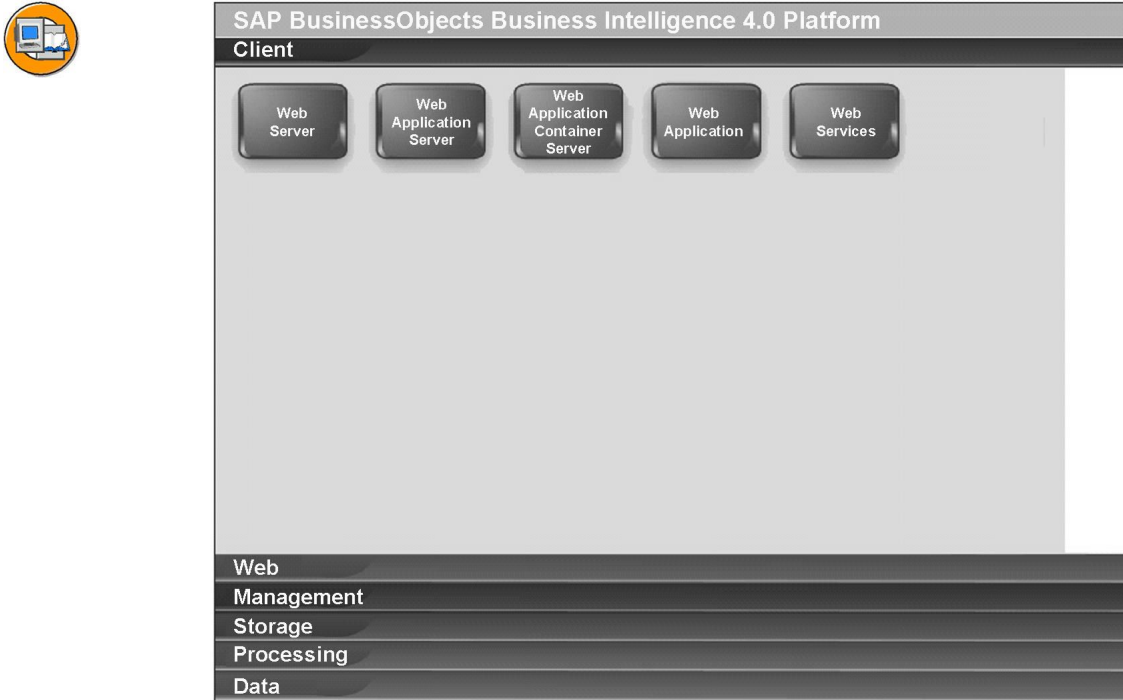
| Group | Tool   |
|-------|--|
|       | <p>The Translation Management Tool defines multilingual universes and manages translation of universes and their Web Intelligence documents and prompts.</p> <p><b>Upgrade Management Tool</b></p> <p>The Upgrade management tool (formerly Import Wizard) guides administrators through the process of importing users, groups, and folders from previous versions of the SAP BusinessObjects Business Intelligence platform (formerly know as SAP BusinessObjects Enterprise). It also allows you to import and upgrade objects, events, server groups, repository objects, and calendars.</p> <p><b>WDeploy</b></p> <p>WDeploy is a tool to assist in deploying SAP BusinessObjects Business Intelligence platform web applications, such as BI launch pad and the Central Management Console, to target application servers.</p> |



**Note:** Key administrative tools for administrators are Central Management Console (CMC), Central Configuration Manager (CCM), Repository Diagnostic Tool, and Upgrade management tool.



## Web



**Figure 5: Web**

### Web Server

The web server receives HTTP requests sent from the web client. The web server holds and manages static content such as .html and .js files that may be part of a SAP BusinessObjects Business Intelligence suite web application.

### Web Application Server

A web application server acts as the translation layer between a web browser or rich application, and the SAP BusinessObjects Business Intelligence platform. The web application server hosts web applications, web services and Software Development Kits (SDK). Various web application servers running on Windows, Unix, and Linux are supported. Note: If you do not have a web application server in place for use with the SAP BusinessObjects Business Intelligence platform, the installation program can install and configure a Tomcat 6 web application server for you.

### Web Application Container Server

The Web Application Container Server (WACS) is an SAP BusinessObjects Business Intelligence platform server that allows SAP BusinessObjects Business Intelligence platform web services and web applications, such as the Central Management Console (CMC) and BI launch pad, to run without the need for a previously installed Java web application server.

### Web Applications

Web applications run in the web application server to process requests from the web client. SAP BusinessObjects Business Intelligence suite web applications include:

- Central Management Console
- Lifecycle Management Console
- BI launch pad
- BI workspaces
- SAP BusinessObjects Web Intelligence
- SAP BusinessObjects Analysis, edition for OLAP
- SAP BusinessObjects Explorer

### Web Services

Web services run in the web application server to process requests from client applications. Web services can be called remotely using the Simple Object Access Protocol (SOAP) for exchanging information that is not dependent on a specific platform, object model, or programming language.

SAP BusinessObjects web services include logic to understand and direct requests to the appropriate SAP BusinessObjects Business Intelligence platform server. SAP BusinessObjects web services can be accessed by rich clients such as Live Office and Crystal Reports, and also by custom-built web service consumer applications.

SAP BusinessObjects Business Intelligence platform web services include:

- Session
- BIPlatform
- ReportEngine
- QueryService
- SaveService
- BICatalog
- Publish
- LiveOffice
- managequeryasaservice
- Federator
- XcelsiusWebServices
- BicsRemote
- Gopher

## Management



**Figure 6: Management**

### Central Management Server

The Central Management Server (CMS) maintains a database of information about your SAP BusinessObjects Business Intelligence platform (in the CMS system database) and audited user actions (in the Auditing Data Store). All platform services are managed by the CMS. The CMS also controls access to the system files where documents are stored, and information on users, user groups, security levels (including authentication and authorization), and content.

### Event Server

The Event Server monitors the system for events, which can act as a trigger for running a report. When you set up an event trigger, the Event Server monitors the condition and notifies the CMS that an event has occurred. The CMS can then start any jobs that are set to run upon the event.

### Explorer Master Server

Explorer Master Server manages all of the Explorer processing servers, including: Explorer Exploration Server, Explorer Indexing Server, and Explorer Search Server

### Server Intelligence Agent

A Server Intelligence Agent (SIA) manages and monitors all of the servers on a node, ensuring they operate properly. Note: A node is a group of SAP BusinessObjects Business Intelligence platform servers that run on the same host. All of the servers on a node run under the same user account. One machine can contain many nodes, so you can run processes under different user accounts.

### Storage



**Figure 7: Storage**

### Crystal Reports Cache Server

The Crystal Reports Cache Server intercepts report viewing requests sent from clients to the Crystal Reports Processing Server. If the Cache Server cannot fulfill the request with a cached report page, it passes the request on to the Crystal Reports Processing Server, which runs the report and returns the results. The Cache Server then caches the report page for potential future use.

### Dashboard Design Cache Server

The Dashboard Design Cache Server determines if a previously served dashboard viewing request would satisfy the current dashboard viewing request. If the request cannot be fulfilled by the Dashboard Design Cache Server, it forwards the request to the Dashboard Design Processing Server. The Dashboard Design Cache Server will try to share previous data results as much as possible.

### Input File Repository Server

The Input File Repository Server stores all of the documents and program objects that have been published to the SAP BusinessObjects Business Intelligence platform. It can store a large variety of file types.

### Output File Repository Server

The Output File Repository Server stores all of the instances generated by scheduled jobs for all object types including Crystal Reports, Web Intelligence, and programs. It can store a large variety of file types.

## Processing

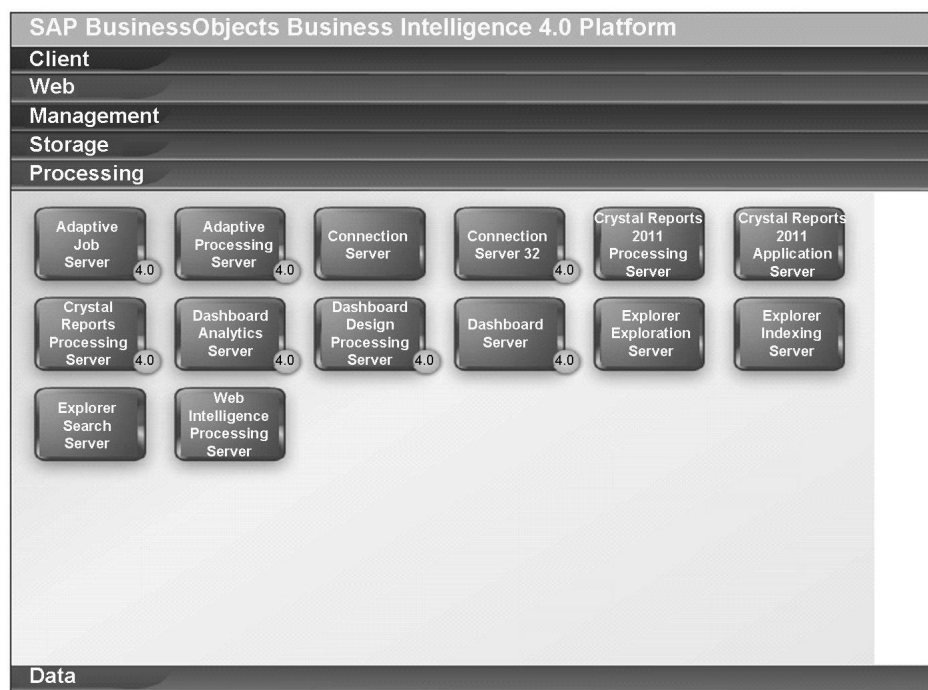


Figure 8: Processing

### **Adaptive Job Server**

The Adaptive Job Server is a generic server that processes scheduled jobs for a variety of object types. Services that can be hosted on this server include: Authentication Update Scheduling Service, Crystal Reports 2011 Scheduling Service, Crystal Reports Scheduling Service, Destination Delivery Scheduling Service, Lifecycle Management Scheduling Service, Platform Search Scheduling Service, Probe Scheduling Service, Program Scheduling Service, Publication Scheduling Service, Replication Service, Security Query Scheduling Service, Visual Difference Scheduling Service, Web Intelligence Scheduling Service.

### **Adaptive Processing Server**

The Adaptive Processing Server is a generic server that hosts services responsible for processing requests from a variety of sources. Services that can be hosted on this server include: Adaptive Connectivity Service, BEx Web Application Service, Client Auditing Proxy Service, Custom Data Access Service, Data Federation Service, Document Recovery Service, DSL Bridge Service, Excel Data Access Service, Lifecycle Management ClearCase Service, Lifecycle Management Console Service, Monitoring Service, Multi Dimensional Analysis Service, Platform Search Service, Publishing Post Processing Service, Publishing Service, Rebean Service, Security Token Service, Translation Service, Visual Difference Service, Visualization Service, Web Intelligence Monitoring Service.

### **Connection Server**

The Connection Server provides database access to source data. It supports relational databases, as well as OLAP and other formats. The Connection Server is responsible for handling connection and interaction with the various data sources and providing a common feature set to clients.

### **Connection Server 32**

The Connection Server 32 is responsible for 32-bit database connectivity to access data.

### **Crystal Reports 2011 Processing Server**

The Crystal Reports 2011 Processing Server responds to Crystal Reports page requests by processing reports and generating encapsulated page format (EPF) files. The key benefit of EPF is that it supports page-on-demand access, so only the requested page is returned, not the entire report. This improves system performance and reduces unnecessary network traffic for large reports. The Crystal Reports 2011 Processing Server retrieves data for the report from the latest instance or directly from the data source. After it generates the report, it converts the requested data to one or more EPF files. These EPF files are then sent to the Crystal Reports Cache Server.

### **Crystal Reports 2011 Report Application Server**

The Crystal Reports 2011 Report Application Server (RAS) provides ad-hoc reporting capabilities that allow users to create and modify Crystal reports via the SAP Crystal Reports Server Embedded Software Development Kit (SDK).

### **Crystal Reports Processing Server**

The Crystal Reports Processing Server responds to Crystal Reports for Enterprise page requests by processing reports and generating encapsulated page format (EPF) files. The key benefit of EPF is that it supports page-on-demand access, so only the requested page is returned, not the entire report. This improves system performance and reduces unnecessary network traffic for large reports. The Crystal Reports Processing Server retrieves data for the report from the latest instance or directly from the data source. After it generates the report, it converts the requested data to one or more EPF files. These EPF files are then sent to the Crystal Reports Cache Server.

### **Dashboard Analytics Server**

The Dashboard Analytics Server is used by BI workspaces to create and manage corporate and personal BI workspace module content.

### **Dashboard Design Processing Server**

The Dashboard Design Processing Server responds to Dashboards requests by processing dashboards and generating the results.

### **Dashboard Server**

The Dashboard Server is used by BI workspaces to create and manage corporate and personal dashboards.

### **Explorer Exploration Server**

Explorer Exploration Server provides and manages the Information Space exploration and analysis capabilities including search on data, filtering and aggregation.

### **Explorer Indexing Server**

Explorer Indexing Server provides and manages the indexing of Information Space data and metadata.

### **Explorer Search Server**

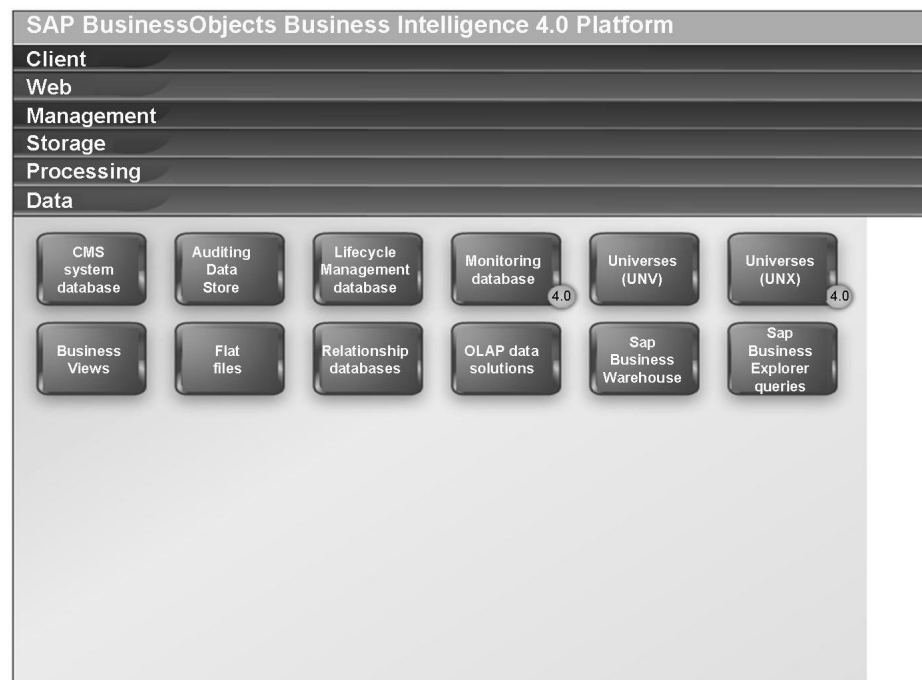
Explorer Search Server processes search queries and returns search results.



## Web Intelligence Processing Server

The Web Intelligence Processing Server is responsible for generating Web Intelligence documents. The Web Intelligence Processing Server obtains document creation requests from the Web Application Server and then communicates with the Input File Repository Server in order to obtain a copy of the Web Intelligence document (WID) file and the universe definition. When viewing an existing instance of a WID, the Web Intelligence Processing Server communicates with the Output File Repository Server to obtain an existing historical instance of a WID.

## Data



**Figure 9: Data**

### CMS system database

The CMS system database is used to store SAP BusinessObjects Business Intelligence platform information, such as user, server, folder, document, configuration, authorization, and authentication details. It is maintained by the Central Management Server (CMS), and is sometimes referred to as the system repository.

### **Auditing Data Store**

The Auditing Data Store (ADS) is used to store information on trackable events that occur in SAP BusinessObjects BI platform. This information can be used to monitor the usage of system components, user activity, or other aspects of day-to-day operation.

### **Lifecycle Management database**

The Lifecycle Management database tracks configuration and version information related to an SAP BusinessObjects Business Intelligence platform installation, as well as updates.

### **Monitoring database**

The Monitoring database is an embedded Java Derby database to store system configuration and component information for SAP supportability in the SAP BusinessObjects Business Intelligence platform.

### **Universes (UNV)**

UNV Universes are identified by the .unv file extension. They are the legacy type of universe based on the semantic layer in previous versions of the SAP BusinessObjects Business Intelligence platform. They are built using the legacy Universe Design Tool. A universe is an organized collection of metadata objects that enables business users to analyze and report on corporate data in non-technical language. These objects include dimensions, measures, hierarchies, attributes, pre-defined calculations, functions, and queries. The metadata object layer is built on a relational database schema or an OLAP cube, so the objects map directly to the database structures. A universe includes connections to the data sources so that users of query and analysis tools can connect to a universe and run queries and create reports using the objects in a universe without needing to know about the underlying data structures in the database.

### **Universes (UNX)**

UNX Universes are identified by the .unx file extension. They are the new type of universe based on the new semantic layer in the SAP BusinessObjects Business Intelligence 4.0 platform. They are built using the new Information Design Tool. A universe is an organized collection of metadata objects that enables business users to analyze and report on corporate data in non-technical language. These objects include dimensions, measures, hierarchies, attributes, pre-defined calculations, functions, and queries. The metadata object layer is built on a relational database schema or an OLAP cube, so the objects map directly to the database structures. A universe includes connections to the data sources so that users of query and analysis tools can connect to a universe and run queries and create reports using the objects in a universe without needing to know about the underlying data structures in the database.

**Business Views**

Business Views simplify report creation and interaction by abstracting the complexity of data for report developers. Business Views help separate the data connections, data access, business elements, and access control. Business Views can only be used by Crystal Reports and are designed to simplify the data access and view-time security required for Crystal report creation. Business Views support the combination of multiple data sources in a single view.

**Flat files**

Flat files include .txt, .csv, and .xls files.

**Relational databases**

Relational databases store data in two-dimensional tables.

**OLAP data sources**

OLAP data sources store data in multi-dimensional cubes.

**SAP Business Warehouse**


SAP NetWeaver Business Warehouse (BW) is the OLAP data source from SAP.

**SAP Business Explorer queries**

SAP Business Explorer (BEx) queries are used to analyze data in SAP NetWeaver Business Warehouse. BEx queries are built in the BEx query designer.

## Log on to SAP BusinessObjects Business Intelligence platform

The following steps explain how CMS validates users when you log on to SAP BusinessObjects Business Intelligence platform.

1. The user sends the log in request from the BI launch pad web client through the web server to the web application server, where the BI launch pad web application is running.  
 **Note:** This log on process also applies to other web clients, such as the Central Management Console (CMC).
2. The web application server determines that the request is a logon request. The web application server sends the username, password, and authentication type to the Central Management Server (CMS) for authentication.
3. The CMS validates the username and password against the appropriate database. In this case, Enterprise authentication is used, so user credentials are authenticated against the CMS system database.
4. Upon successful validation, the CMS creates a session for the user in memory.
5. The CMS sends a response to the web application server to let it know that the validation was successful.
6. The web application server generates a logon token for the user session in memory. For the rest of this session, the web application server uses the logon token to validate the user against the CMS. The web application server also generates the next web page to send to the web client.
7. The web application server sends the next web page to the web server.
8. The web server sends the web page to the web client.

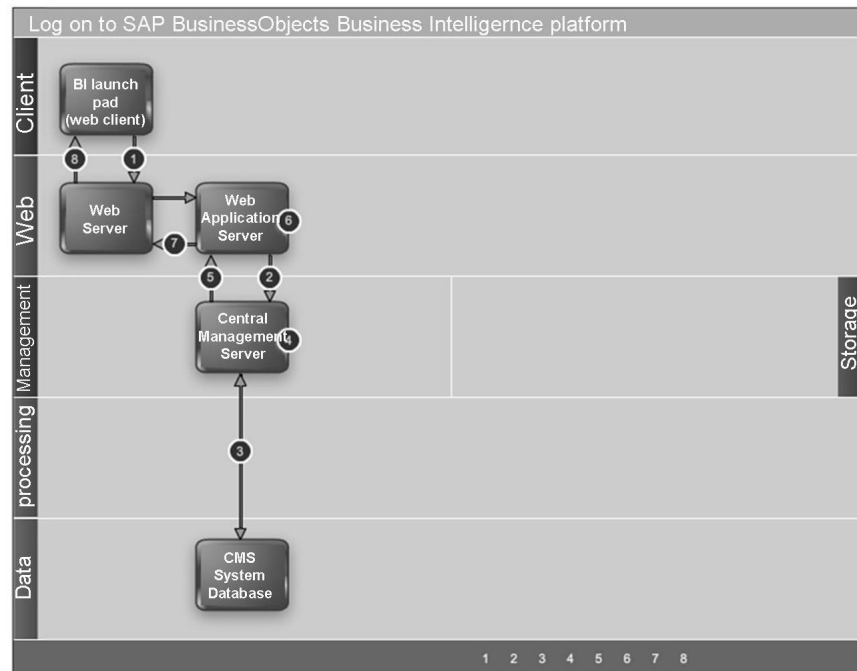



Figure 10: Log on to SAP BusinessObjects Business Intelligence platform

## Setting a schedule for a Web Intelligence document

1. The web client submits a schedule request in an URL, typically via the web server to the Web Application Server.
2. The Web Application Server interprets the URL request and determines that the request is a schedule request. The Web Application Server sends the schedule time, database login values, parameter values, destination, and format to the specified CMS.
3. The CMS ensures that the user has rights to schedule the object. If the user has sufficient rights, the CMS adds a new record to the system database. The CMS also adds the instance to its list of pending schedules.

## Start the Server Intelligence Agent

The following steps explain the interaction of platform components when the Server Intelligence Agent is started.

1. The user starts the Server Intelligence Agent (SIA) manually in the Central Configuration Manager (CCM).  
 **Note:** Note: A Server Intelligence Agent (SIA) can be configured to start automatically with the operating system, or it can be started manually with the Central Configuration Manager (CCM).
2. The Server Intelligence Agent (SIA) looks in its cache to locate a Central Management Server (CMS). If the SIA is configured to start a local CMS, and the CMS is not running, the SIA starts the CMS and connects. If the SIA is configured to use a running CMS (local or remote), it attempts to connect to the first CMS in its cache. If the CMS is not currently available, it attempts to connect to the next CMS in its cache. If no cached CMS is available, the SIA waits for one to become available. The CMS then confirms the SIA's identity to ensure that it is valid.
3. Once the SIA has successfully connected to a CMS, it requests a list of servers to manage. Note: A SIA does not store information about the servers it manages. The configuration information that dictates which server is managed by a SIA is stored in the CMS system database and is retrieved from the CMS by the SIA when it starts.
4. The CMS queries the CMS system database for a list of servers managed by the SIA. The configuration for each server is also retrieved.
5. The CMS returns the list of servers to manage, and their configuration, to the SIA.
6. For each server configured to start automatically, the SIA starts it with the appropriate configuration and monitors its state. Each server started by the SIA is configured to use the same CMS used by the SIA. Any servers that are not configured to start automatically with the SIA will not start.

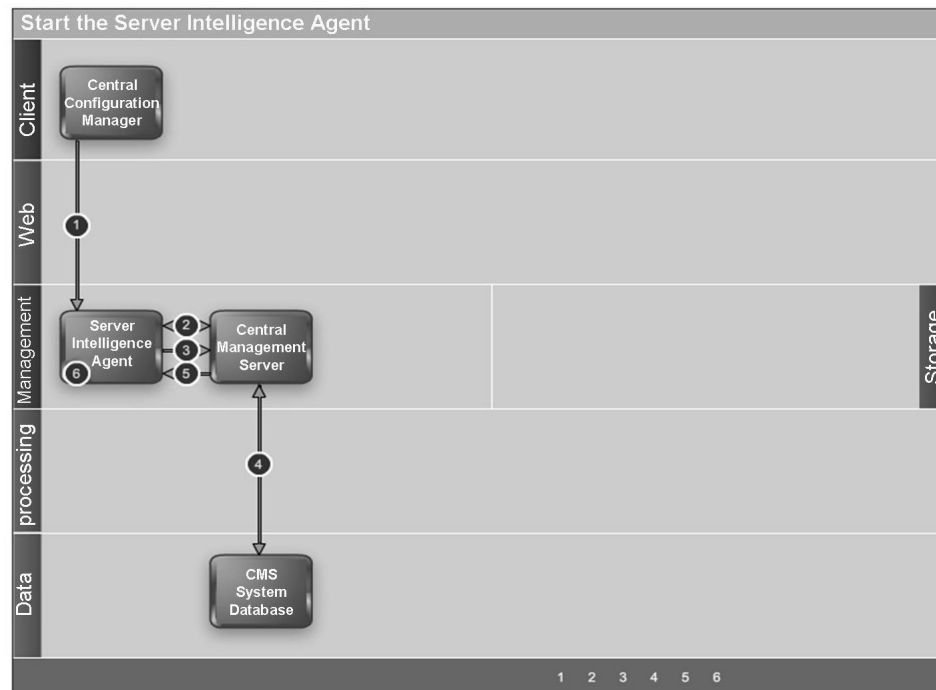


Figure 11: Start the Server Intelligence Agent

## Run a schedule for a Web Intelligence document

The following steps explain the interaction of platform components when a scheduled Web Intelligence document is run to create a document instance.

1. The Central Management Server (CMS) checks the CMS system database to determine if there is any scheduled Web Intelligence document to be run at that time.
2. When the scheduled job time arrives, the CMS locates an available Web Intelligence Scheduling Service running on an Adaptive Job Server. The CMS sends the schedule request and all information about the request to the Web Intelligence Scheduling Service.
3. The Web Intelligence Scheduling Service locates an available Web Intelligence Processing Server based on the Maximum Jobs Allowed value configured on each Web Intelligence Processing Server.
4. The Web Intelligence Processing Server determines the location of the Input File Repository Server (FRS) that houses the document and the universe metalayer file on which the document is based. The Web Intelligence Processing Server

then requests the document from the Input FRS. The Input FRS locates the Web Intelligence document as well as the universe file on which the document is based, and then streams them to the Web Intelligence Processing Server.



**Note:** This step also requires communication (not shown in this diagram) with the Central Management Server (CMS) and the CMS system database to locate the required server and objects.

5. The Web Intelligence document is placed in a temporary directory on the Web Intelligence Processing Server. The Web Intelligence Processing Server opens the document in memory. The QT.dll generates the SQL from the universe on which the document is based. The Connection Server libraries included in the Web Intelligence Processing Server are used to connect to the data source, which is a relational database in this example. The queried data passes through QT.dll back to the Report Engine in the Web Intelligence Processing Server, where the document is processed. A new successful instance is created.
6. The Web Intelligence Processing Server uploads the document instance to the Output File Repository Server. Note: this step also requires communication (not shown in this diagram) with the Central Management Server (CMS) and the CMS system database to locate the required server and objects.
7. The Web Intelligence Processing Server notifies the Web Intelligence Scheduling Service (on the Adaptive Job Server) that document creation is completed. If the document is scheduled to go to a destination such as file system, FTP, SMTP, or Inbox, the Adaptive Job Server retrieves the processed document from the Output File Repository Server and delivers it to the specified destinations. That is not the case in this example.
8. The Web Intelligence Scheduling Service updates the Central Management Server with the job status.
9. The Central Management Server (CMS) updates the job status in its memory, and then writes the instance information to the CMS system database.



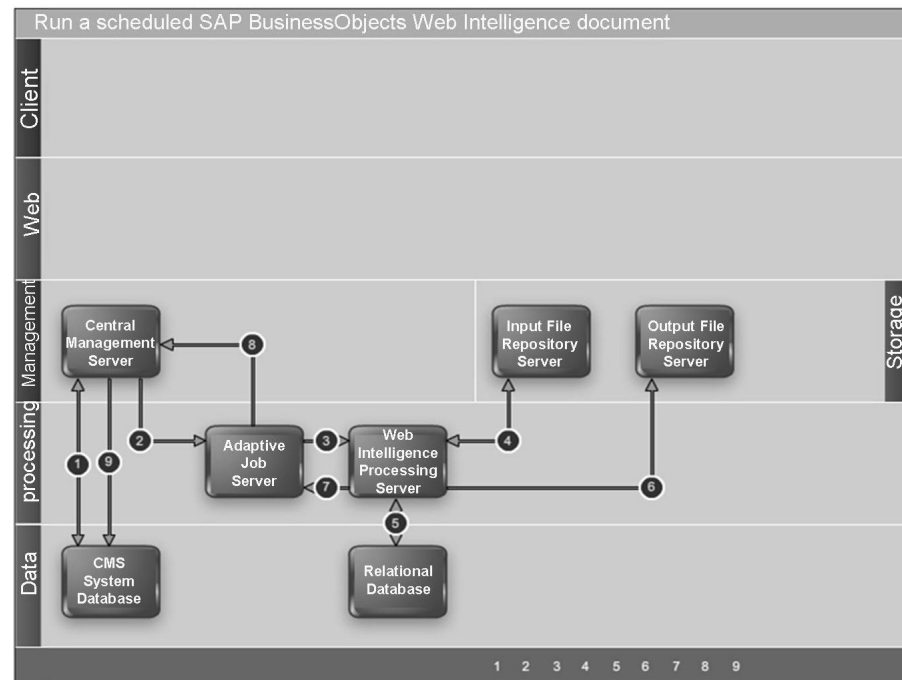


Figure 12: Run a scheduled SAP BusinessObjects Web Intelligence document

## View a Web Intelligence document on demand

The following steps explain the interaction of platform components when you view a Web Intelligence document on demand to see the most current data available.

1. The user sends the view request from the BI launch pad web client through the web server to the web application server, where the BI launch pad web application is running.
2. The web application server recognizes the request as a request to view a Web Intelligence document. The web application server checks the Central Management Server (CMS) to ensure the user has sufficient rights to view the document.
3. The CMS checks the CMS system database to determine if the user has the appropriate rights to view the document.
4. The CMS sends a response to the web application server to confirm that the user has sufficient rights to view the document.
5. The web application server sends a request to the Web Intelligence Processing Server, requesting the document.
6. The Web Intelligence Processing Server requests the document, and the universe file on which the requested document is built, from the Input File Repository Server (FRS). The universe file contains metalayer information, including row-level and column-level security. The Input FRS sends a copy of the document and the universe to the Web Intelligence Processing Server.



**Note:** This step also requires communication (not shown in this diagram) with the Central Management Server (CMS) and the CMS system database to locate the required server and objects.

7. The Web Intelligence Report Engine runs on the Web Intelligence Processing Server. The Report Engine opens the document in memory and launches QT.dll and a Connection Server in process. QT.dll generates, validates, and regenerates the SQL and connects to the database to run the query. The Connection Server uses the SQL to get the data from the database to the Report Engine, where the document is processed.
8. The Web Intelligence Processing Server sends the viewable document page that was requested to the web application server.
9. The web application server forwards the document page to the web server.
10. The web server sends the requested page to be rendered in the web client.

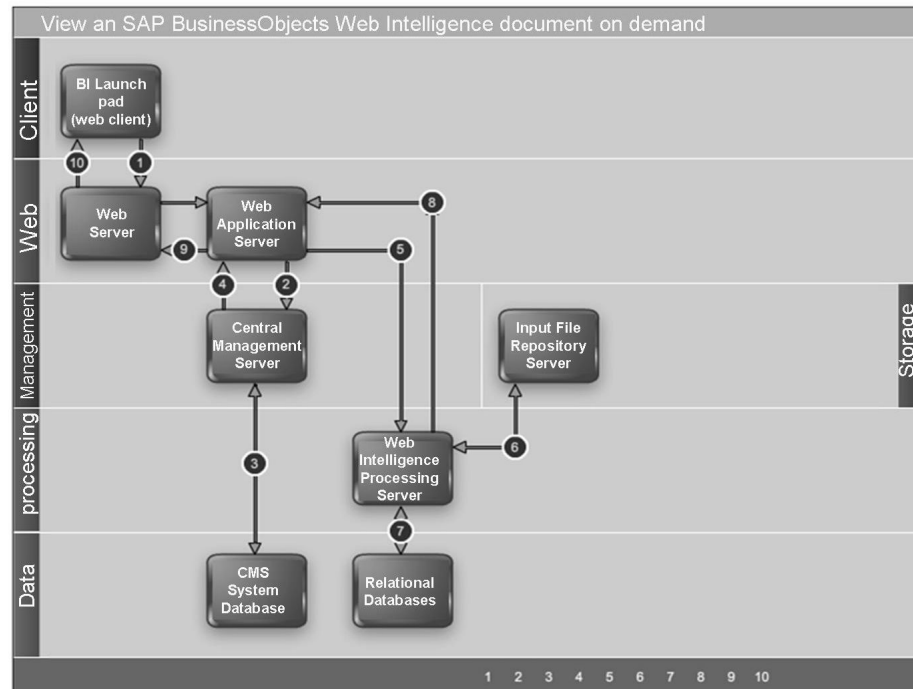


Figure 13: View an SAP BusinessObjects Web Intelligence document on demand



# Exercise 1: Test your knowledge in SAP BusinessObjects Business Intelligence Platform

## Exercise Objectives

After completing this exercise, you will be able to:

- Describe the servers and client applications in SAP BusinessObjects Business Intelligence platform.

## Business Example

As the system administrator, you need to describe the servers and client applications in SAP BusinessObjects Business Intelligence platform.

## Task: Test your knowledge

Use the interactive media files that come with the course to test your knowledge in SAP BusinessObjects Business Intelligence platform.

1. Launch the first media file and complete the activity **Hangman**.
2. Launch the second media file and complete the activity **Application Terms and Definitions Matching**.
3. Launch the third media file and complete the activity **Server Terms and Definition Matching**.

## Solution 1: Test your knowledge in SAP BusinessObjects Business Intelligence Platform

### Task: Test your knowledge

Use the interactive media files that come with the course to test your knowledge in SAP BusinessObjects Business Intelligence platform.

1. Launch the first media file and complete the activity **Hangman**.
  - a) Navigate to the media folder and double-click **Hangman.html**.
2. Launch the second media file and complete the activity **Application Terms and Definitions Matching**.
  - a) Navigate to the media folder and double-click **5Terms\_Definition\_Matching.html**.
3. Launch the third media file and complete the activity **Server Terms and Definition Matching**.
  - a) Navigate to the media folder and double-click **Server\_TandD\_Matching.html**.



## Lesson Summary

You should now be able to:

- Define SAP BusinessObjects BI platform architecture terms
- Describe key architectural process flows

## Lesson: SAP BusinessObjects BI Platform Security

### Lesson Overview

A solid understanding of the SAP BusinessObjects BI platform security model is essential for system architects. This lesson is a review of the security model.



### Lesson Objectives

After completing this lesson, you will be able to:

- Understand how rights work in SAP BusinessObjects BI platform
- Describe how access levels are used
- Understand top-level, folder-level and object-level security
- Understand inheritance

### Business Example

#### How rights work in SAP BusinessObjects BI platform

Rights are the base units for controlling user access to the objects, users, applications, servers, and other features in SAP BusinessObjects BI platform. They play an important role in securing the system by specifying the individual actions that users can perform on objects. Besides allowing you to control access to your SAP BusinessObjects BI platform content, rights enable you to delegate user and group management to different departments, and to provide your IT people with administrative access to servers and server groups. It is important to recognize the difference between rights set on objects or folders, and rights set on principals (the users and groups) who access them. For example, to give a manager access to a particular folder, in the "Folders" area, you add the manager to the access control list (the list of principals who have access to an object) for the folder. You cannot give the manager access by configuring the manager's rights settings in the "Users and Groups" area. The rights settings for the manager in the "Users and Groups" area are used to grant other principals (such as delegated administrators) access to the manager as an object in the system. In this way, principals are themselves like objects for others with greater rights to manage. Each right on an object can be granted, denied, or unspecified. The SAP BusinessObjects BI platform security model is designed such that, if a right is left unspecified, the right is denied. Additionally, if settings result in a right being both granted and denied to a user or group, the right is denied. There is an important exception to this rule. If a right is explicitly set on a child object that



contradicts the rights inherited from the parent object, the right set on the child object overrides the inherited rights. This exception applies to users who are members of groups as well. If a user is explicitly granted a right that the user's group is denied, the right set on the user overrides the inherited right.

## Terminology

### Access levels

Access levels are groups of rights that users frequently need. They allow administrators to set common security levels quickly and uniformly rather than requiring that individual rights be set one by one. SAP BusinessObjects Business Intelligence platform comes with several predefined access levels. These predefined access levels are based on a model of increasing rights: Beginning with View and ending with Full Control, each access level builds upon the rights granted by the previous level.

### Inheritance

#### Top-level folder security

Top-level folder security is the default security set for each specific object type (for example Universes, Web Intelligence Application, Groups and Folders). Each object type has its own top-level folder (root folder) that all the objects below inherit rights from.

If there are any access levels common to certain object types that apply throughout the whole system, set them at the top-level folder specific to each object type. For example, if the Sales group requires the View access level to all folders, you can set this at the root level for Folders.

#### Folder-level security

Folder-level security enables you to set access-level rights for a folder and the objects contained within that folder. While folders inherit security from the top-level folder (root folder), subfolders inherit the security of their parent folder. Rights set explicitly at the folder level override inherited rights.

#### Object-level security

Objects in SAP BusinessObjects Business Intelligence platform inherit security from their parent folder. Rights set explicitly at the object level override inherited rights.

## Setting Rights

### How rights work in SAP BusinessObjects Business Intelligence platform

Rights are the base units for controlling user access to the objects, users, applications, servers, and other features in SAP BusinessObjects Business Intelligence platform. They play an important role in securing the system by specifying the individual actions that users can perform on objects. Besides allowing you to control access to your SAP BusinessObjects Business Intelligence platform content, rights enable you to delegate user and group management to different departments, and to provide your IT people with administrative access to servers and server groups.

It is important to recognize the difference between rights set on objects or folders, and rights set on principals (the users and groups) who access them. For example, to give a manager access to a particular folder, in the **Folders** area, you add the manager to the access control list (the list of principals who have access to an object) for the folder. You cannot give the manager access by configuring the manager's rights settings in the "Users and Groups" area. The rights settings for the manager in the **Users and Group** area are used to grant other principals (such as delegated administrators) access to the manager as an object in the system. In this way, principals are themselves like objects for others with greater rights to manage.

Each right on an object can be granted, denied, or unspecified. The SAP BusinessObjects Business Intelligence platform security model is designed such that, if a right is left unspecified, the right is denied. Additionally, if settings result in a right being both granted and denied to an user or group, the right is denied.

There is an important exception to this rule. If a right is explicitly set on a child object that contradicts the rights inherited from the parent object, the right set on the child object overrides the inherited rights. This exception applies to users who are members of groups as well. If an user is explicitly granted a right that the user's group is denied, the right set on the user overrides the inherited right.

### Advanced rights settings

To provide you with full control over object security, the CMC allows you to set advanced rights. These advanced rights provide increased flexibility as you define security levels for objects at a granular level.

Use advanced rights settings, for instance, if you need to customize a principal's rights to a particular object or set of objects. Most importantly, use advanced rights to explicitly deny a user or group any right that should not be permitted to change when, in the future, you make changes to group memberships or folder security levels.

The following table summarizes the options that you have when you set advanced rights.



### Advanced rights

| Rights option        | Description  |
|----------------------|--|
| Granted              | The right is granted to a principal.   |
| Denied               | The right is denied to a principal.  |
| Not Specified        | The right is unspecified for a principal. By default, rights set to <b>Not Specified</b> are denied. |
| Apply to Object      | The right applies to the object. This option becomes available when you click Granted or Denied.     |
| Apply to Sub Objects | The right applies to sub-objects. This option becomes available when you click Granted or Denied.    |

### Type-specific rights

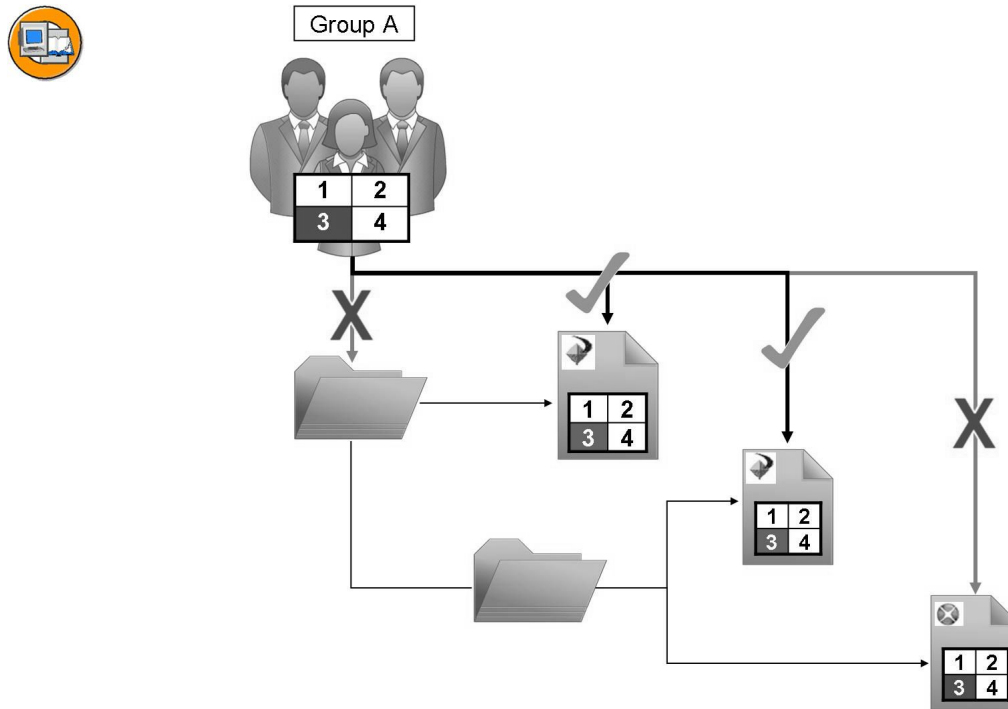
**Type-specific rights** are rights that affect specific object types only, such as Crystal reports, folders, or access levels. Type-specific rights consist of the following:

- General rights for the object type  
These rights are identical to general global rights (for example, the right to add, delete, or edit an object), but you set them on specific object types to override the general global rights settings.
- Specific rights for the object type  
These rights are available for specific object types only. For example, the right to export a report's data appears for Crystal reports but not for Word documents.

The diagram Type-specific rights example illustrates how type-specific rights work. Here right 3 represents the right to edit an object.

Group A is denied Edit rights on the top-level folder and granted Edit rights for Crystal reports in the folder and subfolder. These Edit rights are specific to Crystal reports and override the rights settings on a general global level.

As a result, members of Group A have Edit rights for Crystal reports but not the XLF file in the subfolder.



**Figure 14: Type-specific rights example**

Type-specific rights are useful because they let you limit the rights of principals based on object type. Consider a situation in which an administrator wants employees to be able to add objects to a folder but not create subfolders. The administrator grants **Add** rights at the general global level for the folder, and then denies **Add** rights for the folder object type.

Rights are divided into the following collections based on the object types they apply to:

- General  
These rights affect all objects
- Content  
These rights are divided according to particular content object types. Examples of content object types include Crystal reports, and Adobe Acrobat PDFs.
- Application  
These rights are divided according to which SAP BusinessObjects Business Intelligence platform application they affect. Examples of applications include the CMC and BI launch pad.
- System  
These rights are divided according to which core system component they affect. Examples of core system components include Calendars, Events, and Users and Groups.

Type-specific rights are in the **Content**, **Application**, and **System** collections. In each collection, they are further divided into categories based on object type.

### Troubleshooting user rights

Troubleshooting user rights can be a laborious undertaking for a systems administrator. The SAP BusinessObjects Business Intelligence platform contains two tools which are aimed at negating this challenge.

- Permissions Explorer  
The Permissions Explorer is aimed at making it easier to pinpoint the source of inherited user rights.
- Security Query  
The Security Query tool enables an administrator to list which objects a user can access and why. It also enables the administrator to interactively make changes to the security settings from the query result.

### Managing security settings for objects in the CMC

You can manage security settings for most objects in the CMC with the security options on the **Manage** menu. These options let you assign principals to the access control list for an object, view the rights that a principal has, and modify the rights that the principal has to an object.

## Checking security settings for a principal

In some cases, you may want to know the objects to which a principal has been granted or denied access. You can use a security query to do this. Security queries let you determine which objects a principal has certain rights to and manage user rights. For each security query, you provide the following information:

- **Query Principal**  
You specify the user or group that you want to run the security query for. You can specify one principal for each security query.
- **Query Permission**  
You specify the right or rights you want to run the security query for, the status of these rights, and the object type these rights are set on. For example, you can run a security query for all reports that a principal can refresh, or for all reports that a principal cannot export.
- **Query Context**  
You specify the CMC areas that you want the security query to search. For each area, you can choose whether to include sub-objects in the security query. A security query can have a maximum of four areas.

## Access level

**Access levels** are groups of rights that users frequently need. They allow administrators to set common security levels quickly and uniformly rather than requiring that individual rights be set one by one.

You can do the following with access levels:

- Copy an existing access level, make changes to the copy, rename it, and save it as a new access level.
- Create, rename, and delete access levels.
- Modify the rights in an access level.
- Trace the relationship between access levels and other objects in the system.
- Trace the relationship
- Replicate and manage access levels across sites.
- Use one of the predefined access levels in SAP BusinessObjects Business Intelligence platform to set rights quickly and uniformly for many principals.

## Predefined access levels

SAP BusinessObjects Business Intelligence platform comes with several predefined access levels. These predefined access levels are based on a model of increasing rights: Beginning with **View** and ending with **Full Control**, each access level builds upon the rights granted by the previous level.

The following table summarizes the rights that each predefined access level contains.



### Predefined access levels

| Access level | Description  | Rights involved  |
|--------------|--|--|
| View         | If set on the folder level, a principal can view the folder, objects within the folder, and each object's generated instances. If set at the object level, a principal can view the object, its history, and its generated instances.  | <ul style="list-style-type: none"> <li>View objects</li> <li>View document instances</li> </ul>  |
| Schedule     | A principal can generate instances by scheduling an object to run against a specified data source once or on a recurring basis. The principal can view, delete, and pause the scheduling of instances that they own. They can also schedule to different formats and destinations, set parameters and database logon information, choose servers to process jobs, add contents to the folder, and copy the object or folder. | <b>View</b> access-level rights, plus: <ul style="list-style-type: none"> <li>Schedule the document to run</li> <li>Define server groups to process jobs</li> <li>Copy objects to another folder</li> <li>Schedule to destinations</li> <li>Print the report's data</li> <li>Export the report's data</li> <li>Edit objects that the user owns</li> <li>Delete instances that the user owns</li> </ul> |

| Access level   | Description   | Rights involved   |
|----------------|---|---|
|                |   | <ul style="list-style-type: none"> <li>Pause and resume document instances that the user owns</li> </ul>  |
| View On Demand | A principal can refresh data on demand against a data source. | <b>Schedule</b> access-level rights, plus: <ul style="list-style-type: none"> <li>Refresh the report's data</li> </ul>  |
| Full Control   | A principal has full administrative control of the object.    | All available rights, including: <ul style="list-style-type: none"> <li>Add objects to the folder</li> <li>Edit objects</li> <li>Modify rights users have to objects</li> <li>Delete objects</li> <li>Delete instances</li> </ul> |
| No Access      | The user or group is not able to access the object or folder. | No rights   |



**Hint:** The following rights are required when using these access levels.

| Access level task                                  | Rights required  |
|--|--|
| Create an access level                             | <b>Add</b> right on the <b>Access Levels</b> top-level folder  |
| View granular rights in an access level            | <b>View</b> right on the access level  |
| Assign an access level to a principal on an object | <b>View</b> right on the access level<br><b>Use the Access Level for Security Assignment</b> right on the access level<br><b>Modify Rights</b> right on the object, or <b>Securely Modify Rights</b> right on the object and the principal |



| Access level task      | Rights required   |
|------------------------|---|
| Modify an access level | <b>View</b> and <b>Edit</b> rights on the access level  |
| Delete an access level | <b>View</b> and <b>Delete</b> rights on the access level  |
| Clone an access level  | <b>View</b> right on the access level<br><b>Copy</b> right on the access level<br><b>Add</b> right on the <b>Access Levels</b> top-level folder |

### Custom access levels

In addition to the predefined access levels, you can also create and customize your own, which can greatly reduce administrative and maintenance costs associated with security. Consider a situation in which an administrator must manage two groups, sales managers and sales employees. Both groups need to access five reports in the SAP BusinessObjects Business Intelligence platform system, but sales managers require more rights than sales employees. The predefined access levels do not meet the needs of either group. Instead of adding groups to each report as principals and modifying their rights in five different places, the administrator can create two new access levels, Sales Managers and Sales Employees. The administrator then adds both groups as principals to the reports and assigns the groups their respective access levels. When rights need to be modified, the administrator can modify the access levels. Because the access levels apply to both groups across all five reports, the rights those groups have to the reports are quickly updated.

### Inheritance

Rights are set on an object for a principal in order to control access to the object however, it is impractical to set the explicit value of every possible right for every principal on every object. Consider a system with 100 rights, 1000 users, and 10,000 objects: to set rights explicitly on each object would require the CMS to store billions of rights in its memory, and, importantly, require that an administrator manually set each one.

Inheritance patterns resolve this impracticality. With inheritance, the rights that users have to objects in the system come from a combination of their memberships in different groups and subgroups and from objects which have inherited rights from parent folders and subfolders. These users can inherit rights as the result of group membership; subgroups can inherit rights from parent groups; and both users and groups can inherit rights from parent folders.

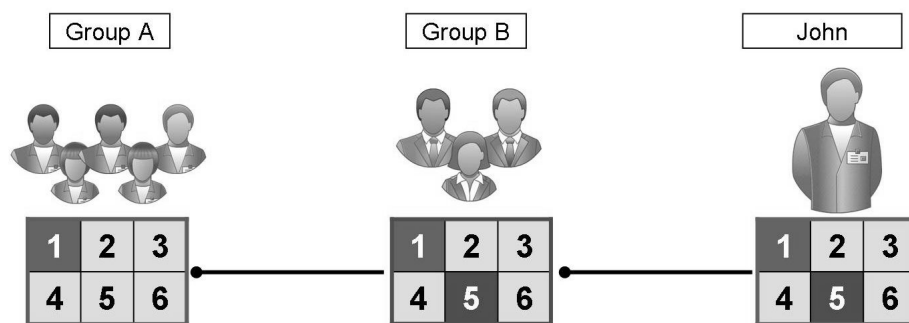
By default, users or groups who have rights to a folder inherit the same rights for any objects that are subsequently published to that folder. Consequently, the best strategy is to set the appropriate rights for users and groups at the folder level first, then publish objects to that folder.

SAP BusinessObjects Business Intelligence platform recognizes two types of inheritance:

1. Group inheritance
2. Folder inheritance

### Group inheritance

Group inheritance allows principals to inherit rights as the result of group membership. Group inheritance proves especially useful when you organize all of your users into groups that coincide with your organization's current security conventions.



**Figure 15: Group inheritance example 1**

In **Group inheritance example 1**, you can see how group inheritance works. Group B is a subgroup of Group A, so it inherits Group A's rights. In this case, it inherits right 1 as granted, and the rest of the rights as unspecified. Every member of Group B inherits these rights. In addition, any other rights that are set on the subgroup are inherited by its members. In this example, John is a member of Group B, and thus inherits right 1 as granted, rights 2, 3, 4, and 6 as not specified, and Right 5 as denied.

When group inheritance is enabled for a user who belongs to more than one group, the rights of all parent groups are considered when the system checks credentials. The user is denied any right that is explicitly denied in any parent group, and the user is denied any right that remains completely not specified thus, the user is granted only those rights that are granted in one or more groups (explicitly or through access levels) and never explicitly denied.

In **Group inheritance example 2**, Green User is a member of two unrelated groups. From Blue Group, he inherits rights 1 and 5 as "granted" and the rest as not specified; however, because Green User also belongs to Red Group, and Red Group has been explicitly denied right 5, Green User's inheritance to right 5 from Blue Group is overridden.

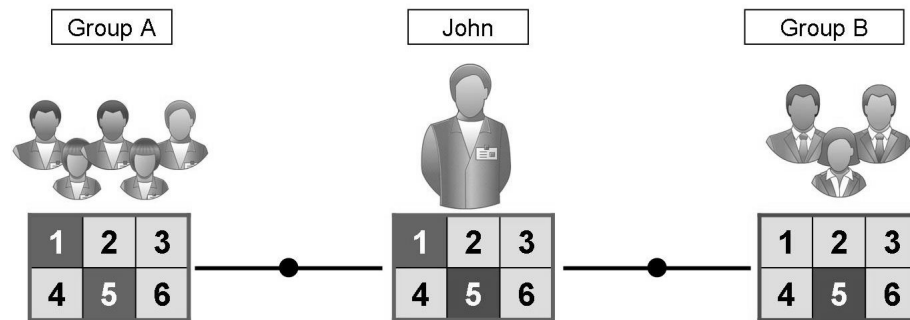


Figure 16: Group inheritance example 2

### Folder inheritance

Folder inheritance allows principals to inherit any rights that they have been granted on an object's parent folder. Folder inheritance proves especially useful when you organize SAP BusinessObjects Business Intelligence platform content into a folder hierarchy that reflects your organization's current security conventions. For example, suppose that you create a folder called Sales Reports, and you provide your Sales group with **View On Demand** access to this folder. By default, every user that has rights to the Sales Reports folder will inherit the same rights to the reports that you subsequently publish to this folder. Consequently, the Sales group will have **View On Demand** access to all of the reports, and you need set the object rights only once, at the folder level.

In **Folder inheritance** example, rights have been set for Group on a folder. Rights 1 and 5 have been granted, while the rest have been left unspecified. With folder inheritance enabled, members of Group have rights on the object level identical to the rights of the group on the folder level. Rights 1 and 5 are inherited as granted, while the rest have been left unspecified.

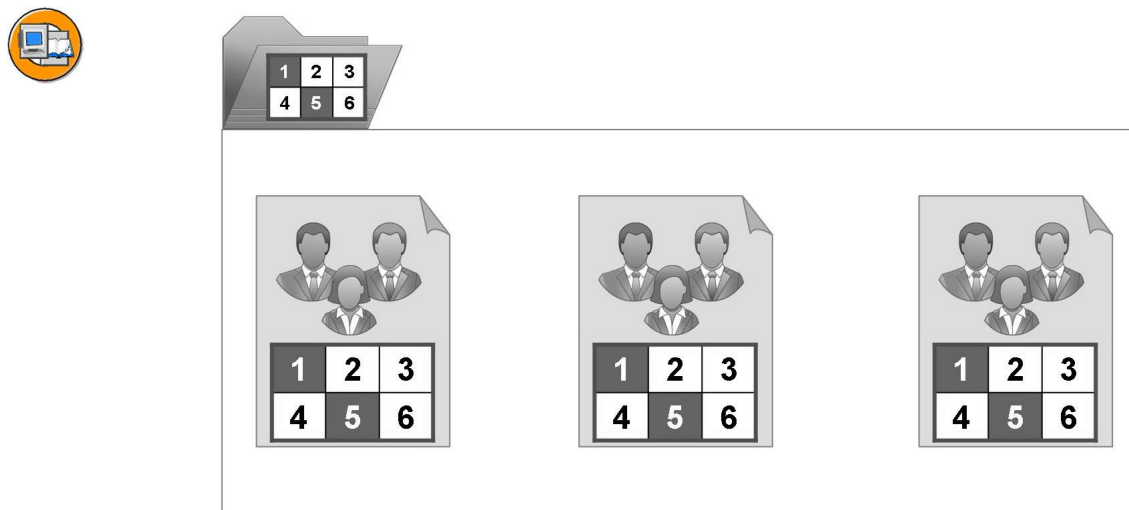


Figure 17: Folder inheritance example

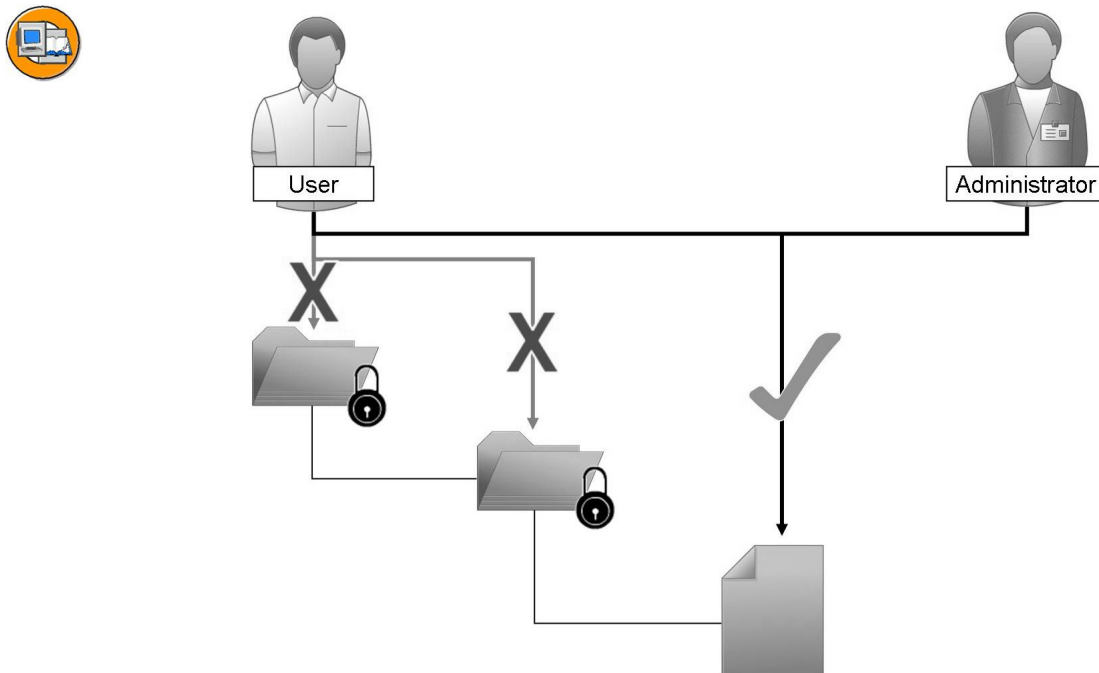
## Rights override

**Rights override** is a rights behavior in which rights that are set on child objects override the rights set on parent objects. Rights override occurs under the following circumstances:

- In general, the rights that are set on child objects override the rights that are set on parent objects.
- In general, the rights that are set on subgroups or members of groups override the rights that are set on groups.

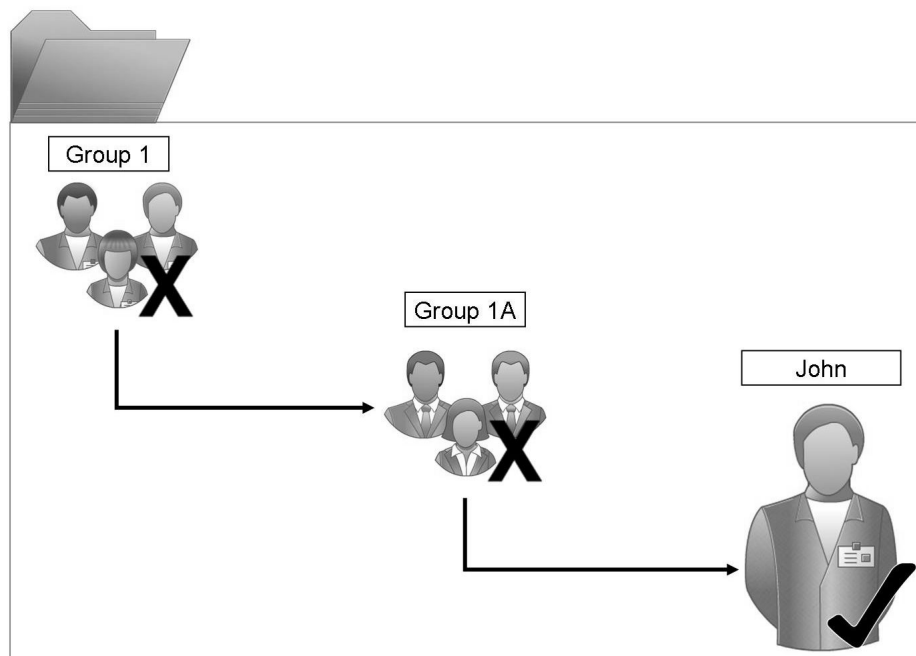
You do not need to disable inheritance to set customized rights on an object. The child object inherits the rights settings of the parent object except for the rights that are explicitly set on the child object. Also, any changes to rights settings on the parent object apply to the child object.

**Rights override example 1** illustrates how rights override works on parent and child objects. A User is denied the right to edit a folder's contents; the rights setting is inherited by the subfolder. However, an administrator grants the User Edit rights to a document in the subfolder. The Edit right that the User receives on the document overrides the inherited rights that come from the folder and subfolder.



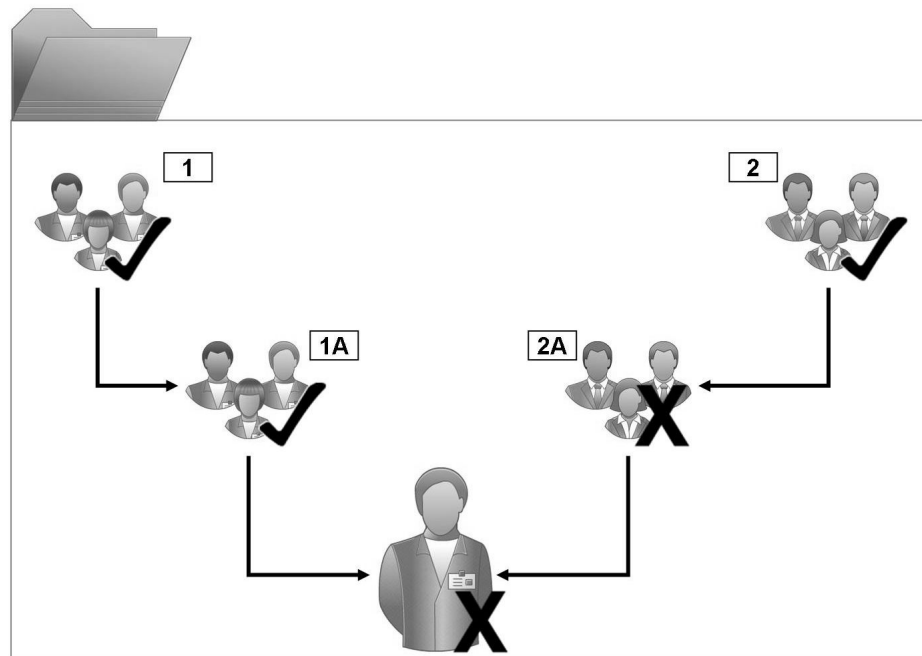
**Figure 18: Rights override example 1**

**Rights override example 2** illustrates how rights override works on members and groups. Group 1 is denied the right to edit a folder; Group 1A inherits this rights setting. However, an administrator grants John, who is a member of Group 1 and Group 1A, Edit rights on the folder. The Edit rights that John receives on the folder override the inherited rights that come from Group 1 and Group 1A.



**Figure 19: Rights override example 2**

**Complex rights override** illustrates a situation where the effects of rights override are less obvious. User is a member of subgroups 1A and 2A, which are in Groups 1 and 2, respectively. Groups 1 and 2 both have Edit rights on the folder. 1A inherits the Edit rights that Group 1 has, but an administrator denies Edit rights to 2A. The rights settings on 2A override the rights settings on Group 2 because of rights override. Therefore, User inherits contradictory rights settings from 1A and 2A. 1A and 2A do not have a parent-child relationship, so rights override does not occur; that is, one sub-group's rights settings do not override another's because they have equal status. In the end, User is denied Edit rights because of the “denial-based” rights model in SAP BusinessObjects Business Intelligence platform.



**Figure 20: Complex rights override**

Rights override lets you make minor adjustments to the rights settings on a child object without discarding all inherited rights settings. Consider a situation in which a sales manager needs to view confidential reports in the Confidential folder. The sales manager is part of the Sales group, which is denied access to the folder and its contents. The administrator grants the manager **View** rights on the Confidential folder and continues to deny the Sales group access. In this case, the **View** rights granted to the sales manager override the denied access that the manager inherits from membership in the Sales group.

### Scope of rights

**Scope of rights** refers to the ability to limit the extent of rights inheritance. To define the scope of a right, you decide whether the right applies to the object, its sub-objects, or both. By default, the scope of a right extends to both objects and sub-objects.

Scope of rights can be used to protect personal content in shared locations. Consider a situation in which the finance department has a shared Expense Claims folder that contains Personal Expense Claims subfolders for each employee. The employees want to be able to view the Expense Claims folder and add objects to it, but they also want to protect the contents of their Personal Expense Claims subfolders. The administrator grants all employees **View** and **Add** rights on the Expense Claims folder, and limits the scope of these rights to the Expense Claims folder only. This means that the

**View** and **Add** rights do not apply to sub-objects in the Expense Claims folder. The administrator then grants employees **View** and **Add** rights on their own Personal Expense Claims subfolders.

Scope of rights can also limit the effective rights that a delegated administrator has. For example, a delegated administrator may have **Securely Modify Rights** and **Edit** rights on a folder, but the scope of these rights is limited to the folder only and does not apply to its sub-objects. The delegated administrator cannot grant these rights to another user on one of the folder's sub-objects.

## Guidelines for planning security

Use the following principles as a guide for planning security in SAP BusinessObjects Business Intelligence platform.

### General Rules

- Each right is also referred to as an Access Control Entry (ACE) in SAP BusinessObjects BI platform and can be set to one of three states: Explicit Denial (D), Explicit Grant (G), Not Specified (NS).
- A list of all ACEs is referred to as an Access Control List (ACL).
- A combination of ACEs and states (for example Right to Schedule - G, Right to View - G, Right to Modify - D, and so on) makes up an Access Level.
- There are predefined Access Levels: No Access (Not Specified state for all rights), Full Control, View, Schedule, View On Demand, and there are also Custom Access Levels that administrators can create on their own.
- Groups and users in the system are also referred to as principals. In SAP BusinessObjects BI platform you give rights to principals on objects (folder, document, application)
- If a user belongs to more than one group, and there is a conflict in rights assignments between the groups to which the user belongs to, the Denied (D) right wins over a Granted (G) right, and the Granted (G) right wins over a Not Specified (NS) right (Deny > Grant > Not Specified).
  - $G + NS = G$
  - $G + D = D$
  - $G + D + NS = D$
  - $D + NS = D$



## Hierarchical Rules

- A more specific assignment typically wins over a less specific assignment, such as a user over a group, a subgroup over a parent group, and a sub-object over a parent object.
- Groups may contain subgroups and/or users. Subgroups and users are treated as members of the parent group. In other words, if a parent group is given an explicit Grant right to view the folder, the user who is a member of a subgroup of the parent group will have the right to view the folder as well. In this case only the parent group is listed in the User Security dialog box on the folder while the subgroup is not.
- The rights given to the group closest to the user take precedence (without breaking inheritance). In other words, if a user is a member of a subgroup and is not added to the parent group, the user's effective rights will come from the subgroup, and not from the parent group. In this case both the parent group and the subgroup are listed in the access rights dialog box on the folder. The rights between the parent group and the subgroup may be the same or conflicting, but rights assigned to the subgroup will take precedence.
- If a user is added to both the subgroup and to the parent group, the calculation of effective rights is the same as if a user belonged to two groups on the same level. Refer to the rule  $G + D + NS = D$ .
- User rights are of explicit type on the object, but of inherited type on sub-objects.
- Group rights are always of inherited type.
- Explicit rights (the user's rights) on an object overwrite inherited rights (the group's rights) on the same object.
- Security rights can be overridden on lower levels in folder hierarchy without breaking inheritance.
- The administrator can combine access levels for a principal which can result in a conflict. In these cases, refer again to the rule  $G + D + NS = D$ .

## Summary of recommendations for rights administration

Keep these considerations in mind for rights administration:

- Use access levels wherever possible. These predefined sets of rights simplify administration by grouping together rights associated with common user needs.
- Set rights and access levels on top-level folders. Enabling inheritance will allow these rights to be passed down through the system with minimal administrative intervention.
- Avoid breaking inheritance whenever possible. By doing so, you can reduce the amount of time it takes to secure the content that you have added to SAP BusinessObjects Business Intelligence platform.
- Set appropriate rights for users and groups at the folder level, then publish objects to that folder. By default, users or groups who have rights to a folder will inherit the same rights for any object that you subsequently publish to that folder.
- Organize users into user groups, assign access levels and rights to the entire group, and assign access levels and rights to specific members when necessary.
- Create individual administrator accounts for each administrator in the system and add them to the Administrators group to improve accountability for system changes.
- By default, the Everyone group is granted with limited rights to top-level folders. After installation, it is recommended that you review the rights of Everyone group members and assign security accordingly.



## Lesson Summary

You should now be able to:

- Understand how rights work in SAP BusinessObjects BI platform
- Describe how access levels are used
- Understand top-level, folder-level and object-level security
- Understand inheritance



## Unit Summary

You should now be able to:

- Define SAP BusinessObjects BI platform architecture terms
- Describe key architectural process flows
- Understand how rights work in SAP BusinessObjects BI platform
- Describe how access levels are used
- Understand top-level, folder-level and object-level security
- Understand inheritance

## Related Information



## Test Your Knowledge

1. In the context of SAP BusinessObjects BI platform, what is the difference between a server and a service?

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2. What is the Server Intelligence Agent?

The SIA is a locally run service managed by the operating system. The task of the Server Intelligence Agent (SIA) is to start, stop, and monitor locally run BusinessObjects servers. When one of the managed servers goes down unexpectedly, the SIA restarts the server immediately. When you issue a command in the CMC to stop a server, the SIA stops the server.

3. What is an Access Level?

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4. List the options available when setting advanced rights.

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5. Describe the concept of rights override.

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6. What is “scope of rights”?

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## Answers

1. In the context of SAP BusinessObjects BI platform, what is the difference between a server and a service?

**Answer:** A server is an Operating System (OS) level process hosting one or more services. For example, CMS and Adaptive Processing Server are servers. A server runs under a specific OS account and has its own PID. A service is a server subsystem that provides a specific function. The service runs within the memory space of its server under the Process ID (PID) of the parent container (server). For example, the Web Intelligence Scheduling and Publishing Service is a subsystem running within the Adaptive Job Server.

2. What is the Server Intelligence Agent?

The SIA is a locally run service managed by the operating system. The task of the Server Intelligence Agent (SIA) is to start, stop, and monitor locally run BusinessObjects servers. When one of the managed servers goes down unexpectedly, the SIA restarts the server immediately. When you issue a command in the CMC to stop a server, the SIA stops the server.

3. What is an Access Level?

**Answer:** Access levels are groups of rights that users frequently need. They allow administrators to set common security levels quickly and uniformly rather than requiring that individual rights be set one by one.

4. List the options available when setting advanced rights.

**Answer:** Granted, Denied, Not Specified, Apply to Object, Apply to Sub-Objects.

5. Describe the concept of rights override.

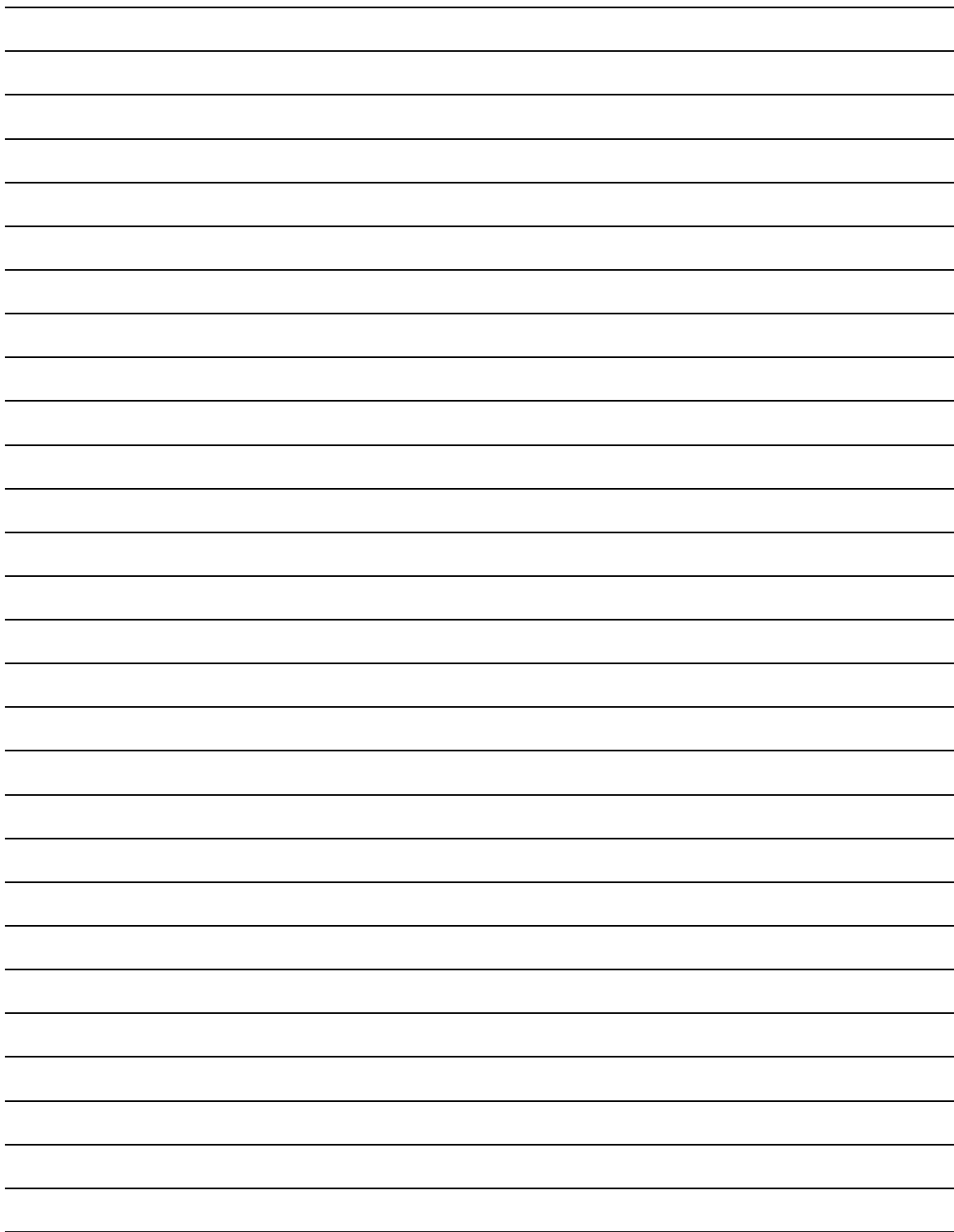
**Answer:** Rights override is a rights behavior in which rights that are set on child objects override the rights set on parent objects. Rights override occurs under the following circumstances:

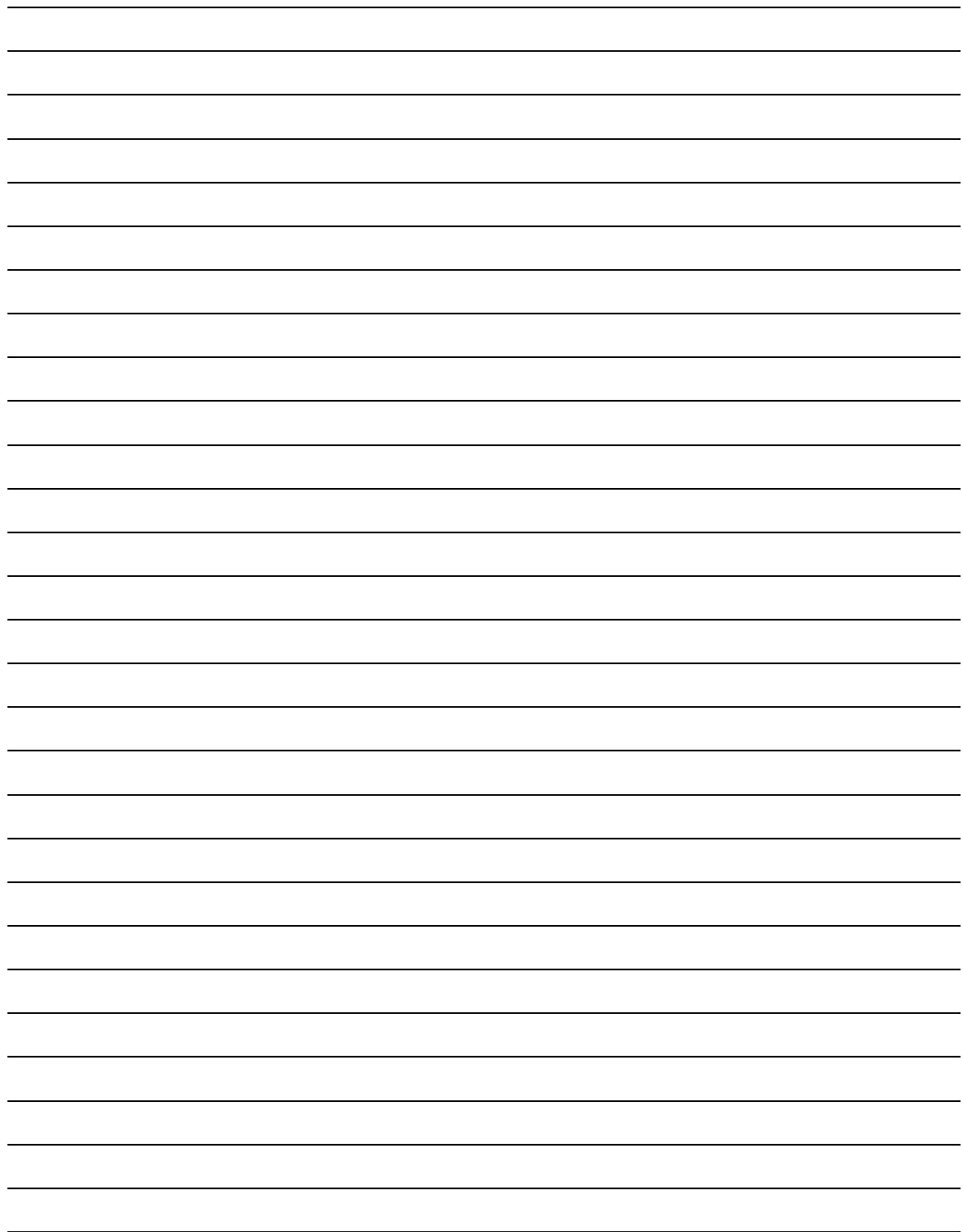
- In general, the rights that are set on child objects override the rights that are set on parent objects.
- In general, the rights that are set on subgroups or members of groups override the rights that are set on groups.

6. What is “scope of rights”?

**Answer:** Scope of rights refers to the ability to limit the extent of rights inheritance. To define the scope of a right, you decide whether the right applies to the object, its sub-objects, or both. By default, the scope of a right extends to both objects and sub-objects.











# Unit 2

## Identifying Requirements

### Unit Overview

This unit provides you with information for planning your SAP BusinessObjects Business Intelligence platform deployment. It explains the key requirements and choices you need to make before you begin your deployment.



### Unit Objectives

After completing this unit, you will be able to:

- Consider the many different requirements that might affect a SAP BusinessObjects Business Intelligence platform deployment
- Evaluate your organization's needs before you deploy your SAP BusinessObjects Business Intelligence platform system
- Describe the checklist of criteria that helps you plan your SAP BusinessObjects Business Intelligence platform deployment,

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## Lesson: Planning your SAP BusinessObjects Business Intelligence platform deployment

### Lesson Overview

This lesson provides guidelines for assessing your organization's needs, and suggestions for deployment scenarios.



### Lesson Objectives

After completing this lesson, you will be able to:

- Consider the many different requirements that might affect a SAP BusinessObjects Business Intelligence platform deployment
- Evaluate your organization's needs before you deploy your SAP BusinessObjects Business Intelligence platform system
- Describe the checklist of criteria that helps you plan your SAP BusinessObjects Business Intelligence platform deployment,

### Business Example

By evaluating your needs before you deploy your SAP BusinessObjects Business Intelligence platform system, you can keep troubleshooting to a minimum.

### Planning your deployment

Planning your deployment involves the following steps:.

1. Refer to the SAP BusinessObjects Business Intelligence platform supported platform document at: [http://support.businessobjects.com/documentation/supported\\_platforms](http://support.businessobjects.com/documentation/supported_platforms).
2. Review the key concepts you need to consider for your deployment, including operating system, database, and application server considerations, in addition to security, performance and scalability, and high availability. See Assessing your organization's environment.
3. Choose an initial deployment architecture. Which deployment architecture will serve your needs within the limits of your resources?



**Note:** It is important to note that each deployment is unique. The flexibility of the SAP BusinessObjects Business Intelligence platform service-based architecture allows you to tailor the deployment to serve your organization's requirements as precisely as possible

## Assessing your organization's environment

The resources and conventions used in your existing network environment affect how you deploy SAP BusinessObjects Business Intelligence platform.

Different deployment options are available to you, depending on the operating systems, web application servers, database servers and authentication method you plan to use. Other conventions used in your current environment may also affect how you deploy SAP BusinessObjects Business Intelligence platform, such as security, performance monitoring, and design for high availability.

### Operating systems

SAP BusinessObjects Business Intelligence platform runs on Microsoft Windows and Unix (including Linux) operating systems.

An Administrator account must be used to install SAP BusinessObjects Business Intelligence platform on Windows operating systems.



**Note:** Review the online SAP BusinessObjects Business Intelligence platform supported platforms document for information related to supported operating system release versions, patch levels, or caveats: [http://support.businessobjects.com/documentation/supported\\_platforms](http://support.businessobjects.com/documentation/supported_platforms).

### Databases in SAP BusinessObjects Business Intelligence platform

In SAP BusinessObjects Business Intelligence platform, a database can be defined as a data repository that organizes a collection of information into structures called tables for rapid search and information retrieval. Databases allow tables to be grouped together into collections of logically related tables called tablespaces. Tables are grouped into tablespaces within a database system in the same way that files are grouped into a directory within a file system.

### Web application servers

SAP BusinessObjects Business Intelligence platform requires a Java web application server to process the server-side scripts that make up web applications. You can install the Tomcat application server during the SAP BusinessObjects Business Intelligence platform installation or use a supported third-party web application server and Java Development Kit (JDK).



**Note:** For a detailed list of supported web application servers, consult the Supported Platforms Guide available at: <http://service.sap.com/bosap-support>.

## Web servers

Although web application servers come with built-in web server functionality, SAP BusinessObjects Business Intelligence platform also supports the separation of web and web application servers into a de-paired configuration. In a de-paired configuration, the web server will serve static and cached content to offset a portion of the requests sent to the web application server.

## Failover and load balancing

SAP BusinessObjects Business Intelligence platform supports clustered web application servers with load balancing. Hardware or software load balancers can be used as the entry-point for the web application servers to ensure that the processing is evenly distributed among the web application servers.



### Note:

- Load balancing a cluster of SAP BusinessObjects Business Intelligence platform servers is not required, as the Central Management Server (CMS) already distributes work between cluster nodes.
- The Central Management Console (CMC) web application does not support session fail-over. However, BI launch pad is fault-tolerant, and does support session fail-over, so users will not notice if a cluster node fails.

## Multi-homed environment

SAP BusinessObjects Business Intelligence platform supports multi-homed environments, in which a server has two or more network addresses. This allows servers to be configured to receive requests from one network and transmit requests to another.

## Security

Your organization's security policies affect how you deploy SAP BusinessObjects Business Intelligence platform on your network. Do you plan to use the system's built-in authentication, or do you need it to work with existing LDAP or Windows Active Directory (AD) authentication? You also need to decide how your firewalls are configured, and if you plan to use a reverse proxy.



## Performance and scalability

Before deciding how to deploy your system, consider whether the demand on the system may change after it has been installed. This could be an increase in the number of concurrent users, the volume of business data, report complexity, or any other factor that could cause your SAP BusinessObjects Business Intelligence platform system requirements to change.

Anticipate these changes before you deploy to save you time and money by making architectural choices that will support a scalable solution. For example, if you are expecting an increase in the number of concurrent users accessing your system, you may consider deploying a small three-node cluster that can be expanded to five-nodes when demand increases.

By monitoring and regularly re-evaluating your system's performance, schedule tuning or configuration changes before potential issues become performance problems.

## Designing for high availability

High availability refers to a system that is almost always operational. When designing a system for high availability, consider how much down-time is acceptable for the system. To minimize time down, consider a combination of failover processing, server or server process redundancy, and frequent back-ups:

## Product co-existence

Several SAP BusinessObjects Business Intelligence platform products can exist on the same host.



**Caution:** All SAP BusinessObjects Business Intelligence platform products installed at your organization must have the same patch level. For example, if your organization upgrades SAP BusinessObjects Business Intelligence platform server products to a service pack or fix pack, all add-ons, Client Tools, and stand-alone products must also be upgraded. Similarly, if one product is downgraded, all other products should also be downgraded.

## Creating additional Adaptive Processing Servers

The installation program installs one Adaptive Processing Server (APS) per host system. Depending on the features that you've installed, this APS may host a large number of services, such as the Monitoring Service, Lifecycle Management Service, Multi-Dimensional Analysis Service (MDAS), Publishing Service, and others.

## Deployment Checklist

This section provides a checklist for the steps you need to perform when planning a deployment of SAP BusinessObjects Business Intelligence platform. The following checklist outlines the major tasks to be completed for the planning phase of your SAP BusinessObjects Business Intelligence platform deployment.

| Checklist item   | Complete? (Y/N) |
|--|-----------------|
| Understand the tiers that make up the SAP BusinessObjects Business Intelligence platform architecture. | Y_/N_           |
| Understand the components and how they communicate with each other.                                    | Y_/N_           |
| Understand the workflows (how information travels through the architecture).                           | Y_/N_           |
| Identify the operating system you are deploying the system on.   | Y_/N_           |
| Choose the database servers will you be accessing.   | Y_/N_           |
| Choose a web application server.   | Y_/N_           |
| Are you using third-party authentication, secure sockets layer, firewalls, and/or reverse proxy,       | Y_/N_           |
| Identify potential performance problems.   | Y_/N_           |

## Case Study: Jade Publishing

This case study is to be used as a reference for facilitated discussions.

## Company information



**Figure 21: Jade Publishing Company**

The first Jade Publishing store opened in the year 2000 in China. It is a subsidiary of a larger company called Crowns Mendocino. Jade Publishing continues the C.M. brand's dedication to customer service and strong commitment to quality. Jade Publishing has a strong direct mail business that distributes millions of catalogs a year and has a highly successful e-commerce site.

Jade Publishing employs 2000 people. The Jade Publishing Beijing office will be the early adopter of a BI system. The Beijing office is the main Jade Publishing office and has employees in all aspects of the business including:

- Marketing
- Sales
- Designers
- Finance .
- Shipping
- IT

Jade Publishing also has other offices: Shanghai (Shanghai Province) and Guangzhou (Guangdong Province). The company is running a province centric model, where each main province office has a very similar structure. Shanghai and Guangzhou offices are much smaller (250 employees each). The head office of the whole company, as mentioned earlier, is in Beijing.

## Business Needs

- There is an immediate need for an enterprise-wide query and analysis, file storage, and reporting distribution for Jade Publishing that will allow users to modify documents on-the-fly and build new queries to get answers.
- Their mandate is to have the users view and analyze reports online whenever possible. There may be highly formatted reports and interactive documents where users can modify report structures or build brand new interactive documents.
- There is a need to allow for prebuilt reports as well as interactive documents that can either be modified or newly created by sales people without asking IT for assistance.
- Upper Management in all departments want to query and analyze their own department's numbers and figures directly, to make better business decisions.
- They would like to standardize on a single BI framework that is scalable, fault tolerant and supports the best BI tools.
- There is a need for interactive user-friendly documents and high quality presentation reports that would provide users the ability to run their reports and documents on an ad hoc or recurring scheduled basis.
- Taking advantage of personal categories and favorites or sending reports direct to a user's email or Inbox would be helpful.
- The IT department would like to give each department the ability to manage users within their business unit. This way IT can restrict one business unit to impact how that unit can use the system while also being able to restrict what data that unit can see.
- The delegated administrator would be able to manage the replication of their content.
- Since this is the first implementation of a BI system within the Jade Publishing Beijing office, there will be a development and production environment. There will also possibly be the need to replicate the system in the Guangzhou office in order to prove the effectiveness of the system.
- Jade Publishing needs to burst customized reports via email to all provincial outlets with sales information.
- Jade Publishing needs to burst customized reports via email to all provincial outlets with sales information.

## User Requirements

While C.M. has offices worldwide we are only dealing with the implementation of a BI system within the Jade Publishing office in Beijing.

- Beijing has 1500 employees
- Guangzhou has 250 employees
- Shanghai has 250 employees

Jade Publishing estimates the following system usage:

- 10% of the total users connect to the system concurrently ( $150 + 25 + 25 = 200$ ).
- 10% of the concurrent active users will be heavy users of the system (logged into the system and viewing reports nearly continuously, averaging one request per second) ( $15 + 2.5 + 2.5 = 20$ ).
- 10% of the concurrent active users will be active users of the system (logged into the system frequently throughout the day averaging one request every four seconds) ( $15 + 2.5 + 2.5 = 20$ ).
- 30% of the concurrent active users will be moderate users of the system (logged into the system from time to time throughout the day averaging one request every eight seconds) ( $45 + 7.5 + 7.5 = 60$ ).
- 50% of the concurrent active users will be light users of the system (logged into the system infrequently and will view a couple of reports and log out) ( $75 + 12.5 + 12.5 = 100$ ).

You can estimate that the number of simultaneous requests pertaining to viewing sessions will be an estimated 75 Crystal Reports simultaneous requests (simultaneous viewing sessions) and 30 Web Intelligence simultaneous requests (simultaneous document viewing/edit sessions).

- 
- 5% of the users will use Crystal Reports to design reports.
- 30% of the users will use Web Intelligence to design reports.

## Report processing requirements

Sales and Manufacturing data is stored provincially. Each province stores data in various regional SQL 2000 databases. Your analysis of reporting requirements has identified the following number of reports in the SAP BusinessObjects BI platform:

### Beijing office

- 100 total Crystal Reports.
- 50 Crystal Reports will run daily.
- 30 Crystal Reports will run weekly.
- 20 Crystal Reports will run at month end.
- 50 are highly analytical and interactive in nature Web Intelligence documents.
- 25 Web Intelligence documents will run daily.
- A few of the Crystal reports will be used in Publications to burst to regional sales managers.
- 80% (80 at the end of the month) of Crystal Reports and (20 daily) Web Intelligence documents will run after hours.
- 20% (20 at the end of the month) of Crystal Reports and (5 daily) Web Intelligence documents will run during working hours.
- 50% of all Crystal Reports and Web Intelligence documents will require prompting before being run, which may be common across different reports. Many prompts will be based on information that is subject to change frequently.
- Because of backups and other maintenance duties, the after hours Crystal Reports and Web Intelligence documents need to run within a five hour window.
- Each Crystal Reports on average takes about 10 minutes to run.
- Each Web Intelligence document takes about 2 minutes to run.
- The average Crystal report size is 1MB. The average Web Intelligence document size is 500Kb.
- North Maple anticipates a 20% annual growth in the number of reports and documents hosted by the system.
- 

Guangzhou office (assume 16.6% of Beijing numbers). Shanghai office (assume 16.6% of Beijing numbers).

Shanghai office (assume 16.6% of Beijing numbers).

### Report viewing requirements

Analysis of report viewing requirements has identified the following:



## Lesson Summary

You should now be able to:

- Consider the many different requirements that might affect a SAP BusinessObjects Business Intelligence platform deployment
- Evaluate your organization's needs before you deploy your SAP BusinessObjects Business Intelligence platform system
- Describe the checklist of criteria that helps you plan your SAP BusinessObjects Business Intelligence platform deployment,



## Unit Summary

You should now be able to:

- Consider the many different requirements that might affect a SAP BusinessObjects Business Intelligence platform deployment
- Evaluate your organization's needs before you deploy your SAP BusinessObjects Business Intelligence platform system
- Describe the checklist of criteria that helps you plan your SAP BusinessObjects Business Intelligence platform deployment,





## Test Your Knowledge

1. List two examples of customer information that pertains to deployment requirements.

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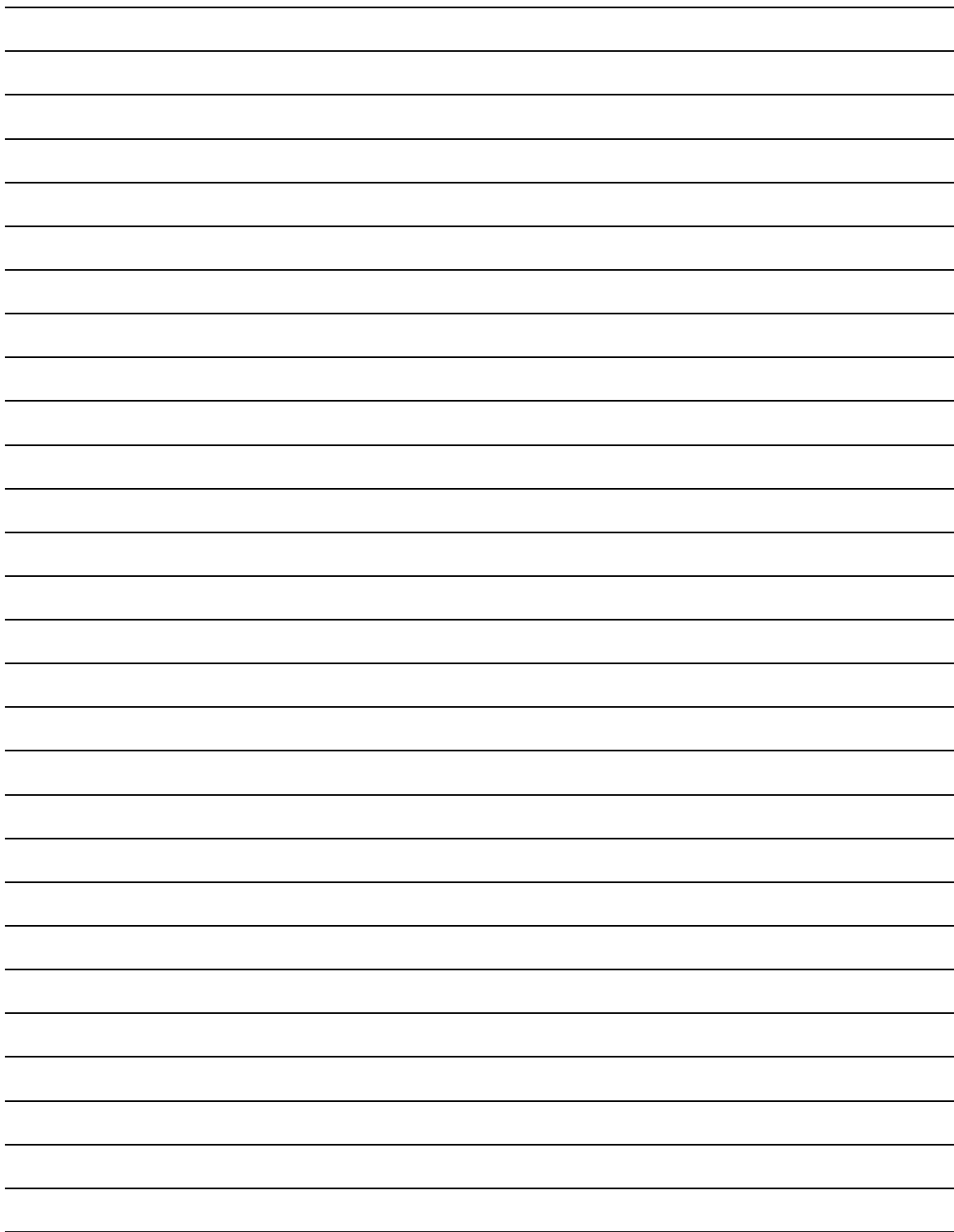
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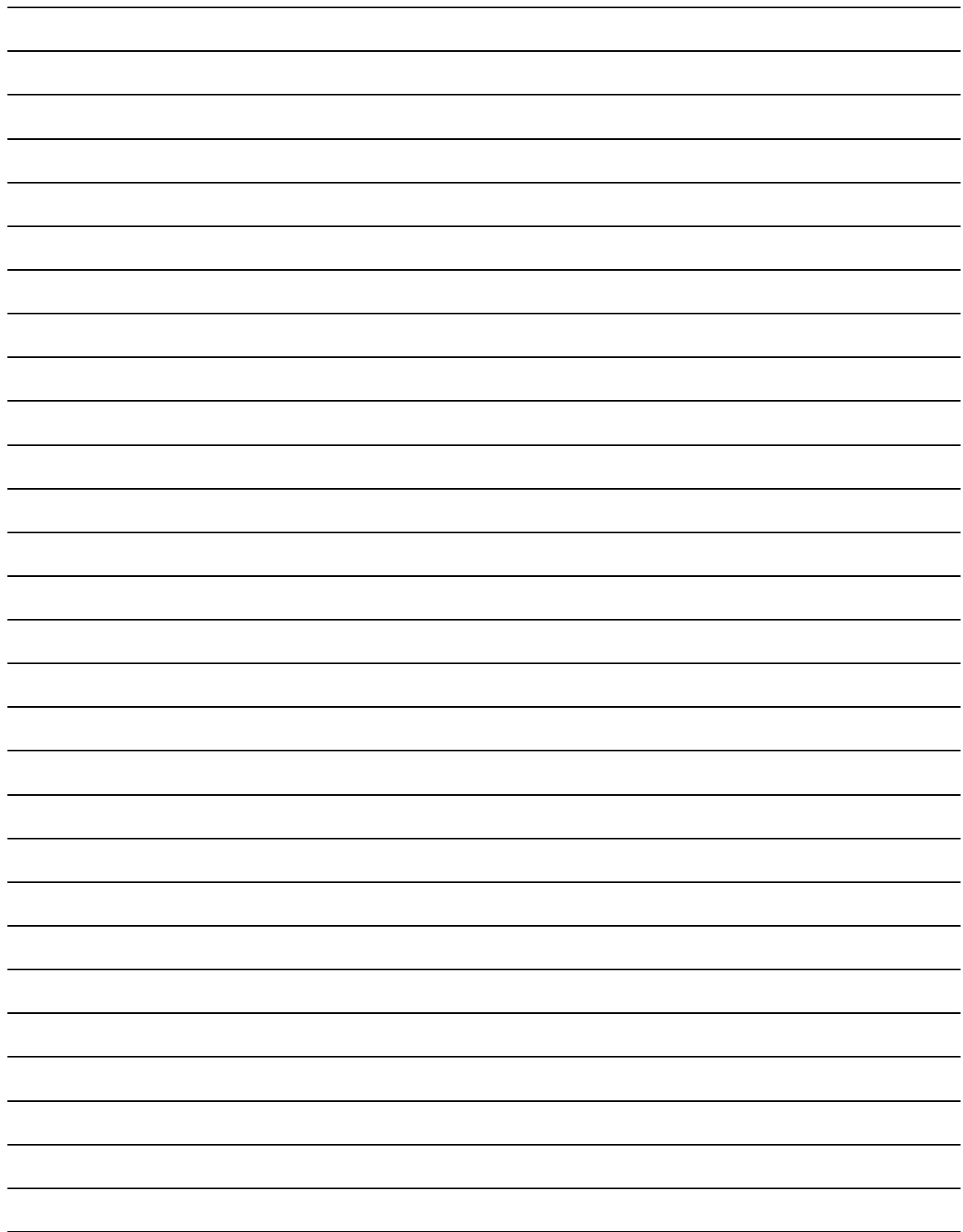


## Answers

1. List two examples of customer information that pertains to deployment requirements.

**Answer:** Network infrastructure, Hardware information (although this could also impact sizing), There is a DMZ zone for external customers, LDAP authentication is used for internal customers









# Unit 3

## Ensuring Availability of your SAP BusinessObjects BI Solutions

### Unit Overview

This unit focuses on the concepts that must be taken into account when you design and deploy a Business Intelligence solution so that it is available to your business and your users. Scalability, fault tolerance, deployment strategies, and disaster recovery are key concepts to cover.



### Unit Objectives

After completing this unit, you will be able to:

- Describe the challenges in a Business Intelligence solution
- Explain the key factors in making your systems fault tolerant and highly available
- Define the deployment strategies for high availability in SAP BusinessObjects BI platform
- List deployment options for the application tier
- Explain vertical and horizontal scaling options
- Describe the new capabilities of the wdeploy tool and its role in creating high availability in the application tier
- Understand high availability in the Intelligence tier
- Describe the process of CMS clustering
- Manage active/passive file repository servers
- Describe the SAP BusinessObjects BI platform servers in the Processing tier
- Understand the concept of server groups
- Create and work with server groups

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# Lesson: Understanding Terms in SAP BusinessObjects Business Intelligence Solution

## Lesson Overview

To ensure that your system meets your requirements for reliability, you need to consider a multitude of internal and external factors.



## Lesson Objectives

After completing this lesson, you will be able to:

- Describe the challenges in a Business Intelligence solution
- Explain the key factors in making your systems fault tolerant and highly available
- Define the deployment strategies for high availability in SAP BusinessObjects BI platform

## Business Example

## SAP Business Intelligence BI Solutions

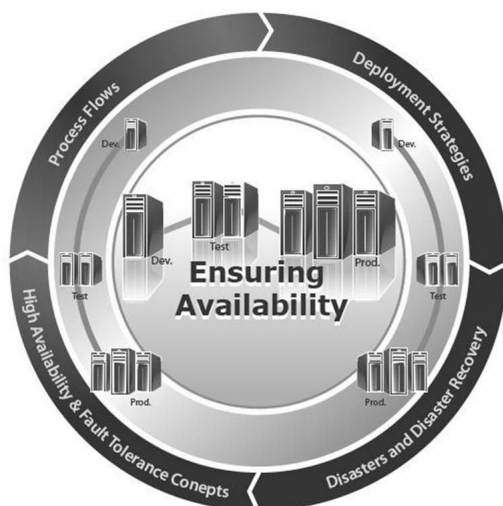
### The Challenges of Discussing how to Ensure Availability

A SAP Business Intelligence BI Solution is one that delivers information to you so that you can make informed business decisions. SAP BusinessObjects BI platform 4.0 is an important component in this solution but there are other components that are required in order to provide the functionality and reliability you need for your business. Even the simplest single server deployment of SAP BusinessObjects BI platform 4.0 depends on many complex systems and processes.

It is impossible to discuss how to ensure availability without including discussions around:

- Process flows.
- Deployment strategies.
- Concepts such as disasters and corresponding recovery strategies.

The challenge is that these topics are so interrelated that it is not possible to explore any one of these four areas in detail without touching upon another.



**Figure 22: Factors in Ensuring Availability**

## High Availability and Fault Tolerance Concepts

### Line of Business Application

A line-of-business (LOB) application is a critical computer application that is vital to running an organization such as accounting, supply chain management, and resource planning applications. If a LOB application becomes unavailable, essential business functions are lost or suffer.

For some companies, their Business Intelligence solution may not be as mission-critical. If it fails, steps must be taken to correct that but the panic to do so is minimal. For such companies, SAP BusinessObjects BI platform is not an LOB application.

Conversely, for other organizations such as health care units, production systems stop and patients' lives are threatened when BI solutions are unavailable. For such companies, significant resources need to go into ensuring this LOB solution is available.

### Disaster

A disaster is any unanticipated event that creates a defined problem. Disasters are usually considered in terms of severity. Some examples of disasters include:

- A report is inadvertently deleted from the DEV system.
- A reporting database is unavailable.
- The primary administrator leaves the company suddenly.
- A software vendor support contract expires.
- A server shuts down unexpectedly.
- The connection to the data center is lost.



**Note:** While planned downtime for maintenance creates unavailability, this is not considered a disaster.

### **Business Continuity Planning**

Business Continuity Planning (BCP) is an interdisciplinary concept used to create and validate a practiced logistical plan on how an organization will recover and restore partially or completely interrupted operations within a predetermined time after a disaster or extended disruption. This logistical plan is called a Business Continuity Plan. In simple terms, BCP is working out how to stay in business in the event of a disaster or incidents such as lost systems, building fires, sudden loss of the CEO, earthquakes, or wars.

### **Disaster Recovery**

Disaster recovery planning is an important part of the larger process of Business Continuity Planning. Disaster recovery is the process, policies, and procedures of restoring operations that are critical to the resumption of business, including regaining access to data (records, hardware, or software), communications (incoming, outgoing, toll-free, or fax), workspace, and other business processes after a disaster. To increase the opportunity for a successful recovery of valuable records, a well-established and thoroughly tested disaster recovery plan must be developed. A disaster recovery plan includes plans for coping with the unexpected or sudden loss of communications and/or key personnel. Disaster recovery planning can also include how to manage maintenance or planned unavailability as well.

### **Single Point of Failure**

A single point of failure as it relates to ensuring availability of your BI solution is a single failure that creates a denial of services or requests to the users.

In reality, removing all single points of failure is extremely difficult to achieve and its cost is also enormous. For an example, it may be easy to implement a cluster of three CMS servers in a cluster to remove a single point of failure in the CMS availability but if the three CMS servers are connected to the same network switch, then the switch becomes a single point of failure. To resolve this single point of

failure, you connect each of the three CMS servers to independent switches. However an unforeseen disaster at the Internet Service Provider can interrupt your Wide Area Network communication and create a situation where no one can connect to your BI solution (even though it is running, it is unavailable).

As a result, your task is to reduce all the single points of failure as possible and create a robust disaster recovery plan.

### **Fault tolerance**

Fault tolerance or graceful degradation is the property that enables a system to continue operating property in the event of the failure of (or one or more faults within) some of its components. The basic characteristics of fault tolerance require:

- No single point of failure: All systems are fully redundant.
- Fault isolation to the failing component: A disaster cannot cause failures in other areas. If the Output FRS fails, the Job Servers that process the schedule requests will be impacted. However, if there is another Output FRS available to handle the request, then the schedule and view requests can still function as normal because all the failure is isolated to the single Output FRS itself.
- Fault containment to prevent propagation of the failure: A disaster cannot cause a chain of further disasters. If your current workload demands two CMS servers to work together in your cluster, when one goes down, the entire workload will depend on the remaining server. This may cause too much workload for the CMS to handle and thus the performance is severely degraded. The solution for this potential problem is to have a cluster of three CMS servers so that if one fails, the remaining two CMS servers can still handle the workload.
- No single point of repair: If a system experiences a failure, it must continue to operate without interruption during the repair process.



**Note:** The key point in fault tolerance is "no denial of services". Should a disaster occur, the system will still be available to your users.

### **High Availability**

High availability is a system design protocol and associated implementation that ensures a certain absolute degree of operational continuity during a given measurement period. Fault tolerance means your systems are always available; high availability

means your system is almost fault tolerant but a certain amount of down time (planned or unplanned periods of unavailability) is expected. Many fault tolerant solutions are used to create a highly available deployment.



**Note:** The terms "uptime" and "availability" are not synonymous. A system can be up, but not available, as in the case of a network usage. Availability is usually expressed as a percentage of uptime in a given year.

Availability is usually expressed as a percentage of uptime in a given year. In a given year, the number of minutes of unavailability (planned and unplanned) is totaled for a system and then divided by the total number of minutes in a year (approximately 525,600 minutes), producing a percentage of unavailability. The complement of this is the percentage of uptime, which is what is typically referred to as the availability of the system.

| Availability % | Downtime per year | Downtime per month | Downtown per week |
|----------------|-------------------|--------------------|-------------------|
| 95%            | 18.25 days        | 36 hours           | 8.4 hours         |
| 99%            | 3.65 days         | 7.20 hours         | 1.68 hours        |
| 99.5%          | 1.83 days         | 3.60 hours         | 50.4 minutes      |
| 99.9%          | 52.6 minutes      | 4.32 minutes       | 1.01 minutes      |

The higher the percentage specified in your business case, the more resources that must be employed to satisfy those requirements.

### Failover

Failover is the capability to switch over automatically to a redundant or standby computer server, system, or network upon the failure or abnormal termination of the previously active server, system, or network. Failover happens without human intervention and generally without warning, unlike switchover. There are many types of failover. Some will maintain availability while others create a moment of unavailability before becoming available again. During the moment of unavailability, there may be a denial of services. Two CMS servers operating in a cluster is an example of failover that maintains availability. If CMS 1 is managing your session and it goes down, you will be automatically connected to CMS 2 without experiencing any denial in service.

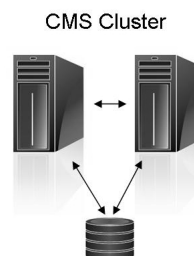


**Failover** is the ability to switch over automatically to a redundant or standby computer server, system, or network upon the failure or abnormal termination of the previously active server, system, or network. Failover happens without human intervention and generally without warning, unlike switchover.

There are many types of failover. Some will maintain availability while others will create a moment (however small) of unavailability before becoming available again. During the small moment of unavailability, there may be a denial of services.

Two CMS servers operating in a cluster is an example of failover that maintains availability.

Other forms of failover require sensing a failure, stopping services, transferring the load to another server or system and then restarting those services before they are available again. In this case, a request made during the failover will result in a denial of services.



**Figure 23: Failover**

### Load Balancing

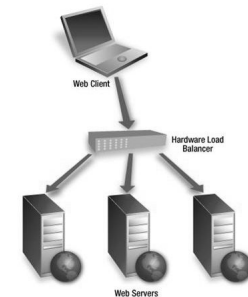
Load Balancing is a technique (usually performed by load balancers) to spread work between two or more computers, network links, CPUs, hard drives, or other resources, in order to get optimal resource utilization, throughput, or response time. The balancing service is usually provided by a dedicated program or hardware device (such as a multilayer switch). In the case of a CMS cluster, the workload can come from multiple users managed by both CMS servers. The two CMS servers then communicate their current load with each other to determine which one will manage the other CMS responsibilities such as database maintenance and schedule management. In the case of a hardware device that manages a load-balancing cluster, it is common to have the entire workload come through a load-balancing front end. This front end offers session persistence or "stickiness" by sending the client to the same back-end server for the duration of the current session.



**Load Balancing** is a technique (usually performed by load balancers) to spread work between two or more computers, network links, CPUs, hard drives, or other resources, in order to get optimal resource utilization, throughput, or response time. The balancing service is usually provided by a dedicated program or hardware device (such as a multilayer switch).

In the case of a CMS cluster, the CMS servers communicate their current load to each other to determine which one will manage other CMS responsibilities such as database maintenance and schedule management.

In the case of a hardware device managing a load-balancing cluster, it is common to have the entire workload come through a load-balancing front end. BIG-IP by F5 is a common hardware load balancing solution used by many web farms.



**Figure 24: Load Balancing**



**Note:** BIG-IP by F5 is a common hardware load-balancing solution used by many web farms.

### Active/Active and Active/Passive Functionality

Active/Active and Active/Passive are general functionality that can be applied and implemented in a variety of fashions. Active/Active refers to two redundant resources (servers or services) that are both functioning to support the system as a whole. A CMS cluster in which multiple CMS servers are running and sharing the workload at the same time is an example of an Active/Active configuration. Active/Passive refers to two or more redundant resources but only one is running and actively managing requests; the other resource is either not running or running in a waiting state until it is further promoted to active state by administrators following the failure of the current active resource. Two Input File Repository Servers running at the same time is an excellent example of Active/Passive.

### High availability server clustering

High-availability clusters (also known as HA Clusters or Failover Clusters) are computer clusters that are implemented primarily for the purpose of improving the availability of services. They operate by having redundant computers or nodes working together and sharing data to provide services and functionality. When a service fails, those processes can be moved to be managed by other nodes so the service is once again available. The shared data is always available. In addition, each

node has many redundant elements to improve reliability such as multiple power supplies and network cards. Many of these components are designed to be changed while the server is still running thus reducing unavailability.

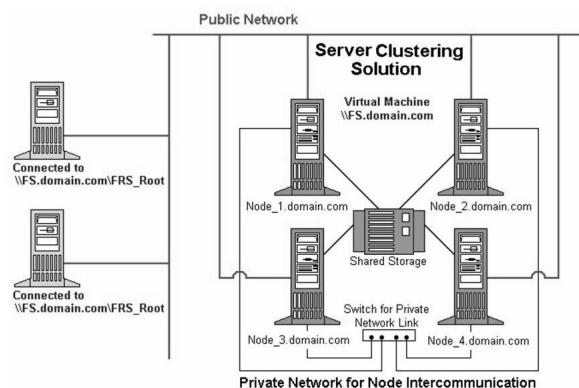


**High Availability Server Clustering** (HA Clusters or Failover Clusters) operate by having redundant computers or nodes which are then used to provide services when system components fail. HA cluster implementations attempt to build redundancy into a cluster to eliminate single points of failure, including multiple network connections and data storage.

HA clusters can be configured in either Active/Active or Active/Passive configurations.

In Active/Active, traffic intended for the failed node is either passed onto an existing node or load balanced across the remaining nodes.

Active/Passive configurations provide a fully redundant instance of each node, which is only brought online when its associated primary node fails.



**Figure 25: High Availability Server Clustering**



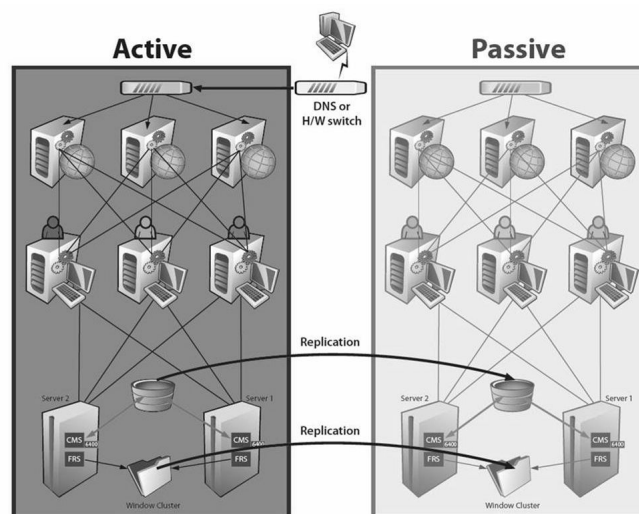
High Availability clusters can be configured in the following ways: •

- Active/Active

In active/active, traffic intended for the application can be processed by any one of the active nodes. This is possible when all nodes have access to the same data. Some clustered instances of database servers are good example of this. Database queries go from a client to a virtual server name but the actual processing of the query can be done by any available node that hosts the same instance of the database. Allowing multiple instances to access the same database (storage) simultaneously provides fault tolerance, load balancing, and performance benefits by allowing the system to scale out. At the same time, since all nodes access the same database, the failure of one instance hosted by a specific node will not cause the loss of access to the database itself.

- Active/Passive

Active/passive configuration provides a fully redundant instance of each node running but only one is actively processing requests; all others are in a waiting state. Should a disaster occur on the current node, the process will be stopped on that node, moved over to another redundant node and then started. This configuration typically requires the most amount of extra hardware. The extra hardware can be mitigated by splitting the hosted applications. Each node runs some applications actively and is also acting as the passive node for applications that run on other nodes. The challenge is to ensure that if a failure occurs, the remaining nodes are able to support all applications.



**Figure 26: Active and passive fail-over architecture**



**Note:** Some commonly used clustering services are 'Veritas Cluster Server' and 'Microsoft Cluster Server' (MSCS). These servers are excellent options for hosting highly available resources such as file shares for the FRS root folders and cluster aware databases such as MS SQL Server and Oracle for the CMS system database and other reporting databases.

## Network Storage Solutions

### Storage Area Network (SAN)

SAN is an architecture to attach remote computer storage devices (such as disk arrays, tape libraries and optical jukeboxes) to servers in such a way that, to the operating system, the devices appear as locally attached. Although cost and complexity are dropping, as of 2007 SANs are still uncommon outside larger enterprises.

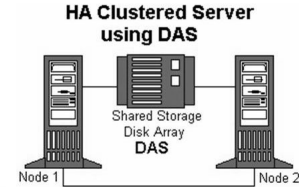
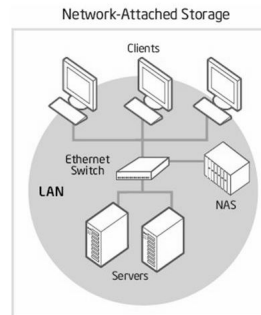


Network storage solutions provide a highly available or fault tolerant solution to making data reliably available. There are several solutions that are used for this.

**Direct Attached Storage (DAS)** is the simplest form of network storage. It consists of an array of disk drives attached directly to a server or a clustered server.

#### Network Attached Storage (NAS)

Is a file-based storage architecture that attaches directly to the LAN. NAS uses familiar Ethernet technology, and storage traffic is transmitted through files, which is the typical and familiar means of transferring data within a LAN.



**Figure 27: Network Storage Solutions**

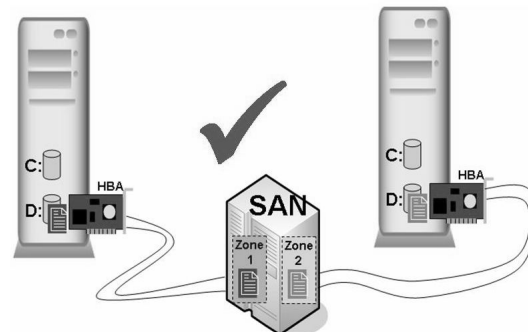


**SAN** is an architecture to attach remote computer storage devices (such as disk arrays, tape libraries and optical jukeboxes) to servers in such a way that, to the operating system, the devices appear as locally attached.

Typically, the server is connected to the remote SAN through a host bus adapter card (HBA) and a very high speed fiber channel.

When multiple servers read and write to the same zone of a SAN, file locking and file corruption can be an issue. Thus, a SAN can be a problem when multiple FRS servers are pointing to the same zone.

Although cost and complexity are dropping, SANs are still uncommon outside larger enterprises.



**Figure 28: SAN**

#### Network Attached Storage (NAS)

By contrast to a SAN, Network Attached Storage (NAS) is essentially a self-contained computer that is connected to a network with the sole purpose of supplying the file-based data storage services to other devices on the network. The operating system and other software on the NAS unit provide the functionality of data storage, file systems, access to files, and management of these components.

Unlike SAN where the remote file system appears to be local, it is clear to the operating system that the NAS resource is remote. The NAS resource appears as a network share accessed by a UNC path (for example \\Server\_Name\File\_Share\Sub\_Folder\File).

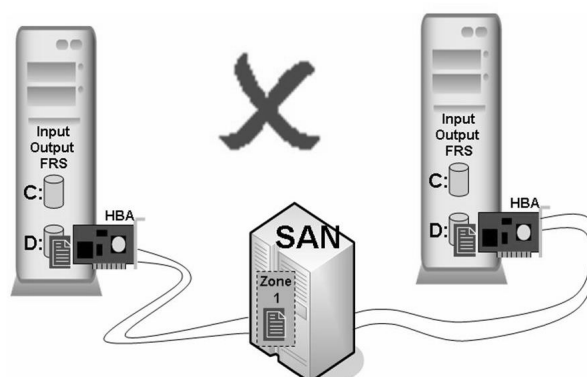
### NAS Heads

A NAS head refers to a NAS which does not have any on-board storage but connects to a SAN. In effect, a NAS acts as a translator between the file-level NAS protocols (NFS, CIFS) and the block-level SAN protocols (Fibre Channel, iSCSI). Thus NAS heads combine the advantages of both SAN and NAS technologies.



**The challenge of the SAN architecture** is that when multiple servers read and write to the same zone of a SAN, file locking and file corruption can be an issue. You should not point two HBAs to the same zone.

Thus, utilizing a SAN with multiple FRS pairs pointing to the same zone can be a problem.



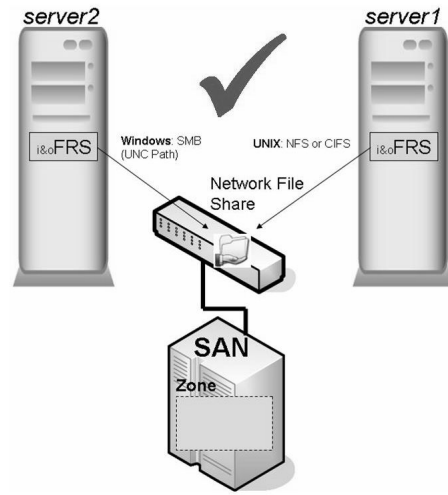
**Figure 29: The challenge of the SAN**



**NAS Heads** refers to a NAS which does not have any on-board storage, but instead connects to a SAN.

It appears to the servers as a file share across the network. The NAS head is multi-faceted in that it can make its shares appear as Windows SMB shares (for Windows clients) or CIFS/NFS shares (for UNIX clients).

Servers no longer need HBA cards since they're simply accessing the share across the network and they can both access the same zone because the NAS Head manages file locking.



**Figure 30: NAS Heads**

## Vertical and Horizontal Scaling

Scalability is a key success factor for business applications in a dynamic environment. SAP BusinessObjects BI platform scales both vertically and horizontally.

Vertical scaling (otherwise known as scaling up) means adding more hardware resources (for example processors and memory) to the same machine. In the context of SAP BusinessObjects BI platform, this means the ability to add multiple servers on the same machine.

Horizontal scaling (otherwise known as scaling out) means adding more machines into the solution. In the context of SAP BusinessObjects BI platform, this means the ability to run multiple servers on multiple machines seamlessly.

## Backup

Backup refers to making copies of data so that these additional copies may be used for restoration after a data loss event occurs. These additional copies are typically called "backups". Backups are useful primarily for two purposes:

- To restore an entire system following a major disaster.
- To restore small numbers of files after they have been accidentally deleted or corrupted.

In SAP BusinessObjects BI platform context, the three critical pieces of data to backup are:

- The CMS system database. This may also include the audit database.
- Input File Repository root folder.
- Output File Repository root folder.



**Note:** It is important that these components are synchronized.

## Deployment Strategies for High Availability

Creating a true fault tolerant BI solution requires removing all single points in failure. Since removing all single points of failure is an immense and extremely cost prohibitive task, the reality is that ensuring availability means deploying a highly available BI solution with backup and disaster recovery strategies that support your organization's business needs.

When designing a system for high availability, you need to consider:

- Availability requirements and how much time is acceptable for the system to be down.
- Failover processing, system backup, and data storage.
- Vertical and horizontal scaling options.

Resources incorporated into a Business Intelligence solution are vast and there are many different ways these resources can interact with each other. The next topic in this lesson will focus specifically on SAP BusinessObjects BI platform and some of its dependencies.

## Designing a System for High Availability

### Single server deployments are not highly available

In a single server deployment, you can duplicate many of the SAP BusinessObjects BI platform servers to provide redundancy. If one service fails, the duplicate service could continue to process requests. However, if there is a catastrophic failure affecting the entire server, SAP BusinessObjects BI platform will become unavailable until the problem is resolved. Planned maintenance can also create periods of unavailability. Whether the downtime is planned or unplanned, if it supports the business requirements of availability, a single server solution may be sufficient but it is not regarded as a highly available deployment.

### Designing a multiple-server system for high availability

Depending on the number of machines you can dedicate to SAP BusinessObjects BI platform, you have many options for designing a system for high availability, taking the advantage of both vertical and horizontal scaling.

In a multiple-server deployment, duplicate services are running on different machines and the SAP BusinessObjects BI platform architecture provides the redundancy and reliable communications to ensure high availability of SAP BusinessObjects BI platform. If one service fails or if there is a hardware failure on the machine running the service, the duplicate service on another machine continues to process requests with little impact to the system. What little impact there is can be managed through configuration settings so there is no denial of services.

The architecture is commonly divided into 3 tiers. It is easier to design a highly available deployment by looking at configuration options within each tier focusing on how to utilize both vertical and horizontal scaling to maintain high availability for both the servers and the resources they depend on.

The following diagram illustrates fault tolerance in a multiple server environment:



## Lesson Summary

You should now be able to:

- Describe the challenges in a Business Intelligence solution
- Explain the key factors in making your systems fault tolerant and highly available
- Define the deployment strategies for high availability in SAP BusinessObjects BI platform



## Lesson: Ensuring Availability in Multiple Tiers

### Lesson Overview

In this lesson, you will learn about creating high availability in the multiple tiers.



### Lesson Objectives

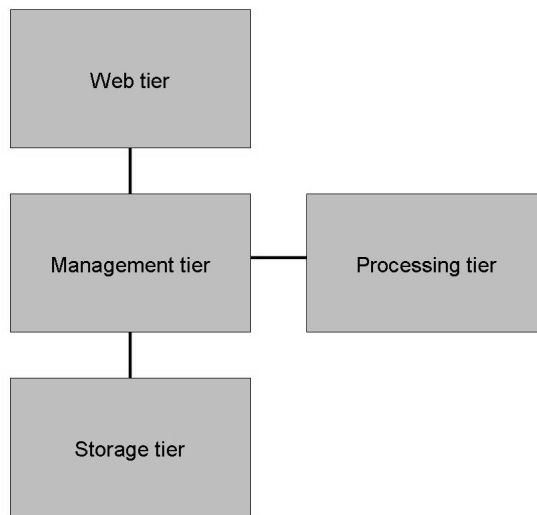
After completing this lesson, you will be able to:

- List deployment options for the application tier
- Explain vertical and horizontal scaling options
- Describe the new capabilities of the wdeploy tool and its role in creating high availability in the application tier
- Understand high availability in the Intelligence tier
- Describe the process of CMS clustering
- Manage active/passive file repository servers
- Describe the SAP BusinessObjects BI platform servers in the Processing tier
- Understand the concept of server groups
- Create and work with server groups

### Business Example

### Conceptual tiers

SAP BusinessObjects Business Intelligence platform can be thought of as a series of conceptual tiers:



**Figure 31: Conceptual tiers in SAP BusinessObjects BI platform deployment**

- Web tier

The Web Tier contains web applications deployed to a Java web application server. Web applications provide SAP BusinessObjects Business Intelligence platform functionality to end users through a web browser. Examples of web applications include the Central Management Console (CMC) administrative web interface and BI launch pad. The web tier also contains Web Services. Web Services provides SAP BusinessObjects Business Intelligence platform functionality to software tools via the web application server, such session authentication, user privilege management, scheduling, search, administration, reporting, and query management. For example, Live Office is a product that uses Web Services to integrate SAP BusinessObjects Business Intelligence platform reporting into Microsoft Office products.

- Management tier

The management tier coordinates and controls all of the components that make up SAP BusinessObjects Business Intelligence platform. It is comprised of the Central Management Server (CMS) and the Event Server. The CMS provides maintains security and configuration information, sends service requests to servers, manages auditing, and maintains the CMS system database. The Event Server manages file based events, which occur in the storage tier.

- Processing tier

The processing tier analyzes data and produces reports. This is the only tier that accesses the databases that contain report data.

- Storage tier

The storage tier is responsible to handling files, such as documents and reports.

The Input File Repository Server manages files that contain information to be used in reports, such as the following file types: .rpt, .car, .exe, .bat, .js, .xls, .doc, .ppt, .rtf, .txt, .pdf, .wid, .rep, .unv.

The Output File Repository Server manages reports created by the system, such as the following file types: .rpt, .csv, .xls, .doc, .rtf, .txt, .pdf, .wid, .rep. The storage tier also handles report caching to save system resources when users access reports.

## High Availability in the Web tier

### Web Client to Web Server

Obviously there is little that you can do to make Web Clients highly available so the Web Server is usually the first place to begin planning for high availability.

You may wish to implement an external web server in front of the Business Intelligence stack for one or many of the following reasons:

- You wish to implement a DMZ.
- You want the web server to serve up static web content only (for example .gif files), thereby removing some of the load from the web application server (WAS). You can separate dynamic and static content using the wdeploy tool, which is included with SAP BusinessObjects BI platform to achieve this.
- You wish to offload the SSL work from Web Application Servers.

Here you encounter a problem however. If you have one web server then you have a single point of failure. You can eliminate the single point of failure by introducing multiple web servers. But this introduces a new problem; now your users have multiple web servers and therefore multiple URLs to choose from. How can do you get around this?

#### DNS round robin

"Domain Name Service round robin" is one solution whereby the DNS server sends web requests to each web server in a round robin manner. DNS round robin is not very popular, but it is very affordable to implement. One problem with this method is that a DNS server cannot verify the availability of hosts in its records. Thus, it might easily hand out the IP address of a server that is switched off or one that is up but has a crashed service.

#### Hardware load balancer

These are hardware appliances that present a single URL to the end users, and then forward traffic on to the web server farm behind it. Hardware load balancers can fail too if but in practice they tend to be very reliable.

Hardware load balancers have several benefits, for example:

- Monitoring network availability of servers within a cluster  
A load balancer can be configured to not direct traffic to a server that is switched off.
- Accommodating session state  
A loadbalancer can be configured with client affinity, so it can maintain session state when necessary.



**Note:** Note: Client affinity is sometimes referred to as "session affinity" or "sticky sessions". Client affinity is implemented using either IP-based switching or cookie-based switching. Most organizations prefer cookie-based switching since it does not suffer from problems associated with NAT translation (where all of the user's behind a particular NAT device appear to come from the same IP address and therefore are all sent to the same web server).

## Web Server to Web Application Server

Although web application servers come with built-in web server functionality, SAP BusinessObjects Business Intelligence platform also supports the separation of web and web application servers into a de-paired configuration. In a de-paired configuration, the web server will serve static and cached content to offset a portion of the requests sent to the web application server. A web server may also support a reverse proxy configuration to improve site security.

## Web application deployment

The SAP BusinessObjects Business Intelligence platform installation program can deploy web applications only to the bundled Tomcat 6.0 web application server. All other supported web application servers require that web applications be deployed after the installation is complete.



**Note:** It is recommended that you use the WDeploy web application deployment tool. However, you can deploy web applications with the server's administrative console if you prefer.

### OSGi WAR files

The OSGi framework for Java web applications simplifies the deployment of the web applications bundled with SAP BusinessObjects Business Intelligence platform. It allows web applications, language packs, SDKs, plugins, and other resources to exist in a single bundle that can be deployed to a web application server in one step.

Deploying a single WAR file also means fewer web sessions are needed when a user accesses multiple web applications, which reduces the memory, disk, and processing load placed on a web application server.



**Note:** Load balancing a cluster of SAP BusinessObjects Business Intelligence platform servers is not required, as the Central Management Server (CMS) already distributes work between cluster nodes.

The Central Management Console (CMC) web application does not support session fail-over. However, BI launch pad is fault-tolerant, and does support session fail-over, so users will not notice if a cluster node fails.

### Failover and load balancing

SAP BusinessObjects Business Intelligence platform supports clustered web application servers with load balancing. Hardware or software load balancers can be used as the entry-point for the web application servers to ensure that the processing is evenly distributed among the web application servers.

### SAP BusinessObjects Business Intelligence platform WAR and EAR files

The functionality that makes up SAP BusinessObjects Business Intelligence platform is divided between several web applications to make it easy to deploy only the components required by your organization. In SAP BusinessObjects Business Intelligence platform 4.0, many of the core web applications included with previous releases have been bundled into a single OSGi archive. This saves web application server memory and reduces the number of web sessions needed for web applications that previously had multiple archives.

For example, SAP BusinessObjects Business Intelligence platform XI 3.x included the Central Management Console (CMC) and InfoView (now BI launch pad) web applications archived as CMC.war and InfoView.war. SAP BusinessObjects Business Intelligence platform 4.0 has consolidated the CMC and InfoView (now BI launch pad) web applications, along with others, into a single archive named BOE.war or BOE.ear.

The WDeploy tool is used to automate the process of tailoring web applications to be deployable on a supported web application server. While it is possible for an experienced administrator to manually tailor a web application for a specific web application server, it is recommended that the WDeploy tool be used to automate the process.

## Overview of WDeploy

The WDeploy tool is included with SAP BusinessObjects Business Intelligence platform to ease deployment of web applications to Java-based web application servers. There are two different versions of WDeploy:

1. A traditional, text-based interface that processes commands and parameters given on the command-line
2. A new Windows-based guided assistant similar to the SAP BusinessObjects Business Intelligence platform installation program, which prompts the user to enter deployment parameters.

While each supported web application server requires different commands and web application package updates, WDeploy provides a consistent interface for administrators, and automates the adjustments needed for deployment to a specific web application server.

## Deployment modes

WDeploy supports two different deployment modes:

1. Standalone mode (a web application server) The web application server serves both static content (HTML pages, images, documents, JavaScript, Cascading Style Sheets) and dynamic content (Java Server Pages, JAR files, XML files).
2. Split web tier mode (a web application server plus a dedicated web server) A dedicated web server receives requests from web browsers and serves all static content (HTML pages, images, documents, JavaScript, Cascading Style Sheets). Requests for dynamic content (Java Server Pages, JAR files, XML files) are forwarded to the dedicated application server and returned to the web browser when the content has been formed.



**Hint:** This mode is suited to larger production deployments where scalability and performance are key.



**Note:** It is also possible to use WDeploy to deploy web applications to a web application server installed on the same system as SAP BusinessObjects Business Intelligence platform. This configuration can be used for small development or test systems, and is not recommended for production systems.

## High Availability in the Management Tier

### Web Application Server to SAP BusinessObjects BI platform Cluster

Once a user has initiated a session, the web application server then communicates with the Intelligence tier, or SAP BusinessObjects BI platform tier.

When you log into SAP BusinessObjects BI platform through any of the client tools you are typically asked to provide four pieces of information:

- A user name
- A password
- The "system" you wish to log into
- The authentication type in use with that system

The system you specify is really the hostname and the port number of a host running a CMS.

➡ **Note:** It is best to use the fully qualified domain name of the host.

➡ **Note:** Interestingly due to the way that SAP BusinessObjects BI platform failover works, the hostname you specify may not actually be the CMS you end up connecting to.

### CMS Clustering

With CMS clustering, a set of two or more server machines function as a single Central Management Server. In the event of a network, power, hardware, or software failure on one server, the workload of the failed CMS is picked up by another within the same cluster.

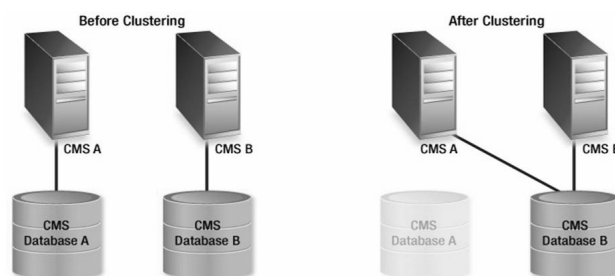


Figure 32: CMS Clustering



**CMS clustering benefits include:**

- Increased CMS availability  
Clustered CMS machines use a heartbeat signal to determine clustered server availability. In the event of a failure, the workload of the failed CMS is picked up by an available CMS within the cluster.
- Providing for incremental growth and scalability  
As the number of SAP BusinessObjects BI platform users grows, adding CMS servers to the cluster allows ease of expansion and continued availability. CMS clusters also allow for easy basic machine maintenance without hampering the SAP BusinessObjects BI platform distribution. This maintenance might include loading a service pack or updating hardware on your CMS. If you have two CMS machines then you can work on one machine at a time without disturbing the production system.
- Improved performance and consistency of Enterprise system  
When users log into SAP BusinessObjects BI platform, they are authenticated by one of the CMS servers. The CMS servers in a cluster use round robin mechanism when taking on new users. If there are for example 50 users logged on the cluster containing two CMS machines, it is very likely that 25 of the users are logged on to CMS1 and the other 25 users are logged on the CMS2.

CMS machines in a cluster communicate via TCP/IP. The nature of a TCP/IP message is that its signal will only be received by the intended service.

When CMSs start up, they communicate with the CMS system database to receive a list of other CMSs in the system. Once the CMS receives the list of CMSs in the system, it communicates with the other CMSs to establish a cluster connection.

**Migrating and Backing up CMS System Data**

Organizations often need to copy data from one SAP BusinessObjects BI platform system to another SAP BusinessObjects BI platform system. This process can be used to periodically backup a deployment's CMS system database.

SAP BusinessObjects BI platform provides the ability to migrate, or copy, the contents of a CMS system database to another database type. You can also copy CMS data from a different CMS database of an earlier version to your current CMS system database.

When you move the entire CMS system database to a different data source, the migration process destroys any information already present in the destination data source. If you are performing an off-site back up of your system database you would

use this process to move the current system database to an empty database. This migration process is performed in the CCM by clicking the Specify CMS Data Source button on the toolbar.



**Note:** For more information on the procedure for migrating and backing up CMS system data, please refer to the Administering Servers - Windows course.

## Managing Active/Passive File Repository Servers

The SAP BusinessObjects BI platform environment may have multiple File Repository Servers, but only one is active at any given time. The order of start up determines which File Repository Server is active and which one is passive. The first File Repository service to start is the active File Repository Server.

If the active File Repository Server shuts down for any reason, the backup (passive) File Repository Server becomes active and takes over.

**Tip:** To determine which FRS is active and which is passive, you can use the Metrics property of a server to verify the start time. The server that has been running the longest is the active server.

### Preferred high availability FRS filestore configuration

All the File Repository Servers point to a disk location where the actual report templates and files reside. By default, the files are stored on the local host's file system on the server upon which you install the SAP BusinessObjects BI platform. However having just one FRS pointing to local file storage has two problems:

- It is a single point of failure
- The files are not visible to another server

It is recommended to use the following configuration for your FRS filestore. You create a shared, common clustered folder on another host across the network then point the FRS pairs to it. If one of the servers within the cluster where the files are stored goes down, the backup FRS pairs will still be able to access the files through the cluster.

## Crystal Reports Cache Server

The Crystal Reports Cache Server is responsible for handling Crystal Reports report viewing requests from the DHTML, ActiveX, and Java viewers. The Crystal Reports Cache Server manages viewable pages. If the requested page is present on the Crystal Reports Cache Server, it is sent back to the Web Application Server; otherwise, the page is requested from the Crystal Reports Processing Server.

## Event Server

The Event Server manages file-based events. When you set up a file-based event within SAP BusinessObjects BI platform, the Event Server monitors the directory that you specified. When the appropriate file appears in the monitored directory, the Event Server triggers your file-based event: that is, the Event Server notifies the CMS that the file-based event has occurred. The CMS can then start any jobs that are dependent upon the file-based event.



**Note:** Schedule-based and custom events are managed through the CMS.

## High Availability in the Processing Tier

### Adaptive Processing Servers

The installation program installs one Adaptive Processing Server (APS) per host system. Depending on the features that you've installed, this APS may host a large number of services, such as the Monitoring Service, Lifecycle Management Service, Multi-Dimensional Analysis Service (MDAS), Publishing Service, and others.

If you are installing a production environment, do not use the default APS. Instead, it is highly recommended that once the installation process is complete, you perform a system sizing to determine: Create new APS server instances as determined by the sizing process. For example, if the outcome of your sizing happens to suggest the creation of one APS for each service category, then may end up creating eight APS servers. One for each service category: Advanced Analysis Services, Connectivity Services, Core Services, Crystal Reports Services, Dashboard Design Services, Data Federation Services, Lifecycle Management Services, and Interactive Analysis Services.

- The type and number of APS services.
- The distribution of services across multiple APS servers. •
- The optimal number of APS servers. Multiple APS servers provide redundancy, better performance, and higher reliability.
- The distribution of APS servers across multiple nodes.

### Crystal Reports Processing Server

The Crystal Reports Processing Server is primarily responsible for responding to page requests by processing Crystal Reports and generating Encapsulated Page Format (.EPF) pages. A single .EPF file represents one page of a Crystal report. The Crystal Reports Processing Server retrieves data for the report from the latest instance or directly from the database (depending on the user's request and security level).

Specifically, the Crystal Reports Processing Server responds to page requests made by the Crystal Reports Cache Server. The Crystal Reports Processing Server and Crystal Reports Cache Server interact closely, so cached .epf pages are reused as frequently as possible, and new pages are generated as soon as they are required.

## Report Application Server

The Report Application Server (RAS) is very similar to the Processing Server. It, too, is primarily responsible for responding to page requests by processing reports and generating EPF pages. However, the RAS uses an internal caching mechanism that involves no interaction with the Cache Server. Specifically, the Report Application Server (RAS) processes reports that BI Launch pad users view with the Interactive DHTML viewer. The RAS also provides the reporting capabilities that allow BI Launch pad users to create and modify Crystal reports over the web. Additionally, the Report Application Server is used at the time of viewing or submitting schedule requests for reports containing dynamic prompts and cascading lists of values.

## Web Intelligence Processing Server

The Web Intelligence Processing Server is used to create, edit, view, and analyze Web Intelligence documents (stored in the Input/Output File Repository Servers). It also processes scheduled Web Intelligence documents and generates new instances of the document, which it stores in the Output File Repository Server. Depending on the user's access rights and the refresh options of the document, the Web Intelligence Processing Server will use cached information or it will refresh the data in the document and then cache the new information.

## Understanding Server Groups

Server groups provide a way of organizing your SAP BusinessObjects BI platform servers to make them easier to manage. That is, when you manage a group of servers, you need only view a subset of all the servers on your system. More importantly, server groups are a powerful way of customizing SAP BusinessObjects BI platform to optimize your system for users in different locations, or for objects of different types.

If you group your servers by region, you can easily set up default processing settings, recurrent schedules, and schedule destinations that are appropriate to users who work in a particular regional office. You can associate an object with a single server group, so the object is always processed by the same servers. And you can associate scheduled objects with a particular server group to ensure that scheduled objects are sent to the correct printers, file servers, and so on. Thus, server groups prove especially useful when maintaining systems that span multiple locations and multiple time zones.

If you group your servers by type, you can configure objects to be processed by servers that have been optimized for those objects. For example, processing servers need to communicate frequently with the database containing data for published reports. Placing processing servers close to the database server that they need to access improves system performance and minimizes network traffic. Therefore, if you had a number of reports that ran against a DB2 database, you might want to create a group of Processing Servers that process reports only against the DB2 database server. If you then configured the appropriate reports to always use this Processing Server group for viewing, you would optimize system performance for viewing these reports.

After creating server groups, configure objects to use specific server groups for scheduling, or for viewing and modifying reports. Use the navigation tree in the Servers management area of the CMC to view server groups. The Server Groups List option displays a list of server groups in the details pane, and the Server Groups option allows you to view the servers in the group.

## To Create a Server Group

To create a server group, you need to specify the name and description of the group, and then add servers to the group.

1. Go to the Servers management area of the CMC.
2. Choose *Manage* → *New* → *Create Server Group*. The Create Server Group dialog box appears.
3. In the Name field, type a name for the new group of servers.
4. Use the Description field to include additional information about the group.
5. Click *OK*.
6. In the Servers management area, click Server Groups in the navigation tree and select the new server group.
7. Choose Add Members from the Actions menu.
8. Select the servers that you want to add to this group; then click the > arrow. Tip: Use CTRL+click to select multiple servers.
9. Click OK. You are returned to the Servers management area, which now lists all the servers that you added to the group. You can now change the status, view server metrics, and change the properties of the servers in the group.

## Working with Server Subgroups

Subgroups of servers provide you with a way of further organizing your servers. A subgroup is just a server group that is a member of another server group. For example, if you group servers by region and by country, then each regional group becomes a subgroup of a country group. To organize servers in this way, first create a group for

each region, and add the appropriate servers to each regional group. Then, create a group for each country, and add each regional group to the corresponding country group. There are two ways to set up subgroups: you can modify the subgroups of a server group, or you can make one server group a member of another. The results are the same, so use whichever method proves most convenient.

## To Add Subgroups to a Server Group

1. Go to the Servers management area of the CMC.
2. Click Server Groups in the navigation tree and select the server group you want to add subgroups to. This group is the parent group.
3. Choose Add Members from the Actions menu.
4. Click Server Groups in the navigation tree, select the server groups that you want to add to this group, and then click the > arrow. Tip: Use CTRL+click to select multiple servers.
5. Click OK. You are returned to the Servers management area, which now lists the server groups that you added to the parent group.

## To make one Server Group a Member of Another

1. Go to the Servers management area of the CMC.
2. Click the group that you want to add to another group.
3. Choose Add to Server Group from the Actions menu.
4. In the Available server groups list, select the other groups that you want to add the group to, then click the > arrow. Tip: Use CTRL+click to select multiple servers.
5. Click *OK*.

## Modifying the Group Membership of a Server

You can modify a server's group membership to quickly add the server to (or remove it from) any group or subgroup that you have already created on the system.

For example, suppose that you created server groups for a number of regions. You might want to use a single Central Management Server (CMS) for multiple regions. Instead of having to add the CMS individually to each regional server group, you can click the server's "Member of" link to add it to all three regions at once.

## To Modify a Server's Group Membership

1. Go to the Servers management area of the CMC.
2. Locate the server whose membership information you want to change.
3. Choose Properties from the Manage menu.
4. In the Properties dialog box, click Existing Server Groups in the navigation list. In the details panel, the Available server groups list displays the groups you can add the server to. The Member of Server Groups list displays any server groups that the server currently belongs to.
5. To change the groups that the server is a member of, use the arrows to move server groups between the lists, then click OK.





## Exercise 2: Create Server Groups

### Exercise Objectives

After completing this exercise, you will be able to:

- Create and test server groups

### Business Example

For distributive processing and load balancing, you have two server groups, **Vancouver Server Group** and **New York Server Group**. These server groups will be used to regionally distribute the processing load for Crystal Reports consumption.

### Task 1: Create the server groups

1. In the CCM, create a new SIA with no servers (Name it ServerGroupSIA).

| Field Name | Value                  |
|------------|------------------------|
| Node Name  | ServerGroup##SIA       |
| SIA Port   | <assigned port number> |

2. Select a CMS.
3. Specify the CMS system database configuration.
4. Enter the CMS logon information.

| Field Name     | Value               |
|----------------|---------------------|
| System         | <assigned hostname> |
| User Name      | administrator       |
| Password       | <assigned password> |
| Authentication | Enterprise          |

5. In the CMC, clone the following servers found under the existing SIANode4x to ServerGroup##SIA Node:



**Note:** Make sure you change the Naming convention manually so the cloned server will include the ServerGroup##SIA prefix. i.e. ServerGroup##SIA. Crystal Reports 2011 Processing Server

*Continued on next page*

| Server   |
|--|
| Crystal Reports 2011 Processing Server         |
| Crystal Reports Cache Server                   |
| Adaptive Job Server                            |
| Crystal Reports 2011 Report Application Server |
| Crystal Reports Processing Server              |

6. Start and enable the newly cloned servers.

## Task 2: Create a server group

1. Log on to the CMC and navigate to the Servers area to create a new server group.
2. Select the newly cloned Crystal Reports Servers and add the following servers to the server group.

| Server   |
|--|
| ServerGroupSIACrystal Reports 2011 Processing Server         |
| ServerGroupSIA.Crystal Reports Cache Server                  |
| ServerGroupSIA.Adaptive Job Server                           |
| ServerGroupSIA.Crystal Reports 2011Report Application Server |
| ServerGroupSIA.Crystal Reports Processing Server             |

3. Create a new Server Group called New York Server Group.
4. Add the following Servers to New York Server Group

| Server  |
|---|
| SIANode4x.Crystal Reports 2011 Processing Server        |
| SIANode4x.Crystal Reports Cache Server                  |
| SIANode4x.Adaptive Job Server                           |
| SIANode4x.Crystal Reports 2011Report Application Server |
| SIANode4x.Crystal Reports Processing Server             |

*Continued on next page*

## Result

To test the server groups, create a new Crystal Report using Crystal Reports 2011 using the *xtreme* SQL Server 2005 database. The report will be simple and only include Customer Name Field and Last Year's Sales.

### Task 3: Create the Crystal report

1. Launch Crystal Reports 2011

|          |             |
|----------|-------------|
| Server   | WDFLBMT2268 |
| UserID   | boadmin     |
| Password | BOTraining  |
| Database | xtreme      |

2. In the Database Expert navigate to the *xtreme* ODBC connection that you have just created. and select the tables *Customer* and *Orders*.
3. Enable visibility for the Field Explorer and place the fields **Customer Name** from the Customer table and **Order ID** and **Order Amount** from the Orders table in the *Details* section of the design area with a small space between the fields.
4. Save the Report to the SAP Business Objects platform folder- Report Samples.
5. Log on to the CMS and navigate to the Crystal Report you just saved to the Report Samples Directory. Go to the properties of the report and expand the Default Settings option. In the Scheduling Server Group option, select *Only use servers belonging to the selected group*. Ensure the group selected is the **Vancouver Server Group**
6. Navigate to the Viewing Server Group option under Default Settings Properties. Under *Default servers to use for processing*, select **Only use servers belonging to the selected group**. Ensure the Vancouver Server Group is selected. Select the same option under *Default servers to use for caching*.

### Task 4: Test the report against the server groups

1. Log on to BI Launchpad and navigate to the Documents tab. Click the Folders drawer and navigate to the Crystal Report created earlier.
2. View the Report and refresh it. Are you able to view? Yes

*Continued on next page*

3. Schedule the report to run. Did it process successfully? Yes. Click on the success link in the instance. What server was used to process the schedule ?  
Vancouver Server Group
4. Stop all the servers that are members of the Vancouver Servers Group
5. Schedule and view the same Crystal Report created earlier.  
Are you successful? Observe any error messages that you receive.
6. Restart servers in the Vancouver Server Group.

## Solution 2: Create Server Groups

### Task 1: Create the server groups

1. In the CCM, create a new SIA with no servers (Name it ServerGroupSIA).

| Field Name | Value                  |
|------------|------------------------|
| Node Name  | ServerGroup##SIA       |
| SIA Port   | <assigned port number> |

- a) Click *Start* → *Programs* → *SAP BusinessObjects Enterprise XI 4.0* → *SAP BusinessObjects Enterprise* → *Central Configuration Manager*.
  - b) In the Central Configuration Manager (CCM), on the toolbar, click *Add Node*.  
The *Add Node Wizard* page appears.
  - c) Click *Next*.
  - d) Enter the *Node Name* and *SIA Port* number for the new Server Intelligence Agent (SIA).
  - e) Select *Add node with no servers*.
  - f) Click *Next*.
2. Select a CMS.
    - a) Select *Use existing running CMS*.
    - b) Click *Next*.

*Continued on next page*

## 3. Specify the CMS system database configuration.

- a) Click *Specify...*
- b) Select *SQL Server (ODBC)*.
- c) Click *OK*.

A window appears asking you to select the data source.

- d) Click the *Machine Data Source* tab.
- e) Select the *BOE4x* Data Source.
- f) Click *OK*.



**Note:** If you are prompted to enter the password and cluster key. Use the assigned administrator's password and cluster key.

- g) Click *OK*.
- h) Click *Next*.

## 4. Enter the CMS logon information.

| Field Name     | Value               |
|----------------|---------------------|
| System         | <assigned hostname> |
| User Name      | administrator       |
| Password       | <assigned password> |
| Authentication | Enterprise          |

- a) Enter the logon information and click *Next*.  
A confirmation box appears.
- b) Review the confirmation page, and click *Finish*.



**Hint:** If any errors occur, review the log file.

The CCM creates a node. You can now use the CCM to manage this new node.


*Continued on next page*

5. In the CMC, clone the following servers found under the existing SIANode4x to ServerGroup##SIA Node:



**Note:** Make sure you change the Naming convention manually so the cloned server will include the ServerGroup##SIA prefix. i.e. ServerGroup##SIA. Crystal Reports 2011 Processing Server

| Server   |
|--|
| Crystal Reports 2011 Processing Server         |
| Crystal Reports Cache Server                   |
| Adaptive Job Server                            |
| Crystal Reports 2011 Report Application Server |
| Crystal Reports Processing Server              |

- Click *Start* → *Programs* → *SAP BusinessObjects Enterprise XI 4.0* → *SAP BusinessObjects Enterprise* → *SAP BusinessObjects Enterprise Central Management Console*.
- Log on with your username and password.
- In the *CMC Home* page, click *Servers*.
- Click the + sign in front of *Nodes*.  
You will see you newly created node is listed there, but it has no server.
- In the *Servers* page, click *Servers List*.
- Right-click the indicated server from *SIANode4x* and select *Clone Server*.  
The *Clone Server* dialog box appears.
- On the *Clone to Node* list, choose *ServerGroup##SIA*.  
 **Note:** This is where you want to add the cloned server.
- Click *OK*.
- Repeat the step for all the indicated servers.

*Continued on next page*

6. Start and enable the newly cloned servers.
  - a) In the *Servers* page, click the + sign in front of *Nodes*.
  - b) Select the node *ServerGroup##SIA*.



**Note:** The new server appears in the *Servers* management area of the CMC.

Port number settings are also cloned. In many cases, such as cloning a CMS, you will want to change the port number to avoid port conflicts between the original server and its clone.

- c) Navigate to each server and click *Start Server* and *Enable Server*.

## Task 2: Create a server group

1. Log on to the CMC and navigate to the Servers area to create a new server group.
  - a) Log on to the CMC and navigate to the Servers area, Navigate to the Server Groups container on the left panel and right click and select *New* → *Server Group*.  
The New Server Group Properties tab appears.
  - b) In the Server Group Name text box, type **Vancouver Server Group**.
  - c) Use the Description text box to include additional information about the group.
  - d) Right click on the newly created Server Group and select the option Add Members
2. Select the newly cloned Crystal Reports Servers and add the following servers to the server group.

| Server   |
|--|
| ServerGroupSIACrystal Reports 2011 Processing Server |
| ServerGroupSIA.Crystal Reports Cache Server          |

*Continued on next page*



| Server   |
|--|
| ServerGroupSIA.Adaptive Job Server                           |
| ServerGroupSIA.Crystal Reports 2011Report Application Server |
| ServerGroupSIA.Crystal Reports Processing Server             |

- a) Right-click the newly created Server Group and select *Add Members*.
- b) Select the indicated servers and click > to add them to the server group.
- c) Click *OK*.

This returns you to the Servers area in the CMC, which now lists all the servers that you added to the server group. You can now change the status, view server metrics and change the properties of the servers in the group

3. Create a new Server Group called New York Server Group.
  - a) In the Servers page, navigate to the Server Groups container on the left panel and right click and select *New* → *Create Server Group*.  
The Create Server Group Properties tab appears.
  - b) In the Server Group Name text box, type **New York Server Group**. Use the Description text box to include additional information about the group.
  - c) Click *OK*.
4. Add the following Servers to New York Server Group

| Server   |
|--|
| SIANode4x.Crystal Reports 2011 Processing Server |
| SIANode4x.Crystal Reports Cache Server           |

*Continued on next page*

|   |
|---|
| <b>Server</b>   |
| SIANode4x.Adaptive Job Server                           |
| SIANode4x.Crystal Reports 2011Report Application Server |
| SIANode4x.Crystal Reports Processing Server             |

- a) Right-click the newly created Server Group and select *Add Members*.
- b) Select the indicated servers and click > to add them to the server group.
- c) Click *OK*.

This returns you to the Servers area in the CMC, which now lists all the servers that you added to the server group. You can now change the status, view server metrics and change the properties of the servers in the group

## Result

To test the server groups, create a new Crystal Report using Crystal Reports 2011 using the xtreme SQL Server 2005 database. The report will be simple and only include Customer Name Field and Last Year's Sales.

## Task 3: Create the Crystal report

1. Launch Crystal Reports 2011

|          |             |
|----------|-------------|
| Server   | WDFLBMT2268 |
| UserID   | boadmin     |
| Password | BOTraining  |
| Database | xtreme      |

- a) Click *Start → Programs → Crystal Reports 2011 → Crystal Reports 2011*.
- b) On the Crystal Reports start page, choose *Blank report*.
- c) In the Database Expert expand *Create New Connection* and click the [+] icon next to *ODBC (RDO)*
- d) Enter the connection information stated above and click *Finish*.

*Continued on next page*

2. In the Database Expert navigate to the *xtreme* ODBC connection that you have just created. and select the tables *Customer* and *Orders*.
  - a) In the Database Expert navigate to *ODBC (RDO) → WDFLBMT2268 → xtreme → dbo*.
  - b) Select *Customer* and *Orders*. Transfer to the selected tables section by clicking the [ > ] button and choose *OK*.
  - c) Do not change the table links that have been created automatically and choose *OK*.
3. Enable visibility for the Field Explorer and place the fields **Customer Name** from the Customer table and **Order ID** and **Order Amount** from the Orders table in the *Details* section of the design area with a small space between the fields.
  - a) Select the menu path *View → Field Explorer*.
  - b) In the Field Explorer, expand *Database fields → Customer* and drag **Customer Name** into the *Details* section.
  - c) Expand *Database Fields → Orders* and drag **Order ID** and **Order Amount** to the *Details* section of the report. Keep a slight distance between the fields.
4. Save the Report to the SAP Business Objects platform folder- Report Samples.
  - a) Choose *File → Save As ...* in the menu. Choose *Enterprise* and log on with the credentials stated above.
  - b) Navigate to the folder *Report Samples* and enter the file name **U## Order Amount per Country**. Press *Save*

*Continued on next page*

5. Log on to the CMS and navigate to the Crystal Report you just saved to the Report Samples Directory. Go to the properties of the report and expand the Default Settings option. In the Scheduling Server Group option, select *Only use servers belonging to the selected group*. Ensure the group selected is the **Vancouver Server Group**
  - a) Click *Start → Programs → SAP BusinessObjects Enterprise XI 4.0 → SAP BusinessObjects Enterprise → Central Management Console*.
  - b) Click *Folders*.
  - c) Navigate to the *Report Samples* folder and select **U## Order Amount per Country**.
  - d) Right-click **U## Order Amount per Country** and select *Properties*.
  - e) In the *Default Settings* tab, click *Scheduling Server Group*. Select *Only use servers belonging to the selected group* and ensure the group selected is the **Vancouver Server Group**.
  - f) Click *Save*.
6. Navigate to the Viewing Server Group option under Default Settings Properties. Under *Default servers to use for processing*, select **Only use servers belonging to the selected group**. Ensure the Vancouver Server Group is selected. Select the same option under *Default servers to use for caching*.
  - a) In the *Default Settings* tab, click *Default servers to use for processing*. Select *Only use servers belonging to the selected group* and ensure the group selected is the **Vancouver Server Group**.
  - b) In the *Default Settings* tab, click *Default servers to use for caching*. Select *Only use servers belonging to the selected group* and ensure the group selected is the **Vancouver Server Group**.
  - c) Click *Save & Close*.

#### Task 4: Test the report against the server groups

1. Log on to BI Launchpad and navigate to the Documents tab. Click the Folders drawer and navigate to the Crystal Report created earlier.
  - a) Click *Start → Programs → SAP BusinessObjects BI platform 4.0 → Custom Link to BI Launchpad*
  - b) Log on with your username and password
  - c) Navigate to your **U## Order Amount per Country** report.

*Continued on next page*

2. View the Report and refresh it. Are you able to view? Yes
  - a) Right-click **U## Order Amount per Country** and select *View*.
3. Schedule the report to run. Did it process successfully? Yes. Click on the success link in the instance. What server was used to process the schedule ?  
Vancouver Server Group
  - a) Right-click **U## Order Amount per Country** and select *Schedule*.
  - b) Click *Schedule*.
4. Stop all the servers that are members of the Vancouver Servers Group
  - a) In the CMC, navigate to the *Servers* page.
  - b) Navigate to *Server Groups* → *Vancouver Server Group*.
  - c) Select all the servers under this group and click *Stop*.
5. Schedule and view the same Crystal Report created earlier.  
Are you successful? Observe any error messages that you receive.
  - a) In the BI Launch pad, navigate to **U## Order Amount per Country**.
  - b) Right-click **U## Order Amount per Country** and select *View*.
  - c) Right-click **U## Order Amount per Country** and select *Schedule*.
6. Restart servers in the Vancouver Server Group.
  - a) In the CMC, navigate to the *Servers* page.
  - b) Navigate to *Server Groups* → *Vancouver Server Group*.
  - c) Select all the servers under this group and click *Start*.



## Exercise 3: Configure the File Repository Servers for High Availability

### Exercise Objectives

After completing this exercise, you will be able to:

- Identify the root directory of the Input File Repository Server
- Set up active/passive File Repository Servers

### Business Example

You need to set up active/passive File Repository Servers.

### Task:

Using the Central Management Console, install a second and third Input File Repository Server.

1. In the Central Management Console, add a second and third Input File Repository Server.

| Field Name | Value               |
|------------|---------------------|
| User name  | Administrator       |
| Password   | <assigned password> |

2. Start and enable the new Input File Repository Servers.
3. Ensure that the root directories of each Input File Repository Server is pointing to the directory where the files are stored
4. Stop all the Input File Repository Servers and start them again in the following order:

| Order | Server                       |
|-------|------------------------------|
| 1     | Input File Repository Server |
| 2     | U## File Repository Server 2 |
| 3     | U## File Repository Server 3 |

*Continued on next page*

5. Go to: D:\Program Files (x86)\SAP Business Objects\SAP Business Objects Enterprise XI4.0\Data\CrystalReportsCachingServer and delete the cache directory. This ensures that you will not be able to view cached pages.
6. Using the BI Launch Pad, navigate to the *Report Samples\Demonstration* folder and view the **World Sales Report**.
7. Stop the **Input File Repository Server**.
8. View the **Order Processing efficiency Report**.  
Are you able to view the report? If so, which Input File Repository Server handled the request to view this report?
9. ) Stop the **U## File Repository Server 2**.
10. View the **Customer List** report.  
Are you able to view the report? If so, which Input File Repository Server handled the request to view this report?
11. Stop the **U## File Repository Server 3**.
12. View the **Comparative Income Statement** report.  
Are you able to view the report? If so, which Input File Repository Server handled the request to view this report?
13. Restart the **Input File Repository Server**.
14. Remove both **U## File Repository Server 2** and **U## File Repository Server 3**



## Solution 3: Configure the File Repository Servers for High Availability

### Task:

Using the Central Management Console, install a second and third Input File Repository Server.

1. In the Central Management Console, add a second and third Input File Repository Server.

| Field Name | Value               |
|------------|---------------------|
| User name  | Administrator       |
| Password   | <assigned password> |

- a) Click *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects BI platform* → *SAP BusinessObjects BI platform Central Management Console*.
  - b) Log on with your username and password.
  - c) In the *CMC Home* page, click *Servers*.
  - d) Navigate to *Servers List* and click *Manage* → *New* → *New Server*.
  - e) In the *Service Category* field, select **Core Services**. Change the *Select Service* to **Input Filestore Service**. Click *Next*. In the *Available Additional Service* screen, click *Next* again.  
In the *Server Name* field, enter **U## File Repository Server 2**. Click *Create*.
  - f) Repeat the steps above to create U## File Repository Server 3.
2. Start and enable the new Input File Repository Servers.
    - a) Navigate to *Servers List* and select both U## File Repository Server 2 and U## File Repository Server 3
    - b) Click *Start* and then Click *Enable*.

*Continued on next page*

3. Ensure that the root directories of each Input File Repository Server is pointing to the directory where the files are stored

- a) Right-click the **Input File Repository Server** and click *Properties*.
- b) In the *Properties* tab, navigate to the *File Store Directory* field.

The value *%DefaultInputFRSDir%* specifies the directory where file repository objects are stored.



**Note:** You may encounter performance issues if this directory does not have adequate disk space.

- c) Click the *Placeholders* tab.
  - d) Lookup the name *%DefaultInputFRSDir%*.
  - e) Write down the value for *%DefaultInputFRSDir%*.
4. Stop all the Input File Repository Servers and start them again in the following order:

| Order | Server                       |
|-------|------------------------------|
| 1     | Input File Repository Server |
| 2     | U## File Repository Server 2 |
| 3     | U## File Repository Server 3 |

- a) Navigate to *Servers List* and select all three servers and click *Stop*.



**Hint:** Wait a few moments for the servers to stop.

- b) Select the first server on the list and click *Start*.
  - c) Select the second server on the list and click *Start*.
  - d) Select the third server on the list and click *Start*.
5. Go to: D:\Program Files (x86)\SAP Business Objects\SAP Business Objects Enterprise XI4.0\Data\CrystalReportsCachingServer and delete the cache directory. This ensures that you will not be able to view cached pages.
  - a) Navigate to the directory and delete all the cache directory.

*Continued on next page*

6. Using the BI Launch Pad, navigate to the *Report Samples\Demonstration* folder and view the **World Sales Report**.
  - a) Click *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects BI platform* → *SAP BusinessObjects BI platform Java BI Launch Pad*.
  - b) Log on with your username and password.
  - c) Click *Documents*.
  - d) Navigate to *Folders* → *Public Folders* → *Report Samples* → *Demonstration* folder.
  - e) Right-click **World Sales Report** and select *View*.
7. Stop the **Input File Repository Server**.
  - a) In the CMC, navigate to *Servers List* and select **Input File Repository Server**.
  - b) Click *Stop*.
8. View the **Order Processing efficiency Report**.

Are you able to view the report? If so, which Input File Repository Server handled the request to view this report?

  - a) In the BI Launch Pad, navigate to *Folders* → *Public Folders* → *Report Samples* → *Demonstration* folder.
  - b) Right-click **Order Processing efficiency Report** and select *View*.
9. ) Stop the **U## File Repository Server 2**.
  - a) In the CMC, navigate to *Servers List* and select **U## File Repository Server 2**.
  - b) Click *Stop*.
10. View the **Customer List** report.

Are you able to view the report? If so, which Input File Repository Server handled the request to view this report?

  - a) In the BI Launch Pad, navigate to *Folders* → *Public Folders* → *Report Samples* → *Demonstration* folder.
  - b) Right-click **Customer List report** and select *View*.

*Continued on next page*

11. Stop the **U## File Repository Server 3**.
  - a) In the CMC, navigate to *Servers List* and select **U## File Repository Server 3**.
  - b) Click *Stop*.
12. View the **Comparative Income Statement** report.

Are you able to view the report? If so, which Input File Repository Server handled the request to view this report?

  - a) In the BI Launch Pad, navigate to *Folders* → *Public Folders* → *Report Samples* → *Demonstration* folder.
  - b) Right-click **Comparative Income Statement** and select *View*.
13. Restart the **Input File Repository Server**.
  - a) In the CMC, navigate to *Servers List* and select **Input File Repository Server**.
  - b) Click *Start*.
14. Remove both **U## File Repository Server 2** and **U## File Repository Server 3**
  - a) In the CMC, navigate to *Servers List* and select both **U## File Repository Server 2** and **U## File Repository Server 3**.
  - b) Click *Delete*.

## Exercise 4: Back up and Restore a SAP BusinessObjects BI deployment

### Exercise Objectives

After completing this exercise, you will be able to:

- Restore a failed SAP BusinessObjects BI deployment
- Back up respective file stores and databases
- Describe recovery process

### Business Example

You need to restore a failed SAP BusinessObjects deployment. It consists of backing up respective file stores and databases, as well as the recovery process.

### Task 1: Back up SAP BusinessObjects deployment

1. Create a backup of the Input file store, the output file store, The SIA bootstrap files, the server configuration, and the System Database.
2. Create a backup of the SAP business Objects Server Configuration using the CCM

### Task 2: Create a backup of the BIP40 system database

1. Using SQL Server 2005 Management Studio, create a new database and call it BIP40\_System\_Backup

| Field          | Value                     |
|----------------|---------------------------|
| Server type    | Database Engine           |
| Server name    | <hostname>                |
| Authentication | SQL Server Authentication |
| User name      | <hostname>\boadmin        |
| Password       | <assigned password>       |
| Database name  | BIP40_System_Backup##     |

2. Create a an ODBC System DSN using the SQL NATIVE DRIVER and call it **BIP40\_System\_Backup##\_DSN**

*Continued on next page*

3. In the CCM, copy the system data from BOE4X to BIP40\_System\_Backup##.
4. Start all functional SIAs in the CCM.
5. Restart Apache Tomcat.
6. Verify you can log on and view the World Sales Report found in the *Report Samples\Demonstration* folder.

### **Task 3: Restore a failed SAP BusinessObjects BI platform 4.0 implementation.**

1. Restore the SIA Bootstrap files from the BIP40 Back up directory to the designated location
2. Restore the Input and Output Directory from the BIP40 Backup Directory (ensure you override all existing files and subdirectories)
3. Restore the CMS system DB by going to the configuration tabs in the properties for the SIANode4x. Use the **Update Data Source Settings** and point the CMS to the **BIP\_System\_Backup DSN**.
4. Start SIANode4x and wait until all BOE servers have been started
5. Restore Server Configuration

### **Result**

To test, log on to the CMC and verify you can view the World Sales Report in the Report Samples\Demonstration directory

## Solution 4: Back up and Restore a SAP BusinessObjects BI deployment

### Task 1: Back up SAP BusinessObjects deployment

1. Create a backup of the Input file store, the output file store, The SIA bootstrap files, the server configuration, and the System Database.
  - a) Create a folder in the Desktop and name it **BIP40 Backup**
  - b) Copy both the **Input** and **Output** directories from *D:\Program Files (x86)\SAP Business Objects\SAP Business Objects Enterprise XI4.0\FileStore\*
  - c) Copy the **SIA bootstrap files** for all of your functional nodes found in *D:\Program Files (x86)\SAP Business Objects\SAP Business Objects Enterprise XI4.0\win64\_x64*
2. Create a backup of the SAP business Objects Server Configuration using the CCM
  - a) Click *Start → Programs → SAP BusinessObjects BI platform 4.0 → SAP BusinessObjects BI platform → Central Configuration Manager*.
  - b) Click the *Back up Server Configuration* button (with a white Arrow surrounded by red).
  - c) Click *Next* on the welcome screen.
  - d) Use the default option *Use existing running CMS* and click *Next*.
  - e) Enter the login information and click *Next*.
  - f) Specify the path to the BIAR file and click *Next*.



**Hint:** Save the BIAR archive to the **BIP40 Backup Folder**.

- g) *Finish*.

### Task 2: Create a backup of the BIP40 system database

1. Using SQL Server 2005 Management Studio, create a new database and call it BIP40\_System\_Backup

*Continued on next page*

| Field          | Value                     |
|----------------|---------------------------|
| Server type    | Database Engine           |
| Server name    | <hostname>                |
| Authentication | SQL Server Authentication |
| User name      | <hostname>\boadmin        |
| Password       | <assigned password>       |
| Database name  | BIP40_System_Backup##     |

- a) Click *Start* → *Programs* → *Microsoft SQL Server 2005* → *SQL Server Management Studio*.
- b) Enter the login information and click *Connect*.
- c) From the *Object Explorer*, right-click *Databases* and select *New Database....*
- d) In the *Database name* field, enter **BIP40\_System\_Backup##**.
- e) Click *OK*.

*Continued on next page*



2. Create a an ODBC System DSN using the SQL NATIVE DRIVER and call it **BIP40\_System\_Backup##\_DSN**
  - a) Click *Start* → *Programs* → *Administrative Tools* → *Data Sources (ODBC)*.
  - b) Click the *System DSN* tab.
  - c) Click *Add...*
  - d) Select *SQL Server Native Client* as the driver for which you want to set up the data source.
  - e) Click *Finish*.
  - f) In the *Name* field, enter **BIP40\_System\_Backup##\_DSN** for the data source.
  - g) In the *Description* field, enter a brief description for your data source.
  - h) In the *Server* selection list, select your hostname for the SQL Server.
  - i) Click *Next*.
  - j) On the authentication screen, leave everything as default and click *Next*.
  - k) Change the default database to **BIP40\_System\_Backup##**.
  - l) Click *Next*.
  - m) Click *Finish*.



**Hint:** You can test the connectivity by clicking the *Test Data Source* button. Ensure the result is successful. Click *OK* to exit the window.

*Continued on next page*

3. In the CCM, copy the system data from BOE4X to BIP40\_System\_Backup##.
  - a) In the CCM, stop all functioning SIAs in your BIP40 deployment. Go to the properties of the **SIANode4x** and navigate to the *Configuration* tab.
  - b) Under the *CMS System Database Configuration* area, click *Specify*.  
CMS Database Setup window will appear.
  - c) Select *Copy data from another Data Source* and click *OK*. The specify data source window appears
  - d) In the *Copy to the following data source* field, use the *Browse* button to select the System DSN pointing to the **BIP40\_System\_Backup##** you created earlier.
  - e) In the *Get data from* field, select the **BOE4x** System DSN and click *OK*.



**Hint:** BOE4x is found under the **Machine Data Source** tab in the **Data Source** window.

- f) A warning appears, click *OK* to proceed with the migration
  - g) Once the migration completes, you will need to re-point the CMS to the original **BOE4x** DSN by clicking on the *Specify* button in the *Configuration* tab, and select *Update Data Source Settings* to select the **BOE4x** DSN
4. Start all functional SIAs in the CCM.
  - a) Right-click **Server Intelligence Agent (SIANode4x)** and click *Start*.
  - b) Repeat this step for other SIAs in CCM.
5. Restart Apache Tomcat.
  - a) Right-click **Apache Tomcat** and click *Start*.
6. Verify you can log on and view the World Sales Report found in the *Report Samples\Demonstration* folder.
  - a) Click *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects BI platform* → *SAP BusinessObjects BI platform Java BI Launch Pad*.
  - b) Log on with your username and password
  - c) Navigate to the *Report Samples\Demonstration* folder
  - d) Right-click the **World Sales Report** and click *View*.

*Continued on next page*

### Task 3: Restore a failed SAP BusinessObjects BI platform 4.0 implementation.

1. Restore the SIA Bootstrap files from the BIP40 Back up directory to the designated location
  - a) Copy the SIA bootstrap backup files back to the directory: *D:\Program Files (x86)\SAP Business Objects\SAP Business Objects Enterprise XI4.0\win64\_x64*
2. Restore the Input and Output Directory from the BIP40 Backup Directory (ensure you override all existing files and subdirectories)
  - a) Copy the backup Input and Output directories back to *D:\Program Files (x86)\SAP Business Objects\SAP Business Objects Enterprise XI4.0\FileStore\*
3. Restore the CMS system DB by going to the configuration tabs in the properties for the SIANode4x. Use the **Update Data Source Settings** and point the CMS to the **BIP\_System\_Backup DSN**.
  - a) In the CCM, go to the properties of the **SIANode4x** and navigate to the *Configuration* tab.
  - b) Under the *CMS System Database Configuration* area, click *Specify*.  
CMS Database Setup window will appear.
  - c) Select *Update Data Source Settings* and click *OK*.
  - d) Select *SQL Server (ODBC)* and click *OK*. Select the System DSN pointing to the **BIP\_System\_Backup DSN**.
  - e) Enter the assigned Login ID and Password and click *OK*.
4. Start SIANode4x and wait until all BOE servers have been started
  - a) Select **SIANode4x** and click *Start*.
5. Restore Server Configuration
  - a) In the CCM, restore the server configuration settings from the BIAR file saved to the BIP40 Backup directory in the Windows Desktop

### Result

To test, log on to the CMC and verify you can view the World Sales Report in the Report Samples\Demonstration directory



## Lesson Summary

You should now be able to:

- List deployment options for the application tier
- Explain vertical and horizontal scaling options
- Describe the new capabilities of the wdeploy tool and its role in creating high availability in the application tier
- Understand high availability in the Intelligence tier
- Describe the process of CMS clustering
- Manage active/passive file repository servers
- Describe the SAP BusinessObjects BI platform servers in the Processing tier
- Understand the concept of server groups
- Create and work with server groups



## Unit Summary

You should now be able to:

- Describe the challenges in a Business Intelligence solution
- Explain the key factors in making your systems fault tolerant and highly available
- Define the deployment strategies for high availability in SAP BusinessObjects BI platform
- List deployment options for the application tier
- Explain vertical and horizontal scaling options
- Describe the new capabilities of the wdeploy tool and its role in creating high availability in the application tier
- Understand high availability in the Intelligence tier
- Describe the process of CMS clustering
- Manage active/passive file repository servers
- Describe the SAP BusinessObjects BI platform servers in the Processing tier
- Understand the concept of server groups
- Create and work with server groups





## Test Your Knowledge

1. What is a disaster?

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2. Fault tolerance is also referred to as graceful degradation?

*Determine whether this statement is true or false.*

- ☐ True  
☐ False

3. Name two benefits of hardware load balancers.

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4. What is a CMS cluster?

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## Answers

1. What is a disaster?

**Answer:** A disaster is any unanticipated event that creates a defined problem. Disasters are usually considered in terms of severity.

2. Fault tolerance is also referred to as graceful degradation?

**Answer:** True

Fault tolerance is also referred to as graceful degradation.

3. Name two benefits of hardware load balancers.

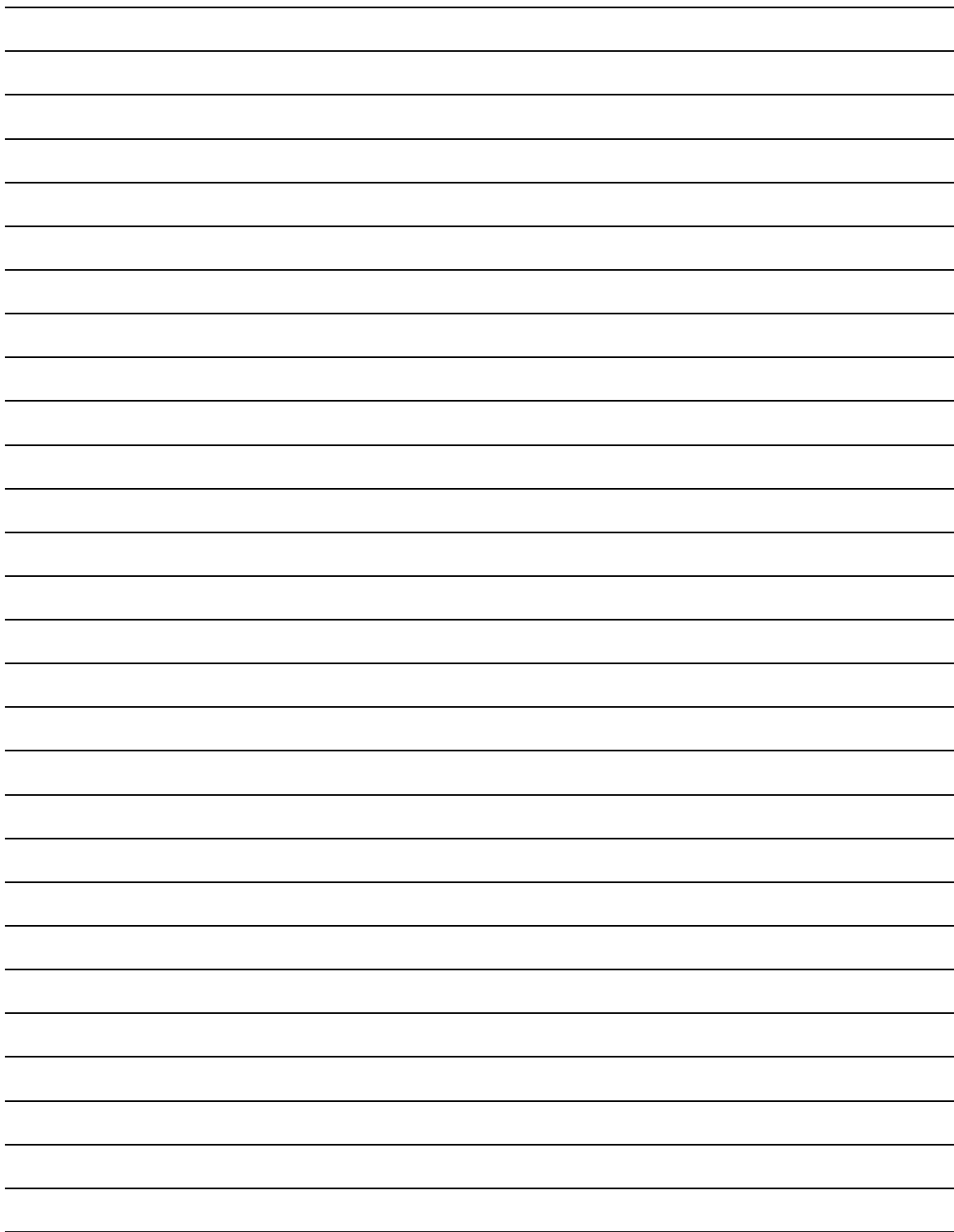
**Answer:**

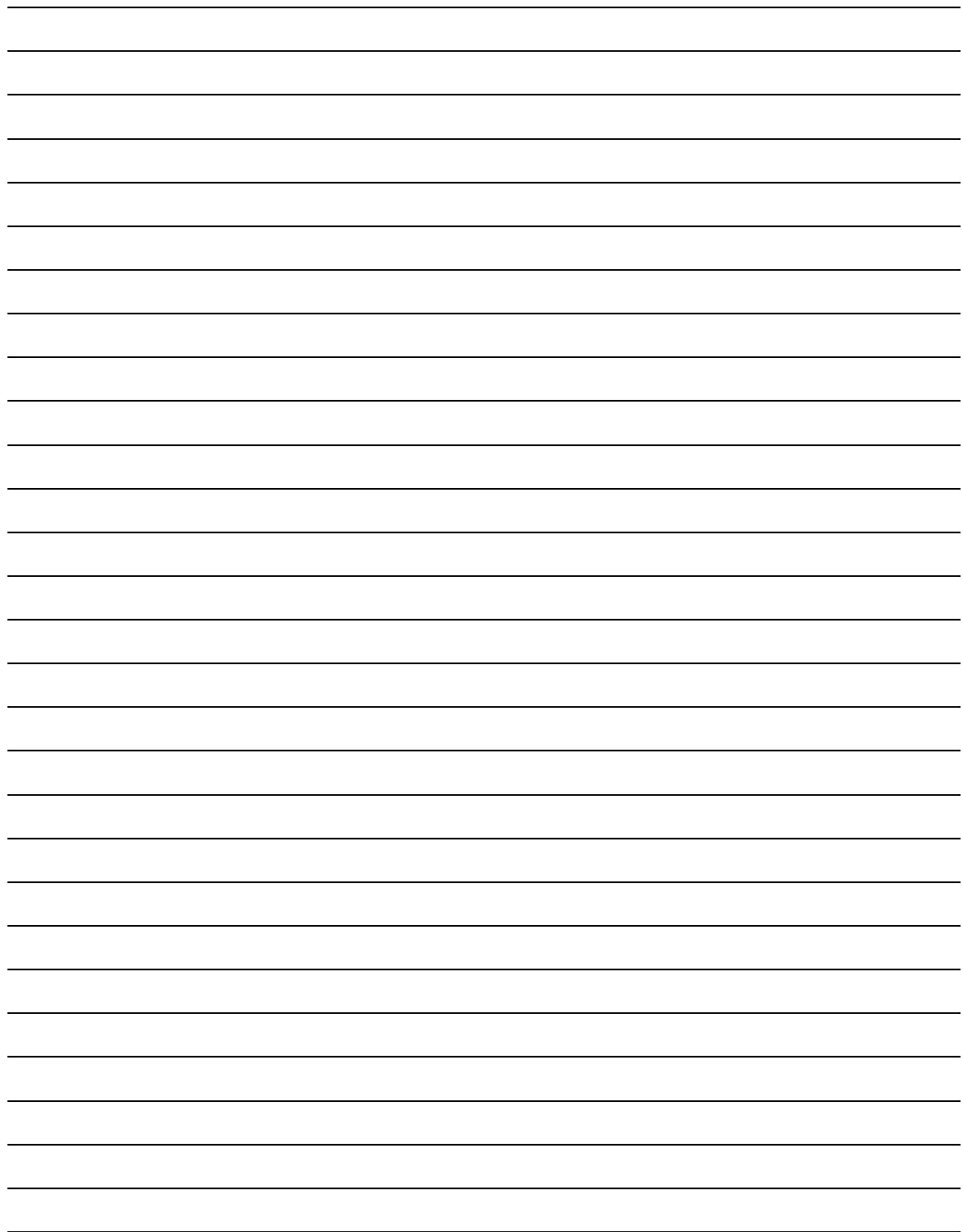
1. Monitoring network availability of servers within a cluster.
2. Accommodating session state.

4. What is a CMS cluster?

**Answer:** CMS clusters are a set of two or more CMS servers that function as a single CMS. The CMSs in a cluster work together to maintain the common system database.











# Unit 4

## Performance, Scalability and Sizing

### Unit Overview

This unit provides an overview of how SAP BusinessObjects BI platforms is designed. It discusses the various reasons for sizing a system including the concept of scalability. The lesson includes a methodology you can use to calculate a sizing solution.



### Unit Objectives

After completing this unit, you will be able to:

- Define scalability
- List and describe general SAP BusinessObjects BI platform scalability considerations
- Define the sizing process
- Size a SAP BusinessObjects BI platform deployment
- Determine system usage, reporting, document interaction, and general deployment requirements
- Analyze deployment requirements to determine the size and configuration of a deployment
- Identify service thresholds

### Unit Contents

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## Lesson: Designing a Scalable System

### Lesson Overview

The SAP BusinessObjects BI platform architecture is scalable in that it allows for a multitude of server configurations, ranging from standalone, single-machine environments to large-scale deployments supporting global organizations. The flexibility offered by the product's architecture allows you to set up a system that suits your current report requirements without limiting the possibilities for future growth and expansion.



### Lesson Objectives

After completing this lesson, you will be able to:

- Define scalability
- List and describe general SAP BusinessObjects BI platform scalability considerations

### Business Example

#### What is Scalability?

Scalability is the capacity to address additional system load by adding resources without fundamentally altering the implementation architecture or implementation design.

When building a scalable system, the main objective is to achieve a linear relationship between the amount of resources added and the resulting increase in performance, while maintaining the speed of the transactions after additional users are added and more requests need to be processed.

There are two methods of scaling SAP BusinessObjects BI platform: vertical and horizontal. Vertical scaling, also referred to as scaling up, is the ability to improve system performance by taking advantage of the hardware on a single server. Horizontal scaling, also referred to as scaling out, is the ability to improve system performance by adding computers to the same enterprise solution. Adding memory to the machine on which the Web Intelligence Processing Server is running to improve performance is an example of vertical scaling. Adding a new machine to the enterprise system and configuring additional Crystal Reports Processing Server services on it, thus improving performance, is an example of horizontal scaling.

Depending on your situation, you can run all services on one machine or you can run them on separate machines. For example, you can run the Central Management Server and the Event Server on one machine, while you run the Adaptive Processing Server on a separate machine. The same service can also run in multiple instances on a single machine.

## General SAP BusinessObjects BI platform Scalability Goals

When scaling your system, it is important to understand the general considerations for system scalability and how each of the SAP BusinessObjects BI platform servers is responsible for particular aspects of your system. You can scale a system to:

- Increase overall system capacity.
- Increase schedule reporting capacity.
- Increase report viewing capacity.
  - Increase on-demand viewing capacity.
  - Increase interactive viewing capacity.
- Improve web response speeds.
  - Configure a web farm for load balancing.
  - Optimize custom web applications.

This section focuses on the different aspects of your system's capacity, discusses the relevant components, and provides a number of ways in which you might modify your configuration accordingly.

The overall performance and scalability of SAP BusinessObjects BI platform can be affected by external factors. When thinking about the overall performance and scalability of SAP BusinessObjects BI platform, keep in mind these points:

- SAP BusinessObjects BI platform depends upon your existing IT infrastructure. SAP BusinessObjects BI platform uses your network for communication between servers and for communication between SAP BusinessObjects BI platform and client machines on your network. Make sure that your network has the bandwidth and speed necessary to provide SAP BusinessObjects BI platform users with acceptable levels of performance.
- SAP BusinessObjects BI platform processes reports against your database servers. If your databases are not optimized for the reports you need to run, the performance of SAP BusinessObjects BI platform may suffer.
- The way in which your network is configured and the third-party tools that are used in correlation with SAP BusinessObjects BI platform may affect the performance of SAP BusinessObjects BI platform.

## Increasing Overall System Capacity

As the number of report objects and users on your system increases, you can increase the overall system capacity by clustering two (or more) Central Management Servers (CMS). You can install multiple CMS services on the same machine. However, to provide server redundancy and fault tolerance, you should ideally install each cluster member on its own machine.

CMS clusters can improve overall system performance because every SAP BusinessObjects BI platform request results, at some point, in a server component querying the CMS for information stored in the CMS database. When you cluster two CMS machines, you instruct the new CMS to share in the task of maintaining and querying the CMS database.

## Increasing Scheduled Reporting Capacity

### Increasing Scheduled Reporting Capacity

All reports (Crystal Reports and Web Intelligence Reports) that are scheduled are processed by a job server. You can expand SAP BusinessObjects BI platform by running individual job servers on multiple machines or by running multiple job servers of different types on a single multi-processor machine.



**Note:** The Web Intelligence Processing Server is added because it is responsible for scheduling the physical processing of a Web Intelligence document.



If the majority of your reports are scheduled to run on a regular basis, there are several strategies you can adopt to maximize your system's processing capacity:

- Install all Adaptive Job Servers and Adaptive Processing Server in close proximity to (but not on the same machine as) the database server against which the reports run. Ensure that the File Repository Servers are readily accessible to the installed services (so you can send a read report objects request from the Input File Repository Server and send a request to write report instances to the Output File Repository Server quickly). Depending upon your network configuration, these strategies may improve the processing speed of your scheduled documents because there is less distance for data to travel over your corporate network.
- Verify the efficiency of your reports. When designing reports in Crystal Reports, there are a number of ways in which you can improve the performance of the report itself by modifying record selection formulas, using the database server's resources to group data, incorporating parameter fields, and so on.
- Use event-based scheduling to create dependencies between large or complex reports. For instance, if you run several very complex reports on a regular nightly basis, you can use Schedule events to ensure that the reports are processed sequentially. This is a useful way of minimizing the processing load that your database server is subject to at any time.
- If some reports are much larger or more complex than others, consider distributing the processing load through the use of server groups. For instance, you might create two server groups, each containing one or more Adaptive Job Servers. When you schedule recurrent reports, you can specify that it be processed by a particular server group to ensure that especially large reports are executed by more powerful servers.
- Increase the hardware resources that are available to your scheduling services. If the server is currently running on a machine along with other SAP BusinessObjects BI platform components, consider moving the server to a dedicated machine. If the new machine has multiple CPUs, you can install multiple Adaptive Job and Adaptive Processing Servers on the same machine (typically no more than one service per CPU).

## Increasing Report Viewing Capacity

### Increasing on-demand viewing capacity

When you provide many users with View On Demand access to reports, you allow each user to view live report data by refreshing reports against your database server. For most requests, the Crystal Reports Processing Server retrieves the data and performs the report processing, and the Crystal Reports Cache Server stores recently

viewed report pages for possible reuse. If users use the Advanced DHTML viewer, the Report Application Server (RAS) processes the request. If users use Web Intelligence, the Web Intelligence Processing Server processes the request.

If your reporting requirements demand that users have continual access to the latest data, you can increase capacity in the following ways:

- Increase the maximum allowed size of the cache for Crystal Reports.
- Verify the efficiency of your reports. When designing reports in Crystal Reports, there are a number of ways in which you can improve the performance of the report itself by modifying record selection formulas, using the database server's resources to group data, incorporating parameter fields, and so on. The efficiency of the design of your universes impacts the processing speed of Crystal Reports.
- Increase the number of Crystal Reports Processing Servers that serve requests on behalf of any single Crystal Reports Cache Server. You can install additional Crystal Reports Processing Servers on multiple machines.
- Increase the number of Crystal Reports Processing Servers, Crystal Reports Cache Servers, Web Intelligence Processing Servers, and Connection Servers on the system, and then distribute the processing load through the use of server groups. For instance, you might create two server groups, each containing one or more Crystal Reports Processing Servers along with one or more Report Application Servers. You can then specify individual reports that should always be processed by a particular server group.

### **Increasing interactive viewing capacity**

When you provide many users with interactive viewing capability, you allow each user to interact with live data by refreshing reports against your relational database server or OLAP data source. If your reporting requirements demand users have continual access and interactivity with live data, you can increase capacity in the following ways:

- Verify the efficiency of your reports. When designing reports with Web Intelligence you will gain the most improvement by carefully investigating the efficiency of the underlying universe.
- Increase the number of Web Intelligence Processing Servers that create, view, and edit Web Intelligence portal requests.

## Improving Web Response Speeds

Because all user interaction with SAP BusinessObjects BI platform occurs over the web, you may need to investigate a number of areas to determine exactly where you can improve web response speeds. These are some common aspects of your deployment that you should consider before deciding how to expand SAP BusinessObjects BI platform:

- Assess your web server's ability to serve the number of users who connect regularly to SAP BusinessObjects BI platform. Use the administrative tools provided with your web server software (or with your operating system) to determine how well your web server performs. If the web server is limiting web response speeds, consider increasing the web server's hardware and/or setting up a "web farm" (multiple web servers responding to web requests to a single IP address).
- If web response speeds are slowed only by report viewing activities, you can increase scheduled reporting capacity and on-demand viewing capacity.
- Take into account the number of users who regularly access your system. If you are running a large deployment, ensure that you have set up a CMS cluster.

If you find that a single application server (for example, the Tomcat Java Web Application Server) inadequately serves the number of scripting requests made by users who access your system on a regular basis, consider the following options:

- Increase the hardware resources that are available to the application server. If the application server is currently running on the web server or on a single machine with other SAP BusinessObjects BI platform components, consider moving the application server to a dedicated machine.
- Consider setting up two (or more) Java application servers. Consult the documentation for your Java Web Application Server for information on load-balancing, clustering, and scalability.



**Note:** If your deployment requires a higher level of failover and fault tolerance, exceeds three or more servers, or serves a large number of users who would be severely affected by any system outage, then it is strongly advised that you distribute the load of the application tier over multiple application servers balanced through a hardware load balancer. Each application server will connect to any CMS service running in the cluster, so the failure of one application server would only affect the application tier, not the processing tier.

### Using a web farm for load balancing

A web farm is a group of two or more web servers working together to handle browser requests. Web farms are not currently supported by SAP BusinessObjects BI platform. However, that is not to say that they won't work together. Some customers have

successfully deployed using web farms, but it is not a scenario that is tested during the QA cycle, as a web server is not required as part of a SAP BusinessObjects BI platform deployment. For Java environments specifically, there are no known issues with the use of any web server proxy components that are supported by the application server vendor or provider.



**Note:** For proxy load balancing, just as with hardware-based load balancing, the use of sticky sessions is required.

### Optimizing custom web applications

If you are developing your own custom desktops or administrative tools with the SAP BusinessObjects BI platform Software Development Kits (SDK), be sure to review the libraries and APIs. You can now, for instance, incorporate complete security and scheduling options into your own web applications. You can also modify server settings from within your own code to further integrate SAP BusinessObjects BI platform with your existing intranet tools and overall reporting environment.

In addition, be sure to check the developer documentation available on your SAP BusinessObjects BI platform product CD for performance tips and other scalability considerations. The query optimization section in particular provides some preliminary steps to ensuring that custom applications make efficient use of the query language.



## Lesson Summary

You should now be able to:

- Define scalability
- List and describe general SAP BusinessObjects BI platform scalability considerations

## Lesson: Sizing an SAP BusinessObjects BI platform deployment

### Lesson Overview

Every SAP BusinessObjects BI deployment is unique and careful sizing calculations and additional post-install testing is necessary in creating a successful deployment.



### Lesson Objectives

After completing this lesson, you will be able to:

- Define the sizing process
- Size a SAP BusinessObjects BI platform deployment

### Business Example

You want to maximize the value of any sizing you conduct, you need to determine the differences between your user mix and landscape versus the deployment used to generate the sizing guide data. You also want to find additional tuning and configuration information which you can use to increase the performance of your BI 4.0 deployments.

### About Sizing

Sizing for versions 3.1 and earlier were conducted using CPU Units. As of BI 4.0, CPU Units are deprecated – they are no longer used for sizing BI 4.0 and later deployments. There are many advantages to providing sizing estimates in SAPS including:

- Each hardware partners generates the SAPS rating for the systems that they sell. This means the SAPS ratings are always current – there is built in anti-obsolescence.
- SAPS are O/S independent, scalar units of capacity
- SAP Business Objects BI 4.0 sizing approach is now consistent with how SAP provides sizing information for other products like Business Suite 7

## The Sizing Process

Since CPU Units are deprecated for sizing and each deployment is reliant on SAP hardware partners, the sizing process of determining the system load and determining the number of services required are no longer applicable for BI 4.0 implementation. Instead the following step is recommended:

1. Determine the active-current users for each of the BI4.0 Client tools (Analysis, edition for OLAP, BI Workspace, Crystal Reports 2011, Crystal Reports Enterprise, Dashboards (Dashboard Design), Connection Server and Web Intelligence)
2. Work with SAP certified hardware partners using SAPS to secure the required resources following the detailed description and guidelines for BI 4.0 Services.

## What is a SAPS?

SAP Application Performance Standard (SAPS) is a scalar, architecture and O/S independent measure of capacity. It has been developed over the last 19 years and every hardware platform we support has a SAPS value which is calculated by the hardware partner using the SAP SD Benchmark (the “SAP Standard Benchmark Kit”). Each Tshirt sizing guide describes SAPS in more detail.



**Hint:** An active-concurrent user is a user who is actively executing a workflow. In the benchmarks used to create this document, all users are active-concurrent. No user is idle (i.e. sitting at the BI Launch Pad home page).

## Service Capacity

This section contains service capacity as measured against concurrent-active users utilizing each particular service.

| Service Name                 | Recommended Maximums                      |
|------------------------------|---|
| Central Management Server    | 500 concurrent-active users per instance. |
| Crystal Reports Cache Server | 400 simultaneous requests per instance.   |

| Service Name                                | Recommended Maximums   |
|---|--|
| Crystal Reports Processing Server (CR 2011) | If maximum simultaneous report jobs is set to auto, 1 service per CPU will default to 25 simultaneous requests – except single CPU machine which defaults to 50. Only configure 1 CR Processing Server instance per machine (unless you're using server groups). |
| Web Intelligence Processing Server          | 25 simultaneous connections per instance.  |
| Web Application Server                      | 100 simultaneous requests per core for Java viewer. 50 simultaneous requests per core for HTML viewer.   |

## Server Intelligence Agent

One Server Intelligence Agent (SIA) is required to run on each machine regardless of CPU configuration. The SIA maintains server status according to the settings you specify in the CMC. It processes the CMC's requests to start, stop, monitor, and manage all servers on the node, and it also monitors potential problems and automatically restarts servers that have shut down unexpectedly. The SIA ensures optimal performance by continually monitoring server status information, which is stored in the CMS database. When you change a server's settings or add a new server in the CMC, the CMS notifies the SIA, and the SIA performs the task.

## Memory Requirement

Only RAM memory consideration is required to maintain the execution of SIA. The recommended RAM memory is 350MB.

## Central Management Server

The principle component of the SAP Business Objects BI 4.0 system is the Central Management Server. Its primary responsibilities include (but are not limited) to the following:

- Management of Users & User Groups
- Management of object security
- Central system configuration
- Management of scheduled tasks
- Management of historical tasks. (such as success or failed instances) Cluster management
- Management of system objects (i.e., Info Objects)



- License management
- System database management
- Name service
- Cluster management

## General Considerations

The CMS manages many areas as described above. The state of various activities is persisted in the CMS repository. This is what enables multiple CMSs to run in a cluster as well as providing for fault tolerance. The CMS depends heavily on the repository for the proper functioning of BI 4.0. It is therefore imperative that the DBMS where the repository is optimally tuned and running on a machine with sufficient capacity (memory, CPU, fast disk and network bandwidth) and reliability. Stated another way, if access to the repository database is slow or the reliability is at question, then the BI 4.0 deployment will not deliver maximum performance and reliability. This also means network throughput between any node running a CMS and the repository database must not be affected by other heavy traffic (like backups running during production hours). This cannot be overstated.



**Note:** It is recommend that the maximum number of CMS services in a cluster to be 4. This is where the best balance of CMS performance and network traffic occurs.

## CMS Clustering Across Subnets

A cluster that has 2 or more CMS cluster members on different subnets is technically possible and has been QA tested. This configuration is supported by SAP, strictly providing that no significant additional network latency is created as a result of an additional subnet.

The most important factor to ensure efficient CMS clustering performance is to eliminate excessive latency between CMS services and the CMS Database.

For example: CMS1 and the CMS system database are located in the same datacenter in New York. CMS2 is a member of the same cluster as CMS1 but is located in China and must communicate with the CMS database in New York. Excessive network latency of CMS2 in China to the CMS database in New York would be problematic.

Make sure that all CMS members of a cluster have **uniform** communication speeds to the system database.



**Note:** For best performance, run each CMS cluster member on a machine that has the same type of CPU, same O/S, same amount of memory and so forth – the machines should be as identical as possible to ensure uniform performance.

## Processor Requirements

The number of cores (and, by association, SAPS) required to support CMS services will be highly dependent on the type of CMS activity. For example, large updates to the CMS system database (i.e. adding or deleting a large number of users; viewing or querying a large number of objects) will use significant CPU time. For increased CMS throughput and response times allocate additional CPU resources.

## Memory Requirements

For best performance, run each CMS cluster member on a machine that has the same amount of memory. Memory usage is controlled (roughly) by the number of objects stored in the object cache. The table earlier in this section covers how to adjust the maximum number of objects in the cache. This specifies the maximum number of objects that the CMS stores in its memory cache. Increasing the number of objects reduces the number of database calls required and greatly improves CMS performance. The memory restrictions that existed in earlier versions with respect to the number of objects in cache has been removed.

## Crystal Reports Cache Server

The Cache Server stores report pages generated by the Processing Server. By storing report pages in cache, the Processing Server and/or database server does not need to be accessed each time the report is requested. The Cache Server is used for viewing of Crystal Reports only, and if viewer's preference is set to any viewer other than Interactive DHTML.

When a report is requested for viewing, the system will first check the Cache Server to see if there are any current available cache pages generated for that report. If there are pages, the Cache Server will send available report pages to the Web Application Server. If there are no cached pages, the Cache Server will request a Processing Server to generate these pages.

The threshold that determines the number of Cache Server services required is the "maximum simultaneous processing threads" per Cache Server service. The number of "simultaneous processing threads" is equal to the number of simultaneous requests.

## Parameters for the Crystal Reports Cache Server

These parameters are set in the CMC. Note for parameters that affect the caching of user data, you should make sure the interval length is not any longer than the shortest interval for refresh of any referenced data source. Note the Oldest on-Demand Data settings will ensure that data is kept in cache no longer than the set interval no matter

how often the cached data is referenced. You should also make sure that any properties that apply to both the Crystal Reports Cache server and Crystal Reports Processing Server are set to the same respective value.

| Option                                    | Values  | Behavior   | Recommended Setting(s)  |
|---|---------|--|---|
| Oldest On-Demand Data Given to Clients    | seconds | Specifies the amount of time that the server uses cached data to meet request from ondemand reports. | Default value is 0 seconds – which means ODD is disabled<br>Recommended setting is 300000 |
| Viewer Refresh Always Yields Current Data | On/Off  | Control caching effectiveness  | ON  |
| Share Report Data Between Client          | On/Off  | Control caching effectiveness  | ON  |

## Disk Requirements

For the Cache Server service, sufficient hard drive disk space should be available for the generation of cache files as well as in the temp directory for the creation of temp files (located in `%DefaultDataDir%/CrystalReportsCachingServer/temp`). The location of Cache Server cache files can be specified from the Central Management Console. The highest volume of cache files will likely be the **encapsulated page file** or **.epf**. A single .epf file represents one page of a Crystal report and the size of the individual file is variable dependent on the complexity of the report page (e.g., a single .epf file from the sample **Statement of Account** report is 88kb in size). A sufficient amount of disk space should be made available to support all potential cache pages generated at a given period.

## File Repository Servers (FRS)

There is an Input and an Output File Repository Server in every SAP BusinessObjects BI 4.0 implementation.

- The Input File Repository Server manages the underlying report files, agnostic documents and other file content which is persisted on disk. Examples include Crystal Reports 2011 and Enterprise reports, Analysis, edition for OLAP reports, Web Intelligence reports, program objects, Microsoft Excel files, Microsoft Word files, Microsoft PowerPoint files, Adobe Acrobat PDFs, rich text format files, text files, hyperlinks, object packages. These are published to the system

by administrators or end users (using the Publishing Wizard, the Central Management Console, or a Business Objects designer component such as Crystal Reports or the Web Intelligence Java or HTML Report Panels)

- The Output FRS maintains all the instances that have been produced from reports (Crystal, or Web Intelligence), programs, and object packages that have been scheduled.

### Repository location

You may have multiple FRS (input) and FRS (output) services on one or several different machines to support a high-availability environment, however the FRS services will behave in an Active/Passive fashion where the first available FRS will be Active and all other FRS services will remain passive unless the Active FRS becomes unavailable. The Input and Output Repository do not have to reside on the same machine. The location of the FRS repositories is managed through the CMC in the Servers section under the Properties tab.

### Parameters for the FRS

| Option            | Values  | Behavior   | Recommended Setting(s)   |
|-------------------|---------|--|--|
| Maximum Idle Time | Minutes | This setting limits the length of time that the server waits before it closes inactive connection. | Default value is 20. Note: Setting a value too low can cause a user's request to be closed prematurely. Setting a value too high can cause excessive user of system resources such as processing and disk space. |

### Calculate Number of File Repository Servers (FRS) Required

One of each Input and Output File Repository Servers are required. In larger deployments, there may be multiple Input and Output File Repository Servers, for redundancy. In this case, all Input File Repository Servers must share the same directory. Likewise, all Output File Repository Servers must share a directory.

## Processor Requirements

The File Repository Servers require higher I/O resources (faster disk, network) and fewer CPU resources. When estimating resource requirements in the SAP BusinessObjects BI platform the File Repository Servers are not considered.

## Memory Requirements

The File Repository Servers will have little impact on system memory.

## Disk Requirements

Enough disk space must be available to store files. We recommend “fast” disk for both the input and output FRS file systems – especially for high volume publications. Typically the Output FRS will require more disk space than the Input FRS. The Output FRS maintains all the instances (with Saved Data) that have been produced from reports (Crystal or Web Intelligence), programs, and object packages that have been scheduled, and as such will require proportionately more disk space. For both the Input and Output FRS, the amount of space required will vary from system to system, however, knowing the average file size and multiplying this by the number of projected instances will assist in estimating total disk needs.

## Adaptive Processing Servers and Adaptive Job Servers

Adaptive Processing Server (APS) and Adaptive Job Servers (AJS) are java host containers that run other services. The APS is for ‘on-demand’ processing and the AJS is for delegating the processing for scheduled jobs. The APS can host one or more of the following services: Search Service, Client Auditing Proxy Service, MDAS, DSL Bridge Service, CVOM, Publishing Post Processing Service and Publishing Service. The AJS can host one or more services including the Destination Delivery Scheduling Service, the Publication Scheduling Service, the Program Scheduling Service, the Replication Service, the Crystal Reports Job Service, the LOV Job Service, the Web Intelligence Job Service and the Destination Configuration Service. This is not an exhaustive list.



**Note:** The DSL Bridge Service that runs in the APS is used by any BI 4.0 client tool which accesses BW data via the transient universe. Note the APS and AJS are not the same as the Java components of Crystal Reports Enterprise and the other products (like the Crystal Reports Processing Server).

### Parameters for the Adaptive Processing Server

| Option    | Behavior  | Recommended Setting   |
|-----------|---|---|
| Log level | Default setting is “unspecified”. Changing this to a higher logging level will increase the amount of disk space consumed which can grow quite large (i.e. setting this at a higher level on a production system which will also impact performance). Only increase the log level when troubleshooting. | Recommended to leave as “Unspecified”. Other values are “None”, “Low”, “Medium” and “High”. Consult the Administrator’s Guide for more information.   |
| -Xmx1024M | This command line flag will increase the server’s heap size. A 1GB heap size is recommended unless otherwise noted – check the specific sections below for exceptions.  | Enables to server to handle more requests. Ensure you have sufficient free memory at peak before increasing this value. Note that certain clients like Analysis, edition for OLAP may recommend a 4GB heap size for an APS running the MDAS service |

For APS instances running publication services, we recommend having 1 APS instance for every 3 concurrent publications.

For small deployments (running a dozen or less users) like development systems, small demo systems or sandbox systems where performance isn’t critical, you can run multiple types of services in a single APS.

For medium to large deployments, it is a general recommendation that an APS instance host only one service for those services which are critical to performance and that you will need to scale out as capacity is added. For example, you would not have one APS instance hosting the CVOM and DSL Session Service – you would have at least one for each. The memory requirements of some of the services hosted by the APS can be quite large. By separating services across APS instances (and nodes), you gain better manageability for memory and scalability considerations.

## **Adaptive Job Server- Web Intelligence Job Service**

### **Processor Requirements**

The Web Intelligence Job Service has a comparable function to the Crystal Reports Job Service in that it is responsible for handling Scheduled Jobs. However, the Web Intelligence Job Service does not actually “process” reports, but only acts as a scheduling manager or “router” sending jobs to be processed by the Web Intelligence Processing Server

### **Disk Requirements**

For the Web Intelligence Job Server service, sufficient hard drive disk space should be available in the temp directory for the creation of temp files during report processing. The data from the database server is stored in these files until it can be saved and compressed in the report

## **Adaptive Job Server- Crystal Reports Job Service**

### **Memory Requirements**

Depending on the design of a report, the number of records retrieved from the database, memory requirements may vary. When a report is executing and loaded into memory the report is decompressed and expanded up to as much as 40 times the original report file size (with saved data/retrieved records).

### **Disk Requirements**

For a Crystal Reports Job Service, sufficient hard drive disk space should be available in the temp directory for the creation of temp files during report processing (%DefaultDataDir%). The data from the database server is stored in these files until it can be saved and compressed in the report. Hard drive access speed to the temp directory may have an impact on the speed at which a report processes

## **Search Service**

The Search Service manages the delivery of search content.

- Memory: 500MB
- Disk space: same size as FRS

## **Client Auditing Proxy Service**

The Client Auditing Proxy Service manages the loggings of events of all clients.

- Load: N/A Memory:
- 500MB Disk space: N/A

## Services for Publishing

In order for the Publishing service to be available, the Publishing Post Processing Service, Publishing Service, and the destination Delivery Service need to be hosted.

## Program Scheduling Service

The Program Scheduling Service manages schedule executable objects. Memory and disk space consumption varies depending of individual executable runtime requirements.

## Dashboard Design

The tables below assume all BI 4.0 services are deployed on the same machine and the only load on the machine are Dashboard Design scenarios. Note the scenarios run at the suite level differ slightly from the workflows that form the basis of these observations. The differences were slight (a little less think time in one case and 100 more rows run in the Suite sizing case).

|        | Dashboard Design Processing Server  | Dashboard Design Cache Server   |
|--------|---|---|
| CPU    | Only one instance is needed per machine.<br>The processing server will manage its own child processes to take advantage of the systems resources                            | Only one instance is needed per machine.  |
| Memory | <b>Parent</b> 40MB base to 40MB under typical operation.<br><b>Children</b> 40MB base to 40MB under typical operation. The Java JVM is allowed up to 858 MB in heap memory. | 80MB base to 120MB under typical operation. The in-process Java JVM is allowed up to 858 MB in heap memory. |
| Disk   | No significant disk space is required for this server.  | Disk consumption is configurable. The default cache size is up to 250 MB but is used only as needed.        |



|                                 | Dashboard Design Processing Server   | Dashboard Design Cache Server   |
|---------------------------------|--|---|
| Process/Instance                | CPU Core dependent. 25 users per CPU core is the recommendation.   | CPU Core dependent. 25 users per CPU core is the recommendation.  |
| Optimal Configuration Parameter | Idle Connection Timeout = 2 minutes<br>Idle Job Timeout = 2 minutes  | Oldest On-Demand Data Given to Clients = 900 seconds<br>Idle Connection Timeout = 2 minute  |
| Sizing/Scale Note               | Adding additional processing servers should only be done if the processing server parent is the CPU bottleneck. This has never been the case in any test scenario. | Adding additional cache servers should only be done if the cache server is the CPU bottleneck. Since each cache server maintains a separate cache, adding more cache servers can have a negative effect since there is no guarantee that similar requests will reach the same cache server, thus prompting additional processing. |

## BI Workspaces

The tables below assume all BI 4.0 services are deployed on the same machine and the only load on the machine are BI Workspace scenarios. Note the scenarios run at the suite level differ slightly from the workflows that form the basis of these observations.

|        | Server Specific Comments   |
|--------|--|
| CPU    | Most of the BI Workspace code is now Java code being run by the Java Application Server (usually Tomcat). It is best to have one Java AS instance per each BOE instance in a clustered installation.                                   |
| Memory | It is critical that there is enough RAM available to the server instance so as not to require paging. If the Java AS is configured with a heap size of 2GB, and the operating system requires another 1GB, and other processes require |

|                                 | Server Specific Comments   |
|---------------------------------|--|
|                                 | another 2GB, then 6GB of RAM should be installed on the server to preserve a buffer for memory usage. Our load tests show that about 500MB of memory is recycled per hour during load. If possible, a heap size of 2GB should be allocated to the Java AS and another 2GB should be reserved for use by the C++ processes such as the CMS. |
| Disk                            | There is no critical requirement for disk space for BIW.   |
| Process/Instance                | On our hardware, we brought the server to 100% CPU usage with 250 users. However, you should plan for no more than 100 concurrent users per instance to keep the load on the server low and reserve server resources for peak usage times.   |
| Optimal Configuration Parameter | N/A  |
| Sizing/Scale                    | N/A  |

## Web Intelligence Processing Server

The Web Intelligence Processing Server is used to create, edit, view, and analyze Web Intelligence documents (stored in the Input/Output FRS). It also processes scheduled Web Intelligence documents and generates new instances of the document, which it stores on the Output File Repository Server (OFRS). Depending on the user's access rights and the refresh options of the document, the Web Intelligence Processing Server will use cached information, or it will refresh the data in the document and then cache the new information.

### Processor Requirements

The Web Intelligence Processing Server will expand to as many CPUs as needed by scaling-up the number of Web Intelligence Server service and can process several documents in parallel, so only 1 Web Intelligence report server is required per machine as a starting point

### Memory Requirements

Depending on the design of a report, the types of actions being performed (viewed, modified, refreshed) memory requirements will vary. A “refresh” request demands the greatest amount of memory for a Web Intelligence document as the database is queried and the entire dataset will be transferred to the Web Intelligence server.

When using several very large documents, it is not necessary to increase the number of Web Intelligence Processing Server instances to more than 1 per machine because in BI 4.0, the platform and all services are native 64 bit. You may choose to create more than one Web Intelligence Processing Server instance per machine for tuning reasons not related to memory.

Load balancing between the Web Intelligence Processing servers is handled by the CMS services automatically.

## **Crystal Reports Processing Server -**

Note there are two different types in BI 4.0. The Crystal Reports 2011 Processing Server utilizes the same architecture as previous versions. However, the Crystal Reports Enterprise Processing Server has a new architecture. Whereas the child processes were single threaded in previous versions, in Crystal Reports Enterprise, they run as threads in a Java component. This means additional tuning can be applied to the Crystal Reports Enterprise Processing Server.

Both Processing Servers are primarily responsible for responding to page requests by processing crystal reports and generating Encapsulated Page Format (EPF) pages. A single .epf file represents one page of a Crystal report. The Processing Server retrieves data for the report from the latest instance or directly from the database (depending on the user's request and user's security level).

Specifically, both Processing Servers respond to page requests made by the Cache Server. The Processing Server and Cache Server interact closely, so cached EPF (encapsulated page files) pages are reused as frequently as possible, and new pages are generated as soon as they are required. The InfoView portal takes advantage of this behavior by ensuring that the majority of report-viewing requests are made to the Cache Server and Processing Server. However, if a user's default viewer is the Interactive DHTML viewer, the Report Application Server processes the report.

The Crystal Reports 2011 Processing Server creates Processing Server Sub Processes. Each Sub Process loads CRPE and then instantiates threads or Print Jobs as needed. With the Crystal Reports 2011 Processing Server, if an individual Print Job were to fail for any reason, only those threads contained in the Processing Server Sub-Process would be affected. All other Sub Processes within the Processing Server service would be unaffected. In addition, individual Sub Processes are shut down after so many requests and a new Sub Process is started, if required, so as to maximize resource management

### Crystal Reports Enterprise Processing Server

| Option                                 | Values          | Behavior  | Recommended Setting(s)   |
|--|-----------------|---|--|
| Max. Concurrent Jobs                   | 0 for automatic |   |  |
| Max. Lifetime Jobs per child           | Number          |   | Default value is 1000  |
| Max. No. of Prestarted Children        | Number          |   | Default value is 1   |
| Idle Connection timeout                | Minutes         |   | Default value is 20  |
| Idle Job Timeout                       | Minutes         |   | Default value is 60 secs.                                      |
| Oldest On-Demand Data Given to Clients | Seconds         | Specifies the amount of time that the server uses cached data to meet request from on-demand reports. | Default value is 0 (disabled)<br>Recommended setting is 300000 |

### Crystal Reports 2011 Processing Server

| Option  | Values  | Behavior  | Recommended Setting(s)   |
|---|---------|---|--|
| Database Records Read When Previewing or Refreshing (0 for unlimited) |         | Specifies the max. no. of DB records to read when the report is being previewed or refreshed. Allows you to limit the no. of records that the server retrieves from the DB when a user runs a query report. | Default value is 20000.<br>Recommendation is to schedule large reports to reduce the load on your DB from these large queries. |
| Idle Job Timeout  | Minutes | Specifies the length of time, the CR Processing server  | Default value is 60 min.   |

| Option   | Values  | Behavior   | Recommended Setting(s)   |
|--|---------|--|--|
|  |         | waits between requests for a given job.  |  |
| Allow Report Jobs to Stay connected to the DB until the Report Job is closed | On/Off  |  | On   |
| Oldest On-Demand Data seconds Given to Clients                               | seconds | Specifies the amount of time that the server uses cached data to meet request from on-demand reports. (disabled) Recommended | Default value is 0 (disabled)<br>Recommended setting is 300000 |

### Report Application Server

The Report Application Server (RAS) is very similar to the Processing Server. It, too, is primarily responsible for responding to page requests by processing reports and generating EPF pages. Additionally, Report Application Server is used at the time of viewing or submitting schedule requests for reports containing dynamic prompts and cascading lists of values.

The default Maximum Simultaneous Report Jobs is set at 75 for each RAS service. This value, as with the Crystal Reports Processing Server, may be adjusted according to anticipated load and available hardware resources. The ideal setting for your reporting environment, however, is highly dependent upon your hardware configuration, your database software, and your reporting requirements. Additionally, a recommended guideline is to run 1 Report Application Server per CPU.

Depending on the design of a report, the number of records retrieved from the database, memory requirements may vary. When a report is viewed and loaded into memory the report is decompressed and expanded up to as much as 40 times the original report file size (with saved data/retrieved records).

These parameters are settable in the CMC.

| Option  | Argument Units | Behaviour   | Recommended Setting(s)                            |
|---|----------------|---|---|
| Browse Data Size (records)  | Number         | Specifies the # of distinct records returned from the database when browsing through a particular field's values. | Default value is 100 records.                     |
| Idle Connection-Timeout   | Minutes        | Specifies the amount of time, in min.that the RAS waits for requests from an idle client before timing out.       | Default value is 30 min.                          |
| Batch Size  | Records        | Specifies how many rows from the result set are returned by the database during each data transfer                | Default value is 100 records.                     |
| Number of database records to read when previewing or refreshing a report | Records        | Specifies the number of database records that will be read when viewing or refreshing a report.                   | Default value is 20000 records (-1 for unlimited) |
| Maximum Concurrent Report Jobs  | Jobs           | Specifies the max. no of independent jobs allowed to run concurrently on the RAS.                                 | Default value is 75 jobs (0 for unlimited)        |
| Oldest on-demand data given to a client                                   | Minutes        | Specifies the amount of time, in minutes,an on-demand report will serve cached report data.                       | Default value is 20 minutes                       |

Example (minimum memory requirements on RAS machine): 500KB Report File Size (contains saved data) = 500KB \* 40 (decompression ratio) = 20MB 25 Reports \* 20MB = 500MB minimum memory required

## Analysis, edition for OLAP

Factors that influence performance

The first category is factors that aren't specific to Analysis, edition for OLAP:

- Network bandwidth and quality
- Other services that are enabled that would have a small effect on performance (like monitoring or auditing)

The second category is factors specific to Analysis, edition for OLAP:

- Hardware settings (HDD RAID settings, memory tuning)
- Defining an optimum server deployment
- JVM memory and GC settings
- Number of MDAS services on the same server machine

Testing has shown a practical limit of 45 users per machine. This is due to a number of factors including the memory needed to support 45 users (for the MDAS instances alone this is 12 GB). Supporting 45 users implies three MDAS instances (3 MDAS instances \* 15 users recommended max/MDAS instance). Keep in mind it is better to scale out than up for BI 4.0 in general. You have more flexibility in terms of allocating services with more nodes, not less.

So, if you wanted to have 3 MDAS instances running, that means you have 3 APS instances which are only running the MDAS service.

An alternate way to configure for 45 users would be to run one APS running the MDAS service supporting 45 sessions. Testing shows this performs better – likely due to the elimination of load balancing. However, as we recommend 4GB heap size per 15 users, that would mean an APS with a heap size of 12 GB.

## Connection Server

Connection Server performance is highly dependent on the backend database performance. Most of query time will be spent in the database middleware. However, performance can be improved by adjusting the array fetch size: this parameter determines the number of rows that will be retrieved during a fetch cycle. Larger array fetch sizes reduce the number of network calls, but increase memory footprint. Smaller values put more load on the network, but reduce memory use. In addition, different Connection Server modes can also have an impact on performance. By

default the “Extended” smart switchboard is used to maximize available connections and performance. Different deployment scenarios can also improve performance, for instance by making sure a database middleware is available locally for a Web Intelligence node.

## Event Server

The Event Server under normal enterprise usage is not a processing or memory intensive server and as such will not be weighted in the sizing process. If Event Server functionality is required, allocate this service into the system but do not estimate any additional cores for this service.

## Web Application Server

Below are the suggested settings for some of the web servers.

| Web Application Server                     | Java Heap Recommended Settings  |
|--|---|
| Tomcat 6                                   | Change the JVM Heap size in the 'Java Options' box. Add the line '-XX:MaxPermSize=256m' Fill out the "Maximum memory pool" field with the host machine's memory (e.g., 1024).               |
| WebLogic 10.0                              | -Xms1024m -Xmx1024m -XX:MaxPermSize=512m  |
| Oracle Application Server 10gR3 (10.1.3.0) | -Xms1024m -Xmx1024m   |
| SAP NetWeaver CE 7.20                      | Use default settings for NetWeaver  |
| WebSphere Community Edition 2.0            | Use default setting for WebSphere CE 2.0  |
| Tomcat 5.5                                 | Change the JVM Heap size in the 'Java Options' box. Add the line '-XX:MaxPermSize=512m' Fill out the "Maximum memory pool" field with the host machine's memory (e.g. 1024). This is in MB. |



| Web Application Server                 | Java Heap Recommended Settings   |
|--|--|
| WebLogic 9.2.2                         | <p>Update the following in the file (substitute your drive letter as appropriate) C:\bea\user_projects\domains\boe_domain\bin\setDomainEnv.cmd before starting up WebLogic</p> <p>From: MEM_ARGS="-Xms256m -Xmx512m" To: #MEM_ARGS="-Xms256m -Xmx512m" MEM_ARGS="-Xms820m -Xmx820m"</p> <p>Also change the MaxPermSize under the JAVA_VENDOR section inside setDoaminEnv.cmd<br/>           from: "-XX:MaxPermSize=128m" To:<br/>           "-XX:MaxPermSize=512m"</p> |
| WebSphere 7.0                          | Use default setting for WebSphere 7.0  |
| WebLogic 10.3                          | -Xms512m -Xmx1024m -XX:PermSize=256m<br>-XX:MaxPermSize=1024m  |
| Sun Java System Application Server 9.1 | Use default setting.   |
| JBoss 5.0                              | -Xms128m -Xmx512m -XX:MaxPermSize=256m   |

## Performance Criteria

Some terminology is necessary to understand how database access may be optimized:

- **Lock:**  
 Locks are used to control concurrency in a database. When a process locks a row or table, no other process can access it until the lock is released. The level at which a lock is requested, that is, row or table level, is referred to as the lock granularity.
- **Deadlock:**  
 A deadlock occurs when two or more processes conflict in such a way that each must wait for the other to release its lock in order to complete.
- **Lock wait:**  
 A lock wait occurs when a process must wait for another process to release a lock on a row or table.
- **Lock escalation:**

A lock escalation occurs when the number of locks on rows or tables in the database equals the maximum number of locks specified in the database configuration settings.

Meeting the following five criteria helps to avoid the most common performance bottlenecks.

- The database system's cache hit rates are over 90%.
- The optimizer statistics are not older than 24 hours.
- Lock granularity is row locking.
- There are no lock escalations.
- There are no log write waits. The average disk write queue length to the disk drives which contain the database log files is smaller than five.

| <b>90% or higher cache hit rates</b> |   |
|--------------------------------------|---|
| Offers:                              | <ul style="list-style-type: none"> <li>• A relatively low number of physical disk reads and writes.</li> <li>• A relatively low number of SQL compiler executions.</li> </ul>   |
| Are important to avoid:              | <ul style="list-style-type: none"> <li>• Disk access being unable to keep up with the level of I/O that the database server requests.</li> <li>• Long disk read or disk write queues.</li> <li>• Unnecessary SQL statement compilations or long SQL statement compilation times.</li> </ul> |
| Are achieved by:                     | <ul style="list-style-type: none"> <li>• Providing sufficient physical memory.</li> <li>• Configuring sufficient cache sizes.</li> </ul>  |

| <b>Up-to-date optimizer statistics</b> |   |
|--|---|
| Offers:                                | <ul style="list-style-type: none"> <li>• Good selectivity estimates of predicates in SQL expressions, especially for expressions including columns with unequal or skewed distribution of column values.</li> </ul> |
| Are important to avoid:                | <ul style="list-style-type: none"> <li>• Long response times and low throughput.</li> <li>• Long execution times for queries.</li> </ul>  |

|                  |  |
|------------------|--|
|                  | <ul style="list-style-type: none"> <li>• Full table scans.</li> <li>• Lock escalations.</li> <li>• Lock waits or deadlocks.</li> <li>• Significant differences between the estimated number of rows for each operator in the query plan from the actual number of rows.</li> </ul>   |
| Are achieved by: | <ul style="list-style-type: none"> <li>• Implementing a procedure to periodically update the statistics or to update the statistics after frequent changes to the database.</li> <li>• Creating statistics for tables, columns, and indexes that are not stale.</li> <li>• Setting the sample size (percentage of data that is analyzed to gather statistical information) to a value which is sufficient for the skewed data distribution.</li> <li>• Setting the number of histogram buckets to a value which is sufficient for the skewed data distribution.</li> </ul> |

#### Lock granularity is row locking

|         |   |
|---------|---|
| Offers: | <ul style="list-style-type: none"> <li>• Increased concurrent execution of transactions.</li> <li>• Reduced transaction processing time due to fewer lock waits.</li> </ul> |
|---------|---|

#### Lock granularity is row locking

|                         |   |
|-------------------------|---|
| Are important to avoid: | <ul style="list-style-type: none"> <li>• Lock waits or deadlocks.</li> </ul>                                    |
| Are achieved by:        | <ul style="list-style-type: none"> <li>• Setting the lock granularity of your database to row level.</li> </ul> |

| No lock escalations     |   |
|-------------------------|---|
| Offers:                 | <ul style="list-style-type: none"> <li>Increased concurrent execution of transactions.</li> </ul>   |
| Are important to avoid: | <ul style="list-style-type: none"> <li>Lock waits or deadlocks.</li> </ul>  |
| Are achieved by:        | <ul style="list-style-type: none"> <li>Configuring a sufficient size of the lock list.</li> <li>Setting the lock escalation threshold to an appropriate level.</li> <li>Keeping the optimizer statistics up to date.</li> </ul> |

| No log write waits      |  |
|-------------------------|--|
| Offers:                 | <ul style="list-style-type: none"> <li>Reduced transaction processing time due to no I/O waits.</li> </ul>   |
| Are important to avoid: | <ul style="list-style-type: none"> <li>Lock waits or deadlocks.</li> </ul>   |
| Are achieved by:        | <ul style="list-style-type: none"> <li>Providing an I/O subsystem with sufficient throughput.</li> <li>Providing a Disk Controller Cache and setting the Disk Controller cache to 100% write cache.</li> </ul> |

 **Note:** Find more information at <http://service.sap.com/sizing>.

## Using Quick Sizer

Quick Sizer is the online sizing tool of SAP. The tool helps prospects, customers and hardware vendors to

- Speed up hardware planning phase by asking structured questions relating to usage of business processes that might affect sizing
- Facilitate tendering procedure by including links to hardware vendors so that they can make an offer based on the information provided in the tool

- Provide content for GoingLive check to analyze, if the hardware is sufficient to smoothly run SAP software



**Hint:** Keep in mind that Quick Sizer is a tool for initial sizings only. Out of scope are post go-live sizings such as upgrade or re-sizing (except delta sizing of a new SAP solution), configuration, landscaping, and customer coding.



**Note:** For more information on the principles of sizing and the theoretical background of SAP's sizing initiative see the background sizing document at [service.sap.com/sizing](http://service.sap.com/sizing) -> Sizing Guidelines -> General Sizing



The screenshot shows the SAP Service Marketplace interface. The left sidebar contains a navigation tree with categories like SAP NetWeaver, SAP NetWeaver in Detail, People Integration, Information Integration, Process Integration, Application Platform, Security, Composite Application Framework, Solution Life-Cycle Management, Adaptive Computing, Customizing and Testing Tools, eCATT Test Automation, Information Lifecycle Management, Hardware Sizing, and Quick Sizer Tool. The main content area is titled 'QUICK SIZER' and features the heading 'INITIAL HARDWARE SIZING TO SUPPORT YOUR BUSINESS'. It includes a 'NEWS' section dated November 2011, stating that the Quick Sizer has been updated. The text describes the tool as a Web-based tool designed to make the sizing of SAP Business Suite easier and faster. It also mentions that the tool calculates CPU, disk, memory, and I/O resource categories based on throughput numbers and the number of users working with the different SAP Business Suite components in a hardware and database independent format.

Figure 33: Using Quick Sizer



Display project '50006917191'

Customer no. TEST  
Project Name TEST  
☐ Limit User Access

Search  
 Search in Tree  
☐ Match whole word Phrase

Tree of Elements

- SAP Business Solutions
  - Project Information
  - SAP Business Suite
  - SAP in-Memory Computing
  - SAP BusinessObjects Portfolio
  - SAP BusinessObjects Business Intelligence
    - SAP BusinessObjects Business Intelligence 4.0 SP2: Display
    - (Further) SAP BusinessObjects Sizing Guidelines
  - Industry Solutions
  - SAP NetWeaver
    - Business Warehouse
    - Portal & KIMC
    - Process Integration
    - NetWeaver Standalone Engines

Project 50006917191

Workdays 220 | Status In progress | Owner Customer | Method All

Check Input | Use Default Values | Long Text | Clear Questionnaire

SAP BusinessObjects Business Intelligence -> SAP BusinessObjects Business Intelligence 4.0 SP2: Display

Avg. workday Start End  
09:00 - 18:00

Table 1: Throughput - SAP BusinessObjects Business Intelligence

| Element    | AP | TI | Info | Business | Expert | % S | % M | % L | SL | EL | Short text |
|------------|----|----|------|----------|--------|-----|-----|-----|----|----|------------|
| AUX-OLAP   | A  | S  |      |          |        |     |     |     | 09 | 18 |            |
| CRYST-2011 | A  | S  |      |          |        |     |     |     | 09 | 18 |            |
| CRYST-ENT  | A  | S  |      |          |        |     |     |     | 09 | 18 |            |
| DASHBOARD  | A  | S  |      |          |        |     |     |     | 09 | 18 |            |
| WEB-INTELL | A  | S  |      |          |        |     |     |     | 09 | 18 |            |

Comment (max. 750 characters):

Crystal Reports for Enterprise and Web Intelligence deployment  
200 Active Concurrent users

Figure 34: Quick Sizer Tool



## Lesson Summary

You should now be able to:

- Define the sizing process
- Size a SAP BusinessObjects BI platform deployment

## Lesson: Designing an Architecture Plan

### Lesson Overview

Designing an architecture plan involves gathering requirements from key stakeholders, analyzing the requirements, and then using the information to perform sizing calculations to determine the size and configuration of the SAP BusinessObjects BI platform system. A thorough architecture plan identifies system usage, report viewing and scheduling requirements, and other system deployment requirements, such as the level of high availability required, the location of users, and standard hardware configurations. To gather the information required to design an architecture plan, you need to perform an analysis of stakeholder requirements. The stakeholders are groups of individuals impacted by the SAP BusinessObjects BI platform implementation. Stakeholders may include users who consume reports and information, business managers who analyze the business value of the software implementation, and IT individuals who are responsible for managing and supporting the SAP BusinessObjects BI platform implementation.



### Lesson Objectives

After completing this lesson, you will be able to:

- Determine system usage, reporting, document interaction, and general deployment requirements
- Analyze deployment requirements to determine the size and configuration of a deployment
- Identify service thresholds

### Business Example

#### Determining Number of Simultaneous Requests

##### The number of simultaneous requests

The number of simultaneous requests is difficult to estimate. Typically, the number of simultaneous requests is 10% to 20% of the number of concurrent users (for example, folders within BI Launch Pad being expanded). To more accurately estimate the number of simultaneous requests, you can group users by how they use the system, calculate the percentage of concurrent users by usage type, and then determine the



simultaneous usage rate. For instance, a simultaneous request to view a report or document causes the server(s) responsible for rendering pages to fulfill the request right away. Also, the request causes the server to use resources for a configurable amount of time (for instance, 20 minutes) in anticipation of future viewing requests. When it comes to dealing with simultaneous viewing requests, the estimated ratio of concurrency could be higher than the documented 10 to 20% range (for example, if there are 100 users and each user is viewing a report). In total there would be 50 reports being viewed (some of the reports are being viewed by more than one user). In this example, the simultaneous request rate would be 50%.

## Determining Reporting Requirements

When determining reporting requirements, you need to consider the number of Crystal Reports and Web Intelligence documents that will be stored in the system. The number of Crystal Reports and Web Intelligence documents stored in the system will influence the number of report/document viewing requirements, and the number of report/ document scheduling requirements. It is important to point out that you need to perform separate calculations for viewing and scheduling needs for each document type that you will be using in the system.

### Report viewing requirements

Analyzing the report viewing requirements helps to determine the load on the Crystal Reports Cache Server, Crystal Reports Processing Server, Web Intelligence Processing Server, Report Application Server, and Connection Server. When determining report/document viewing requirements, you need to estimate:

- The number of unique report/document viewing sessions there will be at any given time.
- The percentage of users who will view reports/documents on demand.
- The percentage of users who will view report /document instances.
- The percentage of report/document viewing requests by geographic location.
- The number of users viewing OLAP reports.

### Report scheduling requirements

Analyzing the report/document scheduling requirements helps to determine the load on the Web Intelligence Processing Server. When determining report scheduling requirements, you need to estimate:

- The percentage of users who will schedule reports.
- The total number of reports/documents that will be scheduled by geographic location.
- The frequency that reports/documents will be scheduled (for example, 100 reports/documents scheduled daily) by geographic location.
- The percentage of reports/documents that will be scheduled after work hours and during work hours.
- The time window required for reports/documents to run.
- The average time it takes to process the report/document.

## Determining System Deployment Requirements

Gathering general system deployment information allows you to consider other factors that may affect how the system is configured. For instance, you may need to determine:

- 
- The level of high availability that is required.
- The standard hardware configurations that you need to follow.
- The geographic location of the users who will access the system.
- The type of network and firewalls used.
- The individuals who will be responsible for managing and maintaining the system.
- The location of the production database(s).

It is also recommended to talk with key stakeholders to identify the business issues that require solutions. By understanding the underlying business problem, you are better able to identify the high-level requirements for the system architecture and deployment configuration.



## Lesson Summary

You should now be able to:

- Determine system usage, reporting, document interaction, and general deployment requirements
- Analyze deployment requirements to determine the size and configuration of a deployment
- Identify service thresholds



## Unit Summary

You should now be able to:

- Define scalability
- List and describe general SAP BusinessObjects BI platform scalability considerations
- Define the sizing process
- Size a SAP BusinessObjects BI platform deployment
- Determine system usage, reporting, document interaction, and general deployment requirements
- Analyze deployment requirements to determine the size and configuration of a deployment
- Identify service thresholds



## Test Your Knowledge

1. What is scalability?

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2. What is scalability?

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3. List the four main SAP BusinessObjects BI platform scalability goals.

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4. List the three estimates necessary when determining system load.

---

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---

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## Answers

1. What is scalability?

**Answer:** Scalability is the capacity to address additional system load by adding resources without fundamentally altering the implementation architecture or implementation design.

2. What is scalability?

**Answer:** Scalability is the capacity to address additional system load by adding resources without fundamentally altering the implementation architecture or implementation design.

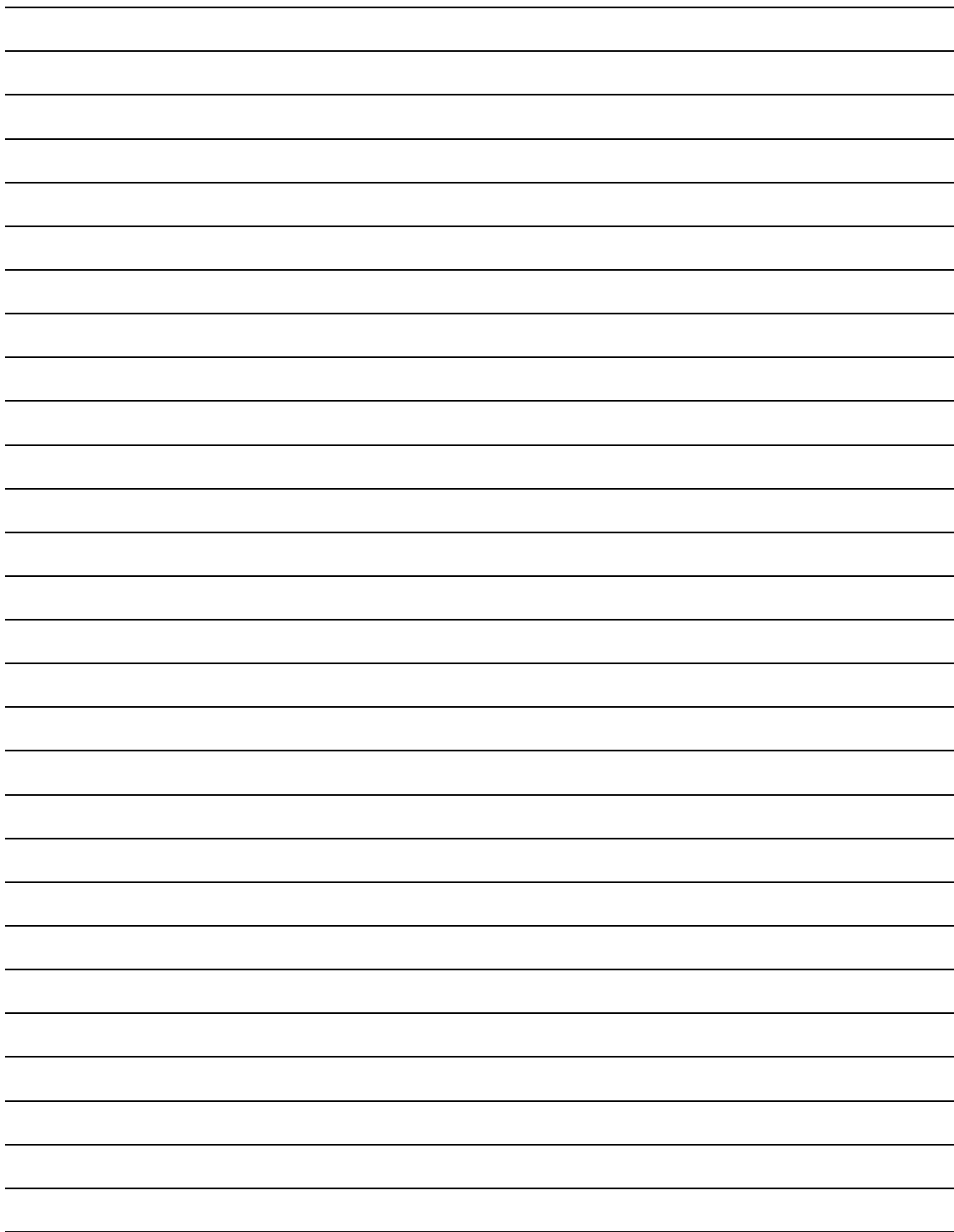
3. List the four main SAP BusinessObjects BI platform scalability goals.

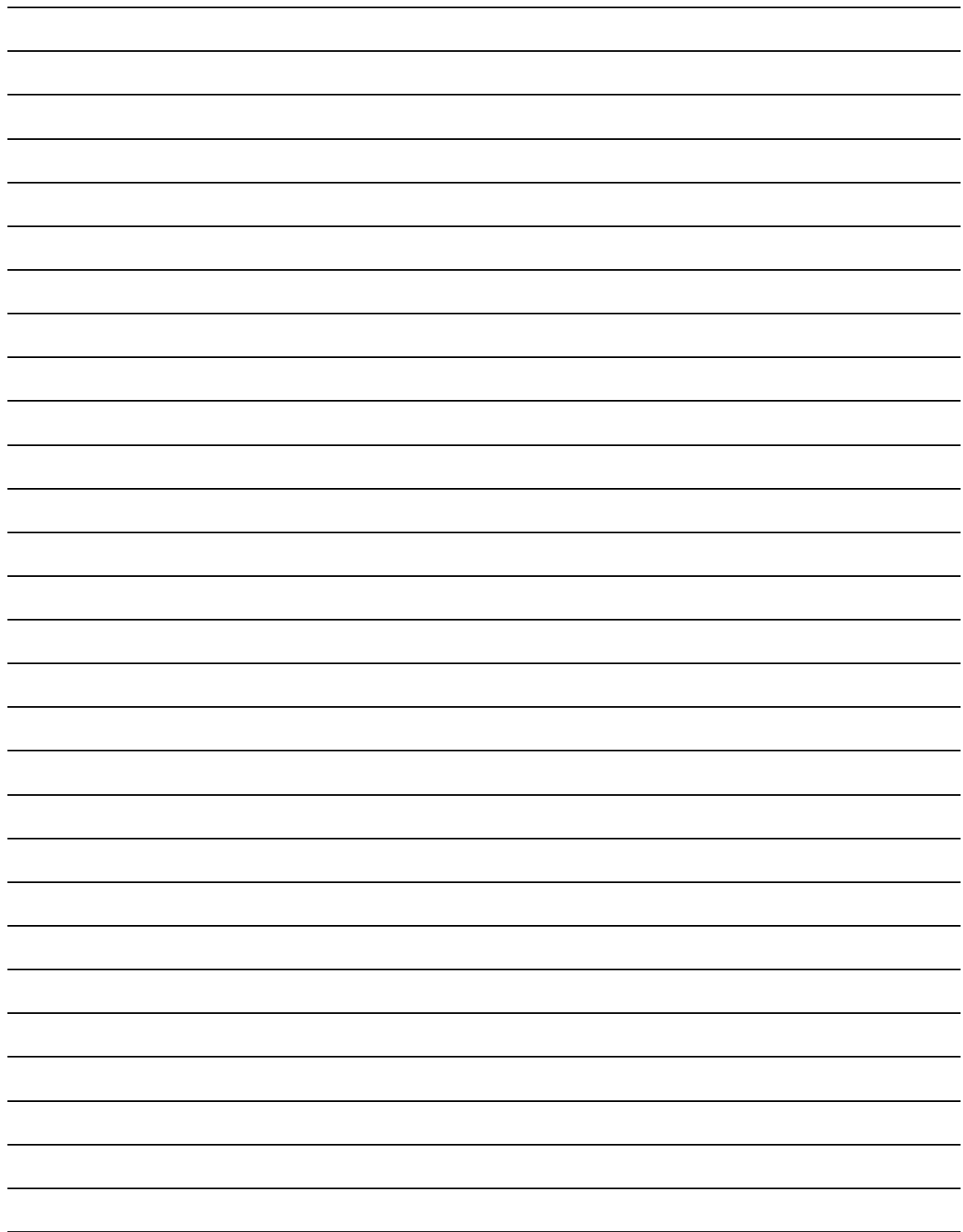
**Answer:** Increase overall system capacity, Increase schedule reporting capacity, Increase report viewing capacity and Improve web response speeds

4. List the three estimates necessary when determining system load.

**Answer:**

1. Total number of potential users who will have access to the system
2. Total number of concurrent active users that will access the system
3. Total number of simultaneous requests that will be made











# Unit 5

## Deploying a System

### Unit Overview

After you have designed a system architecture plan, you then deploy the system in a test environment to ensure that it is operating as expected.



### Unit Objectives

After completing this unit, you will be able to:

- Describe clustering Central Management Servers
- Explain how to secure your deployment
- Understand how web applications are deployed

### Unit Contents

|   |     |
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| Exercise 5: Cluster a SAP BusinessObjects Business Intelligence Platform<br>Deployment..... | 201 |

## Lesson: Clustering Central Management Servers

### Lesson Overview

This lesson explains how to cluster Central Management Servers



### Lesson Objectives

After completing this lesson, you will be able to:

- Describe clustering Central Management Servers
- Explain how to secure your deployment
- Understand how web applications are deployed

### Business Example

If you have a large or mission-critical implementation of SAP BusinessObjects Business Intelligence platform, you will probably want to run several CMS machines together in a cluster. A cluster consists of two or more CMS servers working together against a common CMS system database. If a machine that is running one CMS fails, a machine with another CMS will continue to service SAP BusinessObjects Business Intelligence platform requests. This "high availability" support helps to ensure that SAP BusinessObjects Business Intelligence platform users can still access information when there is an equipment failure.

### Clustering Central Management Servers

When you add a new CMS to an existing cluster, you instruct the new CMS to connect to the existing CMS system database and to share the processing workload with any existing CMS machines. For information about your current CMS, go to the Servers management area of the CMC.

## Clustering requirements

- For best performance, the database server that you choose to host the system database must be able to process small queries very quickly. The CMS communicates frequently with the system database and sends it many small queries. If the database server is unable to process these requests in a timely manner, SAP BusinessObjects Business Intelligence platform performance will be greatly affected.
- For best performance, run each CMS cluster member on a machine that has the same amount of memory and the same type of CPU.
- Configure each machine similarly:
  - Install the same operating system, including the same version of operating system service packs and patches.
  - Install the same version of SAP BusinessObjects Business Intelligence platform (including patches, if applicable).
  - Ensure that each CMS connects to the CMS system database in the same manner: whether you use native or ODBC drivers. Make sure that the drivers are the same on each machine, and are a supported version.
  - Ensure that each CMS uses the same database client to connect to its system database, and that it is a supported version.
  - Check that each CMS uses the same database user account and password to connect to the CMS system database. This account must have create, delete, and update rights on the system database.
  - Ensure that the nodes on which each CMS is located are running under the same operating system account. (On Windows, the default is the "LocalSystem" account.)
  - Verify that the current date and time are set correctly on each CMS machine (including settings for daylight savings time).
  - Ensure that the same WAR files are installed on all web application servers in the cluster.
- Ensure that each and every CMS in a cluster is on the same Local Area Network.
- If you want to enable auditing, each CMS must be configured to use the same auditing database and to connect to it in the same manner. The requirements for the auditing database are the same as those for the system database in terms of database servers, clients, access methods, drivers, and user IDs.



**Hint:** By default, a cluster name reflects the specific name of the first CMS that you install.

### Adding a CMS to a cluster

There are several ways to add a new CMS cluster member. Follow the appropriate procedure:

- You can install a new node with a CMS on a new machine.
- If you already have a node with CMS binary files, then you can add a new CMS server from the CMC.
- If you already have a node with CMS binary files, you can also add a new CMS server by cloning an existing CMS server.



**Note:** Back up your current CMS system database and the contents of you Input and Output File Repositories before making any changes.

## General recommendations for securing your deployment

The following are recommended guidelines for securing your BI platform deployments.

- Use firewalls to protect the communication between the CMS and other system components. If possible, always hide your CMS behind the firewall. At the very least, ensure that the system database is safely behind the firewall.
- Add additional encryption to the File Repository Servers. Once the system is up and running, proprietary content will be stored in these servers. Add additional encryption through the OS or use a third party tool.
- • Deploy a reverse proxy server in front of the web application servers in order to hide them behind a single IP address. This configuration routes all Internet traffic that is addressed to private web application servers through the reverse proxy server, therefore hiding private IP addresses.
- Strictly enforce corporate password policies. Ensure that user passwords are routinely changed.
- If you have opted to install the system database and web application server provided with BI platform, you should access the relevant documentation to ensure these components are deployed with adequate security configurations.
- The platform includes Apache Tomcat as the default web application server. If you plan to use this server, please regularly refer to the Apache site for security updates. In some cases, you may need to manually update your version of Tomcat to ensure that the latest security fixes are installed.
- Use the Secure Sockets Layer (SSL) protocol for all network communication between clients and servers in your deployment.
- Ensure that the platform installation directory and subdirectories are secured - sensitive temporary data may be stored in these directories during system operation.
- Access to the Central Management Console (CMC) should be restricted to local access only.

## Understanding how web applications are deployed

BI platform web applications are deployed on a web application server. The applications are deployed automatically during installation through the WDeploy tool. The tool can also be used to manually deploy the applications after BI platform is deployed. The web applications are located in the following directory on a default Windows installation:

*C:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\warfiles\webapps*

WDeploy is used to deploy two specific WAR files:

- BOE: includes the Central Management Console (CMC), BI launch pad, Open Document,
- dswsbobje: contains the Web Service application



**Note:** If the web application server is located behind a reverse proxy server, the reverse proxy server should be configured with the correct context paths of the WAR files. To expose all of the BI platform functionality, configure a context path for every BI platform WAR file that is deployed.

## Adding or removing additional WACS to your deployment

Adding additional WACS to your deployment can give you a number of advantages:

- Faster recovery from a misconfigured server.
- Improved server availability.
- Better load balancing.
- Better overall performance.

There are three ways to add additional WACS to your deployment:

- Installing WACS on a machine.
- Creating a new WACS.
- Cloning a WACS.



**Note:** It is recommended that you run a single WACS on the same machine at the same time due to high resource utilization. However, you can deploy more than one WACS on the same machine, and only run one of them, to help you recover in the event of a misconfigured WACS.



## Exercise 5: Cluster a SAP BusinessObjects Business Intelligence Platform Deployment

### Exercise Objectives

After completing this exercise, you will be able to:

- Create new Cluster DSN
- Create the BIP 4.0 Cluster

### Business Example

As a system administrator, you need configure a highly available, fault tolerant, horizontally scaled BIP 4.0 solution. WDFLBMT2268 will be the Database Server and original Node source for cloning servers onto WDFLBMT2287. Both servers will serve as a highly available Web farm each housing one instance of Apache Tomcat.

### Task 1: Create new Cluster DSN

Create new Cluster DSN on WDFLBMT2287 pointing to WDFLBMT2268 Database Server

1. Log in to WDFLBMT2287 Windows Server and navigate to Data Sources ODBC.

| Field           | Value               |
|-----------------|---------------------|
| Server Computer | WDFLBMT2287.        |
| User name       | Boadmin             |
| Password        | <Assigned password> |

2. In the System DSN Tab, add a new DSN using SQL Server Native Client. Call the DSN **BIP\_CLUSTER##\_DSN**. In the Database Server name field, type WDFLBMT2268. Use SQL Server authentication and provide user credentials.

### Task 2: Create the BIP 4.0 Cluster

1. From WDFLBMT2287 CCM, stop all functional SIAs
2. Create a new SIA. Name it U##SIA. Use port 641. Select the Option *Add Node with CMS*.

*Continued on next page*

3. Start Your Name SIA. Restart Apache Tomcat. You have successfully created a BIP 4.0 cluster.

### Result

As a follow-up and extension to this exercise, you may want to clone the Web Intelligence Processing tier to your new U##SIA. Start and enable the servers under this SIA. Then you can create a Web Intelligence Server Group with the newly cloned Web Intelligence servers and call it Web Intelligence Processing Server Group. Configure an existing Web Intelligence document to be processed by this server group for both viewing and scheduling.

## Solution 5: Cluster a SAP BusinessObjects Business Intelligence Platform Deployment

### Task 1: Create new Cluster DSN

Create new Cluster DSN on WDFLBMT2287 pointing to WDFLBMT2268 Database Server

1. Log in to WDFLBMT2287 Windows Server and navigate to Data Sources ODBC.

| Field           | Value               |
|-----------------|---------------------|
| Server Computer | WDFLBMT2287.        |
| User name       | Boadmin             |
| Password        | <Assigned password> |

- a) Ensure you are log into WDFLBMT2287. If not use remote desktop to log into this server.
- b) Click *Start* → *Programs* → *Administrative Tools* → *Data Sources (ODBC)*.

*Continued on next page*

2. In the System DSN Tab, add a new DSN using SQL Server Native Client. Call the DSN **BIP\_CLUSTER##\_DSN**. In the Database Server name field, type WDFLBMT2268. Use SQL Server authentication and provide user credentials.
  - a) Click the *System DSN* tab.
  - b) Click *Add...*
  - c) Select *SQL Server Native Client* as the driver for which you want to set up the data source.
  - d) Click *Finish*.
  - e) In the *Name* field, enter **BIP\_CLUSTER##\_DSN** for the data source.
  - f) In the *Description* field, enter a brief description for your data source.
  - g) In the *Server* selection list, select your hostname for the SQL Server.
  - h) Click *Next*.
  - i) On the authentication screen, enter the login ID and Password and click *Next*.
  - j) Change the default database to **BOE4x**.
  - k) Click *Next*.
  - l) Click *Finish*.



**Hint:** You can test the connectivity by clicking the *Test Data Source* button. Ensure the result is successful. Click *OK* to exit the window.


## Task 2: Create the BIP 4.0 Cluster

1. From WDFLBMT2287 CCM, stop all functional SIAs
  - a) Click *Start* → *Programs* → *SAP BusinessObjects Enterprise XI 4.0* → *SAP BusinessObjects Enterprise* → *Central Configuration Manager*.
  - b) Select all the SIAs and click *Stop*.

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2. Create a new SIA. Name it U##SIA. Use port 641. Select the Option *Add Node with CMS*.
  - a) In the Central Configuration Manager (CCM), on the toolbar, click *Add Node*.

The *Add Node Wizard* page appears.
  - b) Click *Next*.
  - c) Enter the *Node Name* and *SIA Port* number for the new Server Intelligence Agent (SIA).
  - d) Select *Add node with CMS*.
  - e) Select the option *Use existing running CMS*. Click *Next*.
  - f) In the *New CMS port* field, ensure you use port **6400**.
  - g) In the *CMS System Database Data Source Name* field, click *Specify*, select **SQL Server ODBC** and click *OK*.
  - h) Click the *Machine Data Source* tab and select the **BIP\_Cluster##\_DSN** you created. Click *OK*.
  - i) Specify SQL Server credentials and click *OK*.
  - j) Enter cluster key and click *Next*.

 **Note:** Obtain the cluster key from your instructor.
  - k) In the *CMS Logon* screen change the system name to **WDFLBMT2268** and log on as **Administrator**. Click *Finish*.
3. Start Your Name SIA. Restart Apache Tomcat. You have successfully created a BIP 4.0 cluster.
  - a) Navigate to U##SIA in the CCM and click *Start*.
  - b) Navigate to the Apache Tomcat server in the CCM and click *Restart*.

## Result

As a follow-up and extension to this exercise, you may want to clone the Web Intelligence Processing tier to your new U##SIA. Start and enable the servers under this SIA. Then you can create a Web Intelligence Server Group with the newly cloned Web Intelligence servers and call it Web Intelligence Processing Server Group. Configure an existing Web Intelligence document to be processed by this server group for both viewing and scheduling.



## Lesson Summary

You should now be able to:

- Describe clustering Central Management Servers
- Explain how to secure your deployment
- Understand how web applications are deployed



## Unit Summary

You should now be able to:

- Describe clustering Central Management Servers
- Explain how to secure your deployment
- Understand how web applications are deployed







## Test Your Knowledge

1. What are the steps that you would perform to cluster two CMS servers?

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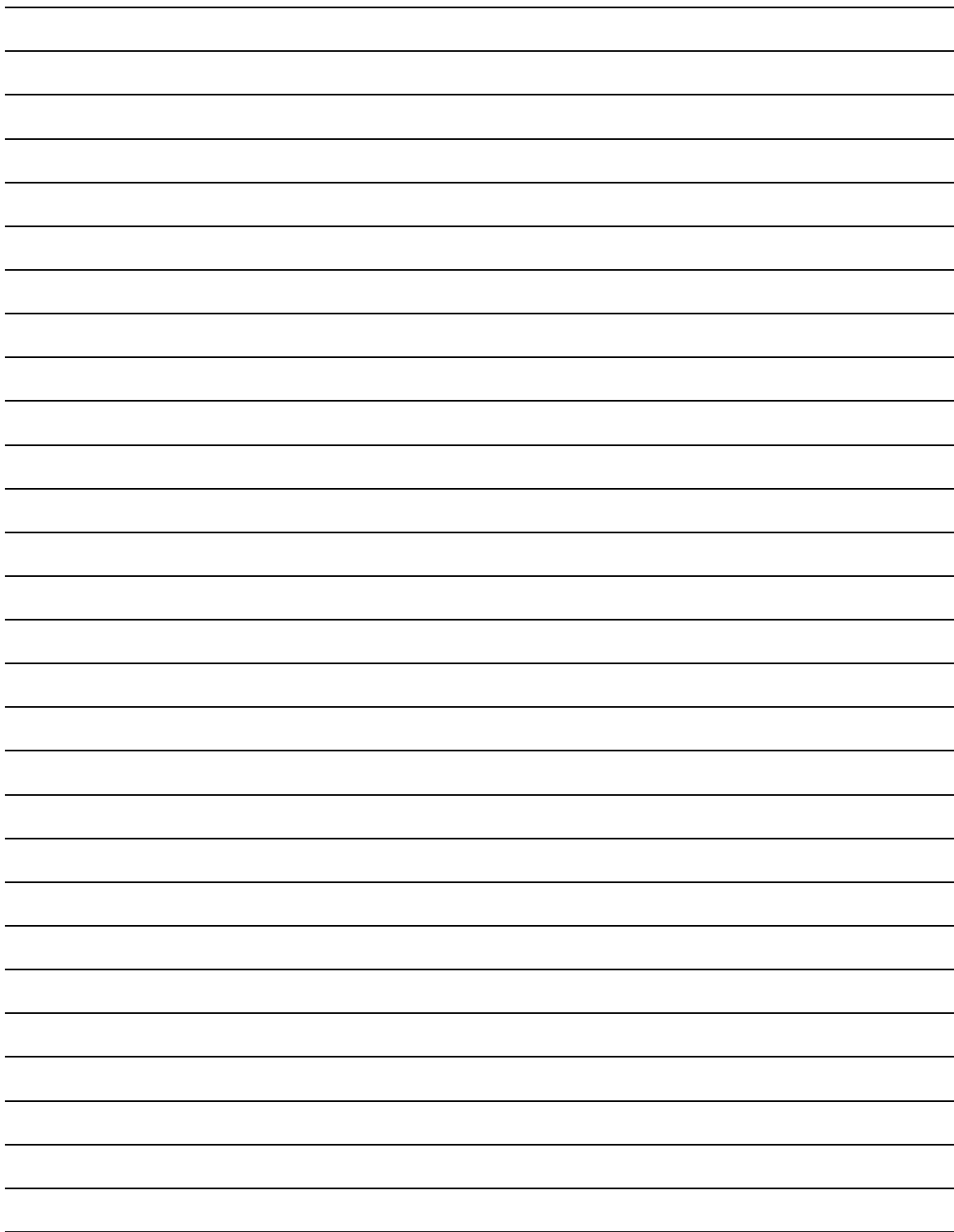


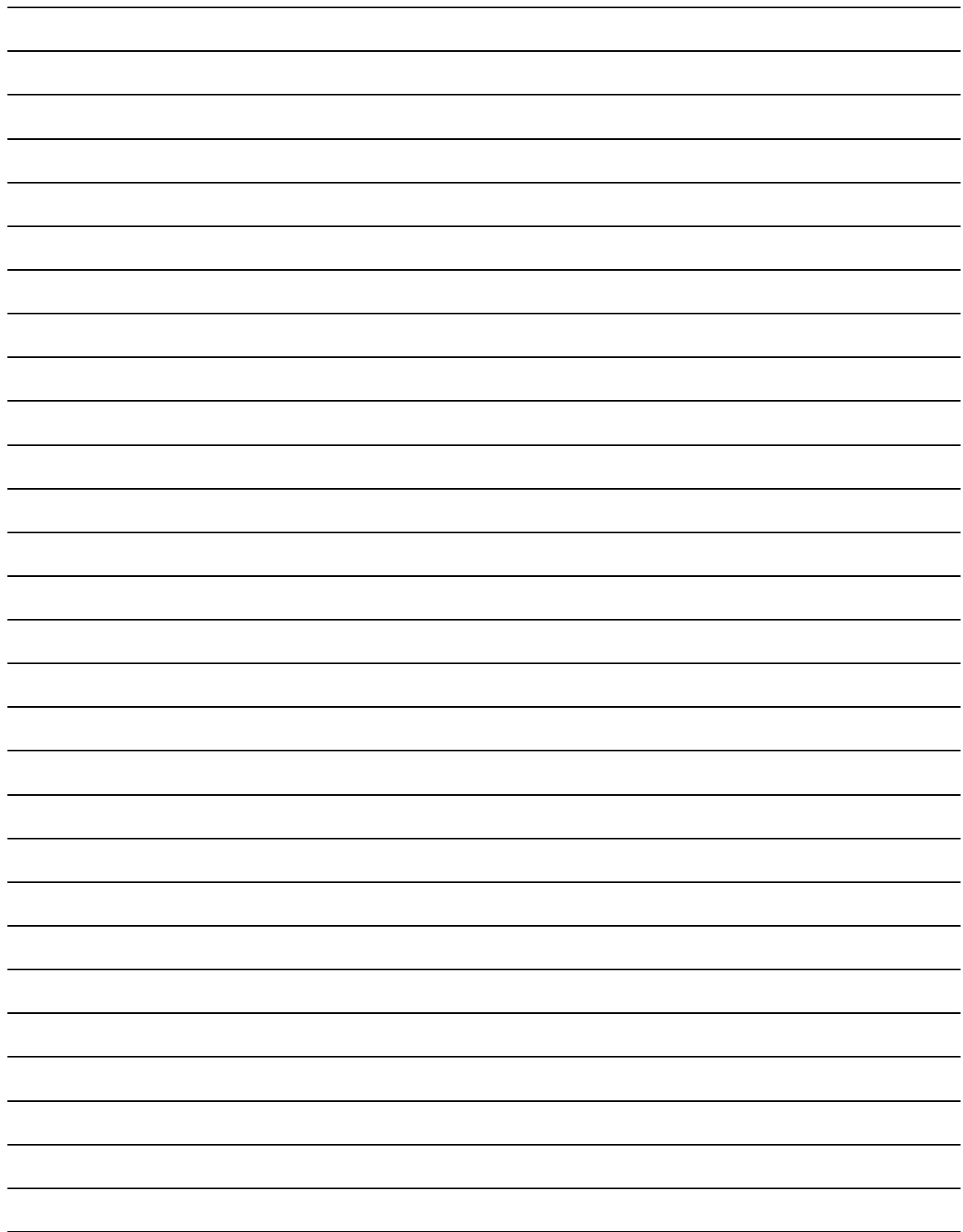
## Answers

1. What are the steps that you would perform to cluster two CMS servers?

**Answer:**

- Create a separate SIA on the joining CMS
- Using CMC add CMS service to the newly created SIA
- Using CCM configure CMS to point to the source CMS System Database









# Unit 6

## Content Management

### Unit Overview

Once you have deployed a SAP BusinessObjects BI platform you need to design and implement a content management plan.



### Unit Objectives

After completing this unit, you will be able to:

- Describe the roles of the upgrade management tool
- Migrate objects using the upgrade management tool
- Explain Lifecycle Management
- Describe the Lifecycle management console
- Manage promotion jobs
- Use Monitoring
- Use Auditing
- Recognize when to use the different types of replication
- Manage replication conflict resolution

### Unit Contents

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## Lesson: Understanding the Upgrade Management Tool

### Lesson Overview

Lesson Understanding the Upgrade Management Tool



### Lesson Objectives

After completing this lesson, you will be able to:

- Describe the roles of the upgrade management tool
- Migrate objects using the upgrade management tool

### Business Example

#### Business Intelligence Archive Resource (BIAR) files

A Business Intelligence Archive Resource (BIAR) file contains compressed business intelligence content. This content can be easily moved to a different location or SAP BusinessObjects Business Intelligence platform deployment.

During an incremental upgrade, you can select a BIAR file as the source or destination if you cannot connect to two Central Management Servers directly (for example, if your destination and source deployments are on different physical networks).



#### Note:

- You can use the upgrade management tool to import a BIAR file generated using the Import Wizard from XI Release 2 or XI 3.x.
- You cannot export a BIAR file generated using the 4.0 upgrade management tool into another 4.0 deployment. Use the lifecycle management console to promote content between two 4.0 deployments.

### Upgrade paths

You can migrate your system data and business intelligence content to SAP BusinessObjects Business Intelligence platform 4.0 from XI 3.x, XI Release 2 SP2 (or higher), or a Business Intelligence Archive Resource (BIAR) file generated from XI R2 SP2 (or higher, except 4.0). If you have an older deployment, use the following guidelines to upgrade your existing deployment:



**Caution:**

- To upgrade to XI 3.1 from XI R2, XI MHF1, or XI R2 SP1, you must first upgrade to XI R2 SP2 (or higher).
- To upgrade from BusinessObjects 5 or 6, Crystal Enterprise 9 or 10, or BusinessObjects Business Intelligence platform, you must first upgrade to XI 3.x, or XI R2 SP2 (or higher).



**Note:** The upgrade management tool upgrades only the Server and Web Tier features in your deployment. To upgrade the client tools, run the Client Tools installation program. If you have an existing Information platform services 4.0 deployment, you can migrate your data to 4.0, using the same Central Management Server (CMS) database, or using different databases.

## Using the upgrade management tool

The upgrade management tool guides you through the process of exporting business intelligence content (user accounts, groups, folders, reports, universes, security, and other objects) and upgrading it to the most recent version.

The upgrade involves the following steps:

- Complete Upgrades
  1. Select an upgrade scenario.
  2. Specify the source and destination deployments.
  3. (Optional) Specify object parameters.
  4. Perform the upgrade.
- Incremental Upgrades
  1. Select an upgrade scenario.
  2. Specify the source and destination deployments.
  3. Select objects to upgrade.
  4. (Optional) Specify object parameters.
  5. Specify object dependencies.
  6. Perform the upgrade.

## Complete upgrade

The SAP BusinessObjects Business Intelligence platform upgrade management tool performs a complete upgrade by copying content from one deployment to another.

Complete upgrades allow you to copy business intelligence content (including dependencies and permissions) from your old deployment to the new deployment, and to upgrade it. Any objects that exist in the destination deployment are automatically overwritten by objects with the same unique identifiers from the source deployment. Objects from the source deployment with different unique identifiers but the same name and location as objects on the destination deployment are renamed when they are upgraded.

This is the simplest and fastest way to upgrade the content of your entire Central Management Server (CMS) database.

## Incremental upgrade

Incremental upgrades allow you to copy individual objects to your new deployment, and to upgrade them. You can select which objects in the source deployment can be copied and renamed, if they have different unique identifiers but the same name and location as objects on the destination deployment.

Selecting and copying specific objects from a Central Management System (CMS) with an incremental upgrade is the best way to import a limited subset of source objects into the destination deployment.

## Side-by-side deployments

In addition to choosing between a complete upgrade or an incremental upgrade, you may want to consider performing a side-by-side deployment. A side-by-side deployment allows you to install the most recent version of SAP BusinessObjects Business Intelligence platform on a machine with an existing, older deployment. Use the upgrade management tool to export your business intelligence content from your existing deployment. You can then make sure that the new deployment is configured and running smoothly before you uninstall your previous deployment.

Side-by-side deployments can also involve life cycle management: moving resources from one system to another system without affecting the dependencies of those resources. The platform uses the Lifecycle management console and the BIAR command-line tool to manage different versions of BI resources between systems.

## Exercise 6: Migrate Objects Using Upgrade Management Tool

### Exercise Objectives

After completing this exercise, you will be able to:

- Migrate a BIAR file to a Live system
- Perform an incremental migration

### Business Example

Using a BIAR file, you can perform migration from a SAP BusinessObjects XI 3.1 repository to a live BIP 4.0 platform.

### Task 1: Perform an incremental migration

You will perform an incremental migration from a SAP BusinessObjects XI 3.1 repository to a live BIP 4.0 platform using a BIAR file.



**Note:** This BIAR file was prepared in a XI 3.1 system and it contains two folders:

- Marketing Reports folder
  - CRMarketing Crystal Reports
  - WebiMarketing Crystal Reports
- Sales Reports folder
  - CRSales Crystal Reports
  - WebiSales Crystal Reports

1. Launch the Upgrade management tool on the server.



**Note:** This step needs to be performed on the server side where Upgrade management tool is installed. Remote desktop to the server assigned to you to perform this exercise.

2. Use the Incremental Upgrade option and use the BIAR to Live option to perform a migration from a prepared BIAR file to another live system that is assigned to you. Configure the source and destination system options as follows:

*Continued on next page*

| Field        | Value  |
|--------------|--|
| Source:      |  |
| BIAR File    | XI31_FoldersObjects.biar (found in the <i>D drive\BOE330</i> folder on the server) |
| Destination: |  |
| CMS Name:    | Your assigned system (For example: wdfbmt2268)                                     |
| User Name:   | Administrator  |
| Password:    | BOTraining4x   |

3. In the *Object Selection* screen, expand the Folders and Objects folder and select the *Marketing Reports* and *Sales Reports* sub folders..
4. Ensure that the option: **Export all instances of an object if the objects is selected to have its dependencies exported** is selected.
5. In the summary screen, click **Upgrade Options** and select the following options:  
**Overwrite object content**  
**Overwrite object security**

## Result

The migration process begins. Review the *General Info* tab for warnings and errors. Click OK when the upgrade is complete.

## Task 2: Validate the migration

Log onto the CMC of the assigned system and validate the migration by verifying the folder structure, reports and universes exist in the repository. As well, verify that you can view and refresh the migrated content documents and reports.

1. Log on to Central Management Console and navigate to the Auditor folder.

## Solution 6: Migrate Objects Using Upgrade Management Tool

### Task 1: Perform a incremental migration

You will perform a incremental migration from a SAP BusinessObjects XI 3.1 repository to a live BIP 4.0 platform using a BIAR file.



**Note:** This BIAR file was prepared in a XI 3.1 system and it contains two folders:

- Marketing Reports folder
  - CRMarketing Crystal Reports
  - WebiMarketing Crystal Reports
- Sales Reports folder
  - CRSales Crystal Reports
  - WebiSales Crystal Reports

1. Launch the Upgrade management tool on the server.



**Note:** This step needs to be performed on the server side where Upgrade management tool is installed. Remote desktop to the server assigned to you to perform this exercise.


- a) Click *Start* → *Programs* → *SAP BusinessObjects BI Platform 4.0* → *SAP BusinessObjects BI Platform* → *Upgrade management tool*.
2. Use the Incremental Upgrade option and use the BIAR to Live option to perform a migration from a prepared BIAR file to another live system that is assigned to you. Configure the source and destination system options as follows:

| Field        | Value  |
|--------------|--|
| Source:      |  |
| BIAR File    | XI31_FoldersObjects.biar (found in the <i>D drive\BOE330</i> folder on the server) |
| Destination: |  |

*Continued on next page*

| Field      | Value  |
|------------|--|
| CMS Name:  | Your assigned system (For example: wdfbmt2268) |
| User Name: | Administrator                                  |
| Password:  | BOTraining4x                                   |

- a) Select *English* in the language selection box, Click **Incremental Upgrade** and click *Next*.
  - b) In the *Upgrade Scenario* selection box, select **BIAR to Live**.
  - c) Enter the source and destination system information as provided.
  - d) Click *Next*.
3. In the *Object Selection* screen, expand the Folders and Objects folder and select the *Marketing Reports* and *Sales Reports* sub folders..
    - a) In the left pane under *Object type*, navigate to *Folders and Objects*.
    - b) Select the **Marketing Reports** folder check box.
    - c) Select the **Sales Reports** folder check box.
  4. Ensure that the option: **Export all instances of an object if the objects is selected to have its dependencies exported** is selected.
    - a) Click *Options*.
    - b) Under the *Object Instances*, select **Export all instances of an object if the objects is selected to have its dependencies exported**.
    - c) Click *OK*.
    - d) Click *Next*.

 **Note:** You should see there are many dependent objects
  5. In the summary screen, click **Upgrade Options** and select the following options:  
**Overwrite object content**

*Continued on next page*

**Overwrite object security**

- a) Navigate to *Folders* and ensure the **Auditor** and **en** folders are checked.
- b) Click *Upgrade Options*.
- c) Under the *Incremental Export*, select **Overwrite object content**.
- d) Under the *Incremental Export*, select **Overwrite object security**.
- e) Click *OK*.
- f) Click *Start*.

**Result**

The migration process begins. Review the *General Info* tab for warnings and errors. Click OK when the upgrade is complete.

**Task 2: Validate the migration**

Log onto the CMC of the assigned system and validate the migration by verifying the folder structure, reports and universes exist in the repository. As well, verify that you can view and refresh the migrated content documents and reports.

1. Log on to Central Management Console and navigate to the Auditor folder.
  - a) Click *Start* → *Programs* → *SAP BusinessObjects Enterprise XI 4.0* → *SAP BusinessObjects Enterprise* → *SAP BusinessObjects Enterprise Central Management Console*.
  - b) Log on with your username and password.
  - c) In the *CMC Home* page, click *Folders*.
  - d) Navigate to *Marketing Reports* folder.
  - e) Right-click the **CRMarketing** report and click *View*.
  - f) Click *Refresh*.
  - g) Repeat the same step to view and refresh **WebMarketing** document.
  - h) Navigate to *Sales Reports* folder.
  - i) Right-click the **CRSales** report and click *View*.
  - j) Click *Refresh*.
  - k) Repeat the same step to view and refresh **WebSales** document.



## Lesson Summary

You should now be able to:

- Describe the roles of the upgrade management tool
- Migrate objects using the upgrade management tool



## Lesson: Using Lifecycle Management Console

### Lesson Overview

This lesson explains how to perform lifecycle management in SAP BusinessObjects BI deployments.



### Lesson Objectives

After completing this lesson, you will be able to:

- Explain Lifecycle Management
- Describe the Lifecycle management console
- Manage promotion jobs

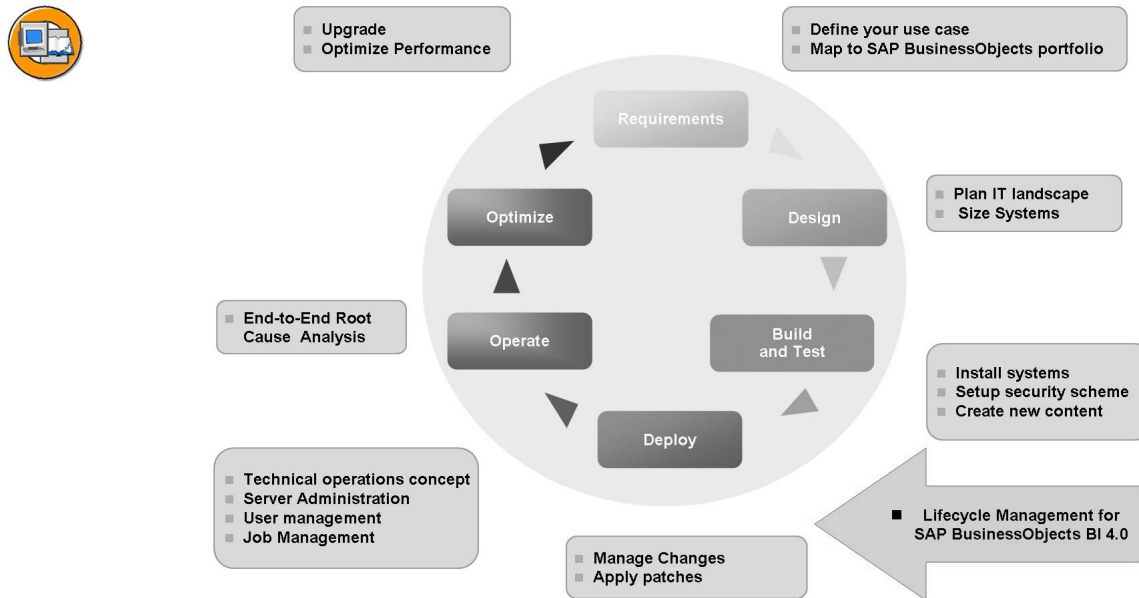
### Business Example

Many BI deployments contain different stages such as development, testing, and production. Reports and other BI objects often require modification or enhancement due to the changing information and business requirements. Administrators must control how objects are promoted through these stages, whether the objects are completely new or the objects have the rights to overwrite or update the objects that already exist in the destination environment.

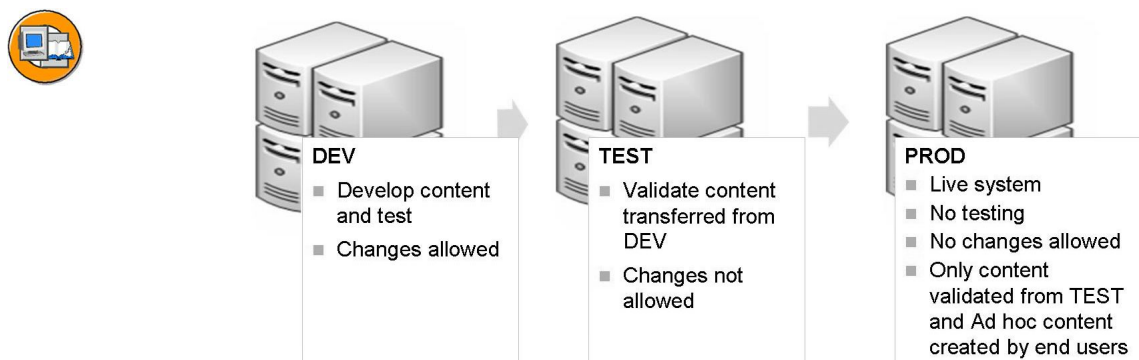
### LifeCycle Management

At SAP, lifecycle management refers to the complete process surrounding an application, from gathering the initial requirements, to designing the solution, to building and testing the solution, to deploying the solution, to the ongoing operation of that solution, and the optimizing of that solution to improve it over time, which can in turn lead to further requirements that would be then rolled into a subsequent iteration. So in this usage of the term, “lifecycle management” covers many topics: installation, deployment, change management, administration, auditing, monitoring, troubleshooting, to name just a few. The Lifecycle Management Console for SAP BusinessObjects BI 4.0 is only for BI content lifecycle. BI content lifecycle management services really are focused on the problem of managing the ongoing lifecycle for BI content specifically. BI content lifecycle management is a subset of this larger topic, primarily in Test and Deploy phases. In this lesson you will learn how to manage BI content lifecycle using LifeCycle Management Console for SAP

BusinessObjects BI 4.0, which is the tool that allows BI administrators and operations teams to package BI content and associated dependencies and promote that content in an efficient, reliable, and repeatable fashion through multiple environments.



**Figure 35: SAP Application LifeCycle Management**



**Figure 36: System Landscape**

## What is Lifecycle management console?

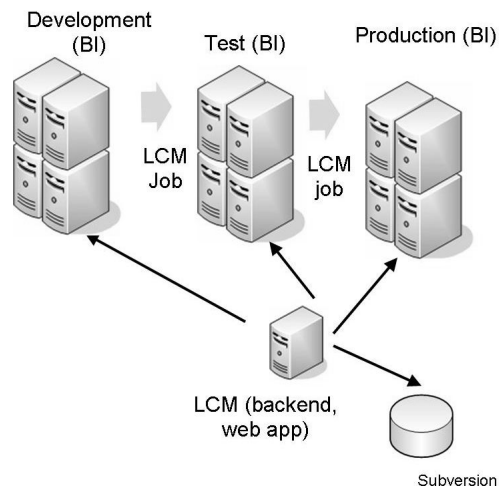
The lifecycle management console refers to the set of processes involved in managing information related to a product life cycle, from the stage of concept through delivery. It establishes procedures for governing the entire product life cycle, which includes phases such as development, testing, and production. These phases can occur at the same site or at different geographical locations.

The BI resources that are present in the development repository must be transferred to the testing repository for testing deployment. The time required to transfer resources from one repository to another repository must be minimal, to obtain a high-quality and competitive product. These resources also have dependencies that have to be moved from one repository to another. The dependencies of resources adds complexity to the movement of resources, because these resources have to move along with the dependents.

Lifecycle management console for SAP BusinessObjects Business Intelligence platform 4.0 is a web-based tool that enables you to move BI resources from one system to another system, without affecting the dependencies of these resources. It also enables you to manage different versions of BI resources, manage dependencies of BI resources, and roll back a promoted resource to restore the destination system to its previous state.



**Caution:** The lifecycle management console tool is a plug-in for the SAP BusinessObjects Business Intelligence platform application. You can promote a BI resource from one system to another system only if the same version of the SAP BusinessObjects Business Intelligence platform application is installed on both the source and destination systems.



### Standalone

- Required addition server to host LCM
- Only one LCM to manage
- Can manage deployments on all platforms
- Allows refreshing of DEV or TEST without losing LCM metadata.
- Cleaner patching of LCM environment
- Needs network connectivity to all BI environments (or standalone LCM for each environment).

**Figure 37: LifeCycle Management for SAP BusinessObjects BI 4.0 – Standalone Deployment**

| Promotion   | Upgrade/Migration  |
|---|--|
| <p>LifeCycle Management Console (LCM)</p> <p><b>Promotion:</b> “Transport content from like system to like system” Systems are the same version. E.g. Dev to Test to Production. Content is primarily document templates, metadata and schedules. Not document instances.</p> | <p>Upgrade Manager</p> <p><b>Upgrade:</b> “Transport and transform content from previous version to newer version” Content includes all objects.</p> <p><b>Migrate:</b> “Transport and transform content from a previous platform to a new platform or architecture”</p> |

## Lifecycle management console Features

The lifecycle management console supports the following features: •

- Promotion - This feature enables you to create or update infoobjects in the destination system. Apart from promoting infoobjects, it enables you to perform the following tasks:
  - Create a new job • Copy an existing job • Edit a job • Schedule a job promotion • View the history of a job •
- Managing Dependencies - This feature enables you to select, filter, and manage dependents of infoobjects in the job that you want to promote.
- Scheduling - This feature enables you to specify a time for job promotion, rather than promote a job as soon as it is created. You can specify the time for job promotion by using any of the following parameters: hourly, daily, weekly, or monthly.
- Security - This feature enables you to promote infoobjects along with the associated security rights. You can also use this feature to promote infoobjects associated with application rights.
- Test Promotion - This feature enables you to check or test the promotion to ensure that all the preventive measures are taken before the actual promotion of the infoobjects. •
- Rollback - This feature enables you to restore the destination system to its previous state, after a job is promoted. You can roll back an entire job or a part of the job.

- Auditing - The events generated by the lifecycle management console are stored in the audit database. The Auditing feature enables you to monitor the events that are logged in the audit database.
- Administration options - This feature enables the administrator to configure the parameters of the lifecycle management console. •
- Version Management - This feature enables you to manage different versions of the same document. It also enables you to track the changes in the directory.
- Promoting Overrides - This feature enables you to promote the overrides through a job promotion.

## Using the Administration Options

The Administration options enable you to configure settings before promoting infoobjects from one SAP BusinessObjects Enterprise deployment to another SAP BusinessObjects Enterprise deployment and SAP deployment. This section describes how to use the administration options.

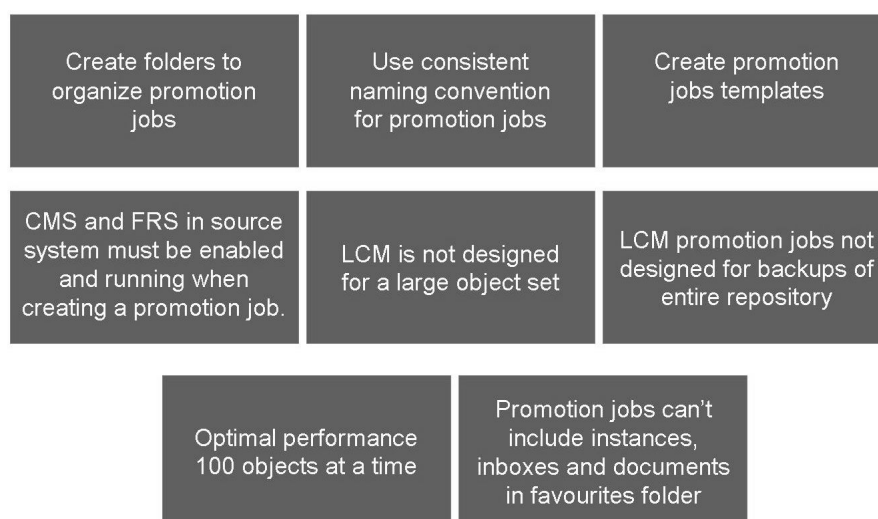
The **Administration Options** link displays the following options:

- Manage Systems - This option enables you to add and remove the host systems.
- Override Settings - This option enables you to override the properties of infoobjects within the job that were promoted to the destination system. It overrides the properties of infoobjects that were promoted from the source system.
- Rollback Settings - This option enables you to configure the rollback process at the system level.
- Job Settings - This option enables you to specify the number of job instances that can exist in lifecycle management console system at any instance of time. If the number of jobs exceed the specified number, they are automatically deleted. It also enables the user to specify the number of days for a job, after which the job must be deleted from the lifecycle management console.
- VMS Settings - This option enables you to configure version management systems.

## Creating a New Job

This section describes how to create a new job by using the lifecycle management console tool. The following table discusses the GUI elements and fields that you can use to create a new job:

| Item               | Description   |
|--------------------|---|
| Name               | Name of the job that you want to create.  |
| Description        | Description of the job you want to create.  |
| Keywords           | The keywords for the contents of the job you want to create   |
| Save Job in        | You must browse and select a folder to create a job.  |
| Source System      | The name of the SAP BusinessObjects Business Intelligence platform system from which you want to promote a job. |
| Destination System | The name of the SAP BusinessObjects Business Intelligence platform system to which you want to promote a job.   |
| User name          | The login ID that you must use to log into the source or destination system.                                    |
| Password           | The password that you must use to log into the source or destination system.                                    |
| Authentication     | The authentication type that is used to connect to the source or destination system.                            |



**Figure 38: Best Practices for Creating Promotion Jobs**

## Managing Job Dependencies

In an SAP BusinessObjects Business Intelligence platform environment, infoobjects are dependent on other infoobjects. For example, a Web Analysis document is dependent on the underlying Universe for its structure, content, and so on. While promoting an object, you can select and filter the dependents that you want to promote, or permit the promotion of all the dependents to another SAP BusinessObjects Business Intelligence platform system. To select and filter the dependents you want to promote along with the infoobject, you must use the **Manage Dependencies** option. If you do not use this option, the dependents are not promoted along with the job.

The following table discusses options that you can use to manage the dependents:

| Types of Dependency objects                              | Description  |
|--|--|
| Universe for selected reports                            | Promotes the universe on which the selected infoobject is dependent.   |
| Selected universes, Universe restriction set             | Promotes universes that are dependent on other Universe restriction set.   |
| Access levels set on selected objects                    | Promotes access levels that are used on the selected infoobjects.  |
| Connections used by selected universes                   | Promotes universe connection objects that are used by the selected infoobjects.  |
| Business Views for selected reports                      | Promotes Business Views, Business elements, Data foundation, data connection, and List of Values (LoVs) that the selected infoobjects depend on. |
| Events, calendars, profiles used by selected publication | Promotes event, calendar, and user profile objects that are used by a selected publication.  |



Dependent objects  
computed only when  
you click on  
Manage Dependencies

Only internal  
dependencies except  
when using  
Promote with CTS+

Only promote  
dependencies if they  
have changed

**Figure 39: Promotion Jobs - Dependences****Note:**

- Dependent objects are computed automatically by the lifecycle management console tool. These dependents are computed based either on the infoobject relationships or infoobject properties.
- If you select a folder for promotion, then the contents in the selected folder are considered as primary resources.
- In the "Manage Dependencies" screen, when you place the cursor on the scheduled infoobject, a tool tip appears describing the file name, file path, created date and time, last modified date and time, next run, expiry, owner, and recurrence of the schedule.

## Scheduling a Job in Lifecycle management console

The lifecycle management console tool enables you to specify when a job must be promoted, rather than promote it as soon as it is created. It also enables you to schedule job promotion at fixed intervals. This feature is useful for promoting large jobs when the load on the server is at its minimum. To schedule a job promotion, you must specify a time in future or select a recurrence pattern, and specify additional parameters.

**Why testing before promoting?**

- You can test what would happen without affecting destination.
- Test Promote will inform you if new object is added, any conflicts with Name/CUID, dependencies not promoted.

**Test Promote Considerations**

- Does not check if user promoting has rights on the folders in the destination.

**Why Scheduling**

- Schedule promotion jobs, when load is at its minimum

**Scheduling Considerations**

- Content is selected when job actually runs, not when promotion job was created or scheduled.

**Figure 40: Testing and Running Promotion Jobs**

## Rolling Back a Job

The Rollback option enables you to restore the destination system to its previous state, after a job is promoted.





### Rollback?

- Restore destination system to it's previous state.

### When?

- Issue is in production
- Change must be reversed quickly.
- Scope of changes to be rolled back is large.

### Considerations?

- Enable rollback only for critical systems.
- Only roll back when absolutely necessary.
- Avoid rolling back more than one versions.
- Do a full roll back when security changes need to be rolled back.
- When using CTS+ integration, rollback is only possible for thr BI content.

**Figure 41: Roll Back**

## Managing Different Versions of an Infoobject

The lifecycle management console tool enables you to manage versions of BI resources that exist in the SAP BusinessObjects Business Intelligence platform repository. It supports both Subversion and ClearCase version management systems. This section describes how to use the Version Management feature in the lifecycle management console tool.



### Version Management?

- Managing different versions of the same document.
- Safe keeping: who made a change, go back to previous version if necessary.

### Where/When?

- Development environment.
- Multiple environments can share the same subversion repository.
- Version objects are environment specific.
- Version objects when design is complete and before making any changes.

### Other Considerations?

- File security to lock down access to Subversion
- View Deleted Resources to restore any object that was accidentally deleted from the CMS
- Backup: checkout folder and the entire repository folder (by default C:\LCM\_Repository\svn\_repository)

**Figure 42: Version Management**



## Exercise 7: Manage the Promotion of Lifecycle Management Jobs

### Exercise Objectives

After completing this exercise, you will be able to:

- Manage the promotion of LifeCycle Management jobs

### Business Example

You need to manage the promotion jobs. One system will be configured as the origin site while another system will be the destination site. You need to manage the promotion of a Crystal report, Web Intelligence document , their universes, and universe connections.

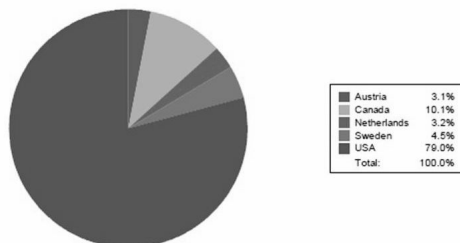
## Task 1: Manage Crystal reports

Create a Crystal Report using the xtreme database using Crystal reports 2011. Call it LCM Crystal Sample



Order Amount over \$ 10000 per Country

Sum of Order Amounts per Country



|             | <u>Customer Name</u>    | <u>Order ID</u> | <u>Order Amount</u> |
|-------------|-------------------------|-----------------|---------------------|
| Austria     |                         |                 | \$10,259            |
|             | Piccolo                 | 1,012           | \$10,259.10         |
| Canada      |                         |                 | \$33,299            |
|             | Bikes for Tykes         | 1,646           | \$11,553.00         |
|             | Crazy Wheels            | 1,912           | \$10,859.17         |
|             | Pedal Pusher Bikes Inc. | 1,177           | \$10,886.79         |
| Netherlands |                         |                 | \$10,629            |
|             | Canal City Cycle        | 2,536           | \$10,629.23         |

**Figure 43: Sample Solution (Partial)**

1. Launch Crystal Reports 2011 and create a new report. Create a new Connection via ODBC to the database **XtremeSQL2005**. Use the following ODBC connection information:

|          |               |
|----------|---------------|
| Server   | XtremeSQL2005 |
| UserID   | boadmin       |
| Password | BOTraining    |
| Database | xtreme        |

2. Still in Database Expert navigate to the *xtreme* ODBO connection that you have just created. and select the tables *Customer* and *Orders*.

*Continued on next page*

3. Enable visibility for the Field Explorer and place the fields **Customer Name** from the Customer table and **Order ID** and **Order Amount** from the Orders table in the *Details* section of the design area with a small space between the fields.
4. Insert a Group on the **Country** field of the Customer table.
5. Use the Select Expert on record level and filter the records displayed in the report so that only records with an Order Amount value greater than 10000 are displayed.

## Task 2: Format the Crystal Report (Optional)

1. Insert a Group Summary for all levels for the field **Order Amount**
2. Remove decimal places from the Group Summary of **Order Amount**.
3. Insert a single border above and double border line below the grand total summary figure.
4. Move the **Group Summary** results from the Group Footer to the Group Header.
5. Insert a title for the report: **Order Amount over \$ 10000 per country**. Make the font color **Navy** and font size **16**.
6. Change the font style for the column headings to **bold** and **underlined** and change the font size to **12**.
7. Insert a page number in the center of the *Page Footer*.
8. Insert a pie chart in the *Report Header* visualizing the sums of the order amounts per country. Change the Chart Title to **Sum of Order Amounts per country**
9. Preview your report and check the results. Afterwards save the report to the My Documents folder of your local drive with the file name **U## Order Amount per Country**.

## Task 3: Save the Report


1. Make your report available to other users by Saving it under the same name **U## LCM Crystal Reports** in the BI Platform repository. Use the following credentials to log on to BI Platform:

*Continued on next page*

|                |               |
|----------------|---------------|
| Server         | wdfbmt2268    |
| User           | administrator |
| Password       | Your password |
| Authentication | Enterprise    |

## Task 4: Manage promotion jobs

Configure LCM settings and create \ promote LCM Job

 **Note:** Make sure to use remote desktop and log into the server machine to perform this task.

1. Log on to the Life Cycle Management console as administrator

| Field          | Value               |
|----------------|---------------------|
| System         | wdfbmt2268          |
| User Name      | administrator       |
| Password       | <assigned password> |
| Authentication | Enterprise          |

2. Configure the server wdfbmt2268 to be the Origin.
3. Create a new LCM folder under the **Promotion Jobs** folder.
4. Highlight the newly created folder and create a new job. Fill out the name field and ensure you save this job in the folder you created.
5. Ensure that the Source system is WDFLBMT2268 and the destination system is WDFLBMT2287.
6. In the Add objects from the system window, select the LCM Crystal Report you created earlier.
7. Promote the LCM job.

## Task 5: Log into BI Launch Pad on the destination side

Log into BI Launch Pad on the destination side to verify you can view the report and refresh it.

1. Launch SAP BusinessObjects BI Launch Pad.

*Continued on next page*

2. Log in to BI Launch Pad using the following information:

| Field Name     | Value               |
|----------------|---------------------|
| System         | wdfbmt2287:6400     |
| User Name      | Administrator       |
| Password       | <Assigned password> |
| Authentication | Enterprise          |

## Task 6: Create a Web Intelligence document

Create a new Web Intelligence document based on the existing **eFashion.unx**.

1. Launch **SAP BusinessObjects Web Intelligence Desktop**.
2. Create a query with the dimensions **State**, **Store name** and the measure **Sales revenue** (in that order) and execute it to view the results.
3. Rename the Report Title to **Sales Revenue Report**.
4. Edit the document you just created to include a listing for **Quantity sold** by **Year** and **Quarter**.
5. Create a **query filter** to show only data for the store **e-Fashion Dallas**.
6. Create a **report filter** to show only data for the year 2004.
7. Switch from the *Design* mode to *Reading* mode and compare the displayed toolboxes and toolbars.



**Note:** In the *Reading* mode you perform simple viewing tasks, while the *Design* mode lets you modify the document that you are viewing.

8. Save your report in the BusinessObjects BI platform folder *Public Folders* → *BI Training* → *User Area* → *User ##* with the name **U## Sales Revenue Report**

## Task 7: Promote Web Intelligence Document

Promote Web Intelligence Document to Destination System



**Note:** Make sure to use remote desktop and log into the server machine to perform this task.

1. Log on to the Life Cycle Management console as administrator

*Continued on next page*

| Field          | Value               |
|----------------|---------------------|
| System         | wdfbmt2268          |
| User Name      | administrator       |
| Password       | <assigned password> |
| Authentication | Enterprise          |

2. Configure the server wdfbmt2268 to be the Origin.
3. Create a new LCM folder under the **Promotion Jobs** folder.
4. Highlight the newly created folder and create a new job. Fill out the name field and ensure you save this job in the folder you created.
5. Ensure that the Source system is WDFLBMT2268 and the destination system is WDFLBMT2287.
6. In the Add objects from the system window, select the LCM Crystal Report you created earlier.
7. Promote the LCM job.
8. In the *Manage Dependencies* tab, select both the Universe and Universe Connection.
9. Complete and verify the promotion job.

### Result

The Web Intelligence document has been promoted. To check, you can log on to BI Launch pad on WDFLBMT2287 system to view and refresh the Web Intelligence document.

## Task 8: Promote the Universe Connection

Promote the Universe Connection override to the Destination System

1. Navigate to the Administration Options.
2. Navigate to the Override settings and to the Connection Overrides tab to see a list of connections resident in the CMS Repository.
3. Log in and select the origin system WDFLBMT2268. Navigate to the efashion-webi connection and change the status to Active.
4. Log in and select the destination system WDFLBMT2287. Navigate to the connection override tab where you will find the promoted connection override efashion-webi. Change the status to Active.



## Solution 7: Manage the Promotion of Lifecycle Management Jobs

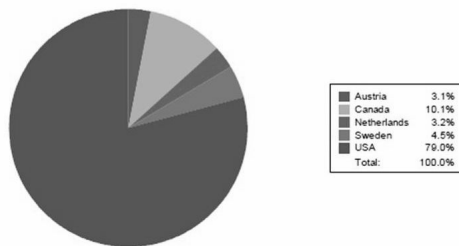
### Task 1: Manage Crystal reports

Create a Crystal Report using the xtreme database using Crystal reports 2011. Call it LCM Crystal Sample



Order Amount over \$ 10000 per Country

Sum of Order Amounts per Country



|             | <u>Customer Name</u>    | <u>Order ID</u> | <u>Order Amount</u> |
|-------------|-------------------------|-----------------|---------------------|
| Austria     |                         |                 | <b>\$10,259</b>     |
|             | Piccolo                 | 1,012           | \$10,259.10         |
| Canada      |                         |                 | <b>\$33,299</b>     |
|             | Bikes for Tykes         | 1,646           | \$11,553.00         |
|             | Crazy Wheels            | 1,912           | \$10,859.17         |
|             | Pedal Pusher Bikes Inc. | 1,177           | \$10,886.79         |
| Netherlands |                         |                 | <b>\$10,629</b>     |
|             | Canal City Cycle        | 2,536           | \$10,629.23         |

**Figure 44: Sample Solution (Partial)**

1. Launch Crystal Reports 2011 and create a new report. Create a new Connection via ODBC to the database **XtremeSQL2005**. Use the following ODBC connection information:

*Continued on next page*

|          |               |
|----------|---------------|
| Server   | XtremeSQL2005 |
| UserID   | boadmin       |
| Password | BOTraining    |
| Database | xtreme        |

- a) Click *Start* → *Programs* → *Crystal Reports 2011* → *Crystal Reports 2011*.
  - b) On the Crystal Reports start page, choose *Blank report*.
  - c) In the Database Expert expand *Create New Connection* and click the [+] icon next to *ODBC (RDO)*
  - d) Enter the connection information stated above and click *Finish*.
2. Still in Database Expert navigate to the *xtreme* ODBO connection that you have just created. and select the tables *Customer* and *Orders*.
    - a) In the Database Expert navigate to *ODBC (RDO)* → *XtremeSQL2005* → *xtreme* → *dbo*.
    - b) Select *Customer* and *Orders*. Transfer to the selected tables section by clicking the [>] button and choose *OK*.
    - c) Do not change the table links that have been created automatically and choose *OK*.
  3. Enable visibility for the Field Explorer and place the fields **Customer Name** from the Customer table and **Order ID** and **Order Amount** from the Orders table in the *Details* section of the design area with a small space between the fields.
    - a) Select the menu path *View* → *Field Explorer*.
    - b) In the Field Explorer, expand *Database fields* → *Customer* and drag **Customer Name** into the *Details* section.
    - c) Expand *Database Fields* → *Orders* and drag **Order ID** and **Order Amount** to the *Details* section of the report. Keep a slight distance between the fields.
  4. Insert a Group on the **Country** field of the Customer table.
    - a) Open the *Group Expert* by selecting *Report* → *Group Expert*.
    - b) Drag the **Country** field to the *Group By:* section and choose *OK*.

*Continued on next page*

5. Use the Select Expert on record level and filter the records displayed in the report so that only records with an Order Amount value greater than 10000 are displayed.
  - a) Select the menu path *Report → Select Expert → Record*.
  - b) Within the *Choose Field* dialog select the *Orders.Order Amount* field and click OK.
  - c) Choose *is greater than* as operator and enter **10000** as the value. Click *OK*.
  - d) Choose *Refresh Data*.

## Task 2: Format the Crystal Report (Optional)

1. Insert a Group Summary for all levels for the field **Order Amount**
  - a) Right-click the field **Order Amount** in the detail section and then choose *Insert → Summary* from the context menu.
  - b) Choose *Order Amount* as the field, *Sum* as the summary function, and *Grand Total* in the summary location.
  - c) Select the checkbox *Add to all group levels* and click *OK*.
2. Remove decimal places from the Group Summary of **Order Amount**.
  - a) Switch to Design View by choosing *View → Design*.
  - b) Right-click **Order Amount** summary field in the *Group Footer #1* and *Report Footer*. Use the *Ctrl* key to select both fields.
  - c) Within the formatting tool bar press the icon *Decrease Decimals* twice. (This is the last icon on the formatting tool bar.)
3. Insert a single border above and double border line below the grand total summary figure.
  - a) Right click the grand total of the field **Order Amount** in the *Report Footer* section and select the *Format Field* option. Click on the *Border* tab.
  - b) Choose Top: *Single*, Bottom: *Double*.
  - c) Click *OK*.
4. Move the **Group Summary** results from the Group Footer to the Group Header.
  - a) Click the **Order Amount** summary in the *Group Footer* and drag it to the *Group Header*.

*Continued on next page*

5. Insert a title for the report: **Order Amount over \$ 10000 per country**. Make the font color **Navy** and font size **16**.
  - a) Right click in the *Report Header* section and select *Insert Text Object* from the context menu.
  - b) Expand the text object to the size that is needed in the *Report Header* section.
  - c) Double-click the text object and enter **Order Amount over \$ 10000 per country**.
  - d) Select the text, then right-click and select *Format Text* from the context menu.
  - e) Select the *Font* tab and change the *Style* to **Bold**, the *Size* to **16**, and the *Color* to **Navy**.
  - f) Click *OK*.
6. Change the font style for the column headings to **bold** and **underlined** and change the font size to **12**.
  - a) Select all headings in the Page Header section. Use the *Ctrl* key to select and highlight both fields.
  - b) Right click on top of one of the headings and select *Format Objects* from the context menu.
  - c) Click the *Font* tab and select **bold** from the *Style* drop down box and select **12** in the *Size* drop down box. Mark the check box *underline*.
  - d) Click *OK*.
7. Insert a page number in the center of the *Page Footer*.
  - a) Within the *Field Explorer* expand *Special Fields*.
  - b) Drag the special field *Page Number* into the center of the *Report Footer*.

*Continued on next page*

8. Insert a pie chart in the *Report Header* visualizing the sums of the order amounts per country. Change the Chart Title to **Sum of Order Amounts per country**
  - a) Select the *Insert* option in the menu bar and choose *Chart*.
  - b) Drag the chart into the *Report Header* section.
  - c) Right-click on the chart and select the *Chart Expert* from the context menu.
  - d) Click the *Type* tab and then select *Pie* from the *Choose your chart type* list.
  - e) Click the *Text* tab and uncheck *Auto-Text* for the *Title* field. Enter **Sum of Order Amounts per country** and click *OK*.
9. Preview your report and check the results. Afterwards save the report to the My Documents folder of your local drive with the file name **U## Order Amount per Country**.
  - a) View the report by choosing *View* → *Preview*.
  - b) Align the field size if required.
  - c) Save your report. Choose *File* → *Save As ...* in the menu. Choose the folder My Documents and enter the description **U## Order Amount per Country**. Press *Save*.

### Task 3: Save the Report

1. Make your report available to other users by Saving it under the same name **U## LCM Crystal Reports** in the BI Platform repository. Use the following credentials to log on to BI Platform:

|                |               |
|----------------|---------------|
| Server         | wdfbmt2268    |
| User           | administrator |
| Password       | Your password |
| Authentication | Enterprise    |

- a) Choose *File* → *Save As ...* in the menu. Choose *Enterprise* and log on with the credentials stated above.
- b) Navigate to the folder *BI Training* → *UserArea* → *User##* and enter the file name **U## LCM Crystal Reports**. Press *Save*
- c) Click *Save*.

*Continued on next page*

## Task 4: Manage promotion jobs

Configure LCM settings and create \ promote LCM Job



**Note:** Make sure to use remote desktop and log into the server machine to perform this task.

1. Log on to the Life Cycle Management console as administrator

| Field          | Value               |
|----------------|---------------------|
| System         | wdfbmt2268          |
| User Name      | administrator       |
| Password       | <assigned password> |
| Authentication | Enterprise          |

- a) Click *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects platform* → *SAP BusinessObjects BI platform Lifecycle Management Console*.
- b) Enter the login information stated above and click *Log On*.
2. Configure the server wdfbmt2268 to be the Origin.
  - a) Navigate to *Administration Options* on the top right hand corner
  - b) Under the *Manage Systems* tab, observe that both **wdfbmt2268** and **wdfbmt2287** are listed.
  - c) Place a checkmark on WDFLBMT2268 and click on the origin button above.



**Hint:** This will make this system the point of origin when managing connection, Crystal Reports, and QAAWS, and Universe connection override jobs.

- d) Click *Close*.
3. Create a new LCM folder under the **Promotion Jobs** folder.
  - a) Click *Folder* on the menu bar.
  - b) In the *Enter a new folder name* field, enter **U##\_Promotion\_Folder**.

*Continued on next page*

4. Highlight the newly created folder and create a new job. Fill out the name field and ensure you save this job in the folder you created.
  - a) Right-click the newly created folder and select *New Job*. Fill out the name field and ensure you save in the folder you created by clicking the browse folder link.
  - b) In the *Name* field, enter **U##\_Job1**.
  - c) In the *Description* field, enter **Promoting U## Crystal Report**.
  - d) Click *Browse* beside the *Save Job in field*. enter **U##\_Promotion\_Folder**.
5. Ensure that the Source system is WDFLBMT2268 and the destination system is WDFLBMT2287.
  - a) In the *Source* field, select *wdflbmt2268:6400*.
  - b) In the *Destination* field, select *Login to a New CMS*.
  - c) select *wdflbmt2287* and enter the login information and click *Login*.
  - d) Ensure you have a green checkmark next to each server indicating successful communication to the servers.
  - e) Click *Create*.
6. In the Add objects from the system window, select the LCM Crystal Report you created earlier.
  - a) Navigate to U##\_LCM Crystal Report and select the check box beside the report.
  - b) Select *Add & Close*.
7. Promote the LCM job.
  - a) Select the check box beside the Crystal report.
  - b) Click *Promote* in the toolbar area.
  - c) Click *History* in the tool bar area to verify successful promotion. Click the *Success* blue link to verify job details.

*Continued on next page*

## Task 5: Log into BI Launch Pad on the destination side

Log into BI Launch Pad on the destination side to verify you can view the report and refresh it.

1. Launch SAP BusinessObjects BI Launch Pad.
  - a) Choose *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects BI platform* → *SAP BusinessObjects BI platform Java BI Launch Pad*.
2. Log in to BI Launch Pad using the following information:

| Field Name     | Value               |
|----------------|---------------------|
| System         | wdfbmt2287:6400     |
| User Name      | Administrator       |
| Password       | <Assigned password> |
| Authentication | Enterprise          |

- a) Enter the given information and click *Log On*.
- b) Navigate to find the U##\_LCM Crystal Report.
- c) View the report.

## Task 6: Create a Web Intelligence document

Create a new Web Intelligence document based on the existing **eFashion.unx**.

1. Launch **SAP BusinessObjects Web Intelligence Desktop**.
  - a) Select *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects BI platform Client Tools* → *Interactive Analysis Desktop*


*Continued on next page*



2. Create a query with the dimensions **State**, **Store name** and the measure **Sales revenue** (in that order) and execute it to view the results.


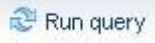
- a) Select the **Universe** data source.
- b) Enter your user information and click *Log On*.

| Field Name     | Value  |
|----------------|--|
| System         | Assigned system                                      |
| User name      | train## (replace ## with your assigned group number) |
| Password       | Enter your password                                  |
| Authentication | Enterprise   |

- c) In the *Universe* window, select the **eFashion.unx** universe.
  - d) In the *Query Panel*, expand the folder *Store* and drag **State** into the *Result Objects* pane.
  - e) Expand the folder *Store* and drag **Store name** into the *Result Objects* pane.
  - f) Expand the folder *Measures* and drag **Sales revenue** into the *Result Objects* pane.
  - g) Click *Run Query* .
3. Rename the Report Title to **Sales Revenue Report**.
    - a) Double-click the title **Report 1** tab and enter **Sales Revenue Report** in the *New value* field.

*Continued on next page*

4. Edit the document you just created to include a listing for **Quantity sold** by **Year** and **Quarter**.



- Open the *Data Access* tab and click *Edit* .
- Expand the folder *Time period* and drag **Year** and **Quarter** into the *Result Objects* pane left to **State**.
- Expand the folder *Measures* and drag **Quantity sold** into the *Result Objects* pane.
- Click *Run Query* .
- Drag the added objects into the report panel. Your report should appear as shown below:


**Sales Revenue Report**

| Year | Quarter | State         | Store name   | Sales revenue | Quantity Sold |
|------|---------|---------------|--------------|---------------|---------------|
| 2004 | Q1      | California    | e-Fashion Lo | 308,928       | 73,541.56     |
| 2004 | Q1      | California    | e-Fashion Sa | 210,292.4     | 52,151.98     |
| 2004 | Q1      | Colorado      | e-Fashion Cc | 131,796.9     | 30,664.17     |
| 2004 | Q1      | DC            | e-Fashion Wd | 208,324.4     | 53,759.87     |
| 2004 | Q1      | Florida       | e-Fashion Mi | 137,529.7     | 29,161.53     |
| 2004 | Q1      | Illinois      | e-Fashion Cr | 256,453.8     | 52,833.21     |
| 2004 | Q1      | Massachusetts | e-Fashion Bo | 92,595.5      | 42,132.2      |
| 2004 | Q1      | New York      | e-Fashion Ne | 222,625.3     | 39,734.21     |
| 2004 | Q1      | New York      | e-Fashion Ne | 333,357.8     | 75,849.85     |
| 2004 | Q1      | Texas         | e-Fashion Au | 197,890.7     | 46,344.5      |
| 2004 | Q1      | Texas         | e-Fashion Da | 150,687       | 39,855.26     |
| 2004 | Q1      | Texas         | e-Fashion Hc | 166,035       | 42,088.04     |
| 2004 | Q1      | Texas         | e-Fashion Hc | 244,183       | 43,344.24     |
| 2004 | Q2      | California    | e-Fashion Lo | 252,558.4     | -51.24        |
| 2004 | Q2      | California    | e-Fashion Sa | 189,935.8     | -4,239.11     |
| 2004 | Q2      | Colorado      | e-Fashion Cc | 129,076.3     | 207.93        |
| 2004 | Q2      | DC            | e-Fashion Wd | 179,863.1     | -1,735.35     |
| 2004 | Q2      | Florida       | e-Fashion Mi | 121,170.3     | -1,723.53     |
| 2004 | Q2      | Illinois      | e-Fashion Cr | 241,148.7     | 3,947.07      |
| 2004 | Q2      | Massachusetts | e-Fashion Bo | 70,902.7      | 8,780.5       |

**Figure 45: Sales Revenue Report**

*Continued on next page*

5. Create a **query filter** to show only data for the store **e-Fashion Dallas**.
  - a) In the *Data Access* tab, click *Edit* .
  - b) Select *Store name* and drag it into the *Query Filters* pane
  - c) Click the arrow on the right of the query filter and select *Value(s) from List*.
  - d) Select the store name **e-Fashion Dallas** and add it to the *Selected Value(s)* pane.
  - e) Click *OK*.
  - f) Execute the report by clicking *Run Query* .
6. Create a **report filter** to show only data for the year 2004.
  - a) Click on the *year* column and navigate to the *Analysis* tab.
  - b) Select *Filter* → *Add Filter*.
  - c) Add the year **2004** to the *Selected Value(s)* and click *OK*.
7. Switch from the *Design* mode to *Reading* mode and compare the displayed toolboxes and toolbars.

 **Note:** In the *Reading* mode you perform simple viewing tasks, while the *Design* mode lets you modify the document that you are viewing.

  - a) Click *Reading* in the main toolbar and compare it with the *Design* mode.
8. Save your report in the BusinessObjects BI platform folder *Public Folders* → *BI Training* → *User Area* → *User ##* with the name **U## Sales Revenue Report**
  - a) Click the arrow next to *Save* on the toolbar in the *File* tab and select *Publish to...* to display the *Publish a document to the server* dialog box.
  - b) Navigate to the folder *Public Folders* → *BI Training* → *User Area* → *User ##* and enter the name **U## Sales Revenue Report**.
  - c) Click *Save*.
  - d) Close *Interactive Analysis Desktop*.

*Continued on next page*

## Task 7: Promote Web Intelligence Document

Promote Web Intelligence Document to Destination System



**Note:** Make sure to use remote desktop and log into the server machine to perform this task.

1. Log on to the Life Cycle Management console as administrator

| Field          | Value               |
|----------------|---------------------|
| System         | wdfbmt2268          |
| User Name      | administrator       |
| Password       | <assigned password> |
| Authentication | Enterprise          |

- a) Click *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects platform* → *SAP BusinessObjects BI platform Lifecycle Management Console*.
  - b) Enter the login information stated above and click *Log On*.
  - c)
2. Configure the server wdfbmt2268 to be the Origin.
    - a) Navigate to *Administration Options* on the top right hand corner
    - b) Under the *Manage Systems* tab, observe that both **wdfbmt2268** and **wdfbmt2287** are listed.
    - c) Place a check mark on WDFLBMT2268 and click on the origin button above.



**Hint:** This will make this system the point of origin when managing connection, Crystal Reports, and QAAWS, and Universe connection override jobs.

- d) Click *Close*.
3. Create a new LCM folder under the **Promotion Jobs** folder.
    - a) Click *Folder* on the menu bar.
    - b) In the *Enter a new folder name* field, enter **U##\_Promotion\_Folder**.

*Continued on next page*

4. Highlight the newly created folder and create a new job. Fill out the name field and ensure you save this job in the folder you created.
  - a) Right-click the newly created folder and select *New Job*. Fill out the name field and ensure you save in the folder you created by clicking the browse folder link.
  - b) In the *Name* field, enter **U##\_Job1**.
  - c) In the *Description* field, enter **Promoting U##\_Web\_Intelligence**.
  - d) Click *Browse* beside the *Save Job in field*. enter **U##\_Promotion\_Folder**.
5. Ensure that the Source system is WDFLBMT2268 and the destination system is WDFLBMT2287.
  - a) In the *Source* field, select *wdflbmt2268:6400*.
  - b) In the *Destination* field, select *Login to a New CMS*.
  - c) select *wdflbmt2287* and enter the login information and click *Login*.
  - d) Ensure you have a green check mark next to each server indicating successful communication to the servers.
  - e) Click *Create*.
6. In the Add objects from the system window, select the LCM Crystal Report you created earlier.
  - a) Navigate to U## Sales Revenue Report and select the check box beside the report.
  - b) Select *Add & Close*.
7. Promote the LCM job.
  - a) Select the check box beside the Crystal report.
  - b) Click *Promote* in the toolbar area.
  - c) Click *History* in the tool bar area to verify successful promotion. Click the *Success* blue link to verify job details.

*Continued on next page*

8. In the *Manage Dependencies* tab, select both the Universe and Universe Connection.
  - a) Navigate to the *Manage Dependencies* tab in the toolbar area. You will observe the Web Intelligence Document dependencies listed: Universe and Universe Connection.
  - b) Select both the Universe and Universe Connection.
  - c) Click *Apply & Close*.
9. Complete and verify the promotion job.
  - a) Click *Promote*.
  - b) In the *Objects to be promoted* window, confirm all the objects that will be promoted in this job.
  - c) Click *Promote*.
  - d) After a few seconds, click *History* to ensure the job ran successfully.

## Result

The Web Intelligence document has been promoted. To check, you can log on to BI Launch pad on WDFLBMT2287 system to view and refresh the Web Intelligence document.

## Task 8: Promote the Universe Connection

Promote the Universe Connection override to the Destination System

1. Navigate to the Administration Options.
  - a) In the Life Cycle Manager Console, click *Administration Options*.
2. Navigate to the Override settings and to the Connection Overrides tab to see a list of connections resident in the CMS Repository.
  - a) Click *Override Settings*.
  - b) To ensure all connections have been accounted for, click the *Log Off* link under **Configure Override Settings** at the top.
  - c) Click Login and log back into WDFLBMT2268 (origin).
  - d) The *Scan* drop down option is now activated.

*Continued on next page*

3. Log in and select the origin system WDFLBMT2268. Navigate to the *efashion-webi* connection and change the status to *Active*.
  - a) From the *Scan* drop down, select *Start* to begin connection scan on source system.
  - b) Find the **efashion-webi** connection and change the status from *Inactive* to *Active*.
  - c) Click *Save*.
  - d) Select the check box beside the *efashion-webi* connection you just activated and click *Promote Overrides*.



**Note:** This will promote the connection to the destination system (WDFLBMT2287)

- e) Under the **Configure Override Settings** area at the top, click *Log off*.
4. Log in and select the destination system WDFLBMT2287. Navigate to the connection override tab where you will find the promoted connection override *efashion-webi*. Change the status to *Active*.
  - a) Click *Login* and log into WDFLBMT2287. Enter the login information and click *Log On*.
  - b) Navigate to the connection override tab where you will find the promoted connection override *efashion-webi*.
  - c) Change the status to *Active*.
  - d) Place a check mark on the connection. Select *edit* button from the toolbar area at the top and verify database parameters including credentials.



**Hint:** Do not make any changes as the WDFLBMT2287 is configured with the identical database settings as WDFLBMT2268.

- e) Click *Save*.





## Exercise 8: Compare Objects and Files using Visual Difference

### Exercise Objectives

After completing this exercise, you will be able to:

- View the differences two versions of the same LCM BIAR file.
- Provide a comparison status between the source and the destination versions.

### Business Example

Visual Difference enables you to view the differences between two versions of the same file or an object (LCM Biar files or LCM Job Objects). You can use this feature to determine the difference between files or objects to develop and maintain different report types. This feature gives a comparison status between the source and the destination versions. For example, if a previous version of the user report is accurate and the current version is inaccurate, you can compare and analyze the file to evaluate the exact issue.

### Task 1: Create a Web Intelligence document



**Note:** If you have not created a Web Intelligence document, follow these instructions. If you already have an existing Web Intelligence document from other exercises, you may skip this task and proceed to the next task.

Create a new Web Intelligence document based on the existing **eFashion.unx**.

1. Launch **SAP BusinessObjects Web Intelligence Desktop**.
2. Create a query with the dimensions **State**, **Store name** and the measure **Sales revenue** (in that order) and execute it to view the results.
3. Rename the Report Title to **Sales Revenue Report**.
4. Edit the document you just created to include a listing for **Quantity sold** by **Year** and **Quarter**.
5. Create a **query filter** to show only data for the store **e-Fashion Dallas**.
6. Create a **report filter** to show only data for the year 2004.

*Continued on next page*

7. Switch from the *Design* mode to *Reading* mode and compare the displayed toolboxes and toolbars.



**Note:** In the *Reading* mode you perform simple viewing tasks, while the *Design* mode lets you modify the document that you are viewing.

8. Save your report in the BusinessObjects BI platform folder *Public Folders* → *BI Training* → *User Area* → *User ###* with the name **U## Sales Revenue Report**

## Result

You have created a Web Intelligence document and this document will be exported into a BIAR file later.

## Task 2: Create a LCM Job

Create a LCM Job that will export WEBI LCM document (U## Sales Revenue Report) to a LCMBIAR file and save it to the Desktop location of the server.

1. Log in to the LCM Console.

| Field          | Value               |
|----------------|---------------------|
| System         | wdfbmt2268          |
| User Name      | administrator       |
| Password       | <assigned password> |
| Authentication | Enterprise          |


2. Create a new LCM Job called U##\_Webi LCMBIAR Job.
3. Configure the Source system to be WDFLBMT2268 and the Destination will be a LCMBIAR file.
4. Add the U## Sales Revenue Report document to the Job. Ensure all dependencies are selected in the Manage dependencies button.
5. Promote the job and save the file to the desktop as U##\_LCMBIAR WEBI.biar.
6. Create a folder in the desktop of WDFLBMT2268 called LCM and share it (this will require basic Microsoft File management knowledge) . Ensure the everyone group has co-owner rights to the LCM folder. Copy the LCMBIAR WEBI file to the LCM folder.

*Continued on next page*

7. Log off WDFLBMT2268 and log on to WDFLBMT2287 using Remote Desktop Connection in Windows.
8. Go to the windows start menu on WDFLBMT2287 and type \\WDFLBMT2268. Copy the LCMBIAR file from WDFLBMT2268 to WDFLBMT2287.
9. Import the contents of LCMBIAR to WDFLBMT2287 repository, log on to the LCM console on WDFLBMT2287. Browse to the desktop and select LCMBIAR WEBI.biar file you copied to the DESKTOP (from WDFLBMT2268 share).

### Task 3: Compare LCMBIAR Webi Job

You can only compare LCMBIAR files or LCM Jobs with Visual Difference. In this task, you will compare LCMBIAR Webi Job on WDFLBMT2268 and LCMBIAR Webi Job on WDFLBMT2287.

1. Log into the CMC application.
2. The compared files are stored in the "Differences" folder, or in any of the user created sub-folder.  
 **Note:** To create a new sub-folder, click the Folder icon.
3. Create a new Comparison using the LCMBIAR WEBI JOB BIARFILE in the Reference system WDFLBMT2268..
4. Enter the target system, select the object to be compared and add this comparison.
5. Click the Compare button to compare the objects or folders.
6. Save the difference report.

## Solution 8: Compare Objects and Files using Visual Difference

### Task 1: Create a Web Intelligence document




**Note:** If you have not created a Web Intelligence document, follow these instructions. If you already have an existing Web Intelligence document from other exercises, you may skip this task and proceed to the next task.



Create a new Web Intelligence document based on the existing **eFashion.unx**.

1. Launch **SAP BusinessObjects Web Intelligence Desktop**.
  - a) Select *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects BI platform Client Tools* → *Interactive Analysis Desktop*
2. Create a query with the dimensions **State**, **Store name** and the measure **Sales revenue** (in that order) and execute it to view the results.
  - a) Select the **Universe** data source.
  - b) Enter your user information and click *Log On*.

| Field Name     | Value  |
|----------------|--|
| System         | Assigned system                                      |
| User name      | train## (replace ## with your assigned group number) |
| Password       | Enter your password                                  |
| Authentication | Enterprise   |

- c) In the *Universe* window, select the **eFashion.unx** universe.
- d) In the *Query Panel*, expand the folder *Store* and drag **State** into the *Result Objects* pane.
- e) Expand the folder *Store* and drag **Store name** into the *Result Objects* pane.
- f) Expand the folder *Measures* and drag **Sales revenue** into the *Result Objects* pane.
- g) Click *Run Query* .

*Continued on next page*



3. Rename the Report Title to **Sales Revenue Report**.
  - a) Right-click the title **Report 1** tab. Select *Rename* and enter **Sales Revenue Report** in the *New value* field.
4. Edit the document you just created to include a listing for **Quantity sold** by **Year** and **Quarter**.
  - a) Open the *Data Access* tab and click *Edit*  .
  - b) Expand the folder *Time period* and drag **Year** and **Quarter** into the *Result Objects* pane left to **State**.
  - c) Expand the folder *Measures* and drag **Quantity sold** into the *Result Objects* pane.
  - d) Click *Run Query*  .
  - e) Drag the added objects into the report panel. Your report should appear as shown below:


**Sales Revenue Report**

| Year | Quarter | State         | Store name   | Sales revenue | Quantity Sold |
|------|---------|---------------|--------------|---------------|---------------|
| 2004 | Q1      | California    | e-Fashion Lo | 308,928       | 73,541.56     |
| 2004 | Q1      | California    | e-Fashion Sa | 210,292.4     | 52,151.98     |
| 2004 | Q1      | Colorado      | e-Fashion Cc | 131,796.9     | 30,664.17     |
| 2004 | Q1      | DC            | e-Fashion Wc | 208,324.4     | 53,759.87     |
| 2004 | Q1      | Florida       | e-Fashion Mi | 137,529.7     | 29,161.53     |
| 2004 | Q1      | Illinois      | e-Fashion Ch | 256,453.8     | 52,833.21     |
| 2004 | Q1      | Massachusetts | e-Fashion Bo | 92,595.5      | 42,132.2      |
| 2004 | Q1      | New York      | e-Fashion Ne | 222,625.3     | 39,734.21     |
| 2004 | Q1      | New York      | e-Fashion Ne | 333,357.8     | 75,849.85     |
| 2004 | Q1      | Texas         | e-Fashion Au | 197,890.7     | 46,344.5      |
| 2004 | Q1      | Texas         | e-Fashion Da | 150,687       | 39,855.26     |
| 2004 | Q1      | Texas         | e-Fashion Hc | 166,035       | 42,088.04     |
| 2004 | Q1      | Texas         | e-Fashion Hc | 244,183       | 43,344.24     |
| 2004 | Q2      | California    | e-Fashion Lo | 252,558.4     | -51.24        |
| 2004 | Q2      | California    | e-Fashion Sa | 188,935.8     | -4,239.11     |
| 2004 | Q2      | Colorado      | e-Fashion Cc | 129,076.3     | 207.93        |
| 2004 | Q2      | DC            | e-Fashion Wc | 179,863.1     | -1,735.35     |
| 2004 | Q2      | Florida       | e-Fashion Mi | 121,170.3     | -1,723.53     |
| 2004 | Q2      | Illinois      | e-Fashion Ch | 241,148.7     | 3,947.07      |
| 2004 | Q2      | Massachusetts | e-Fashion Bo | 70,902.7      | 8,780.5       |

**Figure 46: Sales Revenue Report**

*Continued on next page*

5. Create a **query filter** to show only data for the store **e-Fashion Dallas**.
  - a) In the *Data Access* tab, click *Edit* .
  - b) Select *Store name* and drag it into the *Query Filters* pane.
  - c) Click the arrow on the right of the query filter and select *Value(s) from List*.
  - d) Select the store name **e-Fashion Dallas** and add it to the *Selected Value(s)* pane.
  - e) Click *OK*.
  - f) Execute the report by clicking *Run Query* .
6. Create a **report filter** to show only data for the year 2004.
  - a) Click on the *year* column and navigate to the *Analysis* tab.
  - b) Select *Filter* → *Add Filter*.
  - c) Add the year **2004** to the *Selected Value(s)* and click *OK*.
7. Switch from the *Design* mode to *Reading* mode and compare the displayed toolboxes and toolbars.

 **Note:** In the *Reading* mode you perform simple viewing tasks, while the *Design* mode lets you modify the document that you are viewing.

  - a) Click *Reading* in the main toolbar and compare it with the *Design* mode.
8. Save your report in the BusinessObjects BI platform folder *Public Folders* → *BI Training* → *User Area* → *User ##* with the name **U## Sales Revenue Report**.
  - a) Click the arrow next to *Save* on the toolbar in the *File* tab and select *Publish to...* to display the *Publish a document to the server* dialog box.
  - b) Navigate to the folder *Public Folders* → *BI Training* → *User Area* → *User ##* and enter the name **U## Sales Revenue Report**.
  - c) Click *Save*.
  - d) Close *Interactive Analysis Desktop*.

## Result

You have created a Web Intelligence document and this document will be exported into a BIAR file later.

*Continued on next page*

## Task 2: Create a LCM Job

Create a LCM Job that will export WEBI LCM document (U## Sales Revenue Report) to a LCMBIAR file and save it to the Desktop location of the server.

1. Log in to the LCM Console.

| Field          | Value               |
|----------------|---------------------|
| System         | wdfbmt2268          |
| User Name      | administrator       |
| Password       | <assigned password> |
| Authentication | Enterprise          |

- a) Click *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects platform* → *SAP BusinessObjects BI platform Lifecycle Management Console*.
  - b) Enter the login information stated above and click *Log On*.
2. Create a new LCM Job called U##\_Webi LCMBIAR Job.
  - a) Click *New Job*.
  - b) In the *Name* field, enter **U##\_Compare\_Job**.
  - c) In the *Description* field, enter **Comparing objects..**
  - d) Click *Browse* beside the *Save Job in field*. enter **U##\_Promotion\_Folder**.
3. Configure the Source system to be WDFLBMT2268 and the Destination will be a LCMBIAR file.
  - a) In the *Source* field, select *wdfbmt2268:6400*.
  - b) In the *Destination* field, select *Output to LCMBIAR File*.
  - c) Click *Create*.
4. Add the U## Sales Revenue Report document to the Job. Ensure all dependencies are selected in the Manage dependencies button.
  - a) Navigate to U## Sales Revenue Report and select the check box beside the report.
  - b) Select *Add & Close*.

*Continued on next page*

5. Promote the job and save the file to the desktop as U##\_LCMBIAR WEBI.biar.
  - a) Select the check box beside the Web Intelligence document.
  - b) Click *Promote* in the toolbar area.
  - c) Click *Export*.
  - d) From the *File Download* window, click *Save* to save the BIAR to the desktop of the server.
6. Create a folder in the desktop of WDFLBMT2268 called LCM and share it (this will require basic Microsoft File management knowledge) . Ensure the everyone group has co-owner rights to the LCM folder. Copy the LCMBIAR WEBI file to the LCM folder.
  - a) Navigate to the desktop of the server machine WDFLBMT2268.
  - b) Right-click the desktop area and select *New → Folder*.
  - c) Name the folder **U## LCM Share**.
  - d) Copy the LCMBIAR file to this folder.
  - e) Right-click the folder and click *Share*.
  - f) In the **Choose people to share with field**, select *Everyone (All users in this list)* and click *Add*.
  - g) Click *Share*.
  - h) Write down the path to your folder and click *Done*.
7. Log off WDFLBMT2268 and log on to WDFLBMT2287 using Remote Desktop Connection in Windows.
  - a) Click *Start → Log Off boadmin...*
  - b) Click *Start → Remote Desktop Connection*. and enter wdfldbmt2287.
  - c) Log into wdfldbmt2287 using provided login information.

*Continued on next page*



8. Go to the windows start menu on WDFLBMT2287 and type \\WDFLBMT2268. Copy the LCMBIAR file from WDFLBMT2268 to WDFLBMT2287.

- a) In the window explorer, type the folder link you created earlier.



**Hint:** For example: \\WDFLBMT2268\users\boadmin\desktop\U##\_LCM Share

- b) Press **Enter**. The shared resources on WDFLBMT2268 will appear.
  - c) Navigate to the directory and copy the LCMBIAR file to WDFLBMT2287 desktop.
9. Import the contents of LCMBIAR to WDFLBMT2287 repository, log on to the LCM console on WDFLBMT2287. Browse to the desktop and select LCMBIAR WEBI.biar file you copied to the DESKTOP (from WDFLBMT2268 share).
    - a) Click *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects platform* → *SAP BusinessObjects BI platform Lifecycle Management Console*.
    - b) Click *Import* → *Import LCMBIAR*.
    - c) Click *Browse* to select LCMbiar file from the file system.
    - d) Browse to the desktop and select U##\_LCMBIAR WEBI.biar file you copied.
    - e) Click *OK*.
    - f) In the next screen, ensure that the destination is set to WDFLBMT2287. Ensure you save the job under Promotion Jobs Folder. Click *Create*. You have successfully promoted a Webi document using the LCMBIAR option.



**Note:** You cannot change the Job name

*Continued on next page*

### Task 3: Compare LCMBIAR Webi Job

You can only compare LCMBIAR files or LCM Jobs with Visual Difference. In this task, you will compare LCMBIAR Webi Job on WDFLBMT2268 and LCMBIAR Webi Job on WDFLBMT2287.

1. Log into the CMC application.
  - a) Click *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects platform* → *SAP BusinessObjects BI platform Central Management Console*.
  - b) Enter the login information and click *Log On*.
2. The compared files are stored in the "Differences" folder, or in any of the user created sub-folder.






**Note:** To create a new sub-folder, click the Folder icon.

- a) In the *CMC homepage*, under the "Manage" tab, click the *Visual Difference* link.

The Visual Difference page appears.

3. Create a new Comparison using the LCMBIAR WEBI JOB BIARFILE in the Reference system WDFLBMT2268..
  - a) Click *New Comparison*.  
The "Visual Difference - Comparisons" screen appears.
  - b) Click *Browse* to select LCMBIAR WEBI JOB

*Continued on next page*

4. Enter the target system, select the object to be compared and add this comparison.
  - a) Select the target system from the *Select System* drop-down under **Target**. WDFLBMT2287  
 **Note:** If you login to CMS, the selected object in the reference system can also be automatically matched with an object having the same name in the reference system
  - b) Click the Browse button to select LCMBIAR WEBI job on WDFLBMT2287
  - c) Click *Add*.  
 **Note:** The objects are added to the comparison. If there are more than one pair of objects added, the objects must be scheduled for comparison at a later point of time. However, if the comparison object contains just one pair of objects, you can compare these objects.
5. Click the Compare button to compare the objects or folders.
  - a) Click *Compare*.  
 **Note:** The comparison of LCMBIAR/LCM Job file includes: If the objects other than LCMBIAR or LCM job are selected, the following error message is displayed: Plugin not found.  
  
The comparison process starts immediately and the differences if any are displayed in the "Visual Difference viewer". The differences are highlighted in orange color, and the missing objects are highlighted in red color.  
  
You can also use the filter option to view the compared objects by type, and with differences or with common attributes.
6. Save the difference report.
  - a) Click *Save* to save the difference report.



## Lesson Summary

You should now be able to:

- Explain Lifecycle Management
- Describe the Lifecycle management console
- Manage promotion jobs

## Lesson: Using Monitoring and Auditing

### Lesson Overview

Auditing provides you with a detailed historical view of user and object interaction and system usage. Auditing allows you to fine-tune system performance, retire unused reports, and provide business units with a comprehensive snapshot of their usage patterns.



### Lesson Objectives

After completing this lesson, you will be able to:

- Use Monitoring
- Use Auditing

### Business Example

#### Monitoring

Monitoring is a new application in SAP BusinessObjects Business Intelligence platform 4.0. This application provides the ability to capture the runtime and historical metrics of SAP BusinessObjects Business Intelligence platform 4.0 servers, for reporting and notification. The monitoring application helps system administrators to identify if an application is functioning normally and if the response times

are as expected. By providing key business metrics, the monitoring application provides better insight into SAP BusinessObjects Business Intelligence platform 4.0 . Monitoring allows you to:

- Check the performance of each server: This is possible with the help of watches, which show the state of each server as traffic lights. The system administrator can set thresholds for these watches and receive alerts when these thresholds are breached. This helps in taking proactive action if there is an impending failure or outage.
- View critical system Key Performance Indicators (KPIs): This helps in activity and resource monitoring. These KPIs are displayed on the dashboard page of the monitoring application.
- Check system availability and response time: Using probes, you can simulate workflows to check if the servers and services in the platform deployment are functioning as expected. By analyzing the roundtrip time of these probes at periodic intervals, the system administrator can assess the system usage pattern.
- Analyze peak load and peak period for the CMS: This helps the system administrator determine if more licenses or system resources are required.
- Integrate with other enterprise applications: The SAP BusinessObjects Business Intelligence platform 4.0 monitoring application can be integrated with other enterprise applications like SAP Solution Manager and IBM Tivoli Monitoring.

### **Dashboard**

The Dashboard page provides a centralized view for the system administrator to monitor the performance of all servers. It provides real-time information on the system KPIs, recent alerts, watches, and corresponding graphs based on the watch state.

### **Watch**

Watches provide real-time status and historical trends of servers and workflows within the SAP BusinessObjects Business Intelligence platform environment. Users can associate thresholds and alerts to a watch. You can create a watch using data from probes, servers, SAPOSCOL or Derived Metrics.

### **Derived Metrics**

Derived metric gives you the flexibility to create metrics based on the user's requirements, and then create a watch using this metric. You can create a derived metric by combining two or more existing metrics in a mathematical equation.

## KPI

KPIs (key performance indicators) are standard metrics in the SAP BusinessObjects Business Intelligence platform deployment. They provide information about the schedules and log on sessions. For example, a higher number of RunningJobs indicates good performance of the servers. Alternatively, a higher number of PendingJobs indicates poor performance and high system load.

## Probes

Probes monitor different services and simulates the different functionalities of SAP BusinessObjects Business Intelligence platform components. By scheduling probes to run at specified intervals, the system administrator can track the availability and performance of key services provided by SAP BusinessObjects Business Intelligence platform 4.0. This data can also be used for capacity planning.

## Traffic lights

Traffic lights represent the watch state at any given time. The colors Green, Amber, and Red are used to indicate the state of a watch. Users can choose to set two or three states to a watch.

## Trending graph

A trending graph is a graphical representation of historical metric data generated by probes and servers. It helps the system administrator monitor the system at different time intervals, and assess the system usage pattern.

## Alert

An alert is a notification generated by the monitoring application, when a user-defined threshold value set for different metrics applied to a watch is breached. You can choose to receive alerts either through email or view on the "Dashboard" page.

## Auditing

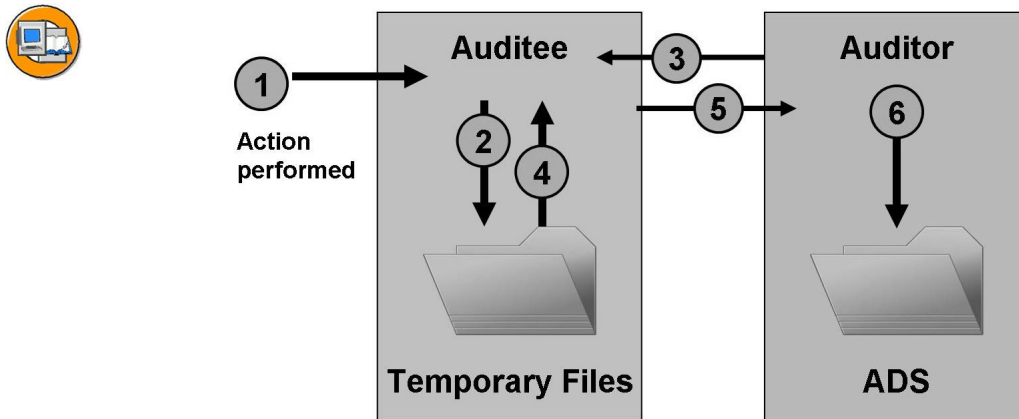
Auditing allows you to keep a record of significant events on servers and applications, which helps give you a picture of what information is being accessed, how it's being accessed and changed, and who is performing these operations. This information is recorded in a database called the Auditing Data Store (ADS). Once the data is in the ADS, you can design custom reports to suit your needs. You can look for sample universes and reports on the SAP Developer Network. For the purposes of this chapter, an auditor is a system responsible for recording or storing information on an event, and an auditee is any system responsible for performing an auditable event. There are some circumstances where a single system can perform both functions.

## How Auditing works

The Central Management Server (CMS) acts as the system auditor, while each server or application that triggers an auditable event acts as an auditee. When an audited event is triggered, the auditee will generate a record and store it in a local temporary file. At regular intervals, the CMS communicates with the auditees to request these records and writes the data to the ADS. The CMS also controls the synchronization of auditing events that occur on different machines. Each auditee provides a timestamp for the auditing events that it records. To ensure that the timestamps of events on different servers are consistent, the CMS periodically broadcasts its system time to the auditees. The auditees then compare this time to their internal clocks. If differences exist, they correct the time recorded for subsequent auditing events. Depending on the type of auditee, the system uses one of the following workflows to record the events.



## 1. Server auditing



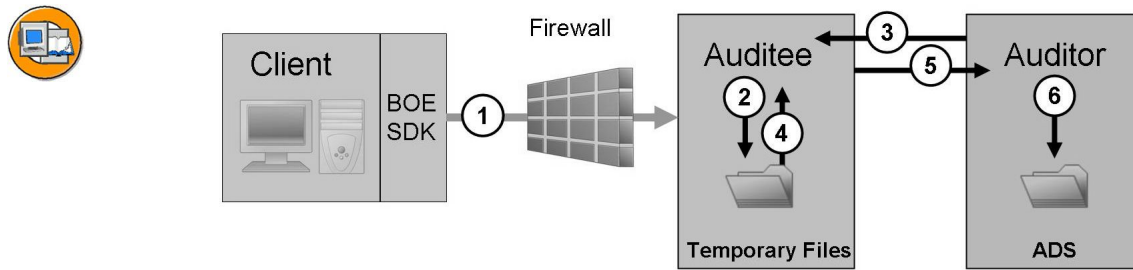
NOTE: The Auditor and Auditee can also co-exist on the same CMS server.

**Figure 47: Server auditing**

1. An auditable event is performed by the server.  
 ➡ **Note:** A port should be opened in the firewall between the client and CMS.
2. The auditee writes events in a temporary file.
3. The auditor polls the auditee and requests a batch of auditing events.
4. The auditee retrieves the events from the temporary files.
5. The auditee transmits the events to the auditor.
6. The auditor writes events to the ADS and signals the auditee to delete the events from the temporary files.

## 2. Client login auditing for clients connecting through CORBA

This includes applications such as Web Intelligence.



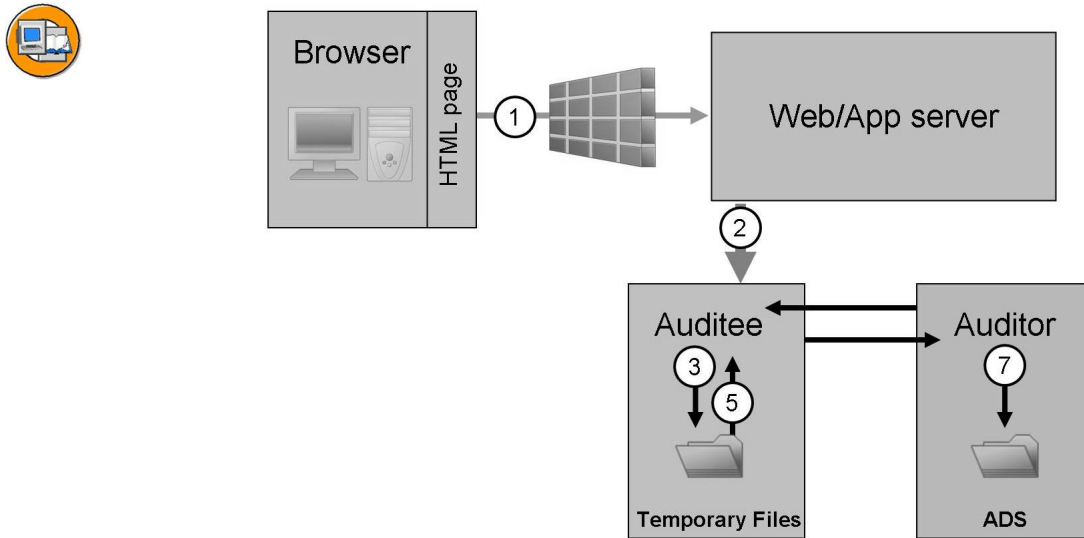
Note: The auditor and auditee can co-exist on the same CMS server

**Figure 48: Client logon auditing for clients connecting through CORBA**

1. The client connects to the CMS, which will act as the auditee. The client provides its IP address and machine name, which the auditee then verifies.
2. The auditee writes events in a temporary file.
3. The auditor polls the auditee and requests a batch of auditing events.
4. The auditee retrieves the events from the temporary files.
5. The auditee transmits the events to the auditor.
6. The auditor writes events to the ADS and signals the auditee to delete the events from the temporary files.

### 3. Client logon auditing for clients connecting through HTTP

This includes online applications such as BI launch pad, Central Management Console, and Web Intelligence.



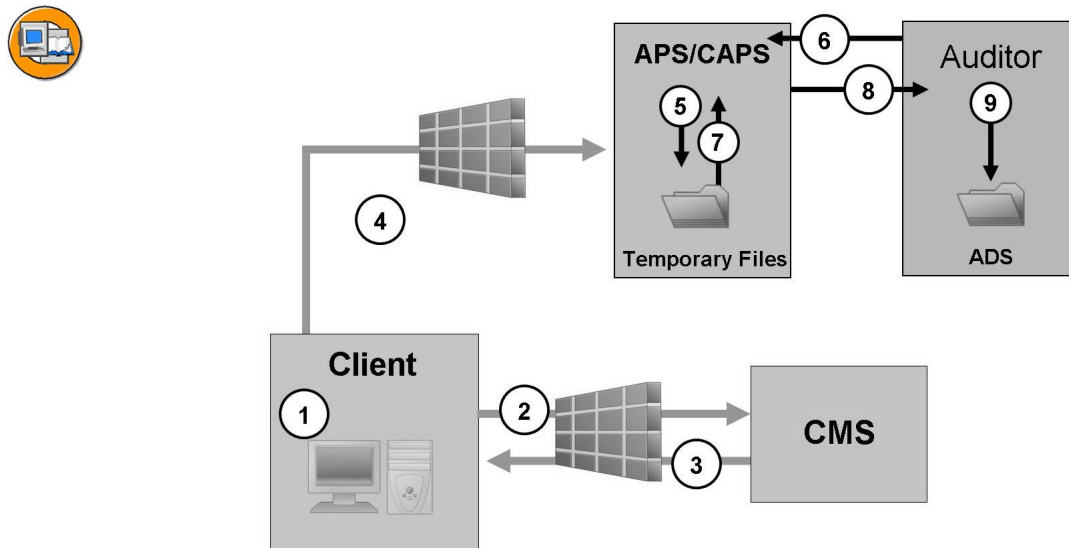
NOTE: The Auditor and Auditee can also co-exist on the same CMS server

**Figure 49: Client logon auditing for clients connecting through HTTP**

1. The browser connects to the web application server, and logon data is submitted to the web application server.
2. SAP BusinessObjects BI platform SDK submits the logon request to the auditee (CMS), along with the IP address and name of the browser machine.
3. The auditee writes events in a temporary file.
4. The auditor polls the auditee and requests a batch of auditing events.
5. The auditee retrieves the events from the temporary files.
6. The auditee sends events to the auditor.
7. The auditor writes events to the ADS and signals the auditee to delete the events from the temporary files.

#### 4. Non-Logon auditing for clients connecting through CORBA

This workflow applies to auditing Web Intelligence events when connecting through CORBA.

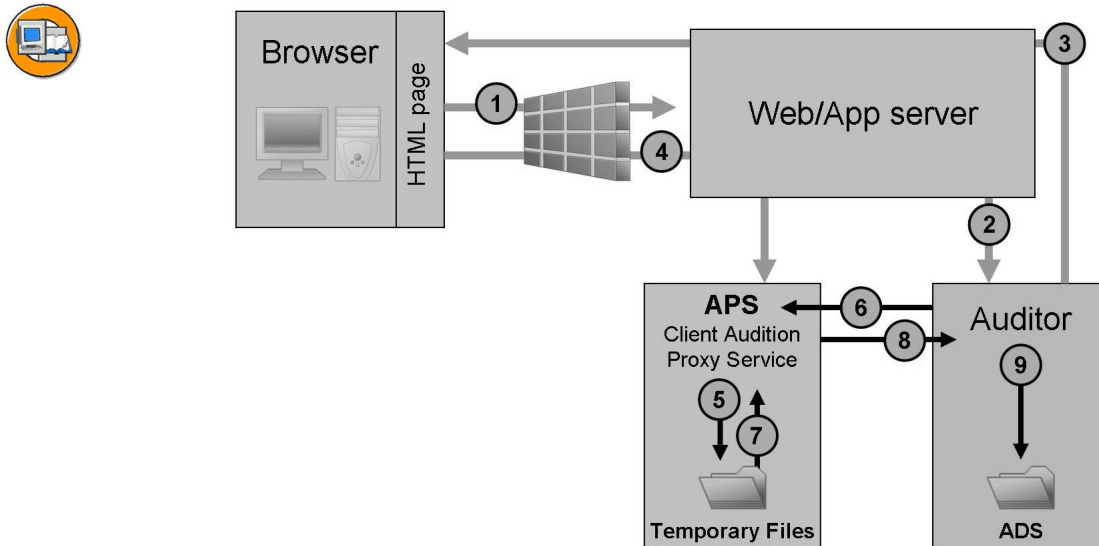


**Figure 50: Non-Logon auditing for clients connecting through CORBA**

1. The user performs an operation that may be audited.
2. The client contacts the CMS to check if the operation is configured to be audited.
3. If the action is set to be audited, the CMS communicates this information to the client.
4. The client sends the event information to the Client Auditing Proxy Service (CAPS), hosted in an Adaptive Processing Server.
5. The CAPS writes events in a temporary file.
6. The Auditor polls the CAPS and requests a batch of auditing events.
7. The CAPS retrieves the events from the temporary files.
8. The CAPS sends the event information to the auditor.
9. The auditor writes events to the ADS and signals the CAPS to delete the events from the temporary files.

### 5. Non-login auditing for clients connecting through HTTP

This workflow applies to auditing Web Intelligence events (except for logon events) when connecting through HTTP.



**NOTE:** The Auditor and Auditee can also co-exist on the same CMS server.

**Figure 51: Non-login auditing for clients connecting through HTTP**

1. The user initiates a potentially auditable event. The client application contacts the web application server.
2. The web application checks to see if the event is configured to be audited.
3. The CMS returns the audit configuration information to the web application server, which passes this information back to the client application.
4. If the event is configured to be audited, the client sends the event information to the web application server, which passes it to the Client Auditing Proxy Service (CAPS), hosted in an Adaptive Processing Server (APS).
5. The CAPS writes events in a temporary file.
6. The auditor polls the CAPS and requests a batch of auditing events.
7. The CAPS retrieves the events from the temporary files.
8. The CAPS sends the event information to the auditor.
9. The auditor writes events to the ADS and signals the CAPS to delete the events from the temporary files.

## Clients that support auditing

The following client applications support auditing:

- Central Management Console (CMC)
- BI launch pad
- Open Document
- Analysis
- Live Office Web Services Provider
- Web Intelligence Rich Client



**Note:** At least one instance of CAPS must be running in order to collect auditing events from the clients listed above. Clients not listed above do not directly generate events, but some actions performed by the servers as a result of client application operations can be audited.

## CMC Auditing page

The *Auditing* page in the CMC has the following areas:

- Auditing Status Summary
- Set Events
- Set Event Details
- Configuration

The *Auditing Status* shows a set of metrics that help you optimize your auditing configuration and alert you to any issues that might affect the integrity of your auditing data. The following table explains the metrics for auditing.

| Metric                      | Details   |
|-----------------------------|---|
| ADS Last Updated on         | The date and time the auditor CMS last started polling the auditees for their auditing events.  |
| Auditing Thread Utilization | The percentage of the polling cycle the auditor CMS spends collecting data from auditees, the remainder is time spent resting between polls.<br>If this reaches 100% the figure will be displayed in yellow, and means the auditor is still collecting data from the auditees when the next poll is due to begin. This may cause delays in the events reaching the ADS. |

| Metric                       | Details  |
|------------------------------|--|
|                              | <p>If this is happening frequently or persistently, it is recommend you either update your deployment to allow the ADS database to receive data at a higher rate (faster network connections or more powerful database hardware for example), or decrease the number of auditing events your system tracks.</p>  |
| Last Polling Cycle Duration  | <p>Duration of the last polling cycle in seconds. This indicates the maximum delay for event data to reach the ADS during the previous polling cycle.</p> <ul style="list-style-type: none"> <li>• If under 20 minutes (1200 seconds), the figure will appear on a green background.</li> <li>• If between 20 minutes and 2 hours (7200 seconds), it will appear on a yellow background.</li> <li>• If over 2 hours, it will appear on a red background.</li> </ul> <p>If this state persists and you consider the delay too long, it is recommend you either update your deployment to allow the ADS database to receive data at a higher rate (faster network connections or more powerful database hardware for example), or decrease the number of auditing events your system tracks.</p> |
| CMS Auditor                  | The name of the CMS currently acting as auditor.   |
| ADS Database Connection Name | <p>The name of the database connection currently used by the auditor CMS to connect to the Auditing Data Store (ADS). For SQL servers this will be the name of the ODBC connection. For other database types it will be the database name, followed by the server name and connection port.</p>  |
| ADS Database User Name       | The user name the auditor CMS is using to log in to the ADS database.  |





## Exercise 9: Monitor Server Performance

### Exercise Objectives

After completing this exercise, you will be able to:

- Create a Watch
- Schedule a Probe

### Business Example

You will create a watch list that monitors Web Intelligence Processing server Processor utilization. Then you will schedule a probe that will give you insight as to the time it takes for the CMS to connect to the System Database

### Task 1: Create a Watch

Create a Watch that will monitor Web Intelligence Processor utilization over 70%



**Hint:** If the processor utilization on any of the servers exceeds 70%, it is an indication that you may need to install and configure another Web Intelligence Processing server to improve performance.

1. In the CMC, navigate to the Monitoring application.
2. Navigate to the Watchlist tab and select new button to create a new watch.
3. Name your watch- Web Intelligence Processor Utilization
4. Define caution rule for CPU usage to be greater than 50.
5. Define Danger rule for CPU usage to be greater than 70.
6. Change watch state every time Caution or Danger rule evaluate to true. Enable Alerting to the Administrator account.

### Result

Now you can schedule a Web Intelligence Document and observe the processor utilization on the Dashboard tab.

*Continued on next page*

## Task 2: Schedule a Probe

Schedule a Probe to verify the amount of time it takes for a user to log in or log out.

1. In the CMC, navigate to the Monitoring dashboard and then the Probes tab.
2. Locate the CMS Logon Logoff built in probe and schedule it.
3. Set the recurrence option to NOW and click schedule. Wait for the schedule to process and observe the status.

### Result

Once complete, in the *Run Result* field, click the link provided to observe the amount of time that transpired in the workflow.

## Solution 9: Monitor Server Performance

### Task 1: Create a Watch

Create a Watch that will monitor Web Intelligence Processor utilization over 70%



**Hint:** If the processor utilization on any of the servers exceeds 70%, it is an indication that you may need to install and configure another Web Intelligence Processing server to improve performance.

1. In the CMC, navigate to the Monitoring application.
  - a) Click *Start* → *Programs* → *SAP BusinessObjects BI platform 4.0* → *SAP BusinessObjects BI platform* → *SAP BusinessObjects BI platform Central Management Console*
  - b) In the *CMC Home* area, click *Monitoring*.
2. Navigate to the Watchlist tab and select new button to create a new watch.
  - a) Click the *Watchlist* tab.
  - b) Click *New*
3. Name your watch- Web Intelligence Processor Utilization
  - a) In the *Name* field, enter Web Intelligence Processor Utilization.
  - b) In the *Description* field, Web Intelligence Processor Utilizations >70%
  - c) Select *Three (OK, Caution, Danger)*.
  - d) Select both Settings – *Show on Dashboard* and *Write to Trending Database*.
  - e) Click *Next*.
4. Define caution rule for CPU usage to be greater than 50.
  - a) Expand the Servers option under *Available Metrics* and expand the *Web Intelligence Processing Server*.
  - b) Select CPU usage % and click > to move it to the *Added Metrics* window.
  - c) Set the threshold to >50.
  - d) Click *Next*.

*Continued on next page*

5. Define Danger rule for CPU usage to be greater than 70.
  - a) Expand the Servers option under *Available Metrics* and expand the *Web Intelligence Processing Server*.
  - b) Select CPU usage % and click > to move it to the *Added Metrics* window.
  - c) Set the threshold to **>70**.
  - d) Click *Next*.
6. Change watch state every time Caution or Danger rule evaluate to true. Enable Alerting to the Administrator account.
  - a) Select the radio button for *Change watch state every time Caution or Danger Rules evaluates to true*.
  - b) Select the *Enable alert notifications* check box. Use **Administrator** for *list of users to be notified*.
  - c) Click *Save*.

## Result

Now you can schedule a Web Intelligence Document and observe the processor utilization on the Dashboard tab.

## Task 2: Schedule a Probe

Schedule a Probe to verify the amount of time it takes for a user to log in or log out.

1. In the CMC, navigate to the Monitoring dashboard and then the Probes tab.
  - a) In the *CMC Home* area, click *Monitoring*.
  - b) Click the *Probes* tab.
2. Locate the CMS Logon Logoff built in probe and schedule it.
  - a) Select *CMS Logon Logoff*.
  - b) Click *Schedule*.

*Continued on next page*

3. Set the recurrence option to NOW and click schedule. Wait for the schedule to process and observe the status.
  - a) Click the *Recurrence* tab.
  - b) In the *Run object* selection list, select *NOW*.
  - c) Click *Schedule*.

**Result**

Once complete, in the *Run Result* field, click the link provided to observe the amount of time that transpired in the workflow.



## Lesson Summary

You should now be able to:

- Use Monitoring
- Use Auditing

## Lesson: Managing the Federation

### Lesson Overview

Federation is a cross-site replication tool for working with multiple SAP BusinessObjects Business Intelligence platform deployments in a global environment.



### Lesson Objectives

After completing this lesson, you will be able to:

- Recognize when to use the different types of replication
- Manage replication conflict resolution

### Business Example

Federation allows you to have separate security models, life cycles, testing, and deployment times, as well as different business owners and administrators. For example, you can delegate administration features that restrict the sales application administrator from changing a human resources application.

### Federation

Federation is a cross-site replication tool for working with multiple SAP BusinessObjects Business Intelligence platform deployments in a global environment. Content can be created and managed from one BI platform deployment and replicated to other BI platform deployments across geographical sites on a recurring schedule. You can complete both one-way replication and two-way replication jobs.

The benefits of Federation include the ability to:

- Reduce network traffic
- Create and manage content from a single site
- Increase performance for end users

When you replicate content using Federation, you can:

- Simplify administration needs for multiple deployments
- Provide a consistent rights policy across multiple offices for global organizations
- Obtain information faster and process reports at remote sites where data resides
- Save time by retrieving local and dispersed data faster
- Synchronize content from multiple deployments without writing custom code

Federation allows you to have separate security models, life cycles, testing, and deployment times, as well as different business owners and administrators. For example, you can delegate administration features that restrict the sales application administrator from changing a human resources application. You can replicate a variety of objects with Federation, as described in the following table.

| Category                       | Object types you can replicate  | Additional notes   |
|--------------------------------|---|--|
| Business Views                 | Business View Manager, DataConnection, LOVs, Data Foundation, etc.  | All objects are supported, although not at the individual level. |
| Reports                        | Crystal reports, Web Intelligence, and Dashboard Design.  | Full client add-in and templates are supported.                  |
| Third-Party Objects            | Excel, PDF, PowerPoint, Flash, Word, text, rich text, and Shockwave Flash files   |  |
| Users                          | users, groups, Inboxes, Favorites, and Personal Category  |  |
| Business Intelligence Platform | Folders, Events, Categories, Calendars, Access Levels, Hyperlinks, Shortcuts, Programs, Profiles, Object Packages, Agnostic |  |
| Universe                       | Universe, Connections, and UniverseOverload   |  |

Scenario 1: Retail (centralized design)



) ACME store wants to send a monthly sales report to the different store locations using the one-way replication method. The administrator at the origin site creates a report that administrators at each destination site replicate and run against that store's database.



**Hint:** Localized instances can be sent back to the origin site that maintain each object's replicated info. For example, it will apply the appropriate logo, database connection information, and so on.

#### Scenario 2: Remote Schedule (distributed access)

The data is at the origin site. Pending replication jobs are sent to the origin site to run. Completed replication jobs are then sent back to the destination sites for viewing. For example, the data for a report may not be available on the destination site, but the user can configure the reports to run on the origin site before the completed report is sent back to the destination site.

## Federation terms

### BI application

The logical grouping of related Business Intelligence (BI) content with a specific purpose and audience. A BI application is not an object. One BI platform deployment can host multiple BI applications, each of which can have a separate security model, life cycle, testing and deployment timeline, as well as separate business owners and administrators.

### Destination site

A BI platform system that pulls replicated BI platform content from an origin site.

### Local

The local system where a user or administrator is connected. For example, the administrator of a destination site is considered “local” to the destination site.

### Locally run completed instances

Instances that are processed on the destination site and then sent back to the origin site.

### Multiple origin sites

More than one site can serve as an origin site. For example, multiple development centers generally have multiple origin sites. However, there can be only one origin site per replication.

**One-way replication**

Objects are replicated only in one direction: from the origin site to the destination site. Any updates made at a destination site remain at that destination site.

**Origin site**

The BI platform system where the content originates.

**Remote**

A system that is not local to a user. For example, the origin site is considered “remote” to users and administrators of the destination site.

**Remote connection**

An object that contains information used to connect to a BI platform deployment, including username and password, CMS name, WebService URI and clean-up options.

**Remote scheduling**

Schedule requests that are sent from the destination site to the origin site. Reports on destination sites can be scheduled remotely, which sends the report instance back to the origin site for processing. Then the completed instance is returned to the destination site.

**Replication**

The process of copying content from one BI platform system to another.

**Replication job**

An object that contains information about replication scheduling, which content to replicate, and any special conditions that should be performed when replicating content.

**Replication list**

A list of the objects to be replicated. A replication list refers to other content such as users, groups, reports, and so on, in the BI platform deployment to be replicated together.

**Replication object**

An object that is replicated from an origin site to a destination site. All replicated objects on a destination site will be flagged with a replication icon. If there is a conflict, objects will be flagged with a conflict icon.

**Replication package**

Created during the transfer, the replication package contains objects from a replication job. It can contain all the objects defined in the replication list, as in the case of a rapidly changing environment or initial replication. Or it can contain a subset of the replication list if the objects change infrequently compared to the schedule of the replication job. The replication package is implemented as a BI Application Resource (BIAR) file.

**Replication refresh**

All objects in a replication list are refreshed regardless of the last modified version. 18.2.17 Two-

**Two-way replication**

Acts the same as one-way replication, but two-way replication also sends changes in both directions. Updates to the origin site are replicated to each destination site. Updates and new objects on a destination site are sent to the origin site.

**Replication Types and Mode Options**

Depending on your selection of Replication Type and Replication Mode, you will create one of four different Replication Job options: one-way replication, two-way replication, refresh from origin, or refresh from destination.

**One-way replication**

With one-way replication, you can only replicate content in one direction, from the Origin site to a Destination site. Any changes made to objects on the Origin site in the Replication List are sent to the Destination site. However, changes made to objects on a Destination site are not sent back to the Origin site.

One-way replication is ideal for deployments with one central BI platform deployment where objects are created, modified, and administered. Other deployments use the content of the central deployment.

To create one-way replication, select the following options:

- Replication Type = One-way replication
- Replication Mode = Normal replication

**Two-way replication**

With two-way replication, you can replicate content in both directions between the Origin and Destination sites. Any changes made to objects on the Origin site are sent to Destination sites, and changes made on a Destination site are sent to the Origin site during replication.



**Note:** To perform remote scheduling and to send locally run instances back to the Origin site, you must select two-way replication mode.

If you have multiple BI platform deployments where content is created, modified, administered, and used at both locations, two-way replication is the most efficient option. It also helps synchronize the deployments.

To create two-way replication, select the following options:

- Replication Type = Two-way replication
- Replication Mode = Normal replication

## Refresh from Origin or Refresh from Destination

When you replicate content in one-way or two-way replication modes, the objects on the replication list are replicated to a destination site. However, not all of the objects may replicate each time the replication job runs.

Federation has an optimization engine designed to help finish your replication jobs faster. It uses a combination of the object's version and time stamp to determine if the object was modified since the last replication. This check is done on objects specifically selected in the replication list and any objects replicated during dependency checking. However, in some cases the optimization engine may miss objects, which won't be replicated. In these cases, you can use "Refresh from Origin" and "Refresh from Destination" to force the replication job to replicate content, and their dependencies, regardless of the timestamps. "Refresh from Origin" only sends content from the origin to the destination sites. "Refresh from Destination" only sends content from the destination sites to the origin site.

The following three examples describe scenarios using "Refresh from Origin" and "Refresh from Destination" where certain objects will be missed due to the optimization.

**Scenario 1:** The addition of objects that contain other objects into an area that is being replicated.

Folder A is replicated from the origin site to the destination site. It now exists on both sites. A user moves or copies Folder B with Report B, into Folder A on the origin site. During the next replication, Federation will see that Folder B's timestamp has changed and will replicate it to the destination site. However, Report B's timestamp does not change. Therefore, it will be missed by a regular one-way or two-way replication job.

To ensure Folder B's content is properly replicated, a replication job with “Refresh from Origin” should be used once. After this, the regular one-way or two-way replication job will replicate it properly. If this example is reversed and Folder B is moved or copied on the destination site, then use “Refresh from Destination”.

**Scenario 2:** The addition of new objects using LifeCycle Manager or the BIAR command line. When you add objects to an area that is being replicated using LifeCycle Manager or BIAR command line, the object may not be picked up by a regular one-way or two-way replication job. This occurs because the internal clocks on the source and destination systems may be out of sync when using the LifeCycle Manager or BIAR command line.



**Note:** After importing new objects into an area that is being replicated on the origin site, it is recommended that you run a “Refresh from Origin” replication job. After importing new objects into an area that is being replicated on the destination site, it is recommended that you run a “Refresh from Destination” replication job.

**Scenario 3:** In between scheduled replication times. If you add objects to an area that is being replicated and can't wait until the next scheduled replication time, you can use “Refresh from Origin” and “Refresh from Destination” replication jobs. By selecting the area where objects have been added, you can replicate content quickly.



**Note:** This scenario can be costly for large replication lists, so it is recommended that you do not use this option often. For example, it is not necessary to create replication jobs to refresh from the origin to destination mode on an hourly schedule. These modes should be used in “run now” or infrequent schedules.

In some cases, you cannot use conflict resolution, including: “Refresh from Origin”: destination site option wins is blocked, or “Refresh from Destination”: origin wins option is blocked.

## Managing Conflict Detection and Resolution

In Federation, a conflict can occur when the properties of an object are changed on both the origin site and destination site. Both top level and nested properties of an object are checked for conflicts. For example, a conflict can occur if a report or the name of a report is modified on both the origin and destination sites.

Some instances do not create a conflict. For example, if the name of a report is modified on the origin site, and the description of the replicated version is modified on the destination site, the changes merge together and no conflict occurs.

## One-way Replication Conflict Resolution

In one-way replication, you have two choices for conflict resolution:

- “Origin site takes precedence”
- “No automatic conflict resolution”

### Origin site takes precedence

If a conflict occurs during one-way replication, the origin site object takes precedence. Any changes to objects on a destination site are overwritten by the origin site's information. For example, if a report is modified on both the origin site and the destination site, the destination site modification will be overwritten by the origin site version after the next replication job.

Because the conflict is automatically resolved, it is not generated in the log file and does not appear in the conflicting object list.

### No automatic conflict resolution

If a conflict occurs and you select “No automatic conflict resolution”, the conflict is not resolved, a log file is not generated, and it does not appear in the conflicting object list. Administrators can access a list of all replicated objects that are in conflict in the Federation area of the CMC. Objects in conflict are grouped together by the remote connection they used to connect to the origin site with. To access these lists, go to the Replication Errors folder in the Federation area of the CMC, and select the desired remote connection. All replicated objects on a destination site will be flagged with a replication icon. If there is a conflict, objects will be flagged with a conflict icon. A warning message also appears in the "Properties" page.

## Two-Way Replication Conflict Resolution

In two-way replication conflict, you have three choices for conflict detection:

- Origin site takes precedence
- Destination site takes precedence
- No automatic conflict resolution

### Origin site takes precedence

If a conflict occurs, the origin site will take precedence and overwrite any changes to the destination site.

Example: Lily modifies the name of a report to Report A. Malik modifies the name of the replicated version on the destination site to Report B. After the next replication job runs, the replicated version on the destination site will revert to Report A. This will not generate a conflict in the log file, and it will not appear in the conflicting object list because the conflict was resolved according to the user's instructions on the origin site.

**Destination site takes precedence**

If a conflict occurs, the destination site keeps its changes and overwrites them to the origin site.

Example: Kamal modifies the name of a report to Report A. Peter modifies the name of the replicated version on the destination site to Report B. When the replication job runs, a conflict is detected. The name of the destination report remains as Report B. In two-way replication, changes are also sent back to the origin site. In this scenario, the origin site is updated and its report name is changed to Report B. This does not generate a conflict in the log file and it will not appear in the conflicting object list because the conflict was resolved according to the user's instructions.

**No automatic conflict resolution**

When “No automatic conflict resolution” is selected, a conflict will not be resolved. The conflict will be noted in a log file for the administrator, who can manually resolve it.

Example: Michael modifies Report A on the origin site. Damien modifies the replicated version on the destination site. When the next replication job runs, the report is in conflict as it has changed on both sites and will not be resolved. The destination report is kept and changes to the origin's report are not replicated. Subsequent replication jobs behave the same way until the conflict is resolved. Any changes on the origin site will not get replicated until the conflict is manually resolved by the administrator or delegated administrator.

## Best Practices

You can use Federation to optimize the performance of a replication job. If there a large number of objects in a single replication job, you can take additional steps to ensure that it runs successfully. Typically, you should be able to replicate up to 32,000 objects in each replication job. However, some deployments may require configurations with smaller or larger replication sizes.

1. Obtain a dedicated Web Services provider

In Federation, replicated content is sent using Web Services. In a default installation of BI platform, all Web Services use the same web service provider. Larger replication jobs may tie up the web service provider longer and slow down its response to other web service requests as well as any applications it serves.

If you plan to replicate a large number of objects at once, or run several replication jobs in sequence, you may consider deploying Federation Web Services on its own Java Application server using your own web services provider.

To do this, use the BI platform installer to install web services. You must have a Java Application Server already running. If you do not, install the entire Web Tier Components option, which will install web services and Tomcat.

2. Increase the Java Application Server's available memory Increase the available memory of your Java Application Server if your single replication job replicates many objects, or if you are sharing the Application Server with other applications.
3. Reduce the size of the BIAR files being created.

Federation uses Web Services to replicate content between the origin site and destination site. Objects are grouped together and compressed into BIAR files for more efficient transportation. When replicating a large number of objects, configure your Java Application Server to create smaller BIAR files. Federation will package and compress objects across multiple smaller BIAR files so the number of objects you want to replicate will not be limited.

4. Increase the Socket Timeout.

The Adaptive Job Server is responsible for running the replication job. During the execution of the replication job, the Adaptive Job Server establishes a connection to the origin site. When receiving large amounts of information from the origin site, it is important that the Socket which the Adaptive Job Server is using to receive information does not timeout. The default value is 90 minutes. You can increase the Socket Timeout if you need to.



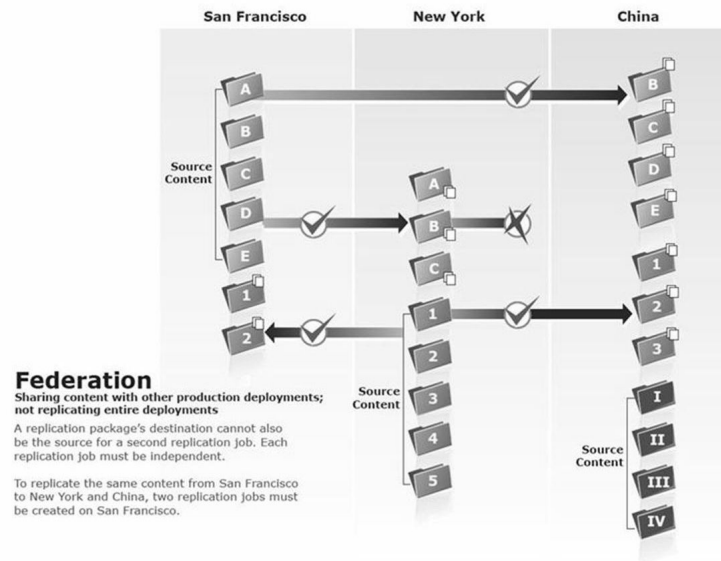


Figure 52: Federation



## Exercise 10: Manage Federation Services

### Exercise Objectives

After completing this exercise, you will be able to:

- Create a replication list .
- Create a remote connection
- Create and schedule a replication job

### Business Example

As a system administrator, you will configure a Federation Origin site as well as a Federation Destination Site. A Web Intelligence Document and all respective dependencies will be federated (using one way federation) to the destination site.

### Task 1: Create a new Web Intelligence document

Create a new Web Intelligence document using the e-fashion universe named U## Federation Webi and publish it to the Report Samples Directory. This document will be federated to the Destination site later in this exercise.

| Site        |             |
|-------------|-------------|
| Origin      | WDFLBMT2268 |
| Desintation | WDFLBMT2287 |

### Task 2: Create a replication list

Create a replication list in the origin site wdfbmt2268.

1. On origin system WDFLBMT2268, Log on to the CMC, navigate to the Replication Lists area. Create a new Replication List by selecting Manage> New Replication List. Name the replication list Your Name replication List. Click next
2. Expand the Public Folder and select U## Federation Webi document created in step 1 in this task. Click save

*Continued on next page*

### Task 3: Creating a remote connection

Creating a remote connection on destination site on wdflbmt2287.

1. On WDFLBMT2287, log on to the CMC and navigate to the Federation area. Right click on the Remote connections folder and select New> New Remote Connection. Name it- Federation Remote Connection.
2. Enter the following parameters:

| Field                          | Value                             |
|--------------------------------|-----------------------------------|
| Title                          | U##_Remote_Connection             |
| Remote System Web Services URL | http://wdflbmt2268:8080/dswsbobje |
| Remote System CMS              | wdflbmt2268                       |
| User name                      | Administrator                     |
| Password                       | <Assigned password>               |

### Task 4: Create and schedule a Replication Job

Create and schedule a Replication Job on the Destination System

1. In the Federation area of the CMC, right click on the existing Federation Remote Connection and select New Replication Job. Name it, Your Name Replication Job. Click Next.
2. Select the available Replication list you created on the origin site.
3. Schedule the Replication Job to run.

### Result

Check the status is changed to Success. Verify the replication of the Federation of the Webi document and dependent objects (Connection and Universe).

## Solution 10: Manage Federation Services

### Task 1: Create a new Web Intelligence document

Create a new Web Intelligence document using the e-fashion universe named U## Federation Webi and publish it to the Report Samples Directory. This document will be federated to the Destination site later in this exercise.

|             |             |
|-------------|-------------|
| Site        |             |
| Origin      | WDFLBMT2268 |
| Desintation | WDFLBMT2287 |

### Task 2: Create a replication list

Create a replication list in the origin site wdfbmt2268.

1. On origin system WDFLBMT2268, Log on to the CMC, navigate to the Replication Lists area. Create a new Replication List by selecting Manage> New Replication List. Name the replication list Your Name replication List. Click next
  - a) In the *CMC Home* page, click the *Replication Lists* link.
  - b) Click *Manage* → *New* → *New Replication List*.
  - c) Name the replication list **U##\_ Replication List**.
  - d) Click *Next*.
2. Expand the Public Folder and select U## Federation Webi document created in step 1 in this task. Click save
  - a) Expand the *Public Folders*
  - b) Select the **U## Federation WebI** document created.
  - c) Click *Save & Close*.

*Continued on next page*

### Task 3: Creating a remote connection

Creating a remote connection on destination site on wdflbmt2287.

1. On WDFLBMT2287, log on to the CMC and navigate to the Federation area. Right click on the Remote connections folder and select **New> New Remote Connection**. Name it- Federation Remote Connection.
  - a) In the *CMC Home* page, click the *Federation* link.
  - b) Right-click the *Remote Connections* folder and select *New → New Remote Connection*
2. Enter the following parameters:

| Field                          | Value                             |
|--------------------------------|-----------------------------------|
| Title                          | U##_Remote_Connection             |
| Remote System Web Services URL | http://wdflbmt2268:8080/dswsbobje |
| Remote System CMS              | wdflbmt2268                       |
| User name                      | Administrator                     |
| Password                       | <Assigned password>               |

- a) Fill out the remote system connection using the information provided.
- b) Click *OK*.

### Task 4: Create and schedule a Replication Job

Create and schedule a Replication Job on the Destination System

1. In the Federation area of the CMC, right click on the existing Federation Remote Connection and select **New Replication Job**. Name it, Your Name Replication Job. Click *Next*.
  - a) In the Federation page of the CMC, right-click U## Remote Connection and select *New → New Replication Job*.
  - b) In the *Title* field, enter **U##\_ Replication Job**.
  - c) Click *Next*.

*Continued on next page*

2. Select the available Replication list you created on the origin site.
  - a) Select the available Replication list you created on the origin site
  - b) Click *Next*.
  - c) In the next screen, keep all default selections. Click *OK*.
3. Schedule the Replication Job to run.
  - a) Right-click the U## Replication Job and select *Schedule*.
  - b) Click *Schedule*.

### Result

Check the status is changed to Success. Verify the replication of the Federation of the Webi document and dependent objects (Connection and Universe).



## Lesson Summary

You should now be able to:

- Recognize when to use the different types of replication
- Manage replication conflict resolution





## Unit Summary

You should now be able to:

- Describe the roles of the upgrade management tool
- Migrate objects using the upgrade management tool
- Explain Lifecycle Management
- Describe the Lifecycle management console
- Manage promotion jobs
- Use Monitoring
- Use Auditing
- Recognize when to use the different types of replication
- Manage replication conflict resolution





## Test Your Knowledge

1. Which tool do you use to manage promotion jobs?

*Choose the correct answer(s).*

- ☐ A Central Configuration Manager
- ☐ B Import Wizard
- ☐ C Lifecycle management console
- ☐ D Upgrade management tool

2. What do you need to take into consideration when planning content security?

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3. What does it take to setup One-Way Federation?

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## Answers

1. Which tool do you use to manage promotion jobs?

**Answer:** C

Lifecycle management console is used to manage promotion jobs.

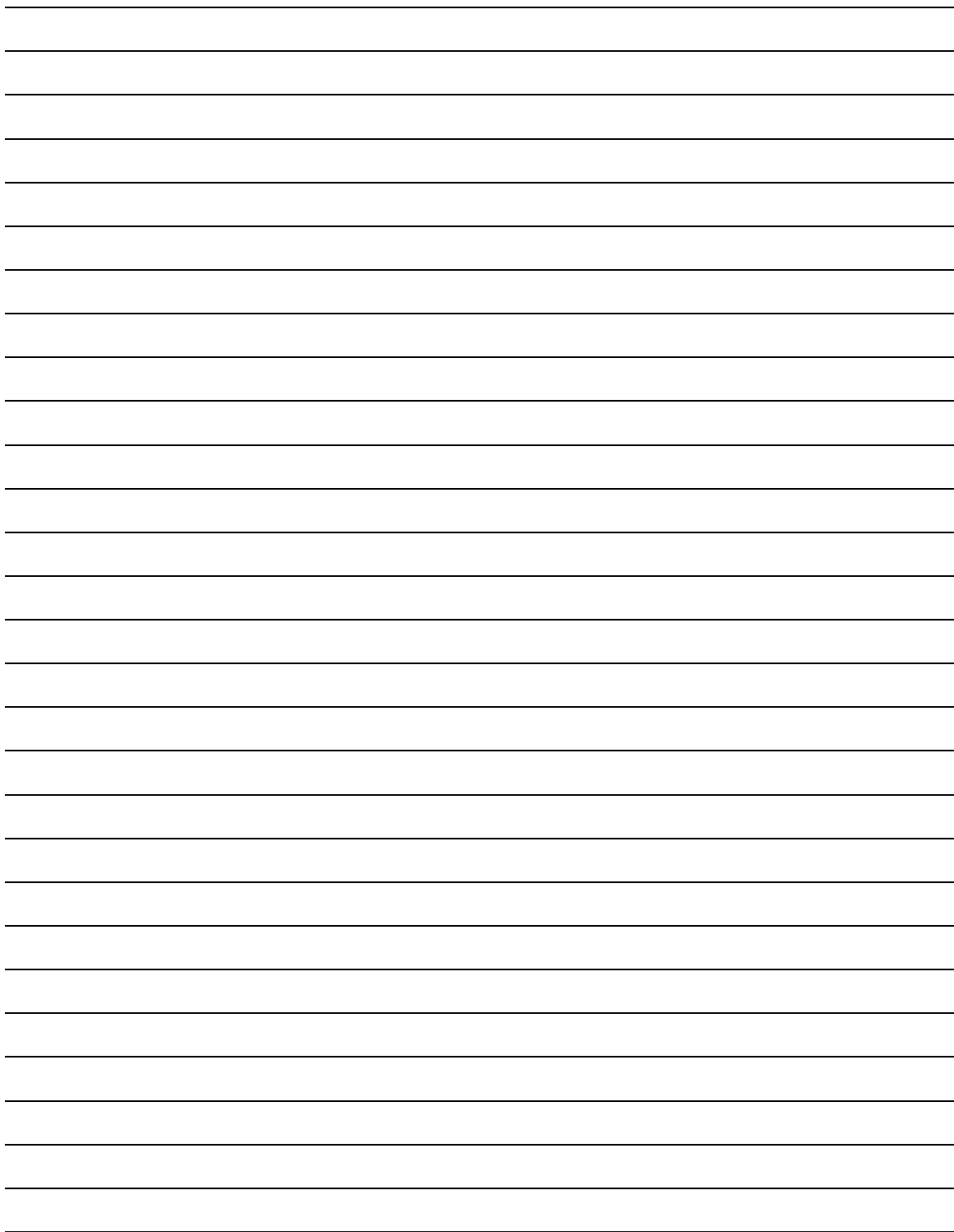
2. What do you need to take into consideration when planning content security?

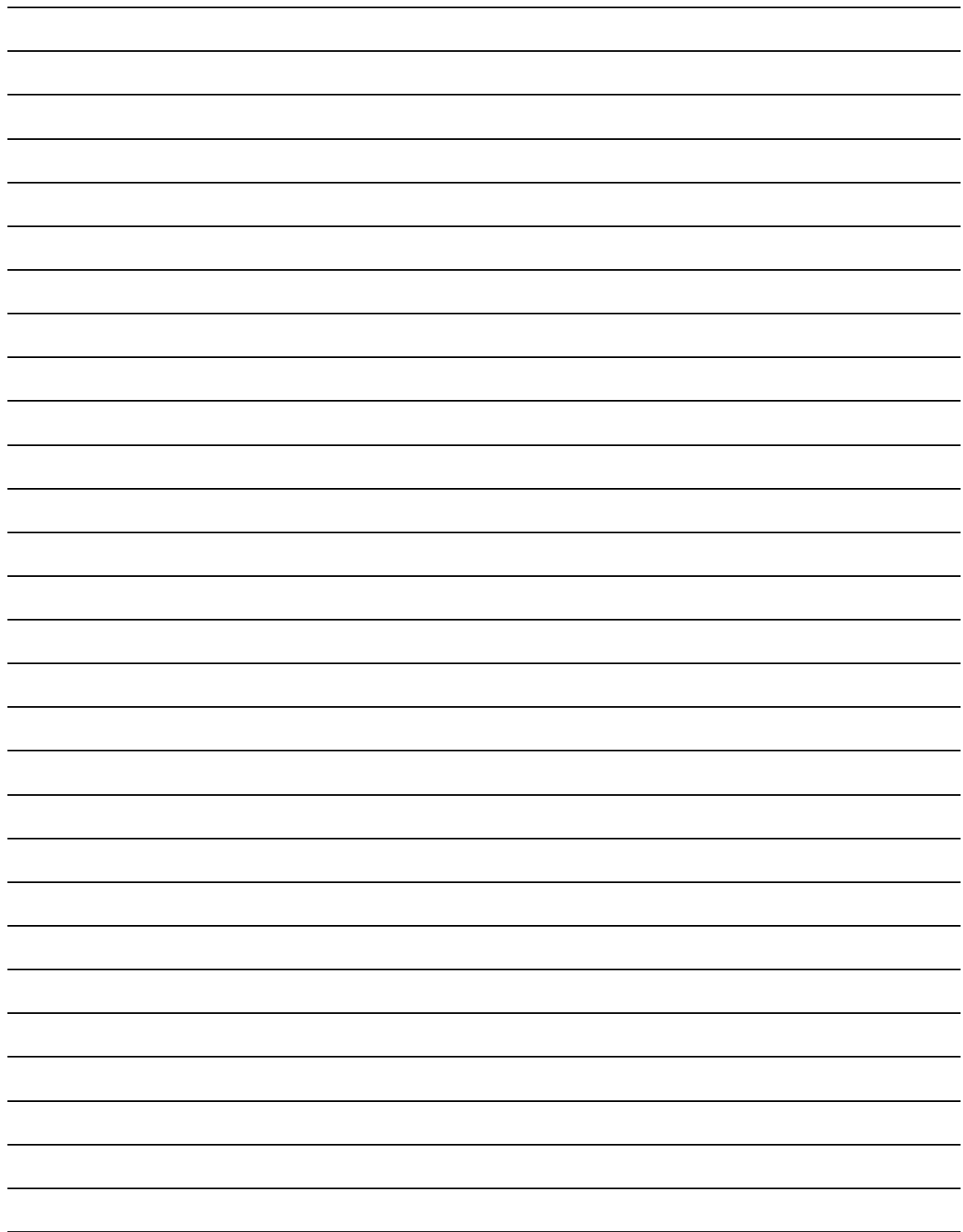
**Answer:**

- Folder content structure
- Group/user structure
- Which access levels to work with
- How to secure content - Where to apply various access levels and for which groups

3. What does it take to setup One-Way Federation?

**Answer:** Create a Replication List (Origin). Create a Remote Connection (on the Destination system pointing to the Origin system). Create a Replication Job (under the Remote Connection). Finally schedule the Replication Job and test the results.









## Course Summary

You should now be able to:

- Explain SAP BusinessObjects BI platform architecture, administration, and security
- Ensure availability of your SAP BusinessObjects BI solutions
- Design a scalable system
- Size a SAP BusinessObjects BI deployment
- Deploy a SAP BusinessObjects BI platform
- Manage content across BI deployments.



# *Feedback*

SAP AG has made every effort in the preparation of this course to ensure the accuracy and completeness of the materials. If you have any corrections or suggestions for improvement, please record them in the appropriate place in the course evaluation.