

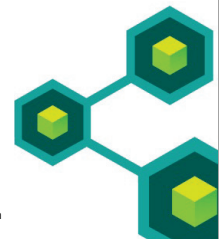


Introduction and Service-Oriented Architecture

IBM Cognos BI 10.2.2

Business Analytics software

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Objectives

- At the end of this module, you should be able to:
 - identify IBM Cognos 10 architectural components
 - describe Service-Oriented Architecture in IBM Cognos




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IBM Cognos BI Architecture

- examine components
 - C:\Edcognos\B5A19\01-Intro_and_SOA\IBM_Cognos_10.2.2_architecture_diagram.jpg



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The IBM Cognos 10.2.2 architecture diagram is provided for your reference, as you progress through this module, and others in the course, to help you understand the architecture of the IBM Cognos BI system.

In addition to the course reference card, at the end of this module is a comprehensive list of acronyms that you may find helpful to refer to as you review the diagram, and the content of this course.

Component Definitions

- IBM Cognos 10 BI is composed of many components:
 - Development Component
 - coded in Java or C++
 - Component Stack or Product Component
 - Install Component

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IBM Cognos 10 is a mix of development components coded in Java or C++. This is important in understanding the deployment in your environment, to help you when troubleshooting.

A development component is the smallest entity in the product, and is often referred to by an acronym such as XTS (XML Transformation Service), CQE (Cognos Query Engine), and RQP (Relational Query Planner).

A set of development components constitute a product component, often referred to by an acronym. For example, CAM (Cognos Access Manager) consists of AAA (Authentication Authorization Accounting), CRP (Cryptography), and AutoCA (Auto Certificate Authority, the IBM Cognos BI certificate authority).

Two Languages, Two Approaches

C++	Java
compiled language	interpreted language
different source code for different target platform (OS)	compiled to platform independent bytecode
compiled executable fixed to target platform	bytecode is not executable; requires JRE
compiled executable is able to run directly	JRE is platform dependent, provided by OS vendors

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While C++ executables are standalone, Java applications require a runtime environment. This runtime environment is called the Java Runtime Environment (JRE). Since parts of a JRE implementation are coded in C++ and/or an assembler, a JRE is platform specific and will leverage all hardware features of that platform.

The advantages of Java are better adapted to a Service-Oriented Architecture environment than C++.

What is Java EE?

- defines a platform of specifications and APIs in an enterprise application
- includes functional components
- Java EE server
 - Java application server or application server
 - provides runtime environment for Java EE applications
 - coded in Java

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Java application servers (Java EE (Java Platform, Enterprise Edition) servers) are complex and designed for enterprise-class applications. The Java EE server is actually a Java program itself, and therefore requires a Java Runtime Environment (JRE). Java EE includes scalable, distributed, transactional, and fault tolerant applications.

Included in Java EE are functional components such as connections to databases or networks, and transaction handling. Java EE includes the following common Java specifications:

- Java Servlets
- Enterprise Java Beans (EJB)
- JavaServer Pages (JSP): a technique where Java code is compiled into a servlet at runtime

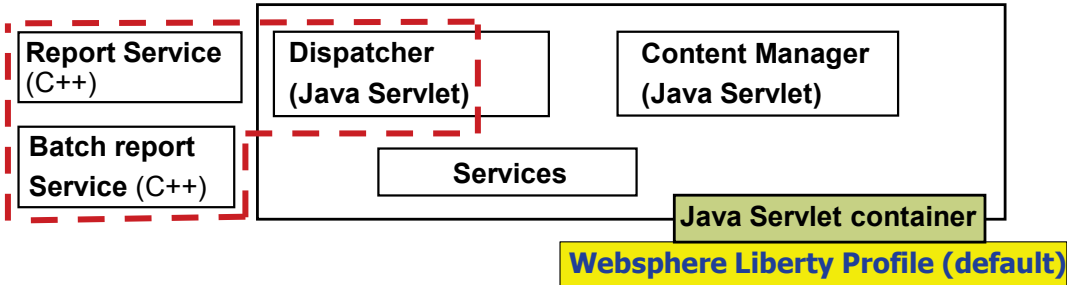
Enterprise-class applications involve thousands of users and petabytes of data. Just because an application can run on a laptop is not an indication that is how it would behave in a large enterprise.

Java EE servers are sometimes called app servers, or application servers.


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Examine IBM Cognos BI Servlets

- IBM Cognos BI operates with two Java servlets running in a Java servlet container.



- You can configure IBM Cognos BI to use a third-party application server other than Websphere Liberty Profile.



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

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

Examine 32-Bit vs. 64-Bit

- addressable memory capacity:
 - 32-bit = 4 Gigabytes (GB) addressable memory
 - 64-bit = 18.45 Exabytes (EB) of addressable memory
- IBM Cognos 10 supports:
 - 32-bit and 64-bit hardware
 - 32-bit OS*
 - 64-bit OS*

*refer to Supported Environments in Product Documentation

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IBM Cognos 10 is affected by bitness mostly with regards to available memory.

Examine 64-Bit Support

- components that leverage 64-bit addressing (beyond 4 GB RAM):
 - Java components running in 64-bit JRE:
 - Content Manager, Dispatcher, Dynamic Query QueryService, Graphics Service engine
 - C++ based authentication providers can offer true 64-bit:
 - LDAP, Active Directory, SAP
 - 64-bit Report Server (dynamic query only)
- components that use 32-bit addressing:
 - Report Server (all relational query handling)
 - gateways (ISAPI, apache_mod)

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With IBM Cognos 10, more components of the product moved to Java, and as a result leveraging larger memory with a 64-bit JRE becomes more important.

Examine 64-bit Support Benefits

- Java components:
 - access to more memory (2 GB to 18 EB theoretically)
 - some speed gains due to 64-bit optimized JRE
- C++ coded components:
 - only if specifically compiled for 64-bit

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64-bit does not imply twice the speed or 30% speed gain or the like.

Examples of general benefits of 64-bit addressing in C++ include gains in numerical and logical operations at the CPU level, and CPU and memory controller internal optimizations due to the higher efficiency of 64-bit processing.

A deep dive into these topics can go beyond the scope of this course. You are encouraged to research 64-bit benefits on the internet.

List Core Install Components

- Application Tier Components (ATC)
- Gateway (GW)
- Content Manager (CM)
- IBM Cognos Content Database (CCD)
- Framework Manager (FM)

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Application Tier: Server components provide the user interfaces for reporting, analysis, score carding and event management, as well as the server functionality for routing and processing user requests. The application tier is a combination of C++ applications and Java servlets. Server components include the following:

- **IBM Cognos Connection:** a Web portal provided with IBM Cognos, provides a single access point to the corporate data available to its products. It provides a single point of entry for querying, analyzing, and organizing data, and for creating reports, scorecards, and events. Users can run all their Web-based IBM Cognos 10 applications through IBM Cognos Connection. Other business intelligence applications, and URLs to other applications, can be integrated with IBM Cognos Connection.
- **IBM Cognos Administration:** a central management interface that contains the administrative tasks for IBM Cognos BI. It provides easy access to the overall management of the IBM Cognos environment and is accessible through IBM Cognos Connection.

- **IBM Cognos Viewer:** a portlet in which you can view and interact with any type of published IBM Cognos content.
- **Report Studio:** allows report authors to create, edit, and distribute a wide range of professional reports. Authors can also define corporate-standard report templates for use in Query Studio as well as edit and modify reports created in Query Studio, Analysis Studio, and Cognos Workspace Advanced. Report Studio also provides access to dimensional, OLAP (online analytical processing) and dimensionally modeled relational data sources.
- **Query Studio:** an ad-hoc reporting tool that lets users quickly design, create and save reports. Query Studio also provides access to dimensional, OLAP (online analytical processing) and dimensionally modeled relational data sources. Query Studio has a subset of capabilities available in Report Studio.
- **Analysis Studio:** users can explore, analyze, and compare dimensional data. Analysis Studio provides access to dimensional, OLAP (online analytical processing) and dimensionally modeled relational data sources. Analyses created in Analysis Studio can be opened in Report Studio and used to build professional reports.
- **Event Studio:** set up agents to monitor your data and perform tasks when business events or exceptional conditions occur in your data that must be dealt with. When an event occurs, people are alerted to take action. Agents can publish details to the portal, deliver alerts by email, run and distribute reports based on events, and monitor the status of events. For example, a support call from a key customer or the cancellation of a large order may trigger an event, sending an email to the appropriate people.
- **Cognos Workspace:** create sophisticated interactive workspaces using IBM Cognos content, as well as external data sources such as TM1 Websheets and CubeViews, according to your specific information needs. You can view and open favorite workspaces and reports, manipulate the content in the workspaces, and email your workspaces. You can also use comments and activities for collaborative decision making.

- **Cognos Workspace Advanced:** a report consumption experience that provides an integrated business intelligence experience for business users. You can create sophisticated interactive workspaces and explore your content in a predefined way. In a Cognos Workspace workspace, you work with existing content and perform basic analysis, data exploration, and collaborative decision making. When you want to perform deeper analysis and report authoring, you graduate to Cognos Workspace Advanced, where you can perform more advanced data exploration, such as adding additional measures, conditional formatting, and advanced calculations. Cognos Workspace Advanced is both an extension of and a replacement for the IBM Cognos Report Studio Express authoring mode, which met the needs of financial analysts to create statement-style reports. Cognos Workspace Advanced offers much greater capability, such as full support for list reports, charts, and relational data sources, and offers an entirely different user experience.
- **Dispatcher:** A dispatcher starts all IBM Cognos 10 services configured and enabled on a computer, and routes requests.
- **Content Manager:** the IBM Cognos 10 service that manages the storage of application data. This application data includes security, configuration data, models, metrics, report specifications, and report output. Models are published from Framework Manager to Content Manager. Content Manager is also used to retrieve or store report specifications, manage scheduling information and manage the built-in Cognos security namespace. Content Manager stores information in a database known as the Content Store. Content Manager is a Java servlet and requires an application server such as IBM WebSphere or servlet container such as IBM WebSphere Liberty Profile.
- **Framework Manager:** a metadata modeling tool that drives query generation for IBM Cognos software. A model is a collection of metadata that includes physical information and business information for one or more data sources.
- **Gateway:** one or more gateways can be installed on one or more servers. A gateway transfers information from one server to another server. For failover, the gateway can be configured with the location of multiple dispatchers.

List Companion Installs

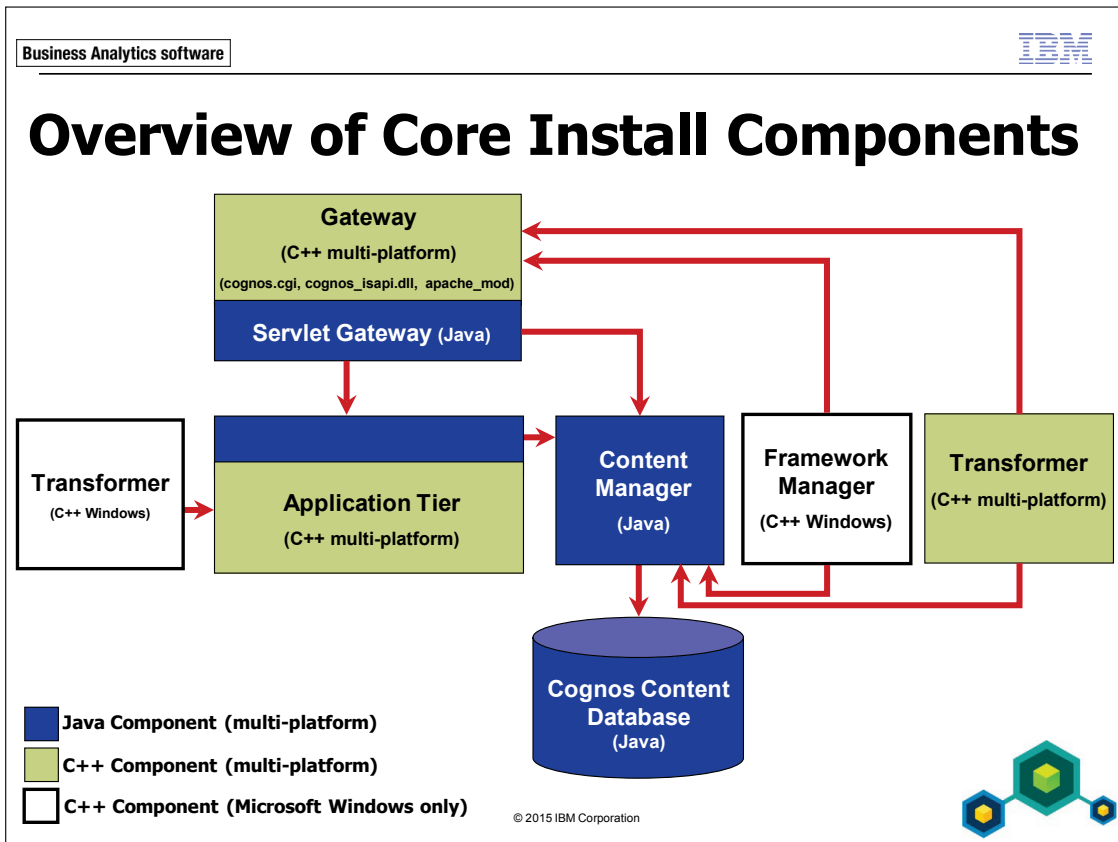
- IBM Cognos Transformer
- IBM Cognos PowerPlay Server and Client
- IBM Cognos Lifecycle Manager
- IBM Cognos Statistics
- IBM Cognos Analysis for Microsoft Excel
- IBM Cognos Mobile
- IBM Cognos for Microsoft Office
- IBM Cognos Business Viewpoint
- IBM Cognos Virtual View Manager
- IBM Cognos Metric Studio
- IBM Connections (Collaboration)

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Companion products are not part of the base IBM Cognos 10 install, and require separate downloads. Some may require additional configuration. There may also be a cost associated with the additional installs.

IBM Connections is not an IBM Cognos product but an IBM product which has to be obtained separately. IBM Cognos 10 offers some integration features with this product.



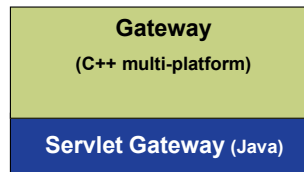
IBM Cognos 10 has a three tier architecture: Web Tier (Gateway), Application Tier, and Database Tier. A Gateway relays to an Application Tier which talks to Content Manager which talks to the Content Store.

Recall that IBM Cognos 10 is a mixture of 32-bit C++ and Java components, that 64-bit Java runtime environments are supported, and that the Java components must be deployed to a Java application server or servlet container.

Describe Gateways

- reside on one or more Web servers
- an extension of a Web server program passing information between Web servers
- types:
 - Common Gateway Interface (CGI)
 - ISAPI*
 - apache_mod* (Apache 1.x, Apache 2, Apache 2.2)
 - servlet*

*supports connection pooling



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IBM Cognos supports several types of Web gateways.

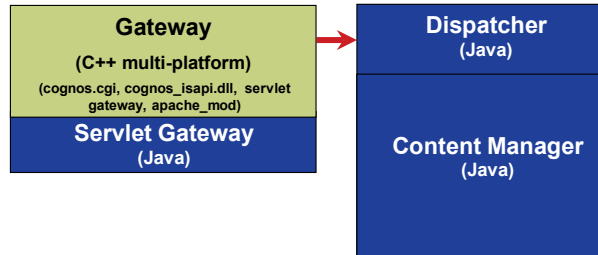
- CGI (Common Gateway Interface): The default gateway, CGI can be used for all supported Web servers. However, for enhanced performance or throughput, you may choose one of the other supported gateway types. For each request a cognos.cgi process is executed on the server. CGI gateways are the least secure.
- ISAPI: ISAPI is used with the Microsoft Internet Information Services (IIS) Web server. It delivers faster performance for IIS. This gateway supports connection pooling.
- apache_mod: You can use an apache_mod gateway with the Apache Web server. This gateway supports connection pooling.

- Servlet: If your Web server infrastructure supports servlets or you are using an application server, you can use a Servlet gateway. This gateway supports connection pooling, 20 by default, configurable in web.xml only.

Establishing and releasing connections is a resource intensive task. IBM Cognos 10 does a lot of connection pooling, a technique used for establishing a pool of resource connections that applications can share on an application server. Not having connection pooling is what makes CGI resource intensive and comparatively poor performing. The Web server manages the number of connections and re-uses them when possible.

If using IIS, you should use the ISAPI gateway. The setup is the same as CGI. You will need to modify the index.html and/or default.html in the webcontent directory.

Explore Gateway Requests



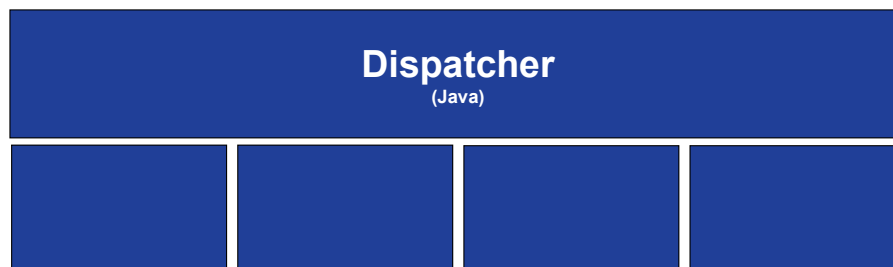
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When a Gateway receives a request it encrypts passwords to ensure security. The Gateway will also extract the information needed to submit the request to an IBM Cognos 10 server. The Gateway attaches environment variables from the Web server, and adds a default namespace to the request to ensure that the server authenticates the user in the correct namespace. The Gateway then passes requests to an IBM Cognos Dispatcher for processing.

Describe the Application Tier Install Component

- contains Dispatcher and other components
- one instance of an Application Tier component is required for a system



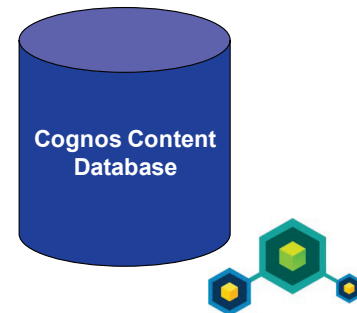
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The Application Tier install component is the central piece of the system. You must have at least one instance of an Application Tier component installed, but many instances can join a system.

Describe IBM Cognos Content Database

- Apache Derby, open source Java relational database
- command line administration
- information readily available on Internet
- cannot be used as Audit database
- do not use as production content store



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Advantages of the IBM Cognos Content Database (CCD) on Apache Derby include a small footprint, compliance with Java, JDBC, and SQL standards, and that it provides an embedded JDBC driver that lets you embed Derby in any Java-based solution. Administration is done through the command line only.

CCD is intended for demo and development use, and is not suitable for enterprise scale applications, and should not be used as a production content store or Audit database.

Note: In version 10.2.2, the Quick Setup option installs all components (application tier, gateway, Content Manager), installs and configures a servlet gateway, installs and configures IBM® DB2® Advanced Workgroup Server Edition as the content store database, populates Content Manager configuration information within Cognos® Configuration, configures a personal data set, and starts all services. This option is only available for 64-bit Microsoft Windows, and is only available if DB2 is not already installed.

Describe Service-Oriented Architecture

- system functionality is exposed as a set of independent services that can be accessed over a network without knowledge of their underlying platform implementation
- services interact with each other
 - communication: SOAP over a system bus
 - SOAP transports an XML payload over HTTP(S) protocol

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The Java EE paradigm (on the Java application servers) enables the coding of applications based on Service-Oriented Architecture (SOA). This is different than earlier application design. With SOA, a service is the entity which offers functionality.

Multiple instances of the same service can exist in the system. Models can be processed on business needs, rather than technical constraints.

An analogy to help understand this concept of service-oriented architecture:

You just moved into town and you need to find a plumber (service). There are many plumbers (service instances) which allow you to "load balance", which means that if you don't reach one, you can call another one. You interact over a network (phone); it is not important where the plumber learned his craft, or what country the plumber is from, but whether or not they can do the service that you require.

Describe SOA Assets

- platform independent
- extendible
- scalable
- flexible

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SOA is platform independent, meaning that a single system can contain services implemented and hosted on different platforms. You can extend a system by adding new functionality, by adding a service, without affecting existing components. SOA is scalable, allowing you to add instances of services to obtain more resources. The flexibility of SOA allows the system to be configured based solely on service availability, which can be established based on usage patterns.

Examine SOA in IBM Cognos

- IBM Cognos based on SOA
- IBM Cognos Services expose functionality implemented in development components
- an IBM Cognos system has one or more physically installed instances
- instances can join a system regardless of the OS or application server they are deployed in

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IBM Cognos Services expose the functionality implemented in development components, including Report Service, Job Service, Agent Service, Delivery Service, and so on.

Each instance in an IBM Cognos system contains a set of install components, and each instance offers a specific set of services. Multiple instances of the same IBM Cognos service may exist in a system.

What are IBM Cognos Services?

- provide all IBM Cognos 10 functionality
- are hosted by a Dispatcher and interact with each other
- Dispatcher interfaces of all services are Java
- each defines one or more handlers
 - external and internal services
- most services are optional
- can be arranged according to the general principles of SOA

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An IBM Cognos Service is a Java part which plugs into the Dispatcher, but the underlying implementation of the service could be Java or C++.

Each IBM Cognos Service defines one or more handlers that describe which type of requests they can handle. External services can be managed through a UI, and internal services cannot be managed.

Mandatory services are CM (Content Manager), CAM-AAA (Cognos Access Manager-Authentication Authorization Accounting), Dispatcher, and Presentation Service. Most services are optional, based on the required functionality of the overall system.

Explain SOA Communication in IBM Cognos 10

- IBM Cognos services communicate using the BIBus
- messages:
 - SOAP 1.1
 - wrapped in <SOAP-ENV:Envelope> element
 - include BIBusHeader as a component
- BIBus:
 - is a set of protocols
 - governs communications among IBM Cognos services

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The BIBus is not software, but is a development component like Content Manager. The BIBus header in the SOAP message contains user preferences, session information, message routing information, and other status-like elements.

SOAP is an XML-based protocol that is transported over HTTP, HTTPS, and other protocols. SOAP is an encapsulation protocol that is used to wrap XML messages.

Messages in SOAP 1.1 have a defined namespace of:

`xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"`.

SOAP 1.2 messages do not have to be of the namespace SOAP_ENV, but they could be if the SOAP-ENV namespace was defined as `xmlns:SOAP-ENV="http://www.w3.org/2003/05/soap-envelope"` (notice the differences in the URL compared to SOAP 1.1).

Examine External IBM Cognos BI Services

Platform		BI Server
<ul style="list-style-type: none"> ▪ Content Manager Service ▪ Agent Service ▪ Event Management Service ▪ Delivery Service ▪ Job Service ▪ Monitor Service ▪ Metadata Service ▪ Presentation Service ▪ Report Data Service 	<ul style="list-style-type: none"> ▪ Graphics Service* ▪ Content Manager Cache Service* ▪ Index XXX Service* ▪ Human Task Service* ▪ Annotation Service* ▪ Interactive Discovery Visualization Service** ▪ Repository Service** ▪ Relational Metadata Service** 	<ul style="list-style-type: none"> ▪ (Batch) Report Service ▪ Query Service*

* new services as of IBM Cognos 10.1

** new services as of IBM Cognos 10.2.0

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The platform services are the core services required for the system to work. In fact, platform services will make use of other platform services. In addition, if you install BI Server, you would get BI specific services as shown.

Adding companion products may add more services, but the companion products will also require the platform services.

Examine Add-on Installs

- can be added to existing installed instance
- usually add new services
- examples:
 - IBM Cognos PowerPlay Server: PowerPlay Service
 - IBM Cognos Statistics: Statistics Service
 - IBM Cognos Metric Studio: Metrics Service, Data Integration Service

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Installing new products may add new services to the main installed instance of IBM Cognos BI; this is how SOA works.

As of version 10.2.2, IBM Cognos Mobile is part of the core BI server components. It does not require an additional installation.

Demo 1: Explore an IBM Cognos BI Environment

Purpose:

You want to familiarize yourself with the distributed environment of IBM Cognos 10 at your company. To do this, you will explore the system and its configuration.

In this environment, the installation and configuration of components uses a technique that has these components installed to different directories in the same physical environment, to simulate a distributed environment.

At the end of this demo, after the Results, is an installation map that may be a helpful reference throughout this course.

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

- Apache Directory Server - default
- DB2-DB2COPY1 - DB2
- DB2 Remote Command Server (DB2COPY1)
- DB2DAS - DB2DAS00
- Lotus Domino Server (CProgramFilesx86IBMLotusDominodata)
- World Wide Web Publishing Service
- IBM Cognos Full:9315
- IBM Cognos DispCM:9320

If any of the services are not running, start them and then close the Services window. Be patient when starting these services, as they will take some time.

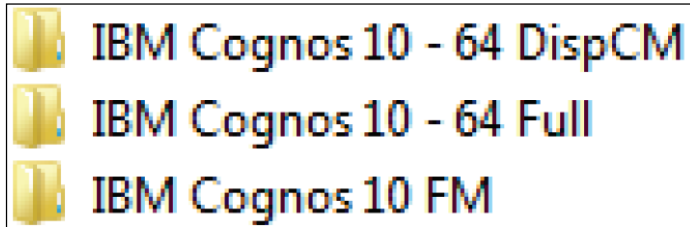
Note: Always start Apache Directory Server - default before the IBM Cognos Services, and start IBM Cognos Full:9315 completely before starting IBM Cognos DispCM:9320.

When starting the IBM Cognos services, a message will appear about not starting the service in a timely fashion; close the message and wait for two minutes before you click Refresh on the Services toolbar. You may have to refresh in two minute increments to see a status of Started.

Task 1. Explore the installed instances on the system.

1. From the **Start** menu, click **All Programs**.

Notice that there are multiple instances of various IBM Cognos Products available. The entries that you will work with in this demo appear as follows:

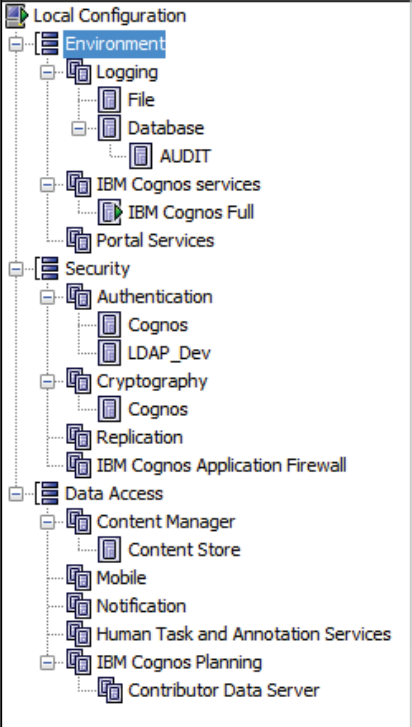


IBM Cognos 10 - 64 DispCM is an install of a Dispatcher and standby Content Manager. IBM Cognos 10 FM is an install of Framework Manager. IBM Cognos 10 - 64 Full is a full installation of Dispatcher, Content Manager, and Gateway.

2. Click each instance mentioned in Step 1 and review what is available to you. Notice that there is an instance of IBM Cognos Configuration for each installation.

- Under **IBM Cognos 10 - 64 Full**, click **IBM Cognos Configuration**, and then in the **Explorer** pane, click the **Environment** node.

A section of the result appears as follows:

Explore	Environment - Group Properties																																																				
	<table border="1"> <thead> <tr> <th>Name</th><th>Value</th></tr> </thead> <tbody> <tr><td>Deployment files location</td><td>../deployment</td></tr> <tr><td>Data files location</td><td>../data</td></tr> <tr><td>* Map files location</td><td>../maps</td></tr> <tr><td>Temporary files location</td><td>../temp</td></tr> <tr><td>Encrypt temporary files?</td><td>False</td></tr> <tr><td>* Format specification file location</td><td>../configuration/cogformat.xml</td></tr> <tr><td>Sort buffer size in MB</td><td>32</td></tr> <tr><td>* IP Version for Host Name Resolution</td><td>Use IPv4 addresses</td></tr> <tr><td colspan="2">Gateway Settings</td></tr> <tr><td>* Gateway URI</td><td>http://vclassbase:88/C10Full/cgi-bin/cognos.cgi</td></tr> <tr><td>Gateway namespace</td><td></td></tr> <tr><td>Content Manager sAMAccountName</td><td></td></tr> <tr><td>Allow namespace override?</td><td>False</td></tr> <tr><td>* Dispatcher URIs for gateway</td><td>http://vclassbase:9315/p2pd/servlet/dispatch/ext...</td></tr> <tr><td>* Controller URI for gateway</td><td>http://localhost:80/ibmcognos/controllerServer</td></tr> <tr><td colspan="2">Dispatcher Settings</td></tr> <tr><td>* External dispatcher URI</td><td>http://vclassbase:9315/p2pd/servlet/dispatch</td></tr> <tr><td>* Internal dispatcher URI</td><td>http://vclassbase:9315/p2pd/servlet/dispatch</td></tr> <tr><td>Dispatcher password</td><td>*****</td></tr> <tr><td>External JMX port</td><td>0</td></tr> <tr><td>External JMX credential</td><td>*****</td></tr> <tr><td>* Report Server execution mode</td><td>64-bit</td></tr> <tr><td colspan="2">Other URI Settings</td></tr> <tr><td>* Dispatcher URI for external applications</td><td>http://vclassbase:9315/p2pd/servlet/dispatch</td></tr> <tr><td>* Content Manager URIs</td><td>http://vclassbase:9315/p2pd/servlet...</td></tr> </tbody> </table>	Name	Value	Deployment files location	../deployment	Data files location	../data	* Map files location	../maps	Temporary files location	../temp	Encrypt temporary files?	False	* Format specification file location	../configuration/cogformat.xml	Sort buffer size in MB	32	* IP Version for Host Name Resolution	Use IPv4 addresses	Gateway Settings		* Gateway URI	http://vclassbase:88/C10Full/cgi-bin/cognos.cgi	Gateway namespace		Content Manager sAMAccountName		Allow namespace override?	False	* Dispatcher URIs for gateway	http://vclassbase:9315/p2pd/servlet/dispatch/ext...	* Controller URI for gateway	http://localhost:80/ibmcognos/controllerServer	Dispatcher Settings		* External dispatcher URI	http://vclassbase:9315/p2pd/servlet/dispatch	* Internal dispatcher URI	http://vclassbase:9315/p2pd/servlet/dispatch	Dispatcher password	*****	External JMX port	0	External JMX credential	*****	* Report Server execution mode	64-bit	Other URI Settings		* Dispatcher URI for external applications	http://vclassbase:9315/p2pd/servlet/dispatch	* Content Manager URIs	http://vclassbase:9315/p2pd/servlet...
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Other URI Settings																																																					
* Dispatcher URI for external applications	http://vclassbase:9315/p2pd/servlet/dispatch																																																				
* Content Manager URIs	http://vclassbase:9315/p2pd/servlet...																																																				

You may have to scroll or resize your window to see all the contents shown.

- In the **Explorer** pane, click **IBM Cognos services**, and familiarize yourself with the services available and the settings that have been configured in this install instance.
- In the **Explorer** pane, under the **Data Access** node, click **Content Manager**, and then click **Content Store**, and review the settings.

Notice that the Content Store database name is cm, and that it is a DB2 database. You will look at the content store in a later task.

- Close **IBM Cognos Configuration** when you have finished reviewing the settings.
- Repeat steps 3 to 6 for the **IBM Cognos 10 - 64 DispCM** instance of **IBM Cognos Configuration**.
- Close **IBM Cognos Configuration** when you have finished reviewing the settings.

9. Repeat step 3 for the **IBM Cognos 10 FM** instance of **IBM Cognos Configuration**.
10. Close this instance of **IBM Cognos Configuration** when you have finished reviewing the settings.

Task 2. Explore the directory structure.

There are different install directories for IBM Cognos that you will use in this course.

- **C:\Program Files\IBM\cognos\c10_64full**
(64-bit BI Server: Dispatcher, Content Manager, Gateway)
- **C:\Program Files\IBM\cognos\c10_64DispCM**
(64-bit BI Server: Dispatcher, Content Manager)
- **C:\Program Files (x86)\IBM\cognos\c10FM**
(32-bit Framework Manager)
- **C:\Program Files (x86)\IBM\cognos\c10**
(32-bit Samples)

1. Start **Windows Explorer**, and navigate to **C:\Program Files\IBM\cognos**.
For most of this course, you will be working with the c10_64full directory as the main IBM Cognos 10 installation directory reference.
2. Expand **c10_64full**, and review the directories that reside there.
3. Double-click the **logs** directory, to review the contents.
You will make use of this directory during the Logging section of this course.
4. On the toolbar click the **Back** button to go up a level, double-click the **configuration** directory, and review the items which reside there.
5. On the toolbar click the **Back** button to go up a level, and then double-click the **webapps** directory, which is where servlet applications reside.
Webapps is a standard name defined in the servlet specification.
6. Expand **webapps\p2pd\WEB-INF**.
This is where the workings of IBM Cognos 10 reside.
7. Close **Windows Explorer**.

Task 3. Explore the content store.

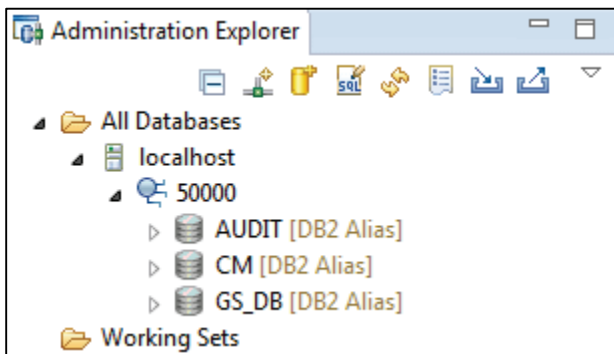
1. From the **Start** menu, navigate to **All Programs\IBM Data Studio\Data Studio 4.1.0.0 Client**.

Data Studio Client opens (this will take a few moments). If you are prompted to specify a workspace, leave the default folder path selected, select the **Use this as the default and do not ask again** check box, and then click **OK**.

If a Windows Security Alert dialog box appears containing a message related to Windows Firewall, click **Allow access**.

2. Maximize the window, in the **Administration Explorer** pane on the left side, and then expand **localhost** and **50000**.

The databases configured that you will use in this course are **AUDIT**, **CM**, and **GS_DB**.



3. In the **Administration Explorer** pane, right-click the **CM** database and click **Connect**.

The Properties for CM window opens.

4. In the **User name** box, type **C10User**, in the **Password** box, type **Education1**, and then select the **Save password** check box.
5. Click **OK**.

You are connected to the CM database (this may take a few moments).

6. In the **Administration Explorer** pane, expand the **CM** database and click the **Tables** folder.

You can see the tables that are populated in the content store (this may take a few moments).

If you receive an error when trying to view the database tables, right-click the CM database, click **Disconnect**, and then connect to the database again.

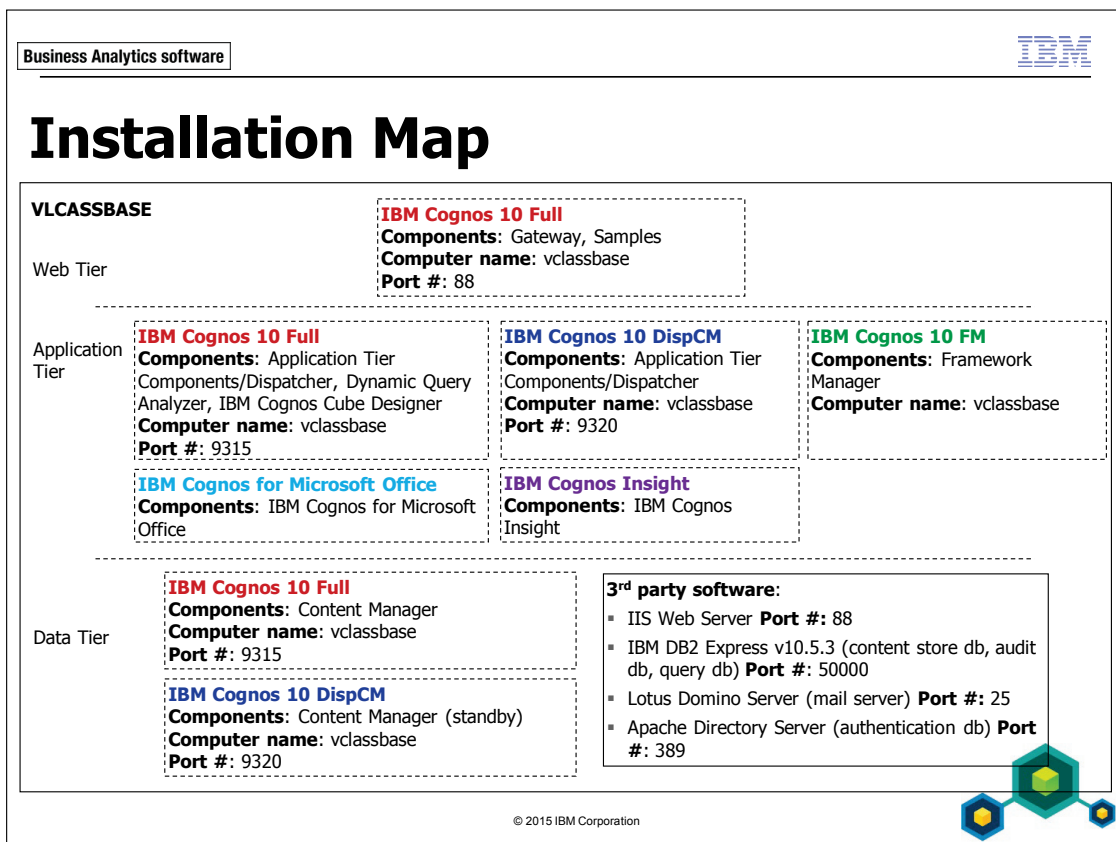
7. Repeat steps 3 to 6 to see the tables in the **GS_DB** database. In step 4, specify a user name of **db2admin**.

This database is populated with items from GO Sales and GO Data Warehouse that are used when authoring and running reports.

8. When you are finished reviewing the content, close the **IBM Data Studio** window. If necessary, select the **Always exit without prompt** check box and then click **OK**.

Results:

You explored the IBM Cognos 10 system and its configuration to become familiar with the distributed environment you will be using. The environment contains a distributed IBM Cognos 10 install consisting of one Gateway, two Dispatchers, and one backup Content Manager.



The installation map provides a virtual topology of where IBM Cognos BI components are installed in the environment used in this course. The tiers are logical. There is no physical separation of components. All installations are on the same OS, however the components have been virtually separated by installing to different directories and by configuring using different port numbers. Apache Directory Server, IBM DB2 Express 10.5, and IIS Web Server are also installed and configured.

- IBM Cognos 10 - 64 Full includes installation of gateway in Web tier (logical), application tier components\dispatcher in Application Tier (logical), and Content Manager in Data Tier (logical)
- IBM Cognos 10 - 64 DispCM includes installation of application tier components\dispatcher in Application Tier (logical), and Content Manager in Data Tier (logical).
- IBM Cognos 10 FM includes installation of Framework Manager in Application Tier (logical)

Demo 2: Set Up the TCPMonitor Utility and Perform a Request

Purpose:

As an administrator, you want to examine requests and responses for your IBM Cognos 10 environment. In order to do this, you will set up the TCPMonitor utility that is bundled with IBM Cognos 10, configure a Listener, and then review the results.

TCPMonitor is a useful tool to view requests and responses. It can also be set to simulate a slow connection, allowing you to set Bytes per Pause and Delay in Milliseconds when you create a new TCP/IP Monitor. This can be useful when testing Web services.

Task 1. Set Up the TCPMonitor utility.

1. Start **Windows Explorer**, navigate to **C:\Program Files\IBM\cognos\c10_64full\webapps\p2pd\WEB-INF**, and then double-click **tcpmon.bat**.

The TCPMonitor window appears.

2. Configure the Listener as follows:
 - Listen Port #: **9999**
 - Target Hostname: **vclassbase**
 - Target Port#: **88**

Create a new TCP/IP Monitor...

Listen Port # 9999

Act as a...

☒ Listener

Target Hostname vclassbase

Target Port # 88

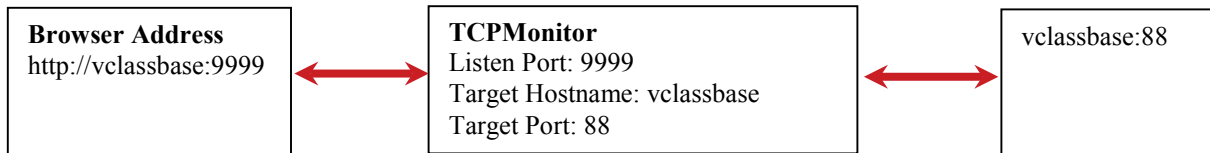
3. Click **Add**.

If a Windows Security Alert dialog box appears, select only the **Private networks, such as my home or work network** check box, and then click **Allow access**.

A new tab with Port 9999 on it appears in the TCPMonitor window. This will let you view the HTTP requests and responses in IBM Cognos 10. The Listener is configured for an unused port.

4. Click the **Port 9999** tab.

The Listener has started, and is waiting. On this tab, you will see a list of requests made to IBM Cognos 10 and can review the HTTP messages for both the requests and responses in the pane below the list, as they are made to IBM Cognos 10, when a user is logged on.

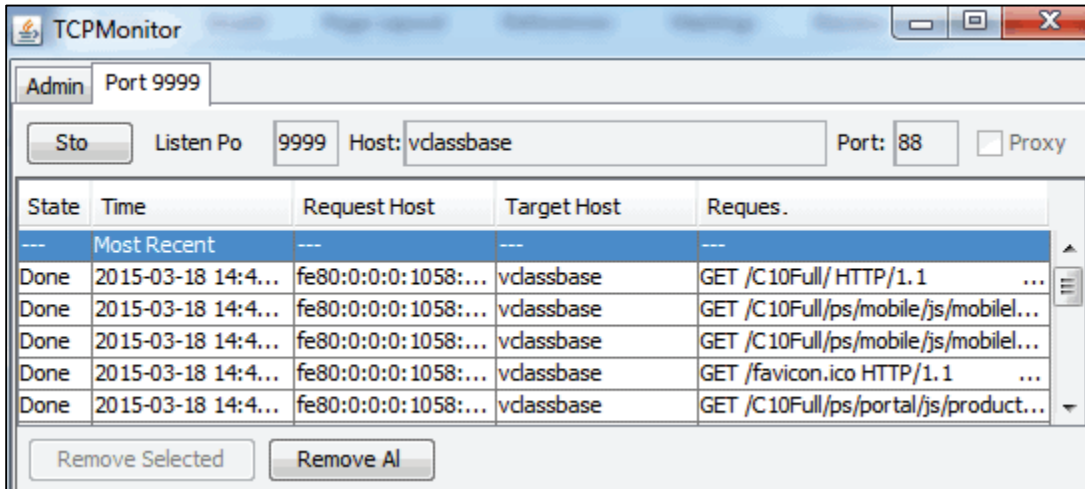


Task 2. Connect to IBM Cognos 10 and view the results of requests and responses.

1. Launch **Internet Explorer**, and then resize the browser window and adjust the layout of windows on your monitor, so that you can see both the browser and **TCPMonitor** windows.

2. In the browser **Address** box, type **http://vclassbase:9999/C10Full/** and then press **Enter**.

You are redirecting the request to the configured listen port of your Listener, which will act as an intermediary to trap the requests as they are passed through the gateway. You should see results in TCPMonitor as the connection is made and the login screen appears in your browser. They will appear similar to those shown below:



Notice the State column. Be sure to watch as the next step happens, as you will see Req change to Done. Another state you may see in TCPMonitor is Active. The middle pane displays requests, and the bottom pane displays responses by vclassbase:88.

3. In the browser, log in to the **LDAP_Dev** namespace with **admin\Education1** credentials, and then review the results in **TCPMonitor**. It may take a few moments to log on.
4. In the browser, click **IBM Cognos content**, and then navigate to **Public Folders\Samples_DQ\Models**, as you observe the messages passing through the Listener, with each request made.
5. In the browser, navigate to **GO Sales (analysis)\Report Studio Report Samples**, and then run the **2011 Sales Summary_DQ** report (this will take a while to complete).

If you receive a timeout-related error, close the Web browser window and repeat steps 1 to 5 again.

6. Review the results in **TCPMonitor**.

The buttons at the bottom of TCPMonitor let you configure the messages to be XML formatted, saved, and resent. You can also switch the layout of the message windows. If you develop Web services, this type of monitoring enables you to review the requests without stopping or starting the server.

7. When you have finished reviewing requests and responses in **TCPMonitor**, close the browser window, and then close **TCPMonitor**.

In your environment, you could configure TCPMonitor to trace SOAP requests and responses, by pointing the Listener to a modified WSDL (Web Services Description Languages) file. This option is available if IBM Cognos SDK is installed in your environment, or if you have a third-party WSDL file in your environment.

8. To prepare the environment for the next demo in the next module, from the **Taskbar**, launch **Services**, and then stop the **IBM Cognos DispCM:9320** service.

Results:

You used TCPMonitor to trace and view requests and responses, such as when users login to use IBM Cognos 10.

Summary

- At the end of this module, you should be able to:
 - identify IBM Cognos 10 architectural components
 - describe Service-Oriented Architecture in IBM Cognos



Reference of Acronyms:

AAA	Authentication Authorization Accounting
ACL	Access Control List
ADO	Active X Directory Objects
ANS	Analysis Studio
API	Application Interface
AR	Active Report
AS	Analysis Studio
ATC	Application Tier Components
BAPI	Business Application Programming Interface
BIBUS	Communication between services (protocol)
BME	BMT Engine
BMT	Batch Metadata Tool
BMTFW	Batch Metadata Tool Framework Manager
BMTFW	BMT UI Framework
BUX-E	Cognos Workspace (sometimes called CW), also Cognos Workspace Service
BUXA	Cognos Workspace Advanced (sometimes called CWA)
CC	IBM Cognos Connection (portal)
CAF	Cognos Application Firewall
CAM	Cognos Access Manager
CATALINA_OPTS	Variable for Apache Tomcat
CCD	Cognos Content Database
CFX	GetCFXHandler
CGI	Common Gateway Interface
CM	Content Manager
CMM	Metric Studio
COBRA	Common Object Request Broker Architecture
CQE	Cognos Query Engine
CRP	Cryptography
CRX	Cognos Report Expression
CSK	Common Symmetric Keystore
CV	IBM Cognos Viewer
DA&M	Data Access and Modeling
DIS	Data Integration Service
DISP	Dispatcher

DLS	Delivery Service
DMB	Dynamic MOLAP Builder
DMR	Dimensionally Modeled Relational
DOM	Document Object Model
DQA	Dynamic Query Analyzer
DQM	Dynamic Query Mode
DRU	Dynamic Reportspec Updater
EMS	Event Management Service
ES	Event Studio
FFP	Full Fidelity Publish
FM	Framework Manager
FMMD	Framework Manager MetaData
FMEE	Framework Manager Expression Editor
FMUI	Framework Manager User Interface
GMT	Greenwich Mean Time
GS	Graphics Service
GUI	Graphical User Interface
GUID	Globally Unique Identifier
GW	Gateway
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
HTS	Human Task Service
HWM	Heavy Weight Modeling
IDViz	Interactive Discovery Visualization
IETF	Internet Engineering Task Force
IIOP	Internet Inter-ORB Protocol
IIS	Microsoft Internet Information Services
IPF	Indication Processing Facility
IPRF	In-Process Request Factor
ISAPI	Internet Server Application Programming Interface
Java EE	Java Platform, Enterprise Edition
JDBC	Java Database Connectivity
JBOSS	JBOSS Applicaton Server
JMS	Job Management Service
JNI	Java Native Interface
JS	Java Scheduler
JSM	Java Schedule Manager

JRE	Java Runtime Environment
JSON	JavaScript Object Notation
JVM	Java Virtual Machine
LOG4J	Java-based logging utility
LWM	Light Weight Modeling
MDDS	Multidimensional Data Services
MDF	Meta Data Framework
MDX	Multidimensional Expression Language
MFW	Metadata Framework
MS	Monitor Service
MM	Metrics Manager
MMS	Metrics Manager Service
MOB	Mobile, Mobile Service
MOLAP	Multidimensional Online Analytical Processing
MQP	Metadata Query Planner
OQP	OLAP Query Planner
OSGI	Open Services Gateway Initiative
PDF	Portable Document Format
POGO	Dispatcher
PP	PowerPlay
PPDS	PowerPlay Data Services
PPDSWeb	PowerPlay Data Service Web
PPDSrm	PowerPlay Data Services Remote
PPDSrms	PowerPlay Data Services Remote Service
PPES	PowerPlay Enterprise Server
PPRP	PowerPlay Report Processor (PDF)
PPRS	PowerPlay Report Service
PRS	Presentation Service
PWQ	PWQHandler
PWR	PWRHandler
QECL	Query Engine Common Library
QF	Query Framework
QFW	Query Framework Components
QFW/QFWP	Query Framework
QFWP	Query Framework Planner
QRD	Query Result Definition
QS	Query Studio

RFC	Remote Function call
RMI	Remote Methods Invocation
RMP	Reporter Mode Provider
RQP	Relational Query Planner
RS	Report Studio
RSAPI	Result Set Application Programming Interface
RSVP	Report Server Manager
RTM	Release to Manufacturing
RTM	Run time Model
RV	IBM Cognos Viewer, or Report Viewer
SDK	Software Development Kit
SLWM	Shared Lightweight Modeling
SMTP	Simple Mail Transfer Protocol
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
SQL	Structured Query Language
SSO	Single Sign-On
STAT	IBM Cognos Statistics
TR, TRAN	Transformer
UI	User Interface
UDA	Universal Data Access
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
XML	Extensible Markup Language
XSL	Extensible Stylesheet Language
XTS	XML Transformation Service component used to generate HTML pages. (xts.run, seen in IBM Cognos URLs). Different from PRS.
XXS	Cross Site Scripting