

**IBM Cognos BI Administration:  
Architecture and Logging (v10.2.2)**  
Student Guide  
**Course Code: B5A19**

IBM Cognos BI Administration: Architecture and Logging (v10.2.2)  
B5A19  
ERC: 1.0  
Published April 2015

All files and material for this course, B5A19: IBM Cognos BI Administration: Architecture and Logging (v10.2.2), are IBM copyright property covered by the following copyright notice.

© Copyright IBM Corp. 2010, 2015

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM corp.

IBM, the IBM logo, ibm.com, Cognos, SPSS and TM1 are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at [www.ibm.com/legal/copytrade.shtml](http://www.ibm.com/legal/copytrade.shtml).

Adobe, is either a registered trademark or trademark of Adobe Systems Incorporated in the United States, and/or other countries.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

# Contents

<b>PREFACE .....</b>	<b>P-1</b>
CONTENTS .....	P-3
COURSE OVERVIEW.....	P-12
DOCUMENT CONVENTIONS .....	P-13
WORKSHOPS .....	P-14
ADDITIONAL TRAINING RESOURCES .....	P-15
IBM PRODUCT HELP .....	P-16
<b>INTRODUCTION AND SERVICE-ORIENTED ARCHITECTURE .....</b>	<b>1-1</b>
OBJECTIVES .....	1-3
IBM COGNOS BI ARCHITECTURE .....	1-4
COMPONENT DEFINITIONS .....	1-5
TWO LANGUAGES, TWO APPROACHES .....	1-6
WHAT IS JAVA EE?.....	1-7
EXAMINE IBM COGNOS BI SERVLETS.....	1-8
EXAMINE 32-BIT VS 64-BIT .....	1-9
EXAMINE 64-BIT SUPPORT.....	1-10
EXAMINE 64-BIT SUPPORT BENEFITS .....	1-11
LIST CORE INSTALL COMPONENTS .....	1-12
LIST COMPANION INSTALLS.....	1-15
OVERVIEW OF CORE INSTALL COMPONENTS .....	1-16
DESCRIBE GATEWAYS.....	1-17
EXPLORE GATEWAY REQUESTS.....	1-19
DESCRIBE THE APPLICATION TIER INSTALL COMPONENT .....	1-20
DESCRIBE IBM COGNOS CONTENT DATABASE.....	1-21
DESCRIBE SERVICE-ORIENTED ARCHITECTURE .....	1-22
DESCRIBE SOA ASSETS .....	1-23
EXAMINE SOA IN IBM COGNOS .....	1-24
WHAT ARE IBM COGNOS SERVICES? .....	1-25
EXPLAIN SOA COMMUNICATION IN IBM COGNOS 10 .....	1-26
EXAMINE EXTERNAL IBM COGNOS BI SERVICES .....	1-27
EXAMINE ADD-ON INSTALLS .....	1-28
DEMO 1: EXPLORE AN IBM COGNOS BI ENVIRONMENT.....	1-29
INSTALLATION MAP .....	1-35

DEMO 2: SET UP THE TCPMONITOR UTILITY AND PERFORM A REQUEST.....	1-36
SUMMARY.....	1-40
<b>EXPLORE THE IBM COGNOS DISPATCHER .....</b>	<b>2-1</b>
OBJECTIVES .....	2-3
WHAT IS A THREAD? .....	2-4
WHAT IS A SERVLET? .....	2-5
WHAT IS A PROCESS? .....	2-6
WHAT IS THE IBM COGNOS DISPATCHER? .....	2-7
EXAMINE THE DISPATCHER AND THE BIBUS.....	2-8
DESCRIBE THE DISPATCHER.....	2-9
WHAT IS THE PURPOSE OF REQUEST ROUTING?.....	2-10
DESCRIBE REQUEST ROUTING CONCEPTS .....	2-11
DESCRIBE THE ROLE OF THE GATEWAY .....	2-12
DESCRIBE DISPATCHER CLUSTER INFORMATION .....	2-13
EXPLORE DISPATCHER CLUSTER INFORMATION DETAILS .....	2-14
DEMO 1: REVIEW THE OUTPUT OF P2PLBdiag.....	2-15
DESCRIBE FRONT DISPATCHERS .....	2-19
DESCRIBE THE DISPATCHER REQUEST QUEUE .....	2-20
EXAMINE THE DETAILS OF THE REQUEST QUEUE .....	2-21
CONSIDERATIONS FOR THE REQUEST QUEUE .....	2-22
WHAT IS A CONVERSATION?.....	2-23
EXPLORE THE BENEFITS OF CONVERSATIONS .....	2-24
EXAMINE THE USUAL CONVERSATION .....	2-25
WHAT ARE ASYNCHRONOUS CONVERSATIONS? .....	2-26
WHAT ARE GROUPED CONVERSATIONS?.....	2-27
DESCRIBE REQUEST AFFINITY .....	2-28
DEFINE REQUEST AFFINITY ASSIGNMENTS .....	2-29
REVIEW REQUEST ROUTING .....	2-30
CONSIDER CUSTOMIZATION.....	2-31
WHAT LOAD BALANCING MODES ARE AVAILABLE? .....	2-32
EXPLAIN WEIGHTED ROUND ROBIN MODE .....	2-33
WEIGHTED ROUND ROBIN IN IBM COGNOS 10 .....	2-34
EXPLAIN CLUSTER COMPATIBLE MODE .....	2-36
WHAT IS ADVANCED ROUTING? .....	2-38
WHAT ARE SERVER GROUPS? .....	2-39

SERVER GROUP CONSIDERATIONS.....	2-40
EXAMPLE OF SERVER GROUPS.....	2-41
DESCRIBE ROUTING SETS .....	2-42
WHAT ARE ROUTING RULES? .....	2-43
ROUTING RULE CONSIDERATIONS .....	2-44
EXPLAIN ADVANCED ROUTING.....	2-45
DESCRIBE STEPS OF THE ROUTING PROCESS.....	2-46
ROUTING PROCESS: EXAMPLE 1 .....	2-48
ROUTING PROCESS: EXAMPLE 2 .....	2-49
THINGS TO REMEMBER .....	2-51
WHAT IS CONTENT MANAGER CACHE SERVICE?.....	2-52
DESCRIBE CMCS DETAILS .....	2-54
SERVICE A PRIMARY REQUEST .....	2-55
SERVICE A SECONDARY REQUEST .....	2-56
EXPLAIN CMCS SETTINGS.....	2-57
DESCRIBE TIMERS .....	2-58
SUMMARY.....	2-59
WORKSHOP 1: REVIEW THE SERVER GROUPS (OPTIONAL).....	2-60
<b>EXAMINE IBM COGNOS SERVICES .....</b>	<b>3-1</b>
OBJECTIVES .....	3-3
WHAT IS CONTENT MANAGER SERVICE? .....	3-4
WHAT DOES CONTENT MANAGER SERVICE SUPPORT? .....	3-6
REPORT SERVICE AND BATCH REPORT SERVICE.....	3-7
INTRODUCE BIBUSTKSERVERMAIN .....	3-8
EXPLAIN REPORT EXECUTION IN IBM COGNOS .....	3-9
DESCRIBE SERVER AFFINITY: LOW .....	3-10
DESCRIBE SERVER AFFINITY: HIGH.....	3-11
DESCRIBE SERVER AFFINITY: ABSOLUTE.....	3-12
DESCRIBE AFFINITY CONNECTIONS.....	3-13
EXAMPLE OF AFFINITY CONNECTIONS .....	3-14
DESCRIBE AFFINITY CONNECTION ASSIGNMENT .....	3-15
MANAGEMENT OF AFFINITY CONNECTION ASSIGNMENT .....	3-16
EXPLAIN AFFINITY CONNECTION CONFIGURATION .....	3-17
DESCRIBE SCHEDULING .....	3-18
SERVICES THAT IMPLEMENT THE TARGET SERVICE API.....	3-20

SET TARGET SERVICES PROPERTIES .....	3-22
EXPLAIN MONITOR SERVICE PROPERTIES .....	3-23
EXPLAIN BATCH REPORT SERVICE PROPERTIES.....	3-24
EXPLAIN CONTENT MANAGER SERVICE PROPERTIES .....	3-26
OVERVIEW OF SERVICES .....	3-27
SERVICE ORIENTED ARCHITECTURE IMPLICATIONS .....	3-30
EXPLAIN COGNOS GRAPHICS SERVICE .....	3-31
DESCRIBE COGNOS GRAPHICS SERVICE .....	3-32
DESCRIBE THE CURRENT DEFAULT ENGINE.....	3-33
CONFIGURE COGNOS GRAPHICS SERVICE .....	3-34
CONFIGURE CGS PARAMETERS .....	3-35
EXPLAIN INTERACTIVE DISCOVERY VISUALIZATION (IDVIZ) SERVICE .....	3-37
EXPLAIN PRESENTATION SERVICE (PRS) .....	3-39
DESCRIBE PRS .....	3-40
EXPLAIN REPORT DATA SERVICE (RDS).....	3-41
WHAT COMPONENTS USE RDS?.....	3-42
WHAT IS METADATA SERVICE (MDS)?.....	3-43
EXPLAIN RELATIONAL METADATA SERVICE (RMDS) .....	3-44
CONFIGURE RMDS .....	3-45
WHAT IS DYNAMIC QUERY MODE?.....	3-47
OLAP FUNCTIONALITY FOR DIMENSIONALLY MODELED RELATIONAL (DMR) PACKAGES .....	3-49
DYNAMIC QUERY MODE CONNECTIVITY .....	3-51
OLAP DQM CONNECTIVITY .....	3-52
RELATIONAL AND DMR DQM CONNECTIVITY.....	3-53
DESCRIBE QUERYSERVICE .....	3-54
DESCRIBE THE QUERYSERVICE PROPERTIES .....	3-56
ADDITIONAL QUERY SERVICE INFORMATION .....	3-58
WHAT ARE INDEX SERVICES? .....	3-59
EXPLORE RELATED INDEX SERVICES .....	3-60
EXPLAIN COLLABORATION FUNCTIONALITY .....	3-61
DESCRIBE COLLABORATION SERVICES.....	3-62
DESCRIBE REPOSITORY SERVICE (REPOS) .....	3-63
EXPLAIN REPOS .....	3-65
CONFIGURE REPOS .....	3-66
WHAT IS COGNOS ACCESS MANAGER SERVICE? .....	3-68

DESCRIBE AUTHENTICATION PROVIDERS.....	3-69
OVERVIEW OF IBM COGNOS ARCHITECTURE .....	3-70
SUMMARY.....	3-71
WORKSHOP 1: OBSERVE THE EFFECTS ON A DISPATCHER WHEN RUNNING MULTIPLE REPORT SERVER INSTANCES .....	3-72
<b>EXPLORE JAVA MEMORY MANAGEMENT .....</b>	<b>4-1</b>
OBJECTIVES .....	4-3
REVIEW JAVA COMPONENTS IN IBM COGNOS .....	4-4
HIGH LEVEL ARCHITECTURAL VIEW .....	4-5
WHAT IS JAVA? .....	4-6
DESCRIBE THE JAVA RUNTIME ENVIRONMENT .....	4-7
EXAMINE THE JRE PROCESS MEMORY LAYOUT .....	4-8
EXAMPLE OF JRE MEMORY MANAGEMENT .....	4-9
WHY IS JAVA MEMORY MANAGEMENT IMPORTANT?.....	4-10
EXPLORE CONCEPTS OF MEMORY MANAGEMENT .....	4-11
JVM SETTINGS .....	4-12
EXPLAIN GARBAGE COLLECTION .....	4-14
CONSIDERATIONS OF GARBAGE COLLECTION.....	4-16
WHAT IS IBM JRE GARBAGE COLLECTION?.....	4-17
DESCRIBE FRAGMENTATION CONCERNs .....	4-18
LOG GARBAGE COLLECTION.....	4-19
VERBOSE GC OUTPUT OF IBM JRE: EXAMPLE 1 .....	4-20
VERBOSE GC OUTPUT OF IBM JRE: EXAMPLE 2 .....	4-21
ENABLE VERBOSE GC IN IBM COGNOS 10: TOMCAT WITH COMMAND LINE .....	4-22
ENABLE VERBOSE GC IN IBM COGNOS 10: EXAMPLE USING TOMCAT AS A SERVICE.....	4-23
ENABLE VERBOSE GC: CGS AND DQM .....	4-24
ENABLE GC LOGGING IN WAS.....	4-25
TUNING GC: IBM JRE .....	4-26
JVM TUNING AND DYNAMIC CUBES .....	4-27
CONFIGURE THE JVM FOR QUERY SERVICE.....	4-29
TIPS ON TUNING SETTINGS.....	4-30
PHASES OF DYNAMIC CUBES OPERATION .....	4-32
ANALYSIS OF JVM GARBAGE COLLECTION .....	4-33

WHAT HAPPENS IN A JRE CRASH? .....	4-35
WHAT SHOULD YOU DO IF JAVA HANGS? .....	4-36
USE TOOLS TO MONITOR JAVA.....	4-37
SUMMARY.....	4-38
<b>EXAMINE AUDIT LOGGING AND INDICATION PROCESSING FACILITY LOGGING.....</b>	<b>5-1</b>
OBJECTIVES .....	5-3
WHAT ARE INSTALLATION LOGS? .....	5-4
REVIEW INSTALLATION LOGS.....	5-5
EXPLORE THE INSTALL LOG.....	5-6
EXPLORE THE ERROR LOG .....	5-7
EXPLORE THE SPECIFICATION FILE .....	5-8
EXPLORE THE CONTENT MANAGER RESULTS LOGS .....	5-9
EXPLORE LOGGING OF CONTENT STORE HIERARCHY CREATION.....	5-10
EXPLORE LOGGING OF CREATION OF INITIAL CONTENT STORE OBJECTS .....	5-11
EXPLORE PROPERTIES OF IBM COGNOS CONFIGURATION .....	5-12
LOGGING OF IBM COGNOS CONFIGURATION .....	5-13
WHAT IS THE COGSTARTUP.XML FILE?.....	5-14
WHAT IS THE COGLOCALE.XML FILE? .....	5-15
WHAT IS AUDITING IN IBM COGNOS 10?.....	5-16
EXPLORE THE BASIC ARCHITECTURE OF AUDIT LOGGING .....	5-17
SET LOGGING LEVELS .....	5-18
EXPLAIN AUDIT LOGGING LEVELS .....	5-19
DEMO 1: SET LOGGING LEVELS .....	5-20
WHAT IS NATIVE QUERY LOGGING? .....	5-24
EXPLAIN AUDIT LOGGING DESTINATIONS.....	5-25
WHERE ARE DESTINATIONS STORED? .....	5-26
EXPLORE THE FILE LOG .....	5-28
EXPLORE THE WINDOWS EVENT LOG.....	5-30
EXPLORE THE UNIX SYSTEM LOG .....	5-31
WHAT IS THE REMOTE LOG SERVER? .....	5-32
EXAMPLE OF REMOTE LOG SERVER PROCESS .....	5-33
WORKSHOP 1: CONFIGURE A WINDOWS EVENT LOG AND REVIEW AUDIT INFORMATION.....	5-34
WHAT IS IPF LOGGING? .....	5-39

EXPLORE THE BASIC ARCHITECTURE OF IPF LOGGING .....	5-40
WHAT ARE IPF INDICATIONS? .....	5-41
WHAT ARE THE FIELDS OF AUDIT AND TRACE INDICATIONS? .....	5-42
APPLICABILITY OF AUDIT AND TRACE INDICATION FIELDS.....	5-44
WHAT ARE THE FIELDS OF PERFORMANCE INDICATION?.....	5-45
WHAT ARE IPF CLIENT LOGS?.....	5-47
EXPLAIN IPF CLIENT LOGGING.....	5-48
WHEN TO USE IPFXXXXCLIENTCONFIG.XML .....	5-50
DESCRIBE SDS LOGGING .....	5-52
MOST COMMONLY USED IPF TRACES.....	5-53
SUMMARY.....	5-54
WORKSHOP 2: CONFIGURE IPF LOGGING .....	5-55
<b>PERFORM DYE TRACING .....</b>	<b>6-1</b>
OBJECTIVES .....	6-3
WHAT IS DYE TRACING? .....	6-4
WHAT ARE THE REQUIREMENTS OF JMX CONNECTIVITY? .....	6-5
ADD AN IPF FILTER.....	6-6
SUMMARY.....	6-7
WORKSHOP 1: PERFORM DYE TRACING .....	6-8
<b>EXPLORE DYNAMIC QUERY MODE.....</b>	<b>7-1</b>
OBJECTIVES .....	7-3
AVAILABLE DYNAMIC QUERY MODE LOGGING .....	7-4
DESCRIBE XQE LOG FILES .....	7-5
IPF LOGGING FOR DQM .....	7-8
DESCRIBE QFS LOGGING FOR DQM.....	7-9
ENABLE DQM BAPI TRACE FOR SAP BW .....	7-10
WHAT IS IBM COGNOS DQA? .....	7-11
WHAT CAN YOU DO WITH IBM COGNOS DQA? .....	7-12
REVIEW THE IBM COGNOS DQA GRAPH LEGEND.....	7-13
EXPLORE IBM COGNOS DQA VIEWS .....	7-14

EXPLORE AGGREGATE ADVISOR .....	7-16
SUMMARY.....	7-18
WORKSHOP 1: ENABLE DQM, PUBLISH A PACKAGE, AND REVIEW THE LOGS CREATED .....	7-19
WORKSHOP 2: USE IBM COGNOS DYNAMIC QUERY ANALYZER TO ANALYZE A QUERY .....	7-32
<b>EXPLORE COMPONENT LOGGING .....</b>	<b>8-1</b>
OBJECTIVES .....	8-3
REPORT SERVER (RSVP) TRACE .....	8-4
BIBUS TRACE .....	8-5
TRACE THE DISPATCHER.....	8-6
EXPLORE QUERY FRAMEWORK LOGGING .....	8-7
DESCRIBE THE DISPATCHER COMMAND CONSOLE .....	8-8
GATEWAY TRACE.....	8-9
DEMO 1: PERFORM A GATEWAY TRACE .....	8-10
DESCRIBE METHODS TO ENABLE UDA TRACES .....	8-15
EXPLORE UDA TRACE AND ENVIRONMENT VARIABLES .....	8-17
DESCRIBE COMMON TRACE LAYERS AND CATEGORIES .....	8-18
EXAMPLE OF A UDA TRACE .....	8-19
ACTIVATE UDA TRACE WITH SESSION VARIABLES .....	8-20
ACTIVATE UDA TRACE WITH IPF FILE .....	8-21
EXAMPLE UDA OUTPUT .....	8-22
WHAT IS UDATEST? .....	8-23
UDATEST SCENARIO 1 .....	8-24
UDATEST SCENARIO 2 .....	8-25
UDATEST SCENARIO 3 .....	8-26
UDATEST SCENARIO 4 .....	8-27
UDATEST SCENARIO 5 .....	8-28
UDATEST SCENARIO 6 .....	8-29
WORKSHOP 1: EXPLORE UDA TRACE AND UDATEST (OPTIONAL) .....	8-30
WHAT IS PERF.QFS? .....	8-47
ACTIVATE PERF.QFS .....	8-48
DESCRIBE PERF.QFS OUTPUT .....	8-49
WORKSHOP 2: PERFORM PERF.QFS LOGGING .....	8-50
SUMMARY.....	8-60

## EXAMINE ADDITIONAL TOOLS AND SPECIAL TASK LOGGING...9-1

OBJECTIVES .....	9-3
IBM COGNOS BI CONTENT MANAGER BROWSER TOOL.....	9-4
IBM COGNOS BI CONTENT MANAGER SIZE TOOL.....	9-5
IBM COGNOS FRAMEWORK MANAGER TOOL .....	9-6
IBM COGNOS BI CONTENT STORE INFORMATION TOOL .....	9-7
SYSTEM OVERVIEW DIAGNOSTIC TOOL .....	9-8
DEMO 1: EXPLORE DIAGNOSTIC TOOLS .....	9-10
IBM COGNOS LOG VIEWER UTILITY .....	9-19
DESCRIBE CM_TESTER .....	9-20
CMTOOLS UTILITY .....	9-21
DEMO 2: EXPLORE THE IBM COGNOS LOG VIEWER AND CMTOOLS UTILITIES .....	9-22
IBM COGNOS VIEWER TRACE .....	9-27
EXPLORE THE OUTPUT FILES .....	9-29
WORKSHOP 1: TRACE IBM COGNOS VIEWER .....	9-31
DRILL THROUGH ASSISTANT .....	9-40
USE DIAGNOSTIC URL COMMANDS .....	9-42
ANALYZE LOGS WITH I.C.E.T.E.A. ....	9-43
DEMO 3: ANALYZE LOGS WITH I.C.E.T.E.A. ....	9-44
SUMMARY.....	9-48
WORKSHOP 2: EXAMINE URLs AVAILABLE FOR TROUBLESHOOTING .....	9-49

## Course Overview

### Course Overview

This course is designed to teach participants how to identify components and sub-components of the IBM Cognos BI architecture and how to use tools and techniques to provide a foundation to troubleshoot issues. Through lecture and interactive exercises participants will identify IBM Cognos BI components, examine how these components interact with Java, and will explore logging to assist when troubleshooting issues.

Recommended duration: 2 days

### Intended Audience

This course is recommended for Administrators responsible for administering the IBM Cognos 10.2.2 BI environment.

### Topics Covered

Topics covered in this course include:

- Architecture Overview: Introduction, Service-Oriented Architecture, IBM Cognos Dispatcher, IBM Cognos Services, Dynamic Query Mode, Java Memory Management
- Logging: Audit Logging, Indication Processing Facility Logging, Perform Dye Tracing, Dynamic Query Mode Logging, Component Logging, Special Task Logging and Additional Tools

### Course Prerequisites

Participants should have:

- IBM Cognos BI Administration (v10.2.2) course or equivalent experience administering the IBM Cognos BI environment

## Document Conventions

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

### **Bold**

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

- actionable items

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

- text to type or keys to press

(Type **Sales Report**, and then press **Enter.**)

- UI elements that are the focus of attention

(In the **Format** pane, click **Data**)

### *Italic*

Used to reference book titles.

### CAPITALIZATION

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

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

# Workshops

## Workshop Format

Workshops are designed to allow you to work according to your own pace. Content contained in a workshop is not fully scripted out to provide an additional challenge. Refer back to demonstrations if you need assistance with a particular task. The workshops are structured as follows:

### The Business Question Section

This section presents a business-type question followed by a series of tasks. These tasks provide additional information to help guide you through the workshop. Within each task, there may be numbered questions relating to the task. Complete the tasks by using the skills you learned in the module. If you need more assistance, you can refer to the Task and Results section for more detailed instruction.

### The Task and Results Section

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

## Additional Training Resources

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

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

# IBM Product Help

Help type	When to use	Location
Task-oriented	You are working in the product and you need specific task-oriented help.	<i>IBM Product - Help link</i>
Books for Printing (.pdf)	<p>You want to use search engines to find information. You can then print out selected pages, a section, or the whole book.</p> <p>Use Step-by-Step online books (.pdf) if you want to know how to complete a task but prefer to read about it in a book.</p> <p>The Step-by-Step online books contain the same information as the online help, but the method of presentation is different.</p>	Start/Programs/ <i>IBM Product/Documentation</i>
IBM on the Web	<p>You want to access any of the following:</p> <ul style="list-style-type: none"> <li>• Training and Certification Web site</li> <li>• Online support</li> <li>• IBM Web site</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="http://www-01.ibm.com/software/analytics/training-and-certification/">http://www-01.ibm.com/software/analytics/training-and-certification/</a></li> <li>• <a href="http://www-947.ibm.com/support/entry/portal/Overview/Software">http://www-947.ibm.com/support/entry/portal/Overview/Software</a></li> <li>• <a href="http://www.ibm.com">http://www.ibm.com</a></li> </ul>

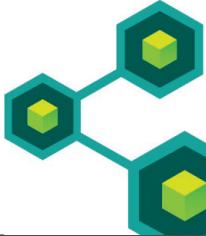


# **Introduction and Service-Oriented Architecture**

IBM Cognos BI 10.2.2

**Business Analytics software**

© 2015 IBM Corporation





# 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

© 2015 IBM Corporation



Business Analytics software

IBM

# IBM Cognos BI Architecture

- examine components
  - [C:\Edcognos\B5A19\01-Intro\\_and\\_SOA\IBM\\_Cognos\\_10.2.2\\_architecture\\_diagram.jpg](C:\Edcognos\B5A19\01-Intro_and_SOA\IBM_Cognos_10.2.2_architecture_diagram.jpg)

© 2015 IBM Corporation



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

© 2015 IBM Corporation



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

© 2015 IBM Corporation



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

© 2015 IBM Corporation



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.

**Business Analytics software**

**IBM**

## Examine IBM Cognos BI Servlets

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

The diagram illustrates the architecture of IBM Cognos BI services. It shows two main groups of services: one group (Report Service and Batch report Service) running as child processes of the dispatcher, and another group (Dispatcher and Content Manager) running within the Java Servlet container. The Java Servlet container is configured by default to use the Websphere Liberty Profile.

**Services**

**Java Servlet container**

**Websphere Liberty Profile (default)**

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

© 2015 IBM Corporation



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](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

© 2015 IBM Corporation



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)

© 2015 IBM Corporation



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

© 2015 IBM Corporation



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)

© 2015 IBM Corporation



**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

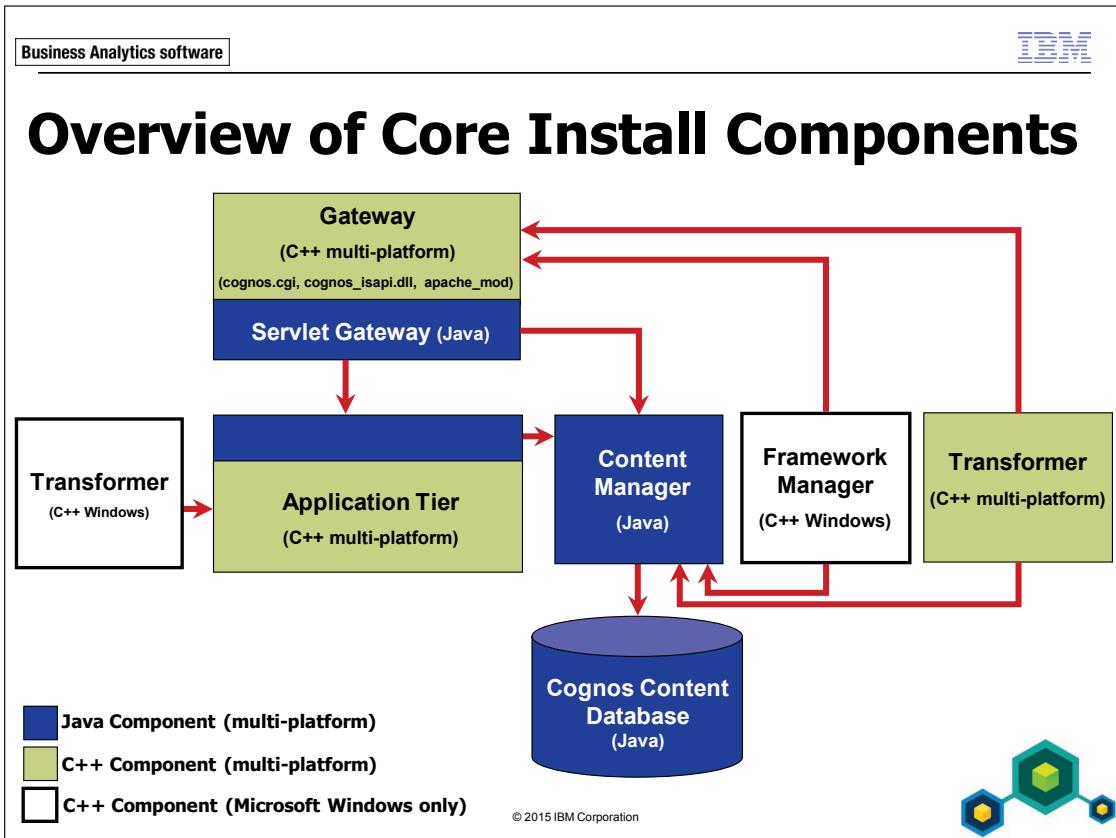
- IBM Cognos Transformer
- IBM Cognos PowerPlay Server and Client
- IBM Cognos Lifecycle Manager
- IBM Cognos Statistics
- IBM Cognos Analysis for Microsoft Excel
- IBM Cognos Mobile
- IBM Cognos for Microsoft Office
- IBM Cognos Business Viewpoint
- IBM Cognos Virtual View Manager
- IBM Cognos Metric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

© 2015 IBM Corporation



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.



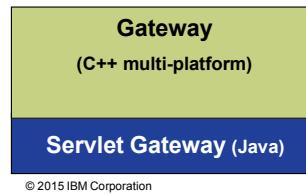
IBM Cognos 10 has a three tier architecture: Web Tier (Gateway), Application Tier, and Database Tier. A Gateway relays to an Application Tier which talks to Content Manager which talks to the Content Store.

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



IBM Cognos supports several types of Web gateways.

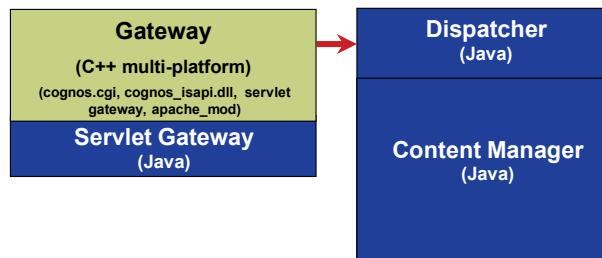
- CGI (Common Gateway Interface): The default gateway, CGI can be used for all supported Web servers. However, for enhanced performance or throughput, you may choose one of the other supported gateway types. For each request a cognos.cgi process is executed on the server. CGI gateways are the least secure.
- 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



© 2015 IBM Corporation



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.

Business Analytics software

IBM

## Describe the Application Tier Install Component

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

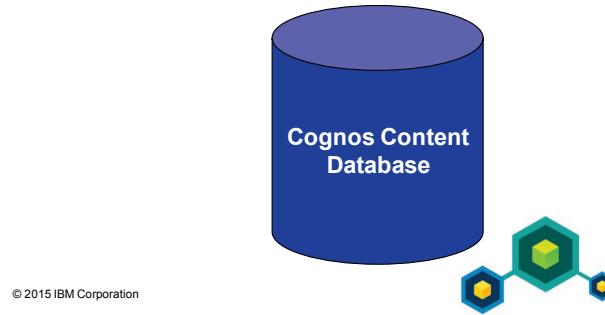
The diagram illustrates the Application Tier Install Component. At the top, a large blue rectangle labeled "Dispatcher" in white text, with "(Java)" written below it, represents the central component. Below this main component are four smaller, identical blue rectangles arranged horizontally, representing other components. In the bottom right corner of the slide, there is a small graphic of three hexagons connected by lines, colored yellow, green, and blue.

© 2015 IBM Corporation

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



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

© 2015 IBM Corporation



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

© 2015 IBM Corporation



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

© 2015 IBM Corporation



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

© 2015 IBM Corporation



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

© 2015 IBM Corporation



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

\* new services as of IBM Cognos 10.1

\*\* new services as of IBM Cognos 10.2.0

© 2015 IBM Corporation



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

© 2015 IBM Corporation



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.

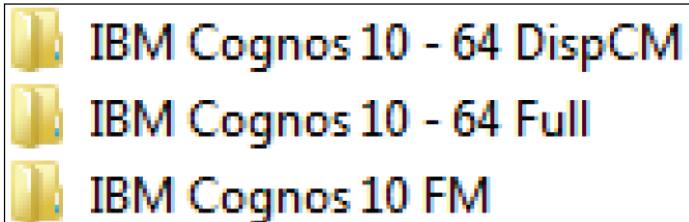
Note: Always start Apache Directory Server - default before the IBM Cognos Services, and start IBM Cognos Full:9315 completely before starting IBM Cognos DispCM:9320.

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.

3. 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:

The screenshot shows the IBM Cognos Configuration application window. The left pane, titled 'Explore:', contains a tree view of configuration nodes under 'Local Configuration'. The 'Environment' node is expanded, showing sub-nodes like 'Logging', 'Database', 'IBM Cognos services', 'Security', and 'Data Access'. The right pane, titled 'Environment - Group Properties', displays a table of properties with their values. The properties include:

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
<b>Gateway Settings</b>	
* Gateway URI	<a href="http://vclassbase:88/C10Full/cgi-bin/cognos.cgi">http://vclassbase:88/C10Full/cgi-bin/cognos.cgi</a>
Gateway namespace	
Content Manager sAMAccountName	
Allow namespace override?	False
* Dispatcher URIs for gateway	<a href="http://vclassbase:9315/p2pd/servlet/dispatch/ext...">http://vclassbase:9315/p2pd/servlet/dispatch/ext...</a>
* Controller URI for gateway	<a href="http://localhost:80/ibmcognos/controllerServer">http://localhost:80/ibmcognos/controllerServer</a>
<b>Dispatcher Settings</b>	
* External dispatcher URI	<a href="http://vclassbase:9315/p2pd/servlet/dispatch">http://vclassbase:9315/p2pd/servlet/dispatch</a>
* Internal dispatcher URI	<a href="http://vclassbase:9315/p2pd/servlet/dispatch">http://vclassbase:9315/p2pd/servlet/dispatch</a>
Dispatcher password	*****
External JMX port	0
External JMX credential	*****
* Report Server execution mode	64-bit
<b>Other URI Settings</b>	
* Dispatcher URI for external applications	<a href="http://vclassbase:9315/p2pd/servlet/dispatch">http://vclassbase:9315/p2pd/servlet/dispatch</a>
* Content Manager URIs	<a href="http://vclassbase:9315/p2pd/servlet...">http://vclassbase:9315/p2pd/servlet...</a>

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

4. 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.
5. 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.
6. Close **IBM Cognos Configuration** when you have finished reviewing the settings.
7. Repeat steps 3 to 6 for the **IBM Cognos 10 - 64 DispCM** instance of **IBM Cognos Configuration**.
8. 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.

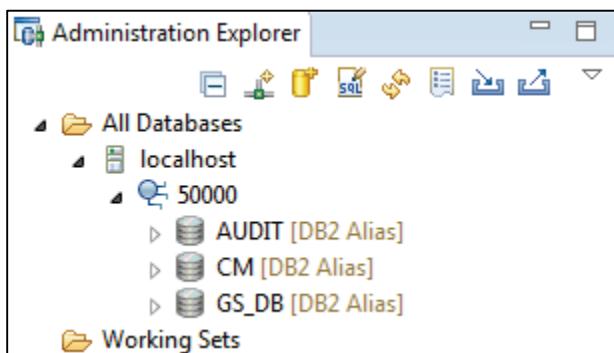
- From the **Start** menu, navigate to **All Programs\IBM Data Studio\Data Studio 4.1.0.0 Client**.

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**.

- 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.



- In the **Administration Explorer** pane, right-click the **CM** database and click **Connect**.  
The Properties for CM window opens.
- In the **User name** box, type **C10User**, in the **Password** box, type **Education1**, and then select the **Save password** check box.
- Click **OK**.

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

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

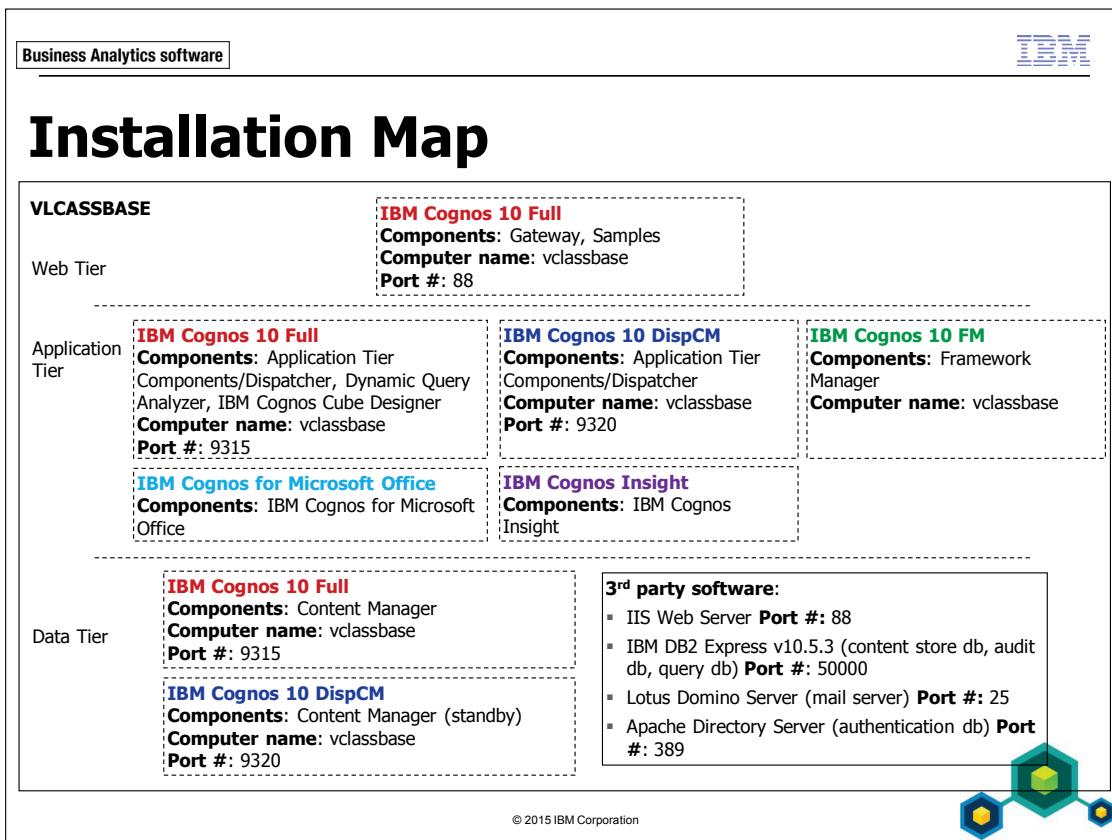
You can see the tables that are populated in the content store (this may take a few moments).

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.**

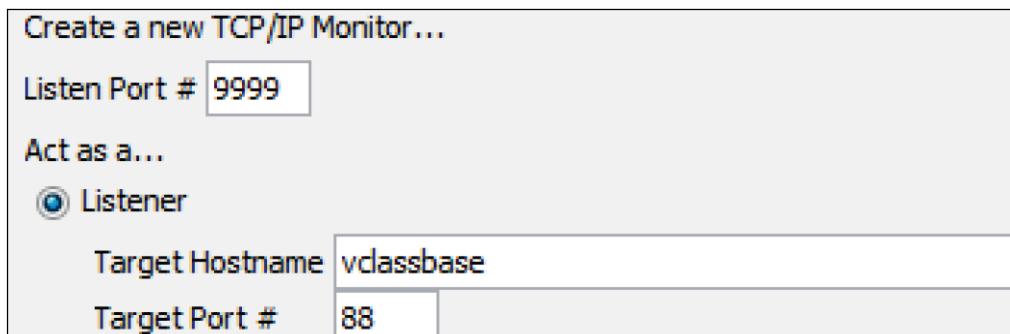
TCPMonitor is a useful tool to view requests and responses. It can also be set to simulate a slow connection, allowing you to set Bytes per Pause and Delay in Milliseconds when you create a new TCP/IP Monitor. This can be useful when testing Web services.

### 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**



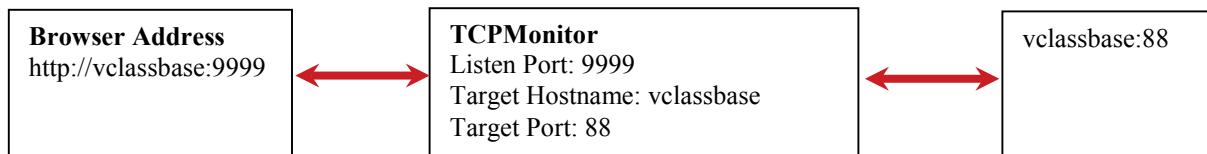
3. Click **Add**.

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.

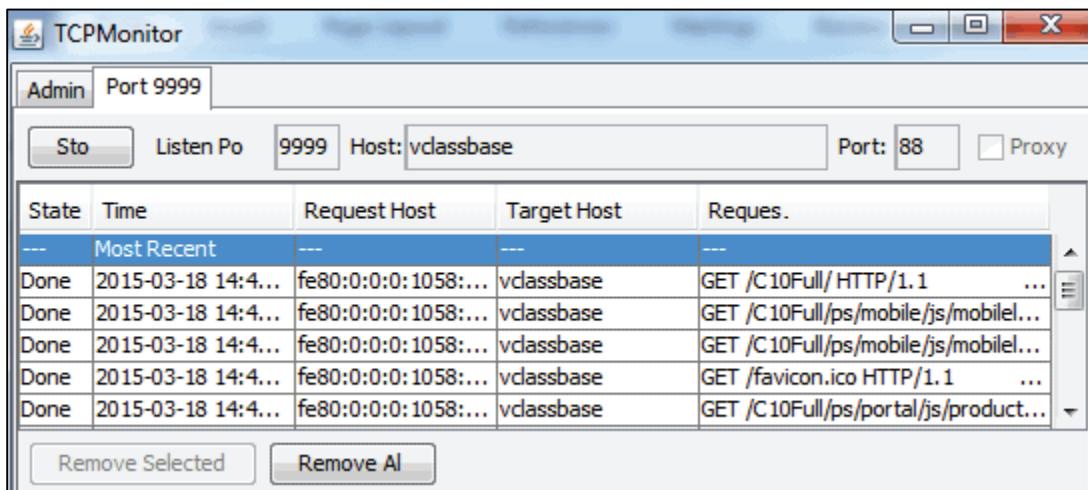


## **Task 2. Connect to IBM Cognos 10 and view the results of requests and responses.**

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

© 2015 IBM Corporation



## 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 Application 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



## Explore the IBM Cognos Dispatcher

IBM Cognos BI 10.2.2

Business Analytics software

© 2015 IBM Corporation





# Objectives

- At the end of this module, you should be able to:
  - describe IBM Cognos Dispatcher
  - describe request routing and the routing process
  - describe Content Manager Cache Service

© 2015 IBM Corporation



## What is a Thread?

- unit of processing time scheduled by the operating system

© 2015 IBM Corporation



Threads, or threads of execution, are the smallest unit of processing time that is scheduled by the operating system (OS). You can have more than one thread of execution in a process. Multiple threads can share resources, as subsets of a process, but processes handle resources differently than threads and are typically independent.

Multi-threading can be handled by the OS distributing to different Central Processing Units (CPU). Programs must be carefully designed in such a way that all the threads can run at the same time without interfering with each other.

## What is a Servlet?

- multi-threaded program
- handles HTTP requests sent to it in one or multiple threads
- responds by HTTP

© 2015 IBM Corporation



Servlets will use threads within the application server process scope, proportional to the number of requests sent to it. Servlets are the application tier equivalent to CGI programs in the Web tier, as they typically do not implement business logic.

A servlet is a Java program which runs in a specific environment, the servlet container as defined by the Java EE framework. The Java EE framework is typically implemented by a Java application server like WebSphere, or JBOSS.

A servlet cannot be run stand-alone but rather runs within the process of the container, and serves the single purpose to accept a request received by the servlet container and passed to it.

## What is a Process?

- an instance of a computer program that is being executed
- executes instructions

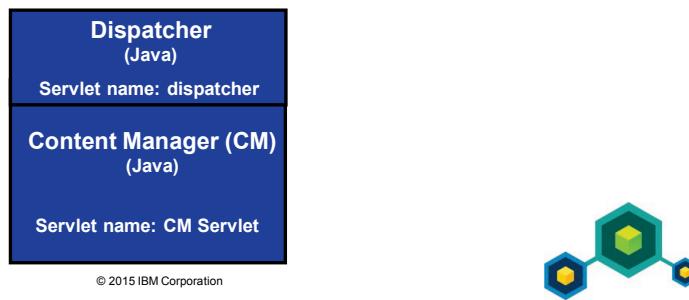
© 2015 IBM Corporation



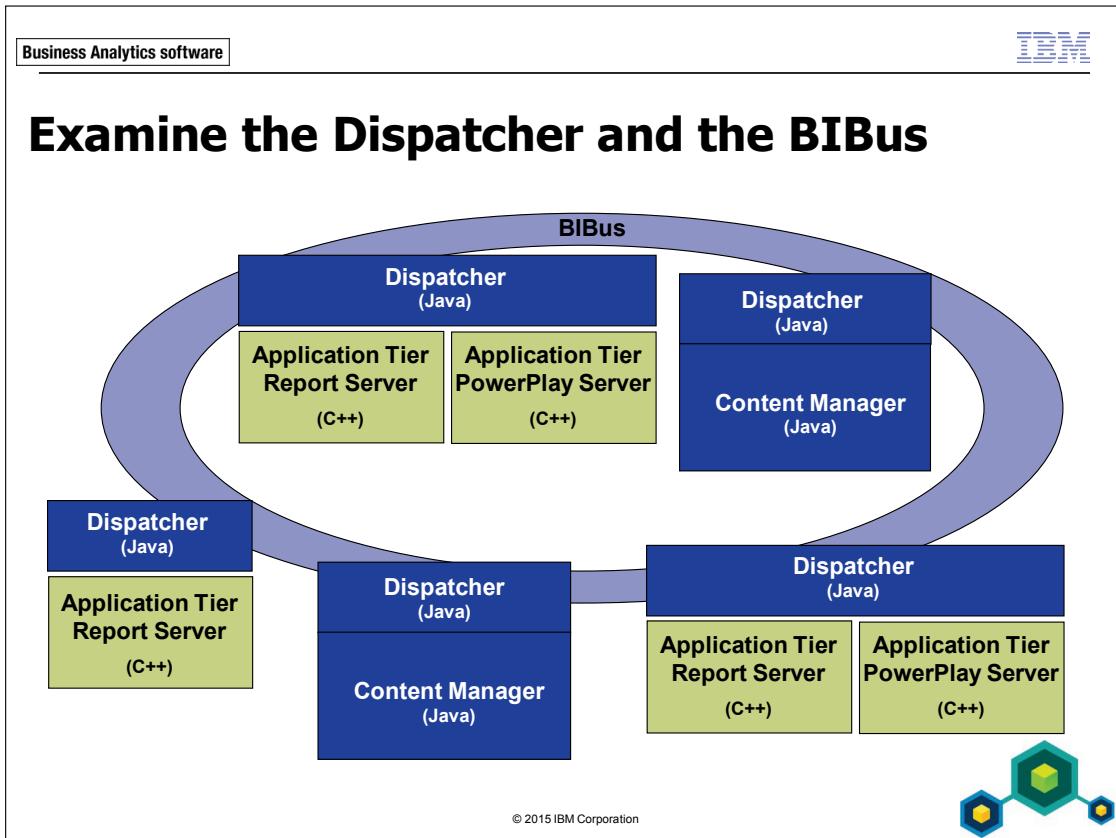
While a program itself is a passive collection of instructions, a process is something which executes those instructions. Several processes can be associated with the same program, although each would execute independently. A single process is always assigned to a single physical CPU.

# What is the IBM Cognos Dispatcher?

- Java servlet
- multi-threaded
- available in Application Tier and Content Manager install components
- interface to BIBus for local IBM Cognos services



The IBM Cognos dispatcher hosts IBM Cognos services exposed by the components of the installed service. The dispatcher starts all local services as configured in IBM Cognos Configuration, with the exception of the Content Manager service, which is separate.

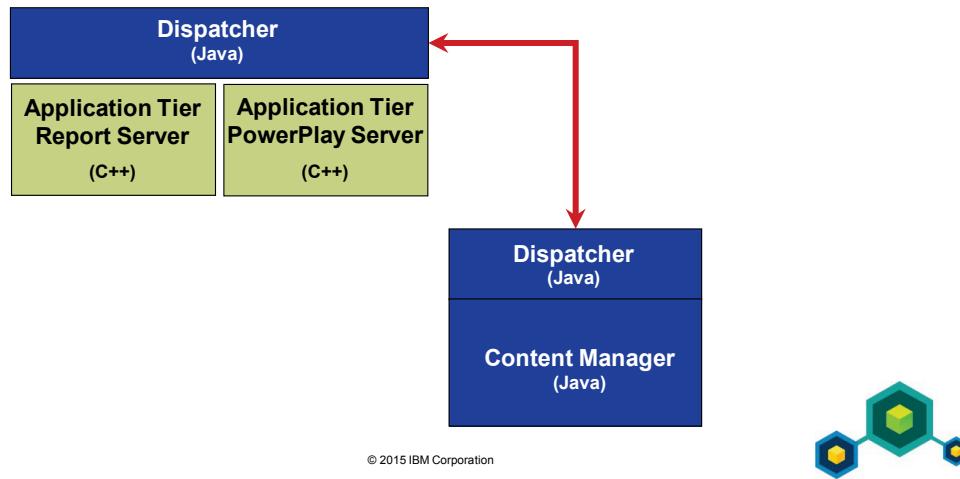


Only dispatchers sit on the BIBus. All inter-system communication travels this bus, although services require a dispatcher to gain access to the BIBus. In other words, all of the installations use the BIBus to communicate with each other, and all communication is done through the dispatchers.

The diagram shows multiple installed instances with different sets of install components.

## Describe the Dispatcher

- registers with Content Manager service on startup
- implements request routing



As the dispatcher registers with the Content Manager service, it enables built-in failover handling, and the dispatcher is assigned a unique ID. The registration can be revoked through IBM Cognos Administration, as in the case of a server name change during migration.

The dispatcher implements request routing as an internal service, and then forwards the requests to locally hosted service instances. The dispatcher can also forward requests to other dispatchers on the BIBus hosting remote service instances.

For the dispatcher to route requests to remote dispatchers through the BIBus, each dispatcher requires knowledge about other dispatchers in the system, the services hosted by the other dispatchers, and the status of the services on the other dispatchers. You will explore this in Demo 1: Review the Output of p2plbDiag.

If a dispatcher fails or is unavailable, requests for that dispatcher are routed to the next available dispatcher until the failed dispatcher updates its status to active again. For this to work dispatchers require knowledge about other dispatchers in the system, and a mechanism to determine whether a dispatcher is available or down; this is done by registration in the content store through the Content Manager service.

## What is the Purpose of Request Routing?

- delivers client requests to the correct IBM Cognos service as quickly as possible
- influenced by:
  - load balancing
  - external factors
  - configuration items

© 2015 IBM Corporation



Request routing is the task of delivering client requests, and is influenced by many factors and underlying concepts.

Load balancing may be affected by the targeted service or the number of available instances of that service. External factors such as system load, dispatcher hardware resources, or external routing software or hardware, may influence the request routing of a dispatcher. Advanced routing configuration based on user identity or packages used can impact request routing also.

# Describe Request Routing Concepts

- role of gateway
- cluster information
- front dispatchers
- request queue
- conversations
- request affinity
- customizations

© 2015 IBM Corporation



Over the next few pages, the request routing concepts listed in the slide will be presented.

## Describe the Role of the Gateway

- relays request to a single dispatcher
- does not load balance or route
- list of dispatchers in gateway configuration is for fail-over only
- pings all configured dispatchers every 30 seconds or on forward failure

© 2015 IBM Corporation



The dispatcher list for a gateway is specified in IBM Cognos Configuration. The gateway will work down the list in the order specified, so if the first dispatcher is not available, the gateway tries the second dispatcher, and so on.

If the gateway pings a dispatcher, and encounters a second failed attempt to connect, that dispatcher is marked as unavailable for this cycle.

## Describe Dispatcher Cluster Information

- dispatcher cluster information includes:
  - list of dispatchers registered to the system
  - server groups they are assigned to
  - IBM Cognos services hosted by each dispatcher and the running state of those services
- the dispatcher cluster information provides each dispatcher with a landscape of the system

© 2015 IBM Corporation



As part of their start-up, each dispatcher registers itself with Content Manager by querying the Content Manager service for dispatcher cluster information, and then the dispatcher joins the system. With the dispatcher cluster information, a dispatcher can eventually forward requests to remote dispatchers and services that are based on it.

The Content Manager service is the keeper and creator of the dispatcher cluster information.

Cluster refers to an entity where several servers are joined together. When a dispatcher registers with Content Manager, they are essentially reporting their part that Content Manager will put into the larger system.

Server group is a property of a dispatcher, and will be mentioned later in this module.

## Explore Dispatcher Cluster Information Details

- updated automatically
- dispatchers query CM service for the cluster information
- can take up to one minute to be propagated to all dispatchers in the IBM Cognos system
- accessible through:
  - `http://<INTERNAL_DISP_URI>/p2plbDiag`
  - any dispatcher on the IBM Cognos system

© 2015 IBM Corporation



The dispatcher cluster information updates automatically when a new dispatcher is added to the system or removed from the system. Dispatchers will query the CM service at regular intervals to signal that they are active and to update their local cluster information.

INTERNAL\_DISP\_URI refers to the internal dispatcher URI from IBM Cognos Configuration. In a default install this will be  
`http://localhost:9300/p2pd/servlet/dispatch/p2plbDiag`.

p2plbDiag shows information about a specific dispatcher including GUID and server group, all known dispatchers, and load balancing statistics.

## Demo 1: Review the Output of p2plbDiag

At the beginning of this workshop, only the IBM Cognos Full:9315 dispatcher needs to be running. Stop the IBM Cognos DispCM:9320 dispatcher service if it is running, before you begin this demo.

### Purpose:

You want to use p2plbDiag to review information about a specific dispatcher including GUID and server group, all known dispatchers, and load balancing statistics.

### Task 1. Access p2plbDiag and log on.

1. Launch Internet Explorer, in the Address box, type <http://vclassbase:9315/p2pd/servlet/dispatch/p2plbDiag>, and then press Enter.
2. Log in to the **LDAP\_Dev** namespace with **admin/Education1** credentials.  
If you are prompted to turn AutoComplete on, click **No**.

### Task 2. Review the results of p2plbDiag and the current system.

1. Use the results to answer the following:
  - Dispatcher:
  - GUID:
  - Content Manager:
  - Server Group:
  - Load Balancing Mode:
  - Disabled Services:
  - Are there multiple dispatchers available?

A section of the result appears similar to the following:

```
This dispatcher is: vclassbase:9315/p2pd/servlet/dispatch
GUID=2015-03-16-20.22.44.255878
Using CM: vclassbase:9315/p2pd/servlet
Current time: Mar 18, 2015 3:36:31 PM EDT
Configured dispatchers and services:
this dispatcher is : "/configuration/dispatcher[@name='http://vclassbase:9315/p2pd']"
this dispatcher is in serverGroup : "Group 64"

All known dispatchers:
Dispatcher: /configuration/dispatcher[@name='http://vclassbase:9315/p2pd']
    name: vclassbase:9315/p2pd
    dispatcherID: 2015-03-16-20.22.44.255878
    capacity: 1.0
    SSL: false
    serverGroup: Group 64
    loadBalancingMode: weightedRoundRobin
    edition: 10.2.6100.68
    Services:
        Service name: repositoryService disabled? false
        Service name: dispatcher disabled? false
        Service name: contentManagerCacheService disabled? false
        Service name: reportDataService disabled? false
        Service name: dispatcherCacheService disabled? false
        Service name: eventManagementService disabled? false
        Service name: dimensionManagementService disabled? false
```

The information here should match up with your configuration settings in IBM Cognos Administration. You can use this as a quick way to find out if the Dispatcher is available; you can also determine this in IBM Cognos Administration.

If you see two dispatchers (<http://vclassbase:9315/p2pd> and <http://vclassbase:9320/p2pd>) listed on this page, you may need to:

- a) Close the Web browser.
- b) Shut down the IBM Cognos DispCM:9320 service if it is not already shut down.
- c) Restart the IBM Cognos Full:9315 service.
- d) Wait 60 seconds.
- e) Reopen the Web browser and browse to <http://vclassbase:9315/p2pd/servlet/dispatch/p2plbDiag> again (logging on as admin/Education1 when prompted).

Now that you can see one Dispatcher is registered and available in the environment, what will happen if another Dispatcher is running? Will the registered Dispatcher display in p2plbDiag?

2. Close the browser window.

## Task 3. Start the second dispatcher and observe the result.

1. In the Taskbar, click the Services icon, and then start the **IBM Cognos DispCM:9320** service.

It will take a few minutes to start the service, and you may get a message indicating that the service did not start in a timely fashion (click OK to dismiss this message). Wait until this instance has fully started (you may do a refresh of the display every two minutes) before proceeding to the next step.

2. When the service has started successfully, in **Internet Explorer**, go to <http://vclassbase:9315/p2pd/servlet/dispatch/p2plbDiag>, and log in (if prompted) to the **LDAP\_Dev** namespace using **admin/Education1** credentials.

If you are prompted to turn AutoComplete on, click No. A section of the result appears similar to the following:

```
This dispatcher is: vclassbase:9315/p2pd/servlet/dispatch
GUID=2015-04-01-21.08.14.757907
Using CM: vclassbase:9320/p2pd/servlet
Current time: Apr 7, 2015 11:14:50 AM EDT
Configured dispatchers and services:
this dispatcher is : "/configuration/dispatcher[@name='http://vclassbase:9315/p2pd']"
this dispatcher is in serverGroup : "Group 64"

All known dispatchers:
    Dispatcher: /configuration/dispatcher[@name='http://vclassbase:9320/p2pd']
        name: vclassbase:9320/p2pd
        dispatcherID: 2015-04-02-20.26.05.342844
        capacity: 1.0
        SSL: false
        serverGroup: Group 32
        loadBalancingMode: weightedRoundRobin
        edition: 10.2.6100.68
        Services:
            Service name: repositoryService disabled? false
            Service name: dispatcher disabled? false
            Service name: contentManagerCacheService disabled? false
```

3. Use the result to answer the following:

- What is the result of the number of available dispatchers?
- What does this say about the output of p2plbDiag and registered dispatchers?

The dispatchers displayed in p2plbDiag are only active dispatchers. Dispatchers that are registered to the Content Manager service are not displayed in p2plbDiag unless they are currently available.

4. Close the browser window, and the **Services** window.

**Results:**

**You used p2plbDiag to review information about a specific dispatcher, including GUID and server group, all known dispatchers, and load balancing statistics.**

## Describe Front Dispatchers

- first dispatcher to touch on a request
- may require specific IBM Cognos services to be available to handle some requests
- multiple front dispatchers can exist if there are multiple gateways
- start request routing

© 2015 IBM Corporation



The list of dispatcher URIs for a gateway configuration should only contain those dispatchers that are capable of acting as a front dispatcher that can offer the required services. All gateways could have the same front dispatcher, but that would always funnel requests to a single dispatcher and hinder efficient failover as well as introduce a single point of failure. A front dispatcher is a dispatcher that is referred to by a gateway and one that interacts directly with external clients such as SDK apps.

The theoretical reason that this is important is that certain services must be enabled on a Front Dispatcher. In practice this is not an issue because all services are turned on by default after an install. However, one of these required services is the `DispatcherService()` and a Content Manager only install does not enable the `DispatcherService()` so what this means is do not have a Gateway use a dispatcher from a CM-only install. This is intentional, and should not be changed under normal circumstances. A front dispatcher will need to run the Presentation service for SSO (Single Signon).

## Describe the Dispatcher Request Queue

- each dispatcher manages a queue for requests
- request queues develop due to:
  - demand being greater than resource provided
  - time intensive requests
  - inappropriate tuning of capacity and process allocation across dispatchers

© 2015 IBM Corporation



If the number of execution type requests for a certain service is greater than the number of requests which can be handled at a time by that service at the given dispatcher, then a dispatcher request queue is developed. This is also the case for long running database or cube queries that are time intensive, or if capacity tuning is not done properly.

**Business Analytics software**

**IBM**

## Examine the Details of the Request Queue

- latency
- monitored in IBM Cognos Administration tool

Metric	Value
Latency	00:00:00.000
Number of queue requests	0
Queue length	-- 0
Queue length high watermark	0
Queue length low watermark	0
Time in queue	00:00:00.000
Time in queue high watermark	00:00:00.000
Time in queue low watermark	00:00:00.000

© 2015 IBM Corporation

The amount of time a request has spent in the queue is called latency.

Note: The values displayed on the service monitoring page in IBM Cognos Administration are 30 to 60 seconds behind the actual activity. This is not real time monitoring.

## Considerations for the Request Queue

- resolution of queues may not be required
- queues should be managed to avoid bigger problems later

© 2015 IBM Corporation



Resolution of queues may not be required if performance is within usage expectations. Examples of specific resolutions to manage queues include:

- add service instances (a benefit of SOA)
- provide more resources to process more requests for that particular local service
- in a distributed environment, monitor and tune process capacity for optimal request dispatching
- design queries and reports for better performance
- scale the system up or out by adding more hardware capacity

It is possible to have too many affinity connections, such as if there are too many report servers spending too much time figuring out what to do instead of just doing it.

For more information, refer to the IBM Cognos System Management Methodology (SMM) on developerWorks. At time of printing, this is available on developerWorks on the IBM Web site at [http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos\\_specific/page592.html](http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos_specific/page592.html). This is a group of documents and examples provided to administrators for information and techniques in using IBM Cognos Administration.

## What is a Conversation?

- sequence of requests sent from the client to a specific service
- example of conversation, running an HTML report:
  - database connectivity prompts
  - parameter selection prompts
  - query execution status updates
  - paging through HTML output

© 2015 IBM Corporation



In many situations, an operation is processed using a sequence of requests sent from the client to a specific service, and it is this sequence of requests known as a conversation.

Business Analytics software



## Explore the Benefits of Conversations

- avoid browser and network timeout
- allows user actions during execution (such as cancel)
- allows detection of server failure and recovery
- allows detection of client abandonment

© 2015 IBM Corporation



The system operates most efficiently when all of the requests in a conversation are handled by the very same instance of the targeted service. Request routing must support this as a priority.

## Examine the Usual Conversation

- starts with primary request such as run()
- subsequent requests such as nextPage() within the same conversation are secondary requests
- if preferred service instance unavailable, secondary request can be fulfilled by any other instance of the targeted service

© 2015 IBM Corporation



A primary request, such as run(), can be fulfilled equally well by any instance of the requested service; these are known as low-affinity requests.

Secondary requests can be fulfilled best by the same instance of the targeted service that handled the previous primary or secondary request; these are known as high-affinity requests.

If the preferred service instance is not available, routing to the non-preferred service instance is known as fail-over. Requests fulfilled by the non-preferred service instance will run slower since the service must first recreate the conversation state.

## What are Asynchronous Conversations?

- if primary or secondary request cannot complete within the Primary Wait Threshold, the service returns a status of Working in the response to the client, and processes the request asynchronously
- client then issues heartbeat requests such as wait() until the service has completed work on previous primary or secondary request
- dispatcher cancels asynchronous conversation if no heartbeats are received within Secondary Wait Threshold

© 2015 IBM Corporation



When the request is processed asynchronously, it is commonly referred to as going asynchronous. The default length of the Primary Wait Threshold is 7 seconds.

Heartbeats must be served by the very same service instance that still works the primary or secondary request (no fail-over is possible); these requests are known as absolute-affinity requests.

The dispatcher will cancel an asynchronous conversation if a heartbeat is not received from the client within the Secondary Wait Threshold, such as if a user has abandoned the conversation, or cancelled the request by calling cancel(). These requests are known as control-affinity requests, and are like absolute-affinity requests but are not queued by the dispatcher. The default length of the Secondary Wait Threshold is 30 seconds.

There is nothing that the end user should need to do when a conversation ends for whatever reason. The dispatcher and the other services are aware of abandoned/cancelled/completed conversations and will do whatever they need to do to release resources that they have allocated to that conversation. No cleanup needs to be done for abandoned conversations.

## What are Grouped Conversations?

- conversations can be grouped
  - multiple runSpecification() requests may be issued to test reports
  - can leverage Report Server caching

© 2015 IBM Corporation



If during Report Studio authoring sessions, many runSpecification() requests are issued to test reports, you can leverage report server caching if all of these primary requests are sent to the same instance of ReportService. These requests are known as session-affinity requests.

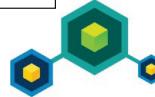
You can disable session caching at the server level or at the package or report level. Refer to the *IBM Cognos Business Intelligence Administration and Security Guide 10.2.2* for more information.

## Describe Request Affinity

- requests handled by the dispatcher
- a request has affinity or is subject to load balancing
- primary requests are low affinity
- secondary requests usually have an affinity

```
<bus:conversationContext xsi:type="bus:conversationContext">
<id>yMdhMlysGsGhw9hqqqd24hhCdMvqClvv9hdd9G99</id>
<nodeID>2015-03-19_14:26:53.641_165</nodeID>
<processID>1</processID>
<affinityStrength>5000</affinityStrength>
<status>complete</status>
</bus:conversationContext>
```

© 2015 IBM Corporation



Conversations imply affinity, a measure of how important it is to route a request to a specific instance of an IBM Cognos service and hence to the dispatcher hosting that instance.

Request affinity is denoted in the suffix of the SOAPAction header, which is set and handled internally.

The <bus:conversationContext> element of a BIBus SOAP message contains information about the affinity request such as the dispatcher ID, affinity strength and status of the conversation.

The example in the slide is a sample conversationContext header.

Request affinity is different from server affinity, which will be covered later for BIBusTKServerMain (Report Server). Request affinity relates to requests being handled by the dispatcher. The affinity concept contradicts load balancing; a request either has affinity or it is subject to load balancing. Request affinity is handled internally and cannot be manipulated.

# Define Request Affinity Assignments

- (none) or low affinity
- .high
- .session
- .absolute
- .control

© 2015 IBM Corporation



In the case of the assignment of no or low affinity, the dispatcher is free to route the request to any running instance of a service.

With high affinity, the dispatcher should try to route the request to the dispatcher that is specified by the node ID. If the requested dispatcher is not available then this request is treated as having no affinity. The node ID in the BIBusHeader is mandatory.

Session affinity is the same as high affinity, except the node ID in the BIBusHeader is optional. If no node ID is specified, this request is treated as having no affinity.

For absolute affinity, the dispatcher must route the request to the dispatcher specified by the node ID. If the specified dispatcher is not available, the request will fail and a SOAP Fault is returned. The dispatcher can queue these requests.

Control affinity is the same as absolute affinity, with the difference that it is never queued. This is reserved for system operations such as cancel(), and these requests cannot be queued at the dispatcher.

## Review Request Routing

- only dispatchers implement request routing
- requests handled in conversations
  - primary and secondary requests
  - secondary requests usually have an affinity
- dispatchers can queue requests except control affinity requests
- request routing can be customized

© 2015 IBM Corporation



Gateways do not contribute to request routing, only dispatchers implement request routing. Dispatchers queue requests if they cannot be processed fast enough.

## Consider Customization

- improve performance
- implement specific requirements
- implement by runtime configuration
- use care when customizing request routing

© 2015 IBM Corporation



Customizations can be implemented by runtime configuration, and include load balancing modes and advanced routing.

Customizing request routing is delicate, as a configuration based on uninformed decisions can hinder performance. Implementation complexity differs from system to system and should be evaluated beforehand, as there may be other approaches to consider.

**Business Analytics software**

**IBM**

## What Load Balancing Modes are Available?

- Weighted Round Robin
- Cluster Compatible

**Set properties - http://vclassbase:9315/p2pd**

**General**   **Settings**   **Permissions**

Specify the configuration settings for this entry. By default, an entry acquires its configuration settings from a parent. You can override those settings with the settings set explicitly for this entry.

**Category:** Tuning

Entries: 1 - 15

Category	Name	Value	Acquired
Tuning	Processing capacity	1.0	Yes
Tuning	Load balancing mode	Weighted Round Robin	Yes
Tuning	Server group	Weighted Round Robin Cluster Compatible	No

© 2015 IBM Corporation

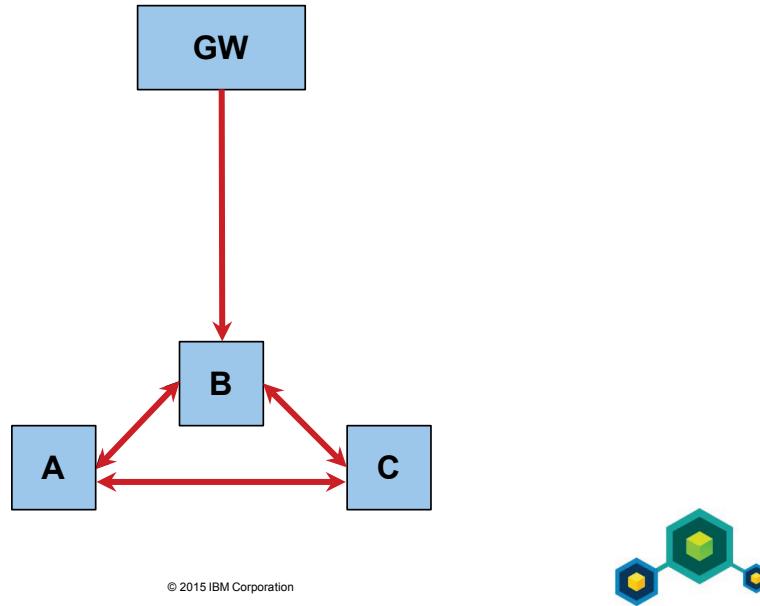


Only primary requests are subject to load balancing.

Load balancing is set in the Load balancing mode property of a dispatcher. All dispatchers in a single system must have the same setting.

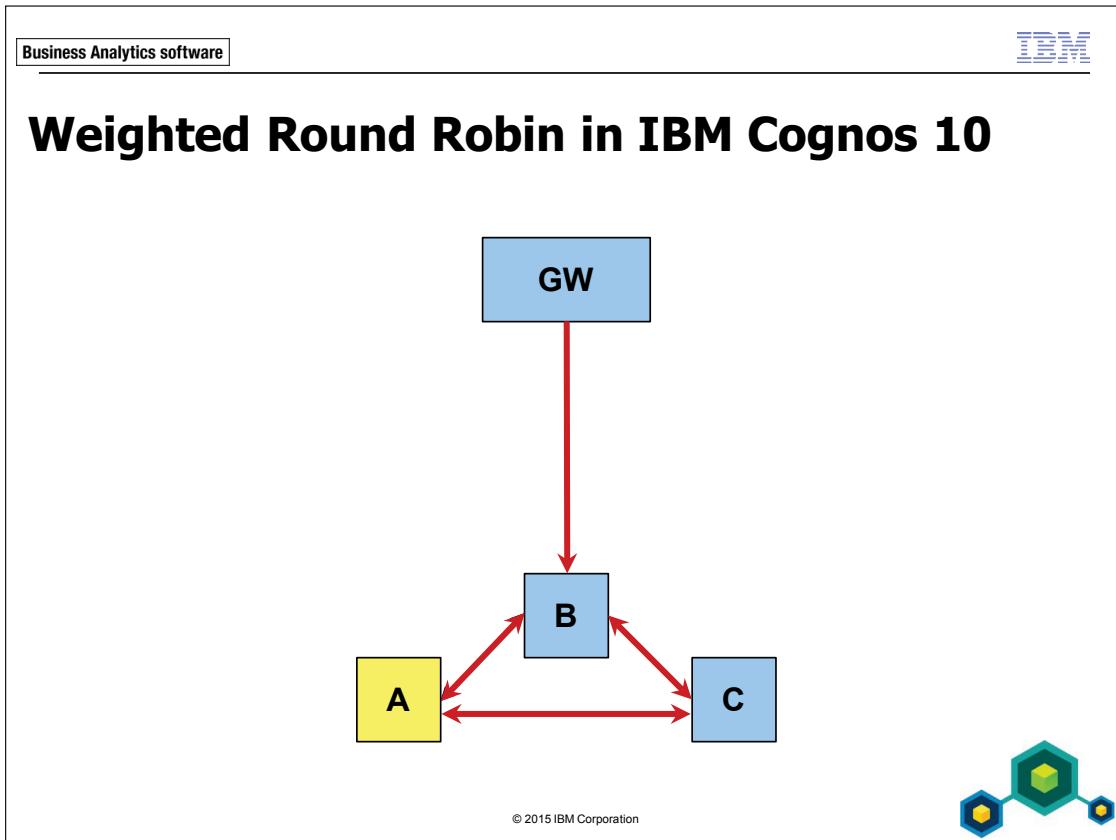
The Processing capacity property is located in IBM Cognos Administration, on the Configuration tab, in the properties of the target dispatcher. The Processing capacity value is arbitrarily assigned based on hardware resources of the dispatcher host system. Although fractional numbers can be used they should be avoided.

## Explain Weighted Round Robin Mode



Weighted round robin (WRR) is the default algorithm where requests are distributed equally between all dispatchers, one after another. The weighted variant allows a dispatcher to have higher capacity than another dispatcher. The processing capacity setting of a dispatcher determines the weight, with the default set as 1.0.

If Dispatcher A has a weight of 2 and Dispatcher B has a weight of 1, Dispatcher A would receive twice as many requests as Dispatcher B. This method is used to account for different hardware resources in a multi-server environment.



In IBM Cognos 10 BI there is an additional factor to weighted round robin: In-Progress Request Factor (IPRF). This is configured as an advanced property of a dispatcher and applies to all services or particular service(s) of a dispatcher. IPRF specifies the factor by which the number of requests (of a particular service) that are executing or waiting at a particular dispatcher or dispatcher queue should influence the weighted round robin. This helps to prevent overloading slow dispatchers and service instances. IPRF allows adaptive influence to the algorithm and automatically adjusts to the system load.

In example on the slide, assume that the ReportService on Dispatcher A has been assigned 4 long runners (for example, still executing after 10 minutes); it would be suboptimal to assign another request for ReportService to A even if WRR has concluded that it should go to A. The IPRF will negatively influence A's weight, thus leading to the request being assigned elsewhere.

For information on tuning the weighted round robin load balancing using the processing capacity and inProgressRequestFactor, go to:

- [http://www-01.ibm.com/support/knowledgecenter/SSEP7J\\_10.2.2/com.ibm.swg.ba.cognos.cbi.doc/welcome.html](http://www-01.ibm.com/support/knowledgecenter/SSEP7J_10.2.2/com.ibm.swg.ba.cognos.cbi.doc/welcome.html), and navigate to: Administer and Deploy\Business Intelligence Administration and Security Guide 10.2.2\Server Administration\Tune Server Performance\Balancing requests among dispatchers

IPRF applies on top of WRR, is off by default and has to be enabled explicitly. IPRF can be set for a single service or all services. The best practice is to use a value of 2.0; 0.0 means normal WRR.

Example: WRR treats every primary request equally. There is no way the routing can know how long a certain request will take. This can lead to overloading a certain service instance/dispatcher although capacity is properly set; IPRF was introduced to alleviate this.

Business Analytics software

**IBM**

# Explain Cluster Compatible Mode

**Example:**

- poor setup; not all nodes run similar services
- request for Service S is assigned to Dispatcher A by external mechanism X
- S is not available locally, so the fall-back of Weighted Round Robin is used; it will be assigned to Dispatcher B eventually
- this is a case of double routing

© 2015 IBM Corporation

The load balancing mode of cluster compatible supersedes routing, as it gives precedence to local processing. The dispatcher tries to assign a request to a local instance of the requested service first, if this fails, the internal weighted round robin load balancing is used. Cluster compatible mode is used for environments where load balancing between dispatchers is performed externally, such as clustered WebSphere deployments.

In this mode, all dispatchers are required to host identical sets of IBM Cognos services. You should not modify the service configuration on the running instances. Requests which are not subject to load balancing will still get routed by the dispatcher.

Only WebSphere clustering is supported.

The concept of a cluster implies the same services are on each participating dispatcher because a single application tier files package is deployed to multiple instances of the application server. The application server treats them as equal and applies its own external load balancing based on its metrics. The application server is not aware of different service configurations per dispatcher/node which could occur due to configuration in IBM Cognos Administration. The phrase "external load balancing between dispatchers" can involve external load balancers, software or hardware, or even external load balancers in front of gateways which use different front dispatchers to forward their requests to.

Service configuration changes to an instance that is running could cause cluster compatible load balancing to fail as all of the instances will no longer be identical.

## What is Advanced Routing?

- provides flexibility
- requires planning and testing
- increases maintenance complexity
- works with server groups and routing sets

© 2015 IBM Corporation



Advanced routing can serve advanced configuration requirements where execution type requests should be routed to specific sets of dispatchers based on the group or role that the executing user is a member of, or the package used for the execution. This is an example of a setup for charge-back accounts, which is used for tracking computing resource usage by business departments or projects, such as a Marketing Department or Summer Promotions project.

Advanced routing can also be based on data source availability and the package which is for specific data sources.

## What are Server Groups?

- dispatchers arranged in server groups
- default server group contains all dispatchers
- define additional explicitly named server groups for advanced routing
- define associations for request execution, as in clusters
- saved in the content store

© 2015 IBM Corporation



Each dispatcher is a member of a single server group. There is an unnamed default server group that initially contains all dispatchers, but it is invisible and cannot be managed like other server groups.

Server groups define association for request execution which can include application clusters, Charge-Back scenarios (either by user or by application), and provide heterogeneous database access (not all machines may have access to all databases).

Server groups are saved in the Content Store (the central repository of the system) and are managed through IBM Cognos Administration. Folders defined in IBM Cognos Administration to contain dispatchers do not automatically imply server groups.

Whenever requests have a target Server Group defined, it will route to that group, but Server Groups will be ignored if there is no specific target Server Group, and instead, the current Server Group would be used.

## Server Group Considerations

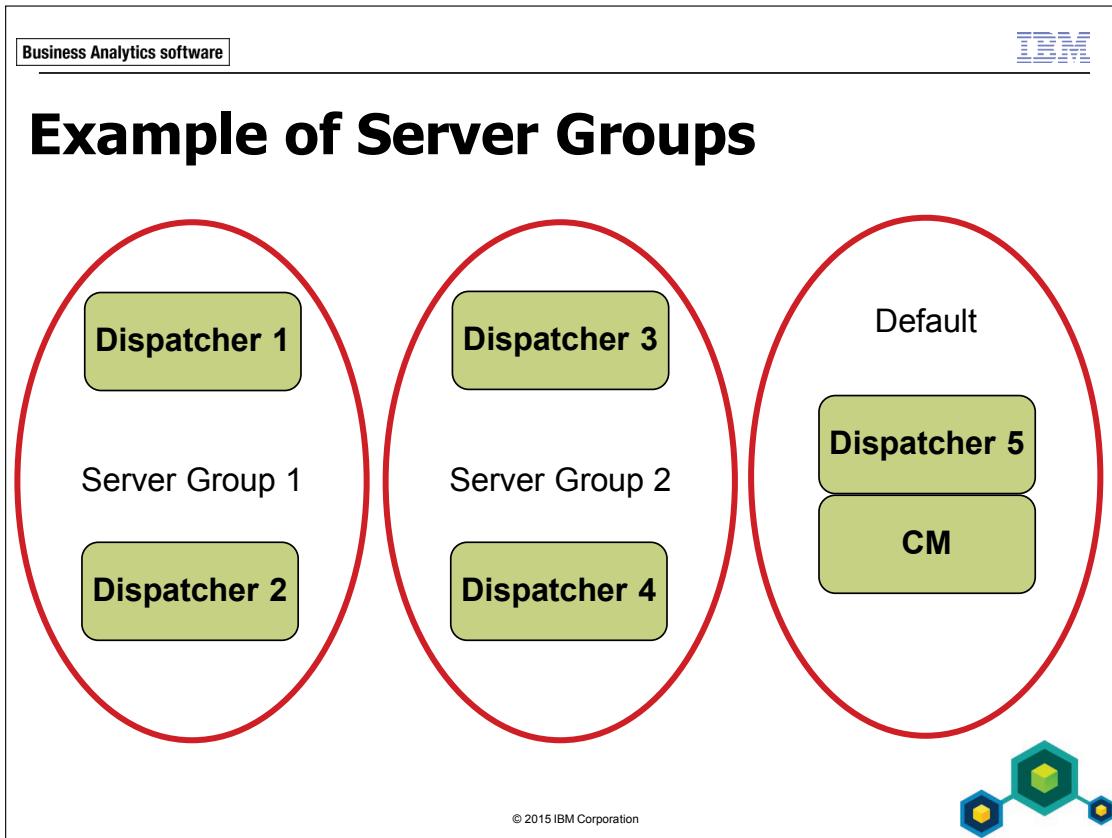
- Content Manager should be in the default server group
- what comes to the server group stays in that server group
  - advanced routing exception

© 2015 IBM Corporation



With the exception of advanced routing, what comes to a server group stays in that server group, where the request will be handled in the server group that the dispatcher to receive the request initially is a member of. Not all dispatchers can handle all types of requests due to services that are available.

From this it becomes clear that load balancing only happens within a server group.



One scenario:

- Server Group 1: handles sales reports
- Server Group 2: handles marketing reports
- Default: Rest of the users

**Business Analytics software**

# Describe Routing Sets

- group routing set
- role routing set
- package routing set

IBM Cognos Administration

Admin Person

Status Security Configuration Library Multitenancy Index Search Mobile

Users, Groups, and Roles Capabilities User Interface Profiles

Assign routing sets - Readers

Type or select the routing sets to assign to this entry. The requests related to the entries of a set can be routed to a selected server group.

Available routing sets:  
Select the routing sets you want and click the Add button to update the Assigned routing sets list.

Assigned routing sets:  
Query Users

Remove

Query Users

Type routing sets:  
Type the names of the new routing sets to add, separated by a semi-colon and click the Add button to update the assigned routing sets list. For example, 'Red; Blue; Green;'

OK Cancel

© 2015 IBM Corporation

Routing sets allow advanced routing to route execution type requests based on groups, roles or packages. A routing set is a label assigned to a set of requests based on different purposes. A group routing set is based on requests from a group from any namespace. A role routing set is based on roles from any namespace. A package routing set is based on packages.

Business Analytics software

IBM

# What are Routing Rules?

- link routing sets to a server group
- stored in a global list
- parsed in sequence

**Specify the routing rules**

Specify the rules used to route requests to server groups. A routing rule consists of any combination of routing sets and of a server group.

**Routing rules:**

Sequence	Package routing set	Group routing set	Role routing set	Server group	Actions
1	32	(Any group)	(Any role)	Group 32	
2	64	(Any group)	(Any role)	Group 64	

Add a rule   Remove   Modify the sequence...   View expanded routing rules...

© 2015 IBM Corporation

A routing rule consists of three conditions logically concatenated by AND, and a target server group. Each condition can reference a routing set of a specific type, or remain neutral (any package\group\role).

In routing rules, the first match is used, and subsequent rules are ignored. The request will fail if the target server group does not exist or the requested service does not exist in that server group.

The slide shows the ordered list of routing rules. You can specify the routing rules in IBM Cognos Administration\Configuration\Dispatchers and Service\Toolbar\Specify Routing Rules. In this example routing sets are defined to server groups named Group 32 and Group 64.

## Routing Rule Considerations

- request matches routing rule if
  - executed by member of a group/role which is assigned to referenced group/role routing set
  - report executed based on package which is part of referenced package routing set

© 2015 IBM Corporation



Routing rules affect non-affine requests for all executing services such as:

- (Batch)ReportService
- PPESSErvice (PowerPlay Enterprise Server)
- GraphicsService
- MetadataService (MDS)

## Explain Advanced Routing

- content manager matches routing rules
- sender of execution request supplies target server group information
- advanced routing takes precedence over load balancing

© 2015 IBM Corporation

The sender of an execution request supplies the target server group information, such as needing the Presentation Service for interactive reports, or the Monitoring Service for batch reports. The sender queries the Content Manager Service for the object to execute, and the response will contain target server group information if applicable. The sender adds the target server group to the BIBusHeader of the request, and then passes the request to its local dispatcher.

The dispatcher routes accordingly, keeping in mind that advanced routing takes precedence over load balancing.

The matching of routing rules is performed by Content Manager, not by a dispatcher.

**Business Analytics software**

**IBM**

## Describe Steps of the Routing Process

- 1. Identify target service.**
- 2. Determine if request is for content manager service.**
- 3. If absolute affinity request, route to requested dispatcher.**
- 4. From cluster information, deduce set of potential target dispatchers request could be assigned to.**
- 5. Within the cluster view, try assigning affine requests to desired dispatcher. If this fails, treat request as non-affine.**
- 6. If cluster compatible load balancing enabled, look for a local instance of requested service. If local dispatcher is within the cluster view, assign there, else continue to Step 7.**
- 7. Evaluate load balancing (weighted round-robin) within the cluster view.**

© 2015 IBM Corporation



Step 1. The targeted IBM Cognos service is identified based on the following information in this order:

1. SOAPAction header (<http://developer.cognos.com/schemas/reportService/1>)
2. b\_action variable in an HTML FORM or URL parameter
3. element in the path component of the URL of the request (such as /cgi-bin/cognosisapi.dll/gd/) used to retrieve pre-rendered output such as a chart

If none of the above, the request is forwarded to the Presentation service to display the IBM Cognos Connection home page.

Step 2. Is this a request for the Content Manager service? If so, forward request to the active Content Manager Service.

Step 3. If this is this is an absolute affinity request, route to the requested dispatcher.

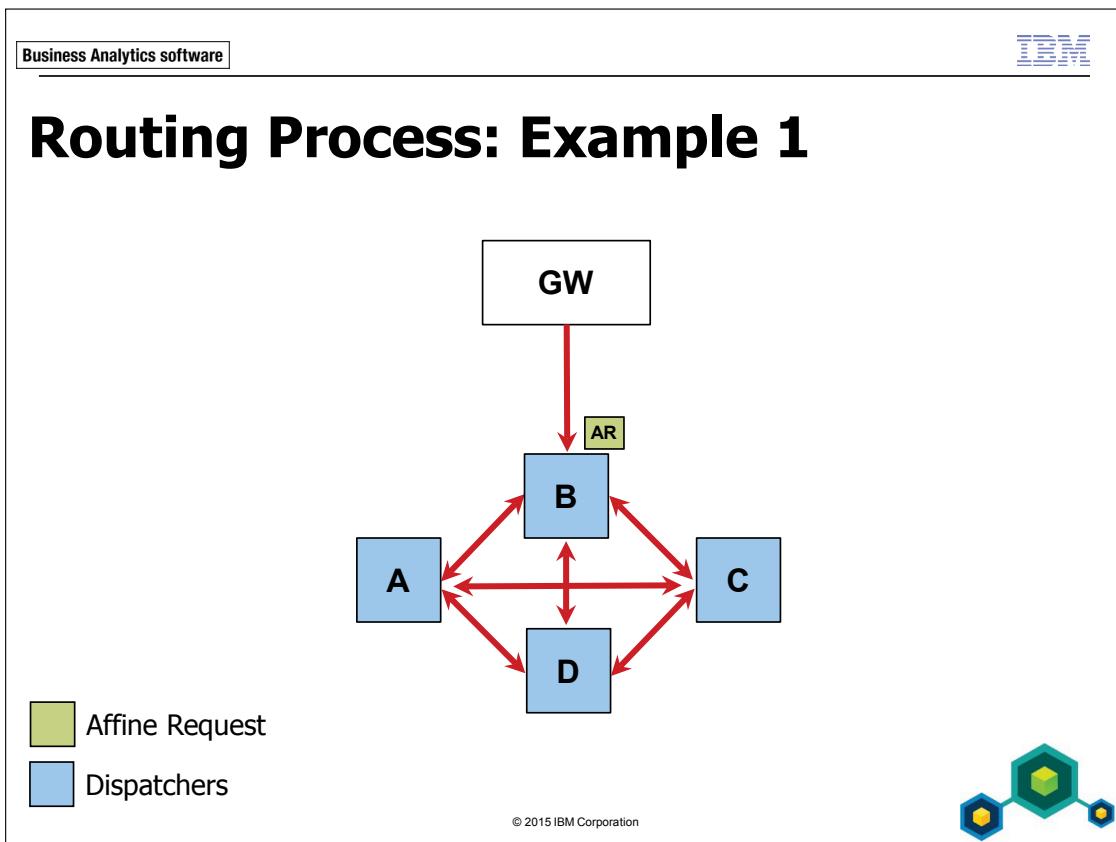
Step 4. From the cluster information, deduce the set of potential target dispatchers the request could be assigned to. This set of target dispatchers is known as the cluster view (CV). If advanced routing is configured, this will be the set of dispatchers within the requested server group, otherwise the request goes to the default server group. Advanced routing will simply limit the set of potential target dispatchers. Since every dispatcher has the cluster information available, it can deduct the set of dispatchers belonging to a certain server group.

Step 5. Within the cluster view, try assigning affine requests to the desired dispatcher. If this fails, treat request as non-affine. Affinity means the dispatcher tries to assign the request to a certain dispatcher as indicated by the NodeID in the BIBusHeader. If that fails, it is treated as non-affine, or having no affinity.

Step 6. If cluster compatible load balancing is enabled, look for a local (on this dispatcher) instance of the requested service. If the local dispatcher is within the cluster view, assign there, otherwise continue to Step 7. For cluster compatible load balancing there is always an attempt to assign the request to a local instance of the requested service. If this does not exist or the local dispatcher is not within the Cluster View, the request is load balanced. This will precede advanced routing because although the request should go to a specific server group, it could remain local. This adds to the point that it is illogical to have server groups in a cluster which are used to model different service layouts and/or resources. In a cluster, all nodes are considered equal.

Step 7. Evaluate load balancing (weighted round robin) within the cluster view. How many instances of the identified IBM Cognos service are active in the current server group?

- = 0 - produce error
- = 1 - assign request to IBM Cognos service
- > 1 - evaluate weighted round robin and assign

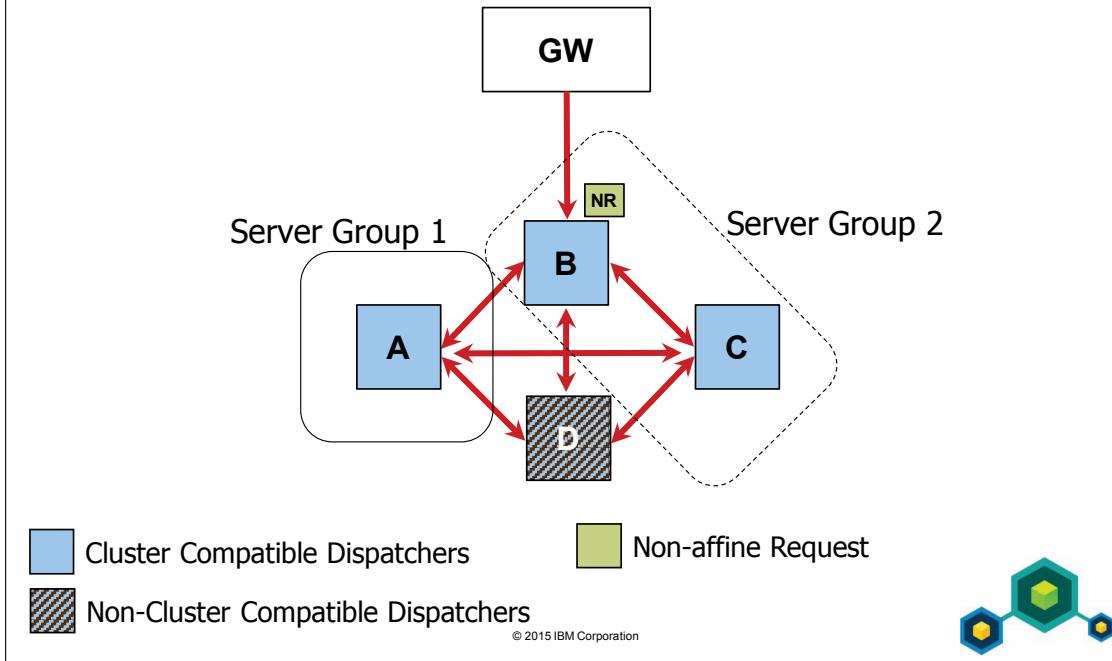


Scenario: An affine request for Dispatcher C hits Dispatcher B.

Using the steps provided on the previous pages as a guideline, what happens? A possible explanation is provided on the next page.

1. Identify the target service.
2. Determine if the request is for the Content Manager service.
3. If it is an absolute affinity request, route it to the requested dispatcher.
4. From cluster information, deduce set of potential target dispatchers that the request could be assigned to. (Cluster view = A, B, C, D)
5. Within the cluster view, try assigning affine requests to the desired dispatcher. If this fails, treat the request as non-affine. (Try to route to C, but service is down.)
6. If cluster compatible load balancing is enabled, look for a local instance of the requested service. If a local dispatcher is within the cluster view, assign there. (Does not apply in this case.)
7. Evaluate load balancing (weighted round robin) within the cluster view.  
Evaluate load balancing within default server group and assign.

## Routing Process: Example 2



Scenario: Dispatchers A, B, and C are cluster-compatible.

Server Group 1: Dispatcher A

Server Group 2: Dispatchers B, C

External load balancing is assigned. A non-affine request for a service in Server Group 2 goes to Dispatcher A.

Using the steps provided on the previous pages as a guideline, what happens? A possible explanation is provided on the next page.

1. Identify the target service.
2. Determine if the request is for the Content Manager service.
3. If it is an absolute affinity request, route it to the requested dispatcher.
4. From cluster information, deduce set of potential target dispatchers that the request could be assigned to. (Cluster view = B, C)
5. Within the cluster view, try assigning affine requests to the desired dispatcher. If this fails, treat the request as non-affine. (Does not apply in this case.)
6. If cluster compatible load balancing is enabled, look for a local instance of the requested service. If a local dispatcher is within the cluster view, assign there. Try assigning to service on Dispatcher A. But Dispatcher A is not in the Cluster View, so this will fail, regardless whether the service does on Dispatcher A.
7. Evaluate load balancing (weighted round robin) within the cluster view. Evaluate load balancing within Server Group 2 and assign.

## Things to Remember

- requests for Content Manager service get routed to active Content Manager
- what comes to a server group stays in that server group unless advanced routing applies
- load balancing only happens within a server group
- secondary requests are usually not subject to load balancing as they have an affinity assigned to them
- advanced routing applies to requests for execution type services

© 2015 IBM Corporation



There is only one active Content Manager in an IBM Cognos system.

For advanced routing, be aware of how the Cluster View is built.

Only service instances within the same server group are available for load balancing. Load balancing never routes a request to a different server group, as only advanced routing can do that, however advanced routing happens before load balancing takes place.

Advanced routing applies to requests for execution type services which include Batch Report service, Graphics service, PPES service, and Metadata service.

## What is Content Manager Cache Service?

- each dispatcher maintains a local cache for objects retrieved from Content Manager service
- IBM Cognos Services will verify CMCS is available on the local dispatcher, and then will query the local CMCS instead of Content Manager service

© 2015 IBM Corporation



The local cache on a dispatcher for objects retrieved from Content Manager service is implemented by the ContentManagerCacheService (CMCS). This is used to decrease load on the active Content Manager and improve the speed execution. Objects subject to caching are Report, ReportCache, Package, Model, PackageConfiguration, ModelView, DataSourceSignon, Account and Session. A best practice is to enable this service on all dispatchers which run the Dispatcher service.

After having verified CMCS is available on the local dispatcher, IBM Cognos services will query the local CMCS instead of CM Service. This is supported by CC, QS, RV and others.

CC: IBM Cognos Connection

QS: Query Studio

RV: IBM Cognos Viewer, or Report Viewer

CMCS is a new feature since IBM Cognos 10.1.1. Memory is taken from the Java heap, and there is no JNI heap involved.

It is best practice to have CMCS enabled on all dispatchers which run the Dispatcher service or in other words all possible front dispatchers. Therefore, this excludes dispatchers of a Content Manager only install.

If this service is not available on a dispatcher which initially handles a request, there will be no caching for that request.

**Business Analytics software**

**IBM**

## Describe CMCS Details

- serves a primary or secondary request
- CacheContext
- Validator

© 2015 IBM Corporation



CMCS either serves a primary or secondary request for some IBM Cognos service or requests sent by other CMCS instances.

Each data item in the cache has context (CacheContext). This context is used to evaluate if it matches a given query. The context may tie the item to a session or not, so data may be shared across sessions if not subject to security.

A Validator is an object attached to each data item by CM. It allows probing for the validity of cached data by using lightweight CM queries only. So it is validation over querying an actual CM object which again saves load to the CM.

When CMCS has found an object in its cache, it has to ensure freshness. For that, it validates the data if necessary. The CM query required for that is minimal though it exists. To reduce the amount of validation queries, Validators may linger, so within the linger timeout data will not be validated again. This is to serve high frequency queries to the same objects. It carries some risk though, which will be presented on the Explain CMCS Settings page.

## Service a Primary Request

- if requested data is not in local cache or Validator is expired
  - Query CM to fill cache; CM will supply the data and the automatically attached Validator for it
  - create CacheContext
  - reset linger timer
- if linger timer is expired
  - validate the data by issuing a light-weight CM query
  - reset linger timer
- respond to query, attach CacheContext
- completed

© 2015 IBM Corporation



The slide lists a pseudo-code rundown of steps which the CMCS executes when serving requests.

## Service a Secondary Request

- if requested data is not in local cache
  - if request has CacheContext attached
    - from CacheContext, retrieve address of remote CMCS with data and access of that instance rather than CM Service
    - add data to local cache and reset local linger timer
  - else
    - query CM to fill cache; CM will supply data and the automatically attached Validator for it
    - create CacheContext and reset linger timer
  - if linger timer is expired
    - validate data by issuing a light-weight CM query
    - reset linger timer
  - respond to query, attach CacheContext
  - completed

© 2015 IBM Corporation



Linger time is how long the item in the cache lingers around.

**Business Analytics software**

**IBM**

# Explain CMCS Settings

- memory limit
  - set memory limit to 0 to disable CMCS
- linger timer

Category	Name	Value	Acquired
Environment	Advanced settings	Edit...	Yes
Logging	Audit logging level for the Content Manager Cache Service	Minimal	Yes
Tuning	Memory limit for the content manager cache service as a percentage of the total JVM heap memory	10	Yes

© 2015 IBM Corporation

The memory limit for CMCS determines the maximum amount of Java heap taken from the JRE hosting the Dispatcher for the cache. The cache size is dynamic. To disable the CMCS, set the memory limit to zero (0).

Add an advanced parameter to CMCS, for the linger timer with the `DISP.contentManagerCacheService.cacheValidatorTimeToLinger` property. The value is in ms (milliseconds), with a default value of 30000. This setting determines the linger time before data is validated again. This implies that changes within 30 seconds are not automatically anticipated by CMCS.

Linger can lead to issues; if cache entries, for example, change frequently then lowering the linger timeout may be required.

## Describe Timers

- **validation timer:**

`DISP.contentManagerCacheService.cacheValidatorTimeToLive`

- **account inactivity timer:**

`DISP.contentManagerCacheService.accountInactivityTimer`

© 2015 IBM Corporation



The validation timer determines how long data objects remain in the cache. After the validation timer expires, objects are considered invalid and have to be fetched from the CM again. Add the advanced parameter to CMCS for the validation timer, with the `DISP.contentManagerCacheService.cacheValidatorTimeToLive` property. The value is in ms, and the default value is 900000.

The account inactivity timer determines how long data for this session is cached. If the session is idle for longer than the inactivity timer, all data cached for that account is purged from the cache. This is a security and resource saving feature. Add the advanced parameter to CMCS for the account inactivity timer, with the `DISP.contentManagerCacheService.accountInactivityTimer` property. The value is in ms, and the default value is 900000.

## Summary

- At the end of this module, you should be able to:
  - describe IBM Cognos Dispatcher
  - describe request routing and the routing process
  - describe Content Manager Cache Service

© 2015 IBM Corporation



## Workshop 1: Review the Server Groups (Optional)

As an administrator, you have configured server groups in your environment to let you define advanced routing rules. You will review these settings in your environment using p2plbDiag, and you will review the routing sets.

You will use p2plbDiag to review:

- the dispatcher vclassbase:9315/p2pd settings: What server group does the dispatcher belong to?
- the dispatcher vclassbase:9320/p2pd settings: What server group does the dispatcher belong to?

You will use IBM Cognos Administration to review:

- the dispatcher vclassbase:9315/p2pd settings: What server group does the dispatcher belong to?
- the dispatcher vclassbase:9320/p2pd settings: What server group does the dispatcher belong to?

You will use IBM Cognos Connection to review the routing sets for the packages in:

- Public Folders\Samples\Models
- Public Folders\Samples\_DQ\Models
- Public Folders\Samples\_Dynamic\_Cubes

You will use IBM Cognos Administration to review:

- the defined routing rules

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows. If you need more information to complete a task, refer to earlier demos for detailed steps.

## Workshop 1: Tasks and Results

The IBM Cognos 10 Full:9315 dispatcher and the IBM Cognos 10 DispCM:9320 dispatcher should be running at the beginning of this workshop.

### Task 1. Review the server groups in p2plbDiag.

- Launch Internet Explorer, and then go to <http://vclassbase:9315/p2pd/servlet/dispatch/p2plbDiag>.
- Log in using **admin/Education1** credentials.

```
This dispatcher is: vclassbase:9315/p2pd/servlet/dispatch
GUID=2015-04-01-21.08.14.757907
Using CM: vclassbase:9320/p2pd/servlet
Current time: Apr 7, 2015 11:14:50 AM EDT
Configured dispatchers and services:
this dispatcher is : "/configuration/dispatcher[@name='http://vclassbase:9315/p2pd']"
this dispatcher is in serverGroup : "Group 64"

All known dispatchers:
    Dispatcher: /configuration/dispatcher[@name='http://vclassbase:9320/p2pd']
        name: vclassbase:9320/p2pd
        dispatcherID: 2015-04-02-20.26.05.342844
        capacity: 1.0
        SSL: false
        serverGroup: Group 32
        loadBalancingMode: weightedRoundRobin
        edition: 10.2.6100.68
        Services:
            Service name: repositoryService disabled? false
            Service name: dispatcher disabled? false
            Service name: contentManagerCacheService disabled? false
```

The server group name is displayed for this dispatcher: Group 64, and the second server group Group 32 is displayed for the vclassbase:9320/p2pd dispatcher.

- Close the browser window when you have finished viewing the results.

### Task 2. Review the server group settings in IBM Cognos Administration.

- Launch Internet Explorer, go to <http://vclassbase:88/C10Full>, log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials, and then launch **IBM Cognos Administration**.
- On the **Status** tab, click **System**. It may take a few moments for the Status tab to refresh.

- In the upper-left corner of the **Scorecard** pane, click the **All servers** arrow to display the **Change view** menu, and then click **All dispatchers**.

Name	Status
System	Available
<a href="http://vclassbase:9315/p2pd">http://vclassbase:9315/p2pd</a>	Available
<a href="http://vclassbase:9320/p2pd">http://vclassbase:9320/p2pd</a>	Available

You can also set the server group property at the system level, rather than at this level of detail.

- Next to the **http://vclassbase:9315/p2pd** dispatcher, click the **Actions** arrow, and then click **Set properties**.
- Click the **Settings** tab, and then from the **Category** list, click **Tuning**.
- Notice that for the **Server group** property, in the **Value** column box, **Group 64** is the name of the server group.

This is where you can configure the Server group name when defining your environment; you could also set this on the Configuration tab, on the Dispatchers and Services pane.

You can assign multiple dispatchers to a server group.

- Click **Cancel** to close the **Set properties** dialog box.
- Optionally, repeat the steps to review the Server group property for the **http://vclassbase:9320/p2pd** dispatcher.

These server group names can be used when you define routing rules.

## Task 3. Review package routing sets that use the server groups.

- Launch **IBM Cognos Connection**, and navigate to **Public Folders\Samples\Models**.
- In the **Actions** column for the **GO Data Warehouse (analysis)** package, click **Set properties**.
- In the **Advanced routing** section, under **Routing sets**, click **Edit**.

Notice the current assigned routing set is 32.

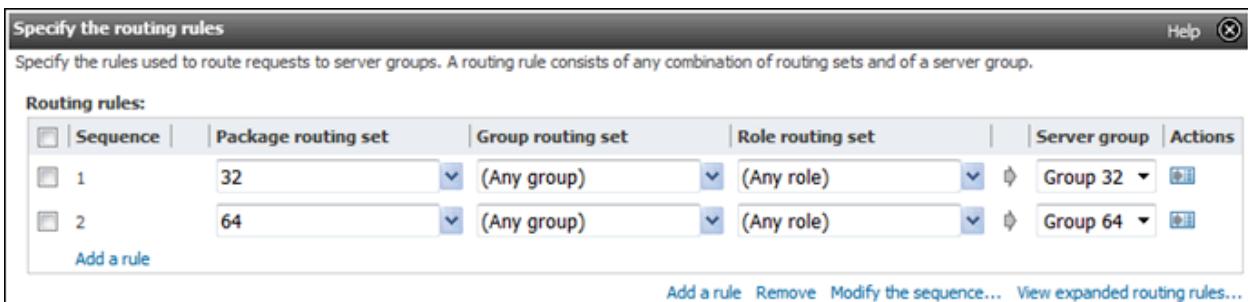
This environment was configured to name the routing sets to align with the server group names. The other option available is 64. The server groups have dispatchers that are configured to handle either 32-bit ReportServer service queries or 64-bit ReportServer service queries, as you cannot run both on the same dispatcher.

All reports in this package, GO Data Warehouse (analysis) use the 32-bit ReportServer for queries.

- Click **Cancel** to close the **Assign routing sets** dialog box, and then click **Cancel** to close the **Set properties** dialog box.
- Optionally, repeat the steps to review the routing sets for any package in the following **Public Folders** packages in:
  - **Samples\_DQ\Models**
  - **Samples\_Dynamic\_Cubes**

## Task 4. Review the routing rules.

- Launch **IBM Cognos Administration**, and then click the **Configuration** tab\Dispatchers and Services pane.
- On the toolbar, click **Specify Routing Rules** .



Notice that in the **Routing rules** pane, there are two package-based routing sets defined.

Also notice that routing sets can also be defined for groups and for roles.

For packages using routing set 32, notice that it is routed to the server group "Group 32", which has dispatchers that are configured to use the 32-bit ReportServer for queries.

Packages using routing set 64 are routed to "Group 64", which has dispatchers that are configured to use the 64-bit ReportServer for queries.

- Click **Cancel** to close the **Specify the routing rules** dialog box, log off **Admin Person**, and then close the browser window.

The advertisement features a white background with a decorative border composed of teal hexagonal icons containing yellow cubes. In the top right corner, the IBM logo is displayed in its signature blue font. Below the logo, the text "IBM Cognos Services" is written in a smaller, bold, black sans-serif font.

# Examine IBM Cognos Services

IBM Cognos BI 10.2.2

**Business Analytics software**

© 2015 IBM Corporation



# Objectives

- At the end of this module, you should be able to:
  - identify IBM Cognos Services
  - review collaboration functionality
  - explore the architecture in IBM Cognos 10

© 2015 IBM Corporation



Business Analytics software

IBM

# What is Content Manager Service?

- implemented by the Content Manager (CM) component
- manages storage of IBM Cognos application data in central repository Content Store (CS)

Dispatcher  
(Java)

Content Manager  
(Java)

Content Store

© 2015 IBM Corporation

CM is a Java Servlet and therefore must be deployed to a Servlet Container. If CM is installed separately, the component comes bundled with a dedicated dispatcher which is deliberately configured to not offer the Dispatcher service.

The CM service manages the storage of IBM Cognos application data in a central repository known as the Content Store. Application data contains security (authorization only), configuration data, models, metrics, report specifications, report output, and more. The CM service automatically creates tables and indexes on first startup.

Content Store is connected by JDBC (Type2/Type4). Type 2 JDBC drivers require a local DB client; Type 4 JDBC drivers are standalone and usually only require JAR files. Type 4 JDBC is supported for DB2 in IBM Cognos 10.2.2.

The information stored by Content Manager includes:

- Reports: Specifications, properties, security settings, outputs. This includes analyses in AS, queries in QS, and reports in RS.
- Report Packages: Metadata, reports, folders.
- Metric Packages: Metadata, scorecards, folders.
- Agents: Conditions, schedules, tasks used to monitor events and deliver notifications. This includes the list of recently detected instances of an event.
- Server Configuration: Cognos namespace and information about contacts, directory information, distribution lists, data sources, printers.
- Personal User Information: My Folders and My Pages.
- Language Information: Names, descriptions.

## What Does Content Manager Service Support?

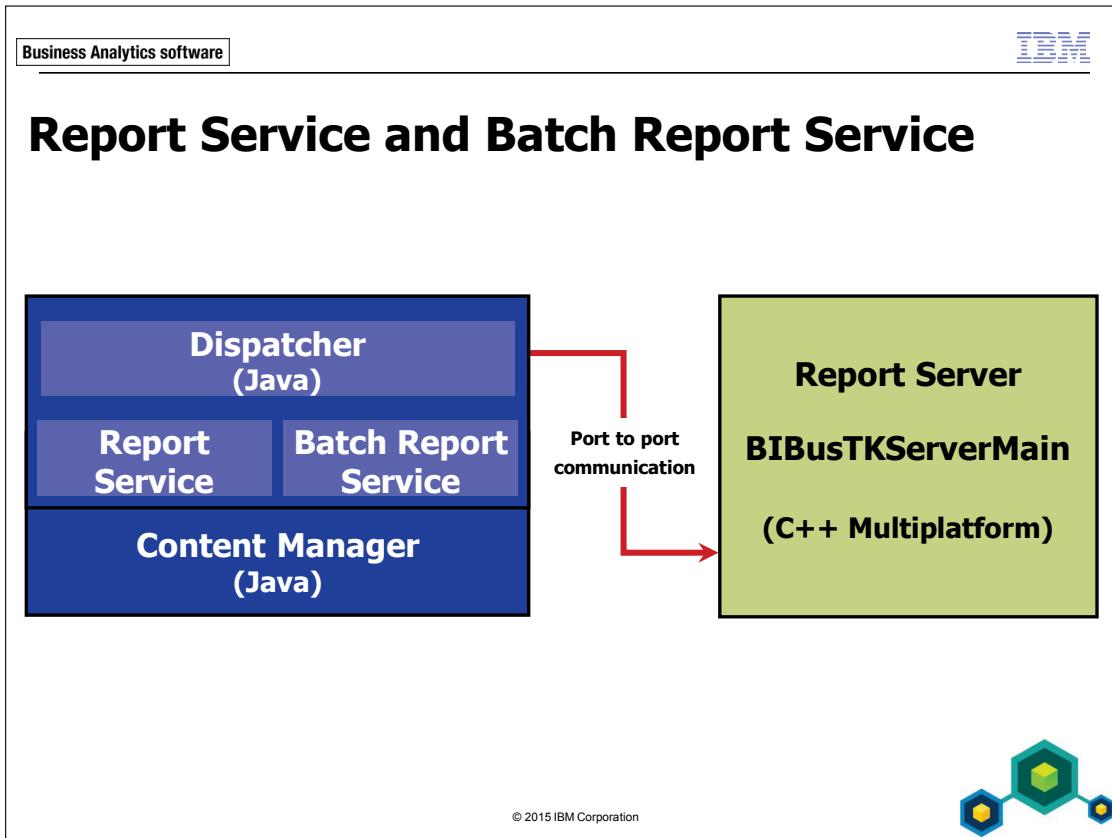
- failover through standby redundancy
  - multiple Content Manager install components installed in single IBM Cognos system
  - on initialization CM registers itself in Content Store database
  - first CM registered becomes the active CM, all others which register subsequently become standby
  - if the active CM becomes unavailable, a standby CM will take over
  - all non-local dispatchers will try to open a socket to the active CM every 5 seconds
  - cluster information update every 30 seconds
  - active CM can be specified using IBM Cognos Administration
- does not support horizontal scaling

© 2015 IBM Corporation



Multiple content managers can be installed on the same computer or across different computers. There are many considerations involved in such a decision, factors such as hardware failover and redundancy requirements, number of processors in a machine, and so on.

Horizontal scaling is leveraging multiple systems to work together in parallel with each system has its own operating system and one or more processors. Therefore we can not have multiple primary content managers working at once.



The Report service and Batch report service are implemented by C++ based components which are referred to as report server (functional component).

Report service and Batch report service are two different service registrations which link back to the same implementation in report server. Report service processes interactive report executions, and Batch report service processes report executions triggered by schedules and background requests. They are controlled by settings in the reportservice.xml and batchreportservice.xml files, as well as other configuration files.

Report server instances run inside a separate process managed by the dispatcher. The process name is BIBusTKServerMain, and an instance of BIBusTKServerMain is often referred to as a BIBus. This is different from the BIBus protocol, which is SOAP over HTTP.

Multiple instances of Report server can be spawned by a single dispatcher.

## Introduce BIBusTKServerMain

- communication between dispatcher and Report server instances is by TCP port to port connection
- Report server instances
  - can be pre-started
  - get spawned and destroyed dynamically
  - linger; flagged for termination
  - multi-threaded; number of threads is configurable
- Report server threads
  - can be used for internal operation
  - can be dedicated to request processing only
  - called affinity connections

© 2015 IBM Corporation



The protocol used for port to port connection is XML-based. A random port from the OS's ephemeral port range is allocated at run-time, for the port-to-port communication. An ephemeral port is a temporary port that can be assigned.

Threads may be distributed among cores in a multi-core CPU. Threads will typically not spawn across CPUs, although exceptions may apply depending on the CPU architecture.

To leverage multiple CPUs, usually multiple processes are required.

## Explain Report Execution in IBM Cognos

- conversation, an operation consisting of multiple steps
- two phases
  - synchronized
  - asynchronous
- each step is a different request
- requests of a conversation have affinity assigned
  - primary request of a conversation: low affinity
  - secondary requests of a conversation: high affinity

© 2015 IBM Corporation



Report execution in IBM Cognos is a conversation. Like any other dispatcher conversation, it happens in two phases. In the synchronized phase, the client and server wait for a result for the amount of time specified by the primary wait threshold (the default is 7 seconds) blocking all participating resources. In the asynchronous phase, the request progresses at the server, but the client and the dispatcher only ping for results every now and then (secondary wait threshold, default 30 seconds) and free resources otherwise.

For request routing, the affinity assigned to requests is the basis of routing conversation requests to a specific instance of (Batch)Report Service (request affinity). For the local dispatcher or Report service, this affinity determines to which instance of report server the request has to be assigned (server affinity).

In the context of a conversation, the term server refers to both the target IBM Cognos Service and the dispatcher which routed the request to the service. Both will hold on to a thread for the duration of the primary wait threshold. For more information about conversations, refer to Module 2: Explore the IBM Cognos Dispatcher, on the topic Conversations.

## Describe Server Affinity: Low

- perform equally well
- previously processed requests have no relevance
- examples
  - administrative: add objects, refresh
  - authoring: query validation
  - report execution: querying, processing, prompting

© 2015 IBM Corporation



Low affinity requests will operate efficiently on any computer, regardless of the Report server instance they are assigned to. For example, a report request can run on any computer in the IBM Cognos 10 system. A low affinity request is used with the following operations: add, collectParameterValues, execute, getMetadata, getParameters, query, testDataSourceConnection, update, and validate.

## Describe Server Affinity: High

- specific requests that can benefit from previously processed requests at this instance
- perform optimally if routed to the same report server instance
- examples
  - report viewing: return, run again
  - HTML report navigation: Top/Bottom page, Page up/down
  - report delivery: E-mail, Save, Save As, Print

© 2015 IBM Corporation



IBM Cognos 10 routes high affinity requests to a specific server regardless of the load balancing. A high affinity request is used with the following operations: back, email, firstPage, forward, lastPage, nextPage, previousPage, print, render, save, and saveAs.

## Describe Server Affinity: Absolute

- must be routed to a specific instance of report server, otherwise will fail
- can be considered secondary requests which fully depend on a previous request
- examples
  - wait (driving an async conversation)
  - cancel
  - getOutput (retrieve a completed rendered output)
  - release (graceful end of a conversation)

© 2015 IBM Corporation



IBM Cognos 10 routes absolute affinity requests to a specific server, regardless of the load balancing. An absolute affinity request is used with the following operations: wait, getOutput, and release.

## Describe Affinity Connections

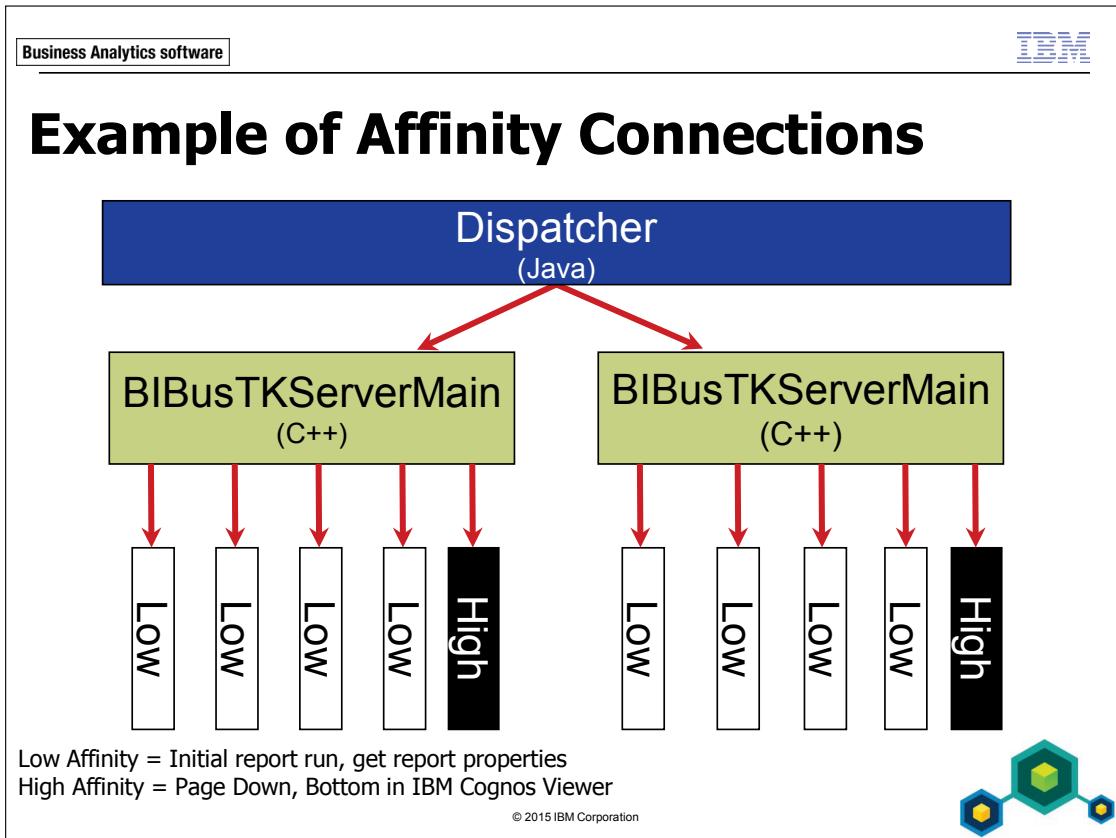
- pooled by request affinity per service instance
- allocation of affinity connections determines the creation of new report server instances
- example
  - by default each report server instance for Report service has 4 low affinity connections, 2 high affinity connections
  - every 3rd low affinity request sent to Report service will trigger a new instance

© 2015 IBM Corporation



There are two pools for affinity connections, one for high affinity and one for low affinity, for either Report service and Batch Report service. This means that if both Report service and Batch report service are enabled for an installed instance, then there are four pools. Absolute affinity is handled internally and therefore has no separate pool.

The allocation of affinity connections determines the creation of new Report Server instances. If half the number of the connections of a pool are already allocated, a new instance of Report Server (BIBusTKServerMain) will be spawned for this service if the configured maximum of processes has not been reached yet. The affinity connection of the new instances will get added to the pools thus increasing the sizes of the pool.



There will be many instances of **BIBusTKServerMain**. Each dispatcher may manage requests for multiple report servers. Low affinity requests can be handled by any report server. Typically, low affinity requests are used when a report or data movement run is initially requested.

High affinity requests are ideally handled by a specific report server. Typically, high affinity requests are for reports that were already requested and may include actions, such as going to the next page in a report.

## Describe Affinity Connection Assignment

- eventually report execution requests get assigned to an affinity connection of a report server
- affinity connections remain assigned or unavailable
  - for the duration of the request
  - or the request terminates due to user action or failure

© 2015 IBM Corporation



Eventually report execution requests, get assigned to an affinity connection of a report server. Affinity connections do not switch servers in mid-request.

If a user terminates the browser session, cancels a request, or logs out of IBM Cognos 10, the request will terminate.

Business Analytics software

IBM

## Management of Affinity Connection Assignment

- dispatcher manages:
  - assignment of requests to one specific instance of Report server
  - map of Report server affinity connections
- report servers manage:
  - allocation of their affinity connections
  - high affinity and low affinity

© 2015 IBM Corporation



The dispatcher manages assignment of requests to one specific instance of report server spawned for either Report service or Batch report service, and manages a map of affinity connections on a report server instance, keeping track of assigned connections vs. available connections.

The report servers manage the allocation of their affinity connections, but are otherwise bare of assignment logic.

## Explain Affinity Connection Configuration

- configured in IBM Cognos Administration
  - affinity is a tuning setting
  - peak periods and non-peak periods
  - at the dispatcher level
  - at the Report service level or Batch report service level
- must be configured based on solid information
  - monitor the system to learn about load patterns
  - leverage audit database for report usage statistics

© 2015 IBM Corporation



The configuration of affinity connections is one of many important settings involved with system performance. It must be configured based on solid information. If this is configured based on uninformed decisions your system can become slow or stop, because of overloading resources. This is not a simple case of more is better.

For more information on leveraging monitoring the system to learn about load patterns, refer to the IBM Cognos System Management Methodology (SMM) on the IBM Web site at [http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos\\_specific/page592.html](http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos_specific/page592.html).

## Describe Scheduling

- Event Management Service (EMS)
- Monitor Service (MS)
- Delivery Service (DLS)
- Job Service (JS)

© 2015 IBM Corporation

Scheduling is handled by several IBM Cognos services.

EMS monitors the global Scheduler Queue and detects when a scheduled task is due to execute. If a background task is due to be run, EMS creates an entry in the global Task Queue using a local JDBC connection to the Notification Database, and executes legacy code which adds a notification about the task to be executed to the JMS queue. Multiple instances of EMS will scale horizontally and can be run independently from other scheduling or target services. Server Groups are irrelevant to EMS.

MS runs background tasks and monitors their execution. It maintains and updates the system global TaskState queue (pending, running, complete, failed). MS uses the capacity mechanism to implement Auto-Load Balancing. It watches the Task queue and takes on tasks if an instance of the required Target Service is available locally and has free capacity. MS will pull tasks from the queue destined for the Server Group it is running in or tasks which have no Server Group assigned.

If there is no instance of a desired Target Service available locally, or there is no capacity the task will not be taken off the Task Queue by this instance of Monitor Service and may remain pending.

DLS sends emails to an external SMTP server on behalf of other services, such as the report service, job service, agent service, or data integration service.

JS handles a set of tasks known as a Job. This service runs jobs by signaling the Monitor service to run job steps in the background. Steps include reports, other jobs, import, exports, and so on.

These scheduling services exchange data through system-global queues stored in relational database tables (the Notification Database):

- Task-state Queue: contains the state of a task passed to MS
- Task Queue: all tasks currently handled by MS
- Scheduler Queue: stores schedule runtime information

## Services that Implement the Target Service API (1 of 2)

- services which implement the Target Service API:
  - Batch report service (reports)
  - Job service (jobs, set of reports)
  - Agent service (agents)
  - Delivery service (sending emails)
  - Content Manager service (deployments)
  - IndexUpdate/Data Services (index update/creation)

© 2015 IBM Corporation



An API is provided for other IBM Cognos services which want to have their requests enabled for background processing. Services which leverage this API are called Target Services. Examples of Cognos tasks and objects that can be scheduled through the Target Service API are reports, jobs, agents, and email.

Target Services are also required to implement the AsyncAPI so that their requests can be processed in the background through asynchronous conversations. The AsyncAPI defines conversations.

## Services that Implement the Target Service API (2 of 2)

- Job Service (JS)
  - governs the execution of jobs
  - splits the job into steps, passes them to the MS for execution
- Delivery Service (DS)
  - builds SMTP compliant emails from data passed, and passes to a configured mail server
- Agent Service (AS)
  - runs agent actions

© 2015 IBM Corporation



A job is defined as set of tasks, although a task can be another job.

Business Analytics software

IBM

## Set Target Services Properties

- define a capacity by a configurable number of connections (threads) to be used to execute work
  - separate settings for peak and non-peak period
  - define status by evaluation free vs. busy connections

<input type="checkbox"/>	 Tuning	Non Peak period start hour	18
<input type="checkbox"/>	 Tuning	Peak period start hour	7

© 2015 IBM Corporation



Target Services properties are configurable as Dispatcher properties, and settings can be configured through IBM Cognos Administration at the service level.

The Target Services require an instance of MS to be assigned work. If separated from MS, they will not be assigned any load for background processing.

A 24 hour day is split into two periods: Peak and Non-Peak.

## Explain Monitor Service Properties

- job: a runnable task
- 1 scheduled report is 1 task (job)
- 1 job (set of tasks) containing 100 reports is 1 task, which when passed to the Job service will eventually become 100 tasks

<input type="checkbox"/>	 Tuning	Non Peak period start hour	18
<input type="checkbox"/>	 Tuning	Peak period start hour	7
<hr/>			
<input type="checkbox"/>	 Tuning	Maximum connections for job service during non-peak period	20
<input type="checkbox"/>	 Tuning	Maximum number of job service connections during peak period	20

© 2015 IBM Corporation 

Administrators can set the start of a peak period and the start of a non-peak period. This allows configuration of the number of Monitor Runners, or connections, for peak and non-peak periods.

**Business Analytics software**

**IBM**

## Explain Batch Report Service Properties

- define number of reports which can run in parallel at a time
- ensure Monitor service can supply enough reports

<input type="checkbox"/>  Tuning	Number of high affinity connections for the batch report service during non-peak period	2
<input type="checkbox"/>  Tuning	Number of low affinity connections for the batch report service during non-peak period	4
<input type="checkbox"/>  Tuning	Maximum number of processes for the batch report service during non-peak period	2

© 2015 IBM Corporation



The Batch report service (BRS) executes reports. Administrators can configure the affinity connections and number of processes for the BRS. This effectively defines the number of reports which can run in parallel at a time for the BRS.

For optimal performance make sure the MS can supply enough reports, which is the number of Jobs (Monitor Runners) as specified on the previous page.

In this example, BRS would be able to run 4 reports at a time, of 2 processes with 2 low affinity connections each. The high affinity connections would only be used for secondary requests.

Refer to the Describe Server Affinity: High topic in this module. High affinity could be tuned for requests such as email, print, save.

A good analogy might be to imagine a sink into which water pours from a faucet. If the drain is too small, the sink will overflow. If the drain is too big, the sink will run dry and the faucet cannot provide enough water.

The Monitor Runners are the faucet, the number of batch processes and their affinity connections define the drain size.

If the drain is too small: Too many Monitor Runners and the requests that they send to BRS are backing up on the dispatcher queue.

If the drain is too big: Too many reports get executed at the same time, overloading the available resource.

Business Analytics software

IBM

## Explain Content Manager Service Properties

- Capacity is defined by a maximum number of connections for ContentManager Service (CM Service)
  - defines the number of deployment/ContentManager maintenance tasks this particular CM Service instance can handle in parallel, along with all other duties of CM Service

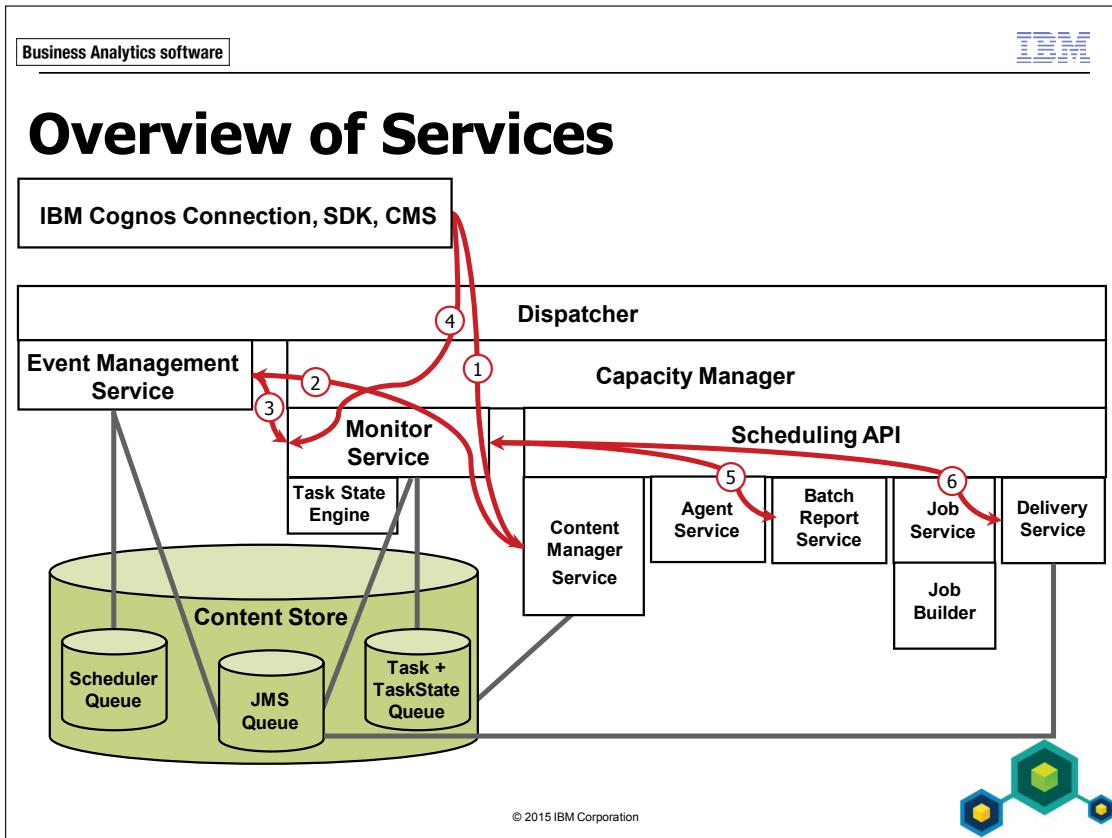
	Category	Name	Value	Acquired
<input type="checkbox"/>	Environment	Advanced settings	<input type="button" value="Edit..."/>	Yes
<input type="checkbox"/>	Logging	Audit logging level for Content Manager service	<input type="button" value="Minimal"/>	Yes
<input type="checkbox"/>	Tuning	Maximum connections for Content Manager service during non-peak period	<input type="text" value="4"/>	Yes
<input type="checkbox"/>	Tuning	Maximum number of Content Manager service connections during peak period	<input type="text" value="4"/>	Yes

© 2015 IBM Corporation



The CM Service runs deployments and Content Manager maintenance tasks.

Since there is only one active instance of CM Service, the capacity should be defined cautiously.



The process flow for scheduled tasks is as follows:

1. A user creates a schedule, either through IBM Cognos Connection or some other client. A scheduler object is created in the Content Store by sending a create request to Content Manager Service.
2. The Content Manager Service calls the Event Management Service, replicating the scheduler objects from the Content Store into the Scheduler queue.
3. Each instance of EMS runs a scheduler thread which polls the Scheduler queue. By design, EMS figures out the next runtime of a task once it is added to the queue and waits until due time. Once it wakes up, it starts a transaction to pull the task from the Scheduler queue and move it to the Task queue through the Monitor service. The task will be entered into the Task queue in a PENDING state.
4. Another scenario where tasks are created and passed to MS is where a user selects "Run now" for saved reports (run and save). IBM Cognos Connection will call MS directly, which will lead to the task being queued in PENDING state.

5. MS has a poll interval (30s hardcoded) after which it will investigate for tasks to take on. MS will only take on tasks for locally available Target Services for this particular server group MS runs in which have free capacity. Capacity information for the local target services is gathered through the Capacity Mechanism.

In addition, any call to the MS will trigger an investigation of the TaskQueue. A third trigger for an MS instance to investigate the TaskQueue is the legacy JMS queue notification being received.

Once MS picks up a task it is granted that there is a target service with free capacity to assign this task to.

MS checks for an authenticated session. For scheduled tasks it will create a new session leveraging the trusted credentials saved with the schedule. For "saved reports" the credentials for the current session are used.

Next the task status is updated to EXECUTING and the task is assigned to the target service which uses the AsyncAPI to execute the task.

The Monitor Service updates the task state based on the response received from the target service. If a cancel was issued in between the processing ends here and the task is cancelled. The result can be succeeded or failed.

6. If the Report has email output then BRS employs DLS to add an item to the JMS SMTP Queue. This queue is worked by all DLS instances in a system. A DLS instance will pick up the item and pass it to a configured SMTP server after which the runtime state of a task is updated finally.

Upon completion of the task execution, the Monitor service will write out the history records from its internal store to Content Manager. It keeps the history internally when tasks fail, in case the user wants to restart any failed tasks.

Periodically the history records for failed tasks are removed, based on the retention rules stored for that task in Content Manager.

## Additional Information:

- JMS: Java Message Service.
- JMS queue: Where scheduled items are stored. The JMS queue is internal but makes use of the data in the NC table NC\_JMSQUEUE.
- JMS SMTP queue: This is an internal queue that sits in memory and cannot be seen or manipulated like the JMS queue.
- SMTP: Simple Mail Transfer Protocol.
- EMS has a queue: jmsqueue. The EMS thread which picks the runnables which need to execute now puts them into this queue. At this moment, the activities/runnables are invisible to the user and administrators; they are neither pending nor executing.
- MS has a queue: monitor queue. This queue contains all the activities which are to be executed by monitor runners. At this point they are pending. From this queue, a monitor runner will pick up an activity, which at that time becomes executing.

## Service Oriented Architecture Implications

- Target Services will not be assigned tasks if they are separated from Monitor Service (MS)
  - without MS, deployments and Content Manager maintenance tasks will not work
  - there must be at least one instance of MS next to CM
- MS is lightweight with regards to performance; more instances can help overall performance.
- all installed instances running Target Services must run Monitor Service

© 2015 IBM Corporation



Server Groups are fully respected; each Server Group requires at least one instance of MS and desired Target Services on the same install.

Target Services can be separated from each other as long as an instance of MS is available next to them, and they remain in the same Server Group.

Example of a single Server Group scenario:

- Dispatcher 1: MS+JS
- Dispatcher 2: MS+DLS
- Dispatcher 3: MS+BRS+EVS

## Explain Cognos Graphics Service

- Legacy Engine
  - runs in-process as part of BIBusTKServerMain
  - used by Analysis Studio and Query Studio
  - can be used by Report Studio
- Current Default Engine
  - runs in own JVM as a separate process
  - used by Cognos Workspace
  - used by Report Studio by default

© 2015 IBM Corporation

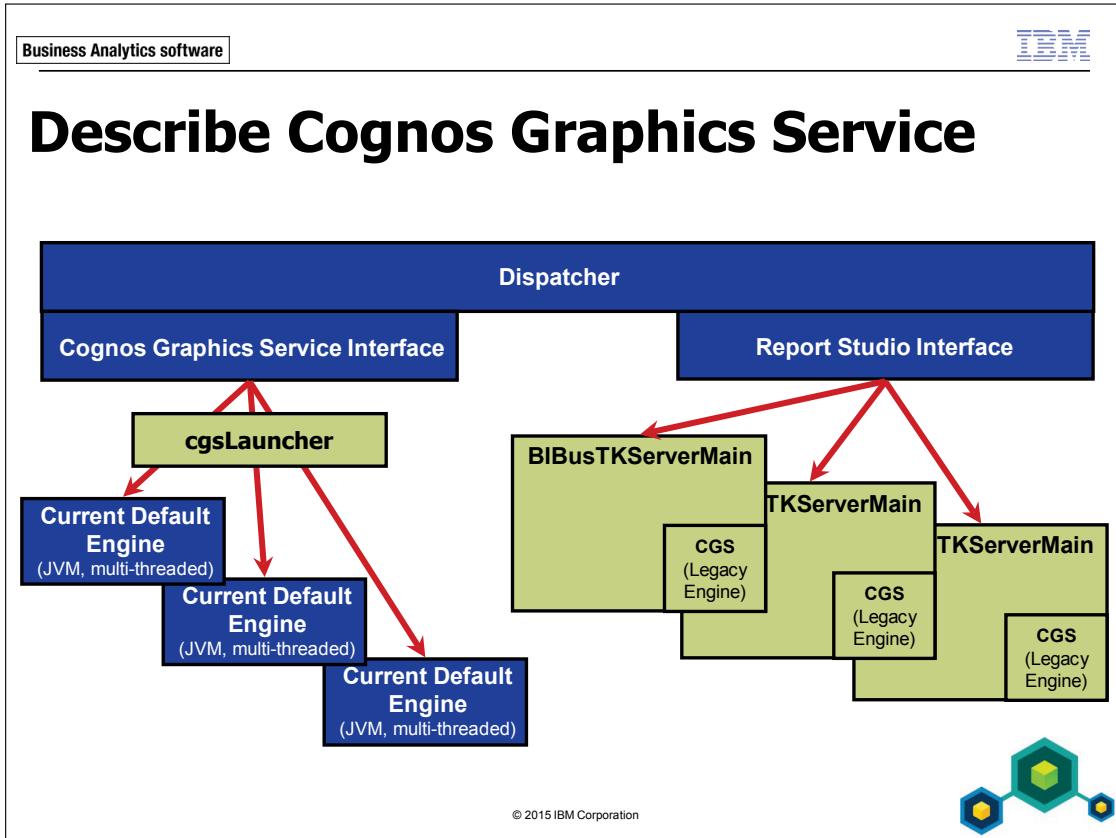


IBM Cognos 10 offers two alternate graphic engines to use, the legacy engine and the current default engine.

Analysis Studio and Query Studio can only use the legacy engine.

Report Studio can use the legacy engine, but you must specify this in Report Studio Options, Advanced.

Cognos Workspace does not have the option of using the legacy engine.



The current default engine is very much like ReportService. The Cognos Graphics Service (CGS) interface consists of handlers registered to the dispatcher. These handlers are partially using the ones from BIBusTKServerMain, which you are now familiar with the concept.

CGSLauncher is used to spawn JVMs which host the current default engine. In Report service the dispatcher invokes BIBusTKServerMain directly, however for CGS there is some additional redirection. In Windows environments, cgslauncher.exe is called which will call a JVM, and in non-Windows environments cgsServer.sh script is called when needed.

The current default engine will use a configurable number of threads (number of low affinity connections from Service properties).

The Current Default Engine Java process will not be recognizable on \*IX, but will be recognizable only by the command which invoked it. On Windows, the cgslauncher.exe in Task Manager is, in fact, the JRE.

The Current Default Engine Java processes will terminate if idle for 5 minutes (configurable in cgsService.xml).

## Describe the Current Default Engine

- invoked through cgsLauncher (cgsLauncher.exe, cgsServer.sh)
  - uses BIBusTKServerMain
- cgsLauncher will start configured number of processes for CGS
  - new instances will get spawned until configured limit for number of processes is reached
  - processes are JVMs
  - JVM arguments can be edited
  - CGS JVMs will use configured number of threads

© 2015 IBM Corporation



The current default engine is written in Java, and invoked through cgsLauncher, which is a C++ process that starts when the product starts. cgsLauncher uses the BIBusTKServerMain interface, which is the same interface as Report server, and is controlled by the dispatcher. There is port to port communication through the dispatcher, and it will terminate if it is idle too long (the default is set to 5 minutes). JVM runs within JRE, and JRE runs within JDK. JVM and JRE sometimes used synonymously.

Category	Name	Value
Environment	Advanced settings	<a href="#">Edit...</a>
Logging	Audit logging level for graphics service	Minimal
Tuning	Number of high affinity connections for the graphics service during non-peak period	1
Tuning	Number of low affinity connections for the graphics service during non-peak period	50
Tuning	Number of high affinity connections for the graphics service during peak period	1
Tuning	Number of low affinity connections for the graphics service during peak period	50
Tuning	Maximum number of processes for the graphics service during non-peak period	2
Tuning	Maximum number of processes for the graphics service during peak period	2
Tuning	Queue time limit of the graphics service (seconds)	240
Tuning	Maximum execution time for the graphics service (seconds)	0

© 2015 IBM Corporation 

Requests for Cognos Graphics Service (CGS) are conversations, which is to say that they can go asynchronous and this implies they are high affinity requests. These requests are subject to queuing.

CGS can be configured in IBM Cognos Administration, and the properties are similar to ReportService. Initial requests to CGS are subject to load balancing and advanced routing because they are not affine.

## Configure CGS Parameters

- cgsService.xml has several parameters as JVM arguments
  - linger\_process
  - prestart\_process
  - idle\_process\_check\_interval\_ms
  - idle\_process\_max\_idle\_ticks
  - report\_server\_port (should be 0 for dynamic ports)
  - server\_port (should be 0 for dynamic ports)

© 2015 IBM Corporation



The parameters are in ..\webapps\p2pd\WEB-INF\services\cgsService.xml. (.. is the install directory for IBM Cognos 10.2.2).

Since this is Java there are many tools available to hook to the JRE. Use Java monitoring on the current default engine processes to monitor performance.

- **linger\_process:** The minimum number of processes to keep in memory once they're started.
- **prestart\_process:** Should the CGSServer be started at initialization time rather than on-demand?
- **idle\_process\_check\_interval\_ms:** Time period between checks for idle or expired processes (in ms). Every time we check an idle process we bump its tick count. Every time we use a process the count is reset to 0. If the count ever reaches the value of idle\_process\_max\_idle\_ticks (below) the process is destroyed.
- **idle\_process\_max\_idle\_ticks:** number of idle check ticks before an idle process is killed.
- **report\_server\_port and server\_port:** The port the CGSServer is listening to. 0 (zero) should be used if the dispatcher spawns the process and uses a dynamically assigned port.

## Explain Interactive Discovery Visualization (IDViz) Service

- As of version 10.2.0, IBM Cognos BI supports a "Full Fidelity Publish" (FFP) of an IBM Cognos Insight dashboard to an IBM Cognos BI Workspace.
- The Explore Points from Cognos Insight will become Facet Controls in IBM Cognos Workspace.

© 2015 IBM Corporation



IBM Cognos Workspace is the new name for BUX-E (formerly named IBM Business Workspace/IBM Business Insight, which was initially named GO Dashboard when this functionality became included into BI by default as of BI 10.1.0).

The FFP is basically deploying a TM1 data source and a workspace to BI. The dynamic elements of the Cognos Insight dashboard need to be transformed into BI actionable workspace objects as Facets.

The Facet Controls are embedded into Workspace Widgets which display dynamic content retrieved from a content provider in the back-end. Often, the content provider is remote.

In case of an FFP, the content provider is a TM1 data source which is created as part of the publish action to a Workspace.

The Facet Controls communicate with a back-end Facet Service. This is not a service as defined in the IBM Cognos BI context, but rather the IDViz Service is the IBM Cognos Service interface for the Facet Service.

Facet Controls send requests to BI asking for the IDViz Service to provide content. This scales horizontally, as requests are routed by Dispatcher. Requests are not subject advanced routing.

The small resource footprint pulls data from TM1 and serves it up.

IDViz supports IPF logging, and can be disabled if nothing is published to this BI system from Cognos Insight.

If FFP from IBM Cognos Insight is used with a BI system, there should be at least two instances of the IDViz Service in a system to allow fail-over.

## Explain Presentation Service (PRS)

- uses underlying components
  - XTS (generate pages based on XML style templates)
  - Fragments (XML based composition of pages)
  - generates HTML output to be viewed in browser client
  - proxies requests for other services
    - Report Data Service (RDS): ATOM Feeds
    - Cognos Portal Services (CPS): WSDL, WSRP

© 2015 IBM Corporation



PRS uses several underlying components to support different techniques for page generation, like XTS (XML Transformation Service) and Fragments.

PRS generates HTML output to be viewed in browser client for IBM Cognos Connection, Query Studio, Event Studio, IBM Cognos Administration, and IBM Cognos Viewer. XTS is not Event Studio or IBM Cognos Viewer, but those UIs will send back requests to XTS, which will then employ the underlying engines to generate the output for those UIs.

Presentation Service is the central IBM Cognos Service when interacting with browser clients. SDK clients would not require XTS necessarily. XTS is not Presentation Service, but is a server-based service component used to generate HTML pages in IBM Cognos Connection. Sometimes XTS and PRS get used interchangeably which is incorrect. XTS is based on XML and XSLT.

## Describe PRS

- requires local dispatcher service to be enabled
- rule: if a gateway is involved, PRS is also involved
- exceptions to the rule:
  - Cognos Workspace,  
Cognos Workspace Advanced
  - Report Studio, Analysis Studio

© 2015 IBM Corporation



PRS is mandatory for front dispatchers, particularly if Single Sign-On (SSO) is configured. This is because XTS is required when handling User and System Recoverable parameters which are part of the process to render the HTML pages for login and to select a namespace.

PRS is unavailable on CM only installs, as PRS requires the local dispatcher service to be enabled. Therefore a basic rule is that if a gateway is involved, then PRS is also involved. There are exceptions to this rule, as listed in the slide.

Cognos Workspace and Cognos Workspace Advanced are rendered by a different engine (Cognos Workspace is Current default engine only) in a different service (BUX).

Report Studio and Analysis Studio are rendered by AJAX based techniques. AJAX is a design approach and a set of techniques for delivering rich Internet applications (RIAs) using open web formats, for example, HTML, CSS and JavaScript; and rendering using a browser engine.

## Explain Report Data Service (RDS)

- RDS exposes IBM Cognos content in Web 2.0 formats
- supports REST and SOAP interfaces
- data can be retrieved as
  - XML (Simple/layout data)
  - HTML including Fragments
  - JSON

© 2015 IBM Corporation



RDS is implemented by a Development component called Cognos Content Service (CCS). The API is a separate product known as Cognos Mashup Services (CMS).

RDS exposes IBM Cognos content (reports, workspaces, analyses) in Web 2.0 formats for mashing it up with other applications data.

RDS makes use of Report service, Metric service, PowerPlay service, and Query service.

Representational State Transfer (REST): A software architectural style for distributed hypermedia systems like the World Wide Web. The term is also often used to describe any simple interface that uses XML (or YAML, JSON, plain text) over HTTP without an additional messaging layer such as SOAP.

## What Components Use RDS?

- IBM Cognos Workspace
- IBM Cognos for Microsoft Excel
- IBM Cognos Mobile
- IBM Cognos for Microsoft Office

© 2015 IBM Corporation



## What is Metadata Service (MDS)?

- implemented in C++, runs in separate executable
  - BmtMDProviderMain
- based on the BIBusTKServerMain model
  - has affinity connections (4 low only)
  - a single instance is spawned upon startup by dispatcher
  - terminates if idle for 5 minutes, restarted as required

© 2015 IBM Corporation



MDS serves metadata requests for Query, Update, Test data base connections, lineage and more. Theoretically MDS can take up the maximum allowed process space but usually remains small in memory, smaller than Report server instances.

## Explain Relational Metadata Service (RMDS)

- RMDS interfaces to the component of the DQM engine (RELMD) which connects to data sources via JDBC and provides metadata.
- Used exclusively by:
  - Framework Manager in "dynamic" mode
  - IBM Cognos Cube Designer (CD)
- Queries run on the server, not on the client.
  - No local DB client install is required for installs of FM or CD
  - A JDBC driver is required on Dispatchers running RMDS.
  - The data source requires JDBC connectivity only.
- Use is governed by the "Import relational metadata" capability.

© 2015 IBM Corporation



This is a new service as of version 10.2.0 which is logically an interface to RELMD, a component shared by XQE that retrieves metadata from DQM data sources via JDBC. The service is used exclusively by CD and FM.

Using RELMD is quite different from CQM modeling.

- FM in mixed mode uses a local (client) UDA stack and therefore requires DB clients to be installed locally.
- Dynamic mode uses the RMDS which runs the queries on the server:
  - no local (client) DB clients are required
  - requires JDBC connectivity only, running on the Application Tier hosting RMDS
  - requires JDBC driver, although QueryService might be disabled on the same node

The new Import relational metadata capability controls who can pull metadata. The capability does not control availability or start of FM or CD.

Business Analytics software

**IBM**

# Configure RMDS

Category	Name	Value	Acquired
Environment	Advanced settings	<a href="#">Edit...</a>	Yes
Logging	Audit logging level for relational metadata service	Minimal	Yes
Tuning	Maximum connections for relational metadata service during non-peak period	4	Yes
Tuning	Maximum execution time for the relational metadata service (seconds)	0	Yes
Tuning	Maximum number of relational metadata service connections during peak period	4	Yes

© 2015 IBM Corporation



With RMDS, there is no horizontal scaling and routing, or fail-over. RMDS is required on Dispatchers referenced in IBM Cognos Configuration for FM and IBM Cognos Cube Designer installations. RMDS does not currently support IPF logging.

RMDS does not require Query Service, and RMDS properties are different than the Metadata Service properties:

- RMDS handles asynchronous conversations
- has batch processing capacity (# connections)

No separate process is being spawned, as work is done in a JVM context of the Dispatcher.

Each instance of RDMS is stand-alone. It uses a local disk cache (../temp directory) and handles requests sent to it through the External Dispatcher URL.

Metadata Service is separate from RDMS and is still required in a system. Metadata Service is required in a system for serving FM mixed mode.

The number of low affinity connections determines how many clients can be served in parallel. Additional requests will possibly be queued at Dispatcher and eventually time out.

RMDS is required on Dispatchers that are referred to by IBM Cognos Cube Designer and FM configurations, nowhere else. RMDS does not require Query Service to be enabled.

## What is Dynamic Query Mode?

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

© 2015 IBM Corporation



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

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

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

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

Ease of Maintenance with Query Visualization through IBM Cognos Dynamic Query Analyzer: Query visualization allows system administrators to analyse the queries generated by the Dynamic Query mode and visually see how they will be processed. These visualizations include cost based information derived from the query execution. This information permits the rapid identification of model and query optimizations which could be applied in order to achieve better performance. The visualizations are consumed as a log file by the stand alone IBM Cognos Query Analyzer application.

## OLAP Functionality for Dimensionally Modeled Relational (DMR) Packages

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

© 2015 IBM Corporation



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

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

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

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

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

An example of performance metrics: with DQM for ROLAP: some tests showed an 85% performance improvement, with an average query time for compatible mode being 125 seconds, improving to 15 seconds average query time for DQM. Results will differ, depending on the environment and the queries being run.

## Dynamic Query Mode Connectivity

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

© 2015 IBM Corporation



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

Relational data source connectivity is done as a JDBC Type 4 connection with the exception of Oracle connections, which can be established as either Type 2 or Type 4 JDBC connections. Type 4 JDBC connections do not require the install of any native client libraries. Connectivity is established through the vendor JDBC driver which is copied to the ..\v5dataserver\lib directory and the p2pd\WEB-INF\lib directory. The Oracle Type 2 JDBC connection also requires the Oracle native library install in conjunction with the Oracle JDBC driver.

## OLAP DQM Connectivity

- supported OLAP technologies:
  - IBM Cognos Dynamic Cubes
  - IBM Cognos TM1
  - SAP BW
  - Microsoft SSAS
  - Oracle Essbase

© 2015 IBM Corporation



The data source specific capabilities files can be located within the ..\configuration\xqe directory. These files help govern the decision making process of DQM during the query planning phase. General OLAP behavior is defined within the OLAP.properties file which is used in conjunction of the data source specific capabilities file, such as bw.properties for SAP BW, eb.properties for Essbase, yk.properties for MSSAS, and so on.

These files should only be changed under the direction of IBM Cognos Support.

## Relational and DMR DQM Connectivity

- supported relational data sources:
  - IBM DB2
  - IBM Netezza
  - Microsoft SQL Server
  - NCR Teradata
  - Oracle

© 2015 IBM Corporation



The data source specific capabilities files can be located within the ..\configuration\xqe directory. These files help govern the decision making process of DQM during the query planning phase. For relational queries, DQM uses the general vendor capabilities in conjunction with the vendor version specific capabilities to help with the query planning.

DQM would use:

- db2.sql.properties and db2.sql9.7.properties when connecting to IBM DB2 9.7
- netezza.properties and netezza5.0.properties when connecting to IBM Netezza 5.0

For DMR queries, the DQM behavior is the same as the above in addition to using the dmr.properties file. These files should only be changed under the direction of IBM Cognos Support or Development.

The screenshot shows the IBM Cognos Administration interface. The left sidebar has 'Status', 'Security', 'Configuration', 'Library', 'Multitenancy', 'Index Search', and 'Mobile' tabs. Under 'Configuration', it says 'Configuration > http://vclassbase:9315/p2pd'. The 'Dispatchers and Services' section is selected, showing 'Data Source Connections', 'Content Administration', 'Distribution Lists and Contacts', 'Printers', 'Styles', 'Portlets', 'Query Service Caching', and 'Dispatchers and Services'. The 'Dispatchers and Services' section is expanded, showing 'QueryService' which is highlighted with a red box. A table lists services: MetadataService, MobileService, MonitorService, PresentationService, QueryService (highlighted), relationalMetadataService, ReportDataService, ReportService, RepositoryService, and SystemService. The 'QueryService' row is selected, indicated by a red box around the 'More...' link. The table has columns for 'Name', 'Modified', and 'Actions'. The footer says 'Last refresh time: March 19, 2015 4:05:12 PM'.

Dynamic Query Mode is also known as QueryService. DQM is coded in Java and runs within its own JVM. By default this JVM is configured to start with 1GB of memory and displays as a separate Java process on the operating system. Although there can be many QueryService services in a multiple server installation, you can only have one QueryService per IBM Cognos 10 dispatcher. Disable the Query Service if you do not need it, to save resources.

You can determine the Process ID (PID) from the ..\v5dataserver\XQE file, where the information takes the format of PID@Servername:Port.

The Query Service is used as a secondary service by Report Service and Batch Report Service.

The QueryService receives requests from the BIBusTKServerMain process in the form of a query request, and from this request, plans the query. The planning of the query is where all the decisions are made to build an optimal query. Once the query is planned, the query is executed. The result of the query is passed back the BIBusTKServerMain process which then renders the report requested output.

In IBM Cognos Administration on the Configuration tab, Dispatchers and Services have a QueryService entry, which is used to configure settings for the Dynamic Query Mode.

The QueryService specific configuration can be found in the ..\configuration\xqe\_config.xml file. This file should only be changed under direction of IBM Cognos Support or Development.

	Value	Acquired
Environment	Yes	Yes
Environment	No	No
Logging	Minimal	Yes
Logging	Yes	Yes
Logging	Yes	Yes
Logging	Yes	Yes
Logging	300	Yes
Tuning	Yes	Yes
Tuning	120	Yes
Tuning	50	Yes
Tuning	1024	Yes
Tuning	1024	Yes
Tuning	0	Yes
Tuning	0	Yes

The QueryService properties allow for the administration of the Dynamic Query Mode. Settings of most interest include:

**Enable query execution trace?** Enabling this trace setting will allow an administrator to capture the query execution after it has gone through its planning phase. The log this trace produces is called the run tree log written to the ..\logs\xqe directory. This file usually accompanied by the profiling log which tracks the time spent in each of parts of the query execution. As a log is generated for each report that is executed, the log file adheres to the following naming convention.

- <date>\_<timestamp>\_reportName/runtreeLog.xml
- <date>\_<timestamp>\_reportName/profilingLog-#.xml

As an example, executing a report called Top\_Sales would result in a log file named 2015-02-10\_11h33m700s\_Top\_Sales/runtreeLog.xml, and one or several profiler logs named 2015-02-10\_11h33m700s\_Top\_Sales/profilingLog-0.xml, 2015-02-10\_11h33m700s\_Top\_Sales/profilingLog-1.xml, and so on.

These files are best viewed with the Dynamic Query Analyzer application which is described in a later module.

**Initial JVM heap size for the query service (MB)** This setting defines how much memory the DQM Java Virtual Machine will take on startup. The value set here is passed to the JVM on startup as the –Xms<value> parameter.

**JVM heap size limit for the query service (MB)** This setting defines the upper memory limit of the DQM Java Virtual Machine during operation. The value set here is passed to the JVM on startup as the –Xmx<value> parameter.

## Additional Query Service Information

- DQM Cookbook available on developerWorks at  
[http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos\\_specific/page529.html](http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos_specific/page529.html)
- DQM Data Source Conformance can be found at  
<http://www-01.ibm.com/support/docview.wss?uid=swg27021368>
- Dynamic Query Analyzer User's Guide can be found at  
[http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos\\_specific/page578.html](http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos_specific/page578.html)

© 2015 IBM Corporation



The DQM Cookbook contains a significant amount of detail. It provides background information and troubleshooting tips as well.

## What are Index Services?

- adds full-context search capabilities
- indexes
  - must be created once and then maintained
  - saved to file system (..\indexes\csn)
  - can be exported to integrate with other search engines

© 2015 IBM Corporation



The former add-on product IBM Cognos Go! Search has been incorporated into IBM Cognos 10 to offer search capabilities for almost all data in the Content Store. The functionality is based on the Apache Jakarta Lucerne project, a text search engine library written entirely in Java.

Using Search requires an index to be available.

## Explore Related Index Services

- Index Data Service
- Index Update Service
- Index Search Service

© 2015 IBM Corporation



The Index Data service retrieves relevant data for index building from the Content Manager service. The Index Update service manages creating and updating indexes. The Index Search service is employed when searching through indexes.

If you have three or more application tier instances in your IBM Cognos 10 system, you can decide to limit the Index services to just a couple of instances, rather than on all instances. To do this, you can disable (in IBM Cognos Configuration) the Index services on all the instances except the ones you want to include the Index services on. Ideally, the Index services should be enabled as a group for any given instance.

## Explain Collaboration Functionality

- annotations and comments
  - only through workspace widgets
  - aimed at business users
- integration with IBM Lotus Connections (LC)
  - link up workspaces with LC activities
  - link out to LC and its capabilities
- assignment of approval tasks to other users of IBM Cognos through Event Studio
  - aimed at report authors

© 2015 IBM Corporation



IBM Cognos 10 BI supported adding rich text comments to report output versions. This includes annotations and comments which can be attached at a cell level or to the report as a whole.

You can integrate with IBM Lotus Connections (LC) by linking up workspaces with LC activities, thereby accessing the capabilities of LC.

You can also assign approval tasks to other users of IBM Cognos through Event Studio.

## Describe Collaboration Services

- Human Task Service (HTS)
- Annotation Service (AS)
- both services are implemented in Java

© 2015 IBM Corporation



Functionality is implemented by two services which belong to the scheduling context, HTS and AS. HTS handles the approval tasks which can be created in Event Studio; it interacts with AS and scheduling. AS manages annotations for reports. HTS is also implemented in My Inbox.

Both services are implemented in Java, and are part of a CM only install, as they run within the JRE hosting the Content Manager component.

Integration with LC is handled by Cognos Workspace and underlying components.

## Describe Repository Service (REPOS)

- allows Content Management System (CMS) integration
- supports versioning
- allows archiving and tracking/auditing
- reduces Content Store (CS) size
- direct support is for IBM FileNet only, other CMS can be used through the file system export and import.

© 2015 IBM Corporation



Since IBM Cognos 10.1.1, report outputs can be saved and archived in locations other than in the Content Store.

- The legacy feature of saving to the file system in addition to CS still exists with limited functionality.
- Support in 10.1.1 was limited. Full support is delivered as of 10.2.2.

Repository Service (REPOS) stores report outputs in one of the supported back-end repositories accessed as a Cognos data source:

- configurable path in the file system (local + UNC)

- IBM FileNet Content Manager (ECM):
  - not the same as the Cognos Content Manager component
  - offers a file system like structure, similar to a mounted drive
  - accessed by the user running Cognos Service

The FileNet system is attached by setting up a Cognos data source for writing. The file system is a virtual FileNet driver which writes to a file system path to a URL. FileNet is exposed as a file system, hence the similarity. File system configuration is done in IBM Cognos Configuration under Global Settings\Alias Root. This is an optional feature, as storing in CS is still fine.

The legacy feature which uses "Archive Location File System Root" is only providing file system storage next to storing in CS; the new feature offers both.

## Explain REPOS

- part of the Application Tier install
- client components access directly through URLs generated by the Presentation Service
- scales horizontally
- multiple instances will work jointly
- Dispatcher distributes load
- REPOS requests are not subject to advanced routing
- local instances preferred when accessed by other services

© 2015 IBM Corporation



REPOS comes with the Application Tier install; it is not provided with a Content Manager only install.

Load balancing is handled by the Dispatcher for REPOS requests. Service registration has a preference of "cluster compatible" mode. REPOS is only used when accessed by other Cognos Services for storing data. That is, a request to store something is unlikely to travel over the BIBus unless it has to (as in the case that no local REPOS instance is available).

There should be at least two instances of REPOS in a system for fail-over.

REPOS can be disabled if no archiving is used, or if output versions are only going to be kept in the Content Store.

**Business Analytics software**

**Configure REPOS**

Category	Name	Value	Acquired
Environment	Advanced settings	<a href="#">Edit...</a>	Yes
Logging	Audit logging level for repository service	<a href="#">Minimal</a>	Yes
Tuning	Maximum number of seconds reports and report elements can exist in the cache.	1200	Yes
Tuning	Maximum number of reports and report elements that can overflow to disk.	1000	Yes
Tuning	Maximum number of reports and report elements that can be stored in memory.	100	Yes

- REPOS can consume a lot of memory if not configured properly
  - uses a two-level cache, local to every service instance
    - first level of cache is in Java heap (such as the Dispatcher memory)
    - second level of cache is an overflow to the local disk (/temp folder)
  - cache control is only by number of objects (reports, report elements)

© 2015 IBM Corporation




It is important to know your report output sizes; reduce the number of objects in the memory cache.

$$100 \text{ (objects)} * 10 \text{ MB} = 1 \text{ GB}$$

Keep in mind that there is a cache for each REPOS instance. The REPOS cache is a potential trap:

- understand your report output size
- outputs will be moved across BIBus and into the memory cache

If 100 users pull 100 different outputs from a single instance of REPOS within 20 minutes, they all are going to be loaded into the memory cache using default settings. Doing the math:  $100 * 2 \text{ MB} = \text{no issue}$ ,  $100 * 20 \text{ MB} = \text{possible issues}$ . For two instances, that might cause half the cache to be built for each instance. Over time though, it might build up to two full copies of the cache.

In the initial release of 10.2, there is no control over the cache size. You will need to use the number of objects in your configuration (`../configuration/cache/ehcache.xml` is the cache settings file).

The overflow location is the `../temp` folder of the local installation.

REPOS should be placed on servers with large RAM (> 8Gb).

Do not put REPOS next to CM or JMS as you do not want to take memory away from these services. It is better to put REPOS next to a Report Service or a Query Service, as the hardware that hosts these services usually has larger amounts of RAM.

## What is Cognos Access Manager Service?

- internal service that handles authentication
  - CAM\_AsyncAAService
- implemented by CAM, a Java component
- authentication providers remain C++ code
  - except Custom Java Authentication Providers (CJAPs)
- single instance in a system only for IBM Cognos 10

© 2015 IBM Corporation

In IBM Cognos 10, authentication is handled by an internal service. Authentication is implemented by the CAM service, which is now a Java component. You should be aware that some authentication providers remain in C++ code, with the exception of Custom Java Authentication Providers (CJAPs).

In an IBM Cognos 10 system, only a single instance of CAM service will exist, and it must be run where the Content Manager runs.

## Describe Authentication Providers

- each authentication provider executed in own C++ process
- 32-bit and partial true 64-bit support
- processes use BIBusTKServer interface
  - started by dispatcher upon startup (CAM\_LPSvr (Legacy Provider Server))
  - terminated if idle for 10 min
  - processes will be re-spawned as required
  - user authenticated session retained even if the process is terminated

© 2015 IBM Corporation



Each authentication provider is now executed in its own separate C++ process, with one process per configured namespace, with the exception of the Cognos namespace.

Having a full range of process memory available to the provider means an increase in support for the number of active users. On 32-bit installs, 2-3 GB C++ heap per configured namespace is available, and on 64-bit installs, > 4GB C++ heap per configured namespace is available.

## Overview of IBM Cognos Architecture

- IBM Cognos 10 introduced several significant changes
  - more components moved to Java (CAM, DQM, current default engine)
  - more processes spawned for a single install (CAM\_LPSvr, JRE for current default engine, JRE for DQM)
  - more services available
- architecture concepts remain the same mostly due to SOA
  - SOA will help manage new resource requirements
  - extendibility of the product due to SOA
  - added new services

© 2015 IBM Corporation



IBM Cognos 10 includes more services such as workspaces, Search, and new functionality including DQM, current default engine, HTS, AS, and Cognos Workspace.

If you have experience with IBM Cognos 8, the architectural knowledge is still applicable for IBM Cognos 10.

## Summary

- At the end of this module, you should be able to:
  - identify IBM Cognos Services
  - review collaboration functionality
  - explore the architecture in IBM Cognos 10

© 2015 IBM Corporation



## Workshop 1: Observe the Effects on a Dispatcher when Running Multiple Report Server Instances

As administrator, you want to run multiple Report Server instances to observe the results in your environment. To do this you will invoke multiple BIBusTKServerMain processes by running a number of reports simultaneously. You will run reports which contain current default engine charts, and then monitor the results.

You will do the following:

- ensure that both dispatchers are running
- launch Windows Task Manager, and select the Processes tab for monitoring
- login to IBM Cognos 10, to the LDAP\_Dev namespace with admin/Education1 credentials, and launch Report Studio with any package; select Blank when prompted for an initial report object type
- ensure that Report Studio is using the current default engine (Tools\Options\Advanced, clear Use legacy chart authoring), and then close Report Studio
- create and save a job in My Folders to run the following reports (which contain charts) from Public Folders\Samples\_DQ\Models\GO Data Warehouse (analysis)\Report Studio Report Samples:
  - Returns by Failed Orders in 2012\_DQ
  - Returns by Order Method\_DQ
- monitor the results in Windows Task Manager
- create and save a job in My Folders to run the following reports (which contain charts) from Public Folders\Samples\Models\GO Data Warehouse (analysis)\Report Studio Report Samples:
  - Returns by Failed Orders in 2012
  - Returns by Order Method
  - Sales Growth Year Over Year
- monitor the results in Windows Task Manager
- close all open windows

Question: What has to be done to monitor this if more than one dispatcher is running?

Answer: You could use routing rules to force the activity to one dispatcher, or through configuring load balancing, or other configurations. This environment uses routing rules.

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

## Workshop 1: Tasks and Results

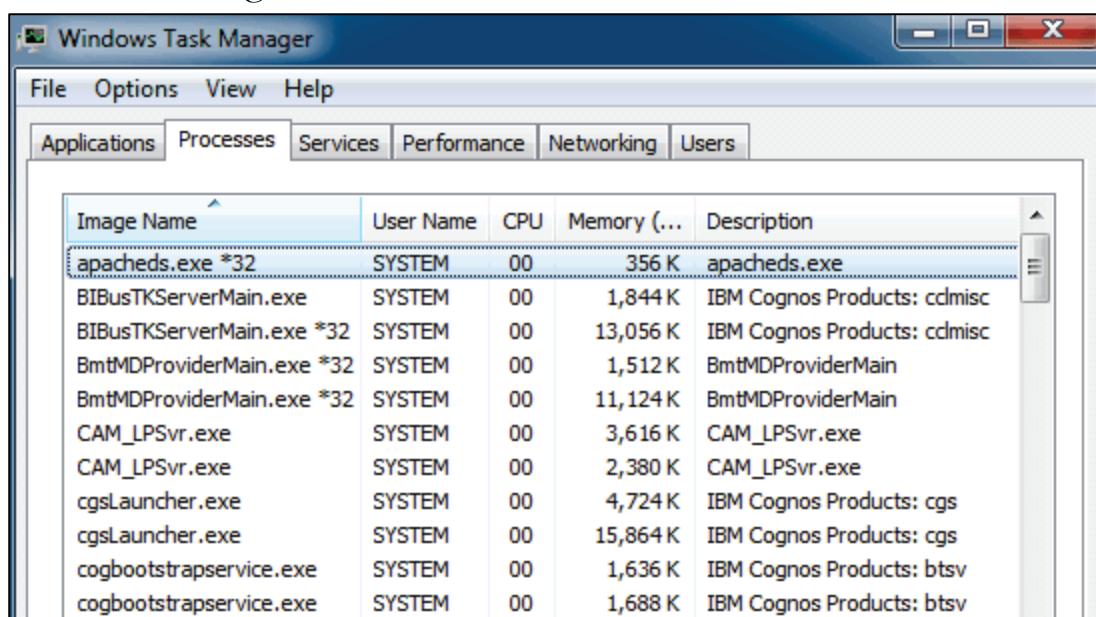
The IBM Cognos 10 Full:9315 dispatcher and the IBM Cognos 10 DispCM:9320 dispatcher should be running at the beginning of this workshop.

### Task 1. Start Windows Task Manager.

- Ensure that both dispatchers are running, and then right-click the **Taskbar**, and click **Start Task Manager**.
- Click the **Processes** tab, click the **Image Name** column title to sort alphabetically ascending, and then review the processes that are running.

Look for instances of BIBusTKServerMain.exe. Also identify instances of java.exe.

A section of results which may appear are as follows. You may have different services running in addition to these:



The screenshot shows the Windows Task Manager window with the 'Processes' tab selected. The 'Image Name' column is highlighted and sorted alphabetically. The table lists various system processes and their details.

Image Name	User Name	CPU	Memory (...)	Description
apacheds.exe *32	SYSTEM	00	356 K	apacheds.exe
BIBusTKServerMain.exe	SYSTEM	00	1,844 K	IBM Cognos Products: cdmisc
BIBusTKServerMain.exe *32	SYSTEM	00	13,056 K	IBM Cognos Products: cdmisc
BmtMDProviderMain.exe *32	SYSTEM	00	1,512 K	BmtMDProviderMain
BmtMDProviderMain.exe *32	SYSTEM	00	11,124 K	BmtMDProviderMain
CAM_LPSvr.exe	SYSTEM	00	3,616 K	CAM_LPSvr.exe
CAM_LPSvr.exe	SYSTEM	00	2,380 K	CAM_LPSvr.exe
cgsLauncher.exe	SYSTEM	00	4,724 K	IBM Cognos Products: cgs
cgsLauncher.exe	SYSTEM	00	15,864 K	IBM Cognos Products: cgs
cogbootstrapservice.exe	SYSTEM	00	1,636 K	IBM Cognos Products: btsv
cogbootstrapservice.exe	SYSTEM	00	1,688 K	IBM Cognos Products: btsv

Keep this window open and visible on the desktop as you proceed with the next task.

### Task 2. Run multiple reports.

- Launch **Internet Explorer**, go to <http://vclassbase:88/C10Full>, and then log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials.
- Click **Author advanced reports** to launch **Report Studio**, and when prompted for a package, navigate to **Public Folders\Samples\_DQ\Models**.

- Click **GO Sales (analysis)**, click **Create new**, and then double-click **Blank** when prompted for a report object type. It will take a few moments for the package to load in Report Studio.

You could have selected any package, as you have opened Report Studio to ensure that legacy charts are turned off, thereby using current default engine charts in your reports. This will cause current default engine JREs to execute as reports with current default engine charts are running.

- To review the **Report Studio** configuration, from the **Tools** menu, click **Options**, on the **Advanced** tab ensure that the **Use legacy chart authoring** check box is not selected, click **OK**, and then close **Report Studio**.

You will create jobs to run multiple reports at the same time, so that you can monitor the results. One job will be for dynamic query based reports, and the other job will be for compatible query based reports.

- On the **IBM Cognos Software** page, click **IBM Cognos content** to launch IBM Cognos Connection, click the **My Folders** tab, and then on the toolbar, click **New Job** .

It may take a few moments for the My Folders tab to load.

- In the **Name** box, type **Run Multiple Chart Reports DQM**, and then click **Next**.
- Under the **Steps** pane, click **Add**, and then under the **Available entries** section on the left side, click **Cognos** and navigate to **Public Folders\Samples\_DQ\Models\GO Data Warehouse (analysis)\Report Studio Report Samples**.
- Click the check boxes for the following reports (which contain charts), click **Add** (right yellow arrow) to add the selected entries, and then click **OK**:

- **Returns by Failed Orders in 2012\_DQ**
- **Returns by Order Method\_DQ**

You may have to navigate to the next page of reports to get both selections.

- To accept the default settings for submission of steps click **Next**, on the **Select an action** page, click **Save only**, and then click **Finish**.
- On the **My Folders** tab, on the toolbar, click **New Job**.

- In the **Name** box, type **Run Multiple Chart Reports CQM**, and then click **Next**.
- Under the **Steps** pane, click **Add**, and then under the **Available entries** section click **Cognos** and navigate to **Public Folders\Samples\Models\GO Data Warehouse (analysis)\Report Studio Report Samples**.
- Add the following reports (which contain charts):
  - **Returns by Failed Orders in 2012**
  - **Returns by Order Method**

You may have to navigate to the next page of reports to get both selections.
- Click **OK** to close the **Select entries** page.
- To accept the default settings for submission of steps click **Next**, on the **Select an action** page, click **Save only**, and then click **Finish**.

### **Task 3. Run the jobs, and observe the processes in Windows Task Manager.**

- Ensure that you can see both the **Windows Task Manager** and **IBM Cognos Connection\My Folders** windows on your desktop.  
Resize and reposition the windows to see both, as necessary.
- In **Windows Task Manager**, observe the processes that are running, and notice in particular, if any instances of **BIBusTKServerMain.exe** and **java.exe** are running.

- In the browser window, in the **Actions** column for the **Run Multiple Chart Reports CQM** entry, click **Run with options** , click **Run**, and then click **OK**.
  1. Observe the number of instances of BIBusTKServerMain that are spawned.
  2. Question: How many instances were spawned?

More instances of java.exe should be spawned for Graphics service, and for BIBusTKServerMain.

The results appear similar to the following:

Image Name	User Name	CPU	Memory (...)	Description
apacheds.exe...	SYSTEM	00	396 K	apacheds...
BIBusTKServe...	SYSTEM	00	26,068 K	IBM Cogn...
BIBusTKServe...	SYSTEM	00	184,972 K	IBM Cogn...
BIBusTKServe...	SYSTEM	00	3,048 K	IBM Cogn...
BIBusTKServe...	SYSTEM	00	171,124 K	IBM Cogn...
BmtMDProvid...	SYSTEM	00	1,464 K	BmtMDPr...
BmtMDProvid...	SYSTEM	00	2,404 K	BmtMDPr...
CAM_LPSvr.exe	SYSTEM	00	3,400 K	CAM_LPS...
CAM_LPSvr.exe	SYSTEM	00	2,324 K	CAM_LPS...
cgsLauncher....	SYSTEM	00	9,800 K	IBM Cogn...
cgsLauncher....	SYSTEM	00	5,748 K	IBM Cogn...
cogbootstrap...	SYSTEM	00	1,752 K	IBM Cogn...
cogbootstrap...	SYSTEM	00	1,844 K	IBM Cogn...

- If you have time, you can continue to observe the processes until they are complete, and they are no longer displayed.  
You may refresh the display by periodically pressing F5.
- When you have finished your observations, in the browser window, in the **Actions** column for the **Run Multiple Chart Reports DQM** entry, click **Run with options**, click **Run**, and then click **OK**.

- Observe the number of instances of BIBusTKServerMain and other services that are spawned.

The results appear similar to the following:

Image Name	User Name	CPU	Memory (...)	Description
apacheds.exe...	SYSTEM	00	396 K	apacheds...
BIBusTKServe...	SYSTEM	00	26,068 K	IBM Cogn...
BIBusTKServe...	SYSTEM	00	184,972 K	IBM Cogn...
BIBusTKServe...	SYSTEM	00	3,048 K	IBM Cogn...
BIBusTKServe...	SYSTEM	00	171,124 K	IBM Cogn...
BmtMDProvid...	SYSTEM	00	1,464 K	BmtMDPr...
BmtMDProvid...	SYSTEM	00	2,404 K	BmtMDPr...
CAM_LPSvr.exe	SYSTEM	00	3,400 K	CAM_LPS...
CAM_LPSvr.exe	SYSTEM	00	2,324 K	CAM_LPS...
cgsLauncher....	SYSTEM	00	9,800 K	IBM Cogn...
cgsLauncher....	SYSTEM	00	5,748 K	IBM Cogn...
cogbootstrap...	SYSTEM	00	1,752 K	IBM Cogn...
cogbootstrap...	SYSTEM	00	1,844 K	IBM Cogn...

- When you have finished your observations, close all open windows.



**IBM**  
IBM Cognos BI

# Explore Java Memory Management

IBM Cognos BI 10.2.2

**Business Analytics software**



© 2015 IBM Corporation



# Objectives

- At the end of this module, you should be able to:
  - describe Java memory layout
  - manage Java memory
  - use tools to monitor Java memory

© 2015 IBM Corporation



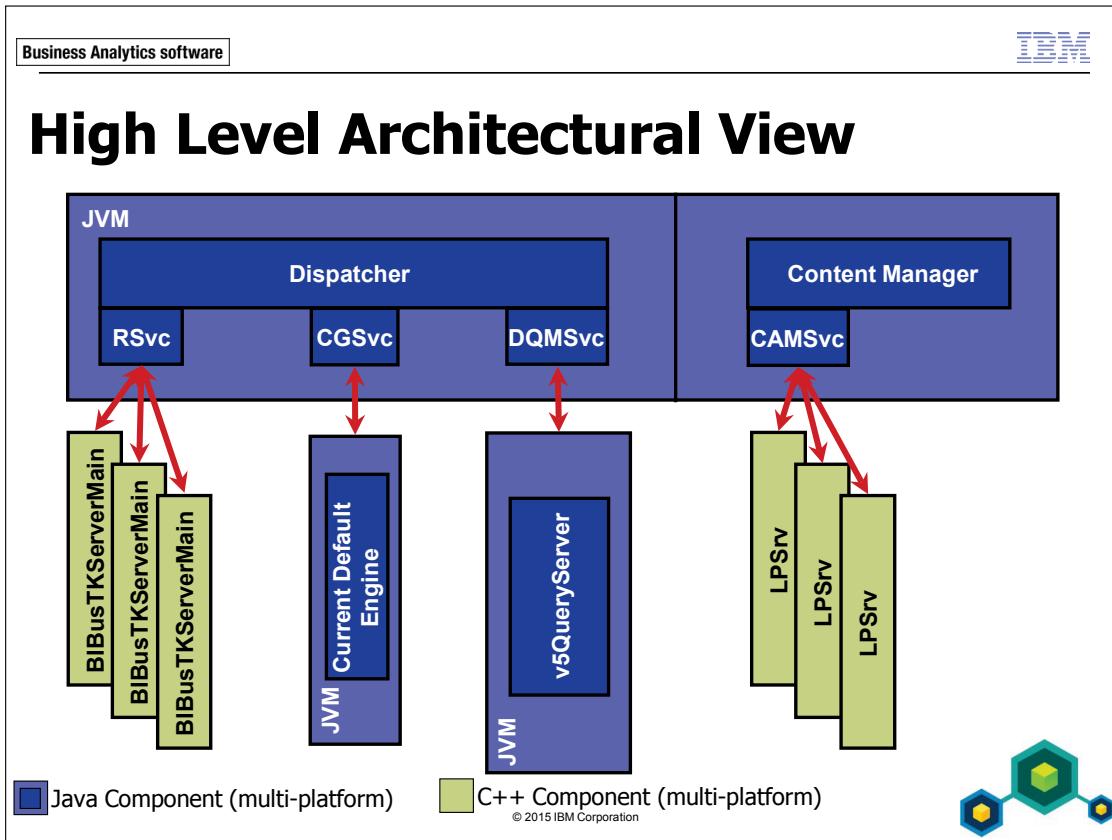
## Review Java Components in IBM Cognos

- IBM Cognos 10 is a mix of Java and C++
- new as of 10.2.0: Cognos Graphic Service (CGS), Dynamic Query Mode (DQM)
- changed as of 10.2.0: Cognos Access Manager (CAM), Content Manager
- legacy: Content Manager (CM), Dispatcher (DISP)

© 2015 IBM Corporation



IBM Cognos is moving to more Java components over time.



This high level example shows that even a simple install runs three instances of JRE with IBM Cognos 10. This is one reason why Java is important to understand.

## What is Java?

- an interpreted, object oriented programming language
- develop once, deploy anywhere
- low cost code maintenance, single code stream for all platforms
- standardized
- optimizable at JRE level with Just-In-Time compilation (JIT)

© 2015 IBM Corporation



Java offers a modular structure of code, with objects and classes, where the same source code can be used for all targets. It can be compiled to platform independent bytecode, such as .class files which are sometimes zipped into .jar files. Bytecode is not executable, and requires a run-time environment. There is no direct control of hardware, and Java needs more resources than machine code.

## Describe the Java Runtime Environment

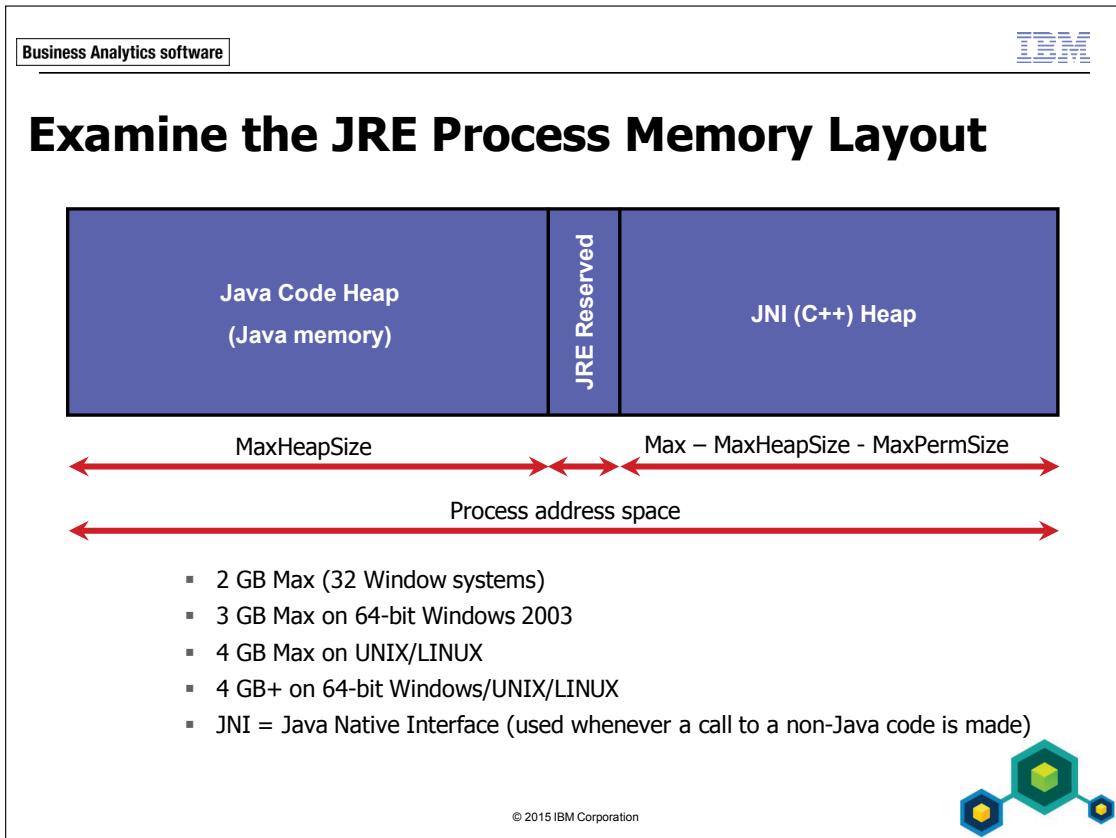
- platform dependent, usually machine code
- implemented by different OS vendors typically
- abstracts hardware specifics to developer
- implements memory management
- responsible for optimizations (JIT)
- enables parallelizing threads by mapping to CPU architecture

© 2015 IBM Corporation



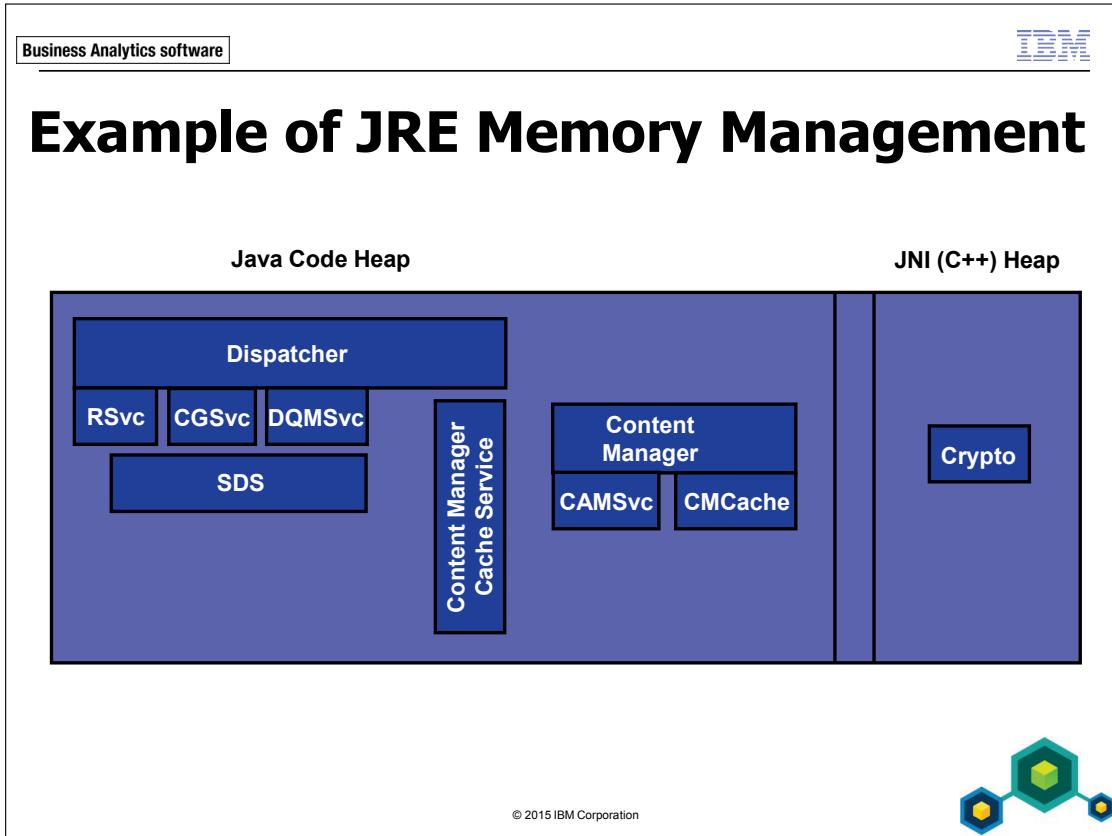
Memory management (allocation and garbage collection) can be the most critical configuration of a JRE. The quality and configuration of the JRE directly impacts Java code performance and stability. Good optimization and memory management can overlay bad code design, resulting in increased performance for the Java applications.

Bad memory management will negate good code design.



A JRE uses a configurable amount of memory within the allowed address space for a single process on the particular hardware and operating system. This amount is passed to the JRE upon start in a parameter called `-Xmx` (MaxHeapSize) and is usually less than the theoretical maximum. Additionally, a smaller amount is reserved for the JRE itself.

The MaxHeapSize works much like a slider control; more Java heap means less JNI heap.



IBM Cognos 10 uses both heaps, therefore the MaxHeapSize still has a direct impact, however more Java heap is favorable.

Separating install components to separate instances of application servers helps to manage memory requirements for Java heap, and in particular for Content Manager. Having multiple instances of JRE will help to leverage large RAM pools on 32-bit JREs, and using 64-bit JREs enables even larger Java heaps.

## Why is Java Memory Management Important?

- defining amount of memory is not sufficient configuration
- JRE memory management handles allocation and freeing memory in Java heap
- JRE interfaces with OS level memory management for optimum performance

© 2015 IBM Corporation



It is important to understand how memory is managed in a JRE in detail because this significantly impacts the stability and performance of both the JRE and the IBM Cognos 10 components.

In Java, memory is allocated implicitly when instantiating an object, and there is no concept of freeing memory or releasing objects explicitly. In addition, the JRE has to interface with OS level memory management for optimum performance. Allocating and freeing memory is expensive, and OS level memory management concepts like virtual memory (paging) can interfere with the JRE memory management.

## Explore Concepts of Memory Management

- Garbage Collection (GC)
  - allocates and frees memory for Java objects within the Java heap but not in the JNI heap
  - GC implementation details are not part of any specification, only the concept is
  - each JRE vendor implements GC differently
- Virtual Memory
  - memory is reserved from the OS but not committed
  - committed memory dynamically changes due to GC
  - reserved memory is the maximum JRE can allocate
  - enable by specifying `-Xms` (MinHeapSize) parameter to JRE
  - disabled if `-Xms >= -Xmx`.

© 2015 IBM Corporation



A JRE implements two concepts for memory management, garbage collection and virtual memory. The combination of the two concepts leads to things like a JRE process reserving 786MB on Win32 but depending on load and components running in that JRE, the committed size may be considerably less.

For more information on GC and memory, go to  
<http://download.boulder.ibm.com/ibmdl/pub/software/dw/jdk/diagnosis/GCandMemory-042005.pdf>.

For more information on IBM JVM, go to  
<http://download.boulder.ibm.com/ibmdl/pub/software/dw/jdk/diagnosis/diag142.pdf>.

Business Analytics software

IBM

## JVM Settings

- starting points for 50+ concurrent users include:
  - set gcpolicy=gencon to minimize the long pauses for gc

© 2015 IBM Corporation

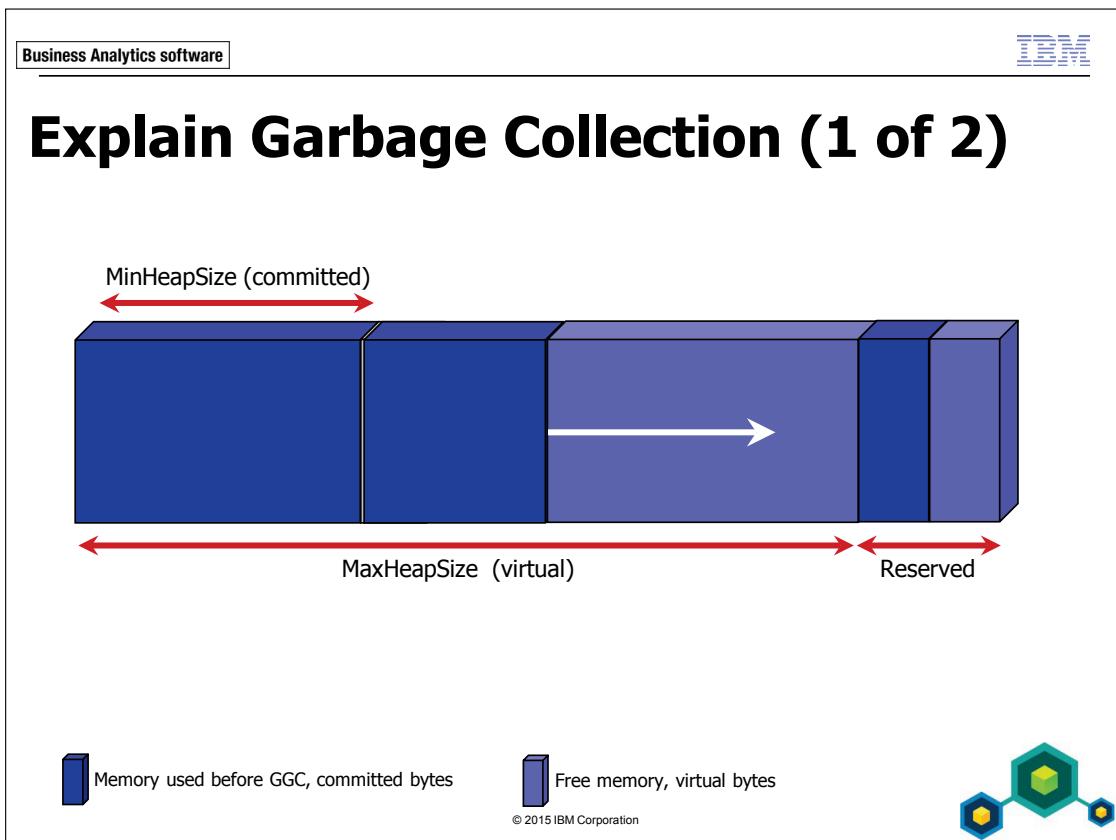


Along with the setting in the slide, consider the following component-specific starting point settings for JVM:

- Dispatcher IBM JVM (Report Server)
  - 64 bit: xms=xmx= 4GB and xmn set to approx. 1/3 of xmx, or 1286MB
  - 32 bit: xms=xmx= 1024MB and xmn set to approx. 1/3 of xmx, or 341MB
- Dispatcher IBM JVM (Content Manager, or combined CM+RS)
  - 64 bit: xms=xmx= 6 GB and xmn set to approx. 1/3 of xmx, or 2048MB
  - 32 bit: xms=xmx= 768MB and xmn set to approx. 1/3 of xmx, or 256MB

- Graphics Service IBM JVM (IBM Cognos BI v10 only)
  - Unix: <cog\_install>/bin/cgsServer.sh
  - Change "Xmx1g" (default) to "Xmx2g" for 32 bit or "Xmx4g" for 64 bit
- Dynamic query data server IBM JVM (IBM Cognos BI v10 only)
  - <cog\_install>/configuration/xqe.config.xml
  - set -Xmx and -Xms to the same value, set -Xmn to 1/2 -Xmx
  - 64 bit: -Xmx4096m -Xms4096m -Xmn512m (default settings)
  - 32 bit: -Xmx2048m -Xms2048m -Xmn512m (default settings)

For DQM, this can be changed in IBM Cognos Administration, in the properties of the Query Service.

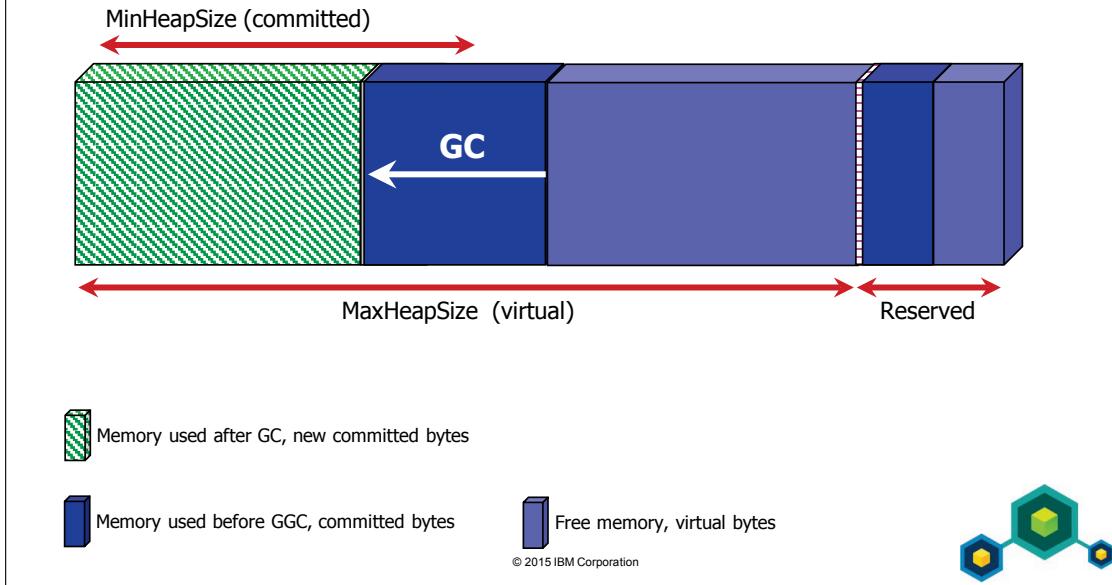


This example is to introduce the general concept of GC only, and does not provide implementation details.

During runtime, Java objects get created in the Java heap, thereby filling it up. If the Java heap is running low, more committed bytes are requested from the OS, up to the MaxHeapSize if virtual memory is enabled.

GC is triggered by memory allocation and/or after a period of time. GC leverages empirical observations about Java memory usage (infant mortality) and is cost intensive (lowers performance).

## Explain Garbage Collection (2 of 2)



To avoid running out of memory, GC must occur in cycles triggered by criteria based on memory occupation (depending on the vendor and the GC implementation). GC identifies the objects not referenced by any other objects as garbage. GC will collect and dump the garbage, freeing up the memory again. The amount of committed bytes can decrease down to MinHeapSize.

## Considerations of Garbage Collection

- can cause problems when the JRE does not process code
- is cost intensive
- having an optimal GC is key to good performance
- different GC implementation strategies exist
- finding the right strategy can be challenging

© 2015 IBM Corporation



Identifying dead objects for GC is expensive and depends on the size of Java heap and the number of objects.

Different GC implementation strategies exist; depending on the JRE, several strategies are supported, and can be configured by passing parameters to the JRE upon initialization.

# What is IBM JRE Garbage Collection?

- 3 step approach to identify dead objects
  - Mark
  - Sweep
  - Compact

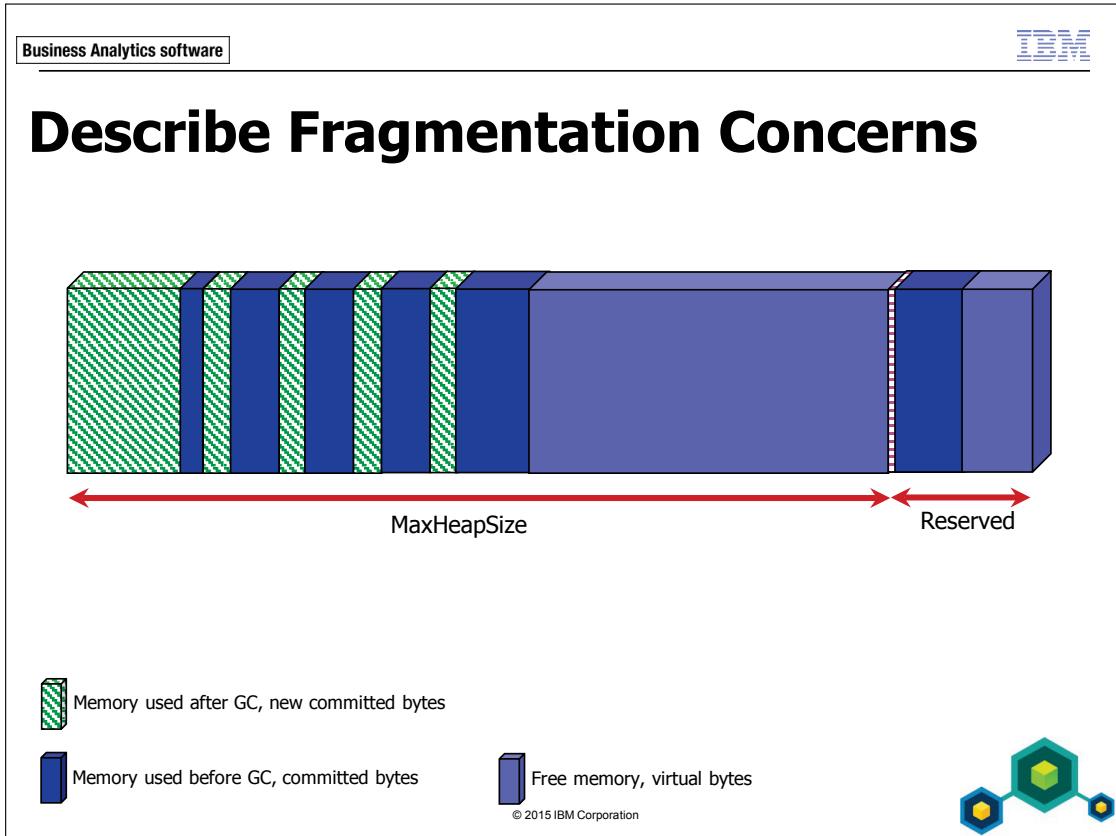
© 2015 IBM Corporation



Mark occurs most frequently, and will mark only the dead objects. This is a quick process and is not very expensive in terms of processing time.

Sweep happens less frequently, and marked objects will get freed. This is more expensive than a Mark.

Compact will defragment the memory by collecting all live objects and relocate them to a contiguous chunk. Compact is the least frequent, as it can be very expensive.



If GC is configured to run too few compacts, fragmentation can occur. It is impossible to allocate large objects and OutOfMemory errors can occur even though the sum of free bytes is sufficient.

## Log Garbage Collection

- log will at least show most crucial information about a GC run
- from a verbose GC log you can deduct if the configured MinHeapSize of 768M is a good fit

```
[GC 203376K->45888K(227220K), 0.0279463 secs]
[GC 203200K->44599K(227220K), 0.0173486 secs]
[GC 201910K->50273K(227220K), 0.0462307 secs]
[GC 207585K->50437K(227220K), 0.0490736 secs]
...
[GC 203376K->45888K(227220K), 0.0279463 secs]

GC <oldHeapSize> -> <NewHeapSize> (<totalHeapSize>), <timeTakenforGC>
```

© 2015 IBM Corporation



GC can be logged for basically any JRE by specifying the Verbose GC parameter. The resulting log will at least show most crucial information about a GC run, including duration, result (how many bytes have been freed), and some GC implementation specific detail (this varies by vendor).

## Verbose GC Output of IBM JRE: Example 1

### System.gc call

```
<GC(3) : GC cycle started Tue Mar 10 08:24:34 2015
<GC(3) : freed 58808 bytes, 27% free (1163016/4192768), in 14 ms>
<GC(3) : mark: 13 ms, sweep: 1 ms, compact: 0 ms>
<GC(3) : refs: soft 0 (age >= 32), weak 0, final 0, phantom 0>
```

© 2015 IBM Corporation



All the lines start with GC(3), which indicates that this was the 3rd garbage collection in this JVM. The first line shows the date and time of the start of the collection. The second line shows that 58808 bytes were freed in 14 ms, resulting in 27% free space in the heap. The figures in parentheses show the actual number of bytes that are free and the total bytes that are available in the heap. The third line shows the times for the mark, sweep, and compaction phases. In this case, no compaction occurred, so the time is zero. The last line shows the reference objects that were found during this garbage collection, and the threshold for removing soft references. In this case, no reference objects were found.

## Verbose GC Output of IBM JRE: Example 2

### Allocation failure

```
<AF[5]: Allocation Failure. need 32 bytes, 286 ms since last AF>
<AF[5]: managing allocation failure, action=1 (0/6172496) (247968/248496)>
<GC(6): GC cycle started Tue Mar 10 08:24:46 2015
<GC(6): freed 1770544 bytes, 31% free (2018512/6420992), in 25 ms>
<GC(6): mark: 23 ms, sweep: 2 ms, compact: 0 ms>
<GC(6): refs: soft 1 (age >= 4), weak 0, final 0, phantom 0>
<AF[5]: completed in 26 ms>
```

© 2015 IBM Corporation



An allocation failure does not mean that an error has occurred in the code; it is the name that is given to the event that triggers when it is not possible to allocate a large enough chunk from the heap.

The output contains the same four lines that are in the System.gc() verbose output, and some additional lines.

The lines that start with AF[5] are the allocation failure lines and indicate that this was the fifth AF collection in this JVM. The first line shows how many bytes were required by the allocation that had a failure and how long it has been since the last AF. The second line shows what action the Garbage Collector is taking to solve the AF, and how much free space is available in the main part of the heap, and how much is available in the wilderness. The last line shows how long the AF took, including the time taken to stop and start all the application threads.

## Enable Verbose GC in IBM Cognos 10: Example using Tomcat with Command Line

- any JRE, log to console only

```
set CATALINA_OPTS=-Xmx768m -XX:MaxNewSize=384m -XX:NewSize=192m -
XX:MaxPermSize=128m -verbose:gc %DEBUG_OPTS%
```

- IBM JRE, log to file

```
set CATALINA_OPTS=-Xmx768m -XX:MaxNewSize=384m -XX:NewSize=192m -
XX:MaxPermSize=128m -Xverboselogclog:<path+filename> %DEBUG_OPTS%
```

- Sun JRE (as of 1.4), log to console

```
set CATALINA_OPTS=-Xmx768m -XX:MaxNewSize=384m -XX:NewSize=192m -
XX:MaxPermSize=128m -verbose:gc -XX:+PrintGCTimeStamps -
XX:+PrintGCDetails %DEBUG_OPTS%
```

- Sun JRE (as of 1.4), log to file

```
set CATALINA_OPTS=-Xmx768m -XX:MaxNewSize=384m -XX:NewSize=192m -
XX:MaxPermSize=128m -Xloggc:<path+filename> %DEBUG_OPTS%
```

© 2015 IBM Corporation



To enable verbose garbage collection, edit the startup\_tomcat.bat located in the ..\bin64 directory and add a command line argument to the call. The examples provided are specific to using Tomcat. If you are not using Tomcat, then other steps apply.

Business Analytics software



## Enable Verbose GC in IBM Cognos 10: Example using Tomcat as a Service

- edit bootstrap\_xxxx.xml in the ..\bin64 folder and add a new <param> element directly after

```
<param>-Xmx${dispatcherMaxMemory}m</param>
```

- IBM JRE

```
<param>-Xmx${dispatcherMaxMemory}m</param>
```

```
<param> -Xverbosegclog:../logs/gc.log</param>
```

...

- Sun JRE

```
<param>-Xmx${dispatcherMaxMemory}m</param>
```

```
<param> -Xlogg gc:../logs/gc.log</param>
```

© 2015 IBM Corporation



This example requires a restart of the IBM Cognos 10 service.

## Enable Verbose GC: CGS and DQM

- Cognos Graphic Service
  - additional JRE parameters can be put into
    - cgsserver.sh (UNIX)
    - ..\webapps\p2pd\WEB\_INF\services\cgsService.xml (Windows)
- Dynamic Query Mode
  - additional JRE parameters can be put into
    - ..\webapps\p2pd\WEB\_INF\services\queryService.xml (Windows and UNIX)

© 2015 IBM Corporation



# Enable GC Logging in WAS

1. In **Administrative Console**, expand **Servers**, click **Application Servers**, and then click the desired server.
2. On **Configuration** tab, under **Server Infrastructure**, expand **Java and Process Management**, and click **Process Definition**.
3. Under **Additional Properties** section, click **Java Virtual Machine**.
4. Select the **Verbose garbage collection** check box, and then click **Apply**.
5. At the top of the **Administrative Client**, click **Save** to apply changes to the master configuration.
6. Stop and then restart the **Application Server**.
7. The verbose garbage collection output is written to either native\_stderr.log or native\_stdout.log for the Application Server, depending on the SDK operating system as follows:

**For AIX®, Microsoft® Windows®, or Linux®:**  
native\_stderr.log

**For Solaris™ or HP-UX:**  
native\_stdout.log

© 2015 IBM Corporation



WAS is Websphere Application Server.

## Tuning GC: IBM JRE

- **garbage collection frequency is too high until the heap reaches a steady state**
  - use verbosegc to determine the size of the heap at a steady state and set `-Xms` to this value
- **heap is fully expanded and the occupancy level is greater than 70%**
  - increase `-Xmx` value so that the heap is not more than 70% occupied
  - for best performance try to ensure that the heap never pages
  - maximum heap size should, if possible, be able to be contained in physical memory
- **at 70% occupancy the frequency of garbage collections is too great**
  - change the setting of `-Xminf`
  - default is 0.3, which tries to maintain 30% free space by expanding the heap
  - a setting of 0.4, for example, increases this free space target to 40%, and reduces the frequency of garbage collections
- **pause times are too long**
  - try using `-Xgcpolicy:optavgpause`
  - this reduces the pause times and makes them more consistent when the heap occupancy rises
  - it does, however, reduce throughput by approximately 5%, although this value varies with different applications

© 2015 IBM Corporation



These are some examples of tuning GC for IBM JRE.

## JVM Tuning and Dynamic Cubes

- dynamic cubes have large, long-lived caches, partially pre-loaded
- require much larger heap sizes (may be >120 GB)
- occupy more of the tenured space in a generational garbage collector
- may require reduced nursery size

© 2015 IBM Corporation



Dynamic Query is a Java-based engine and can be tuned to optimize JVM performance. The most common setting that users need to adjust is the maximum java heap size, but there are many configurables that can be used to tune the JVM for the specific usage patterns experienced in an enterprise environment. The default settings generally work well for traditional DQM implementations which tend to use smaller heap sizes (< 10GB) and have usage consisting of many short-lived transactions with modest caching.

The memory allocation pattern of dynamic cubes changes over time. Because dynamic cubes preload the member and aggregate caches when the cube is started, they exhibit different patterns while starting/refreshing than while queries are running against them. During a start/refresh, the cube loads a large number of objects into the JVM which will stay alive for quite a long time. In a generational garbage collector, these objects must first survive a number of nursery collections before they are promoted to tenured space. Since the nursery is optimized to copy small numbers of live objects to survivor spaces during collections, this behavior causes long pauses for large nurseries. So, during the load/refresh phase, it is ideal to have a smaller nursery, to reduce such pauses. However when queries are executing (especially after the caches are sufficiently warm), it is good to have a larger proportion of nursery space because the objects created during a query are short lived, so they play well into the nursery collection policy. Further, a larger nursery is even more useful the higher the user concurrency because higher concurrency usually causes a higher proportion of the JVM heap is being used for short-lived objects.

Business Analytics software

**IBM**

# Configure the JVM for Query Service

<input type="checkbox"/>  Tuning	Initial JVM heap size for the query service (MB) (Requires QueryService restart)	1024	Yes
<input type="checkbox"/>  Tuning	JVM heap size limit for the query service (MB) (Requires QueryService restart)	1024	Yes
<input type="checkbox"/>  Tuning	Initial JVM nursery size (MB) (Requires QueryService restart)	0	Yes
<input type="checkbox"/>  Tuning	JVM nursery size limit (MB) (Requires QueryService restart)	0	Yes
<input type="checkbox"/>  Tuning	JVM garbage collection policy (Requires QueryService restart)	Generational	Yes
<input type="checkbox"/>  Tuning	Additional JVM arguments for the query service (Requires QueryService restart)		Yes
<input type="checkbox"/>  Tuning	Number of garbage collection cycles output to the verbose log (Requires QueryService restart)	1000	Yes
<input type="checkbox"/>  Tuning	Disable JVM verbose garbage collection logging (Requires QueryService restart)	<input type="checkbox"/>	Yes



© 2015 IBM Corporation

In IBM Cognos Administration, there are eight JVM configurable values available for tuning the Query Service.

The first four properties allow you to adjust the minimum and maximum sizes of the overall JVM respective nursery sizes within the overall heap.

For more information on the individual properties, refer to the product documentation.

For more details on heap sizing, refer to

[http://publib.boulder.ibm.com/infocenter/javasdk/v6r0/index.jsp?topic=%2Fcom.ibm.java.doc.diagnostics.60%2Fdiag%2Funderstanding%2Fmm\\_heapsizing\\_initial.html](http://publib.boulder.ibm.com/infocenter/javasdk/v6r0/index.jsp?topic=%2Fcom.ibm.java.doc.diagnostics.60%2Fdiag%2Funderstanding%2Fmm_heapsizing_initial.html).

## Tips on Tuning Settings

- set initial heap size large enough for normal operation
- set the maximum heap size large enough for peak operation plus 15% for overhead to prevent unnecessary GCs
- set initial nursery size to 0

© 2015 IBM Corporation



Set the initial heap size large enough for normal operation. It should be large enough to fit all the caches and run most reports at the required level of concurrency. For more information on hardware requirements, see the document entitled *Understanding Hardware Requirements for Dynamic Cubes* in the Business Analytics Proven Practices Web location at <http://www.ibm.com/developerworks/analytics/practices.html>.

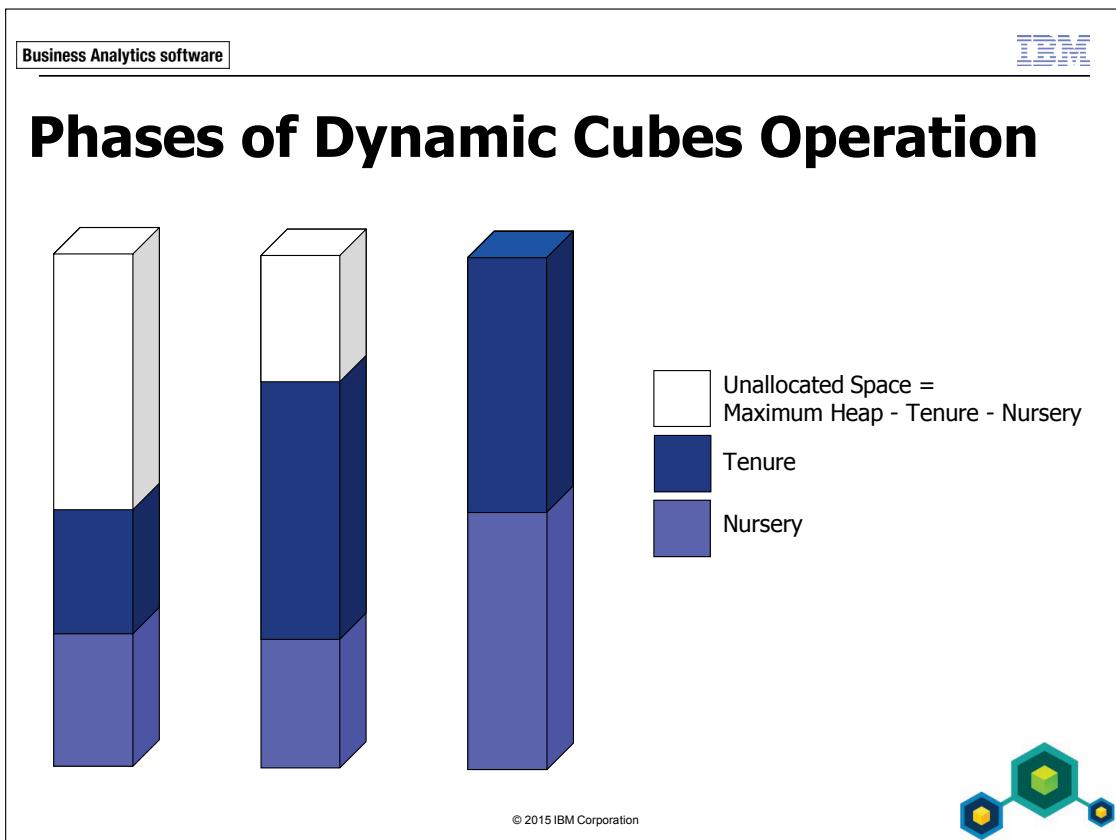
Set the maximum heap size large enough for peak operation plus a small (15%) overhead to prevent unnecessary GCs. It should be large enough to absorb the memory spikes that can occur when more data volume-intensive queries are executed or a higher concurrency is experienced.

Set the initial nursery size to 0 unless there is a problem. This will allow the system to calculate the initial nursery size as a proportion of the initial heap size. The calculated proportion has been shown to achieve better performance, especially during and immediately after the priming phase.

Set the maximum nursery size to an appropriate level, given your expected amount of caching, reporting style, and concurrency requirements. The idea is for all the temporary objects created during report execution to fit in the nursery so they aren't promoted to tenured space. That way they can take advantage of the nursery's collection policy. A larger proportion of nursery space to tenured space is required for higher concurrency and/or data volume-intensive reports with modest caching, than for lower concurrency and/or simple reports with aggressive caching. For the former, you may choose to set the maximum nursery size to 50% of the maximum heap. For the latter, you could leave it set to 0 and the system will calculate it as a smaller proportion of the maximum heap.

Set the maximum tenured size using the -Xmx setting in the additional arguments to the maximum heap - maximum nursery. This should generally be large enough to fit all the caches, plus a 10-20% buffer. Since tenured space is generally increased before nursery space, this maximum allow the tenured space to expand large enough to fit all the caches and then allow the nursery space to increase to accommodate queries, which generally only need short term space.

Set minimum tenured size using the -Xms setting in the additional arguments to the same value as maximum tenured space? This will prevent unnecessary GCs for increasing the size.



The tuning setting tips should allow the heap proportions to be adjusted automatically by the JVM so that they are optimal for the distinct phases of dynamic cubes operation.

While there is no theoretical limit on the maximum heap size, performance starts to degrade as more long-lived objects are added to memory. The theory is that tenured GC is scanning all the objects to find dead ones and that gets more expensive. Also, it maybe more expensive to allocate objects when there are many objects alive, due to overhead. GC pauses may become prohibitively long when the heap usage grows beyond ~120GB, so the initial heap size generally should not be set larger than that value, and the maximum heap size should not be much larger. Of course, pause time can also vary due to hardware variances and enterprise environment patterns, and so this is not a hard limit.

# Analysis of JVM Garbage Collection

- Out of Memory (OOM) messages
- Heapdumps
- Verbose GC logs

© 2015 IBM Corporation



Out of memory (OOM) messages: Severe out of memory conditions can affect the stability of the Query Service. In such cases, the Query Service will become unavailable in the portal. In this case, the maximum JVM heap size (and probably the three others) should be increased, and the Query Service should be restarted.

In the case where the Query Service is able to remain stable, the Query Service will report the `OutOfMemoryError` to every user who's action was affected by the error. This includes report execution as well as admin operations (such as cube cache refreshes). The error message also includes the current setting for the maximum JVM heap size, so you can cross reference it to the setting in the portal. For example: "Insufficient memory. The current JVM maximum heap size of the QueryService is 512MB and may need to be increased".

Heapdumps and MAT tool: When an OutOfMemoryError occurs, one or more heap dump files are generally created in the bin or bin64 directory. These are useful for looking at the contents of the heap at the time of the error to find the root cause of issues and can be analyzed with the Memory Analyzer Tool. Information on the Memory Analyzer Tool is available at:

<http://www.ibm.com/developerworks/java/jdk/tools/mat.html>.

Verbose GC logs and ISA tool: Verbose GC logging is particularly useful for analyzing and tuning JVM garbage collection. A detailed set of instructions for how to interpret the log and use it to tune the JVM is beyond the scope of this course, but it should be noted that:

- Verbose GC logging is enabled by default
- You can disable it or adjust the size of the log with the dedicated parameters in the portal
- The IBM Support Assistant tool is useful for analyzing the log (Information on the ISA tool is available at: <http://www-01.ibm.com/software/support/isa/>.)
- Large collection times generally indicate insufficient heap/nursery sizes, suboptimal proportions of nursery and tenured space

## What Happens in a JRE Crash?

- dump file called a Java core created
- depending on the JRE version one of these files is in the ..\bin directory of the IBM Cognos 10 install
  - HS\_err\_(timestamp).txt
  - Javacore\_(timestamp).txt

© 2015 IBM Corporation



A JRE can crash like any other process, and when that happens, a dump file is created. Depending on the version of your JRE you will get one of two files in the ..\bin directory of the IBM Cognos 10 install.

Depending on the JRE, the file will contain local environment info, JRE information, thread dumps (per thread) in a Stack trace, GC history, memory information, and ClassLoader information. This file may be required by IBM Cognos Support to help troubleshoot issues.

## What Should You Do if Java Hangs?

- force a Java dump or Threaddump
  - Windows: Ctrl+Break (only works in CMD window)
  - UNIX: Kill -3 <Java\_PID>

© 2015 IBM Corporation



Sometimes a Java process churns or hangs, and is unresponsive. To troubleshoot, force a Java dump or Threaddump to obtain similar information as a Java core file.

Business Analytics software



## Use Tools to Monitor Java

- Process Explorer:
  - <http://technet.microsoft.com/en-us/sysinternals/bb896653.aspx>
- IBM Support Assistant:
  - <http://www-01.ibm.com/software/support/isa/>

© 2015 IBM Corporation



## Summary

- At the end of this module, you should be able to:
  - describe Java memory layout
  - manage Java memory
  - use tools to monitor Java memory

© 2015 IBM Corporation



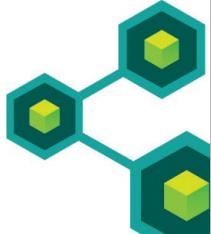


**IBM**  
IBM Cognos BI

# **Examine Audit Logging and Indication Processing Facility Logging**

IBM Cognos BI 10.2.2

**Business Analytics software**



© 2015 IBM Corporation



# Objectives

- At the end of this module, you should be able to:
  - describe installation logs and configuration logs
  - explore audit logging
  - explore IPF logging

© 2015 IBM Corporation



## What are Installation Logs?

- record activities performed by installation wizard transferring files
  - Install
  - Error summary
  - Installer specification

© 2015 IBM Corporation



Creation of these log files is enabled by default. They provide details of the installation activities of the product.

Business Analytics software

IBM

## Review Installation Logs

- Install Log
- Error Log
- Specification Log
- Content Manager Result Logs

© 2015 IBM Corporation



You will review the installation logs over the next few pages.

**Business Analytics software**

**IBM**

# Explore the Install Log

Your System Information:

```

Logging of IBM Cognos Business Intelligence Server started on wednesday, March 11, 2015 10:33:11 AM
Login Name: Student
User Name: Student
Computer Name: VCLASSBASE
Operating System: Win7
System Locale: en_US
Selected Language: English

Licensed Materials - Property of IBM, BI and PM: is.
(C) Copyright IBM Corp. 2004, 2014. US Government Users Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule
Contract with IBM Corp.

WINDOWS IBM Cognos InstallStream Version 10.2.2

Reading archive information - C:\\IBM Cognos BI Install Files\\bisrvr\\winx64\\setup.csp. Please wait...
Successfully retrieved values from section "Custom Install" in file "C:\\IBM Cognos BI Install Files\\bisrvr\\winx64\\options.ini".
Successfully retrieved keys from section "Custom Install" in file "C:\\IBM Cognos BI Install Files\\bisrvr\\winx64\\options.ini".
Successfully retrieved value "1" from section "Custom Install" with key "C8BISRVR_APP" in file "C:\\IBM Cognos BI Install
Files\\bisrvr\\winx64\\options.ini".
Successfully retrieved value "1" from section "Custom Install" with key "C8BISRVR_APPLICATION_TIER" in file "C:\\IBM Cognos BI Install
Files\\bisrvr\\winx64\\options.ini".
Successfully retrieved value "1" from section "Custom Install" with key "C8BISRVR_GATEWAY" in file "C:\\IBM Cognos BI Install
Files\\bisrvr\\winx64\\options.ini".
Successfully retrieved value "1" from section "Custom Install" with key "C8BISRVR_CONTENT_MANAGER" in file "C:\\IBM Cognos BI Install
Files\\bisrvr\\winx64\\options.ini".
Successfully retrieved value "C:\\Program Files" for value name "ProgramFilesDir" under key
"HKEY_LOCAL_MACHINE\\Software\\Microsoft\\Windows\\CurrentVersion".
Successfully retrieved value "C:\\Program Files" for value name "ProgramFilesDir" under key
"HKEY_LOCAL_MACHINE\\Software\\Microsoft\\Windows\\CurrentVersion".

```

© 2015 IBM Corporation



The tl-<component>-<version>-<date>\_<time>.txt file is located in the ..\instlog directory and contains information on the files that were copied and the registry keys that have been altered by the installation.

The example in the slide represents a section of the file contents.

**Business Analytics software**

**IBM**

# Explore the Error Log

Your System Information:

```
Logging of IBM Cognos Business Intelligence Server started on wednesday, March 11, 2015 10:33:11 AM
Login Name: Student
User Name: Student
Computer Name: VCLASSBASE
Operating System: win7
System Locale: en_US
Selected Language: English

Licensed Materials - Property of IBM, BI and PM: is,
(C) Copyright IBM Corp. 2004, 2014. US Government Users Restricted Rights - use, duplication or disclosure restricted
by GSA ADP Schedule Contract with IBM Corp.
WINDOWS IBM Cognos InstallStream Version 10.2.2

Selected Components:
  IBM Cognos Business Intelligence Server
    Application Tier Components
      Gateway
      Content Manager

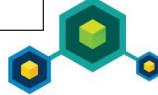
Local disk space information:

Drive: Available: Required Estimate:
C:\ 25.22 GB 3.15 GB

Dialog Entry Information:
[Installation Location]
C:\Program Files\IBM\cognos\c10_64full

[Shortcut Folder]
IBM Cognos 10 - 64 Full
```

© 2015 IBM Corporation



The tl-<component>-<version>-<date>\_<time>\_summary\_error.txt file is located in the ..\instlog directory and contains any error that may have been encountered during the copy or apply phase of the install.

The example in the slide represents a section of the file contents.

Business Analytics software

IBM

# Explore the Specification File

```

; Licensed Materials - Property of IBM
; BI and PM: is
; (C) Copyright IBM Corp. 2004, 2014
; US Government Users Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract
with IBM Corp
[Dialog1]
Title=Welcome to the Installation Wizard
DE=0
EN=1
FR=0
JA=0
ES=0
NL=0
SV=0
FI=0
IT=0
PT_BR=0
KO=0
ZH_CN=0
ZH_TW=0
[Dialog2]
Title=IBM License Agreement
;Failure to accept the license agreement and non-IBM terms, if any, will abort the installation.
;Please return the software to the point of acquisition and obtain a refund, if applicable.

```

© 2015 IBM Corporation



The tl-<component>-<version>-<date>\_<time>.ats file is located in the ..\instlog directory and contains the selections made by the user within the installation wizard.

This file can also be used to pre-select installation items when performing a silent install.

The example in the slide represents a section of the file contents.

## Explore the Content Manager Results Logs

- records activities product performed creating initial Content Store hierarchy and objects
- activities are logged to files CMCreateBaseObjectsScript\_results.xml and CMCreateScript\_results.xml in the ..\logs directory

© 2015 IBM Corporation



If you see these logs, you will know that Content Manager was created.

The Content Manager Results logs may include log files that start with 00x. These include additional setup information of the Content Store. For example, 002.CMCreatePageletObjects\_results.xml shows the setup of the portlets for IBM Cognos Administration.

Note: In the lab environment used in this course, the logs directory has been cleared, so you will not see these files.

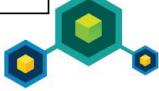
**Business Analytics software**

**IBM**

## Explore Logging of Content Store Hierarchy Creation

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:SOAP-
  ENC="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:bus="http://developer.cognos.com/schemas/bibus/3/" xmlns:SOAP-
  ENV="http://schemas.xmlsoap.org/soap/envelope/">
  - <SOAP-ENV:Header>
    <bus:biBusHeader xsi:type="bus:biBusHeader"/>
  </SOAP-ENV:Header>
  - <SOAP-ENV:Body>
    - <cm:addResponse xmlns:cm="http://developer.cognos.com/schemas/bibus/3/">
      - <returns xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="cm:addReply[26]">
        - <item xsi:type="cm:addReply">
          - <addResult xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="cm:baseClass[8]">
            - <item xsi:type="cm:adminFolder">
              - <defaultName xsi:type="cm:tokenProp">
                <value xsi:type="xsd:string">Administration</value>
              </defaultName>
              - <searchPath xsi:type="cm:stringProp">
                <value xsi:type="xsd:string">/adminFolder</value>
              </searchPath>
              - <storeID xsi:type="cm:guidProp">
                <value
                  xsi:type="cm:guid">i2CC84985613241CEA5129CE5A410AFE4</value>
              </storeID>
            </item>
            - <item xsi:type="cm:content">
              - <defaultName xsi:type="cm:tokenProp">
                <value xsi:type="xsd:string">Public Folders</value>
              </defaultName>
```

© 2015 IBM Corporation



The CMCreateBaseObjectsScript\_results.xml contains the results of the creating the initial content hierarchy.

If you receive a message that an error was detected while creating the initial content objects, to troubleshoot the problem, check the

..\logs\CMCreateBaseObjectsScript\_results.xml log file to see what was created.

## Explore Logging of Creation of Initial Content Store Objects

```
<?xml version="1.0" encoding="UTF-8"?>
- <SOAP-ENV:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:SOAP-
  ENC="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:bus="http://developer.cognos.com/schemas/bibus/3/" xmlns:SOAP-
  ENV="http://schemas.xmlsoap.org/soap/envelope">
  - <SOAP-ENV:Header>
    <bus:biBusHeader xsi:type="bus:biBusHeader"/>
  </SOAP-ENV:Header>
  - <SOAP-ENV:Body>
    - <cm:updateResponse xmlns:cm="http://developer.cognos.com/schemas/bibus/3/">
      - <updateResult xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="cm:baseClass[125]">
        - <item xsi:type="cm:adminFolder">
          - <defaultName xsi:type="cm:tokenProp">
            <value xsi:type="xsd:string">Administration</value>
          </defaultName>
          - <searchPath xsi:type="cm:stringProp">
            <value xsi:type="xsd:string">/adminFolder</value>
          </searchPath>
          - <storeID xsi:type="cm:guidProp">
            <value xsi:type="cm:guid">i2CC84985613241CEA5129CE5A410AFE4</value>
          </storeID>
        </item>
        - <item xsi:type="cm:content">
          - <defaultName xsi:type="cm:tokenProp">
            <value xsi:type="xsd:string">Public Folders</value>
          </defaultName>
```

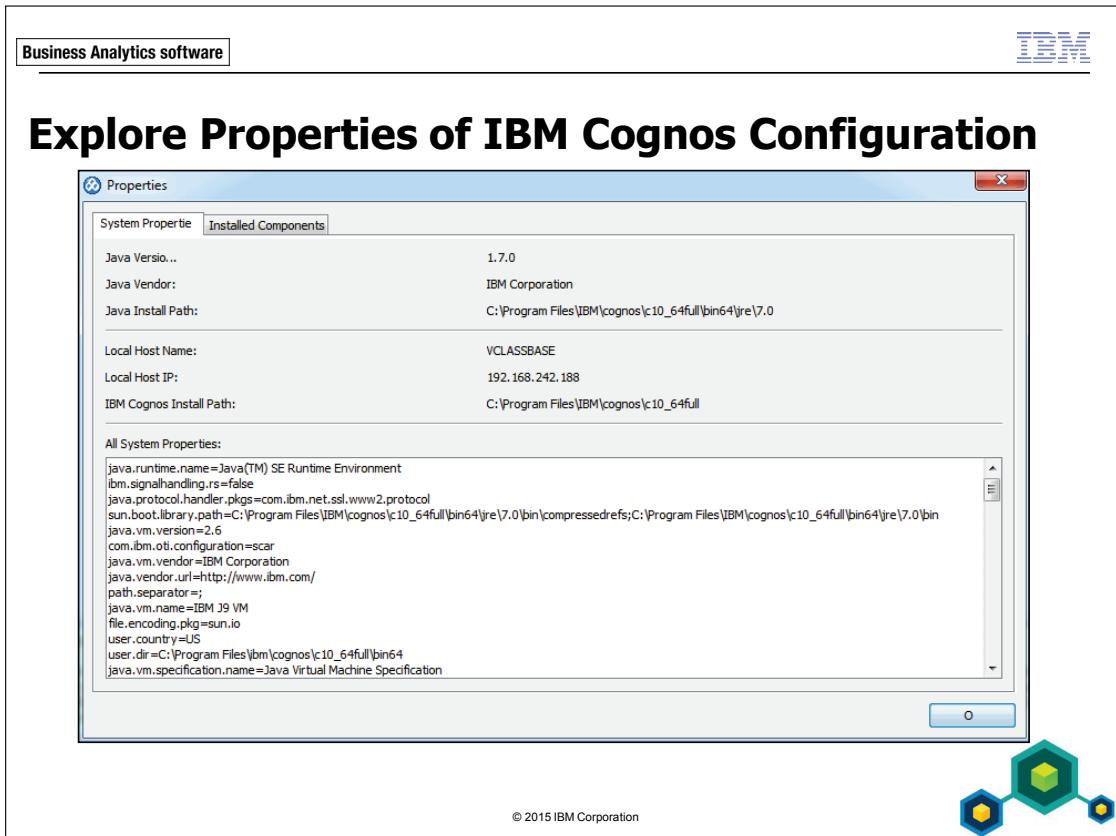
© 2015 IBM Corporation



The CMCreateScript\_results.xml contains the results of the creation of the initial Content Store objects, including security objects.

The element `<updateResult xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="cm:baseClass[125]">` tells us that 125 objects (items) were created in the initial Content Store.

The SOAP message in the slide displays the SOAP response.



You can explore the properties of IBM Cognos Configuration to obtain system information such as Java version, Java vendor, Java install path, local host name, local IP address, IBM Cognos 10 install path, Java system properties, selected environment variables and installed IBM Cognos 10 components.

In IBM Cognos Configuration, press Ctrl+ F3, and the results will be written to a dialog box. Here you can review system properties and installed components.

# Logging of IBM Cognos Configuration

- obtain information on Java path and the loading of JAR files on launch of IBM Cognos Configuration

```

Looking for JRE in: \bin...
Looking for JRE in: \jre\bin...
Looking for JRE in: jre\7.0\bin...
Using CLASSPATH:
    .;..\bin\cclcfgmcf_mcf.jar;cogconfig.jar;configcnfm.jar;..\bin\cogconfigi.jar;..\bin\cogcn
    fm.jar;..\bin\bcprov-jdk14-145.jar;..\bin\dom4j-1.6.1.jar;..\bin\jaxen-
    1.1.1.jar;..\bin\cclcfgmcf.jar;..\bin\cclcfgapi.jar;..\bin\jcam_crypto.jar;..\bin\i18nj.ja
    r;..\bin\icu4j.jar;..\bin\commons-httpclient-3.1.jar;..\bin\commons-codec-
    1.3.jar;..\bin\commons-logging-1.1.jar;..\bin\commons-logging-api-1.1.jar;..\bin\commons-
    logging-adapters-1.1.jar;..\bin\CognosIPF.jar;..\bin\log4j-
    1.2.17.jar;..\bin\jcam_jni.jar;..\bin\jdxslt.jar;..\bin\ant.jar;..\bin\ant-
    launcher.jar;..\bin\jcam_config_test.jar;..\bin\cclcoreutil.jar;..\bin\CognosCCL4J.jar
Using J_HOME:      jre\7.0
Using J_OPTS:

```

© 2015 IBM Corporation



If you cannot open IBM Cognos Configuration, you can double-click cogconfig.bat or cogconfig.sh in the ..\bin directory (in the ..\bin64 directory for 64-bit installations). You may encounter this if there is a JVM/JRE issue. The output will be written to a command window.

To obtain additional information on the launch of IBM Cognos Configuration, in a command window, run cogconfig.bat or cogconfig.sh with the parameters –log and –d. This creates a cogconfig\_<timestamp>.log in the ..\logs directory, and will provide more detail on why IBM Cognos Configuration did not load.

## What is the cogstartup.xml File?

- located in ..\configuration folder
- backups have timestamp suffix
- contains IBM Cognos 10 configuration settings

© 2015 IBM Corporation



This file contains all of the IBM Cognos configuration settings for a specific installed instance of IBM Cognos 10.

## What is the coglocale.xml File?

- located in..\configuration folder
- backups have time stamp suffix
- records configuration choices made in IBM Cognos Configuration for product and content locales, locale mapping, and currency support

© 2015 IBM Corporation



If you experience problems with language support in the user interface or in reports, use these files to track your changes.

## What is Auditing in IBM Cognos 10?

- audit logging provides basic information about user and system activity
  - user login/logout
  - report executions
  - schedule executions
  - services start/stop
  - agent execution
  - authorization actions (add/remove permissions)
  - threshold violations (IBM Cognos Administration defined metrics)
- Human Task Service (HTS), Annotation Service (AS) activity

© 2015 IBM Corporation

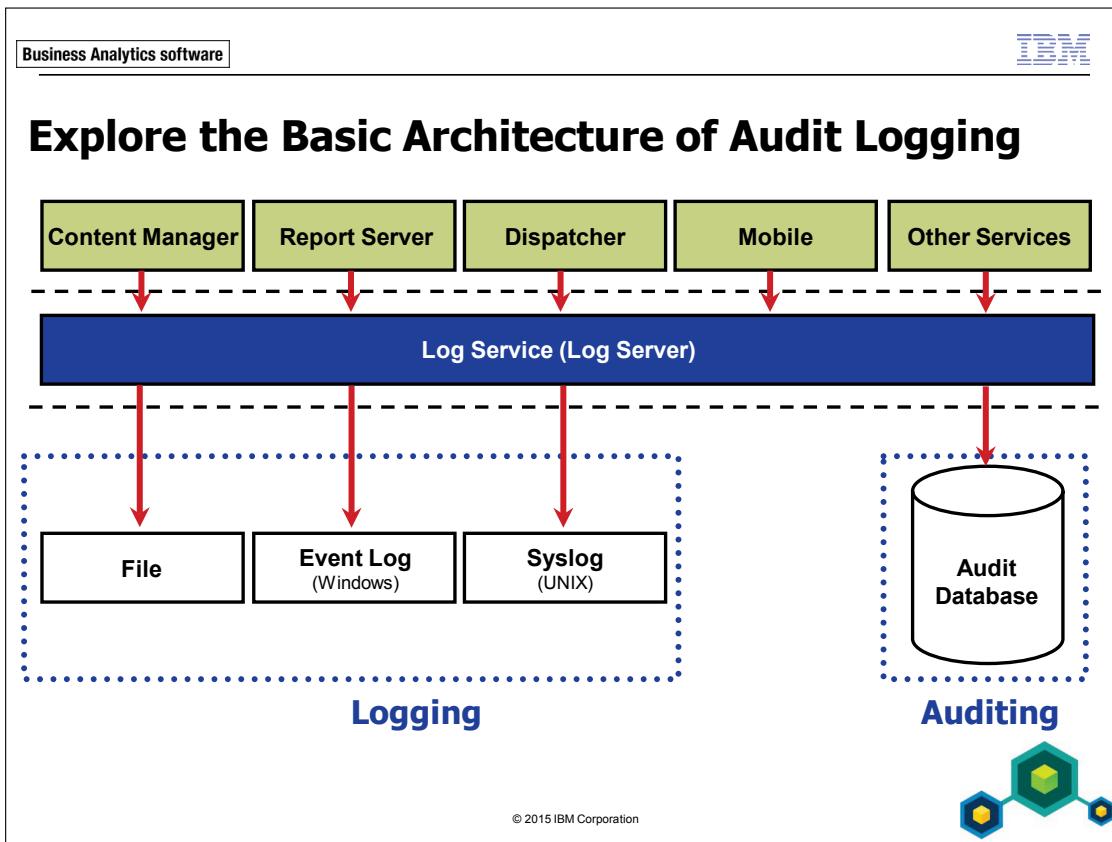


Audit logging can answer the following questions: Who? When? What? Affecting what object?

Audit logging is used to:

- audit the operation of a system or users
- monitor usage of reports and studios
- gather usage statistics
- troubleshoot issues in conjunction with other log files

What about reports of users by role, in order to be SOX compliant? This functionality is not available out of the box. However, the Audit Extension utility can be used to accomplish this task. It is available from the IBM developerWorks Web site at <http://www.ibm.com/developerworks/data/library/cognos/development/utilities/page574.html>.



Components and services provide output generated locally to a local instance of Log Service which runs on every installed instance and is the first service to start. This service will collect the input and output it to local destinations.

The log messages are not sent through the BIBus, but are instead passed to the local service through other means, such as direct port to port communication.

LogService is implemented by a component called Log Server.

The screenshot shows the IBM Cognos Administration interface. At the top, there's a navigation bar with links for 'Business Analytics software' and the 'IBM' logo. Below the navigation bar, the main title 'Set Logging Levels' is displayed in large, bold, black font. The interface is divided into several panes:

- Status Tab:** Shows a tree view of services under 'All servers > vclassbase > http://vclassbase:9315/p2pd'. Services listed include AgentService, AnnotationService, BatchReportService, ContentManagerCacheService, ContentManagerService, DeliveryService, EventManagementService, GraphicsService, HumanTaskService, idVizService, IndexDataService, IndexSearchService, IndexUpdateService, and JobService, all marked as 'Available'.
- Scorecard Tab:** Displays a table with columns 'Name' and 'Status' for the selected service.
- Metrics Tab:** Shows metrics for JVM and Request. It includes a table with columns 'Name' and 'Value' and a note: 'Last refresh time: March 20, 2015 12:27:05 PM'.
- Settings Tab:** Contains a table with a single entry: 'Logging' set to 'Minimal'. It also includes a note: 'Audit logging level for the dispatcher'.

At the bottom of the interface, there's a copyright notice: '© 2015 IBM Corporation' and a decorative graphic of three hexagons connected by lines.

Logging levels are configurable through the IBM Cognos Administration UI for each service. In IBM Cognos Administration, on the Status tab, the System page reveals a scorecard, metrics, and settings. In the Scorecard pane, click on the server name that you want to set logging on; for example, click `http://<server_name>:port/p2pd` for properties at the dispatcher level.

Logging levels are set based on a service for audit logging in the UI. Since this UI only reflects services (this is SOA), this is used as the base for defining the settings. Internally the log level specified for the service will be mapped to components.

## Explain Audit Logging Levels

- Minimal (default)
- Basic
- Request
- Trace
- Full

© 2015 IBM Corporation



The Trace and Full levels can generate huge files in a short time, and therefore can degrade server performance significantly, and should never be used during peak periods. Because of this, once you gather your required information, you should then reduce the log level.

The Minimal level is the default, which logs start and stop service logs and runtime errors.

The Basic level logs the same as the Minimal level and also tracks the following: Logon/Logoff/Logon Expired logs, Report and query execution logs, Schedule execution logs, Agent mail, and Build and execution logs.

In addition to logging the same as the Basic level, the Request level logs also includes SOAP request and response logs.

The Trace level logs the same as the Basic level and includes requests to components with parameter values or function calls.

The Full level logs all of the above.

## Demo 1: Set Logging Levels

The IBM Cognos 10 Full:9315 dispatcher and the IBM Cognos 10 DispCM:9320 dispatcher should be running at the beginning of this demo.

### Purpose:

You want to configure logging for the system. To become familiar with the logging available, you will use the IBM Cognos Administration tool.

### Task 1. Select a dispatcher to configure.

1. Launch Internet Explorer, go to <http://vclassbase:88/C10Full>, log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials, and then launch **IBM Cognos Administration**.
2. On the **Status** tab, click **System**.
3. In the **Scorecard** pane, click **vclassbase**, and then click <http://vclassbase:9315/p2pd>.

A section of the result appears as follows:

The screenshot shows the 'Scorecard' pane with the following details:

- Path:** All servers > vclassbase > http://vclassbase:9315/p2pd
- Services:**

Name	Status
http://vclassbase:9315/p2pd	Available
AgentService	Available
AnnotationService	Available

### Task 2. Configure the Logging settings.

1. In the **Settings** pane, expand **Logging**.

The current logging level is displayed, which is minimal logging for the dispatcher.

2. To access logging settings at the dispatcher level, click the **Set properties** icon on the **Settings** pane title bar.
3. In the **Category** list click **Logging**.

There are many entries to configure logging for. Each service can be configured independently across the system.

4. Click **Next Page** to review more entries, and then click **First Page**.  
Leave IBM Cognos Administration open.

### **Task 3. Review the results of minimal logging for the dispatcher.**

1. Launch Windows Explorer, navigate to **C:\Program Files\IBM\cognos\c10\_64full\bin**, and then double-click **logviewV2.exe**.  
Optionally, you may want to create a shortcut for IBM Cognos Log Viewer on the desktop, for your convenience, as it will be used a few times in the course.
2. In **IBM Cognos Log Viewer**, from the **File** menu, click **Load Cognos Log File(s)**, and then double-click **cogserver.log**.
3. Near the bottom left, click the **cogserver.log** tab, and then scroll to the bottom of the log, and click the last entry, scrolling through the lower pane to read the entry details.  
You may see information similar to the following (the exact message will differ, depending on the actions that have occurred in your environment):

<b>Component ID:</b>	DISP
<b>Build Number:</b>	6100
<b>Level:</b>	1
<b>Logger:</b>	Audit.Other.dispatcher.DISP.com.cognos.pogo.logging.SystemEventLogger
<b>Operation:</b>	Start
<b>Object Type:</b>	Dispatcher
<b>Object Path:</b>	
<b>Status:</b>	Success

Minimal tracing logs start and stop service logs and runtime errors. The most recent entries that you see should include these types of messages. Notice that there are no entries for logging on or off, or query executions, as that is not traced at the minimal level.

4. Close **IBM Cognos Log Viewer**.  
You will work more with this application later.

## Task 4. Modify the logging level to request level tracing.

1. Switch to **IBM Cognos Administration**, on the **Set properties** page, for the **Audit logging level for the dispatcher** entry, change the value from **Minimal** to **Request**, and then click **OK**.
2. In the **Settings** pane, expand **Logging**.  
The new logging level is displayed.

<input style="width: 15px; height: 15px; border: 1px solid black; vertical-align: middle;" type="button" value="+"/>	Name	Value
<input style="width: 15px; height: 15px; border: 1px solid black; vertical-align: middle;" type="button" value="-"/>	<b>Logging</b>	
	Audit logging level for the dispatcher	Request

## Task 5. Log on, run a report, and observe the results.

1. Log off **Admin Person**, and then log on again with **admin/Education1** credentials.
2. Launch **IBM Cognos Connection**, navigate to **Public Folders\Samples\_DQ\Models\GO Sales (query)\Report Studio Report Samples**, and run the **Horizontal Pagination\_DQ** report.
3. When the report displays, log off **Admin Person**.
4. Launch **IBM Cognos Log Viewer**.  
In Windows Explorer, navigate to **C:\Program Files\IBM\cognos\c10\_64full\bin**, and double-click **logviewV2.exe**, or use the Desktop shortcut if you created one.
5. From the **File** menu, click **Load Cognos Log File(s)**, and then double-click **cogserver.log**.

6. Near the bottom left, click the **cogserver.log** tab, maximize the window, and then scroll to the bottom of the log, reviewing the most recent entries.  
You may see a message similar to the following:

<b>Component ID:</b>	DISP
<b>Build Number:</b>	6100
<b>Level:</b>	4
<b>Logger:</b>	Audit.Other.dispatcher.DISP.com.cognos.pogo.handlers.engine.ServiceLookupHandler
<b>Operation:</b>	
<b>Object Type:</b>	
<b>Object Path:</b>	
<b>Status:</b>	
<b>Message:</b>	

Notice that there are many more entries that are tracked at this level of logging. The Request level logs start and stop service logs and runtime errors, tracks Logon/Logoff/Logon Expired logs, Report and query execution logs, Schedule execution logs, Agent mail, and Build and execution logs, and includes SOAP request and response logs.

7. Close all open windows.

At this point, if logging was completed, you would return the logging state back to minimal, but in this case, you will need this detailed logging for a workshop later in this course, so you will leave the logging state as request.

8. To prepare the environment for the upcoming workshop, from the **Taskbar**, launch **Services**, and stop the **IBM Cognos DispCM:9320** dispatcher.

### Results:

**You used IBM Cognos Administration to explore the logging available in IBM Cognos 10, and set the audit logging for the Dispatcher service to Request tracing level.**

Business Analytics software

IBM

# What is Native Query Logging?

	Category	Name	Value	Acquired
<input type="checkbox"/>	Logging	Write model to file	<input type="checkbox"/>	Yes
<input type="checkbox"/>	Logging	Generate comments in native SQL	<input type="checkbox"/>	Yes
<input type="checkbox"/>	Logging	Enable query planning trace	<input type="checkbox"/>	Yes
<input type="checkbox"/>	Logging	Enable query execution trace	<input type="checkbox"/>	Yes
<input type="checkbox"/>	Logging	Audit the native query for report service	<input type="checkbox"/>	Yes
<input type="checkbox"/>	Logging	Audit the native query for batch report service	<input type="checkbox"/>	Yes

© 2015 IBM Corporation



For Report service, Batch report service and PowerPlay service, there is an additional setting to enable capturing the SQL/MDX sent to the query engine in audit logging. The captured SQL/MDX is not necessarily the one sent to the database, as the query engine might apply changes for various reasons.

The true native SQL/MDX can only be captured at the database side or in UDA trace (SQL for relational) or MDX debug output.

## Explain Audit Logging Destinations

- target for audit logging data
- several types of destinations supported for different purposes
- multiple destinations can be used at the same time
- not every destination will output the same data

© 2015 IBM Corporation



Several types of destinations are supported for different purposes, including database, files, Windows Event log, UNIX System log (Syslog), and Remote log service.

Depending on the destination, the generated log data will be filtered. Information that will vary includes the level of detail and the services and components that will be included.

For information on tables that are available in the audit logging database and what they are used for, refer to the IBM Cognos BI: Administration (v10.2.2) course, and the IBM Cognos Business Intelligence 10.2.2 Administration and Security Guide.

## Where are Destinations Stored?

- audit database
  - stores audit logging data in a relational database schema for reporting on it
- filtering
  - only stores messages at Basic level or above
  - does not store system errors
- enable native query logging to capture SQL/MDX being sent to the query engine

© 2015 IBM Corporation



Destinations are defined in IBM Cognos Configuration. The default destination is File. Additional destinations can be defined as required.

The destination database is commonly referred to as the audit database. Currently supported databases are DB2, SQL Server, Oracle, Informix, and Sybase.

A business reason for audit logging would be to gather usage statistics for reports and studios, track report, agent, and schedule executions, and to determine user activity.

IBM Cognos 10 provides a sample Framework Manager model and deployment that is included in the BI Samples install component. Model files can be found in the ..\webcontent\samples\models\Audit directory. Sample reports are provided in a deployment archive file located at ..\webcontent\samples\content\IBM\_Cognos\_Audit.zip.

## Additional Information:

- The BI Samples are a separate install and do not come with the base IBM Cognos 10 server install.
- The Apache Derby that is used for the Cognos Content Store is not supported as an audit database.
- By default, the logging levels are set to Minimal.

**Business Analytics software**

**IBM**

## Explore the File Log

- stores output in flat tab delimited file(s)
- no filtering
- default configuration out of the box
  - log file name is cogserver.log, size 10 MB, single file only

The screenshot shows the IBM Cognos Administration interface. On the left is the 'Explorer' pane with a tree view of 'Local Configuration' under 'Environment'. The 'Logging' node is expanded, showing 'File' as the selected destination. To the right is the 'File - Destination - Resource Properties' dialog box, which contains a table of properties:

Name	Value
Type	File
* Log file location	..../logs/cogserver.log
* Maximum size of log file in MB	10
* Maximum number of full log files	1
Use UTF8 encoding?	False

At the bottom of the dialog box, it says '© 2015 IBM Corporation'. To the right of the dialog box is a decorative graphic of three hexagons in yellow, green, and blue.

The destination File stores output in flat tab delimited file(s), for which you can configure the number and size of the log files. If all files are filled, the oldest one will get deleted and a new one is created for the most recent output (rolling windows). You will need to stop, and then start the IBM Cognos service to apply the new configuration settings.

The output is not filtered at all, and contains SQL/MDX if native query logging has been enabled.

cogserver.log should be the first place to look if something does not work or stops working. It is unusual to change the default destination, and it is recommended that name cogserver.log be used for this file.

The configuration fields are as follows:

- **Type:** The destination type (not modifiable).
- **Log file location:** location and file name of the log file. The ../ indicates the install directory.
- **Maximum Size of Log File in MB:** Maximum size before a new file will be created.
- **Maximum Number of Full Log Files:** The number of log files created. Can be a value between 1 and 10,000.

If multiple log files get created then the name of the files would be cogserver.1.log, cogserver.2.log.

The file without any .#.log, for example cogserver.log, will always have the most recent information.

**Business Analytics software**

**IBM**

## Explore the Windows Event Log

- send audit logging messages to the Windows Event log
- no filtering
- requires IBM Cognos 10 to be started as a Windows service

Name	Value
Type	Event log
* NT Event log source	IBM Cognos

© 2015 IBM Corporation

Logging messages are sent to the Application log; you may have to adjust the maximum size of the log to suit your environment. Use this when running as a Windows service to support integration with an Event Log based system management.

No filtering is applied, and it will not include SQL/MDX even if native query logging has been enabled.

This logging requires IBM Cognos 10 to be started as a Windows service, and does not work if IBM Cognos 10 is launched with startup.bat. The NT Event log source field is going to be the name that shows under the Source Column in the Windows Event Log. This value is modifiable.

If the Event Log source name changes in IBM Cognos Configuration, then the service will be unregistered with the old name, and the new name will get registered. Restarting the Windows service is necessary for these settings to take effect. Use startup.bat in test environments for a quick startup; it will run in a command window.

**Business Analytics software**

**IBM**

## Explore the UNIX System Log

- send audit logging messages to the UNIX/LINUX system log (syslog)
- no filtering

Name	Value
Type	Syslog
* Syslog host name	vclassbase
* Syslog facility	DAEMON
Print syslog facility?	False

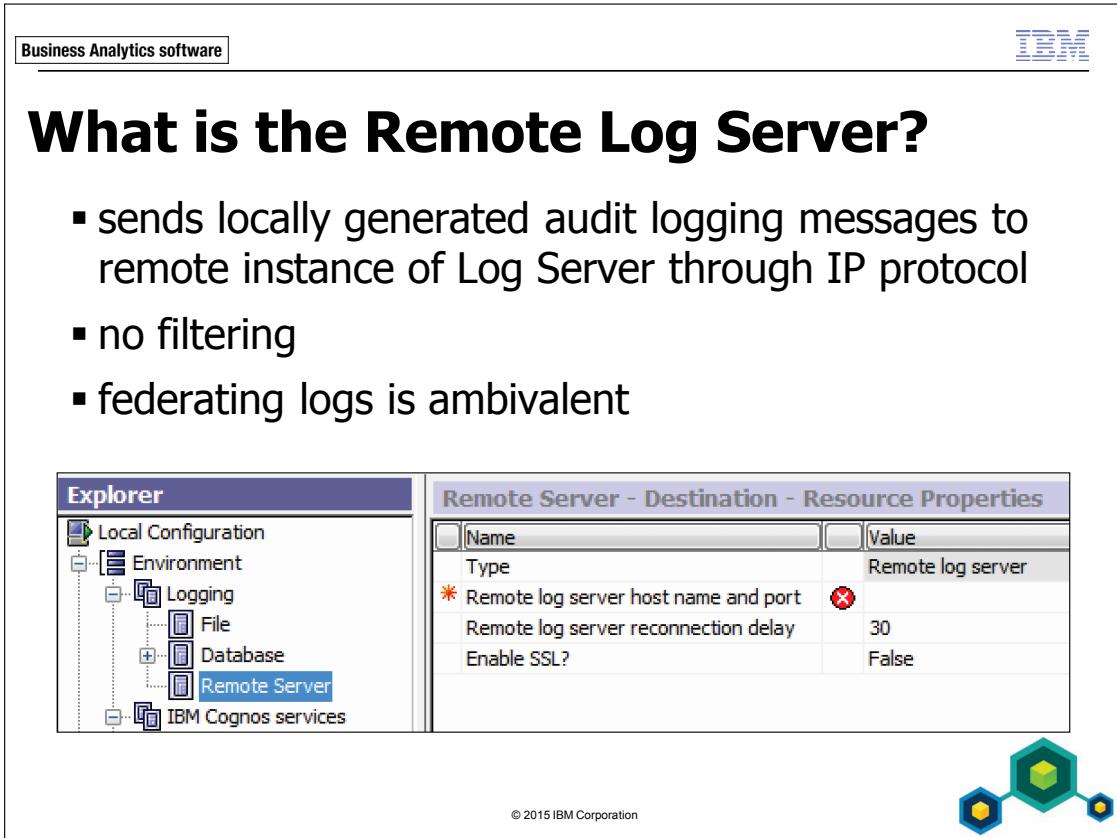
© 2015 IBM Corporation

Use this logging mechanism when running on UNIX/Linux to support integration with syslog based system management.

No filtering is applied, and it will not include SQL/MDX even if native query logging has been enabled.

The configuration fields are as follows:

- Syslog host name: The name of the machine for the log file to be generated on.
- Syslog facility: The system component generating the system log. Possible values are KERN, USER, MAIL, DAEMON, AUTH, SYSLOG, LPR, NEWS, UUCP, CRON, AUTHPRIV, FTP, LOCAL0, LOCAL1, LOCAL2, LOCAL3, LOCAL4, LOCAL5, LOCAL6, LOCAL7.



The screenshot shows the 'Remote Server - Destination - Resource Properties' dialog box. In the left pane, under 'Local Configuration > Environment > Logging > Remote Server', the 'Remote Server' item is selected. The right pane displays the properties for this destination:

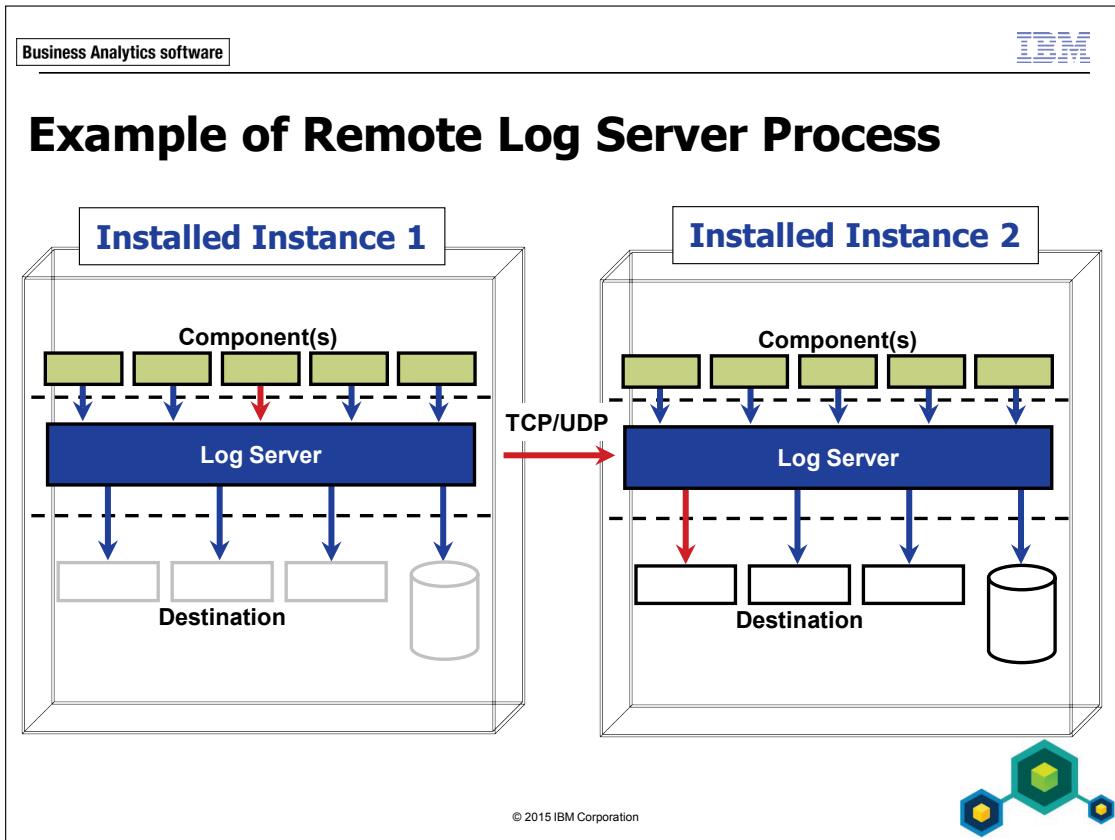
Name	Value
Type	Remote log server
* Remote log server host name and port	(highlighted with a red asterisk)
Remote log server reconnection delay	30
Enable SSL?	False

At the bottom of the dialog, there is a copyright notice: © 2015 IBM Corporation.

Use this method to collect and merge log messages from IBM Cognos 10 servers in a distributed install into one location. Log messages are sent to a remote instance of Log Server as UDP (User Datagram Protocol) by default, but could be sent by TCP as an alternative. SSL encryption can be applied.

No filters are applied, and all output is forwarded to the destination Log Server.

Federating, or joining logs is ambivalent, so you get the advantage of all logs in one location, but this will require more effort to identify an issue on a certain installed instance. It is suggested to keep local file based destinations and specify Remote Log Service destinations additionally. If the connection to the remote Log Server is lost, local recovery files will get created.



A component of installed instance 1 sends information to the local Log Service which sends it to the remote Log service on installed instance 2. Installed instances may not necessarily be on different servers. The Log service on installed instance 2 will send the info to one of the output destinations defined for installed instance 2.

Transmission is by TCP or UDP. TCP and UDP are both OSI layer 4 protocols and part of the Internet Protocols (IP) suite. While TCP is a reliable protocol which supports integrity checking, preserving the sequence of transmitted data and the confirmation from the receiver if the data was received completely, this is not supported by UDP. UDP is a protocol that sends the message and forgets about it on the client side. In practice UDP is faster but does not guarantee that data reaches the recipient in the right order or integrity. This can imply losing log messages or receiving them in the wrong order. Under high loads however, UDP might be a practical choice.

## Workshop 1: Configure a Windows Event Log and Review Audit Information

You want to familiarize yourself with the information which is tracked in an audit database and logged to the cogserver.log file, and compare that to information logged in a Windows Event log for IBM Cognos 10. There is an audit database already configured in your environment which logs to cogserver.log, so you will have to configure a Windows Event log, and then run some activities in IBM Cognos 10, so that you can compare results between the two logs.

To do this you will:

- in IBM Cognos Configuration of the IBM Cognos 10 Full instance, create a new resource: Destination, named Windows7; type: Event log
- save the configuration, and restart the services
- perform activities such as running DQM reports in IBM Cognos 10 to populate the audit tables; logged on with admin/Education1 credentials (you will use DQM as this is the only server currently running, in the interest of time stopping and restarting the servers)
- review the logged results in Event Viewer
- review the logged results in C:\Program Files\IBM\cognos\c10\_64full\logs\cogserver.log, using Microsoft Excel

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows. If you need more information to complete a task, refer to earlier demos for detailed steps.

## Workshop 1: Tasks and Results

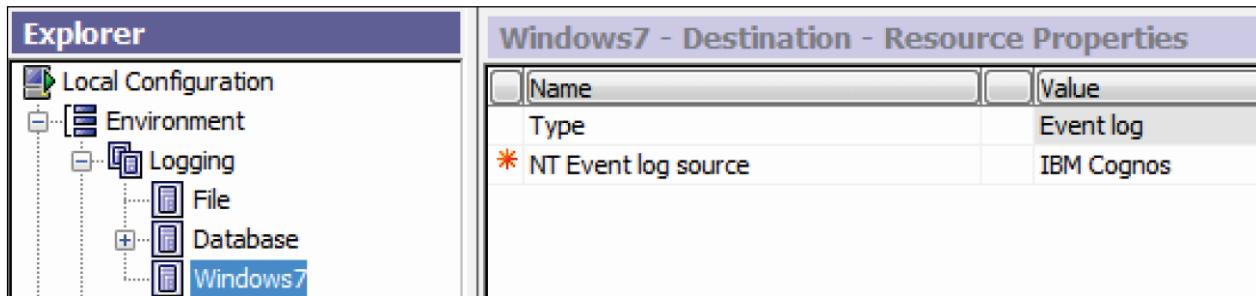
At the beginning of this workshop, the IBM Cognos Full:9315 dispatcher is running; the IBM Cognos DispCM:9320 dispatcher is not running. This is solely to reserve system resources. Stop the IBM Cognos DispCM:9320 dispatcher if it is running.

### Task 1. Configure logging to the Windows Event log.

Currently, your environment is logging to an audit database, and you also want to log to a Windows destination, to compare the results.

- From the **Start** menu, click **All Programs**, click **IBM Cognos 10 - 64 Full**, and then click **IBM Cognos Configuration**.
- In the **Explorer** pane, navigate to **Environment\Logging**.
- Right-click **Logging**, click **New resource**, and then click **Destination**.
- In the **New Resource - Destination** dialog box, name the destination **Windows7**.
- From the **Type** list, select **Event log**, and then click **OK**.

You have configured logging to the Windows Event log destination.



- Save the configuration and restart it, closing all messages that appear.  
Be patient, as it will take a few minutes for all the underlying services to restart. If the Lotus Domino Server (CProgramFilesx86IBMLotusDominodata) service is not running in the Services window, you will see a message in IBM Cognos Configuration indicating that the mail server cannot be reached. This is acceptable because you are not using the mail server at this time.
- Close **IBM Cognos Configuration** when the services have successfully started.

## Task 2. Perform activities in IBM Cognos 10 to populate cogserver.log.

- Launch Internet Explorer, go to <http://vclassbase:88/C10Full>, log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials, and then launch **IBM Cognos Connection**.
- In **My Folders**, run the job called **Run Multiple Chart Reports DQM**.

If you did not perform the demo earlier in this course that created this job, you can run a few random dynamic query reports of your choice. You have configured auditing for the 9315 dispatcher only, and that is the dispatcher which services dynamic queries, so run dynamic query reports to ensure results. When you run the job, you can monitor the execution by selecting the option to view run history details before clicking OK.

- After the reports run (this will take a few moments), close the browser window.

## Task 3. Review the logged results in Event Viewer.

- To open **Event Viewer**, from the **Start** menu, navigate to **Control Panel\Administrative Tools**, and then double-click **Event Viewer**.
- Maximize the window, and then in the navigation pane on the left, expand the **Windows Logs** folder.

There are five categories of messages for you to view: Application, Security, Setup, System, and Forwarded Events.

- Click **Application**.

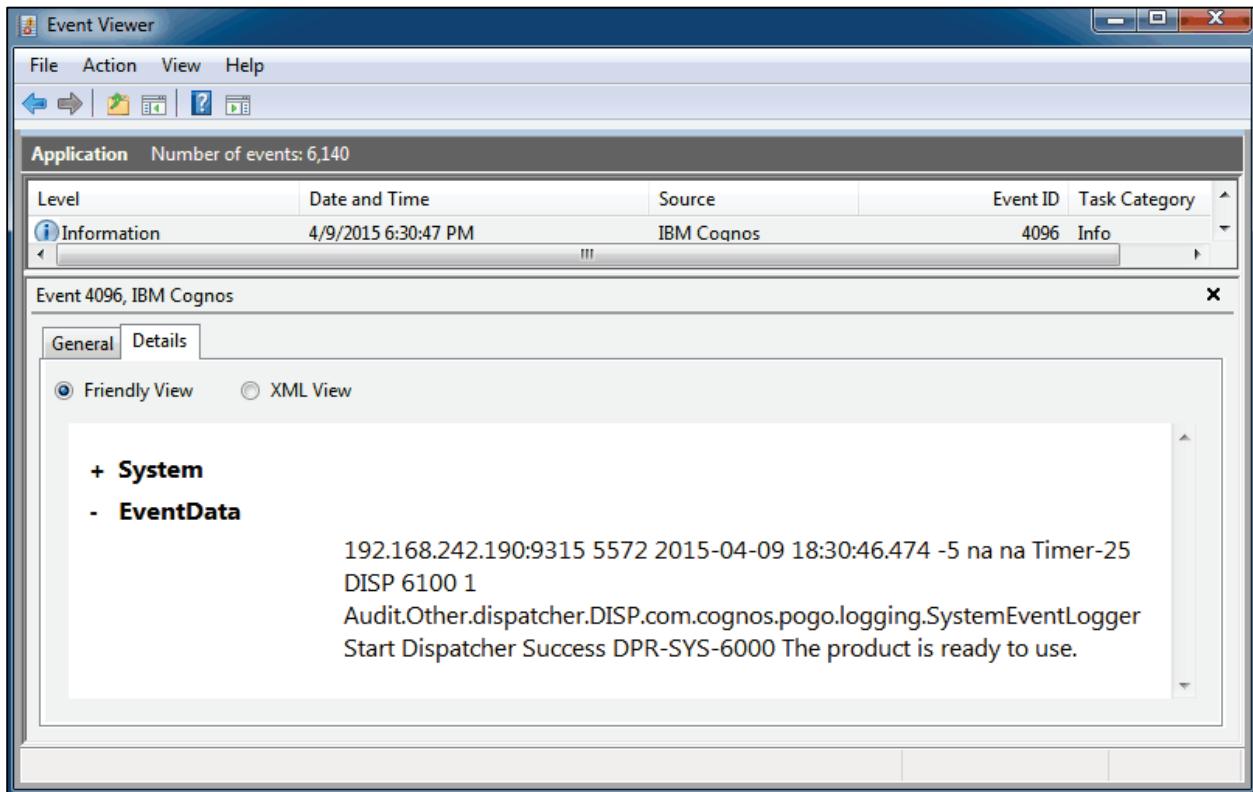
The logged entries are displayed. It may take some time for the entries to display.

- Under the **Source** column, double-click an **IBM Cognos** entry.

The information is displayed for the entry.

- In the **Event Properties** window, click the **Details** tab, click + to expand **System**, review the information, and then close the **Event Properties** dialog box.

The results appear similar to the following:



- Scroll through the list of entries in the **Application** pane, opening an IBM Cognos entry for each of the following types: **Information**, **Warning**, and **Error** (if applicable)
- When you have finished reviewing the events, close the **Event Viewer** window, close the **Administrative Tools** window, and then close the **Control Panel** window.

## Task 4. Review the logged results in cogserver.log.

- Launch Windows Explorer, navigate to C:\Program Files\IBM\cognos\c10\_64full\logs, and then open cogserver.log with Microsoft Excel.

The file will be locked, as the server is using it, so open as read only when prompted. You may also be prompted about the file not loading completely; accept this message.

The results appear similar to the following:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	192.168.242.188:9315	1340	20:57.0	-5		main	LOGS	6100	1	server.Audit.IF StartService	LogService				SUCCESS	<parameters><item name="DB URL"><![CDATA[				
2	192.168.242.188:9315	1340	20:57.0	-5		main	LOGS	6100	1	server.Audit.IF StartService	LogService				Success	<parameters><item name="Port"><![CDATA[93				
3	192.168.242.188:9315	1340	21:12.2	-5		main	caf	2047	1	Audit.dispatch	Request				Info	CAF-WRN-0021 CAF Third Party XSS checking dis				
4	192.168.242.188:9315	1340	21:19.6	-5		Thread-2	LOGS	6100	1	server.Audit.IF Execute	AuditDatabaseC.jdbc:db2://	i/	Success	<parameters><item name="DB Connection"><![CDATA[						
5	192.168.242.188:9315	1340	21:12.2	-5		main	caf	2047	1	Audit.dispatch	Request				Info	CAF-WRN-0010 CAF input validation enabled.				
6	192.168.242.188:9315	1340	21:26.0	-5		Initiali	zationThread-2	CM	6100	1	Audit.cms.CM	StartService ContentManagerService				Info	CM-SYS-2057 Creating content store tables (sch			
7	192.168.242.188:9315	1340	22:11.4	-5		Initiali	zationThread-2	CM	6100	1	Audit.cms.CM	StartService ContentManagerService				Info	CM-SYS-2215 A Content Manager internal PRECA			
8	192.168.242.188:9315	1340	22:11.7	-5		Initiali	zationThread-2	CM	6100	1	Audit.cms.CM	StartService ContentManagerService				Info	CM-SYS-2216 A Content Manager internal PRECA			
9	192.168.242.188:9315	1340	22:12.3	-5		Initiali	zationThread-2	CM	6100	1	Audit.cms.CM	StartService ContentManagerService				Info	CM-SYS-2093 The Content Manager cache initial			
10	192.168.242.188:9315	1340	22:12.3	-5		Initiali	zationThread-2	CM	6100	1	Audit.cms.CM	StartService ContentManagerService				Info	CM-SYS-2215 A Content Manager internal POSTI			

- Scroll through the messages, and notice that they include different information than what was tracked in the Windows Event log.  
The information tracked in cogserver.log is collected at a lower level of detail.
- When you have finished reviewing this file, close Microsoft Excel without saving changes, and then close Windows Explorer.

## What is IPF Logging?

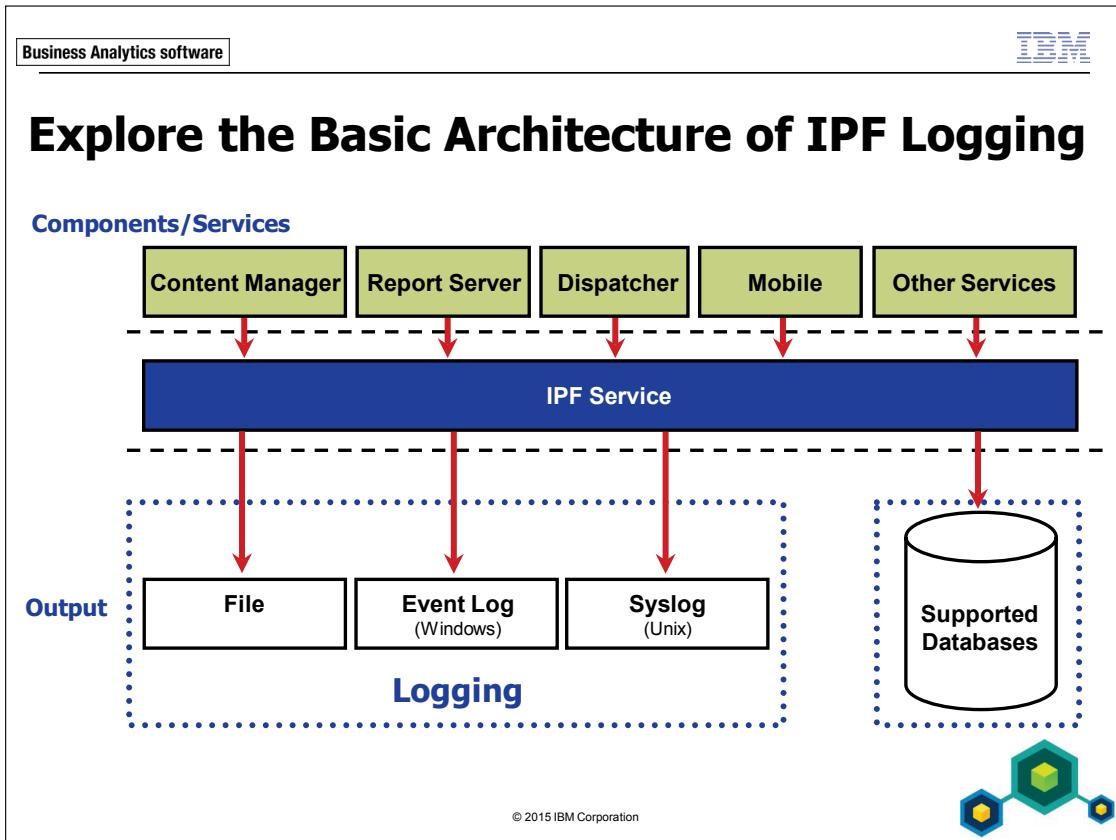
- based on Indication Processing Facility (IPF)
- IPF is thin wrapper around log4j
  - many applications use log4j as logging framework
  - update log4j default configuration file for applications that integrate with IBM Cognos 10 integrates
- Java and C++ interfaces
  - IBM Cognos interfaces

© 2015 IBM Corporation



log4j is a Java-based logging utility that allows configuration of what information is output to log files. It is used primarily as a debugging tool, and is one of several Java logging frameworks. log4j is part of the Jakarta project of the Apache Software Foundation.

Although the Apache Jakarta Project has been retired, more information is available at <http://jakarta.apache.org> and <http://logging.apache.org/log4j/1.2/>.



IPF has a client-server architecture. The IPF Server is configured through IBM Cognos Configuration and IBM Cognos Connection, and IPF clients use their own configuration files.

In the diagram, the IPF Clients are the Components/Services.

## What are IPF Indications?

- indication, category
- 3 types
  - Audit
  - Trace
  - Performance

© 2015 IBM Corporation



Another word for indication is category. There are 3 types of indications:

- Audit: shows calls that are made from components
- Trace: shows what tasks and function calls are being performed
- Performance: shows the amount of system resources taken for a task

**Business Analytics software**

**IBM**

## What are the Fields of Audit and Trace Indications?

- Host Identity
- Process ID
- Time
- TimeZone Offset
- Session ID
- Request ID
- SubRequest
- Step ID
- Thread ID
- Component ID
- Build Number
- Level
- Logger Name
- Operation
- Object Type
- Object Path
- Status
- Message
- Log Data

© 2015 IBM Corporation



These fields are what is parsed out to logviewerV2.

Host Identity: Identifies the system on which the indication was generated. It is expressed as an IP address.

Process ID: The operating system assigned Process ID (PID). The Process ID provides information that aids in the analysis of process flow and the correlation of the actions within a component.

Time: Local system time of the event.

TimeZone Offset: Offset from GMT.

Session ID: Represents the session where the definition of a session is the lifetime of a passport ID and its passport.

Request ID: An ID representing the request.

SubRequest ID:	Subrequest ID of a component.
Step ID:	An ID representing the step within a job execution, otherwise it is empty.
Thread ID:	An ID representing the thread where the request is executing.
Component ID:	The four character name of the component generating the indication.
Build Number:	Build number of component.
Level:	Logging level that this indication was created with.
Logger Name:	Component that is processing the indication.
Operation:	Action being performed on an object.
Object Type:	Object on which the action is being performed. It depends on the context but often it will be the name of a service that the Component ID is calling.
Object Path:	Path of the object on which the action is being performed. This field is often empty but when populated it is usually a Content Store search path or a connection string.
Status:	Operations where a start and end indication are written.
Message:	Content of what was performed.

Business Analytics software

**IBM**

## Applicability of Audit and Trace Indication Fields

Field Name	Minimal	Basic	Request	Trace	Full
Host Identity	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Process ID	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Time	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
TimeZone	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Session ID	N/A	Mandatory	Mandatory	Mandatory	Mandatory
Request ID	Optional	Optional	Mandatory	Mandatory	Mandatory
SubRequestID	N/A	Optional, Conditional Mandatory*	Mandatory	Mandatory	Mandatory
StepID	N/A	N/A	Conditional Mandatory**	Conditional Mandatory**	Conditional Mandatory**
Thread ID	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Component ID	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Build Number	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Level	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
LoggerName	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
operation	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
logData	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
objectType	Optional	Mandatory	Mandatory	N/A	N/A
objectPath	Optional	Optional	Mandatory	N/A	N/A
status	Mandatory	Mandatory	Mandatory	N/A	N/A
Message	Optional, Conditional Mandatory***	Optional, Conditional Mandatory***	Optional, Conditional Mandatory***	N/A	N/A

\* if RequestID exists    \*\*only for jobs    \*\*\* if error occurs

© 2015 IBM Corporation



This indicates what fields will show in an indication for specific levels. N/A represents a field that is not applicable for the given level.

## What are the Fields of Performance Indication?

- Host Identity\*
- Process ID\*
- Time\*
- TimeZone Offset\*
- Session ID\*
- Request ID\*
- SubRequest ID\*
- Step ID\*
- Thread ID\*
- Component ID\*
- Build Number\*
- Level\*
- Logger Name\*
- Resource ID
- CPU Time
- Memory
- Disk Operations
- Disk IO
- Commops
- Commio
- Elapsed Time
- Class ID
- Method ID
- Sequence ID
- Execution ID
- Status
- Log Data

© 2015 IBM Corporation



Fields with an asterisk are identical to audit and trace indications, and the other fields are specific to performance indications.

There are other logs and traces that do performance, such as Perf.QFS, UDA.

Resource ID: ID used for internal purposes

CPU Time: Amount of time used by the CPU for processing

Memory: Current memory used by object.

Disk Operations: Count of disk operations made by object.

Disk IO: Total bytes read and written by the object.

Commops: Count of network operations made by an object.

Commio:	Total bytes read and written over network links.
Elapsed time:	Amount time taken in total to process.
Class ID:	Name of object creating the indication.
Method ID:	The name of the method/function from where the indication is being generated.
Sequence ID:	Value to distinguish multiple indications being logged in the same context.
Execution ID:	Unique ID for the indication to distinguish a given indication from another due to a call to the same component.
Status:	Current action represented by the indication.
Log Data:	Any custom data that a component wants to log.

**Business Analytics software**

**IBM**

## What are IPF Client Logs?

- component-specific IPF logs
- configuration files have the form ipfXXXXclientconfig where XXXX represents component name
- ipfClientConfig.xml
- files reside in ..\configuration folder

© 2015 IBM Corporation

Component specific IPF logs cannot be configured in the IBM Cognos 10, but instead configuration is done to a file named ipfClientConfig.xml. As more IBM Cognos components are installed, more ipfXXXXclientconfig files will be installed. Some component specific IPF files may have different layouts or verbosity levels regarding comments in them. Most important though, is that they may differ in the way they are used. Some files require modification beyond renaming them to get output.

When employing internal IPF based logging, enabling a client configuration file will disable the audit logging configured, including audit DB.

IPF Client logs can be useful to troubleshoot components (all tracing and debugging), or to troubleshoot performance issues of a component.

## Explain IPF Client Logging (1 of 2)

- IPF maintains watch on the ipfclientconfig.xml file pinging for it every 60 seconds
- rename the required ipfXXXXclientconfig.xml.sample file to ipfclientconfig.xml
- if ipfclientconfig.xml file is found, logging instantly is reconfigured according to file contents
- logs tracing and performance indications

© 2015 IBM Corporation



It is best practice to make a copy of the ipfXXXXclientconfig.xml.sample first before you rename (and edit) the required ipfXXXXclientconfig.xml.sample file to ipfclientconfig.xml.

If the ipfclientconfig.xml file is found, logging in the system is automatically reconfigured according to file contents and no restart of IBM Cognos 10 is required. To disable the logging, rename the file back to what it was before it was renamed to ipfclientconfig.xml.

Only Tracing and Performance indications are generally logged in IPF client logging. Audit indications must be explicitly enabled and special configuration must be applied so that Audit indications are sent back to the IPF Server where they are properly written to the configured Audit output targets.

## Explain IPF Client Logging (2 of 2)

- client configurations impose complete override of audit logging settings
- mapping file (..\configuration\ipfstartup.xml) loaded at LogService startup maps services to components

```
<service id="dispatcher">
  <component id="DISP"/>
  <component id="dispatcher"/>
  <component id="CAF"/>
</service>
```

**Mapping file**

© 2015 IBM Corporation



Client configurations impose a complete override of the audit logging settings. Audit logging configures the IPF Server only and does so only for audit categories, and ipfclientconfig.xml overrides at the IPF Client.

You may need to customize an ipfclientconfig.xml file to incorporate the audit logging settings to have tracing and audit logging in parallel. Changes to the files may be required if you are not running in Tomcat, or if the default log port has been changed.

If Audit logging been enabled, it is best to try to replicate issues in a non-production environment, so that IPF client logs can be taken without impacting the audit information in the production environment.

Audit logging is simply a UI-enabled subset of IPF functionality. Internal logging is more sophisticated and detailed, and its main purpose is for troubleshooting.

Business Analytics software			IBM
Component	File to Use	Helps Troubleshoot	
DISP	ipfdspclientconfig.xml.sample	Start-up problems (including services started by the Dispatcher), load balancing, performance	
BIBUS	ipfBiBusclientconfig.xml.sample	Low level communication between Dispatchers and Report Services	
CM	ipfCMclientconfig.xml.sample	Content Store database access problems	
CRP	ipfcryptoclientconfig.xml.sample	Keystore access and synchronization, access to AutoCA, SSL/Trust issues, Trusted Request problems	
AAA	ipfaaaclientconfig.xml.sample	Security issues	
CAF	ipfCAFclientconfig.xml.sample	Database access problems, get error details strip by the CAF secure error feature, get details about CAF validation failures, get textual descriptions of CAF configuration failures, debug CAF internal failures	
XTS	ipfXTSclientconfig.xml.sample	Query Studio UI issues, Cognos Portal Service (CPS) issues, Agent Studio UI issues	
JSM, DLS, JS, MS, ASV, EMS	ipfSDSclientconfig.xml.sample	Scheduling (JSM, JS), E-mail delivery (DLS), Agents (ASV), Future scheduled events or schedules (EMS), Background tasks currently running (MS)	

© 2015 IBM Corporation



## When to Use ipfXXXXclientconfig.xml (2 of 2)

Component	File to Use	Helps Troubleshoot
RSVP	ipfRSVPclientconfig.xml.sample	Report Service / Batch Report Service, reports and queries, performance
CQE	ipfCQEclientconfig.xml.sample	See notes
MDDS	ipfMDDSConfig.xml.sample	Interaction with 3rd party OLAP providers such as SAP, MSAS and DB2OLAP
UDA	ipfUDAClientconfig.xml.sample	Runtime Queries
CRX	ipfCRXclientconfig.xml.sample	Report Expressions
DMB	ipfDMBclientconfig.xml	See notes
FM	ipfFMclientconfig.xml.sample	Framework Manager
ANS	ipfANSclientconfig.xml.sample	Analysis Studio issues
XQE	ipfXQEclientconfig.xml.sample	Dynamic Query Mode issues
BUX	ipfBUXclientconfig.xml.sample	Cognos Workspace specific issues
HTS	ipfHTSclientconfig.xml.sample	Human Task Service issues
MOB	ipfMOBclientconfig.xml.sample	Cognos Mobile issues

© 2015 IBM Corporation



For CQE troubleshooting using the ipfCQEclientconfig.xml.sample file:

- Trace logging records the input received by CQE (such as governor settings), warnings, and detailed information about input query translation to CQE internal logical and physical query trees.
- Performance logging records the time spent in CQE functions.
- Audit logging records all CQE query service API calls.

For DMB (Dynamic Molap Builder) troubleshooting using the ipfDMBclientconfig.xml file:

- Audit data: Audit.RTUsage.DAM.DMB records information about Public API function call (names and parameters): the XML model definition, the data streams, and the request to build the cube.
- Trace data: Trace.DAM.DMB records information about the Exceptions thrown in DMB, policy implementation, and specific failures.
- Performance data: Perf.DAM.DMB records information about the time spent to build the cube (time spent in DMB and PPDS).

## Describe SDS Logging

- ipfSDSclientconfig controls logging of several services
- to turn on trace logging for the Agent Service in ipfSDSclientconfig.xml
  - search for <level value="warn">
  - change <level value="warn"> to <level value="debug">

```
<category name="Trace.ASV" class="com.cognos.indications.LogTypedLogger">
  <level value="warn"/>
  <appender-ref ref="clientFlatFile"/>
</category>
```

© 2015 IBM Corporation



The slide provides an example of turning on trace logging for the Agent service.

Business Analytics software



## Most Commonly Used IPF Traces

- CM
- AAA
- UDA / MDDS
- CQE
- PERF
- DISP
- RSVP

© 2015 IBM Corporation



These are the most common IPF traces that are used on a regular basis.

Some new IPF Client files as of IBM Cognos 10.2.0 include: XQE, BUX, HTS, SPSS.

## Summary

- At the end of this module, you should be able to:
  - describe installation logs and configuration logs
  - explore audit logging
  - explore IPF logging

© 2015 IBM Corporation



## Workshop 2: Configure IPF Logging

You need to configure log files to get additional logging information for Cognos 10 components. These log files are useful in getting additional information for specific Cognos 10 Components. Specifically, you will implement IPF logging on the dispatcher and Content Manager components. You will be working with the IBM Cognos 10 - 64 Full instance only, in this workshop.

To do this you will:

- open ipfdispclientconfig.xml in Internet Explorer, examine elements of the file, and focus on the <appender> sections, noting the target file names and locations
  - What is the difference between the <appender> sections named fileWithFilter and clientFlatFile?
- implement IPF logging on the dispatcher
  - stop services for the IBM Cognos Full:9315 instance
  - rename the file appropriately and start the services
  - stop services and examine the log file in Microsoft Excel
  - disable IPF logging on the dispatcher
- repeat as above for the Content Manager using the ipfCMclientconfig.xml file

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows. If you need more information to complete a task, refer to earlier demos for detailed steps.

## Workshop 2: Tasks and Results

At the beginning of this workshop, the IBM Cognos Full:9315 dispatcher is running; the IBM Cognos DispCM:9320 dispatcher is not running. This is solely to reserve system resources.

### Task 1. Open the ipfdispclientconfig.xml file and examine the elements of the file.

When IPF logging is implemented on the ipfdispclientconfig.xml file, it can be used to troubleshoot start-up problems, including services started by the dispatcher, load balancing issues, and performance issues.

- In Windows Explorer, navigate to **C:\Program Files\IBM\cognos\c10\_64full\configuration**, copy **ipfdispclientconfig.xml.sample**, and then paste to the same directory.
  - Rename **ipfdispclientconfig.xml - Copy.sample** to **ipfdispclientconfig.xml**, from the file properties, ensure that the **Read-only** attribute is not selected, and then open the file in **Internet Explorer** (iexplore.exe).
- If the Information Bar displays a message about running scripts, click the Information Bar, click Allow Blocked Content, and then click Yes.
- Locate the following section:

```

- <appender class="org.apache.log4j.RollingFileAppender"
  name="fileWithFilter">
  <param name="File" value="../logs/crnclientWarn.log"/>
  <param name="MaxBackupIndex" value="1"/>
  <param name="MaximumFileSize" value="10485760"/>
- <layout class="org.apache.log4j.PatternLayout">
    <param name="ConversionPattern" value="%m%n"/>
</layout>
- <filter class="org.apache.log4j.varia.LevelRangeFilter">
    <param name="LevelMin" value="WARN"/>
    <param name="LevelMax" value="WARN"/>
</filter>
</appender>
```

This section is used to define a log file that includes a filter as defined by **<param name="LevelMin" value="WARN" />** and **<param name="LevelMax" value="WARN" />**. As a result this file will only capture WARN messages if they are generated.

- Locate the following section:

```
<appender class="org.apache.log4j.RollingFileAppender"
  name="clientFlatFile" >
  <param name="File" value="../logs/crnclient.log"/>
  <param name="MaxBackupIndex" value="1"/>
  <param name="MaximumFileSize" value="10485760"/>
  - <layout class="org.apache.log4j.PatternLayout">
    <param name="ConversionPattern" value="%m%n" />
  </layout>
</appender>
```

This section is used to define a log file that is not filtered. As a result this file will capture WARN messages and all lower messages, such as STOP and START, if they are generated.

Notice that both sections include parameters for defining:

- a target file name and location for log output, for example:
  - <param name="File" value="../logs/crnclient.log" />
- file properties, for example:
  - <param name="MaxBackupIndex" value="1" /> - maximum number of log files that will ever exist
  - <param name="MaximumFileSize" value="10485760" /> - maximum size of the log file in KB

Note: With these property settings, when the file reaches its maximum size, log data begins to be overwritten. If MaxBackupIndex value is set to > 1, then once the maximum file size is reached additional log files will be created as <name>.log.1, <name>.log.2, <name>.log.3 depending on the set value.

- Close Internet Explorer.

## Task 2. Implement IPF logging on the dispatcher using ipfdiscclientconfig.xml.

- On the Taskbar, click Services, and then stop the IBM Cognos Full:9315 service.
- In Windows Explorer, rename ipfdiscclientconfig.xml to ipfclientconfig.xml.
- Navigate to C:\Program Files\IBM\cognos\c10\_64full\logs.
- Delete all files from the root of the logs folder, and then start the IBM Cognos Full:9315 service.

Do not delete the XQE directory or its contents.

If a message displays, indicating that the service did not start in a timely fashion, click OK to dismiss this message. Wait until this instance has fully started (you may do a refresh of the display every two minutes) before proceeding to the next step.

- When the service has successfully started, navigate to **C:\Program Files\IBM\cognos\c10\_64full\logs** to identify the log files that are generated as a result of the start operation, including the **crnclient\_xxxx.log** files.

The results appear similar to those shown below:

Name	Date modified	Type	Size
aurora	4/7/2015 5:43 PM	File folder	
ffdc	4/7/2015 5:41 PM	File folder	
XQE	4/7/2015 5:43 PM	File folder	
cbs_run_WebSphereLiberty.log	4/7/2015 5:44 PM	Text Document	1 KB
cmMetrics_2015-04-07.log	4/7/2015 5:41 PM	Text Document	1 KB
cogserver.log	4/7/2015 5:44 PM	Text Document	40 KB
crnclient_8180.log	4/7/2015 5:43 PM	Text Document	0 KB
crnclient_8420.log	4/7/2015 5:44 PM	Text Document	9 KB
ipfInternal_cpp.log	4/7/2015 5:41 PM	Text Document	0 KB
ipfInternal_java.log	4/7/2015 5:41 PM	Text Document	0 KB
mob.log	4/7/2015 5:43 PM	Text Document	15 KB
mobccs.log	4/7/2015 5:42 PM	Text Document	0 KB
p2pd_messages.log	4/7/2015 5:44 PM	Text Document	112 KB
pdc-0.log	4/7/2015 5:44 PM	Text Document	1 KB
pdc-0.log.lck	4/7/2015 5:44 PM	LCK File	0 KB
pogo_2015-04-07.log	4/7/2015 5:44 PM	Text Document	13 KB
pogoMetrics_2015-04-07.log	4/7/2015 5:41 PM	Text Document	0 KB
qs_cmMetrics_2015-04-07.log	4/7/2015 5:43 PM	Text Document	0 KB
qs_pogo_2015-04-07.log	4/7/2015 5:43 PM	Text Document	0 KB
qs_pogoMetrics_2015-04-07.l...	4/7/2015 5:43 PM	Text Document	0 KB
wlp_cogbootstrap_service.pid	4/7/2015 5:40 PM	PID File	1 KB

- Stop the **IBM Cognos Full:9315** service.
- Open the most recent **crnclient\_xxxx.log** file with **Microsoft Excel** (the other **crnclient\_xxxx.log** file will be empty).

If an activation message appears for Microsoft Excel, dismiss the message, and continue.

In Microsoft Excel, you may have to click the **crnclient\_xxxx** tab to see the results display.

At this point the **crnclient\_xxxx.log** file contains start up information only, as that is the only operation you have performed. Notice that columns map to the indication fields seen earlier in the content of this module.

The results appear similar to the following:

	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	Perf.dispatcher	the_dispatcher	0	0	0	0	0	0	0	com.cognos.pogo.handlers checkproxy		1428443048171_d4960367	ENTER	
2	Perf.dispatcher	the_dispatcher	0	0	0	0	0	0	32	com.cognos.pogo.handlers checkproxy		1428443048171_d4960367	EXIT	
3	Perf.dispatcher	DISP		0	203	0	0	0	0			1428443048203_fde34996	START	
4	Perf.dispatcher	the_dispatcher	0	0	0	0	0	0	0	com.cognos.pogo.handlers checkproxy		1428443058031_957ae5ce	ENTER	
5	Perf.dispatcher	the_dispatcher	0	0	0	0	0	0	0	com.cognos.pogo.handlers checkproxy		1428443058031_957ae5ce	EXIT	

- Close **Microsoft Excel** without saving changes.
- At **C:\Program Files\ibm\cognos\c10\_64full\configuration**, delete the **ipfclientconfig.xml** file.

### Task 3. Open the ipfCMclientconfig.xml file and examine the elements of the file.

- Copy **ipfCMclientconfig.xml.sample** and paste to the same directory.
- Rename **ipfCMclientconfig.xml - Copy.sample** to **ipfCMclientconfig.xml**, and then open it in **Internet Explorer**.

Disregard the running scripts message if it appears in the browser, or allow the blocked content.

- Locate the following section:

```

<appender class="org.apache.log4j.RollingFileAppender"
name="cmFlatFile">
    <param name="File" value="../logs/cm_trace.log"/>
    <param name="MaxBackupIndex" value="1"/>
    <param name="MaximumFileSize" value="10485760"/>
    - <layout class="org.apache.log4j.PatternLayout">
        <param name="ConversionPattern" value="%m%n"/>
    </layout>
</appender>
```

Again, notice that this section includes parameters for defining a target file name and location for log output, and file properties.

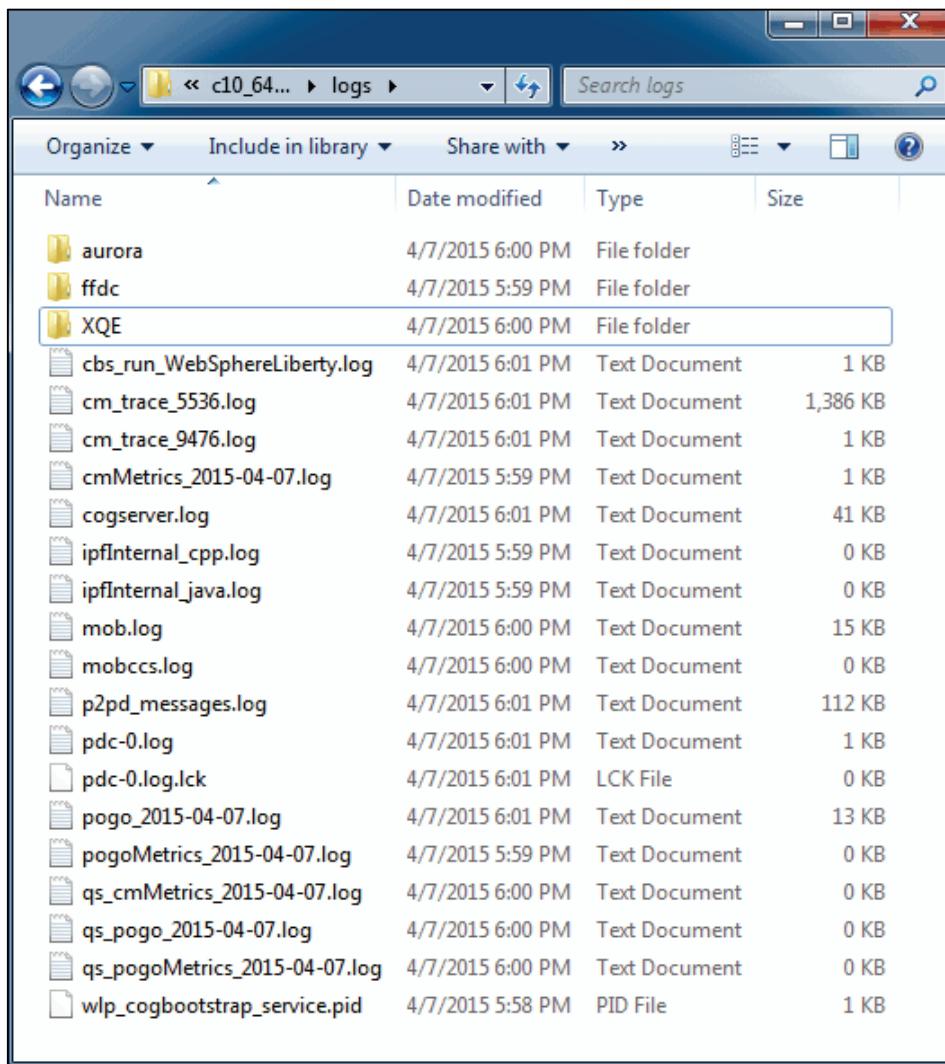
- Close **Internet Explorer**.

## Task 4. Implement logging on the Content Manager using ipfCMclientconfig.xml.

- Open the **Services** window and ensure that the **IBM Cognos Full:9315** service is not running (stop it if necessary).
- In **Windows Explorer**, rename **ipfCMclientconfig.xml** to **ipfclientconfig.xml**.
- Navigate to **C:\Program Files\ibm\cognos\c10\_64full\logs**, and then delete all files from the root of the **logs** folder.  
Do not delete the **XQE** directory or its contents.
- Start the **IBM Cognos Full:9315** service.

- When the service has successfully started, navigate to **C:\Program Files\IBM\cognos\c10\_64full\logs** to identify the log files that are generated as a result of the start operation, including the **cm\_trace\_xxxx.log** files.

The results appear similar to the following:



A screenshot of a Windows File Explorer window. The address bar shows 'c10\_64... > logs'. The search bar says 'Search logs'. The main area is a grid view with columns: Name, Date modified, Type, and Size. The 'XQE' folder is highlighted with a blue selection border. Below it is a list of log files and other files. The log files include 'cbs\_run\_WebSphereLiberty.log', 'cm\_trace\_5536.log', 'cm\_trace\_9476.log', 'cmMetrics\_2015-04-07.log', 'cogserver.log', 'ipfInternal\_cpp.log', 'ipfInternal\_java.log', 'mob.log', 'mobccs.log', 'p2pd\_messages.log', 'pdc-0.log', 'pdc-0.log.lck', 'pogo\_2015-04-07.log', 'pogoMetrics\_2015-04-07.log', 'qs\_cmMetrics\_2015-04-07.log', 'qs\_pogo\_2015-04-07.log', 'qs\_pogoMetrics\_2015-04-07.log', and 'wlp\_cogbootstrap\_service.pid'. Most log files are 0 KB except for 'cm\_trace\_5536.log' at 1,386 KB and 'pdc-0.log' at 1 KB.

Name	Date modified	Type	Size
aurora	4/7/2015 6:00 PM	File folder	
ffdc	4/7/2015 5:59 PM	File folder	
<b>XQE</b>	4/7/2015 6:00 PM	File folder	
cbs_run_WebSphereLiberty.log	4/7/2015 6:01 PM	Text Document	1 KB
cm_trace_5536.log	4/7/2015 6:01 PM	Text Document	1,386 KB
cm_trace_9476.log	4/7/2015 6:01 PM	Text Document	1 KB
cmMetrics_2015-04-07.log	4/7/2015 5:59 PM	Text Document	1 KB
cogserver.log	4/7/2015 6:01 PM	Text Document	41 KB
ipfInternal_cpp.log	4/7/2015 5:59 PM	Text Document	0 KB
ipfInternal_java.log	4/7/2015 5:59 PM	Text Document	0 KB
mob.log	4/7/2015 6:00 PM	Text Document	15 KB
mobccs.log	4/7/2015 6:00 PM	Text Document	0 KB
p2pd_messages.log	4/7/2015 6:01 PM	Text Document	112 KB
pdc-0.log	4/7/2015 6:01 PM	Text Document	1 KB
pdc-0.log.lck	4/7/2015 6:01 PM	LCK File	0 KB
pogo_2015-04-07.log	4/7/2015 6:01 PM	Text Document	13 KB
pogoMetrics_2015-04-07.log	4/7/2015 5:59 PM	Text Document	0 KB
qs_cmMetrics_2015-04-07.log	4/7/2015 6:00 PM	Text Document	0 KB
qs_pogo_2015-04-07.log	4/7/2015 6:00 PM	Text Document	0 KB
qs_pogoMetrics_2015-04-07.log	4/7/2015 6:00 PM	Text Document	0 KB
wlp_cogbootstrap_service.pid	4/7/2015 5:58 PM	PID File	1 KB

- Stop the **IBM Cognos Full:9315** service, and when it has stopped, open the largest **cm\_trace\_xxxx.log** file in **Microsoft Excel**, and review the contents.  
If an activation message appears for Microsoft Excel, dismiss the message, and continue.  
At this point the **cm\_trace\_xxxx.log** file contains start up information only, as that is the only operation you have performed. Again, notice that columns map to the indication fields seen earlier in this module.  
The results appear similar to those shown below:

M	N	O	P	Q	R
1 Audit.dispatcher.caf	Request		Info	CAF-WRN-0010 CAF input validation enabled.	
2 Audit.dispatcher.caf	Request		Info	CAF-WRN-0021 CAF Third Party XSS checking disabled.	
3 Audit.cms.CM	StartService	ContentManagerService	Info	CM-SYS-2215 A Content Manager internal PRECACHEINITIATIONS task started.	
4 Audit.cms.CM	StartService	ContentManagerService	Info	CM-SYS-2216 A Content Manager internal PRECACHEINITIATIONS task is complete.	
5 Audit.cms.CM	StartService	ContentManagerService	Info	CM-SYS-2093 The Content Manager cache initialization is complete. 1515 objects lo	
6 Audit.cms.CM	StartService	ContentManagerService	Info	CM-SYS-2215 A Content Manager internal POSTINITIATIONS task started.	
7 Audit.cms.CM	StartService	ContentManagerService	Info	CM-SYS-2216 A Content Manager internal POSTINITIATIONS task is complete.	
8 Audit.cms.CM	StartService	ContentManagerService	Info	CM-SYS-2215 A Content Manager internal CMUPGRADESCRIPT task started.	
9 Audit.RTUsage.cms.CM	StartService	ContentManagerService	Success	CM-SYS-5090 Content Manager build 10.2.6100.69 started (10.2.6100.69;20141028145	
10 Audit.RTUsage.cms.CM	StartService	ContentManagerService	Info	CM-SYS-5159 Content Manager is running in active mode.	

Note: If you see messages regarding "runTimeState" is unknown, it could be due to the dispatcher being too busy when starting, to be able to return a value.

- Close **Microsoft Excel** without saving.
- At **C:\Program Files\ibm\cognos\c10\_64full\configuration**, delete the **ipfclientconfig.xml** file.  
Leave the IBM Cognos Full:9315 service stopped for the next module.
- Close all open windows



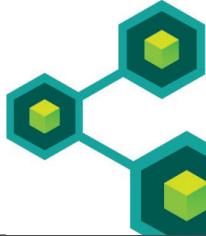


## Perform Dye Tracing

IBM Cognos BI 10.2.2

Business Analytics software

© 2015 IBM Corporation





# Objectives

- At the end of this module, you should be able to:
  - identify dye tracing requirements
  - perform dye tracing

© 2015 IBM Corporation



## What is Dye Tracing?

- allows tracing of actions by a single user or a set of users
- implements special filter to be leveraged in IPF appenders
- enabled through JMX and IPF configuration
- enabled/disabled at run-time only

© 2015 IBM Corporation



By dye tracing the actions of defined users, the actions of other users will be filtered out in the trace. This is useful to focus on specific users, as previously all actions of all users would be trapped in a dye trace, producing large quantities of data to review. Dye tracing is available to all IPF (Indication Processing Facility) based logging, and can filter all categories, and any type of indication. You could use this method, for example, if someone is having a login problem, as this could trace their efforts, and by defining the user, you can focus on the user(s) being traced.

Dye tracing is to be enabled or disabled at run-time only. JMX parts reset if IBM Cognos 10 is shut down or restarted, as there is no persistence in the JMX. The CAMIDs to dye trace will need to be re-entered, but the IPF files will have maintained their information and require no further modification.

**Business Analytics software**

**IBM**

## What are the Requirements of JMX Connectivity?

- dye tracing requires JMX port and credentials
- CAMID of a user must be added to a JMX dialog
- can use JConsole as tool to work with JMX properties

The screenshot shows the J2SE 5.0 Monitoring & Management Console interface. The title bar reads "J2SE 5.0 Monitoring & Management Console: service:jmx:rmi://vclassbase/jndi/rmi://vclassbase9700/proxyserver". The main window has tabs for Connection, Summary, Memory, Threads, Classes, MBeans, and VM. The MBeans tab is selected, showing a tree view of MBeans under "com.cognos". One node is expanded to show sub-MBeans like "MBeanDump", "MetricHealth", "Metrics", etc. On the right, the "Operations" tab is selected for the "Metrics" MBean, showing three operations: "getXqeJMXURL()", "void disableDyeTrace ( p1 String )", and "void enableDyeTrace ( p1 String )". The "enableDyeTrace" operation is highlighted with a red box.

Dye tracing is enabled via Java Management Extensions (JMX). This requires the JMX connectivity to be enabled in IBM Cognos 10 and to have access to a JMX console to actually work with the JMX properties. To enable JMX connectivity for dye tracing, modify the external JMX port and JMX credential properties in IBM Cognos Configuration.

You can get the CAMID from a user's Properties page in IBM Cognos Connection, using the Search path property, to add to the JMX dialog box. You can add more than one CAMID; the CAMID(s) act as parameters to the IPF filter. CAMIDs are entered into the JMX property enableDyeTrace.

## Add an IPF Filter

- a filter can be added to any appender in IPF file

```

<appender name="ipfLocalFile" class="org.apache.log4j.RollingFileAppender">
    <param name="File" value="../logs/AAAclient.log"/>
    <param name="MaxBackupIndex" value="10"/>
    <param name="MaximumFileSize" value="10485760"/>
    <layout class="org.apache.log4j.PatternLayout">
        <param name="ConversionPattern" value="%m%n"/>
    </layout>
    <filter class="com.cognos.indications.LogIPFDyeTraceFilter"/>
</appender>

```

© 2015 IBM Corporation



Dye tracing is implemented such that a <filter> is available for reference in IPF based logging. This <filter> will exclude any IPF indication which does not originate from a dyed user so that the remaining output contains dyed indications only.

By adding a new filter to any appender in an IPF file, it will filter indications from user sessions that were not specified in the JMX dialog box. A <filter> element which is referenced within an <appender> is used to define where to write the indication stream. Any category making reference to that <appender> element will consequently provide a superset of indications which the <appender> element might or might not dump to the specified target, depending on the filter.

The filter in the slide example adds a dye tracing filter to the AAA trace (ipfaaaclientconfig.xml).

## Summary

- At the end of this module, you should be able to:
  - identify dye tracing requirements
  - perform dye tracing

© 2015 IBM Corporation



## Workshop 1: Perform Dye Tracing

Dye tracing allows for the filtering of any IPF based logging to a defined set of users. To achieve this, dye tracing leverages fields in the CAM cookie in IBM Cognos 10. Once dye tracing is enabled, a special log4j <filter> can be added to any given IPF <appender> to filter on only the dyed user's actions from the log stream. Any IPF based logging in IBM Cognos 10 can leverage the dye tracing functionality. log4j is a Java-based logging utility.

You will enable user specific logging for IPF (dye tracing). To do this you will:

- enable JMX connectivity:
  - IBM Cognos Configuration: External JMX port **9700**, and External JMX credentials admin/Education1
- use IBM Cognos Administration to find the CAMIDs for users to dye trace: Frank Bretton and Donald Chow
- activate dye tracing using JConsole  
(C:\Program Files (x86)\Java\jdk1.5.0\_04\bin\jconsole.exe)
  - add the CAMIDs using the enableDyeTrace option
- gather the dyed log stream and write it to a log file:
  - change AAAclient.log to dyetrace\_output.log
  - preceding the </appender> tag, add a filter:  
`<filter class="com.cognos.indications.LogIPFDyeTraceFilter"/>`
  - change the <appender-ref> property as follows:  
`<appender-ref ref="DyeTraceOutput"/>`
- log on to IBM Cognos 10 as a dyed user, and then as a non-dyed user (Branka Hirsch, hirschb), repeating the same navigation tasks each time
- optionally, log on as another dyed user, chowd, repeating the same navigation tasks as the other users
- stop the IBM Cognos 10 Full: 9315 service, and investigate the results of the trace by reviewing the log output file
- start the IBM Cognos 10 Full: 9315 service, for the next module workshop

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

Notes:

Dye tracing is enabled via Java Management Extensions (JMX). This requires the JMX connectivity to be enabled in IBM Cognos 10 and to have access to a JMX console to actually work with the JMX properties. The Java Developer's Kit (JDK) contains a JMX console called JConsole. As IBM Cognos 10 comes bundled with a JRE only, to get JConsole a JDK has to be installed. This is only for the JConsole tool. If you have other JMX tools you may use those, however this workshop will use JConsole. JConsole can run on any computer and is not dependent on any IBM Cognos 10 components. In the classroom environment for this course, a JDK installed with Apache was used, jdk1.5.0\_04.

## Workshop 1: Tasks and Results

At the beginning of this workshop, all dispatchers are stopped.

### Task 1. Enable JMX connectivity for IBM Cognos 10.

- Launch the **IBM Cognos 10 - 64 Full** instance of **IBM Cognos Configuration**, and ensure that the IBM Cognos Full service is stopped.
- In the **Explorer** pane, click **Environment**.

You will configure the JMX properties for External JMX port and External JMX credential.

If your environment is a distributed install, you will have to enable JMX connectivity on each instance of the application tier. This environment is a distributed install, however you will use only one instance in this workshop, so you only have to enable JMX connectivity on this active instance.

- In the **External JMX port** property, type the available port number **9700**, and then press **Enter**.
- In the **External JMX credential** property, click **Edit**, type the **admin/Education1** credentials, and then click **OK**.



- In **IBM Cognos Configuration**, on the toolbar click **Save configuration**, close the message box when the process has finished, and then on the toolbar, click **Start**.
- When all services have started, close the message, and then close **IBM Cognos Configuration**.

## Task 2. Find the CAMIDs for the users that you want to dye trace.

Dye tracing can be enabled for a defined set of users. This set is defined by the search path for a user object in the Content Store in the form of a CAMID. As administrator, you will use IBM Cognos Administration to obtain the CAMID for the users that you want to trace.

- Launch **Internet Explorer**, go to <http://vclassbase:88/C10Full>, and then log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials.
- Launch **IBM Cognos Administration**, and then click the **Security** tab.  
The users you want to trace are in the LDAP namespace.
- Click **LDAP\_Dev**, and then click **People**.
- Navigate through the list to find **Frank Bretton**.
- In the **Actions** column for the **Frank Bretton (brettonf)** entry, click **Set properties**, and then on the **General** tab, click **View the search path, ID and URL**.

The CAMID information is displayed in the Search path box. The results appear similar to the following:



- Copy the **Search path** contents, launch **Notepad**, and then paste the contents into a text document.
- In **IBM Cognos Administration**, close the **View the search path, ID and URL** dialog box, close the **Set properties** page, and then repeat the steps for **Donald Chow**, to include him in your set of users to trace.
- In **IBM Cognos Administration**, close the **View the search path, ID and URL** dialog box, close the **Set properties** page, and then click **Log Off**.

Leave the browser window and Notepad open.

## Task 3. Activate dye tracing using JConsole.

- In Windows Explorer, navigate to **C:\Program Files (x86)\Java\jdk1.5.0\_04\bin**, and then double-click **jconsole.exe** to launch **JConsole**.

Close any messages that appears regarding the color scheme being changed to Windows 7 basic.

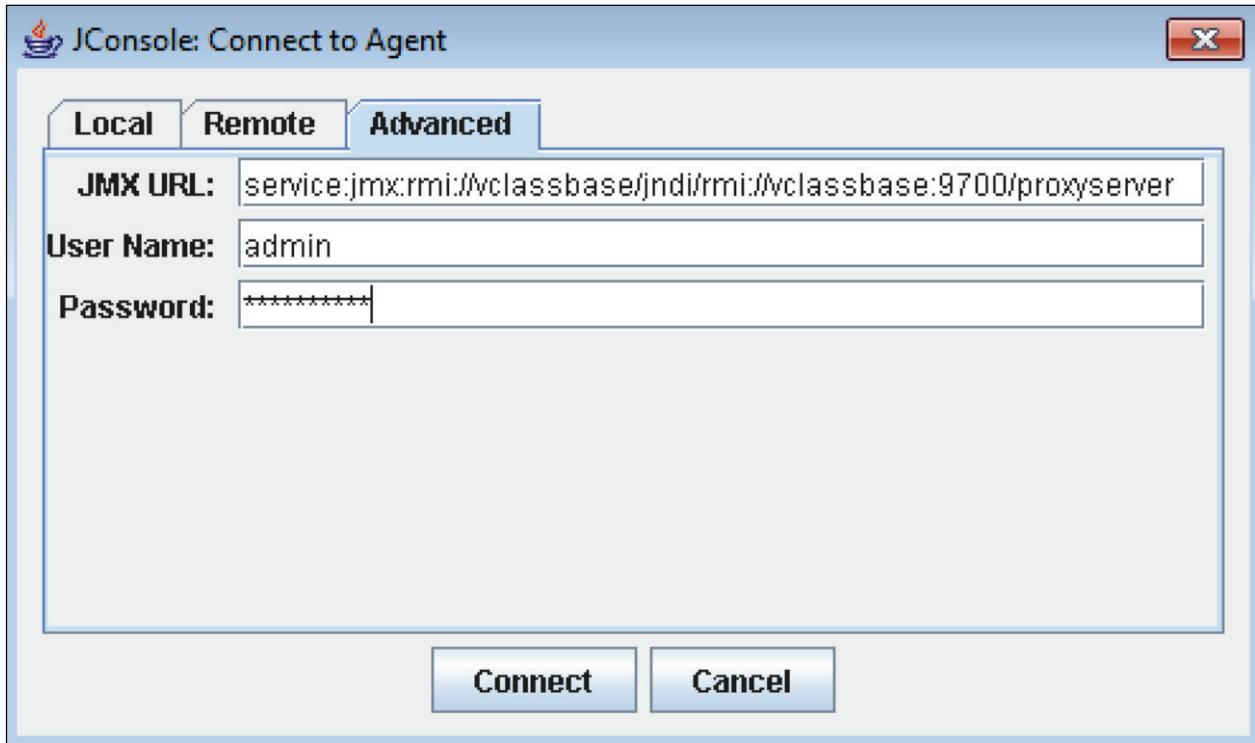
If you stop the IBM Cognos 10 service, remember that JConsole is not persistent, and to activate the dye tracing again, you will have to invoke another JConsole session and re-enter the user(s) CAMID information for tracing.

- Click the **Advanced** tab.

You will use a connection string in the JMX URL field in the following format:  
service:jmx:rmi://CM\_Server/jndi/rmi://Monitoring\_Server:<JMXport>/proxyserver

CM\_Server is the server name running Content Manager (vclassbase) and Monitoring\_Server is the server name running a JMX-enabled Dispatcher, which in this environment is vclassbase.

- Populate the fields as follows:
  - JMX URL: `service:jmx:rmi://vclassbase/jndi/rmi://vclassbase:9700/proxyserver`
  - User Name: **admin**
  - Password: **Education1**



- Click **Connect**.  
It may take a few moments for the contents in the Tree pane to appear.
- In the **Tree** pane, navigate to **com.cognos\"http://vclassbase:9315/p2pd"\Metrics**, and then in the pane on the right, click the **Operations** tab.  
Several operations are displayed. You can add a single user to the set of dye traced users, remove a single user from this set, or reset the whole set which will disable dye tracing for all users.

- Copy the search path (CAMID) line for Frank Bretton that you pasted in **Notepad**, paste it into the **p1** text box for **enableDyeTrace**, replacing the current contents.
- Ensure that you remove all text from the **p1** text box and replace it with the CAMID. The results appear similar to the following:

Attributes	Operations	Notifications	Info
<b>ComposedData</b>	getDetails ( p1 String; , p2 String; )		
	void removeXqeJMXURL ( Url String )		
	void refreshCubeMemberCache ( p1 String; )		
	void enableResultSetCache ( p1 String; )		
java.lang.String	getXqeJMXURL ()		
	void disableDyeTrace ( p1 String )		
	void enableDyeTrace ( p1 [63-22b7c4a667b0"] )		

- Click **enableDyeTrace**.
- In the **Info** dialog box, click **OK** to close the message that the method was successfully invoked.
- Click the **Attributes** tab, click **Refresh**, and then review the **DyeTracedUsers** property to ensure that the CAMID information has been added.

The results appear similar to the following:

Attributes	Operations	Notifications	Info
<b>Name</b>			<b>Value</b>
AllRequestsLastUpdateTime			Wed Apr 08 00:36:18 GMT 2015
AnnotationServiceRequestCount			0
AverageTimeInQueue			0
AverageTimeInThreadQueue			0
CMRequestCount			0
CommittedHeapSize			1073741824
CommittedHeapSizeHighWatermark			1073741824
ConsolidatedLastResponseTime			javax.management.openmbean.CompositeDataSupport
Credentials			AAAAAAAEEAAAFAAAKfzpCTVqbW6kG2aNxD+U6X6H2Q
CubeState			javax.management.openmbean.CompositeDataSupport
CurrentHeapSize			754085928
CurrentHeapSizeHighWatermark			754085928
CurrentTime			Wed Apr 08 00:36:19 GMT 2015
DispatcherSearchPath			/configuration/dispatcher[@name='http://vclassbase:9315/p2pd']
DispatcherStatus			true
DispatcherURL			http://vclassbase:9315/p2nd/servlet/dispatch
<b>DyeTracedUsers</b>			[CAMID("LDAP_Dev ID:ucdd5001a-1c66-4966-8263-22b7c4a667b0")]
FailedExternalizedDocumentsPercent			0.0

- Click the **Operations** tab, and then repeat the steps for the CAMID information for Donald Chow.

The results appear similar to the following:

Attributes	Operations	Notifications	Info
<code>CompositeData</code>	<code>getDetails ( p1 String; , p2 String;</code>		
<code>void</code>	<code>removeXqeJMXURL ( Url String )</code>		
<code>void</code>	<code>refreshCubeMemberCache ( p1 String; )</code>		
<code>void</code>	<code>enableResultSetCache ( p1 String; )</code>		
<code>java.lang.String</code>	<code>getXqeJMXURL ()</code>		
<code>void</code>	<code>disableDyeTrace ( p1 String )</code>		
<code>void</code>	<code>enableDyeTrace ( p1 dfd-d8b1b6f81243" )</code>		

- On the **Attributes** tab, click **Refresh**, and then double-click the **DyeTracedUsers** property value to review the set of users to trace.

The results appear similar to the following:

Attributes	Operations	Notifications	Info
<b>Name</b>			
AllRequestsLastUpdateTime			Value
AnnotationServiceRequestCount			Wed Apr 08 00:39:39 GMT 2015
AverageTimeInQueue			0
AverageTimeInThreadQueue			0
CMRequestCount			0
CommittedHeapSize			0
CommittedHeapSizeHighWatermark			1073741824
ConsolidatedLastResponseTime			1073741824
Credentials			javax.management.openmbean.CompositeDataSupport
CubeState			AAAAAAAEEAAAFAAAAKfpCTVqbW6kG2aNxD+U6X6H2Q
CurrentHeapSize			javax.management.openmbean.CompositeDataSupport
CurrentHeapSizeHighWatermark			755000424
CurrentTime			755000424
DispatcherSearchPath			Wed Apr 08 00:39:42 GMT 2015
DispatcherStatus			/configuration/dispatcher[@name='http://vclassbase:9315/p2pd']
DispatcherURL			true
DyeTracedUsers			http://vclassbase:9315/p2pd/servlet/dispatch CAMID("LDAP_Dev_ID:u:7fb5dc9f-868e-4835-adfd-d8b1b6f81243") CAMID("LDAP_Dev_ID:u:cdd5001a-1c66-4966-8263-22b7c4a667b0")

You have defined the users that will be dye traced.

Leave JConsole open.

## Task 4. Gather the dyed log stream and write it to a log file.

An easy method of getting a dyed IPF based log file is to add the new <filter> to the <appender> used in the pre-created IPF configurations. For example, consider the ipfAAAClientconfig.xml.sample file which would be used to create an AAA trace to troubleshoot authentication and security issues. It contains an <appender> which is referenced by all the defined categories called "ipfLocalFile". This <appender> will write to a file named AAAClient.log.

To add dye tracing to that file, simply add the <filter> to that <appender> and save the file. This will create a dye tracing version of the AAA trace. The method you will use here is to activate your IPF based logging by renaming the component specific IPF trace, adding the <category> element, and adding dye tracing support by editing the ipfclientconfig.xml file to add a new appender.

- In Windows Explorer, navigate to **C:\Program Files\IBM\cognos\c10\_64full\configuration**, make a copy of **ipfAAAClientconfig.xml.sample**, paste it in the same location, and then rename this new file as **ipfclientconfig.xml**.
- From the **Taskbar**, launch **Eclipse**. If the Workspace Launcher dialog box appears, select the **Use this as the default and do not ask again** check box and then click **OK**. If the Usage Data Upload dialog box appears, select the **Turn UDC feature off** button and then click **Finish**. When Eclipse opens, close the **Welcome** tab (if it is open).
- From the **File** menu, click **Open File**, navigate to **C:\Program Files\IBM\cognos\c10\_64full\configuration**, and then open **ipfclientconfig.xml**.
- Maximize the **Eclipse** window, and then maximize the **ipfclientconfig.xml** tab.

- At the bottom of the pane click the **Source** tab, and then from the **Edit** menu, do a **Find/Replace** for <appender name="ipfLocalFile".

The section appears similar to the following:

```
<appender name="ipfLocalFile"
  class="org.apache.log4j.RollingFileAppender">
  <param name="File" value="../logs/AAAClient.log"/>
  <param name="MaxBackupIndex" value="10"/>
  <param name="MaximumFileSize" value="10485760"/>
  <layout class="org.apache.log4j.PatternLayout">
    <param name="ConversionPattern" value="%m%n"/>
  </layout>
</appender>
```

- Change **AAAClient.log** to **dyetrace\_output.log**.

- Preceding the </appender> tag, add the following code:

```
<filter class="com.cognos.indications.LogIPFDyeTraceFilter"/>
```

A section of the result appears as follows:

```
</layout>
<filter class="com.cognos.indications.LogIPFDyeTraceFilter"/>
</appender>
```

- Do a **Find** for **Audit.RTUsage.CAM.AAA** and locate the following section:

```
<category name="Audit.RTUsage.CAM.AAA"
  class="com.cognos.indications.LogTypedLogger" additivity="true">
  <!-- Configurable levels: debug, error, off -->
  <level value="debug"/>
  <appender-ref ref="ipfLocalFile"/>
</category>
```

- Change the <appender-ref> property as follows:

```
<appender-ref ref="DyeTraceOutput"/>
```

Using this method allows you to specifically enable dye tracing for selected categories only, and distribute the output to one or more appenders.

The results appear as follows:

```
<category name="Audit.RTUsage.CAM.AAA" class="com.cognos.indications.LogTypedLogger" additivity="true">
  <!-- Configurable levels: debug, error, off -->
  <level value="debug"/>
  <appender-ref ref="DyeTraceOutput"/>
</category>
```

- Save the file, and then close **Eclipse**. If necessary, select the **Always exit without prompt** check box and then click **OK**.

Dyed output will go to the file specified for the new DyeTraceOutput <appender>.

## **Task 5. Log on as a non-dyed user, and then as a dyed user.**

- From the **Taskbar**, launch **Services**, and stop the **IBM Cognos 10 Full:9315** service, when the service has fully stopped, in **Windows Explorer**, delete the files from the root of the **C:\Program Files\IBM\cognos\c10\_64full\logs** directory, and then take note of the time.  
Do not delete the XQE directory or its contents.
- Start the **IBM Cognos 10 Full:9315** service.  
If using the Services dialog to start IBM Cognos Full:9315 service, and a message appears stating that it could not be started in a timely fashion, click **OK**, and then click the Refresh button in 2 minute intervals until you can see that the service has started successfully.
- When the service has fully started, in **Internet Explorer**, go to **http://vclassbase:88/C10Full**, and then log on to the **LDAP\_Dev** namespace with **brettonf\Education1** credentials.  
Frank Bretton is a dyed user.
- Launch **IBM Cognos Connection**, and then navigate to **Public Folders\Samples\_DQ\Models\GO Sales (query)**.
- On the toolbar, click **My Area Options**, click **My Preferences** , click **OK**, and then log off **Frank Bretton**.
- Make note the time, and wait for 2 minutes to pass.
- Repeat the steps, logging on as a non-dyed user (**hirschb/Education1**).  
Optionally, you can repeat the steps by logging on as another dyed user: **chowd/Education1**.

## **Task 6. Investigate the results of the trace.**

- In **Windows Explorer**, disable the dye tracing by deleting the **C:\Program Files\IBM\cognos\c10\_64full\configuration\ipfclientconfig.xml** file.
  - In the **Services** window, stop the **IBM Cognos 10 Full:9315** service.  
Wait for the service to stop, before proceeding to the next step.
  - Open **Eclipse** and close the **ipfclientconfig.xml** tab (if necessary).
  - In **Eclipse**, open the most recent **C:\Program Files\IBM\cognos\c10\_64full\logs\dyetrace\_output\_xxxx.log** file that was created during the trace (the other dyetrace\_output\_xxxx.log files will be empty).

The results appear similar to the following:

You could also open this file in another tool, such as Microsoft Excel.

Question: What entries do you see for each user? What entries are missing for the non-dyed user? (Hint: Use the times you recorded to look in the log files.)

Answer: Only dye traced users are getting filtered.

Consider a large company with users logging in or out at all times; this could generate large log files to review. Dye tracing is a great way to filter the results. What you trace depends on the problem(s) they are having.

- Close the **dyetrace\_output\_xxxx.log** tab, and then close **Eclipse**.
  - Close the **Jconsole: Connect to Agent** dialog box, and then close the **J2SE 5.0 Monitoring & Management Console** window.
  - In the **Services** window, start the **IBM Cognos 10 Full:9315** service for the next module, and then close all open windows without saving.

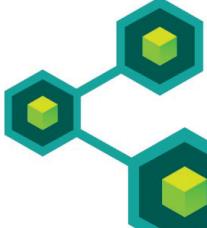




# Explore Dynamic Query Mode

IBM Cognos BI 10.2.2

Business Analytics software



© 2015 IBM Corporation



# Objectives

- At the end of this module, you should be able to:
  - explain Dynamic Query Mode (DQM) logging
  - explain IBM Cognos Dynamic Query Analyzer (DQA)

© 2015 IBM Corporation



Business Analytics software

IBM

## Available Dynamic Query Mode Logging

- XQE log files
- IPF logging
- QFS logging
- BAPI tracing (for SAP BW)
- QueryService logging

© 2015 IBM Corporation



Usually, this type of logging would be done under the guidance of customer support. A general starting point for troubleshooting errors or connectivity issues is to review XQELog files. IPF logging is used mainly to enable XQE audit logging. QFS logging is used for tracing performance and communication between XQE and the BIBus. BAPI tracing for SAP BW is enabled in XQE.diagnosticlogging.xml.

QueryService logging is useful for troubleshooting report issues.

## Describe XQE Log Files (1 of 2)

- located in ..\logs\XQE by default
- log files generated by default
  - xqelog-<date>-<timestamp>.xml
  - queriesNotPlanned
  - usage
  - requestDumps

© 2015 IBM Corporation



The xqelog files are at the root of the XQE directory and are date and time stamped. These are a good starting point for DQM issues. Log files are not cleaned up automatically, and will need to be removed manually or through some batch process implemented outside of IBM Cognos 10.

You can change the default XQE log output location in the xqe.config.xml file under the XQEConfiguration\General section. Uncomment <!--logsFolder value="..../logs"/--> and specify the location in the value attribute. This can be helpful in a distributed environment, to define a central log location.

queriesNotPlanned is DQM information output for queries that could not be planned for one reason or another. For example, these logs may be generated if the IBM Cognos data source was missing for a report. The report spec query or queries cannot be planned in these cases. Another time you will see these logs generate is when a report is run and you see an XQE-PLN-0000 error. These files can indicate when DQM reports are failing.

DQM statistics are tracked in the usage files log. These files are generated when the BI server is stopped.

requestDumps are used to analyze data output for requests. This can be useful in troubleshooting data integrity issues between IBM Cognos 10 releases. For example, report data from release to release may return the same data differently. This logging would only be enabled under the guidance of customer support.

## Describe XQE Log Files (2 of 2)

- start point for any errors or DQM issues
- contains IPF logging
- XQE logging can be configured in `xqe.diagnosticlogging.xml` located in ..\configuration
  - can increase logging detail to the `xqelog` XML files in the Diagnostics\Components section
  - can enable or disable various XQE logging
- must restart Cognos BI service for changes to take effect

© 2015 IBM Corporation



When dealing with any DQM errors or issues, such as service or connectivity issues, the `xqelog-000000-00000000000.xml` log files are a good start. These logs can provide information to help guide you on where to focus your attention. For example, it may indicate an issue with the `MetadataService` component of DQM. You can set the `MetadataService` `eventGroup` item under the `Diagnostics\Components` section to trace, which will write more details about that component in the `xqelog-000000-00000000000.xml` log files. If there is no level attribute for a component, the default behavior is none (no logging).

In the `xqe.diagnosticlogging.xml` file, you can also enable and disable specific log files. For example, you can disable `queriesNotPlanned` or enable `queriesPlanned`. You can also turn off `xqelog-000000-00000000000.xml` logging by changing `<diagnostics enabled="true" appender="file" level="error">` to `<diagnostics enabled="false" appender="file" level="error">`.

Business Analytics software

IBM

## IPF Logging for DQM

- enabled by renaming ipfXQEclientconfig.xml.sample to ipfclientconfig.xml in ..\configuration
- change is picked up after approximately 30 seconds
- for XQE, typically would be used to enable IPF audit logging since all IPF information is already written to the xqelog XML files

© 2015 IBM Corporation



The same concept about IPF logging applies here for the DQM component except that the ipfXQEclientconfig.xml logging was created for conformance with other components. This version of IPF logging is written to the xqelog-000000-0000000000.xml files (mentioned earlier). Enabling IPF logging here would be possible, but redundant.

## Describe QFS Logging for DQM

- configured in qfs\_config.xml in ..\configuration
- troubleshoot communication and performance between BIBus (C++) and DQM (Java)
- parameters of interest under the XQEQueryProvider section
  - TraceLogLevel (communication)
    - generates xqe prefixed log files in ..\logs
  - PerfLogLevel (performance)
    - generates xqePerf.csv file in ..\logs

© 2015 IBM Corporation



For TraceLogLevel, the xqe log file name will be xqeTrace.log when setting the value to 1 or 2. If set to 3 or higher, you will see an xqeTrace.log file and an XQERequest\_00000000.log file. Value setting information is provided in this file.

Logging values for <parameter name="TraceLogLevel" value="0"/> are 0 Disable trace logging, 1 Service level trace logging, 2 Session level trace logging, 3 Request level trace logging, 4 Operation level trace logging, and 5 Detail trace logging.

The PerfLogLevel trace produces the xqePerf.csv file in the logs folder. This file indicates the object, the operation, a begin and end timestamp for each operation, and a column to show the time difference between the two.

There are other settings for tweaking performance and functionality also in this file, but use these under customer support guidance only. qfs\_changes are supposed to be picked up automatically after approx. 30 seconds, but you may have to refresh the service.

## Enable DQM BAPI Trace for SAP BW

- in ..\configuration, configure the SBWOPD section at the bottom of the xqe.diagnosticlogging.xml file change

```
<eventGroup name="DataQuery"/>  
to  
<eventGroup name="DataQuery" level="info"/>
```
- information written to XQElog XML files

© 2015 IBM Corporation



Add the level="info" comment in xqe.diagnosticlogging.xml, and then stop and start the Query Service on the Dispatcher where the file change was made, to pick up the changed configuration.

## What is IBM Cognos DQA?

- IBM Cognos Dynamic Query Analyzer
- ships with IBM Cognos 10
- focuses on profiled runtree logs
- if report failed in planning you can open the last stage of planning log

© 2015 IBM Corporation



IBM Cognos Dynamic Query Analyzer (DQA) is a utility that provides a graphical user interface for the execution tree logs (runtreeLog.xml) that are produced by Dynamic Query Mode queries.

You can enable global execution trace logging for all DQM reports through the IBM Cognos Administration console, or you can use IBM Cognos DQA to run individual reports, which will automatically generate an execution trace for just that report, and can be immediately analyzed in IBM Cognos DQA. For more information, refer to the *IBM Cognos Dynamic Query Analyzer User Guide 10.2.2*.

## What Can You Do with IBM Cognos DQA?

- debug reports
- run and display reports
- read logs locally or remotely
- display properties for each individual node
- display MDX and SQL and copy the syntax
- display performance times

© 2015 IBM Corporation



IBM Cognos DQA allows a report administrator to easily identify the individual pieces of a Dynamic Query Mode query. This overview helps to simplify the troubleshooting of Dynamic Query Mode query performance.

## Review the IBM Cognos DQA Graph Legend

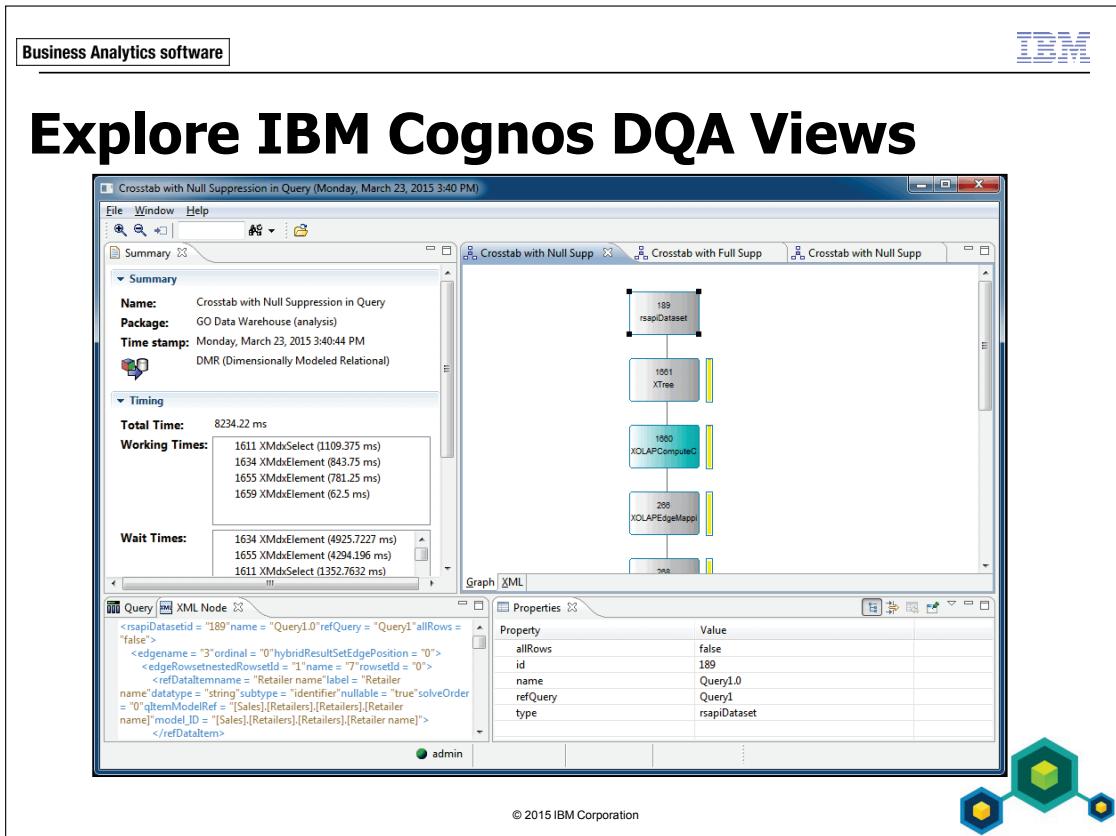
Node	Description
	An operation that occurred when the report was run.
	An attribute of an operation, such as the data being processed. By default, most of these nodes are suppressed in the graph. (To display all navigate to Window\ Preferences, and select Visualization\Node filtering.)
	A collapsed node. To display the hidden nodes, double-click the node, or right-click it and click Show Subtree.
	A node that with hidden children due to the Node filtering settings. (To display hidden nodes, right-click the node and click Expand Filtered.)
	The node that is currently selected. The properties of this node are displayed in the Properties view. Click a node to select it.
	This node has subqueries that can be opened in another graph. (To display subquery graphs, right-click the node and click Open sub queries. Some subqueries do not have an associated node in the parent trace and can be opened using this option.)
	The vertical bar represents timing information for the node. The color red represents the time for the report spent in the node. The color yellow represents the proportion of time spent in the children of the node. The color gray represents the time spent outside the node and its children. If the node is selected, the times are also displayed in the Properties view.

© 2015 IBM Corporation



When you open query log files in IBM Cognos DQA, you can view and analyze the data in a number of ways.

The graph that is displayed when a query log file is opened shows a series of linked nodes. Each node represents an operation that occurred when the report was run or represents an attribute of an operation (such as the data being processed). The meaning of the different node representations is defined in the table on the slide.



The Summary view tab provides information about the active graph. There are four sections on this tab:

- Summary section: displays the name, package, and timestamp of the query. It also indicates whether the data source type is relational, OLAP, or DMR (Dimensionally Modeled Relational).
- Timing section: displays timing information, the working times and waiting times for each node that has timing information attached to it, in descending time order. If you click a node, the corresponding node in the graph is selected. Timing information for a query is not displayed if all the timing information is contained in subqueries.
- Analysis section: displays information if the query planning trace option is enabled.
- Node Shapes and Colors section: provides the meaning of node shapes and colors.

The Query view tab shows the MDX or SQL query used in this report.

You can link MDX commands in the Query view with nodes in the graph by using the



Link MDX to graph icon. If you select an MDX command in the Query view and click the Link MDX to graph icon, the nodes in the graph where the MDX commands are executed are selected.

If the query is a SQL query, you can run the report again by clicking the Execute Sql



The Properties view tab displays the properties for the currently selected graph node.

The Navigation view tab displays the graph as a tree structure. To open the Navigation view for the active graph, click File>Show in Navigation. You can have multiple Navigation views open, one for each graph. To navigate quickly between a Navigation



view and the corresponding graph, click the Link with editor icon. Clicking an item in the Navigation view selects the corresponding node in the graph, and vice versa.

## Explore Aggregate Advisor

- in IBM Cognos Dynamic Query Analyzer, Aggregate Advisor is used with dynamic cubes
- can use default logging settings
- optimize aggregates
- resolve performance issues

© 2015 IBM Corporation



In IBM Cognos Dynamic Query Analyzer, you can launch the Aggregate Advisor, to analyze dynamic cubes and suggest aggregates that, when implemented, will improve cube performance. While tweaking a model is required when using in-database aggregates, for in-memory aggregates the Aggregate Advisor allows performance problems to be resolved without re-authoring or re-modeling.

Default logging is sufficient to enable logs for use by the Aggregate Advisor, as Aggregate Advisor can analyze the underlying model in a dynamic cube data source and recommend which aggregates to create. Aggregate Advisor runs on the query service and can reference a workload log file. Administrators should be aware that to consider information from workload logs when making recommendations, the workload log file must be enabled on the dynamic cube.

When enabled, the workload log file captures the information that represents user workload usage such as running reports or performing interactive analysis. This log file allows Aggregate Advisor to suggest aggregates (in-database or in-memory) that correspond directly to the reports referenced in the log file.

Consider running Aggregate Advisor if non-trivial changes are made to the model, if there are significant data changes, if query performance is not meeting expectations, or if workload characteristics change significantly.

For more information on using the Aggregate Advisor, refer to the IBM Cognos *Dynamic Query Analyzer User Guide 10.2.2*, in the section Getting started with Cognos IBM Cognos Dynamic Query Analyzer: Optimize dynamic cube performance with Aggregate Advisor.

## Summary

- At the end of this module, you should be able to:
  - explain Dynamic Query Mode (DQM) logging
  - explain IBM Cognos Dynamic Query Analyzer (DQA)

© 2015 IBM Corporation



## Workshop 1: Enable DQM, Publish a Package, and Review the Logs Created

The following workshop will explain how to configure a relational data source for Dynamic Query Mode, publish a package in DQM, enable global trace logging, and review the logs that are created. When you are done, you will disable global trace logging.

To do this you will:

- Ensure that the query service is enabled in IBM Cognos Configuration.
- Create a dynamic query mode enabled project and connection to IBM DB2. Create a project named DB2 DQM Model, enabling Dynamic Query Mode; use admin/Education1 credentials.
- Create a data source connection named GOSALESDW(DB2) based on an IBM DB2 connection, and enable the JDBC connection to the GS\_DB database, with GOSALESDW/Education1 credentials, and test the connection for compatible mode.
- Configure the JDBC connection to VCLASSBASE:50000 for the GS\_DB database, and then test for dynamic query mode compatibility.
- For the GOSALESDW(DB2) data source, import the following tables: GO\_TIME\_DIM, SLS\_PRODUCT\_DIM, SLS\_SALES\_FACT, and then test the GO\_TIME\_DIM definition.
- Publish a package named GOSALESDW(DB2).
- In IBM Cognos Administration, ensure that the data source connection for GOSALESDW(DB2), is running in both modes (DQM and Compatible) on the dispatcher.

- In IBM Cognos Administration, select the query execution trace check box to enable the service.
- Create, save, and run a simple report based on the GOSALES DW(DB2) package.
- Review the logs generated by DQM at C:\Program Files\IBM\cognos\c10\_64full\logs\XQE.

If necessary, modify the <reportPath></reportPath> tags in the manifest.xml file to refer to the full path of the report.

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows. If you need more information to complete a task, refer to earlier demos for detailed steps.

## Workshop 1: Tasks and Results

At the beginning of this workshop, the IBM Cognos Full:9315 dispatcher is running.

### Task 1. Ensure the Dynamic Query Mode service is enabled.

- From the **Start** menu, navigate to **All Programs\IBM Cognos 10 - 64 Full**, and then click **IBM Cognos Configuration**.
- In the **Explorer** pane, click **IBM Cognos Services**, and then ensure **Query service enabled?** is set to **True**.  
If the value was set to False, change it to True, save the configuration, and then restart the IBM Cognos service.
- Close **IBM Cognos Configuration**.

### Task 2. Create a dynamic query mode enabled project and connection to IBM DB2.

The following instructions use the sample Great Outdoors Warehouse IBM DB2 database called GS\_DB to allow you to create a relational data source connection.

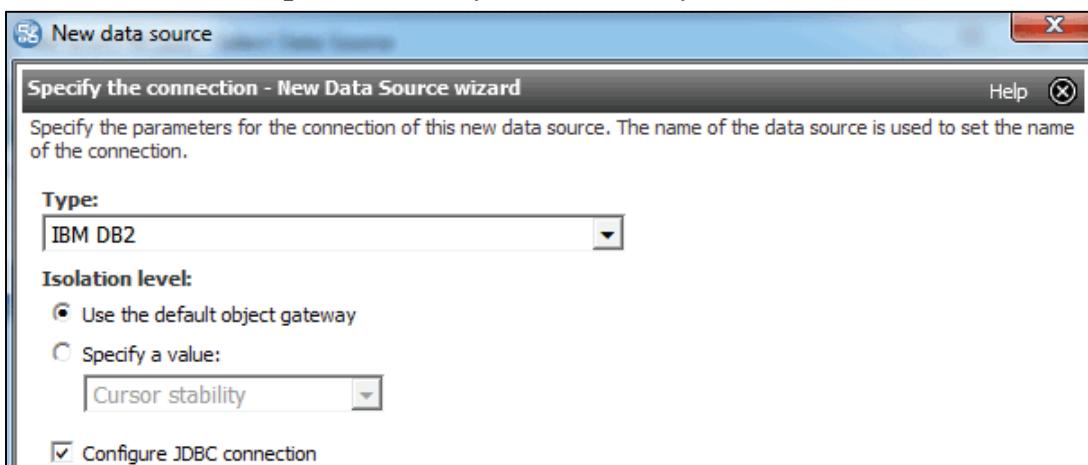
For an IBM DB2 data source, the IBM Cognos Framework Manager machine requires no additional software if all of your Framework Manager projects use the Dynamic Query Mode. If any of your projects use the Compatible Query Mode, however, an IBM DB2 client must be installed and configured on the IBM Cognos BI Framework Manager machine. This has been configured in the environment for this course.

Although you may already be familiar with creating a Dynamic Query Mode-enabled project, this workshop will be looking deeper into the process and the results.

- From the **Start** menu, navigate to **All Programs\IBM Cognos 10 FM**, and then click **IBM Cognos Framework Manager**.
- Click **Create a new project**, in the **Project name** box, type **DB2 DQM Model**, and ensure that the **Use Dynamic Query Mode** check box is selected.
- Notice the path of the project location, and then click **OK**.
- Click **OK** if a message is displayed to create the directory, and then login to the **LDAP\_Dev** namespace with **admin/Education1** credentials.
- In the **Select Language** dialog box, ensure that **English** is selected, and then click **OK**.

- On the **Select Metadata Source** page, ensure that **Data Sources** is selected, click **Next**, and then click **New** to create a new data source connection.
- In the **New Data Source** wizard, click **Next**, in the **Name** box, type **GOSALES DW(DB2)**, and then click **Next**.
- Under **Type**, click **IBM DB2**.

Notice the Configure JDBC connection check box. Ensure that this box is selected, so that information can be provided to connect through the JDBC driver which is required for Dynamic Query Mode.



- Click **Next**.

In the next steps, the information provided is based on how the IBM DB2 clients on the Framework Manager machine and the IBM Cognos BI servers were configured and how security is implemented for IBM DB2. Connection information and sign on information should be provided by the database administrator.

- In the **DB2 database name** box, type **GS\_DB**, in the **Signon\Signons** section, click the **Password** check box to select it, in the **User ID** box, type **GOSALES DW**, and then in the **Password** and **Confirm password** boxes, type **Education1**.

- Click **Test the connection**, and then click **Test**.

Notice that the Query Mode is Compatible. This means that Dynamic Query Mode has not been configured for this data source at this point.

<a href="#">...&gt; Name</a>	Type / Query Mode	Status
<a href="http://vclassbase:9315/p2pd">http://vclassbase:9315/p2pd</a>	IBM DB2 / Compatible	Succeeded

- On the **View the results** page click **Close**, on the **Test the connection** page click **Close**, and then on the **Specify the IBM DB2 connection string** page, click **Next**.

You will now configure the JDBC connection information.

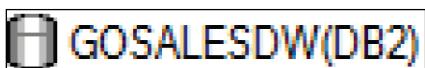
- In the **Server name** box, type **VCLASSBASE** (the name of the server hosting the database), in the **Port number** box, type **50000** (the port number of the database), and then in the **Database name** box, type **GS\_DB**.
- In the **Testing** section click **Test the connection**, and then click **Test**.

Notice that the Query Mode is Dynamic.

<a href="#">...&gt; Name</a>	Type / Query Mode	Status
<a href="http://vclassbase:9315/p2pd">http://vclassbase:9315/p2pd</a>	IBM DB2 (JDBC) / Dynamic	Succeeded

- On the **View the results** page click **Close**, on the **Test the connection** page click **Close**, click **Finish**, and then in the **Finish** dialog box, click **Close**.

The new GOSALES DW(DB2) data source that appears in the list is configured to query using either query mode.

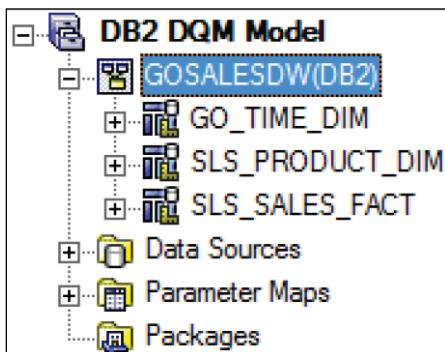


You will import metadata and test query subjects for this data source.

- Click **GOSALES DW(DB2)** to select it in the list of data sources, click **Next**, expand **GOSALES DW**, expand **Tables**, and then select the following tables:
  - GO\_TIME\_DIM**
  - SLS\_PRODUCT\_DIM**
  - SLS\_SALES\_FACT**
- Click **Next**, click **Import**, and then click **Finish**.

- In the **Project Viewer**, expand **GOSALESDW(DB2)**.

The query subjects appear as child objects as follows.



- Double-click **GO\_TIME\_DIM** to open its definition, and then click the **Test** tab.

If the Query Mode property of the project is set to Dynamic when testing a query subject, the test query will run in Dynamic Query Mode. If the Query Mode property is set to Compatible, however, there is an option to use the Dynamic Query Mode on the Test tab in the lower left corner, provided that the query subject is for a data source supported by the Dynamic Query Mode. In this case, the property for this project was set to Dynamic Query Mode, and therefore you do not see this check box option.

- At the lower right, click **Test Sample**.

Framework Manager sends the test query through the IBM Cognos 10 gateway to one of the IBM Cognos BI servers, which, in turn, queries the reporting database. The data retrieved by the test query appear in the Test results pane.

A section of the result appears as follows:

Query Subject Definition - GO_TIME_DIM				
SQL	Calculations	Filters	Determinants	Test
Test results				
DAY_KEY	DAY_DATE	MONTH_KEY	CURRENT_MONTH	MONTH_NUMB
20100000		201000	0	0
20100101	Jan 1, 2010 12:00:00 AM	201001	1	1
20100102	Jan 2, 2010 12:00:00 AM	201001	1	1

- Click **OK** to close the **Query Subject Definition** window.

You should test all your model objects against the Dynamic Query Mode to ensure that SQL generation is as expected for your requirements. If you are building an OLAP over Relational model, this includes foundation objects such as Data Source and Model Query Subjects as well as Regular and Measure Dimensions. OLAP over Relational model replaces the term DMR model, for DQM.

When you have finished building the model, you can create and publish a package that uses the Dynamic Query Mode.

### Task 3. Create and publish a package that uses the dynamic query mode, and then verify the package properties.

- In the **Project Viewer**, right-click **Packages**, click **Create**, and then click **Package**.
- In the **Name** box, type **GOSALES DW(DB2)**, click **Next**, and then click **Finish**.
- At the prompt to open the **Publish Package Wizard**, click **Yes**.

- Change the **Folder location in the Content Store** to the root of **Public Folders** (if necessary), in the **Publish Wizard** click the **Enable model versioning** check box to clear it, click **Next**, and then on the **Add Security** page click **Next**.

On the Publish Wizard - Options page, if the Query Mode property of the project is set to Compatible and if the package contained supported DQM data sources, then the Use Dynamic Query Mode check box option would be displayed. You have already defined the property of this project as Dynamic Query Mode, so this option does not appear.

- Click **Publish**, and then click **Finish**.

The package is now available in IBM Cognos 10 and will use the Dynamic Query Mode for reports written against this package. In IBM Cognos Connection, the query mode used by the package can be verified in the package properties.

- Close **Framework Manager**, saving your changes.
- Launch **Internet Explorer**, go to <http://vclassbase:88/C10Full>, log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials, and then launch **IBM Cognos Connection**.
- In the **Actions** column for the **GOSALES DW(DB2)** package that you published, click **Set properties**.

Notice that the Query Mode is Dynamic.



- Click **OK**.

## Task 4. In IBM Cognos Administration, enable the Query execution trace to generate XQE log files.

In this task you will enable global tracing. Be aware that in a busy production environment, enabling global tracing will result in all Dynamic Query reports being traced as they are executed, which may have an impact on the system performance. In the next workshop, you will generate log files on a report by report basis, a strategy which would be better for a busy production environment.

- Launch **IBM Cognos Administration**, and then click the **Configuration** tab.

On the Configuration tab, there are four locations pertaining to the Dynamic Query Service:

- Data Source Connections for configuring data sources including supported Dynamic Query Mode data sources and dynamic cubes
- Content Administration for scheduling Query service administration tasks
- Dispatchers and Services for configuring the QueryService service
- Query Service Caching to immediately perform cache tasks
- On the **Configuration** tab\**Data Source Connections** pane, in the **Actions** column for the **GOSALES DW(DB2)** data source connection, click **More**.
- Click **View connections**, in the **Actions** column click **Test the connection**, and then click **Test**.

There are two query modes listed for this dispatcher.

<a href="#">...&gt; Name</a>	Type / Query Mode	Status
<a href="http://vclassbase:9315/p2pd">http://vclassbase:9315/p2pd</a>	IBM DB2 / Compatible	Succeeded
<a href="http://vclassbase:9315/p2pd">http://vclassbase:9315/p2pd</a>	IBM DB2 (JDBC) / Dynamic	Succeeded

- Click **Close**, and then on the **Test the connection** page click **Close**.
- In the left pane, click the **Dispatchers and Services** link, and then click <http://vclassbase:9315/p2pd>.

- Click the **Next Page** button, and notice that the **QueryService** appears in the list.

The screenshot shows a configuration interface with a header "Configuration > http://vclassbase:9315/p2pd". Below the header is a table with a single column labeled "Name". The table contains five entries: "MetadataService", "MobileService", "MonitorService", "PresentationService", and "QueryService". The "QueryService" entry is highlighted with a green border, indicating it is selected or the current focus.

Name
MetadataService
MobileService
MonitorService
PresentationService
<b>QueryService</b>

- In the **Actions** column for the **QueryService**, click **Set properties**, on the **Settings** tab, in the **Value** column, click the **Enable query execution trace** check box to select it.

The trace configuration change will be picked up automatically within 15 seconds.

Enabling the query execution trace will write information such as the native MDX to a run tree log in the ..\logs\xqe directory. Profiler information is also written to capture execution and waiting time metrics for query constructs.

- In the **Value** column, notice the **Enable query planning trace** check box.

Enabling the query planning trace setting will write information related to the transformation of the query to the plan tree log within the ..\logs\xqe directory. This trace is useful when attempting to determine what decisions were made by the Dynamic Query Mode to build the execution plan, however resultant log files are large and may impact overall query performance. Use only for reports that fail before the profile is complete.

Do not enable the query planning trace in this workshop.

- Click **OK**, and then wait 15 seconds before proceeding.

## Task 5. Create and run a simple report based on a DQM data source.

- Launch IBM Cognos Connection, click the **GOSALES DW(DB2)** package, and then from the **Launch** menu, click **Report Studio**.
- Click **Create New**, and then double-click **List**.
- From the **Source** tab, populate the list with the following items from the package:
  - GO\_TIME\_DIM: **DAY\_DATE**
  - SLS\_PRODUCT\_DIM: **PRODUCT\_KEY**
  - SLS\_SALES\_FACT: **QUANTITY**

You could use any items from the package for your report; the specific content of the items selected above is not important to this workshop. You can drag and drop items in the list, or double-click items on the Source tab to add them to the list.

- Save the report as **DQM Report**, and then run the report.

A section of the report will appear similar to the following:

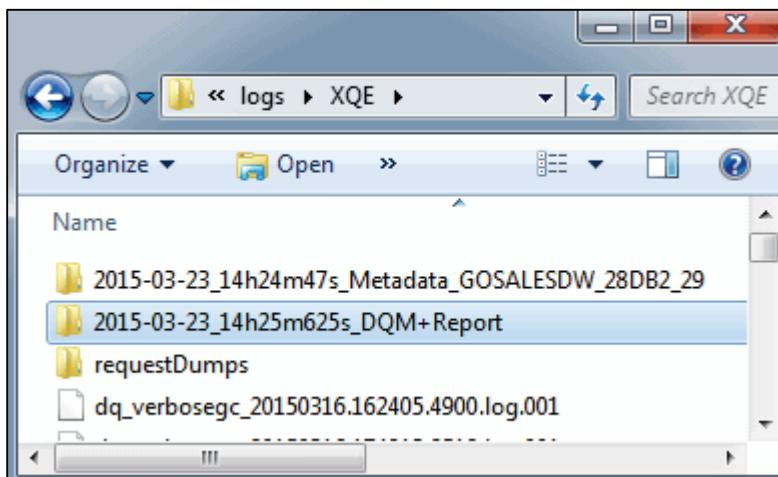
DAY_DATE	PRODUCT_KEY	QUANTITY
Jan 12, 2010 12:00:00 AM	30001	51,522
Jan 12, 2010 12:00:00 AM	30002	24,182
Jan 12, 2010 12:00:00 AM	30003	11,265

- Close all open windows.

## Task 6. Review the logs generated by DQM.

- In Windows Explorer, navigate to C:\Program Files\IBM\cognos\c10\_64full\logs\XQE.

This is where the QueryService logs are located. Notice that there is a folder named <date>\_<timestamp>\_<report name> that was generated for the report that you ran.



- Double-click the **DQM Report** folder to open it.

The following files are available:

- manifest.xml
- profilingLog-0.xml
- runtreeLog.xml

Some report executions require executing sub-queries. Sub-queries execution trace is stored under a separate directory named subqueries, within the main report directory, and contains the same logging elements as the main report, runtreeLog.xml and profilingLog-#.xml.

If you had enabled the planning trace, you would also see many planningLog\_pass\_###.xml files.

- Open the **manifest.xml**, **profilingLog-0.xml**, and **runtreeLog.xml** files in **Internet Explorer** to familiarize yourself with the information that has been captured.

The manifest.xml file appears similar to the following:

```
<?xml version="1.0" encoding="UTF-8"?>
- <xqetraceInfo>
  <date>2015-03-23T15:11:32-04:00</date>
  <reportName>DQM Report</reportName>
  <reportPath>/content/package[@name='GOSALES DW(DB2)']/report[@name='DQM Report']</reportPath>
  <packageName>GOSALES DW(DB2)</packageName>
  <modelPath>/content/package[@name='GOSALES DW(DB2)']/model[@name='model']</modelPath>
  <logVersion>1.2.0.v10.1</logVersion>
  <requestId>C4wCw8sv8CssM8h2G4jlCydsGywddqvM2wGqC48I</requestId>
  <operationName>execute</operationName>
  <subRequestId>C4wCw8sv8CssM8h2G4jlCydsGywddqvM2wGqC48I</subRequestId>
  <version>UNKNOWN</version>
  <expectedNumberOfPasses>549</expectedNumberOfPasses>
</xqetraceInfo>
```

- If the **<reportPath></reportPath>** tags contain a value of UNKNOWN, open the manifest.xml file in Notepad, modify the value within the tags to appear as follows, and then save and close the file:

```
<reportPath>/content/package/[@name='GOSALES DW(DB2)']/
report[@name='DQM Report']</reportPath>
```

## **Task 7. Disable the query execution trace.**

- Launch **Internet Explorer**, go to <http://vclassbase:88/C10Full>, log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials, launch **IBM Cognos Administration**, and then click the **Configuration** tab.
- In the left pane, click the **Dispatchers and Services** link, and then click <http://vclassbase:9315/p2pd>.
- Click the **Next Page** button, in the **Actions** column for the **QueryService**, click **Set properties**, on the **Settings** tab, in the **Value** column, click the **Enable query execution trace** check box to clear it.

The trace configuration change will be picked up automatically within 15 seconds.

- Click **OK**, log off **Admin Person**, and then close the browser.

## Workshop 2: Use IBM Cognos Dynamic Query Analyzer to Analyze a Query

IBM Cognos Dynamic Query Analyzer (DQA) is a tool that provides graphical representations for the query logs produced by Dynamic Query mode queries. This workshop will introduce you to using IBM Cognos Dynamic Query Analyzer to analyze results of the logs generated by the queries.

It is assumed that you have generated log files for use with IBM Cognos Dynamic Query Analyzer, as described in Workshop 1. Please complete Workshop 1 before proceeding with this workshop. This will help you become familiar with analyzing log files in IBM Dynamic Query Analyzer, before you assess differences in report variations.

In this workshop scenario, with no global tracing enabled, you will run a report directly in IBM Cognos Dynamic Query Analyzer, which will generate log files that you can immediately analyze. This method of generating log files will have less of an impact on the production environment than the global tracing method.

To do this workshop you will:

- Launch IBM Cognos DQA. If you encounter any "null pointer" errors, close and reopen IBM Cognos DQA. If you encounter any login-related messages, dismiss them. Review the settings in Window\Preferences to familiarize yourself with the configuration of the environment. If necessary, modify the settings to reference the correct IBM Cognos server and the logs directory URL. After you have validated the settings, close and reopen DQA (logging on if prompted).
- In IBM Cognos DQA, refresh the content store display (if necessary), and explore the GOSALESdw(DB2)\DQM Report\Report (<Date>, <Time>)\ Profile 0 log. Refer to the DQA Graph Legend page in this module, as you review the objects in the graph, to assist in your interpretation of the graph.
- In a browser session, login to the portal at <http://vclassbase:88/C10Full>, with LDAP\_Dev/admin/Education1 credentials.

- Launch Report Studio with the Public Folders\Samples\_DQ\Models\GO Data Warehouse (analysis) package.
- Create a crosstab report with the Sales and Marketing (analysis)\Sales source (Measures: Sales fact\Quantity, Rows: Products dimension\Products hierarchy\Product level, Columns: Retailers dimension\Retailers hierarchy\Retailer name level, and Order method dimension\Order method hierarchy\Order method type level, nested under <#Retailer name#>). Apply full suppression to rows and columns. Save the report as Crosstab with Full Suppression.
- In the same report, change the suppression to nulls only, for rows and columns, and save the report as Crosstab with Null Suppression.
- In the same report, remove the suppression from the rows and columns, apply suppression within the query, and save the report as Crosstab with Null Suppression in query.
- Run one of the three reports, clearing the cache after it has run. Repeat this for the other two reports.
- In IBM Cognos DQA, review the Profile 0 logs generated by each of the three report executions. Explore the runtree graph, XML node information, Properties of the nodes, and timings. Compare results of the three report variations.

You have compared three different variations of a report, using IBM Cognos Dynamic Query Analyzer, and can use the results to ensure that the most efficient report is available for users. Which report is the most efficient, based on your findings?

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows. If you need more information to complete a task, refer to earlier demos for detailed steps.

## Workshop 2: Tasks and Results

At the beginning of this workshop, the IBM Cognos Full:9315 dispatcher is running, and log files are available in the ..\logs\XQE directory.

### Task 1. Start IBM Cognos Dynamic Query Analyzer and review the configuration.

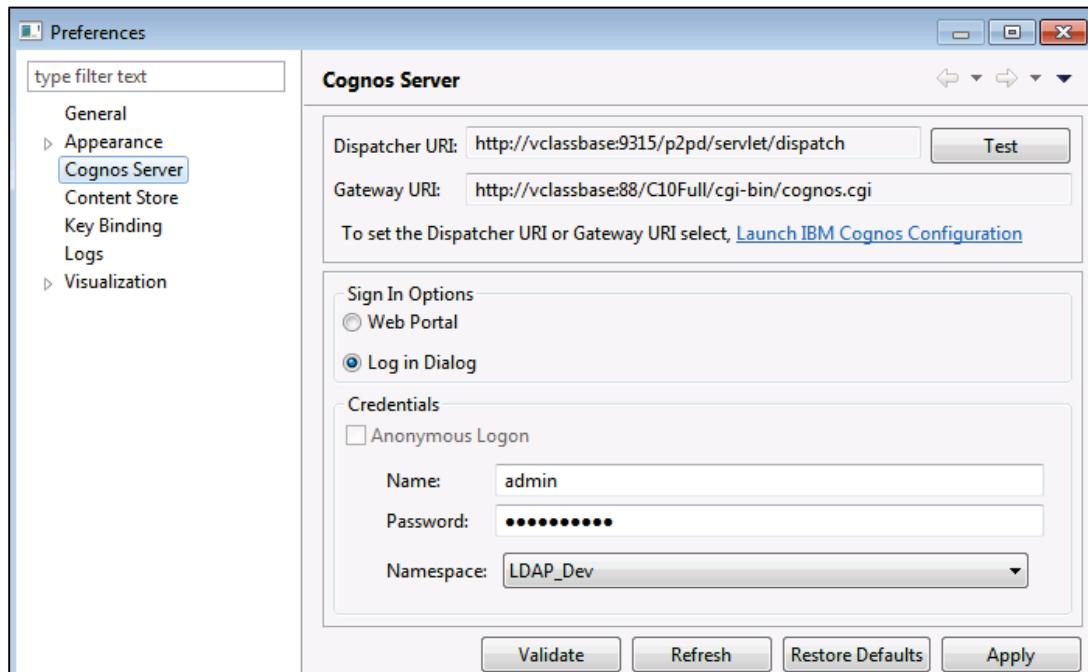
- From the **Start** menu, navigate to **All Programs\IBM Cognos 10 - 64 Full**, and then click **IBM Cognos Dynamic Query Analyzer**.

If you receive any "null pointer" errors (either standalone or at the top of what appears to be a login dialog box), dismiss the errors and then close and reopen IBM Cognos Dynamic Query Analyzer before proceeding.

- If you receive any other login-related errors, dismiss them and leave IBM Cognos Dynamic Query Analyzer open.
- From the **Window** menu, click **Preferences**, and then in the pane on the left, click **Cognos Server**.

This property has the settings for the host and port of the IBM Cognos server which contains the reports to be analyzed. This has been configured by the administrator who set up the environment.

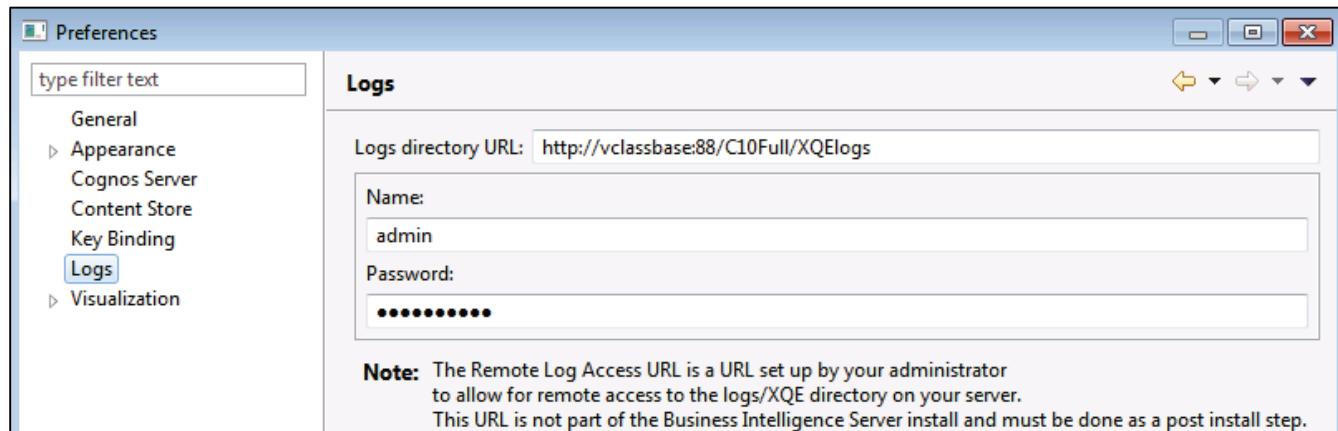
- If necessary, ensure that the settings appear as shown below (the value in the Password box is Education1), click **Validate**, click **OK**, and then click **Apply**.



- On the left, click **Logs**.

The Logs directory URL points to a virtual directory (XQElogs) on the Web server, which references the XQE directory where the log files are saved on the server. This property has been configured by the administrator who set up the environment.

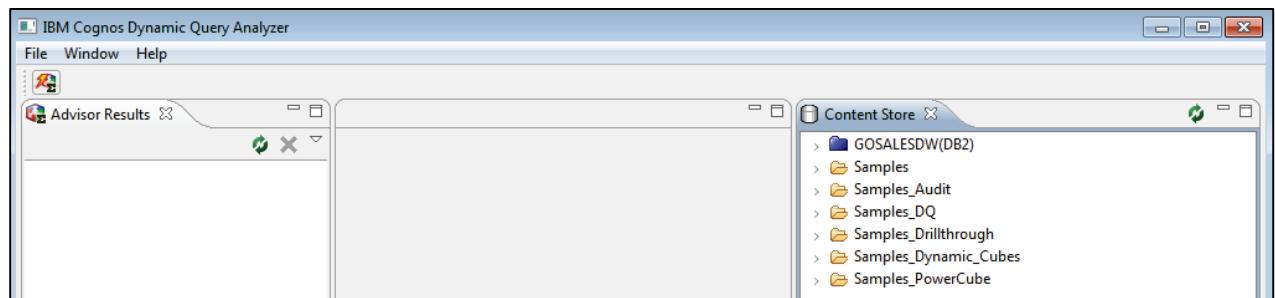
If necessary, ensure that the settings appear as shown below (the value in the Password box is Education1), and then click **Apply**:



- Click **OK** to close the **Preferences** dialog box.
- To ensure that you are in the correct view for this workshop, from the **Window** menu, click **Show View**, click **Navigation\Content Store**, and then click **OK**.

Dismiss any error messages that may appear, and then close and reopen DQA. If you are prompted to log on at this point, specify the LDAP\_Dev namespace, a user ID of admin, and a password of Education1. Also specify that you want to save the selected namespace, user ID, and password.

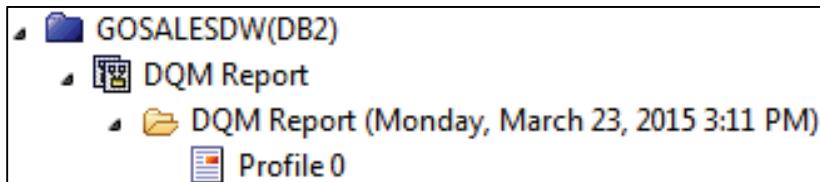
The results appear similar to the following:



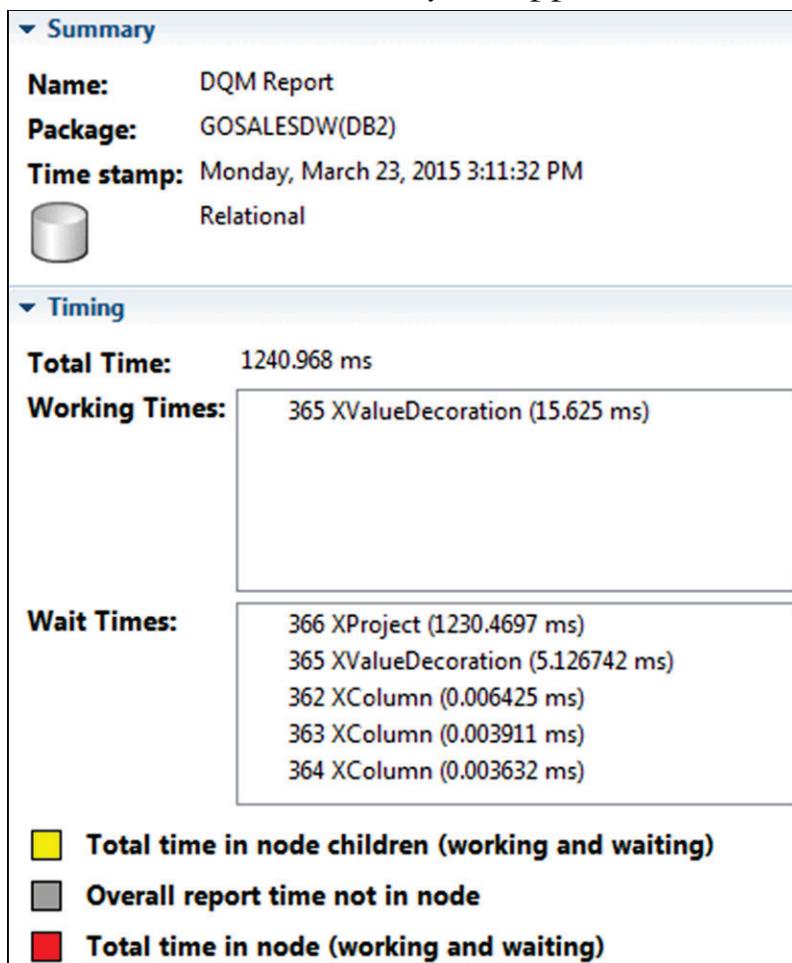
## Task 2. Review the results of a report that was run, in IBM Cognos Dynamic Query Analyzer.

- On the Content Store tab, if necessary, click the Refresh button, expand the **GOSALESDW(DB2)** entry (click the entry, then click > to the left of the entry), and then expand the **DQM Report\ DQM Report (<Date>, <Time>)** entries.

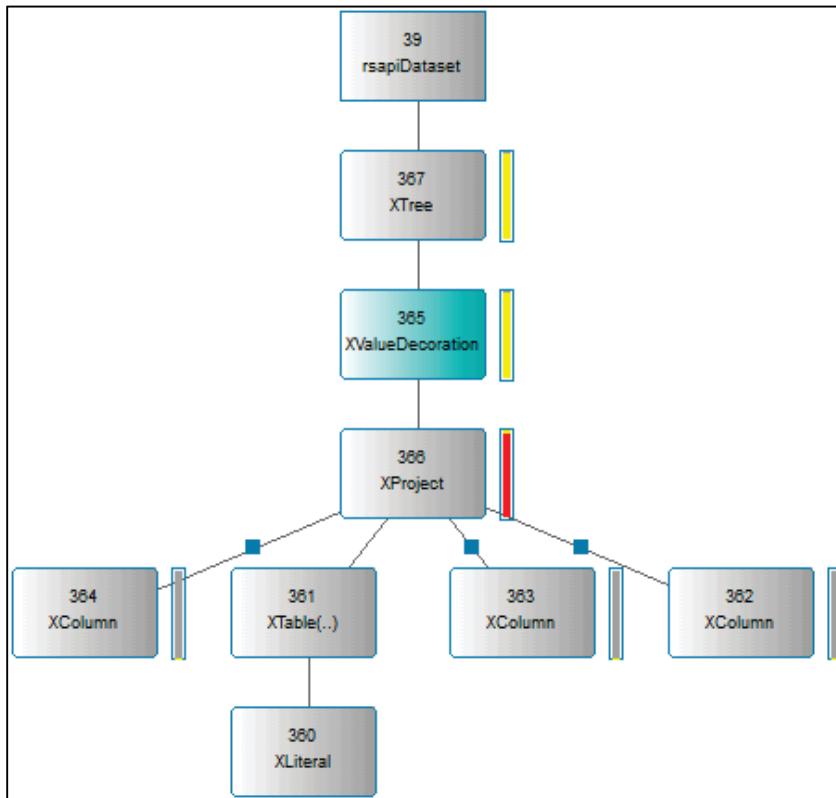
A section of the result appears as follows:



- Double-click the **Profile 0** entry, and then in the right pane, click the **Summary** tab. The analysis will load, and the runtree log is displayed in a graphical view. The results in the Summary tab appear similar to the following:



The results in the middle pane appear similar to the following:



- Maximize the window, and adjust the width of the **Summary** tab layout to allow you to see the information.
- On the **Summary** tab, expand the **Node Shapes and Colors** section, to assist you in interpreting the results.
- Review the **Timing** section, and note the total time in node children and total time in node color annotations, and summary of working times and wait times.
- Refer to the **DQA Graph Legend** page earlier in the content of this module, as you review the objects in the graph, to assist in your interpretation of the graph.

Nodes can be SQL execution nodes, MDX execution nodes, local processing nodes, decoration nodes, and many more. Results flow from the bottom of the run tree (leaf nodes) to the top (XTree node) where the result is represented in RSAPI (Resultset API) format and can be sent to the report service for rendering.

- Click the **XTree** node object in the graph, to select it.

- Review the properties by clicking the **Properties** tab, and then select the other objects, one by one, to familiarize yourself with the properties and the information that is displayed for each one.
- Notice the **XColumn** objects, and compare the timing results of each column.
- Close **IBM Cognos Dynamic Query Analyzer**, and any other open windows.

### **Task 3. Create report variations.**

You want to create reports with variations, so that you can compare the results in IBM Cognos Dynamic Query Analyzer. To do this, you will create three variations of a report. Typically, a report would be created, ran, and then the log files would be analyzed to determine if efficiencies could be found. Then, the updated report would be run and the log files analyzed to determine the difference in timing. In the interest of time you will create three reports, save them, run them to generate the log files, and then in the next task, you will open the log files, and compare results of all three.

- Launch **Internet Explorer**, go to <http://vclassbase:88/C10Full>, and then log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials.
- Launch **IBM Cognos Connection**, on the toolbar click **New Folder**, in the **Name** box type **Suppression Reports**, ensure that the location is set to **Public Folders**, and then click **Finish**.

You will save the reports to this public folder, rather than a private folder, so that you can access them from the Content Store pane in IBM Cognos Dynamic Query Analyzer. You will proceed to open the package to use in your reports.

- Navigate to **Public Folders\Samples\_ DQ\Models\GO Data Warehouse (analysis)**, and then from the **Launch** menu, click **Report Studio**.
- Click **Create New**, and then double-click **Crosstab**.
- On the **Source** tab, expand **Sales and Marketing (analysis)**, and then expand **Sales**.

You will build a report from items in this namespace.

- Populate the crosstab by dragging the following source items to the crosstab in the report layout:
  - **Measures** drop zone: Sales fact\Quantity
  - **Rows** drop zone: Products dimension\Products hierarchy\Product level
  - **Columns** drop zone:
    - Retailers dimension\Retailers hierarchy\Retailer name level
    - Order method dimension\Order method hierarchy\Order method type level, nested under <#Retailer name#>

The crosstab appears as follows:

Quantity	<#Retailer name#>		<#Retailer name#>		
	<#Order method type#>				
<#Product#>	<#1234#>	<#1234#>	<#1234#>	<#1234#>	<#1234#>
<#Product#>	<#1234#>	<#1234#>	<#1234#>	<#1234#>	<#1234#>

- On the toolbar, click the **Suppress**  arrow, and then click **Suppression Options**.
- In the **Suppression** section, click **Rows and columns**, in the **Suppress the following** section, ensure that all check boxes are selected, and then click **OK**.
- From the **File** menu, click **Save As**, name the report **Crosstab with Full Suppression**, and then save the report in **Public Folders\Suppression Reports**.

What if the author was to decide that it is not full suppression that was required, but merely suppression of null (missing) values? You will make the changes to the report and save the new variation to analyze later.

- On the toolbar, click the **Suppress** arrow, and then click **Suppression Options**.
- In the **Suppress the following** section, ensure that only the **Missing values** check box is selected, and then click **OK**.

- From the **File** menu, click **Save As**, name the report **Crosstab with Null Suppression**, and then save the report in **Public Folders\Suppression Reports**.

What if the author was to decide that suppression of null (missing) values could be run in the query directly? You will make the changes to the report and save the new variation to analyze later.

- On the toolbar, click the **Suppress** arrow, and then click **No Suppression**.
- On the **Explorer** bar, the to left of the report layout, click **Query Explorer** , and then click **Query1**.
- From the **Data Items** pane, drag **Quantity** to the **Detail Filters** pane.
- In the **Detail Filter Expression** pane, in the **Expression Definition** pane, click the cursor at the end of the expression, type **is not null**, and then click **Validate** .

The [Quantity] is not null expression has no errors.

- Click **OK**.
- From the **File** menu, click **Save As**, name the report **Crosstab with Null Suppression in Query**, and then save the report in **Public Folders\Suppression Reports**.
- Close Report Studio.

## **Task 4. Run the reports in IBM Cognos Dynamic Query Analyzer to generate log files for analysis.**

- Launch **IBM Cognos Dynamic Query Analyzer**, if prompted log in with **LDAP\_Dev/admin/Education1** credentials, and then from the **File** menu, click **Close All Results**, if it is available, to ensure that all previous results are closed.

If you encounter any **NullPointerException** errors, close IBM Cognos Dynamic Query Analyzer and reopen it.

- Click the **Content Store** tab, click **OK** to accept the Login settings (if necessary), and then expand the **Suppression Reports** folder to see the reports that you created.

- Double-click the **Crosstab with Full Suppression** report, click **OK** to close the **Login to Cognos Server** message, and then log in to the portal with **LDAP\_Dev/admin/Education1** credentials.

Before you run the first report, you want to clear the query service cache.

- Return to the browser window where **Admin Person** is logged into **IBM Cognos Connection**, and then from the **Launch** menu, click **IBM Cognos Administration**.
- On the **Configuration tab\Query Service Caching** pane, in the **Server Group(s)** column, click the **Group 64** check box to select it, and then click **Clear cache**.
- When the cache has succeeded in clearing, click **Close**.
- Switch to the **IBM Cognos Query Analyzer** window, in the **Content Store** tab, right-click the **Crosstab with Full Suppression** entry, and then click **Run Report**.

The report executes, and displays the results on the report tab in the middle.

- In the **Open Logs** dialog box, click **No**, as you will open the log later.  
You want to clear the cache before running a different report, to ensure that results are not skewed by cached information.
- Return to the browser window, where **Admin Person** is logged into **IBM Cognos Administration**, and repeat the previous steps to clear the **Query Service** cache.
- Switch to the **IBM Cognos Dynamic Query Analyzer** window, and repeat the previous steps to run the **Crosstab with Null Suppression** report and clear the query service cache.
- Switch to **IBM Cognos Dynamic Query Analyzer**, and repeat the previous steps to run the **Crosstab with Null Suppression in Query** report and clear the query service cache. It may take a while for this report to finish running.

By running the reports in IBM Cognos Dynamic Query Analyzer, even though query execution is not enabled in your environment, logs have been generated, for which you can analyze results.

## Task 5. Review the logs from different report variations.

- In **IBM Cognos Dynamic Query Analyzer**, from the **File** menu, click **Close All Results**.
- From the **Window** menu, click **Analyze Logs**, from the **File** menu, click **Open log**, and then click **From URL**.

You can use this option if a virtual directory has been configured for the XQE folder. In this environment, all of the dynamic query logs are stored here.

- Click the **Crosstab with Full Suppression (<Date>, <Time>)** entry, click the **>** at the left of the entry to expand the list, and then in the expanded list, click the **Profile 0** check box to select it.

You only want to load the Profile 0 file for comparison analysis at this time. Other files that you may see in the log files are Fetch Cell Values and LoadLevels.

- Expand the **Crosstab with Null Suppression (<Date>, <Time>)** entry, and then in the expanded list, click the **Profile 0** check box to select it.
- Expand the **Crosstab with Null Suppression in Query (<Date>, <Time>)** entry, in the expanded list, click the **Profile 0** check box to select it, and then click **OK**.
- Click the **Crosstab with Full Suppression (<Date>, <Time>)** tab, to review the results.
- From the **Window** menu, click **Show View**, expand **Graph Details**, click **XML Node**, and then click **OK**.

As you explore each node, you can refer to this tab to view the XML associated with it.

- In the **XML Node** tab, click in the blank pane, and then in the **Crosstab with Full Suppression** pane, select the node objects, one by one, to familiarize yourself with the properties and the information that is displayed for each one.

Refer to the DQA Graph Legend page earlier in the content of this module, as you review the objects in the graph, to assist in your interpretation of the graph.

- For expandable nodes, double-click the node or click the  icon to expand and explore more nodes and properties in the runtree.

In this runtree, the MDX query (green nodes) are sent to an MDX data source for execution. The results returned will go through some decoration nodes (decoration is an internal process that allows the mode to distinguish between different parts of a query result), then a node that will flatten the result (MDX results are multidimensional by nature) and finally another node will process the flattened result.

The XMDXSelect node is the node which will display the pieces of the actual MDX query used to satisfy the report request. The scale icon beside node is used as a visual representation of the performance of the node.

- Click the **XMDXSelect** node to display the properties.

A section of the result appears similar to the following:

Property	Value
cellProperties	CELL_ORDINAL, FORMAT_STRING, VALUE
cubeName	go_data_warehouse
id	1609
type	XMdxSelect
Wait time in node	6509.2734 ms
Wait time in node and children	83137.14 ms
Working time in node	1671.875 ms
Working time in node and children	5531.25 ms

The properties pane of this node reveals the wait time spent in the node and the wait time in the node and children. In this case, the time spent in the node itself was 1671.875 ms and the cumulative time for the node and its children was 5531.25 ms.

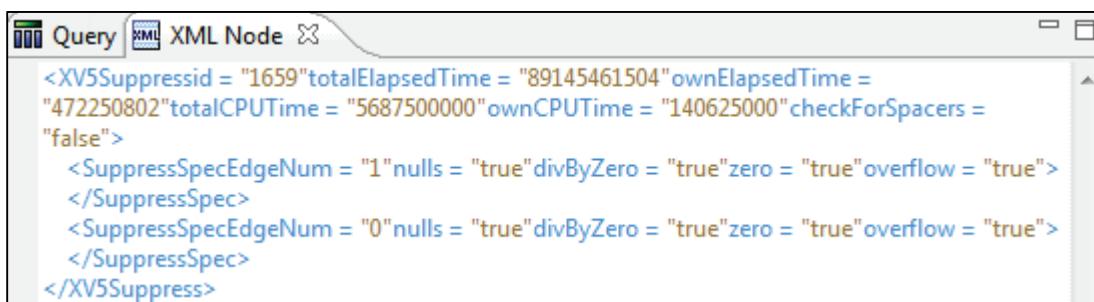
Your result times may be different, depending on what is happening in your environment. Compare each of the results of your findings against each other, in your analysis in this workshop.

- Click the **XV5Suppress** node near the top of the tree, and observe the properties.

Property	Value
checkForSpacers	false
id	1659
type	XV5Suppress
Wait time in node	331.62582 ms
Wait time in node and children	83457.96 ms
Working time in node	140.62498 ms
Working time in node and children	5687.5 ms

The XV5Suppress node is evoked by the application of the Suppress\Rows and Columns on the report.

- View the contents of the **XML Node** tab, while the **XV5Suppress** node is selected.
- Results appear similar to the following:



```

<XV5Suppress id = "1659" totalElapsedTime = "89145461504" ownElapsedTime =
"472250802" totalCPUTime = "5687500000" ownCPUTime = "140625000" checkForSpacers =
"false">
  <SuppressSpec EdgeNum = "1" nulls = "true" divByZero = "true" zero = "true" overflow = "true">
  </SuppressSpec>
  <SuppressSpec EdgeNum = "0" nulls = "true" divByZero = "true" zero = "true" overflow = "true">
  </SuppressSpec>
</XV5Suppress>

```

In this particular run, the time spent in the node itself was 140.62498 ms and the cumulative time for the node and its children was 5687.5 ms.

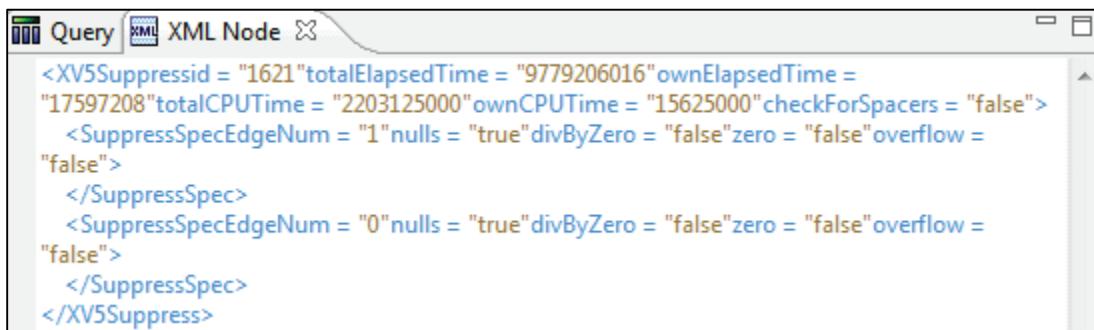
Notice the code for the suppression, and how all suppression values are true. Based on the fact that there are two EdgeNum entries and nulls, divByZero and overflow are all set to true, the properties confirm that a user applied zero, divide by zero, overflow and null suppression on both the rows and columns.

At this point, it would be time to ask the report author whether or not they actually need the divByZero, zero and overflow suppression, or whether or not they just wanted to suppress nulls. Another good question to ask would be whether suppression was actually needed on both the rows and columns.

The report author could come back with the statement that only null suppression is required on both columns and rows. You have made this change to the report and saved it as Crosstab with Null Suppression (<Date>, <Time>) on the same package, and you ran the report to generate log files.

- In **IBM Cognos Dynamic Query Analyzer**, click the **Crosstab with Null Suppression (<Date>, <Time>)** tab, and review the objects in the runtree.
- Click the **XV5Suppress** node, and review the **XML Node** tab.

Results similar to the following appear:



```
<XV5Suppresid = "1621" totalElapsedTime = "9779206016" ownElapsedTime =
"17597208" totalCPUTime = "2203125000" ownCPUTime = "15625000" checkForSpacers = "false">
<SuppressSpecEdgeNum = "1" nulls = "true" divByZero = "false" zero = "false" overflow =
"false">
</SuppressSpec>
<SuppressSpecEdgeNum = "0" nulls = "true" divByZero = "false" zero = "false" overflow =
"false">
</SuppressSpec>
</XV5Suppres>
```

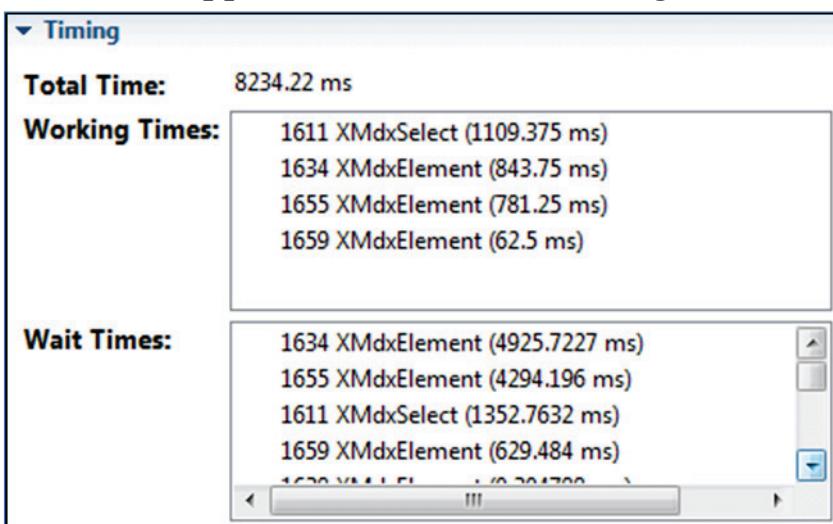
In this particular run, the time spent in the node itself was 15.625 ms and the cumulative time for the node and its children was 2203.125 ms. The timing has changed significantly from the previous report design execution.

Notice the code for the suppression, and how not all suppression values are true, only those for null values. Based on the fact that there are two EdgeNum entries, the properties confirm that a user null suppression on both the rows and the columns.

For this report run only nulls are being suppressed on both the row and column edge of the crosstab. Since the requirement is to only suppress nulls, the visual null suppression can be replaced by the Null suppression on the actual query. At this point, it would be time to ask the report author to make this change to the report design and query. You have made this change to the report and saved it as Crosstab with Null Suppression in Query (<Date>, <Time>) on the same package, and you ran the report to generate log files.

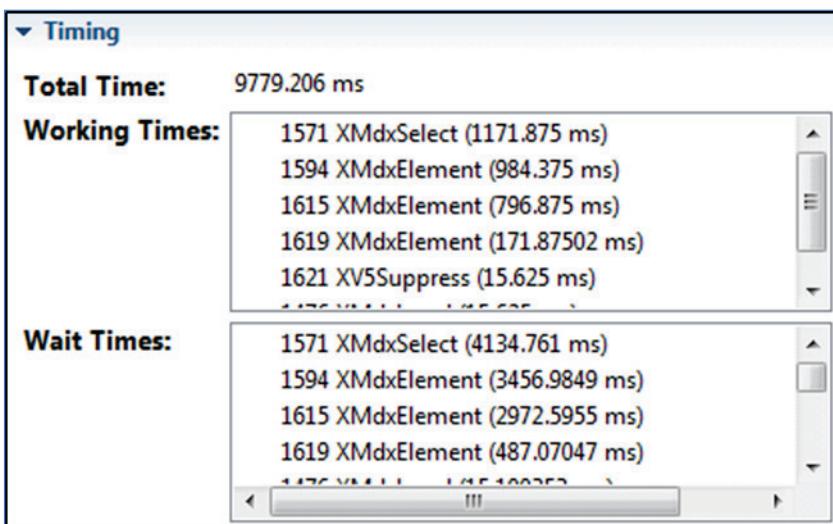
- In IBM Cognos Dynamic Query Analyzer, click the **Crosstab with Null Suppression in Query (<Date>, <Time>)** tab, and review the objects in the runtree.
- In the **Graph** tab, notice that there is no XV5Suppress node, due to visual suppression being removed from the report, and running the suppression in the query.
- On the **Summary** tab, notice the **Timing** section.

The results appear similar to the following:



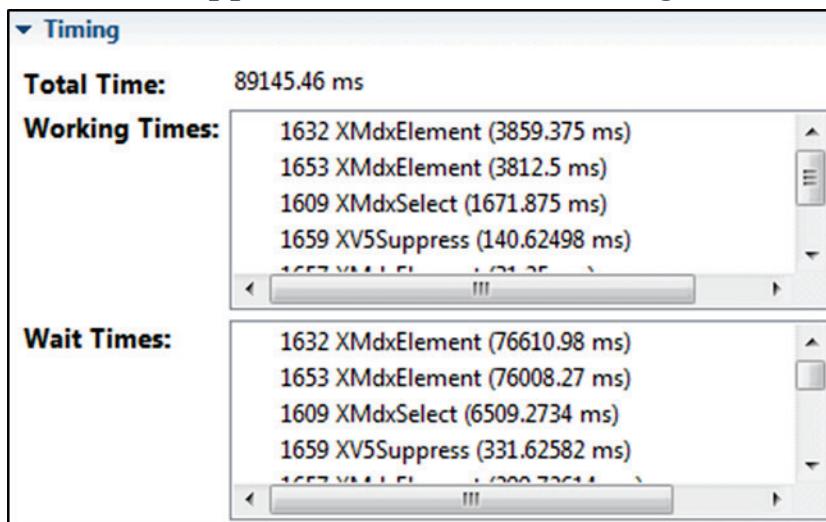
- In IBM Cognos Dynamic Query Analyzer, click the **Crosstab with Null Suppression (<Date>, <Time>)** tab, and review the **Timing** section results.

The results appear similar to the following:



- Compare the results with the timing results for the initial report, **Crosstab with Full Suppression (<Date>, <Time>)**.

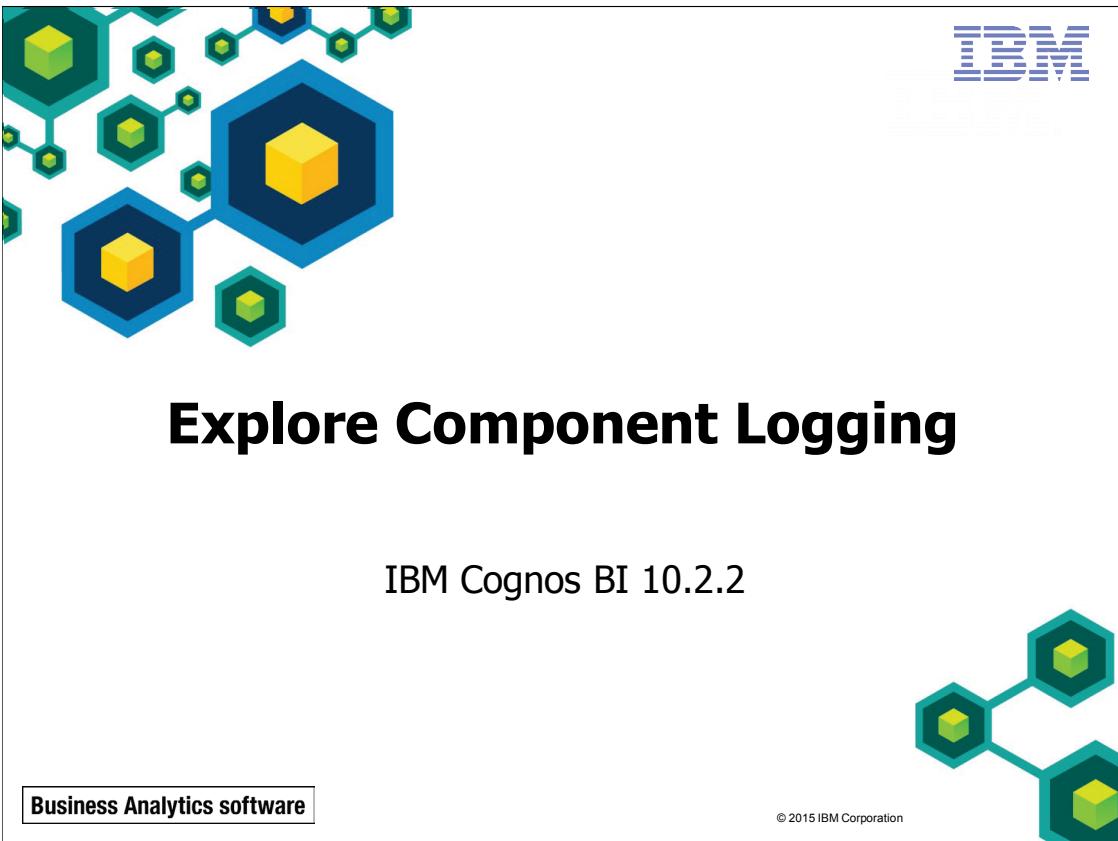
The results appear similar to the following:



You have compared three different variations of a report, using IBM Cognos Dynamic Query Analyzer, and the results have revealed that the Crosstab with Null Suppression in Query report is the most efficient report for users.

- Close **IBM Cognos Dynamic Query Analyzer**, log out from **IBM Cognos Administration** and then close the web browser
- From the **Taskbar**, launch **Services**, and then stop the **IBM Cognos 10 Full:9315** service for the next module demo.





**Explore Component Logging**

IBM Cognos BI 10.2.2

Business Analytics software

© 2015 IBM Corporation



# Objectives

- At the end of this module, you should be able to:
  - explore component logging for Gateway, Dispatcher, Report Server, and Universal Data Access layer

© 2015 IBM Corporation



## Report Server (RSVP) Trace

- for RSVP errors, do RSVP trace
  - trace SOAP requests sent to RSVP
  - trace data sent and received over BIBusTKServerMain socket
  - command and response documents associated with all Query Framework requests generated by RSVP
  - enable recordings
  - trace print commands and statuses

© 2015 IBM Corporation



This is for your information. You would only use this if you were asked to do so by customer support.

Traces are usually done in combination with other traces, and interpreting only one trace file is merely one part of the whole story. When troubleshooting, customer support would typically review more than one trace.

## BIBus Trace

- capture HTTP and socket requests sent to and from the BIBusTKServerMain process
- activate through environment variables or a configuration file
- log to a file or console

© 2015 IBM Corporation



This is for your information. You would only use this if you were asked to do so by customer support.

## Trace the Dispatcher

- Trace the Dispatcher: trace start-up problems and inter-component communication
- add elements

© 2015 IBM Corporation



Tracing the dispatcher is useful for determining what is happening between a dispatcher and the other IBM Cognos services. The resulting files can be used to troubleshoot general, performance, affinity and load balancing issues.

Historically, the dispatcher was once known as pogo. If you see a configuration file that contains pogo, it is related to the dispatcher.

This is for your information. You would only use this if you were asked to do so by customer support.

## Explore Query Framework Logging

- primary purpose of file is to configure various OLAP providers
- most of the OLAP providers have the following logging capabilities
  - dump incoming execute/validate requests as XML files
  - dump processing MDX statements into a log file
  - dump incoming metadata requests into a log file
  - output processing MDX statements into a debug window

© 2015 IBM Corporation



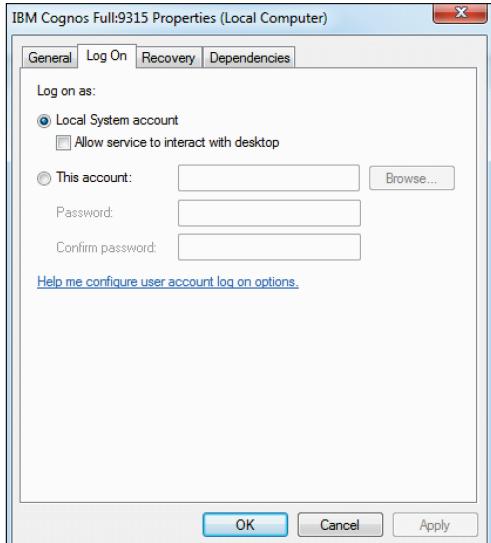
Query Framework logging can track information sent between components involved in processing OLAP requests.

**Business Analytics software**

**IBM**

## Describe the Dispatcher Command Console

- activate
  - enable Allow service to interact with desktop functionality of the IBM Cognos 10 Windows service



© 2015 IBM Corporation



This console is only available on a Windows OS with a registered IBM Cognos 10 service. You can use startup.bat if in a development or test environment, as a quick way to start IBM Cognos 10 in a command window; do not use this method in a production environment.

You can use this to capture startup calls to troubleshoot service initialization issues.

## Gateway Trace

- diagnose problems with single sign-on and secure sockets, standby dispatcher mechanism, and password encryption
- activate
  - in ..\cgi-bin\ directory, rename cognoscgi.conf.sample to cognoscgi.conf
  - add code to end of file
 

```
gw<type>LoggingConfig=<file_name>.log 5 GWSiMTLogger 1
```
  - output: ..\logs\<file\_name>.log

© 2015 IBM Corporation



A gateway is an extension of a Web server program that transfers information from the Web server to another server. Gateways are often CGI programs, but may follow other standards such as Internet Server Application Program Interface (ISAPI), and Apache Modules (apache\_mod).

An example of a cognoscgi.conf file (remove # to uncomment a line):

```
# optional overrides; defaults are shown, uncomment and edit as required
#dispatcher_host=localhost
#dispatcher_port=9300
#dispatcher_Encryption=enabled
#SystemRecoverableIterationLimit=50
gwISAPILoggingConfig=gwisapi.log 5 GWSiMTLogger 1
```

Valid <type> entries include gwCGILoggingConfig for CGI, gwISAPILoggingConfig for ISAPI, and gwModLoggingConfig for apache\_mod.

## Demo 1: Perform a Gateway Trace

At the beginning of this demo, no dispatcher is running.

Ensure that the following services are running:

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

### Purpose:

**You want to become familiar with the information available in a gateway trace. To do this, you will invoke a trace and review the output.**

### Task 1. Allow IIS 7 write permission to the logs directory.

In this environment, the IIS 7 Web server user (IUSR) requires permission to write in the logs directory. Before proceeding with the trace, you will enable this permission.

1. In Windows Explorer, navigate to **C:\Program Files\IBM\cognos\c10\_64full**, right-click the **logs** directory, and then click **Properties**.
2. On the **Security** tab, to change permissions, click **Edit**.
3. Click **Add**.
4. In the **Enter the object names to select (examples)** pane, type **IUSR**, and then click **Check Names**.  
If the user is found, it will appear with an underscore in the pane.
5. Click **OK**, and then in the **Group or user names** pane, click **IUSR**.
6. In the **Permissions for IUSR** pane, scroll to the **Write** permission, and in the **Allow** column, click the **Write** check box to select it.
7. Click **Apply**, and then click **OK** to close the **Permissions for logs** dialog box.
8. Click **OK** to close the **logs Properties** dialog box, and then close **Windows Explorer**.

## Task 2. Enable the gateway trace.

1. On the **Taskbar**, click **Services**, ensure that the **IBM Cognos Full:9315** service has been stopped, and then close the **Services** window.
2. In **Windows Explorer**, navigate to **C:\Program Files\IBM\cognos\c10\_64full\cgi-bin**, and then copy and paste **cognoscgi.conf.sample** to the same directory.
3. Rename to **cognoscgi.conf - Copy.sample** to **cognoscgi.conf**, and then open **cognoscgi.conf** in **Eclipse**.
4. Modify the code as follows:
  - **dispatcher\_host=vclassbase**
  - **dispatcher\_port=9315**
  - **dispatcher\_Encryption=enabled**
  - **SystemRecoverableIterationLimit=50**
  - **gwCGILoggingConfig=gw.cgi.log 5 GWSiMTLogger 1**

This will direct the logging of the gateway to a log file called **gw.cgi.log**. Do not add a path to the filename. The result of the modified section of text appears as follows:

```
# optional overrides... defaults are shown. Uncomment and edit as required.
dispatcher_host=vclassbase
dispatcher_port=9315
dispatcher_Encryption=enabled
SystemRecoverableIterationLimit=50
gwCGILoggingConfig=gw.cgi.log 5 GWSiMTLogger 1
```

5. Save the file and then close **Eclipse**.
6. Start the **IBM Cognos Full:9315** service, clearing any messages of the service not starting in a timely fashion, and refreshing the status every 2 minutes until it has successfully started.

## Task 3. Log on and run a report.

1. Launch **Internet Explorer**, go to **http://vclassbase:88/C10Full**, and then log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials.
2. Launch **IBM Cognos Connection**, navigate to **Public Folders\Samples\_DQ\Models\GO Sales (query)\Report Studio Report Samples**, and run the **Horizontal Pagination\_DQ** report.
3. Navigate through all pages of the report, and then close the browser window.

## Task 4. Observe the results of the trace.

1. Open C:\Program Files\IBM\cognos\c10\_64full\logs\gw.cgi.log in Eclipse.

If a file is open in the middle pane (for example, cognoscgi.conf), close the tab first.

You will see results similar to the following:

```
11:40:51.656 - 2596 DEBUG t:2520 Calling CGIGatewayInterface::getenvvariable( REQUEST_METHOD )
11:40:51.656 - 2596 DEBUG t:2520 Leaving CGIGatewayInterface::getenvvariable() with value: POST
11:40:51.656 - 2596 DEBUG t:2520 started method= POST
11:40:51.656 - 2596 DEBUG t:2520 Calling CGIGatewayInterface::getenvvariable( QUERY_STRING )
11:40:51.656 - 2596 DEBUG t:2520 Leaving CGIGatewayInterface::getenvvariable() with value:
11:40:51.656 - 2596 DEBUG t:2520 Calling CGIGatewayInterface::getenvvariable( REQUEST_METHOD )
11:40:51.656 - 2596 DEBUG t:2520 Leaving CGIGatewayInterface::getenvvariable() with value: POST
11:40:51.656 - 2596 DEBUG t:2520 Calling CGIGatewayInterface::getenvvariable( CONTENT_LENGTH )
```

2. Scroll through the file to see the information that is captured in this trace. Items to look for include SOAP messages, HTML code, and elapsed time (scroll to the bottom of the file).
3. When you have finished reviewing the file, close the **gw.cgi.log** tab, and then close **Eclipse**.

## Task 5. Disable the trace.

1. From the **System Tray**, click **Services** window, stop the **IBM Cognos Full:9315** service.
2. In **Windows Explorer**, navigate to **C:\Program Files\IBM\cognos\c10\_64full\cgi-bin**, and delete **cognoscgi.conf**. Leave the **IBM Cognos Full:9315** service stopped for the next workshop.

### Results:

**You invoked a CGI gateway trace and reviewed the information available in the output.**

## Why Use a UDA Trace?

- capture SQL sent to native API for purposes of executing SQL through UDATest.exe
- analyze performance issues
- diagnose reporting database connection issues

© 2015 IBM Corporation



The Universal Data Access (UDA) layer is the component used for the processing of SQL queries to relational data sources.

UDATest is a utility which ships with Cognos 10. The purpose of the utility is to allow users to execute the SQL generated by UDA, which has been previously captured in a UDA trace, directly against a third party RDBMS. The output generated by UDATest from the SQL execution will show the attach to the 3rd party RDBMS API, the preparation of the SQL, the actual SQL, and will display the data returned.

It is important to understand that UDATest does not fix issues. Its purpose is to verify if the SQL sent to the RDBMS will execute successfully.

Possible use cases of UDATest. Keep in mind that in some of these examples, the SQL generated was identical or ran successfully. UDATest did not help resolve the issue, but rather proved the SQL sent to the RDBMS could execute successfully and therefore helped the administrator determine that the actual issue may be elsewhere:

- Report runs against one DB vendor and fails against another. For example, you create a report against SQL Server, the report validates and runs as expected, then you create a similar report against a DB2 data source and the report fails with a UDA error. Run UDATest against both vendors RDBMS and compare the output to see where the process is failing and how the SQL differs.
- SQL Performance with Virtual View Manager versus directly against the vendor: Running a report which uses a Composite data source runs in x minutes. Running the same SQL, directly against Oracle takes x + minutes. Run UDATest, with output logging enabled, against both and compare to see what the differences are in the SQL.
- Upgrade: Comparing SQL generated in different versions of Cognos 10: Running a report against Cognos 10.1 runs successfully, running the same report after upgrading to Cognos 10.2 fails with an error. Run UDATest to see the differences in the SQL being generated.
- Intermittent Report Failures: Every day a summary report is sent out. Since upgrading report returns incorrect data usually once or twice a week. This is not due to a database issue because if you re-run the report again you will get the correct answer. Run UDATest a number of times in sequence, waiting a couple of seconds between each launch of UDATest.  
See good results for run#2, run# 3, run#4 and run# 5: uda\_2.log, uda\_3.log, uda\_4.log, uda\_5.log. See bad results for run# 1, run #6 and run# 7: uda\_1.log, uda\_7.log and uda\_7.log. Compare the logs to see the differences.

## Describe Methods to Enable UDA Traces

Method	Pros	Cons
Server Environment Variables	<ul style="list-style-type: none"> <li>▪ set any EVs</li> <li>▪ logs until EVs are unset</li> </ul>	<ul style="list-style-type: none"> <li>▪ requires IBM Cognos service restart</li> </ul>
Session Environment Variables	<ul style="list-style-type: none"> <li>▪ set any EVs</li> <li>▪ no IBM Cognos restart required</li> </ul>	<ul style="list-style-type: none"> <li>▪ variables only good for session</li> </ul>
Use ipfUDAClientConfig.xml	<ul style="list-style-type: none"> <li>▪ captures performance categories</li> <li>▪ no IBM Cognos restart required</li> </ul>	<ul style="list-style-type: none"> <li>▪ will probably want to use other IPF files at the same time and merging IPF files takes care and consideration</li> </ul>

© 2015 IBM Corporation



There are several methods to enable UDA traces. The method you choose depends on your circumstances for enabling the UDA trace, your comfort level with the method and what flexibility you require for the tracing.

Before enabling UDA tracing:

- check the IBM Cognos *Business Intelligence Troubleshooting Guide 10.2.2* and the Readme file for common UDA issues
- search the IBM technical support knowledge base ([http://www-947.ibm.com/support/entry/portal/troubleshooting/software/software\\_support\\_\(general\)](http://www-947.ibm.com/support/entry/portal/troubleshooting/software/software_support_(general))) for the UDA error message and see if any are similar to the issue that is being encountered
- search the IBM Cognos Proven Practice document library (<http://www.ibm.com/developerworks/data/library/cognos/cognosprovenpractices.html/>) for potential solutions

## Enable UDA tracing:

- To capture the SQL sent to the native API for the purposes of executing that SQL through .bin/UDATest.exe, thereby taking the rest of the Cognos services and components out of the picture.
- To help in analyzing performance issues. If you have encountered a performance issue where the actual slow points of performance have not been isolated across components you may want to enable UDA logging. Be aware that one will probably need to capture traces from other components to establish a timeline of activity across all components.
- The key place where the timeline becomes important is establishing where components are waiting for their consumers (either other Cognos components or 3rd Party APIs) to re-invoke them, etc. Looking at a single component trace on its own can mask that delay.
- The cogserver.log does not provide enough granularity to pinpoint where the performance hit is taking place.

## Explore UDA Trace and Environment Variables

- activate with server environment variables
  - TRACE\_FILE=<trace\_file\_location>/<filename>.xml
  - TRACE\_ALL\_THREADS=Y
  - TRACE\_LAYER\_DMD\_SQLAPIRW = 0x0002

© 2015 IBM Corporation



When using TRACE\_FILE=<trace\_file\_location>/<filename>.xml, if you are a Visual Studio user, if this is set to a value of ::DEBUGWIN, the output will be directed to Visual Studio.

TRACE\_ALL\_THREADS=Y will catch tracing from all threads.

TRACE\_LAYER\_DMD\_SQLAPIRW = 0x0002 performs SQL API tracing.

There are other environment variables that are organized into trace layers with 32 trace categories within each layer. These environment variables apply to IBM Cognos only and will not affect any other processes.

For the settings in the environment variables to take effect, the IBM Cognos BI service will have to be re-started, as setting environment variables is a function of the operating system. In Windows, open My Computer, click View system information, click the Advanced tab, click the Environment Variables button. For UNIX/Linux, environment variables are usually set in shell scripts.

## Describe Common Trace Layers and Categories

Trace Layer	Category
TRACE_LAYER_COMMON=0x0004	Trace low level initialization
TRACE_LAYER_COMMON=0x0008	Trace loading/unloading of shared libraries
TRACE_LAYER_DMD_SQLAPIRW = 0x0002	SQL API tracing
TRACE_LAYER_GENERIC=0x0400	Trace sort statistics
TRACE_FORMAT=bare	Removes trace file formatting such as the XML tags

© 2015 IBM Corporation



The most common traces are displayed above.

**Business Analytics software**

**IBM**

## Example of a UDA Trace

- **TRACE\_FILE = x:\<path>\<name>.api**
- **TRACE\_LAYER\_DMD\_SQLAPIRW = 0x0002**
- **TRACE\_ALL\_THREADS=Y**

The screenshot shows the Windows Environment Variables dialog box. The 'System variables' section contains the following entries:

Variable	Value
TRACE_ALL_THREADS	Y
TRACE_FILE	C:\UDA_TRACE.api
TRACE_LAYER_DMD-S...	0x0002

© 2015 IBM Corporation



The trace file can be located in any place that is accessible by the IBM Cognos 10 server and can be named at your discretion. The file extension does not matter; it could be .xml, .log, .txt, and so on. UDATest picks up .api by default, but you can just point to the trace file using Show all files.

The IBM Cognos Service has to be restarted for the trace to be enabled.

The example shows the setting of System Environment variables for UDA trace on a Windows server. Customer support frequently uses UDA traces for troubleshooting.

## Activate UDA Trace With Session Variables

- stop IBM Cognos service
- modify ..\bin\startup.bat, add code below @echo off
- save and run startup.bat file to start IBM Cognos 10

```
@ echo off
set TRACE_FILE = <drive letter>:\<path>\<name>.api
set TRACE_LAYER_DMD_SQLAPIRW = 0x0002
set TRACE_ALL_THREADS=Y
```

**Example**

```
@ echo off
set TRACE_FILE = C:\UDATrace.txt
set TRACE_LAYER_DMD_SQLAPIRW = 0x0002
set TRACE_ALL_THREADS=Y
```

© 2015 IBM Corporation



This technique really only applies to Windows platforms and is only applicable in development or test environments since startup.bat should not be used in a production environments.

In the example shown, press Ctrl+C to stop.

## Activate UDA Trace with IPF File

- rename  
..\\configuration\\ipfUDAClientconfig.xml.sample to  
ipfclientconfig.xml
- output to ..\\logs directory:
  - UDA\_Trace.log
  - UDA\_Perf.log
  - UDA\_RTUsage.log

© 2015 IBM Corporation



Tracing will take effect within 30 seconds.

A UDA trace can be useful to determine how long things are taking with the database.

## Example UDA Output

```
<?xml version="1.0"?><UDATrace version="UDA-AW-ML-8.500-WIP-31860-0(Production)" build="31860" patch="0"
Date="2015/03/11 11:06"><TraceEvent Layer="8" Category="2" ThreadId="00000C84"
Timestamp="1469"><SQLAPI><![CDATA[initialize e1 for "en" metadata callback m1,ThreadId="00000C84"
Timestamp="1469"><SQLAPI><![CDATA[initialize e1 for "en" metadata callback m1,
sql99datatypes:]]></SQLAPI><TraceEvent Layer="8" Category="2" ThreadId="00000C84"
Timestamp="1469"><SQLAPI Id="e1"><![CDATA[multidbattachdirect d10001 dblogicname "CQE_DB" in e1(dblogicname "SQL-
Environment" "" QS );]]></SQLAPI><TraceEvent><TraceEvent Layer="8" Category="2" ThreadId="00000C84"
Timestamp="1469"><SQLAPI Id="e1"><![CDATA[show features d10001 passive;]]></SQLAPI></TraceEvent><TraceEvent
Layer="8" Category="2" ThreadId="00000C84" Timestamp="1469"><SQLAPI Id="e1"><![CDATA[start t10001 for d10001
read;]]></SQLAPI><TraceEvent><TraceEvent Layer="8" Category="2" ThreadId="00000C84" Timestamp="1469"><SQLAPI
Id="e1"><![CDATA[prepare r10001 from"Select * from [gosales].PRODUCT_LINE" in t10001 tag sql, enable
nagging;]]></SQLAPI><TraceEvent><TraceEvent Layer="8" Category="2" ThreadId="00000C84" Timestamp="1469"><SQLAPI
Id="e1"><![CDATA[show tagged sql for r10001;]]></SQLAPI></TraceEvent><TraceEvent Layer="8" Category="2"
ThreadId="00000C84" Timestamp="1469"><SQLAPI Id="e1"><![CDATA[release request
r10001;]]></SQLAPI></TraceEvent><TraceEvent Layer="8" Category="2" ThreadId="00000C84"
Timestamp="1531"><SQLAPI Id="e2"><![CDATA[initialize e2 for "en" metadata callback m2,
sql99datatypes:]]></SQLAPI><TraceEvent><TraceEvent Layer="8" Category="2" ThreadId="00000C84"
Timestamp="1531"><SQLAPI Id="e2"><![CDATA["CQE_DB" in e2(dblogicname "great_outdoors_sales"
"DBInfo_Type=MS;Provider=SQLOLEDB;User ID=sa;Password=*****;Data Source=localhost\SQL2005;Provider_String=Initial
Catalog=gosales;"@COLSEQ="OL );]]></SQLAPI><TraceEvent><TraceEvent Layer="8" Category="2" ThreadId="00000C84"
Timestamp="1672"><SQLAPI Id="e2"><![CDATA[get attribute max name length context dbname "great_outdoors_sales" for
database d20001;]]></SQLAPI></TraceEvent><TraceEvent Layer="8" Category="2" ThreadId="00000C84"
Timestamp="1672"><SQLAPI Id="e2"><![CDATA[show features d20001 case sensitive;]]></SQLAPI></TraceEvent><TraceEvent
Layer="8" Category="2" ThreadId="00000C84" Timestamp="1672"><SQLAPI Id="e2"><![CDATA[show features d20001 case
sensitive;]]></SQLAPI></TraceEvent><TraceEvent Layer="8" Category="2" ThreadId="00000C84" Timestamp="1672"><SQLAPI
Id="e1"><![CDATA[prepare r10002 from"select      PRODUCT_LINE.PRODUCT_LINE_CODE
```

© 2015 IBM Corporation

In the slide is a snippet of some UDA output. The items in red bold are the connect string, SQL and bulkfetch. Timings are in milliseconds. The second timing in red bold (Timestamp="1531") is the connection to the 3rd party data source vendors API. The line (Timestamp="1672") is the first response back from that call. Therefore you can determine that at least part of 1.5 seconds of this request was the time it took to attach and get a response back.

By finding the timestamp in the log file, looking at the response, and looking at the timestamp, you can determine timings to help troubleshoot. For example, how long did it take to log on? This trace may help you to identify where the time is being spent, including in connection of third party database vendor applications.

This type of code will be displayed in Workshop 1: Explore UDA Trace and UDATest. In the example description provided for the scenario, a use case for this would be to say, for example, that previously a report was taking 8 seconds to run. Through a UDA trace you were able to determine that 5 seconds was taken up by this attach time. The issue in this case was a bug in a third party vendor driver which was taking too long to encrypt the information. A bug was logged with the vendor and eventually the report execution time was reduced by 3 seconds. The connection time will never be zero as all vendors require some time to process this information.

## What is UDA Test?

- utility in IBM Cognos 10 at ..\bin\udatest.exe or ..\bin64\udatest.exe
- users can execute SQL generated by UDA directly against a third party data source
- UDA Test verifies if the SQL sent to the RDBMS will execute successfully

© 2015 IBM Corporation



It is important to understand that UDA Test does not fix issues. Over the next few pages, some possible use cases for UDA Test are presented.

## UDATest Scenario 1

- report runs against one DB vendor and fails against another
  - you create a report against SQL Server, the report validates and runs as expected
  - you create a similar report against a DB2 data source and the report fails with a UDA error
  - run UDATest against each vendor RDBMS and compare output to see where process is failing and how the SQL differs

© 2015 IBM Corporation



## UDATest Scenario 2

- SQL Performance with Composite/VVM vs. directly against the vendor
  - a report which uses a Composite/VVM data source runs in x minutes
  - running the same SQL, directly against Oracle takes x + minutes
  - run UDATest, with output logging enabled, against both, and compare differences in the SQL

© 2015 IBM Corporation



## UDATest Scenario 3

- compare SQL generated on different operating systems
  - report performance on AIX going through DataDirect ODBC driver to MS SQL Server is unacceptable
  - database administrators see multiple cursors on AIX
  - running on Windows, the cursors are not sent to the database and performance is acceptable
  - run UDATest against both, and review the SQL generated and the output it produced

© 2015 IBM Corporation



## UDATest Scenario 4

- compare SQL generated in different versions of IBM Cognos BI
  - running a report against IBM Cognos 8.4.1 runs successfully
  - running the same report after upgrading to IBM Cognos 10 fails with an error
  - report still fails with an error when upgraded to IBM Cognos 10.2.2
  - run UDATest to see the differences in the SQL being generated

© 2015 IBM Corporation



## UDATest Scenario 5

- specific version of IBM Cognos
  - running a report in IBM Cognos 8.4.1 runs successfully
  - same report fails with an error in IBM Cognos 10
  - same report runs successfully in IBM Cognos 10.2.2
  - probably not a database issue
  - run UDATest and compare the resulting SQL to look for differences

© 2015 IBM Corporation



## UDATest Scenario 6

- intermittent report failures
  - each day a summary report is sent out
  - since upgrading, the report returns incorrect data usually once or twice a week
  - not due to a database issue because if you re-run the report again you will get the correct data
  - run UDATest a number of times in sequence, waiting a couple of seconds between each launch of UDATest
    - see good results for run #2, run #3, run #4 and run #5: uda\_2.log, uda\_3.log, uda\_4.log, uda\_5.log.
    - see bad results for run #1, run #6 and run #7: uda\_1.log, uda\_7.log and uda\_7.log.
  - compare the logs to see the differences

© 2015 IBM Corporation



Be aware that UDA is not used with the QueryService which processes the 64-bit ReportServer service. The scenario presented here assumes that you are running a report against the 32-bit ReportServer service. For 64-bit ReportServer traces of queries, use the Dynamic Query Analyzer utility.

## Workshop 1: Explore UDA Trace and UDATest (Optional)

UDA is not used with the QueryService which processes the 64-bit ReportServer service. In this workshop, you will run a report against the 32-bit ReportServer service. For 64-bit ReportServer traces of queries, use the Dynamic Query Analyzer utility.

You are an administrator testing a report in Report Studio, and want to know if the query submitted in IBM Cognos returns the correct information from the database. You need to extract the native SQL and query execution plan of Relational Query Planner (RQP). The native SQL then can be tested in the database vendor's native query tool. You will use the UDATest utility to accomplish this.

UDATest is used to isolate the database information. You will perform a trace to get this information.

You will:

- Ensure that the IBM Cognos Full:9315 service and the IBM Cognos DispCM:9320 service are stopped.
- Enable SQL comments in CQEconfig.xml making it easier to identify the query and the user running it. The log file created will be tested using the udatest.exe and the native query will be executed in the native client query tool.
- Set Universal Data Access (UDA) environment variables (on both Dispatchers) to enable the creation of the log files when a query is executed.
- Create a Report Studio report (using admin/Education1 credentials) that will be used to run UDA trace.
- Modify the uda\_trace.log file and save as .api file.

- Run udatest.exe to examine the .api file from the Cognos 10 bin folder.
- Copy the native SQL from the .api file and test its performance in IBM Data Studio.
- Reset all configurations back to their original state

Keep in mind, that in a real troubleshooting scenario, it is best to run multiple traces (UDA, BIBus, Dispatcher) to get a better understanding of the causes of the issues.

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows. If you need more information to complete a task, refer to earlier demos for detailed steps.

## Workshop 1: Tasks and Results

At the beginning of this workshop, no dispatcher is running.

### Task 1. Enable SQL comments in the UDA trace and native SQL.

- In the **Services** window, ensure the **IBM Cognos Full:9315** service and the **IBM Cognos DispCM:9320** service are stopped.
- In **Windows Explorer**, navigate to **C:\Program Files\IBM\cognos\c10\_64full\configuration**, and then copy and paste **CQEConfig.xml.sample** to the same directory.
- Rename to **CQEConfig.xml - Copy.sample** to **CQEConfig.xml**, and then open **CQEConfig.xml** in **Notepad**.
- Locate the following section:

```
<section name="QueryEngine">
...
</section>
```

- Uncomment the following four lines of code in this section by deleting the **--** characters:

```
<!-- entry name="GenerateCommentInNativeSQL" value="1"-->
<!-- entry name="GenerateCommentInCognosSQL" value="1"-->
<!-- entry name="NativeCommentMacro" value="#'user=' +
$account.defaultName + ' report-Path=' + $reportPath + ' queryName='
+ $queryName + 'REMOTE_ADDR=' + $REMOTE_ADDR + ' SERVER_NAME='
+$SERVER_NAME + ' requestID=' + $requestID#/-->
<!-- entry name="CognosCommentMacro" value="#'user=' +
$account.defaultName + ' report-Path=' + $reportPath + ' queryName='
+ $queryName + 'REMOTE_ADDR=' + $REMOTE_ADDR + ' SERVER_NAME='
+$SERVER_NAME + ' requestID=' + $requestID#/-->
```

You can also copy the contents of **C:\Edcognos\B5A19\08-Explore\_ComponentLogging\Mod 8\_Wkshp 1\_Task 1.txt** into **CQEconfig.xml**, replacing these lines of code.

The result appears as follows:

```

<section name="QueryEngine">
    <!-- Description: queryReuse feature -->
    <!-- value="0" means disable the feature -->
    <!-- default is value="5" which means cache up to 5 result sets per
session -->
    <entry name="queryReuse" value="5"/>
    <!-- -->
    <!-- Description: References to model query items may have 2-part
names. (default(off)=0; choices=0,1) -->
    <!-- off: A parsing error is returned for a reference to a model
query item using a 2-part name. -->
    <!-- on: The expression resolver will allow 2-part name references
to model query items. -->
    <!-- NOTE: Cognos 8.1 MR2 was the last release in which the default
setting allowed 2-part names. This release (8.2) -->
    <!-- has the default set to disallow 2-part names. The next release
(8.3) will no longer allow 2-part names. -->
    <!-- The use of 2-part names will generate the QE-DEF-496 warning
message in the log file. -->
    <!-- entry name="AllowModelQueryItem2PartNameReference"
value="0"/-->
    <!-- -->
    <!-- Generation of comments in native sql and cognos sql.-->
    <entry name="GenerateCommentInNativeSQL" value="1"-->
    <!-- ( default(off)=0, on=1 ) -->
    <entry name="GenerateCommentInCognosSQL" value="1"-->
    <!-- ( default(off)=0, on=1 ) -->
    <!-- The content of the comments is controlled with two entries,
their defaults are specified in the value attribute -->
    <entry name="NativeCommentMacro" value="#'user=' +
$account.defaultName + ' reportPath=' + $reportPath + ' queryName=' + $queryName + '
REMOTE_ADDR=' + $REMOTE_ADDR + ' SERVER_NAME=' + $SERVER_NAME + ' requestID=' +
$requestID#"/-->
    <entry name="CognosCommentMacro" value="#'user=' +
$account.defaultName + ' reportPath=' + $reportPath + ' queryName=' + $queryName + '
REMOTE_ADDR=' + $REMOTE_ADDR + ' SERVER_NAME=' + $SERVER_NAME + ' requestID=' +
$requestID#"/-->

```

- Save the file, and then close Notepad.

## Task 2. Set environment variables to enable UDA tracing.

- In Windows Explorer, create a folder named **Temp** at the root of **C:**.
- Navigate to **C:\Program Files\IBM\cognos\c10\_64full\bin64**, right-click **startup.bat**, and then click **Properties**.
- Ensure that the **Read-only** check box is clear, and then click **OK**.
- Right-click **startup.bat**, and then click **Edit**.

- Preceding the **setlocal** line, add the following lines of code:
- ```
set TRACE_LAYER_DMD_SQLAPIRW=0x0002
set TRACE_FILE=C:\Temp\uda_trace.log
```
- The results appear as follows:

```
File Edit Format View Help
@rem Licensed Materials - Property of IBM
@rem IBM Cognos Products: btsv
@rem (C) Copyright IBM Corp. 2003, 2014
@rem US Government Users Restricted Rights - Use, duplication or disclosure
restricted by GSA ADP Schedule Contract with IBM Corp.
@echo off

set TRACE_LAYER_DMD_SQLAPIRW=0x0002
set TRACE_FILE=C:\Temp\uda_trace.log
setlocal

rem Call websphere Liberty Profile start up batch file
call startwlp.bat

endlocal
```

This trace will contain all SQL statements sent to the UDA layer. In addition it will have the timings of how long each statement took to execute. The trace file will be written to `uda_trace.log`.

- Save and then close the file.
- Repeat the preceding steps for the **C:\Program Files\IBM\cognos\c10\_64DispCM\bin64\startup.bat** file.

### **Task 3. Create a Report Studio report that will be used to run the UDA trace.**

- Double-click **C:\Program Files\IBM\cognos\c10\_64full\bin64\startup.bat** to start the IBM Cognos 10 - 64 Full instance with the new `CQEconfig.xml` and environment variable settings.

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

You should not use startup.bat to start IBM Cognos 10 in a production environment, but you are doing testing in a non-production environment for this workshop.

Allow a few minutes for the services to start.

- When **The dispatcher is ready to process requests** message appears in the command window, repeat with the **C:\Program Files\IBM\cognos\c10\_64DispCM\bin64\startup.bat** file to start the IBM Cognos 10 - 64 DispCM instance.

UDA is not used with the QueryService which processes the 64-bit ReportServer service. You will be running a report against the 32-bit ReportServer service, and in this environment, that is on the DispCM server. Therefore you must start both instances to execute the trace. For 64-bit ReportServer traces of queries, use the Dynamic Query Analyzer utility.

- Launch **Internet Explorer**, go to **<http://vclassbase:88/C10Full>**, and then log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials.
- On the **IBM Cognos software** page, click **Author advanced reports** to launch Report Studio.
- In the **List of all packages**, navigate to **Public Folders\Samples\Models\GO Sales (query)** package, when prompted, click **Create New**, and then double-click **List**.

It may take a few moments for the package to load in Report Studio.

- From the **Source** tab, populate the list report with the following items from the **Sales (query)** namespace:
  - Products: Product line, Product type**
  - Sales: Product cost**
- In the report layout, click the **<Product line>** column, and then on the toolbar click **Group / Ungroup** .



- On the **Properties** pane in the bottom left corner, click **Select Ancestor** , and then click **List**.
- In the **Data** section of the **Properties** pane, change the **Rows Per Page** to **25**.
- Save the report as **UDA Test** in the **GO Sales (query)** package.

Ensure that the report is saved to a location that is accessible to all, and is not saved to a private location, like My Folders.

- Close **Report Studio**, launch **IBM Cognos Connection**, navigate to the **Public Folders\Samples\Models\GO Sales (query)** package, and then click **UDA Test** to run the report.

You may have to click Refresh to see the report entry listed. Count the number of rows of data that are returned in the report.

The results appear similar to the following:

| Product line             | Product type         | Product cost     |
|--------------------------|----------------------|------------------|
| Camping Equipment        | Cooking Gear         | \$167,128,146.52 |
|                          | Lanterns             | \$72,808,366.01  |
|                          | Packs                | \$213,232,893.15 |
|                          | Sleeping Bags        | \$188,159,844.17 |
|                          | Tents                | \$360,908,320.53 |
| Golf Equipment           | Golf Accessories     | \$19,927,608.85  |
|                          | Irons                | \$135,602,473.09 |
|                          | Putters              | \$55,499,773.14  |
|                          | Woods                | \$163,187,870.64 |
| Mountaineering Equipment | Climbing Accessories | \$39,594,854.17  |
|                          | Rope                 | \$78,380,688.26  |
|                          | Safety               | \$52,250,948.68  |
|                          | Total                | \$76,157,733.00  |

- After the report opens in **IBM Cognos Viewer**, leave the browser open.

## Task 4. Modify the **uda\_trace.log** file and save as an **.api** file.

- In Windows Explorer, navigate to **C:\Temp**, to identify the presence of the **uda\_trace.<PID #>.log** file.  
If there is more than one log file, it is because the trace was enabled on both dispatchers. You will want to open the file with the most recent timestamp, and which has some content in it. Likely the other file will be 0 KB in size and will be blank.
- Open the **uda\_trace.<PID #>.log** file in **Eclipse** and find **\*\*\*\*\***.  
This line will contain the connection string information to the database. The eight asterisks represent the connection password to the database.
- Change **\*\*\*\*\*** to **Education1**, and then close the **Find/Replace** dialog box.
- Press **Ctrl+Home** to return to the beginning of the file, find the second instance of **multidbattach**, and then copy the following text from the file to the clipboard:

```
multidbattachdirect d20001 dblogicname "CQE_DB" in e2(dblogicname
"great_outdoors_sales"
"DSN=GS_DB;UID=GOSALES;PWD=Education1;@ASYNC=0@0/0@COLSEQ=IBM_JD_CNX
_STR:^User ID:^?Password:;LOCAL;JD-
D2;URL=jdbc:db2://VCLASSBASE:50000/GS_DB;DRIVER_NAME=com.ibm.db2.jcc
.DB2Driver" D2 );
```

- In Windows Explorer, navigate to **C:\Edcognos\B5A19\08-Component\_Logging**, and then open **Mod 8\_Wkshp 1\_Task 4.txt** in **Notepad**.  
This file will serve as a template to create a query for UDATest that will return the native SQL and the execution plan.
- Delete the following text:  
**<<INSERT MULTIDBATTACHDIRECT STATEMENT HERE>>;**

- Paste the contents of the clipboard.

- Locate the following section:

```
get attribute max name length context dbname "<<INSERT DATA  
SOURCE NAME HERE>>" for database d20001 ;
```

- Replace <<INSERT DATA SOURCE NAME HERE>> with **great\_outdoors\_sales**.

This line appears as follows:

```
get attribute max name length context dbname "great_outdoors_sales"  
for database d20001 ;
```

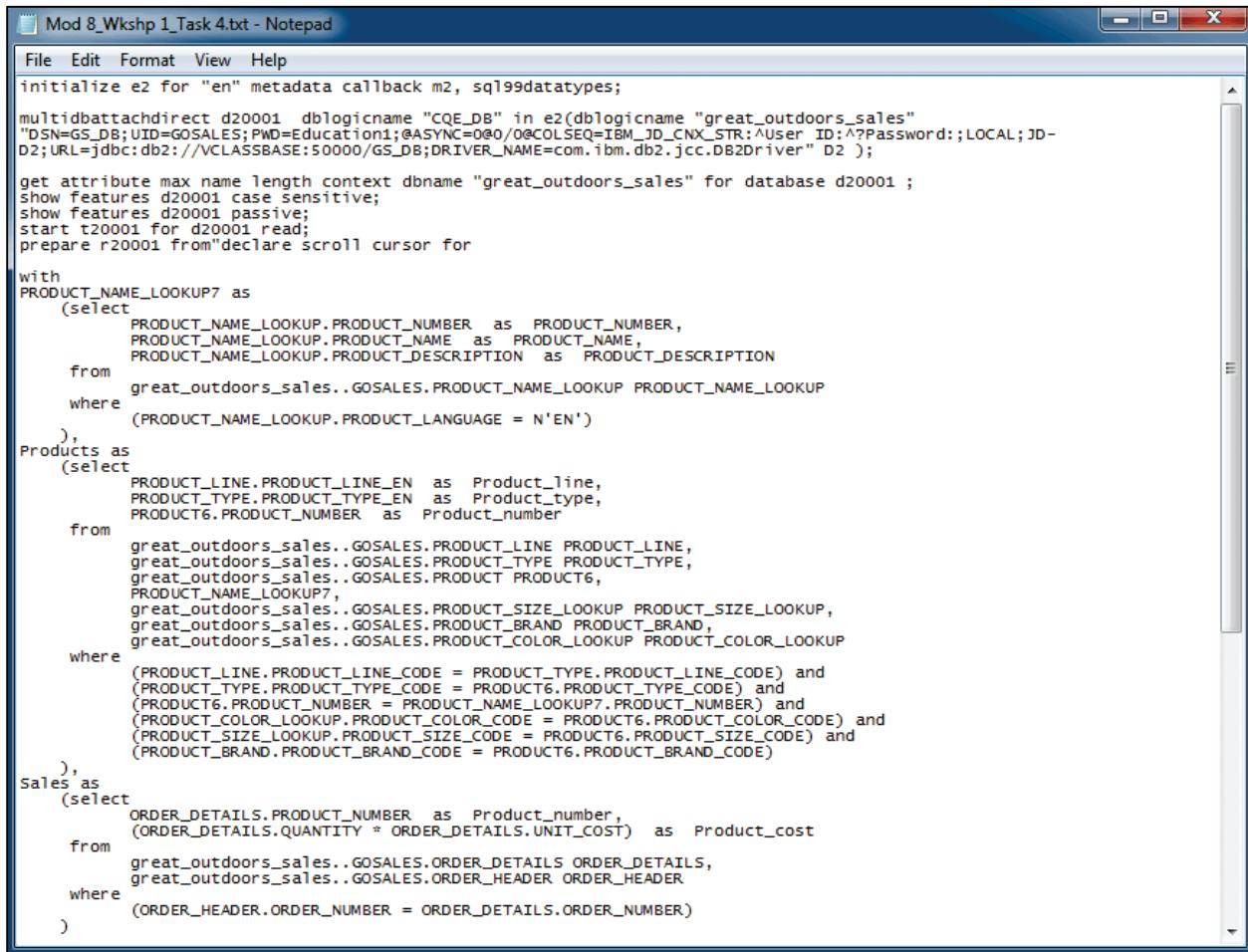
- In **Eclipse**, in the **uda\_trace.<PID #>.log** file, find **with**, and then search for the semicolon at the end of the SQL statement.
- Copy all the text from the **with** clause to the end of the SQL including the **avoid zero division** and **;** (semicolon), to the clipboard.
- In the **Mod 8\_Wkshp 1\_Task 4.txt** file, delete the following text:  
**<<INSERT SQL STATEMENT HERE>>**

- Paste the contents of the clipboard.

In this example, the two features for which you want to get information are:

- show native sql for r20001;** (this will generate the native SQL)
- show execution plan for r20001;** (this will show the execution plan for RQP)

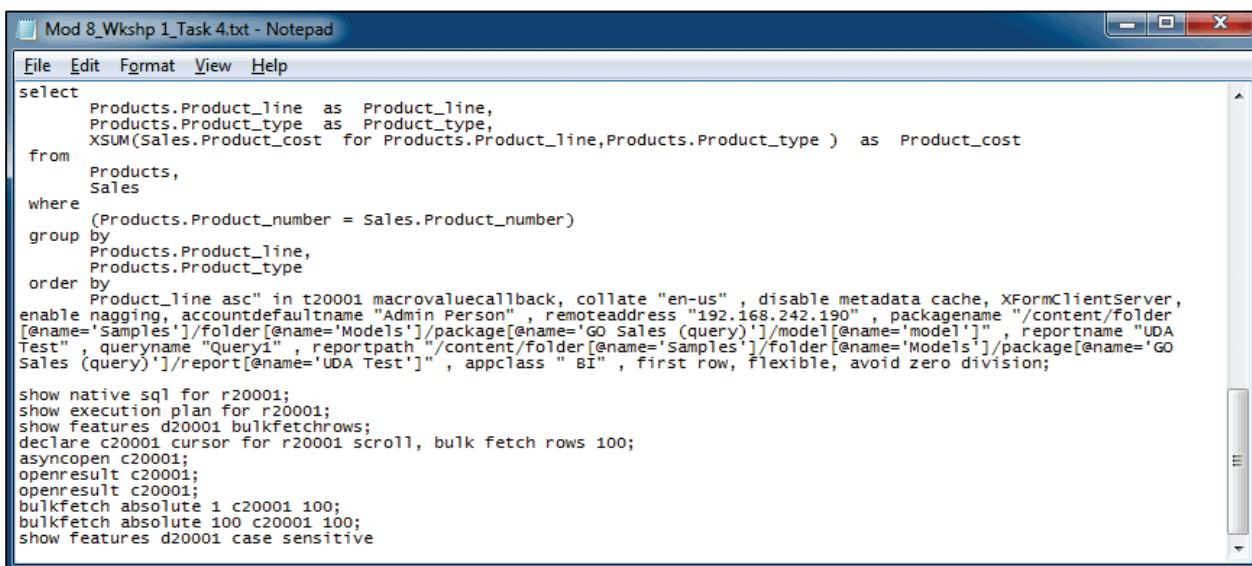
The results appear as follows:



```

Mod 8_Wkshp 1_Task 4.txt - Notepad
File Edit Format View Help
initialize e2 for "en" metadata callback m2, sql99datatype;
multidbattachdirect d20001 dblogicname "CQE_DB" in e2(dblogicname "great_outdoors_sales"
"DSN=GS_DB;UID=GOSALES;PWD=Education1;@ASYNC=0@0/0@COSEQ=IBM_JD_CNX_STR:@User_ID:^?password:;LOCAL;JD-
D2;URL=jdbc:db2://VCLASSBASE:50000/GS_DB;DRIVER_NAME=com.ibm.db2.jcc.DB2Driver" D2 );
get attribute max name length context dbname "great_outdoors_sales" for database d20001 ;
show features d20001 case sensitive;
show features d20001 passive;
start t20001 for d20001 read;
prepare r20001 from"declare scroll cursor for
with
PRODUCT_NAME_LOOKUP7 as
(select
    PRODUCT_NAME_LOOKUP.PRODUCT_NUMBER as PRODUCT_NUMBER,
    PRODUCT_NAME_LOOKUP.PRODUCT_NAME as PRODUCT_NAME,
    PRODUCT_NAME_LOOKUP.PRODUCT_DESCRIPTION as PRODUCT_DESCRIPTION
  from great_outdoors_sales..GOSALES.PRODUCT_NAME_LOOKUP PRODUCT_NAME_LOOKUP
  where (PRODUCT_NAME_LOOKUP.PRODUCT_LANGUAGE = N'EN')
),
Products as
(select
    PRODUCT_LINE.PRODUCT_LINE_EN as Product_line,
    PRODUCT_TYPE.PRODUCT_TYPE_EN as Product_type,
    PRODUCT6.PRODUCT_NUMBER as Product_number
  from great_outdoors_sales..GOSALES.PRODUCT_LINE PRODUCT_LINE,
       great_outdoors_sales..GOSALES.PRODUCT_TYPE PRODUCT_TYPE,
       great_outdoors_sales..GOSALES.PRODUCT PRODUCT6,
       PRODUCT_NAME_LOOKUP7,
       great_outdoors_sales..GOSALES.PRODUCT_SIZE_LOOKUP PRODUCT_SIZE_LOOKUP,
       great_outdoors_sales..GOSALES.PRODUCT_BRAND PRODUCT_BRAND,
       great_outdoors_sales..GOSALES.PRODUCT_COLOR_LOOKUP PRODUCT_COLOR_LOOKUP
  where ((PRODUCT_LINE.PRODUCT_LINE_CODE = PRODUCT_TYPE.PRODUCT_LINE_CODE) and
         (PRODUCT_TYPE.PRODUCT_TYPE_CODE = PRODUCT6.PRODUCT_TYPE_CODE) and
         (PRODUCT6.PRODUCT_NUMBER = PRODUCT_NAME_LOOKUP7.PRODUCT_NUMBER) and
         (PRODUCT_COLOR_LOOKUP.PRODUCT_COLOR_CODE = PRODUCT6.PRODUCT_COLOR_CODE) and
         (PRODUCT_SIZE_LOOKUP.PRODUCT_SIZE_CODE = PRODUCT6.PRODUCT_SIZE_CODE) and
         (PRODUCT_BRAND.PRODUCT_BRAND_CODE = PRODUCT6.PRODUCT_BRAND_CODE))
),
Sales as
(select
    ORDER_DETAILS.PRODUCT_NUMBER as Product_number,
    (ORDER_DETAILS.QUANTITY * ORDER_DETAILS.UNIT_COST) as Product_cost
  from great_outdoors_sales..GOSALES.ORDER_DETAILS ORDER_DETAILS,
       great_outdoors_sales..GOSALES.ORDER_HEADER ORDER_HEADER
  where (ORDER_HEADER.ORDER_NUMBER = ORDER_DETAILS.ORDER_NUMBER)
)

```



The screenshot shows a Microsoft Notepad window titled "Mod 8\_Wkshp 1\_Task 4.txt - Notepad". The content of the window is a block of UDA (Universal Data Access) SQL code. The code includes a SELECT statement with various clauses like FROM, WHERE, GROUP BY, and ORDER BY, along with several SHOW features and declarations. The code is written in a syntax that is a mix of standard SQL and UDA-specific commands.

```

select
    Products.Product_line as Product_line,
    Products.Product_type as Product_type,
    XSUM(Sales.Product_cost for Products.Product_line,Products.Product_type ) as Product_cost
from
    Products,
    Sales
where
    (Products.Product_number = Sales.Product_number)
group by
    Products.Product_line,
    Products.Product_type
order by
    Product_line asc" in t20001 macrovaluecallback, collate "en-us" , disable metadata cache, XFormClientServer,
enable naging, accountdefaultname "Admin Person" , remoteaddress "192.168.242.190" , packagename "/content/folder
[@name='Samples']/folder[@name='Models']/package[@name='Go_Sales(query)']/model[@name='model']" , reportname "UDA
Test" , queryname "query1" , reportpath "/content/folder[@name='Samples']/folder[@name='Models']/package[@name='Go
Sales(query)']/report[@name='UDA Test']" , appclass " BI" , first row, flexible, avoid zero division;

show native sql for r20001;
show execution plan for r20001;
show features d20001 bulkfetchrows;
declare c20001 cursor for r20001 scroll, bulk fetch rows 100;
asyncopen c20001;
openresult c20001;
openresult c20001;
bulkfetch absolute 1 c20001 100;
bulkfetch absolute 100 c20001 100;
show features d20001 case sensitive

```

- In **Notepad**, from the **File** menu, click **Save As**, and then in the **Save in** list, navigate to **C:\Program Files\IBM\cognos\c10\_64full\bin64**.
- In the **File name** box, type **Test.api**, in the **Save as type** list, click **All Files (\*.\*)**, in the **Encoding** list, click **ANSI**, and then click **Save**.

You may wonder why another format, other than ANSI is not used here. UDA is a low level component; and this format has been traditionally used. As an experiment, you could try to use different encoding types (UTF-8, Unicode) and determine if alternate types work with UDA. Do this only after you have successfully completed this workshop, and if you have the time to do this.

- Close **Notepad** without saving changes.
- In **Eclipse**, close the **uda\_trace.<PID #>.log** tab without saving changes, and then close **Eclipse**.

## Task 5. Run **udatest.exe** and test the native SQL.

- Navigate to **C:\Program Files\IBM\cognos\c10\_64full\bin64** and then double-click **udatest.exe**.
- From the **I/O Control** menu, click **Read from**, and then open **Test.api**.

The UDACTest utility executes the test.api file and produces a log file. In this case, test.log will be created in the bin folder.

The results in the UDACTest utility indicate that 21 rows were selected.

The results appear as follows:

```
API Test Driver (Production) Version: UDA-AW-ML-10.2-WIP-6100-243 Build 6100 Patch 243
File I/O Control Log File
show execution plan for r20001;
show features d20001 bulkfetchrows;
declare c20001 cursor for r20001 scroll, bulk fetch rows 100;
asyncopen c20001;
openresult c20001;
openresult c20001;
bulkfetch absolute 1 c20001 100;
bulkfetch absolute 100 c20001 100;

Product_line
=====
21 rows selected.
```

- In the **C:\Program Files\IBM\cognos\c10\_64full\bin64** folder open the **TEST.log** file in **Eclipse**.
- The log file contains the original query, the native SQL, the execution plan and the data that is returned from the query.

- Find **native SQL**.

This section of the file contains the native SQL that is sent to the database. Notice that most of the code appears on one line (displayed below with word wrap).

```
SQL> show native sql for r20001;
```

```
Native SQL statements ( 1 ) :
with "PRODUCT_NAME_LOOKUP7" as (select "PRODUCT_NAME_LOOKUP"."PRODUCT_NUMBER"
"PRODUCT_NUMBER" , "PRODUCT_NAME_LOOKUP"."PRODUCT_NAME" "PRODUCT_NAME" ,
"PRODUCT_NAME_LOOKUP"."PRODUCT_DESCRIPTION" "PRODUCT_DESCRIPTION" from
"GOSALES"."PRODUCT_NAME_LOOKUP" "PRODUCT_NAME_LOOKUP" where
"PRODUCT_NAME_LOOKUP"."PRODUCT_LANGUAGE" = 'EN') , "Products" as (select
"PRODUCT_LINE"."PRODUCT_LINE_EN" "Product_line" ,
"PRODUCT_TYPE"."PRODUCT_TYPE_EN" "Product_type" , "PRODUCT6"."PRODUCT_NUMBER"
"Product_number" from "GOSALES"."PRODUCT_LINE" "PRODUCT_LINE",
"GOSALES"."PRODUCT_TYPE" "PRODUCT_TYPE" , "GOSALES"."PRODUCT" "PRODUCT6",
"PRODUCT_NAME_LOOKUP7" , "GOSALES"."PRODUCT_SIZE_LOOKUP" "PRODUCT_SIZE_LOOKUP",
"GOSALES"."PRODUCT_BRAND" "PRODUCT_BRAND" , "GOSALES"."PRODUCT_COLOR_LOOKUP"
"PRODUCT_COLOR_LOOKUP" where "PRODUCT_LINE"."PRODUCT_LINE_CODE" =
"PRODUCT_TYPE"."PRODUCT_LINE_CODE" and "PRODUCT_TYPE"."PRODUCT_TYPE_CODE" =
"PRODUCT6"."PRODUCT_TYPE_CODE" and "PRODUCT6"."PRODUCT_NUMBER" =
"PRODUCT_NAME_LOOKUP7"."PRODUCT_NUMBER" and
"PRODUCT_COLOR_LOOKUP"."PRODUCT_COLOR_CODE" = "PRODUCT6"."PRODUCT_COLOR_CODE"
and "PRODUCT_SIZE_LOOKUP"."PRODUCT_SIZE_CODE" = "PRODUCT6"."PRODUCT_SIZE_CODE"
and "PRODUCT_BRAND"."PRODUCT_BRAND_CODE" = "PRODUCT6"."PRODUCT_BRAND_CODE"),
"Sales" as (select "ORDER_DETAILS"."PRODUCT_NUMBER" "Product_number" ,
"ORDER_DETAILS"."QUANTITY" * "ORDER_DETAILS"."UNIT_COST" "Product_cost" from
"GOSALES"."ORDER_DETAILS" "ORDER_DETAILS" , "GOSALES"."ORDER_HEADER"
"ORDER_HEADER" where "ORDER_HEADER"."ORDER_NUMBER" =
"ORDER_DETAILS"."ORDER_NUMBER") select "Products"."Product_line" "Product_line"
, "Products"."Product_type" "Product_type" , sum("Sales"."Product_cost")
"Product_cost" from "Products" , "Sales" where "Products"."Product_number" =
"Sales"."Product_number" group by "Products"."Product_line",
"Products"."Product_type" order by "Product_line" asc FOR FETCH ONLY
```

- Copy the SQL from **with** to the end of **asc** to the clipboard.

The following is selected:

```
with "PRODUCT_NAME_LOOKUP7" as (select "PRODUCT_NAME_LOOKUP"."PRODUCT_NUMBER"
"PRODUCT_NUMBER" , "PRODUCT_NAME_LOOKUP"."PRODUCT_NAME" "PRODUCT_NAME" ,
"PRODUCT_NAME_LOOKUP"."PRODUCT_DESCRIPTION" "PRODUCT_DESCRIPTION" from
"GOSALES"."PRODUCT_NAME_LOOKUP" "PRODUCT_NAME_LOOKUP" where
"PRODUCT_NAME_LOOKUP"."PRODUCT_LANGUAGE" = 'EN'), "Products" as (select
"PRODUCT_LINE"."PRODUCT_LINE_EN" "Product_line" ,
"PRODUCT_TYPE"."PRODUCT_TYPE_EN" "Product_type" , "PRODUCT6"."PRODUCT_NUMBER"
"Product_number" from "GOSALES"."PRODUCT_LINE" "PRODUCT_LINE",
"GOSALES"."PRODUCT_TYPE" "PRODUCT_TYPE", "GOSALES"."PRODUCT" "PRODUCT6",
"PRODUCT_NAME_LOOKUP7", "GOSALES"."PRODUCT_SIZE_LOOKUP" "PRODUCT_SIZE_LOOKUP",
"GOSALES"."PRODUCT_BRAND" "PRODUCT_BRAND", "GOSALES"."PRODUCT_COLOR_LOOKUP"
"PRODUCT_COLOR_LOOKUP" where "PRODUCT_LINE"."PRODUCT_LINE_CODE" =
"PRODUCT_TYPE"."PRODUCT_LINE_CODE" and "PRODUCT_TYPE"."PRODUCT_TYPE_CODE" =
"PRODUCT6"."PRODUCT_TYPE_CODE" and "PRODUCT6"."PRODUCT_NUMBER" =
"PRODUCT_NAME_LOOKUP7"."PRODUCT_NUMBER" and
"PRODUCT_COLOR_LOOKUP"."PRODUCT_COLOR_CODE" = "PRODUCT6"."PRODUCT_COLOR_CODE"
and "PRODUCT_SIZE_LOOKUP"."PRODUCT_SIZE_CODE" = "PRODUCT6"."PRODUCT_SIZE_CODE"
and "PRODUCT_BRAND"."PRODUCT_BRAND_CODE" = "PRODUCT6"."PRODUCT_BRAND_CODE"),
"Sales" as (select "ORDER_DETAILS"."PRODUCT_NUMBER" "Product_number" ,
"ORDER_DETAILS"."QUANTITY" * "ORDER_DETAILS"."UNIT_COST" "Product_cost" from
"GOSALES"."ORDER_DETAILS" "ORDER_DETAILS", "GOSALES"."ORDER_HEADER"
"ORDER_HEADER" where "ORDER_HEADER"."ORDER_NUMBER" =
"ORDER_DETAILS"."ORDER_NUMBER") select "Products"."Product_line" "Product_line"
, "Products"."Product_type" "Product_type" , sum("Sales"."Product_cost")
"Product_cost" from "Products", "Sales" where "Products"."Product_number" =
"Sales"."Product_number" group by "Products"."Product_line",
"Products"."Product_type" order by "Product_line" asc
```

- From the **Start** menu, navigate to **All Programs\IBM Data Studio**, and then click **Data Studio 4.1.0.0 Client**.

You need to submit this query to the vendor database vendor query tool for the specific database you are referencing; in your environment, the database is DB2.

- In the **Administration Explorer** pane on the left side, expand **localhost** and **DB2**.
  - Click **New SQL Script** .
  - Click the **No Connection** link, click **GS\_DB**, and then click **Finish**.
- Once you have connected to a database as an authorized user, you can then issue SQL statements or DB2 commands against that database.
- If you are prompted to enter a password, type **Education1** in the **Password** box, select the **Save password** check box, and then click **OK**.

- Paste the clipboard contents into the middle pane, click **OK** to close the **Statement Terminator** dialog box, and then click **Run SQL** .

The query runs and the **Result1** tab in the bottom right corner displays the output of 21 rows.

The results appear as follows:

| Status                   | Result1              |              |
|--------------------------|----------------------|--------------|
| Product_line             | Product_type         | Product_cost |
| Camping Equipment        | Cooking Gear         | 167128146.52 |
| Camping Equipment        | Lanterns             | 72808366.01  |
| Camping Equipment        | Packs                | 213232893.15 |
| Camping Equipment        | Sleeping Bags        | 188159844.17 |
| Camping Equipment        | Tents                | 360908320.53 |
| Golf Equipment           | Golf Accessories     | 19927608.85  |
| Golf Equipment           | Irons                | 135602473.09 |
| Golf Equipment           | Putters              | 55499773.14  |
| Golf Equipment           | Woods                | 163187870.64 |
| Mountaineering Equipment | Climbing Accessories | 39594854.17  |
| Mountaineering Equipment | Rope                 | 78380688.26  |
| Mountaineering Equipment | Safety               | 52250948.68  |
| Mountaineering Equipment | Tools                | 76157733.00  |
| Outdoor Protection       | First Aid            | 6428902.92   |
| Outdoor Protection       | Insect Repellents    | 12631783.58  |
| Outdoor Protection       | Sunscreen            | 10950326.97  |
| Personal Accessories     | Binoculars           | 78645643.41  |
| Personal Accessories     | Eyewear              | 514880568.49 |
| Personal Accessories     | Knives               | 95092176.77  |
| Personal Accessories     | Navigation           | 129008368.71 |
| Personal Accessories     | Watches              | 291463483.11 |

Total 21 records shown

You have checked the performance of the query at the database level, to see if the same values are returned as those seen in the report in IBM Cognos Viewer. In both environments, 21 rows were returned.

- Return to the **TEST.log** file in **Eclipse**, and locate the **execution plan** section.

- Examine the fetch, prepare, execution and CPU times by locating the following section.

```
<operator CPUTime="0.000000" elapsedTime="0.000000" nRows="0"
operatorType="dbScan" rowSize="448" totalCPUTime="0.000000"
totalElapsedTime="0.000000">
```

In this scenario, the execution time of the query was minimal, and there were no issues. This workshop provides you with a method to get this information; there is nothing to troubleshoot here, but you were able to confirm that the SQL results returned were the same in the IBM Cognos query as they were in the direct SQL query against the database.

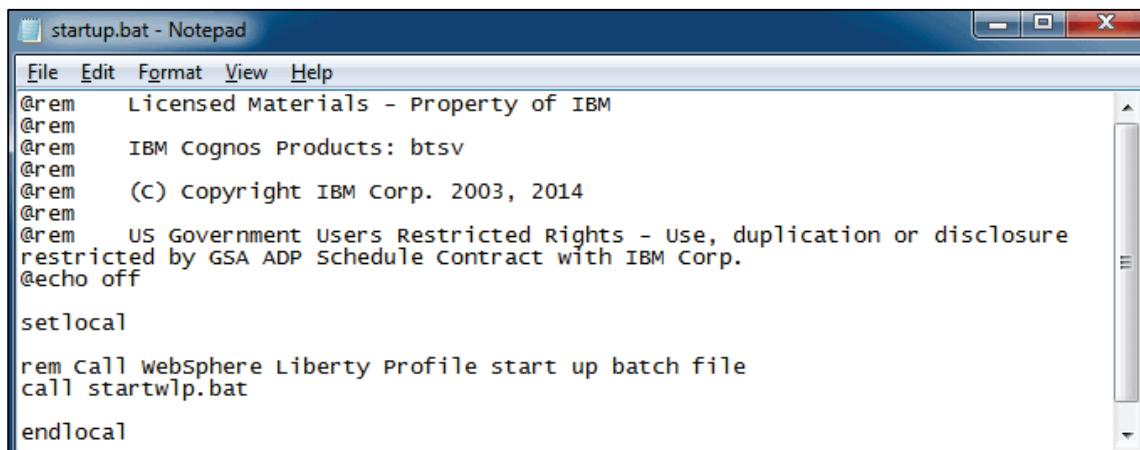
This is an example of a low level development trace. You could also test the SQL going through Cognos SQL, as opposed to the native SQL. Does it take longer to execute?

If you do comparisons with earlier versions of IBM Cognos, the SQL may not be the same. This does not necessarily indicate an issue

## **Task 6. Restore the settings and files to their original state.**

- Close all open windows without saving.
- In Windows Explorer, navigate to **C:\Program Files\IBM\cognos\c10\_64full\bin64**, and then delete **TEST.log** and **Test.api**.
- Edit **startup.bat** for both dispatcher installations (**C:\Program Files\IBM\cognos\c10\_64full\bin64** and **C:\Program Files\IBM\cognos\c10\_64DispCM\bin64**) to remove the setting of the environment variables.

The result appears as follows:



```
startup.bat - Notepad
File Edit Format View Help
@rem Licensed Materials - Property of IBM
@rem
@rem IBM Cognos Products: btsv
@rem
@rem (C) copyright IBM Corp. 2003, 2014
@rem
@rem US Government Users Restricted Rights - Use, duplication or disclosure
@rem restricted by GSA ADP Schedule Contract with IBM Corp.
@echo off

setlocal

rem call websphere Liberty Profile start up batch file
call startwlp.bat

endlocal
```

- Navigate to **C:\Program Files\IBM\cognos\c10\_64full\configuration**, and delete **CQEconfig.xml**.
- Close all open applications.

Leave the IBM Cognos Full:9315 service and the IBM Cognos DispCM:9320 service stopped for the next workshop.

## What is Perf.QFS?

- Purpose:
  - use to determine report running time allocation
- Description:
  - captures data within query framework (QFW) code
  - captures gesture and action times from studios

© 2015 IBM Corporation



If your report is slow, use Perf.QFS to determine where time is being spent when running a report. There may be external factors involved such as database loads, network latency, overloaded servers, and so on, but this will isolate the IBM Cognos BI components involved.

Perf.QFS provides a method to capture data within the QFW code, and is independent of the product or test tool that consumes the QFW code.

Perf.QFS allows gesture or action times from studios to be captured, rather than only the overall request run timing as in QFWTest.

# Activate Perf.QFS

- Activate:

- modify ipfPERFclientconfig.xml.sample and save as ipfclientconfig.xml

```
<category name="Perf.QFS" class="com.cognos.indications.LogTypedLogger">
    <level value="debug"/>
    <appender-ref ref="clientFlatFile"/>
</category>
```

© 2015 IBM Corporation



To setup Perf.QFS, edit the ipfPERFclientconfig.xml.sample file, in the section below the string <!-- QFS -->.

## Describe Perf.QFS Output

- Output:
  - ..\logs directory in a file prefixed with performance information by report and component

```
<RP n="Add Color" rN="0" st="2015-03-24T08:56:38.977" et="2015-03-24T09:15:56.609" status="SUCCESS">
  <RC><! [CDATA[;/content/package[@name='GO Sales(Query)']/folder[@name='Documentation Report Samples']/report[@name='Add Color'];asynchRun_Request;]]></RC>
  <RS et="6586">
    <C n="MDOperationProvider" et="227"></C>
    <C n="RelationalQueryProvider" et="317"></C>
    <C n="CoordinationPlanner" et="5522"></C>
```

© 2015 IBM Corporation



The information in the file will be presented by report and then by component.

The XML file can be analyzed as is, or it can be transformed into something more readable by applying a transformation to the XML output, such as perf.xslt, which will be used in the workshop on this topic.

The meaning of the XML elements are described at the top of the output file. The file may not be written immediately, as it depends on the flushing of master dataset. In most cases, running more than one report or running the same report twice will result in the file being created in the ..\logs directory.

perf.xslt will identify the areas that took more than 15 seconds in red; you can change the 15 seconds setting by editing perf.xslt. The code for perf.xslt has been provided for your reference at the end of this module, if you are interested in using such a file in your own environment.

## Workshop 2: Perform Perf.QFS Logging

You need to identify the architectural components that are used to process a run report request and how much time spent in each component. This will help you with troubleshooting issues should they occur.

You will:

- Assign the IIS 7 IUSR user to have Write permission to the logs directory for the c10\_64DispCM instance.
- Set the logging level to info for Perf.QFS logging in the ipfclientconfig.xml file for the c10\_64DispCM instance.
- Using admin/Education1 credentials, create and save a list report and a crosstab report in Report Studio, and then execute each report twice.
- Stop the services and open the perf.xml file and briefly examine the contents. You can modify the xml file to use the perf.xslt stylesheet at C:\Edcognos\B5A19\08-Explore\_Component\_Logging\.
  - Compare the components that each report used and compare the results with the IBM Cognos 10.2.2 Architecture diagram. Why is there an OlapQueryProvider as a component for the cross tab report?
  - What component is the crosstab report spending most of its time in? Why?
  - What component function is the most time spent in? Why?

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows. If you need more information to complete a task, refer to earlier demos for detailed steps.

## Workshop 2: Tasks and Results

At the beginning of this workshop, no dispatcher is running.

### Task 1. Allow IIS 7 write permission to the logs directory.

In this environment, the Web server user (IUSR) requires permission to write in the ..\logs directory. Before proceeding with the trace, you will enable this permission for the C10\_64DispCM instance. You may be familiar with this process, as it has been done earlier, for the C10\_64Full Dispatcher instance.

- In Windows Explorer, navigate to **C:\Program Files\IBM\cognos\c10\_64DispCM**, right-click the **logs** directory, and then click **Properties**.
- On the **Security** tab, to change permissions, click **Edit**.
- Click **Add**.
- In the **Enter the object names to select (examples)** pane, type **IUSR**, and then click **Check Names**.

If the user is found, it will appear with an underscore in the pane.

- Click **OK**, and then in the **Group or user names** pane, click **IUSR**.
- In the **Permissions for IUSR** pane, scroll to the **Write** permission, and in the **Allow** column, click the **Write** check box to select it.
- Click **Apply**, and then click **OK** to close the **Permissions for logs** dialog box.
- Click **OK** to close the **logs Properties** dialog box, and then close **Windows Explorer**.

## Task 2. Set the logging level to INFO for Perf.QFS logging in the ipfclientconfig.xml file.

- From the **Taskbar**, launch **Services**, and then ensure that the **IBM Cognos DispCM:9320** service is stopped.
- 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
- Start the **IBM Cognos Full:9315** service.
- In **Windows Explorer**, navigate to **C:\Program Files\IBM\cognos\c10\_64DispCM\configuration** and copy **ipfPERFclientconfig.xml.sample** to the same directory.

The DispCM instance is the instance in the server groups that runs the 32-bit ReportServer service queries. The Full instance is the instance in the server groups that runs the 64-bit ReportServer service queries, and therefore does not require this type of tracing.

- Rename **ipfPERFclientconfig.xml - Copy.sample** to **ipfclientconfig.xml**, and then open this **ipfclientconfig.xml** file in **Eclipse**.
 

Ensure that you do not keep **PERF** in the filename when you rename the file.  
If necessary, close any open tabs in the middle pane before opening the **ipfclientconfig.xml** file.
  - Maximize the **ipfclientconfig.xml** tab, and then on the **Source** tab, locate the following section:
- ```
<!--category name="Perf.QFS" class="com.cognos.indications.
LogTypedLogger">
  <level value="info"/>
</category-->
```
- Do not use the **level value="warn"** section.

- Replace this section with the following:

```
<category name="Perf.QFS" class="com.cognos.indications.  
LogTypedLogger">  
  <level value="debug"/>  
  <appender-ref ref="clientFlatFile"/>  
</category>
```

Hint: You can copy and paste the text from C:\Edcognos\B5A19\08-Explore\_Component\_Logging\Mod 8\_Wkshp 2\_Task 1.txt.

You have uncommented the section, by removing the !, the --, and have modified the setting of info to debug, and added an appender-ref setting.

The results appear as follows:



```
<!--  
  <category name="Perf.QFS" class="com.cognos.indications.LogTypedLogger">  
    <level value="debug"/>  
    <appender-ref ref="clientFlatFile"/>  
  </category>|
```

- Save the file, close the ipfclientconfig.xml tab, and then close Eclipse.

### **Task 3. Create a list report and a crosstab report in Report Studio and then execute the reports.**

- Navigate to C:\Program Files\IBM\cognos\c10\_64DispCM\logs, and then delete the files at the root of this folder.  
Do not delete the XQE folder if there is one.
- Switch to the **Services** window, start the **IBM Cognos DispCM:9320** service, and wait for it to fully start before proceeding to the next step.
- Launch **Internet Explorer**, go to <http://vclassbase:88/C10Full>, and then log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials.

- Launch **Report Studio** using the **Public Folders\Samples\Models\GO Sales (query)** package, and then create a list report and populate it from the **Sales (query)** namespace with the following items:

- **Products: Product line, Product type**
- **Sales: Product cost**

| Product line   | Product type   | Product cost   |
|----------------|----------------|----------------|
| <Product line> | <Product type> | <Product cost> |
| <Product line> | <Product type> | <Product cost> |
| <Product line> | <Product type> | <Product cost> |

- Do not run the report at this time, but save the report as **perf.qfs\_list** in the **GO Sales (query)** folder.
- Using the same **GO Sales (query)** package, create a **Crosstab** report (**File** menu\New) and populate it from the **Sales (query)** namespace with the following items:
  - Columns: **Time: Year**
  - Rows: **Order method: Order method type**
  - Measures: **Sales: Quantity**

| Quantity              | <#Year#> | <#Year#> |
|-----------------------|----------|----------|
| <#Order method type#> | <#1234#> | <#1234#> |
| <#Order method type#> | <#1234#> | <#1234#> |

- Do not run the report at this time, but save the report as **perf.qfs\_crosstab** in the **GO Sales (query)** folder.
- Close **Report Studio**, and then navigate to **IBM Cognos Connection**.

- From **Public Folders\Samples\Models\GO Sales (query)**, run the **perf.qfs\_list** report, on the toolbar click **Return**, run the same report again, and then click **Return**.  
You may have to refresh the view in IBM Cognos Connection to see the new entries.
- Repeat to run the **perf.qfs\_crosstab** report two times, and then close the browser window.

What do you notice about the run times after the first execution of the report?

## **Task 4. Modify the Performance\_<datetimestamp>.xml file so that its contents can be examined in a stylesheet.**

- In Windows Explorer, navigate to **C:\Program Files\IBM\cognos\c10\_64DispCM\logs** to identify the presence of the **Performance\_<datetimestamp>.xml** file.
- Stop the **IBM Cognos DispCM:9320** service and the **IBM Cognos Full:9315** service, and then open the **Performance\_<datetimestamp>.xml** file in **Eclipse**.

At the top of the **Performance\_<datetimestamp>.xml** file you'll find some descriptions of the elements (for example, CF=Component Function), and their attributes (for example, nc=NumCalls, rN=RunNumber, and so forth).

- Add the following as the second line:  

```
<?xmlstylesheet type="text/xsl" href="C:\Edcognos\B5A19\08-Explore_Component_Logging\perf.xslt"?>
```

The perf.xslt code has been provided at the end of this workshop.
- Add the following as the last line (if necessary), **</PerformanceData>**.
- From the **File** menu, click **Save As**, navigate to **C:\Edcognos\B5A19\08-Explore\_Component\_Logging**.
- In the **Save as type** list, click **\*.\***, in the **File name** box, type **perf.xml**, and then click **Save**.

- Close the **perf.xml** tab, and then close **Eclipse**.
- In **Windows Explorer**, navigate to **C:\Edcognos\B5219\08-Explore\_Component\_Logging**, and then open **perf.xml** in Internet Explorer.

The result appears similar to the following, note that you may have to scroll through the results to see the perf.qfs\_list and perf.qfs\_crosstab outputs:

| <b>Report: perf.qfs_list</b>    |                         |
|---------------------------------|-------------------------|
| <b>Execution Start Time</b>     | 2015-03-24T17:03:35.941 |
| <b>Execution End Time</b>       | 2015-03-24T17:04:15.769 |
| <b>Status</b>                   | SUCCESS                 |
| <b>Request Summary</b>          | 30712                   |
| QECL                            | 396                     |
| CM_GetModelConnectInfo ( 1 )    | 34                      |
| CM_LoadParameterMapFromCM ( 1 ) | 0                       |
| CM_GetDatabaseAccessInfo ( 2 )  | 361                     |
| RelationalQueryProvider         | 2064                    |
| QFSQuery::Prepare ( 1 )         | 22                      |

The file opens based on the formatting used in the perf.xls file. This makes the file easier to read.

The numbers shown in the right column (such as 396) are milliseconds. Numbers in parentheses shown in the left column represent the number of calls. These values come directly from the original, unformatted Performance\_<datetimestamp>.xml log file. You can refer to Performance\_<datetimestamp>.xml to understand the values being presented. Near the top of this file is an explanation of the abbreviations for results.

- Review the information in the file, and answer the following:
  - Compare the components that each report used. Are there any differences?
  - Identify the components that spent the most time processing the request.
  - Compare the components used with the `IBM_Cognos_10.2.2_architecture_diagram.jpg` file located at `C:\Edcognos\B5A19\01-Intro_and_SOA`.
  - Why is there an `OlapQueryProvider` as a component for the crosstab report?
- Close **Internet Explorer**, and then delete `perf.xml` from `C:\Edcognos\B5A19\08-Explore_ComponentLogging`.
- In **Windows Explorer**, delete the files at the root of `C:\Program Files\IBM\cognos\c10_64DispCM\logs`.
- Delete `ipfclientconfig.xml` from `C:\Program Files\IBM\cognos\c10_64DispCM\configuration`.
- To prepare for the first demo in the next module, start the **IBM Cognos Full:9315** service, and then start the **IBM Cognos DispCM:9320** service.
- Close all open windows.

## Additional information for workshop: perf.xslt code

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- Copyright (C) 2007 Cognos Incorporated. All Rights Reserved. Cognos (R) is a trademark of Cognos Incorporated. -->
<!-- Cognos and the Cognos logo are trademarks of Cognos Incorporated. -->
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
    <xsl:output method="html" encoding="UTF-8"/>
    <xsl:variable name="result" select="/PerformanceData"/>
    <!--Match document root-->
    <xsl:template match="/">
        <html>
            <head>
                <title>Performance</title>
                <meta http-equiv="pragma" content="no-cache"/>
                <meta http-equiv="cache" content="0"/>
            </head>
            <body bgcolor="#ffffff">
                <font size="5" face="arial">Performance Information</font>
                <!--Match all elements under 'PerformanceData' -->
                <xsl:apply-templates select="$result/RP"/>
            </body>
        </html>
    </xsl:template>
    <!--Execute this block for every matching File element-->
    <xsl:template match="RP">
        <table border="1" cellpadding="10">
            <!--Output Name attribute from element File-->
            <tr>
                <td bgcolor="#8EB6F0" colspan="4">
                    <font size="4" face="arial">
                        <b>Report: </b>
                    </font>
                    <xsl:value-of select="@n"/>
                </td>
            </tr>
            <tr>
                <td bgcolor="#E3E9F3">
                    <font size="2" face="arial">
                        <b>Execution Start Time</b>
                    </font>
                </td>
                <td bgcolor="#E3E9F3">
                    <xsl:value-of select="@st"/>
                </td>
            </tr>
            <tr>
                <td bgcolor="#E3E9F3">
                    <font size="2" face="arial">
                        <b>Execution End Time</b>
                    </font>
                </td>
                <td bgcolor="#E3E9F3">
                    <xsl:value-of select="@et"/>
                </td>
            </tr>
            <tr>
                <td bgcolor="#E3E9F3">
                    <font size="2" face="arial">
                        <b>Status</b>
                    </font>
                </td>
                <td bgcolor="#E3E9F3">
                    <xsl:value-of select="@status"/>
                </td>
            </tr>
            <!--Match all Customer elements under the RS element-->
            <xsl:apply-templates select="RS"/>
            <xsl:apply-templates select="RQ"/>
        </table>
    </xsl:template>
    <!--Execute this block for every matching RS element-->

```

```

<xsl:template match="RS">
    <tr>
        <td bgcolor="#BFD2E2">
            <font size="3" face="arial">
                <b>Request Summary </b>
            </font>
        </td>
        <td bgcolor="#BFD2E2">
            <xsl:value-of select="@et"/>
        </td>
    </tr>
    <xsl:apply-templates select="C"/>
</xsl:template>
<xsl:template match="RQ">
    <tr>
        <td bgcolor="#BFD2E2">
            <font size="3" face="arial">
                <b>Request Query: </b>
                <xsl:value-of select="@n"/>
            </font>
        </td>
        <td bgcolor="#BFD2E2">
            <xsl:value-of select="@et"/>
        </td>
    </tr>
    <xsl:apply-templates select="C"/>
</xsl:template>
<xsl:template match="C">
    <tr>
        <td bgcolor="#E3E9F3">
            <font size="2" face="arial">
                <xsl:value-of select="@n"/>
            </font>
        </td>
        <td bgcolor="#E3E9F3">
            <!--Highlight name when elapse time exceeds n milliseconds'-->
            <xsl:if test="@et > 15000">
                <xsl:attribute name="bgcolor">#FF0000</xsl:attribute>
            </xsl:if>
            <font size="2" face="arial">
                <xsl:value-of select="@et"/>
            </font>
        </td>
    </tr>
    <xsl:apply-templates select="CF"/>
</xsl:template>
<xsl:template match="CF">
    <tr>
        <td bgcolor="#E3E9F3">
            <font size="2" face="arial">
                &#160;&#160;&#160;&#160;
                <xsl:value-of select="@n"/>
                ( <xsl:value-of select="@nc"/> )
            </font>
        </td>
        <td bgcolor="#E3E9F3">
            <!--Highlight name when elapse time exceeds n milliseconds'-->
            <xsl:if test="@et > 15000">
                <xsl:attribute name="bgcolor">#FF0000</xsl:attribute>
            </xsl:if>
            <font size="2" face="arial">
                <xsl:value-of select="@et"/>
            </font>
        </td>
    </tr>
</xsl:template>
</xsl:stylesheet>

```

## Summary

- At the end of this module, you should be able to:
  - explore component logging for Gateway, Dispatcher, Report Server, and Universal Data Access layer

© 2015 IBM Corporation





## Examine Additional Tools and Special Task Logging

IBM Cognos BI 10.2.2

Business Analytics software

© 2015 IBM Corporation





# Objectives

- At the end of this module, you should be able to:
  - explore diagnostic tools and utilities for special task logging

© 2015 IBM Corporation



Note: In this module, ..\ references point to the install location of IBM Cognos BI.  
For example: ..\bin can be found at C:\Program Files\ibm\cognos\c10\_64full, the install path of the IBM Cognos BI server product.

Business Analytics software

IBM

## IBM Cognos BI Content Manager Browser Tool

- Diagnostic name: IBMCognosBI\_CM**Browser**
- Diagnostic description: reports detailed information of objects
- Download from the IBM Support Portal:
  - <http://www-01.ibm.com/support/docview.wss?uid=swg24021211>

© 2015 IBM Corporation



The IBM Cognos BI Content Manager Browser Tool (CM**Browser**) is a graphical user interface that displays detailed information for all objects in the content store.

For each object within the content store database, which is managed through Content Manager, the user can review the properties and their respective value settings. You can use this to verify that what you think should be in the database is in fact, in the database.

Note: For the Windows-based tools presented in this module, you could use a Windows shell or emulator in a non-Windows environment.

Business Analytics software



## IBM Cognos BI Content Manager Size Tool

- Diagnostic name: IBMCognosBI\_CMSIZE
- Diagnostic description:
  - reports size and count of objects in Content Store
  - returns the search path of the objects
- Download from the IBM Support Portal:
  - <http://www-01.ibm.com/support/docview.wss?uid=swg24021252>

© 2015 IBM Corporation



The IBM Cognos 10 Content Manager Size Tool (CMSIZE) is a Windows-based utility that reports the size and count of all objects in the Content Store database.

Within the specified search scope and type of objects, it returns the count, approximate size, and search path of the objects. This can be useful to find content store objects that can take up a lot of space, such as report outputs and report versions.

This tool will be opened in the demo, but will be explored in more detail in the upcoming Workshop 1: Use CMTools to Extract the Model from the Content Store.

Business Analytics software

IBM

## IBM Cognos Framework Manager Tool

- Diagnostic name: IBMCognosBI\_FrameMgr
- Diagnostic description: retrieves system and product information about Framework Manager
- Download from the IBM Support Portal:
  - <https://www-304.ibm.com/support/docview.wss?uid=swg24020971>

© 2015 IBM Corporation



The Framework Manager Windows-based diagnostic tool will retrieve system and product information about Framework Manager, and will highlight potential issues with Framework Manager models, such as ambiguous joins, list of facts, multiple valid joins, and recursive joins. These are common modeling traps that the modeler might want to consider resolving.

Business Analytics software

IBM

## IBM Cognos BI Content Store Information Tool

- Diagnostic name: IBMCognosBI\_ContentStore
- Diagnostic description: use to retrieve Content Store database information
- Download from the IBM Support Portal:
  - <https://www-304.ibm.com/support/docview.wss?rs=0&uid=swg24020678>

© 2015 IBM Corporation



This diagnostic is executed when you are troubleshooting problems with getting Content Store tables created in IBM Cognos 10. It will retrieve Content Store database information, database connection URL, driver name and version, and database name and version.

The output results are displayed in 2 forms:

- a text file named IBMCognosBI\_ContentStore\_<date>\_<time>.txt
- an XML file named IBMCognosBI\_ContentStore\_<date>\_<time>.xml

Business Analytics software

IBM

## System Overview Diagnostic Tool

- Diagnostic name: IBM\_SystemOverview
- Diagnostic description: gathers environment and system information
- Download from the IBM Support Portal:
  - <https://www-304.ibm.com/support/docview.wss?rs=0&uid=swg24020682>

© 2015 IBM Corporation



The graphical user interface (GUI) IBM\_SystemOverview allows the user to select the categories to report on.

Using this tool allows you to:

- compare your system values from two different environments
- quickly gather system information
- check information about local drives

It is recommended to run the utility from the .bat file, which enables you to see the progress in the command window. You can also double-click the .jar file, which runs in the background without displaying progress, but will display the result window when the diagnostic process has completed.

The following list provides a summary of the information collected: local drives and system information, Microsoft network adapter configuration, Computer name, Operating system version, user and system environment, Java information, Microsoft Internet Explorer properties and security settings, Microsoft Internet Explorer trusted sites, Processes, Microsoft Data Access (MDAC) version, network status/statistics, Microsoft .NET Framework, Add/Remove Programs, Microsoft Windows hot fixes, ODBC versions.

This diagnostic runs the reg.exe utility; if it is not installed, the diagnostic will not run.

## Demo 1: Explore Diagnostic Tools

At the beginning of this demo, ensure that both dispatchers are running.

Note: For the Windows-based tools presented in this module, you could use a Windows shell or emulator in a non-Windows environment.

### Purpose:

**You are the administrator and want to use diagnostic tools to gather information about your IBM Cognos BI environment.**

### Task 1. Configure the system path variable for Java home and bin directories.

Prior to running a diagnostic, the PATH system variable should include the Java\bin path.

1. From the **Start** menu, right-click **Computer**, and then click **Properties**.
2. In the left pane, click **Advanced system settings**, click the **Advanced** tab, and then click **Environment Variables**.
3. Scroll through the **System variables** list, click the **Path** variable, and then click **Edit**.
4. At the end of the current path, type a semi-colon, and then type the Java\bin path. In this case, you will be referencing the folder that was included with the full install of IBM Cognos 10.2.2.

You have added the following items to your PATH system variable:

**;C:\Program Files\IBM\cognos\c10\_64full\bin64\jre\7.0\bin**

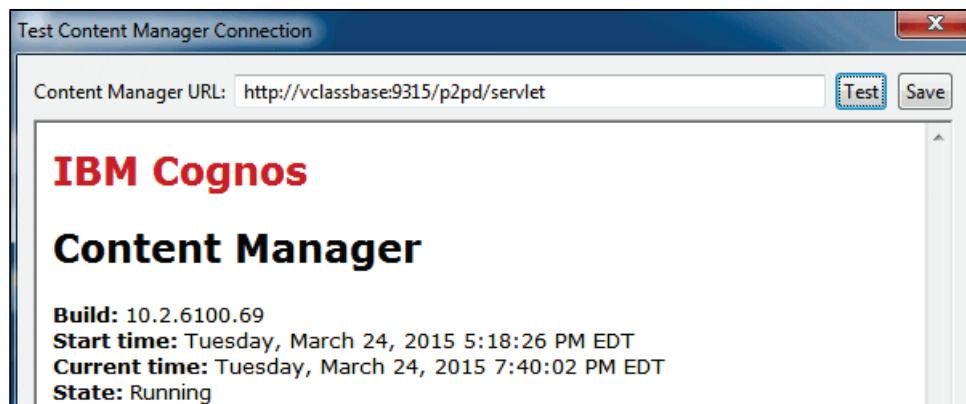
5. Click **OK** to close the following dialog boxes: **Edit System Variable**, **Environment Variables**, **System Properties**.
6. Close the **Control Panel Home** dialog box.

## Task 2. Use the IBM Cognos BI Content Manager Browser tool to report detailed information of objects.

For each object within the content store database, the IBM Cognos BI Content Manager Browser tool will allow the user to review the object properties and their respective values.

1. In Windows Explorer, navigate to **C:\Edcognos\B5A19\diagnosticstools**, open the **IBMCognosBI\_CMBrowser\_64** folder, and then double-click **IBMCognosBI\_CMBrowser.exe**.
2. If you receive a message indicating that the Content Manager could not be reached, click **OK** to dismiss it.
3. On the toolbar, click **Test Content Manager Connection** .
4. If necessary, modify the URL to **http://vclassbase:9315/p2pd/servlet**.
5. Click **Save**, and then click **Test**.

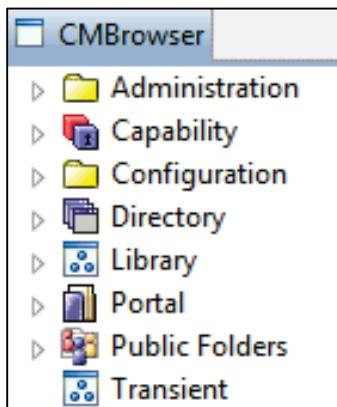
The results display the Content Manager build, the time it was started, current time, and the state, which is currently running.



6. Click **OK** to close the **Test Content Manager Connection** dialog box.
7. On the toolbar, click **Log on to Content Manager** , populate the fields with the following information, and then click **Login**:
  - Content Manager URL: **http://vclassbase:9315/p2pd/servlet**
  - Namespace: **LDAP\_Dev\_ID**
  - User name: **admin**
  - Password: **Education1**

8. On the toolbar at the top right, click **Refresh the complete browse tree**, to see the objects appear in the tree.

The top level objects in Content Manager are displayed in the left pane of the CMBrowser tab.



You can expand each item to view its child objects.

9. From the **Window** menu, click **Preferences**.

Here you can configure your environment settings for Content Manager URL that will be used by CMBrowser. Your environment could have more than one Content Manager. Do not change the Soap Action and BI Bus Namespace fields.

10. Click **Cancel** to close the **Preferences** window.

In the CMBrowser toolbar, you can toggle between retrieving a small set of properties and all properties, refresh the browse tree, search for objects, and access Help.

11. Click **Search Tool** , and then in the **Select scope** section, click **Portal**.

12. In the **Enter search string(\* retrieves all objects)** box, type \*, click **Search**, and then click **Yes** to close the message about all objects being returned.  
The results include pages, pagelets, portlets, and other portal objects. This will help you determine a count of portlet objects in your environment. You can use this tool to count and list other object types also.  
Optional search: To get the information on a specific item in the content store, in IBM Cognos Connection, click the Set properties icon for the item to get its search path. For example, in Public Folders\Samples\Models, for the Audit package, you could click the Set properties icon, and then click View the search path, ID and URL. You can then copy the Search path to the clipboard, and paste it into the search string in the Search Tool of IBM Cognos BI Content Manager Browser. Select the scope, such as Public Folders, and then click **Search** to return the results.
13. Scroll through the results to review them, click **Exit** to close the **Search Tool** window, and then in the **IBM Cognos BI Content Manager Browser Tool** window, from the **File** menu, click **Exit**.

### **Task 3. Use the IBM Cognos BI Content Manager Size tool to report the size of objects.**

Within the specified search scope and type of objects, this utility returns the count, approximate size, and search path of the objects. This can be useful to find content store objects that can take up a lot of space, such as report outputs and report versions.

1. In **Windows Explorer**, navigate to the directory with the diagnostic tools, open the **IBMCognosBI\_CMSIZE\_64** folder, and then double-click **IBMCognosBI\_CMSIZE.exe**.  
Notice that on the CMSIZE tab toolbar at the right, there are buttons to save (the query results will be saved to a CSV file), save to a new file, refresh, and to access Help. You could save the results to a file, and compare this to the results taken at a later time. This could help you to understand what has changed over time with regards to the objects in your content store.
2. From the **Window** menu, click **Preferences**, change the **CM URL** to **http://vclassbase:9315/p2pd/servlet**, and then click **OK**.
3. On the toolbar, click **Test CM Connection** , and then click **OK** to close the **Test CM Connection** window.

4. Explore the **Help** file, available on the **CMSIZE** toolbar for more detail on each of the options, and the tool itself.
5. On the **Object Size** tab, expand the **Scope** dropdown list to review the options, and then click **Public Folders**.
6. Expand the **Objects** dropdown list, click **Report**, and then click **Send**.
7. Click **Yes** to accept the message that you are going to execute an intensive query.
8. If prompted, logon to the **LDAP\_Dev\_ID** namespace ID, with **admin/Education1** credentials.

The reports are returned, with the largest report displayed at the top.

A section of the result appears similar to the following:

|                               | Count   | Size (approx.)                   | Search Path |
|-------------------------------|---------|----------------------------------|-------------|
| Revenue by GO Subsidiary 2011 | 190,121 | /content/folder[@name='Samples'] |             |
| Top 10 Retailers for 2011     | 159,623 | /content/folder[@name='Samples'] |             |
| Recruitment Report            | 153,624 | /content/folder[@name='Samples'] |             |
| Budget vs. Actual             | 137,940 | /content/folder[@name='Samples'] |             |

9. Expand the **Objects** dropdown list, click **Model**, click **Send**, and then click **Yes** to the warning message.

The results are returned, again displaying the size of the object, in descending order.

10. From the **File** menu, click **Exit**.

You will explore more of the CM Size Tool functionality within the CMTools utility in Demo 2.

## Task 4. Use the IBM Cognos Framework Manager tool to retrieve information about models.

This diagnostic tool will retrieve system and product information about Framework Manager, and will highlight potential issues with Framework Manager models, such as ambiguous joins, list of facts, multiple valid joins, and recursive joins.

1. In **Windows Explorer**, navigate to the directory with the diagnostic tools, open the **IBMCognosBI\_FrameMgr** folder, and then double-click **execute\_IBMCognosBI\_FrameMgr.bat**.

Ensure that the Java bin path was added to the PATH system variable in Task 2.

The first time the diagnostic is executed a file called properties is created. This file holds a true or false value for a list of variables that can be chosen from the check boxes. You can open the file and modify the values as needed, or from this window, click Current Settings Saved if you make changes to the default settings.

The IBM Cognos BI Framework Manager Information Request dialog box is displayed.

2. In the **Diagnostic Categories** section, click **Unselect All**, and then click the **Content Store Info** and the **Ambiguous Join Info** check boxes to select them.
3. In the **IBM Cognos BI Install Path** section, click **Browse**, navigate to **C:\Program Files\IBM\cognos\c10\_64full**, and then click **Open**.
4. In the **Content Store Connection** section, enter the **admin/Education1** credentials.
5. In the **Model Filepath** section, browse to where the dynamic query sample models were installed, **C:\Program Files (x86)\IBM\cognos\c10\webcontent\samples\models\great\_outdoors\_sales**, click **model.xml**, and then click **Open**.
6. Click **OK** to run the diagnostic.

The **DIAGNOSTICS RESULTS TREE** window is displayed in the background, and in the active dialog box in the foreground you are prompted to select the results tree, results file, log file, or go to the results directory. Notice that the results file location is displayed in the message along with the filename.

7. If necessary, click **View Results Tree**.

8. In the tree, click **Ambiguous Joins**, and use the **PgUp** and **PgDn** keyboard buttons to scroll through the results, resizing the window if necessary.
9. Click the **DIAGNOSTIC TOOLS** dialog box to view an alternate option, and when you have finished your review, close any windows opened by the tool, and then in the **DIAGNOSTIC TOOLS** dialog box, click **Exit**.

## **Task 5. Use the IBM Cognos BI Content Store Information tool to retrieve information about the Content Store database.**

This diagnostic tool is executed when you are troubleshooting problems with getting Content Store tables created in IBM Cognos 10. It will retrieve Content Store database information, database connection URL, driver name and version, and database name and version.

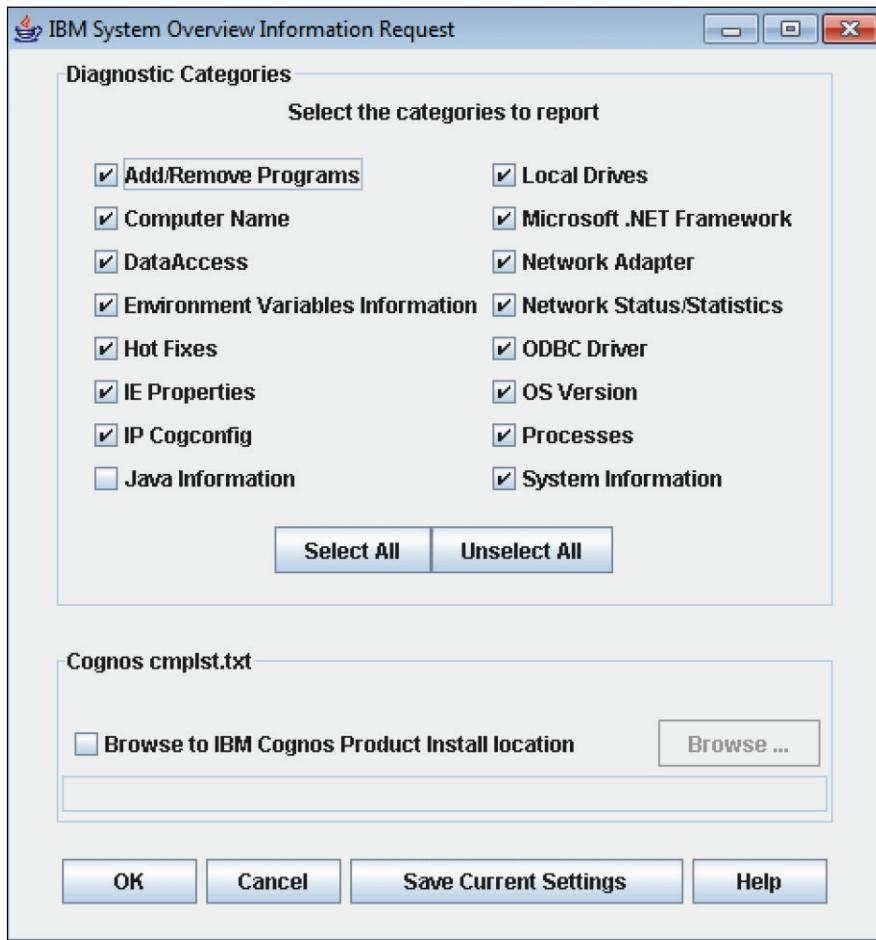
1. In **Windows Explorer**, navigate to the directory with the diagnostic tools, open the **IBMCognosBI\_ContentStore** folder, and then double-click **execute\_IBMCognosBI\_ContentStore.bat**.
2. In the **IBM Cognos BI Information Request** dialog box, click **Browse**, navigate to **C:\Program Files\IBM\cognos\c10\_64full**, and then click **Open**.
3. Login with the **admin/Education1** credentials, and then click **OK**.  
In the **DIAGNOSTIC TOOLS** dialog box, you have the options to view the text results, XML results, or log file, or go to the results directory.
4. Click **View TEXT Results File**, scroll through the results, and then close the window.
5. Click **Go To Results Directory**.  
Windows Explorer is directed to the path of the output result files. The output results are displayed in 2 forms:
  - a text file called **IBMCognosBI\_ContentStore\_<date>\_<time>.txt**
  - an XML file called **IBMCognosBI\_ContentStore\_<date>\_<time>.xml**
 The log file is also saved at this location.
6. Double-click the **IBMCognosBI\_ContentStore\_<date>\_<time>.txt** file, review the results, and then close the file.
7. Close the results directory window, and then click **Exit** to close the **DIAGNOSTIC TOOLS** dialog box.

## Task 6. Use the System Overview diagnostic tool to gather environment and system information.

The graphical user interface (GUI) IBM\_SystemOverview allows the user to select the categories to report on.

1. In **Windows Explorer**, navigate to the directory with the diagnostic tools, open the **IBM\_SystemOverview** folder, and then double-click **execute\_IBM\_SystemOverview.bat**.

The IBM System Overview Information Request dialog box allows you to customize multiple categories on which to report.



2. Click **OK** to run the diagnostic with the default options.

When the execution is complete (it will take a few moments), the IBM SYSTEM OVERVIEW DIAGNOSTIC Results window is displayed, with a tab for each of the categories selected at the execution.

3. Click each tab, to see the information results.

In the DIAGNOSTIC TOOLS dialog box, notice that you can select a tabbed view, and that you can also view the text results and XML results, or you can go to the results directory.

4. Click **Exit** to close the diagnostic tool.

**Results:**

**As the administrator, you used diagnostic tools to gather information about your IBM Cognos BI environment.**

## IBM Cognos Log Viewer Utility

- Utility name: logviewV2
- Utility description: allows filtering of a log file
- Location of utility: ..\bin and ..\bin64

© 2015 IBM Corporation



This utility presents a formatted view of log files that you may find easier to read compared to looking at log files in a text editor. You can use this utility to review IPF log files.

With IBM Cognos Log Viewer, you can filter the log file to reduce the amount of data being viewed, and focus on specific messages.

## Describe cm\_tester

- Utility name: cm\_tester.htm
- Utility description: manipulate Content Manager objects with SOAP requests
- Location of utility: ..\webapps\p2pd

© 2015 IBM Corporation



CMTTools requires Java, whereas cm\_tester.htm uses a lot of JavaScript and runs within a browser, such as Internet Explorer or Firefox.

cm\_tester functionality is also included in CMTTools, which will be explored in Workshop 1: Use CMTTools to Extract a Model from the Content Store workshop.

Business Analytics software



## CMTTools Utility

- Utility name: CMTTools
- Utility description: provides advanced cm monitoring and update capabilities
- Location of utility: ..\bin64\utilities\cm\CMTTools

© 2015 IBM Corporation



This utility provides advanced Content Manager monitoring and update capabilities. The CMTTools utility includes the functionality of CMBrowser, CMSIZE, and cm\_tester.htm (CMTester).

## Demo 2: Explore the IBM Cognos Log Viewer and CMTools Utilities

At the beginning of this demo, the IBM Cognos Full:9315 dispatcher and the IBM Cognos DispCM:9320 dispatcher are running.

### Purpose:

**Log files can be difficult to read through, due to the amount of information and limited formatting if viewing with a text viewer. You will launch CMTools and explore some of the functionality available for advanced Content Manager monitoring.**

### Task 1. Use logviewV2.exe to filter log files for easier reading.

1. In **Windows Explorer**, navigate to **C:\Program Files\IBM\cognos\c10\_64full\bin**, and then double-click **logviewV2.exe**.  
The IBM Cognos Log Viewer launches, and displays a tab that allows you to drag and drop IPF log files onto it.
2. In **IBM Cognos Log Viewer**, from the **File** menu, click **Load Cognos Log File(s)**.  
This is an easy way to quickly navigate to where the Cognos log files are stored. Also available from the File menu, you can load files with filters that you have already created.
3. Click **cogserver.log**, and then click **Open**.  
If prompted with a warning about messages other than audit messages being dropped, click **OK**.
4. Click the **cogserver.log** tab, and maximize the window.  
Notice that the information is presented in columns, with a reference ID for each row.



There are summary buttons on the toolbar that you can use, presented on the toolbar.

5. Click **Summarize errors** .

If there are errors, the errors are listed with counts of each, and information is displayed about the last occurrence and the message text that was displayed.

You can generate a filter from each of the summary views provided, by clicking the Generate Filter button. If there were no errors, the summary will display a blank window.

6. Click **OK** to close the **Error Summary** window, and then click **Summarize messages** .

7. Review the information, click **OK** to close the dialog box, and then scroll through the log file.

Rows may be highlighted in yellow or highlighted in dark red. This is a quick visual identifier, which is not usually available when looking at log files in a text editor. The color highlights are based on Rulesets that have been configured. To change the colors, right-click in the rows area, and then select LogPanel Color Filter. You can easily customize the foreground and background colors of specific rules.

There are many lines of information in this log file, so you want to apply a filter, to focus on items requiring attention.

8. In the **Refine focus on** box type **STATUS == 'Warning'**. You do not need to press Enter.

Syntax is important in this field as you type a value. If there are no Warning entries, you may want to filter on a different status, such as 'Info'.

The items are filtered to match this status of Failure, allowing you to focus on much less data.

9. Right-click anywhere in the **Status** column body, and then click **Clear 'refine focus' field** to display all results.

10. Scroll to a row with **Info** listed in the **Status** column, in the **Status** column, right-click the **Info** status, and then click **Set 'refine focus' field**.  
 If there are no Info entries, you may want to filter on a different status. This is another way to populate the Refine focus on field, without typing the syntax, to filter your results. Using the methods presented here, you can efficiently focus on specific items to assist when troubleshooting.  
 If there were no Info messages in your log, use a different status row for the next step.
11. Click a row displayed with the **Info** status to select it, and then expand the lower pane as needed for a different presentation of the information.  
 The last line lists other information that can be helpful to you, in a more readable format than the tabular view.
12. Close **IBM Cognos Log Viewer**.

## **Task 2. Use CMTools for advanced Content Manager monitoring.**

1. In **Windows Explorer**, navigate to **C:\Program Files\IBM\cognos\c10\_64full\bin64\utilities\cm\CMTools**, and then double-click **CMTools.exe**.
2. Click **OK** to close the **Problem Occurred** dialog box.
3. On the toolbar, click **Test CM Connection**.
4. In the **CM URL** box, ensure that **http://vclassbase:9315/p2pd/servlet** is displayed, click **Test**, and then click **OK**.
5. In the **Logon** dialog box, login with **admin/Education1** credentials, and then click **OK**.  
 Within this utility, you can access other CM tools.
6. From the **Window** menu, click **Show View**, and then click **Content Tree** if this view is not already visible.
7. On the **Content Tree** toolbar, click **Rebuilds the entire browse tree**  to refresh the display.
8. From the **Window** menu, click **Show View**, and then click **Other**.
9. In the **Cognos** folder, click **CMSIZE**, and then click **OK**.  
 A new tab appears in the CMTools window. The functionality of the CMSIZE tool, that you reviewed earlier in this module, is available through CMTools.

10. On the **CMSIZE** tab, change **Scope** to **Other**, and then replace **/content/\*** with the following:  
**/content/folder[@name='Samples\_DQ']/folder[@name='Models']/\***

11. In the **Max Objects** box, type **10**.
12. Change **Classes** from **output** to **model**, and then click **Send**.

You may need to resize the window to see all options on the CMSIZE tab, such as the Send button.

13. Click **Yes** to the message about executing an intensive query.

A section of the result appears similar to the following:

The screenshot shows the CMSIZE tool interface. At the top, there are tabs for "Object Size" and "Object Count", with "Object Count" being the active tab. Below the tabs, the "Scope" is set to "Other" and the query path is "/content/folder[@name='Samples\_DQ']/folder[@name='Models']/\*". There are checkboxes for "Enable Size" (checked) and "Save Results in the Database" (unchecked). The "Max Objects" field is set to 10, and "Skip Objects" is set to 0. The "Classes" dropdown is set to "model", with a "Edit Classes" button next to it. To the right, a "Summary" box displays "Total Count: 4" and "Total Size: 1.98 MB". At the bottom, there are buttons for "Back", "Drill Down", and "Send". Below these buttons is a table with the following data:

|                                | Count | Size (approx.) | Data Size (approx.) | Metadata Size (approx.) |
|--------------------------------|-------|----------------|---------------------|-------------------------|
| ▶ Cognos Workspace Samples     | 0     | 0 MB           |                     |                         |
| ▶ GO Data Warehouse (analysis) | 1     | 0.79 MB        |                     |                         |
| ▶ GO Data Warehouse (query)    | 1     | 0.6 MB         |                     |                         |
| ▶ GO Sales (analysis)          | 1     | 0.34 MB        |                     |                         |
| ▶ GO Sales (query)             | 1     | 0.26 MB        |                     |                         |
| ▶ Interactive Samples          | 0     | 0 MB           |                     |                         |

The count and size of the models found in the Samples\_DQ folder in the Models subfolder of the content store are displayed. Notice that the Count column is empty at the folder level.

14. In the list of results, expand **GO Sales (query)**, and observe the size of the model.

Notice that you can export the findings to a .CSV or .XML file (Export button on the toolbar), which would be helpful to compare to later results, if you monitor the changes in the size of your content store over time.

15. Change **Classes** from **model** to **specs**, and then in the **Max Objects** box, type **10** (if necessary).
16. Click **Send**, click **Yes** to the intensive query message, and review the children of **GO Sales (query)**.

You have changed the class of objects that you want to review. Instead of one model, there is information displayed regarding reports, queries, report version, and analysis.

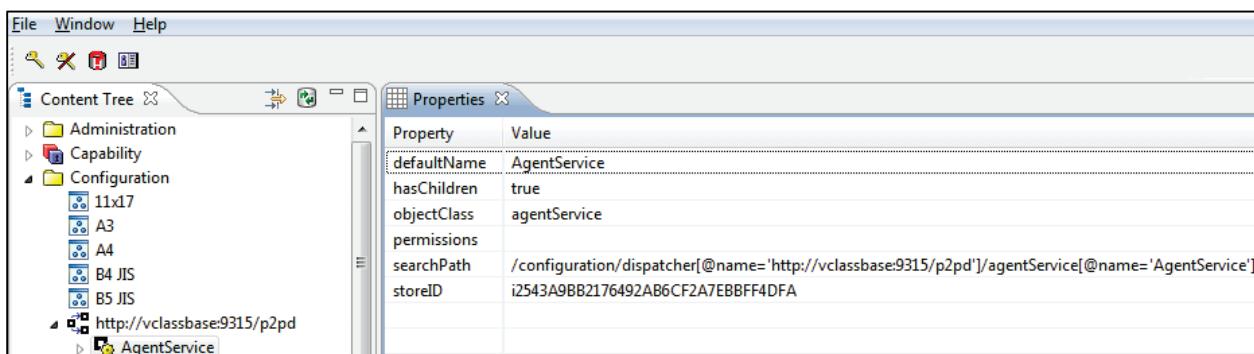
You will now explore the Content Tree in CMTools.

17. From the **Window** menu, click **Show View**, and then click **Content Tree** (if necessary).
18. In the **Content Tree** pane, expand **Configuration**.

Notice the two dispatchers in the environment are displayed.

19. Expand **http://vclassbase:9315/p2pd** to review the children, and then double-click any item to display its properties.

The results appear similar to the following:



20. Explore the **Help** file for more detail on each of the options and the tool itself.
21. When you have finished reviewing the tool, from the **File** menu, click **Exit**.

## Results:

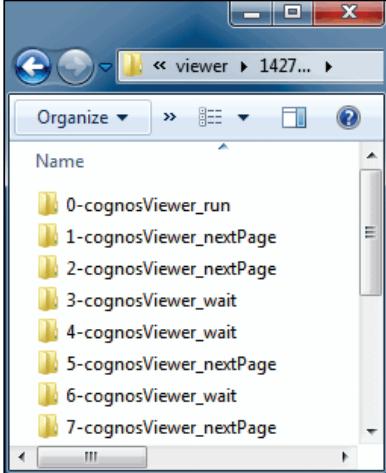
**Using IBM Cognos Log Viewer, you were able to use formatting and filters to focus on information and warnings that can be helpful when troubleshooting issues. You then launched CMTools, and explored some of the functionality available in the utility, for advanced Content Manager monitoring.**

**Business Analytics software**

**IBM**

## IBM Cognos Viewer Trace (1 of 2)

- Enable debug tracing on IBM Cognos Viewer
  - global trace
  - session trace
- Output:
  - log files created under the ..\temp\viewer directory
  - each new action creates a new set of folders



© 2015 IBM Corporation

IBM Cognos Viewer Trace results provide information such as the overall time that the IBM Cognos Viewer takes to load a page. With debug tracing enabled, each page load has its own set of resulting folders and files.

Along with performance information, other output files provide information such as server variables, user preferences, output similar to viewing the source on a standard HTML page, files called to render the page to the viewer, and so on.

Note: Globally enabling IBM Cognos Viewer debugging will generate hundreds of log files in a short period on a slightly active site. A complete set of folders and files is generated for each navigation task, such as Page up, or Page down.

## IBM Cognos Viewer Trace (2 of 2)

- Activate tracing in viewerconfig.properties
  - ..\webapps\p2pd\WEB-INF\classes
- To enable session tracing, add the line
  - enableURLDebug=true
  - specify cv.debug or cv.perfDebug on a URL
- To enable global tracing, add the line
  - debug=true

© 2015 IBM Corporation



In the first method, to enable session level tracing using URLs, add the enableURLDebug=true line, and specify cv.debug. If you append cv.perfDebug instead, the logs for a successful request are deleted, which will help to keep the size of the logs directory small.

In the second method, to enable global level tracing, add the debug=true line. If you append perfDebug=true, instead of using debug=true, the logs for a successful request are deleted, which will help to keep the size of the logs directory small.

Session tracing will remain active as long as the session is valid. Global tracing remains enabled until it is manually disabled. It is recommended to do this tracing in a non-production environment. If working in a distributed environment, it is recommended to use routing rules to force the report being traced to a specific Report Server, otherwise the configuration process will need to be done for each Report Server in the distributed environment.

## Explore the Output Files

- **query:** request.xml, response.xml
- **run:** request.xml, response.xml, mimeAttachment1.txt
- **output:** output.txt
- **timing.xml**
  - <event elapsedTime="57">Overall time used by the viewer</event>

© 2015 IBM Corporation

The query request.xml file contains all cookies passed to the viewer, server variables passed and user IBM Cognos 10 preferences as set in My Preferences. The query response.xml file contains similar information as the query request.xml file. The run request.xml and response.xml files are similar in content to the query request.xml and response.xml files.

The run mimeAttachment1.txt file provides information similar to viewing the source of the contents in the body of IBM Cognos Viewer.

The output.txt file contains all JavaScript files loaded and their paths, all HTML generated, all data loaded into the report and any CAF IDs associated to that page.

The timing.xml file provides an overall performance view for IBM Cognos Viewer by the specific page. For example, it may record that all actions by the IBM Cognos Viewer took an elapsed time of 57 milliseconds to complete.

Typically if you right click a Web page, you can select "View Source" to see information such as styles used, data in the report, etc. As View Source is not available in IBM Cognos Viewer, should you require such information, this is a method to obtain it. You can explore some of the output files in the demo Trace IBM Cognos Viewer.

There may be more than one <timing> element in the timing.xml file which means the XML will become invalid. To make the XML valid so it can be seen in a browser or other XML viewing application, add an opening element <cvt> at the very beginning of the file and add the closing element </cvt> as the very end of the file.

## Workshop 1: Trace IBM Cognos Viewer

You are working in a non-production environment, and want to test the overall time IBM Cognos Viewer takes to load a page. You will also use IBM Cognos Viewer tracing to review the server variables passed, and user preferences.

In this workshop, you will enable session tracing, and then global tracing.

To do this you will:

- ensure that no dispatchers are running
- edit the viewerconfig.properties file to enable session tracing to include the statement enableURLDebug=true, then start the IBM Cognos Full:9315 service
- in IBM Cognos Connection, ensure that the dispatcher logging level has been set to Request
- in IBM Cognos Connection, logged in as admin/Education1, run a report, modify the URL to perform a trace by appending &cv.debug=true, and then navigate through the report
- examine the results in C:\Program Files\ibm\cognos\c10\_64full\temp\viewer, reviewing input.xml, and copying the session ID
- load cogserver.log in IBM Cognos Log Viewer, filter on the session ID and review the results
- stop the IBM Cognos Full:9315 service
- edit the viewerconfig.properties file to delete the statement enableURLDebug=true, enable session tracing by including the statement debug=true, and then start the IBM Cognos Full:9315 service
- in IBM Cognos Connection, logged in with admin/Education1 credentials, run a report, and then navigate through the report, noticing that you do not have to include the URL modification for global tracing to be enabled
- stop the IBM Cognos Full:9315 service

- edit the viewerconfig.properties file to disable global tracing by deleting the statement debug=true, and then start the IBM Cognos Full:9315 service
- start the IBM Cognos Full:9315 service, and then start the IBM Cognos DispCM:9320 service, to prepare for the next workshop

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows. If you need more information to complete a task, refer to earlier demos for detailed steps.

## Workshop 1: Tasks and Results

At the beginning of this workshop, ensure no dispatcher is running.

### Task 1. Edit the viewerconfig.properties file to enable session tracing.

- In the **Taskbar**, click **Services**, ensure that both IBM Cognos dispatcher services are stopped, and then close the **Services** window.

You will begin the process by making a backup copy of the viewerconfig.properties file, and then you will edit the file to enable session tracing.

- In **Windows Explorer**, navigate to **C:\Program Files\IBM\cognos\c10\_64full\webapps\p2pd\WEB-INF\classes**, copy **viewerconfig.properties**, and paste into the same directory.
- Launch **Eclipse**, and then open **viewerconfig.properties**.
- Type the following line at the end of the code:  
**enableURLDebug=true**
- Save the file and close **Eclipse**.
- In the **Services** window, ensure that the **Apache Directory Server - default** service is running, and then start the **IBM Cognos Full:9315** service.

If a message displays, indicating that the service did not start in a timely fashion, click **OK** to dismiss this message.

Ensure that the service is fully started before proceeding to the next task.

In the interest of time, you will only work with one dispatcher for this workshop. You can elect to start both dispatchers, but it will take more time. Because the workshop will use the IBM Cognos Full:9315 dispatcher, the reports that you run will be reports connecting to a dynamic query mode data source. To run compatible query mode reports in this workshop, the IBM Cognos DispCM:9320 dispatcher would have to be started to handle those reports. This latter option is not scripted in the steps.

## Task 2. Launch IBM Cognos Connection, run a report, and modify the URL to perform a trace.

- Launch Internet Explorer, go to <http://vclassbase:88/C10Full>, and then log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials.
- Launch **IBM Cognos Administration**, on the **Status** tab, click **System**, and then in the **Scorecard** pane, click **vclassbase**.
- Click <http://vclassbase:9315/p2pd>, and then in the **Settings** pane, expand **Logging**.
- If the logging level is not set to **Request**, click the **Set properties** icon on the **Settings** pane title bar, in the **Category** list click **Logging**, for the **Audit logging level for the dispatcher** entry, change the value to **Request**, and then click **OK**.
- In the top right corner, click **Launch**, and then click **IBM Cognos Connection**.
- Navigate to **Public Folders\Samples\_DQ\Models\GO Sales (query)\Report Studio Report Samples**, and then run the **Briefing Book\_DQ** report.
- When the report is displayed in **IBM Cognos Viewer**, modify the URL to include **&cv.debug=true** at the end.

The address should look something like the following:

```
http://vclassbase:88/C10Full/cgi-bin/cognos.cgi?b_action=cognosViewer&ui.action=run&ui.object=%2fcontent%2ffolder%5b%40name%3d%27Samples_DQ%27%5d%2ffolder%5b%40name%3d%27Models%27%5d%2fpackage%5b%40name%3d%27GO%20Sales%20(query)%27%5d%2ffolder%5b%40name%3d%27Report%20Studio%20Report%20Samples%27%5d%2freport%5b%40name%3d%27Briefing%20Book_DQ%27%5d&ui.name=Briefing%20Book_DQ&run.outputFormat=&run.prompt=true&ui.backURL=%2fC10Full%2fcgi-bin%2fcognos.cgi%3fb_action%3dxts.run%26m%3dportal%2fcc.xts%26m_folder%3di9A890DD7508C46EF9FB06010C90886D1&cv.debug=true
```

**Tip:** Appending **cv.perfDebug=true** instead of **cv.Debug=true** results in all the logs for a successful request to be deleted which will help keep the size of the logs directory small.

- Press **Enter** to run the report, and login again if prompted.

The Briefing Book displays. Notice the text DEBUG ENABLED at the top of the page.

The results appear as follows:

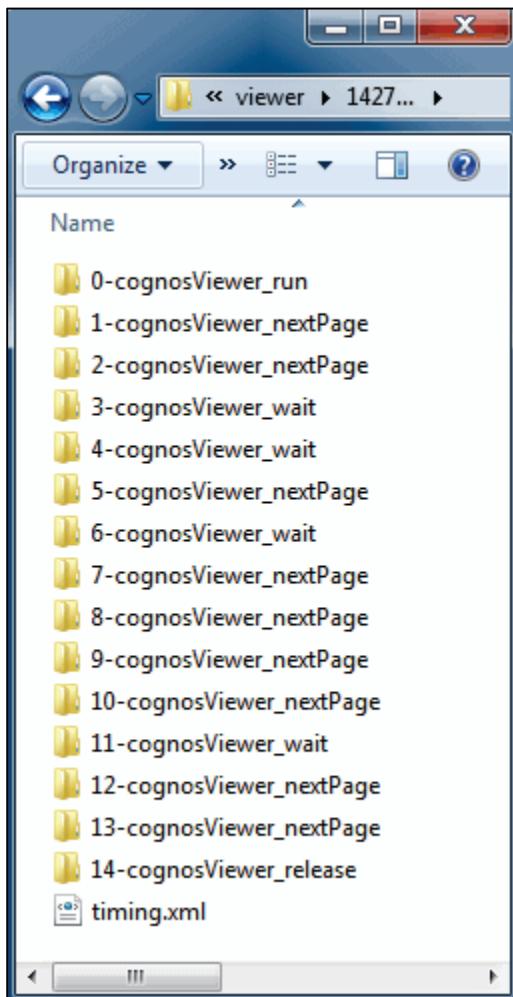


- Navigate through the report, page by page, to the last page (page 10), log off **Admin Person**, and then close the browser window.

### Task 3. Review the results of the trace.

- Navigate to the **C:\Program Files\IBM\cognos\c10\_64full\temp\viewer** folder and expand the subfolder structure.

Similar results are shown as follows (you may see a different number of folders):



Each page load results in its own set of folders and files being generated.

- Expand the **0-cognosViewer\_run** folder, and observe that the folders available include input, queryCache, run, and so on.

There are also two other files, timing.xml and trace.log.

- On the toolbar, click **Back**, and then expand a **nextPage** folder, and review the contents.

Using the URL method is a quick way to obtain the request ID or session ID for a particular run of a report. You will now obtain the session ID contained in the input.xml output file, and follow the actions of the session by filtering on the session ID in cogserver.log. You could also use the request ID.

- From a **cognosViewer\_nextPage** folder, expand the **input** folder and open **input.xml** in **Internet Explorer**.  
Disregard any browser messages about script restrictions.
- Press **Ctrl+F** to display the **Find** box, and then type **sessioncontext**.  
In the line of code, you will copy the section between the tags for `sessionContext`, but do not include the colon or the characters before it.
- Copy the **sessionContext** information to the clipboard as described:
  - In the example below, you would just copy  
73A33A5B578BF67C882BD1580F28051185287262

You would not copy the f:0 or any of the other characters on the line.

```
<sessionContext xsi:type="xsd:string">f:0:73A33A5B578BF67C882BD1580F28051185287262</sessionContext>
```
- Launch **IBM Cognos Log Viewer**, and load **cogserver.log** into the utility.  
IBM Cognos Log Viewer is in the C:\Program Files\ibm\cognos\c10\_64full\bin directory, logviewV2.exe file. Dismiss any message regarding non-audit messages being dropped.
- Click the **cogserver.log** tab.
- To refine the focus, in the Refine focus on text box, type to **SESSIONID == '** and paste the session ID code from the clipboard, and then type **'** to end the statement.  
Ensure that before and after the double equal signs (==) there is a space.  
If you did not do the earlier demo in this course that increased the level of logging, or if you reset your lab environment to the initial state of this course, you may not get results on a Session ID being logged. Review the note at the beginning of this workshop.
- Click an item in the filtered list, to review the information that was logged for the session.
- When you have reviewed the items of interest, close **IBM Cognos Log Viewer** and all other windows, and then stop the **IBM Cognos Full:9315** service.  
Wait until the service has fully stopped before proceeding to the next task.

## Task 4. Enable global logging.

Warning: Globally enabling Cognos Viewer tracing will generate hundreds of log files in a short period of time, on even a slightly active site, as a complete set of folders and files are generated for each navigation task (page up, page down, etc.). Use with extreme care.

- Launch **Eclipse**, and activate the tab for the previously opened file **viewerconfig.properties**.

If this file was closed in a previous Eclipse session, open the file by navigating to **C:\Program Files\IBM\cognos\c10\_64full\webapps\p2pd\WEB-INF\classes**.

- Type the following line at the end of the code:

**debug=true**

**Tip:** Inserting **perfDebug=true** instead of **debug=true** results in all the logs for a successful request to be deleted which will help keep the size of the logs directory small.

- Delete the **enableURLDebug=true** line, which was used for the session tracing in an earlier task.
- Save the file, close **Eclipse**, and then start the **IBM Cognos Full:9315** service.

Ensure that the service is fully started before proceeding to the next step.

- Launch **Internet Explorer**, go to **http://vclassbase:88/C10Full**, log on to the **LDAP\_Dev** namespace with **admin/Education1** credentials, and then on the **IBM Cognos Software** page, click **IBM Cognos content**.

- Navigate to **Public Folders\Samples\_DQ\Models\GO Sales (query)\Report Studio Report Samples**, and then run the **Briefing Book\_DQ** report.

At the top of the IBM Cognos Viewer window, notice the presence of the **DEBUG ENABLED**. As with the session tracing, this indicates that the trace is active, and all actions will be logged.

Actions are logged the same as for session tracing, and so you can read the resulting files using the method described in Task 3 of this workshop. If there is time, you can run a report and review the resulting files, otherwise proceed to the next task to disable global logging.

## Task 5. Disable global logging.

1. Close the browser window and then stop the **IBM Cognos Full:9315** service.
2. Launch **Eclipse**, and activate the tab for the previously opened file **viewerconfig.properties**.

If this file was closed in a previous Eclipse session, open the file by navigating to C:\Program Files\IBM\cognos\c10\_64full\webapps\p2pd\WEB-INF\classes.

3. Delete the **debug=true** line, save the file, and then close all windows.
4. To ready the environment for the next workshop, start the **IBM Cognos Full:9315** service, and when that has started, start the **IBM Cognos DispCM:9320** service.

## Drill Through Assistant (1 of 2)

- Purpose:
  - debug drill through definitions
- Description:
  - displays values selected by the user for passing to the target report
  - displays the parameter names mapped in the drill-through definition

© 2015 IBM Corporation



Use the Drill Through Assistant to debug functionality for drill through definitions. The values selected by the user when invoking the drill-through action will be displayed, for you to review as what is available for passing to the target report. This utility also displays the name of the parameter that was mapped in the drill-through definition, and the values that the source is attempting to pass to that parameter.

This feature is available by default to System Administrators. To activate the Drill Through Assistant for other users, in IBM Cognos Administration, on the Security tab, in the Capabilities section, add users to the member list for Drill Through Assistant.

**Business Analytics software**

## Drill Through Assistant (2 of 2)

**Available links:**

- Run
- View Target Mapping
- Run with Dynamic Filter

**Selection context:**

| Item         | Display value  | Use value      |
|--------------|----------------|----------------|
| Revenue      | 726,411,367.89 | 726411367.89   |
| Product line | Golf Equipment | Golf Equipment |

**Parameter mapping:**

| Parameter name | Display value  | Use value      |
|----------------|----------------|----------------|
| PL             | Golf Equipment | Golf Equipment |

**Target**  
Directory > LDAP\_Dev > People > Admin Person > My Folders > Total Revenue by Country Drill Target Report  
View passed source values

```

<s:selection rModel="TM_P_0" xmlns:s="http://developer.cognos.com/schemas/selection/1/" xmlns:xm="http://www.w3.org/2005/namespace" rSelectedCells="C_0"><s:metadataCells><s:metadataCell xmlid="M_0" rQueryName="QN_0" rName="N_0" rExpression="QJ_0" rType="T_0" rUsage="U_0"/><s:metadataCell xmlid="M_1" rQueryName="QN_0" rName="N_1" rExpression="QJ_1" rUsage="U_1"/><s:metadataCell xmlid="M_2" rName="N_2" rType="T_1"/><s:metadataCell xmlid="M_3" rName="N_2" rType="T_1"/><s:metadataCells><s:cells><s:cell xmlid="C_0" rMetadataCell="M_0" rValue="V_0" display="726,411,367.89"><s:dependentCells><s:cell xmlid="C_3" rMetadataCell="M_3" rValue="V_2"/></s:dependentCells></s:definingCells><s:axis rCell="C_1"/></s:definingCells></s:cell></s:cells><s:strings><s:string xmldid="QN_0">[Country view].[Sales fact].[Revenue]</s:string><s:string xmldid="N_1">Product line</s:string><s:string xmldid="N_2">memberCaption</s:string><s:string xmldid="V_0">726411367.89</s:string><s:string xmldid="V_1">Golf Equipment</s:string><s:string xmldid="V_2">726,411,367.89</s:string><s:string xmldid="QJ_0">[Business view].[Sales fact].[Revenue]</s:string><s:string xmldid="QJ_1">[Business view].[Products].[Product line]</s:string><s:string xmldid="U_0">measure</s:string><s:string xmldid="U_1">nonMeasure</s:string><s:string xmldid="TM_P_0">[content/folder[@name='Samples']]</s:string></s:selection>

```

© 2015 IBM Corporation

When the Drill Through Assistant capability is enabled, the Go to window will have additional options available to the user. This information can assist you when troubleshooting drill through issues.

For more information about the Drill Through Assistant see the *Administration and Security* guide.

This topic is also covered in the IBM Cognos BI Administration (v10.2.2) course, which is a prerequisite to this course.

## Use Diagnostic URL Commands

- Get Dispatcher version
- Determine if Content Manager is running
- Determine if a Dispatcher is alive
- View installed components
- Memory utilization
- Environment
- Get load balancing statistics
- Pin requests for load balanced services to a specific Dispatcher
- Determine if the Certificate Server is responding
- XML parser information

© 2015 IBM Corporation



There are a variety of URL diagnostic commands available, to assist you when troubleshooting issues. Refer to the product for others than those listed here.

Refer to the Workshop titled Examine URLs Available for Troubleshooting for specific examples of available commands.

Business Analytics software



## Analyze Logs with I.C.E.T.E.A.

- I.C.E.T.E.A.: IBM Cognos Exploration Tool for Event Analysis
- Logs (individual files or entire directories) are loaded into an in-memory database.
- Logs can be associated to specific "cases" and have several pre-canned queries (hourly activity, hourly errors, process lifecycles, and so forth).
- Logs can be filtered on-demand and have full drill-through capability into underlying errors which then allow for further filtering.

© 2015 IBM Corporation



I.C.E.T.E.A. (IBM Cognos Exploration Tool for Event Analysis) is a log analysis tool which allows for interactive examination, filtering, and correlation of log entries from single or multiple log files which are imported and indexed into a database.

I.C.E.T.E.A. is similar to the logviewV2.exe tool, but is considerably more powerful. It is not installed with IBM Cognos BI. You can download it from IBM developerWorks at the following link:

<https://www.ibm.com/developerworks/community/groups/service/html/communityview?communityUuid=0ad1d51b-4366-4735-a999-3522a4cba6cd>.

## Demo 3: Analyze Logs with I.C.E.T.E.A.

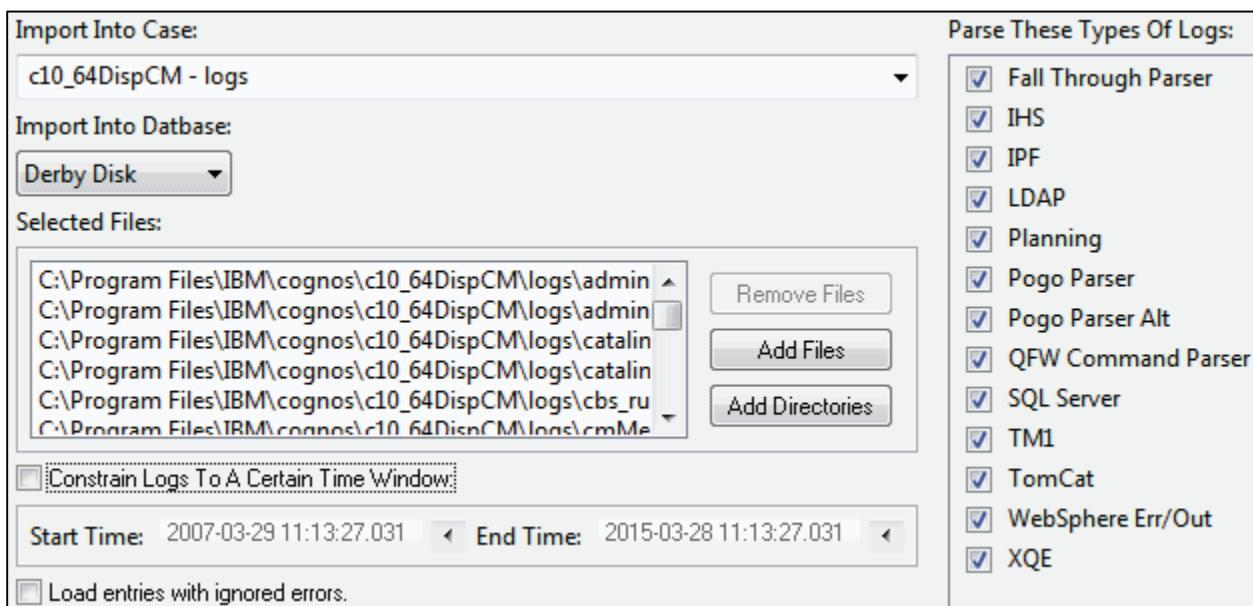
### Purpose:

To get a better understanding of what is going on in your BI environment, you will use the I.C.E.T.E.A. utility to analyze the logs that have been generated. You will first launch I.C.E.T.E.A. and import the logs. You will then drill through on error messages to see more detail. Next you will filter on errors using query filters. Lastly you will examine the pre-made queries that come supplied with the tool.

### Task 1. Launch I.C.E.T.E.A. and import logs.

1. In the C:\Edcognos\B5A19\diagnostictools folder, double-click the **ICETEA** subfolder, and then double-click **icetea.exe**.  
If necessary, accept the license agreement and then close the **Welcome** tab.
2. On the toolbar of the **Case Navigator** pane in the top left corner, click **Import Logs** .
3. In the **Validating database connectivity** dialog box, click **Details** to see the progress of connecting, and wait for the **Import Data Files** dialog box to display.
4. In the **Selected Files** area, click **Add Directories**, navigate to **C:\Program Files\IBM\cognos\c10\_64DispCM\logs**, and then click **OK**.

5. Click the **Constrain Logs To A Certain Time Window** check box to clear it.  
A section of the result appears similar to the following:



6. Click **Next**, and then on the **Filter Log Entry Columns** page click **Next**.
7. Type additional notes about the case (if you want), and then click **Finish**.  
The log parsing window displays (this may take a few moments).
8. In the **Additional Information Required** window, click **OK**.  
This message appears due to missing timing information in some log files.
9. In the **Case Navigator** pane in the top left corner, expand the date object, and then double-click the logs directory which was imported.  
The Case Summary pane on the right side is populated with information about the case.

## **Task 2. Drill through on error messages.**

1. In the **Error Summary Count** section, right-click an error message and then click **Drill Through On <error>**.  
Notice that to the right side of the vertical scroll bar there are thin blue horizontal marks . These represent the occurrences of the errors in the logs.
2. Click a blue mark to jump to that point of the log file (you may need to scroll slightly up or down to get to the error row which will be highlighted in blue).

## Task 3. Filter errors using query filters.

1. Expand **Query Filters** at the top of the workspace tab.
2. Expand the **Error Code** dropdown list, and select an error.
3. Click **Execute This Tab**.

The result set is now filtered down to only rows containing the selected error code.

4. In the **COMPONENT** column, notice the value for the error message logged.
5. Expand **Query Filters** at the top of the workspace tab.
6. In the **Error Code** list, click the top blank entry to clear it, in the **Component** list, select the value you had seen in step 4 (for example, "caf"), and then click **Execute This Tab**.

The result set is now filtered down to only rows containing the selected component. This may be quite a large result set.

7. Expand **Query Filters**, maintain the selection in the **Component** list, and then select a value in the **Process ID** list that matches with a value in the **PID** column of the result set.
8. Click **Execute This Tab**.

The result set is now filtered down to only rows containing *both* the selected component and the selected PID (Process ID).

The results appear similar to the following:

| TIMESTAMP                     | HOST ID | PID | SESSIONID | REQUESTID | SUBREQUESTID | STEPID | TID  | COMPONENT |
|-------------------------------|---------|-----|-----------|-----------|--------------|--------|------|-----------|
| 2015-03-25 14:192.168.24:3636 |         |     |           |           |              |        | mair | caf       |
| 2015-03-25 14:192.168.24:3636 |         |     |           |           |              |        | mair | caf       |

9. Close the workspace tab.

## Task 4. Explore the pre-made queries.

1. In the **Queries** pane on the bottom left side, expand **Case Summary\System Runtime Information\Error Pattern**.
2. Right-click **Hourly Error Pattern** and select **Run Query**.

A message may appear with requirements to turn on basic level logging of the study component and ensure that there are cogserver.log or pogo logs.

When these requirements are met, the result set will display the frequency with which errors occurred on an hour-by-hour basis. This result set can be filtered using the same steps outlined in Task 3. The results appear similar to the following:

The screenshot shows a software window titled 'Case Summary' with a sub-tab 'Hourly... - logs'. Below the tabs is a section labeled 'Query Filters'. The main area is a table with the following data:

| TIME PERIOD      | CAF-WRN-0010 | CAF-WRN-0021 | CAM-AAA-0026 | CAM-AAA-0056 | CAM-AAA-0064 | CAM-AAA-0146 |
|------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 2015-03-24 17:00 | 1            | 1            |              |              |              |              |
| 2015-03-24 19:00 |              |              |              |              |              |              |
| 2015-03-24 20:00 |              |              |              |              |              |              |
| 2015-03-24 21:00 |              |              |              |              |              |              |
| 2015-03-25 11:00 | 1            |              |              |              |              |              |
| 2015-03-25 12:00 | 1            | 1            | 1            | 1            | 1            | 1            |
| 2015-03-25 13:00 |              |              |              |              |              |              |
| 2015-03-25 14:00 | 1            | 1            |              |              |              |              |
| 2015-03-25 15:00 |              |              |              |              |              |              |
| 2015-03-27 11:00 |              |              |              |              |              |              |

Additional queries can be created and saved within this section of I.C.E.T.E.A. by right-clicking a folder and selecting New Query.

3. Close all open windows.

### Results:

To get a better understanding of what is going on in your BI environment, you used the I.C.E.T.E.A. utility to analyze the logs that have been generated. You first launched I.C.E.T.E.A. and imported the logs. You then drilled through on error messages to see more detail. Next you filtered on errors using query filters. Lastly you examined the pre-made queries that come supplied with the tool.

## Summary

- At the end of this module, you should be able to:
  - explore diagnostic tools and utilities for special task logging

© 2015 IBM Corporation



## Workshop 2: Examine URLs Available for Troubleshooting

As the administrator, you want to use URL commands to assist in troubleshooting your company's BI environment. You will review some URL commands, to become familiar with the tools available. Before beginning this workshop, ensure that both Dispatchers are running.

Within a browser window, explore the following commands and review their purpose:

- Get Dispatcher version: **http://vclassbase:9315/p2pd/servlet/gc**
- Get Dispatcher version: **http://vclassbase:9320/p2pd/servlet/gc**
- Determine if Content Manager is running:  
**http://vclassbase:9315/p2pd/servlet**
- Determine if Dispatcher ("pogo") is alive:  
**http://vclassbase:9315/p2pd/servlet/dispatch?b\_action=/dbg**
- Memory utilization:  
**http://vclassbase:9315/p2pd/servlet/dispatch?b\_action=/diagnostics**
- Get load balancing statistics. Can also use this to verify the configuration of an install:  
**http://vclassbase:9315/p2pd/servlet/dispatch/p2plbDiag**
- Pin requests for load balanced services to a specific Dispatcher (need to be logged in first):  
**http://vclassbase:9315/p2pd/servlet/dispatch/pin**  
You could use this to force select services to one dispatcher, to free up resources for another.
- See if the Certificate Server is responding:  
**http://vclassbase:9315/p2pd/servlet/dispatch/autoCAService**
- XML Parser Information:  
**http://vclassbase:9315/p2pd/servlet/dispatch/xts.diag**

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows. If you need more information to complete a task, refer to earlier demos for detailed steps.

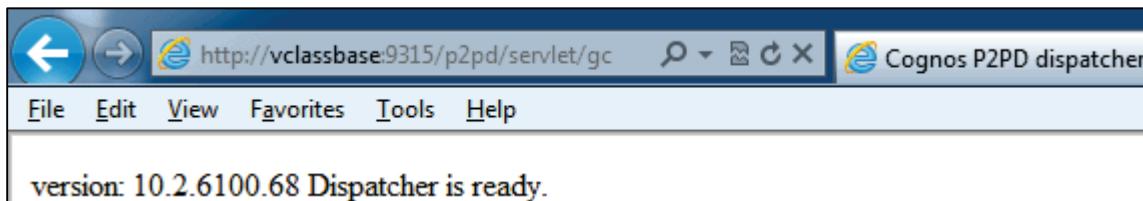
## Workshop 2: Tasks and Results

At the beginning of this workshop, both dispatchers are running.

### Task 1. Explore Useful URL commands.

- Launch **Internet Explorer**.
- Launch **Windows Explorer**, navigate to **C:\Edcognos\B5A19\09-Examine\_Additional\_Tools\_and\_Special\_Task\_Logging**, and then open **UsefulURLS.txt** in **Notepad**.
- From the **UsefulURLS.txt** file, copy the first URL command, to get the Dispatcher version, **http://vclassbase:9315/p2pd/servlet/gc**, switch to **Internet Explorer**, paste the URL command in the **Address** box, and then press **Enter**.

The version of the dispatcher is displayed, and the state is ready. There is another instance of a dispatcher in your environment. You can easily redirect the URL command to the second dispatcher.



- In the **Address** box of **Internet Explorer**, change **9315** to **9320** and then press **Enter**.
- Repeat for the next URL command **http://vclassbase:9315/p2pd/servlet**.

- For each of the remaining URL commands in the text file, repeat to view the results.

Some of the results appear as follows:

- [http://vclassbase:9315/p2pd/servlet/dispatch?b\\_action=/diagnostics](http://vclassbase:9315/p2pd/servlet/dispatch?b_action=/diagnostics)

```
<?xml version="1.0"?>
- <Diagnostics>
  <Dispatcher capacity="1.0" port="9315" host="vclassbase"/>
  <Memory Total_memory_in_the_JVM="805306.368 KB" Amount_of_free_memory_in_the_system="529169.344 KB"/>
  <CM port="9315" host="vclassbase"/>
</Diagnostics>
```

- <http://vclassbase:9315/p2pd/servlet/dispatch/p2plbDiag>

```
This dispatcher is: vclassbase:9315/p2pd/servlet/dispatch
GUID=2015-03-16-20.22.44.255878
Using CM: vclassbase:9315/p2pd/servlet
Current time: Mar 25, 2015 3:37:48 PM EDT
Configured dispatchers and services:
this dispatcher is : "/configuration/dispatcher[@name='http://vclassbase:9315/p2pd']"
this dispatcher is in serverGroup : "Group 64"

All known dispatchers:
  Dispatcher: /configuration/dispatcher[@name='http://vclassbase:9315/p2pd']
    name: vclassbase:9315/p2pd
    dispatcherID: 2015-03-16-20.22.44.255878
    capacity: 1.0
    SSL: false
    serverGroup: Group 64
    loadBalancingMode: weightedRoundRobin
    edition: 10.2.6100.68
    Services:
      Service name: repositoryService disabled? false
      Service name: dispatcher disabled? false
```

- <http://vclassbase:9315/p2pd/servlet/dispatch/xts.diag>

<i>XML Transformation Service</i>	
<b>XTS</b>	
<b>version</b>	10.2.6100.5
<b>template</b>	../templates/ps
<b>SAX Parser</b>	
<b>factory class</b>	org.apache.xerces.jaxp.SAXParserFactoryImpl
<b>parser class</b>	org.apache.xerces.jaxp.SAXParserImpl
<b>XSLT Transformer</b>	
<b>factory class</b>	jd.xml.xslt.trax.TransformerFactoryImpl
<b>transformer class</b>	jd.xml.xslt.trax.TransformerImpl

For some commands, you will be prompted to authenticate. Use the LDAP\_Dev namespace, admin/Education1 credentials for logging in.

If you encounter Firewall Security Rejection for any of the URLs, it may be due to the current environment setup. One possible solution is within IBM Cognos Configuration, set all of the URI settings to fully qualified URI's; an example of Gateway URI: `http://machine-name.domain-name.com:88/ibmcognos/cgi-bin/cognos.cgi`. The classroom environment is not on a domain, but you are encouraged to try this in your environment if you are on a domain and encounter this issue.

Question: For the Content Manager URL, do you see any differences between the states of each?

Answer: One is Running, the other is Running as standby.

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

*IBM Director of Licensing*  
IBM Corporation  
North Castle Drive  
Armonk, NY 10504-1785  
U.S.A.

**The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:** INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

