IBM® Tivoli® Software

Maximo Asset Management – Version 7.1 Releases

Maximo Cognos Integration Guide

Document Version 6

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Maximo Report Designer/Architect

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REVISION HISTORY

Date	Version	Revised By	Comments
April 2014	6	PD	Updates include (1) requirement for users to sign out and close browser session before another user signs in on page 25 and 46 (2) reformatting
October 2011	5	PD	Updates include (1) Details on property setting, mxe.rest.webappurl. (2) Updated reference materials section
August 2011	4	PD	Updates include (1) Additional information on Cognos Report Studio and Query Studio Reports (2) Updated restriction query on page 74 to use unique id column
February 2011	3	PD	Updates include (1) Additional screenshots and details on Meta Data publishing process (2) Additional architecture diagrams in overall and report integration sections
August 2010	2	PD	additional information to Conditions and Limitations Section on page 33
December 2009	1	PD	Initial Release

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Overview

In Maximo® Base Services 7.1.1.6 Release, an IBM Cognos ® Reporting Integration is enabled. This integration extends the current suite of reporting tools that Maximo enables into a deeper level of Strategic Reporting.

The Maximo Cognos Integration uses the Cognos Reporting Products of Developers Studio, Query Studio, Cognos Connection and Framework Manager Products. It does not utilize the Cognos Analytics Products of Transformer, Analysis Studio, Event Studio and Metric Studio.

The Maximo Cognos integration will enable Maximo Clients to further analyze all the powerful Maximo data that exists so they can make the best business decisions possible for their unique business environments. It enables users to see the Cognos Report from within the Maximo Applications, and display the Cognos Report within the Cognos Portal via a silent log-in.

This integration also enables the automatic creation of a metadata layer. The metadata layer is used by developers to create Enterprise or Ad Hoc Reports. It consists of pre-joined tables, so developers can quickly and consistently develop reports versus the traditional method of creating complex sql statements for each individual report.

To enable the metadata layer in the Maximo Cognos Integration, Cognos packages will be based off of the Maximo Applications, like Assets, Work Order or Job Plans. These packages will be created from within the Maximo Object Structure Application, and published to Cognos Content Store thru Framework API's.

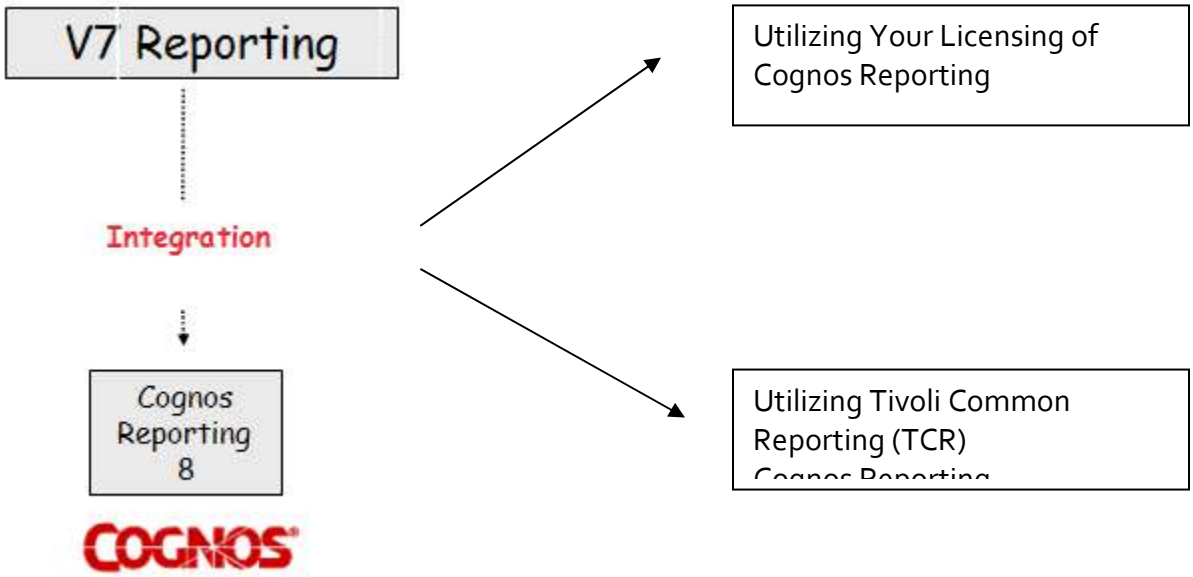
By utilizing the Maximo Object Structure Application, a client's object customizations can be incorporated. This is a key design point as the vast majority of our clients extend the Maximo database. Therefore, their unique database customizations will be picked up dynamically – so clients do not have to expend significant time and efforts in determining individual table relationships needed for package creation.

This document will start by describing the metadata layer enablement. It then will delve into the details on the integration, including its security and how it is enabled, and how to create Cognos Reports to execute from within the Maximo Framework.

Finally, it is the assumption of this document that the client will already have the Maximo Cognos Integration installed. Details on the Maximo Cognos Install can be found in the document 'MaximoCognosIntegrationInstall_Instructions.doc' referenced at the end of this guide.

Enabling the Maximo Cognos Integration

You can enable the Maximo Cognos Integration in two different ways - either through your existing license of Cognos Reporting, or through your utilization of Tivoli Common Reporting. Each of these options is detailed below.



Corporate Licensing of Cognos Reporting

If you have, or are in process of procuring Cognos Reporting Licenses, you can enable the Maximo Cognos Integration through the use of these licenses. This scenario enables you to utilize your corporate reporting licenses within the Maximo framework. You can then begin creating reports against the powerful Maximo data, along with any other relevant corporate data you may have.

Utilization of Tivoli Common Reporting

Beginning with the Maximo 7.1.1.6 Release, you are entitled to Tivoli Common Reporting (TCR) Asset Management and Performance Management Release, or TCR 1.3. TCR 1.3 includes the Cognos 8.4 Reporting Products. TCR is designed for Tivoli Cross Product reporting. It utilizes the Tivoli Integrated Portal (TIP) as its platform basis.

Utilizing TCR 1.3 enables you a license to the Cognos 8.4 Reporting products for Tivoli Software Products only. If you wish to use Cognos 8.4 Reporting against other databases in your corporate environment, you would need to acquire additional licensing. Additionally, please note platform restrictions with TCR noted on page 35 below.

1. The details in the document below apply to either of these scenarios – whether you have enabled the integration with your Corporate Cognos Reporting License, or thru the utilization of Tivoli Common Reporting.

Cognos Report Types

With the Maximo Cognos Integration, you can create two types of reports, which are

1. Enterprise Reports using the Cognos Developers Studio Tool
2. Ad Hoc Reports using the Cognos Query Studio Tool

The Cognos Developers Studio tool is intended for report developers to create enterprise, complex reports for users to access on a continuing daily, weekly or monthly basis. These reports require resources to design, develop, test and administer them, so they can be a significant investment for you. Developer Studio reports can be accessed by users from either the Maximo environment, or from the Cognos Portal.

The Cognos Query Studio Tool is intended for either report developers or business users to create 'on the fly' ad hoc reports to meet their individual business or project needs. These ad hoc reports do not have the same level of resource investment as Developer Studio reports – as one user designs, develops and tests his own reports for his own needs.

Query Studio reports can only be accessed from the Cognos Portal. This occurs because these reports are focused on enabling the business user's ability to quickly create these reports – without any additional code manipulation to include maximo application information.

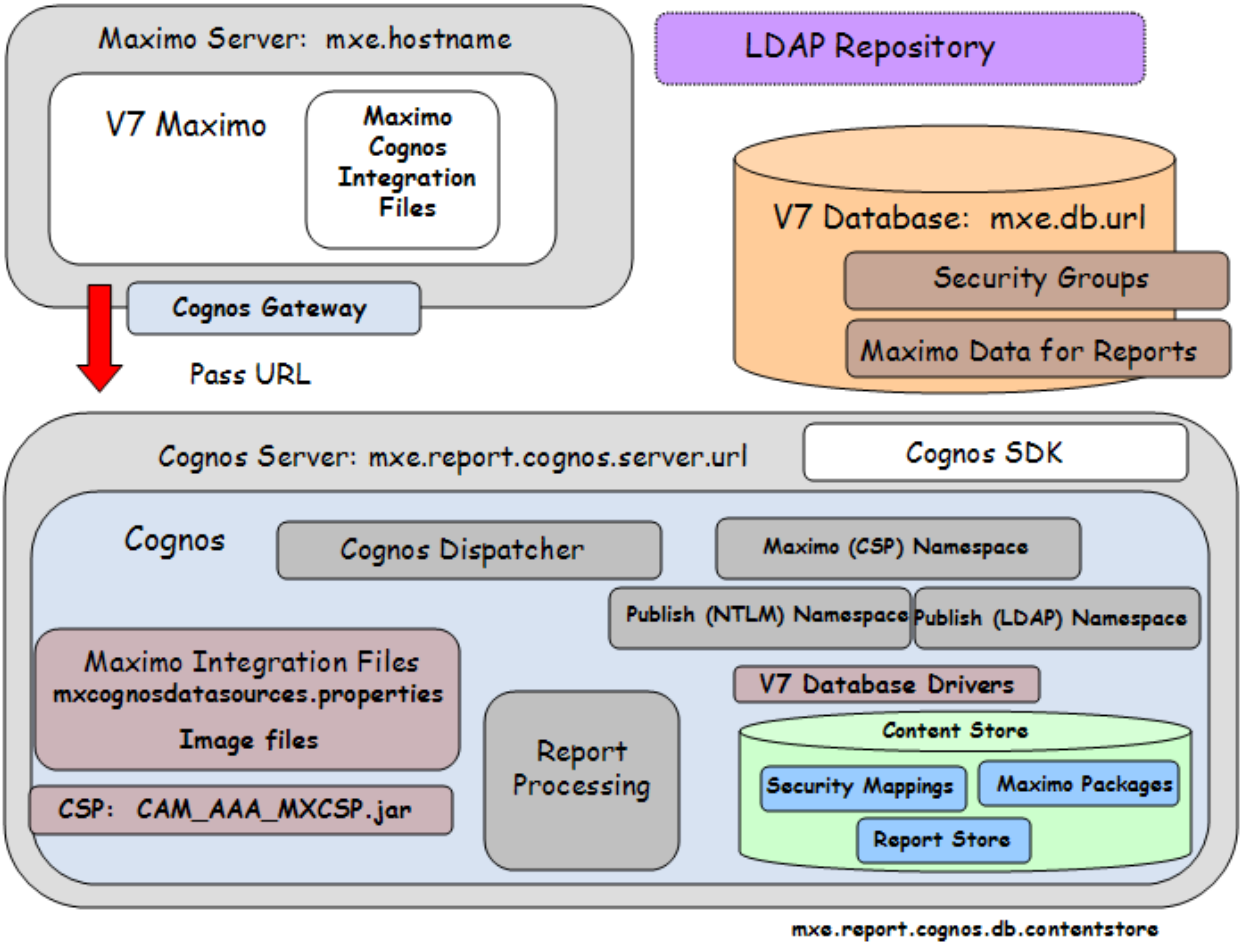
Additional details on how you can create and enable Cognos reports created in both Report Studio and Query Studio for Maximo data are contained in the sections titled 'Developing Maximo Cognos Reports in Report Studio' and 'Developing Maximo Cognos Reports in Query Studio' located later in this guide.

Integration Architecture

This document will detail how the Maximo-Cognos integration works in the key areas of (1) Cognos Meta Data package creation (2) Report Execution and (3) Security Authorization. Throughout the guide, a top level view of the architecture will be highlighted so you can become familiar with the terminology and product components involved.

Your architecture may vary from the diagram shown below depending on factors including your security group repository, your application server and whether or not TCR is utilized in your environment.

However, the key components this document highlights include the namespaces, content store components, and security group repositories. These components were installed or configured in the Maximo Cognos Installation Guide.



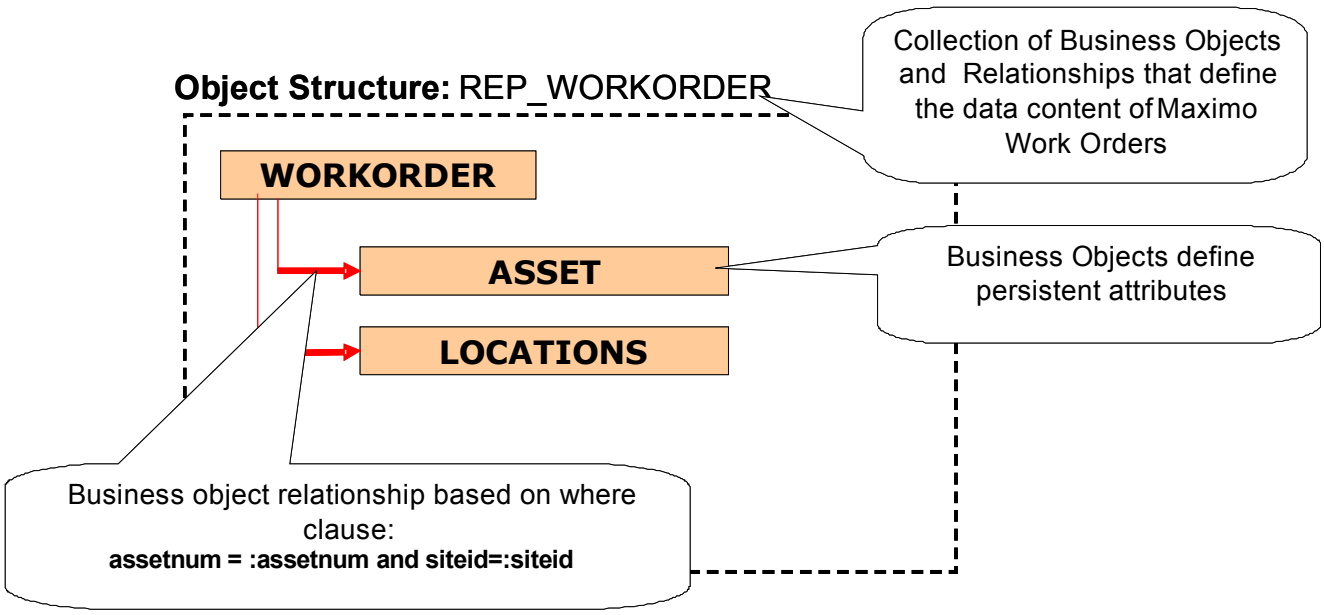
Maximo Metadata

To support integration with the Cognos 8 reporting tools, Maximo enables the ability to create and publish Cognos Metadata Packages. These metatdata packages include data models, based on Maximo Report Object Structures, that enable developers to create Cognos reports.

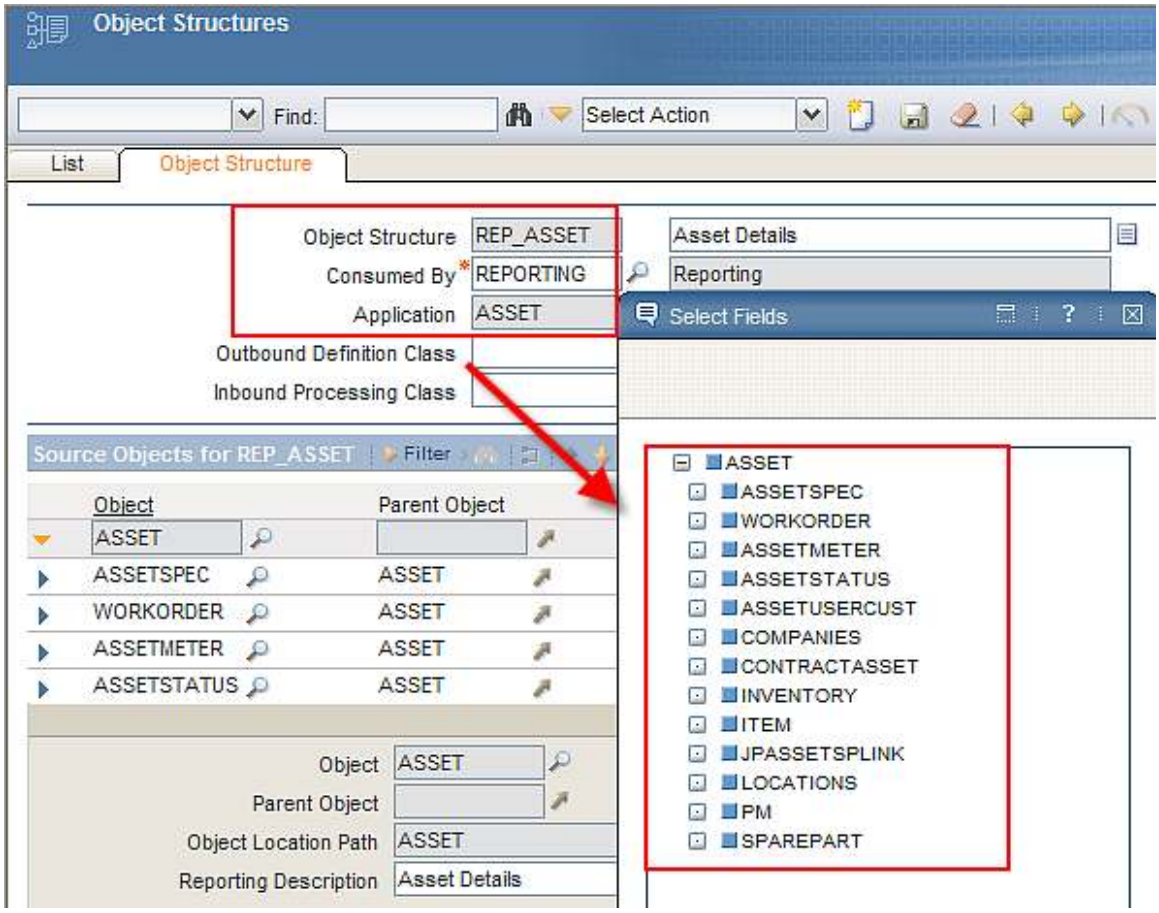
The Maximo metadata, when published to Cognos 8, defines the tables, attributes and relationships that Cognos will use to reference Maximo data content. The metadata encapsulates the complexity of Maximo's physical database definition, and exposes a user friendly view of Maximo's business objects definitions.

Report Object Structures

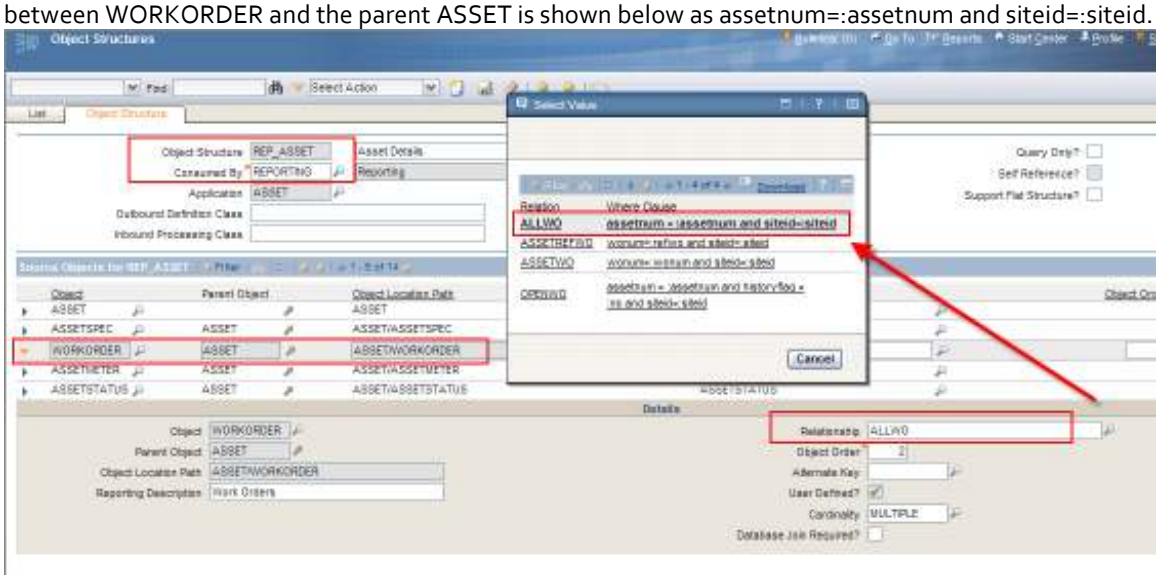
Maximo metadata models are based on Report Object Structures (ROS). ROS provide a collection of the business objects, and their associated relationships, that define Maximo's functional components (ex. Assets, Workorders, etc.).



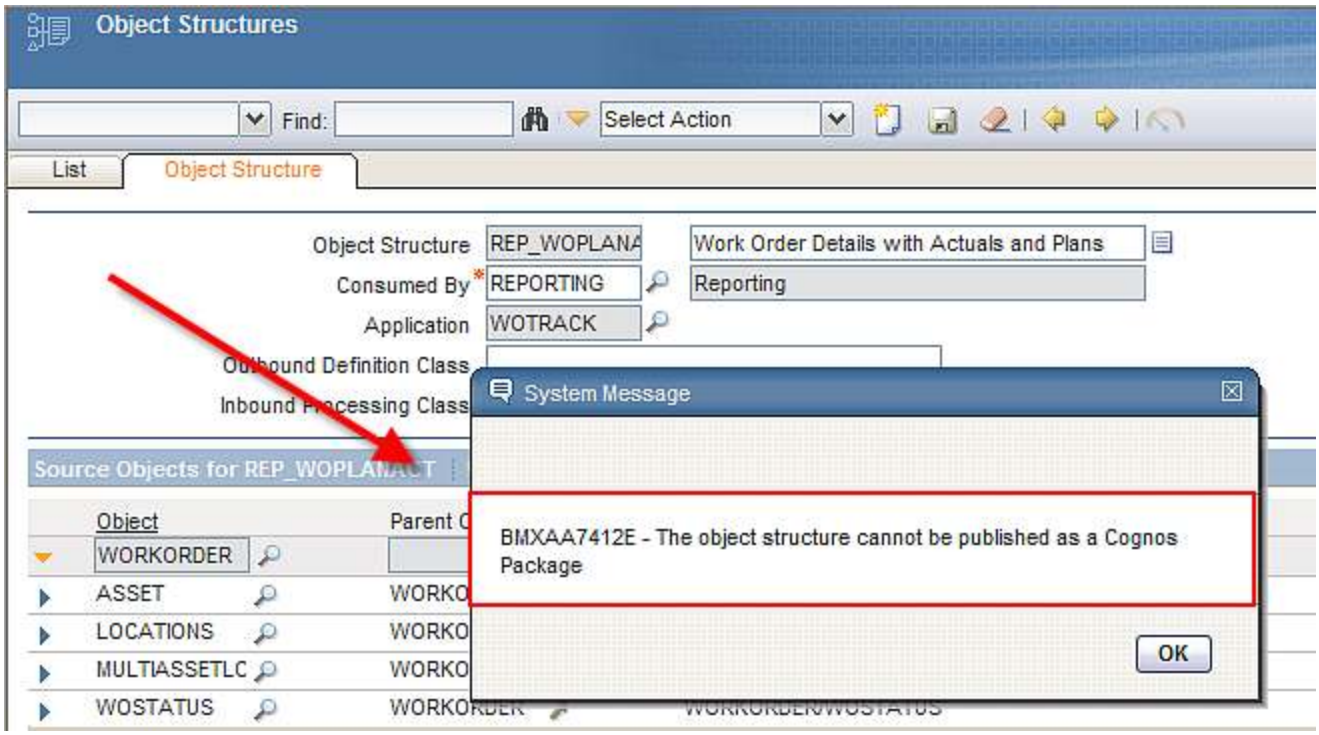
ROS are created in Maximo's Object Structure Application. The Business objects they use define data attributes available for Maximo reporting functionality. The Business Objects are created in parent child hierarchies, whose relationships are defined via maxrelationships. The maxrelationship is an SQL statement which specifies the attributes establishing the parent child relationship. The example below shows the Asset ROS, with the parent object of Asset, along with thirteen children objects.



The Cognos Metadata publishing process implemented in Maximo Base Services 7.1.1.6 fix pack ONLY SUPPORTS column to column relationships (simple relationships). An example of a simple relationship between WORKORDER and the parent ASSET is shown below as assetnum=:assetnum and siteid=:siteid.



However, maxrelationships defined by SQL statements that include filters and/or sub-selects are considered complex relationships. ROS containing complex relationships are not supported for Cognos Package Publishing. If you try to publish these, a metadata generation processing exception will occur and the publishing process will be interrupted. An example of this is shown below.



Examples of complex relationship include:

assetnum=:assetnum and siteid=:siteid and linetype not in (select value from synonymdomain where domainid='LINETYPE' and maxvalue='TOOL')

To resolve complex relationships, you can create new maxrelationships only utilizing COLUMN TO COLUMN relationships.

ROS Notes:
1. The current list of Report Object Structures available from Maximo out of the box that are not currently supported for Cognos include:

REP_ASSETACTIVITY
REP_WOPLANACT

2. Details on how to create your own, unique Report Object Structures for Cognos Package Publishing are contained at the end of this document.

Maximo Metadata Model

To properly represent Maximo metadata (business objects, relationships, and physical tables), the Maximo metadata publishing process creates a "layered data model" based on two different relational model views:

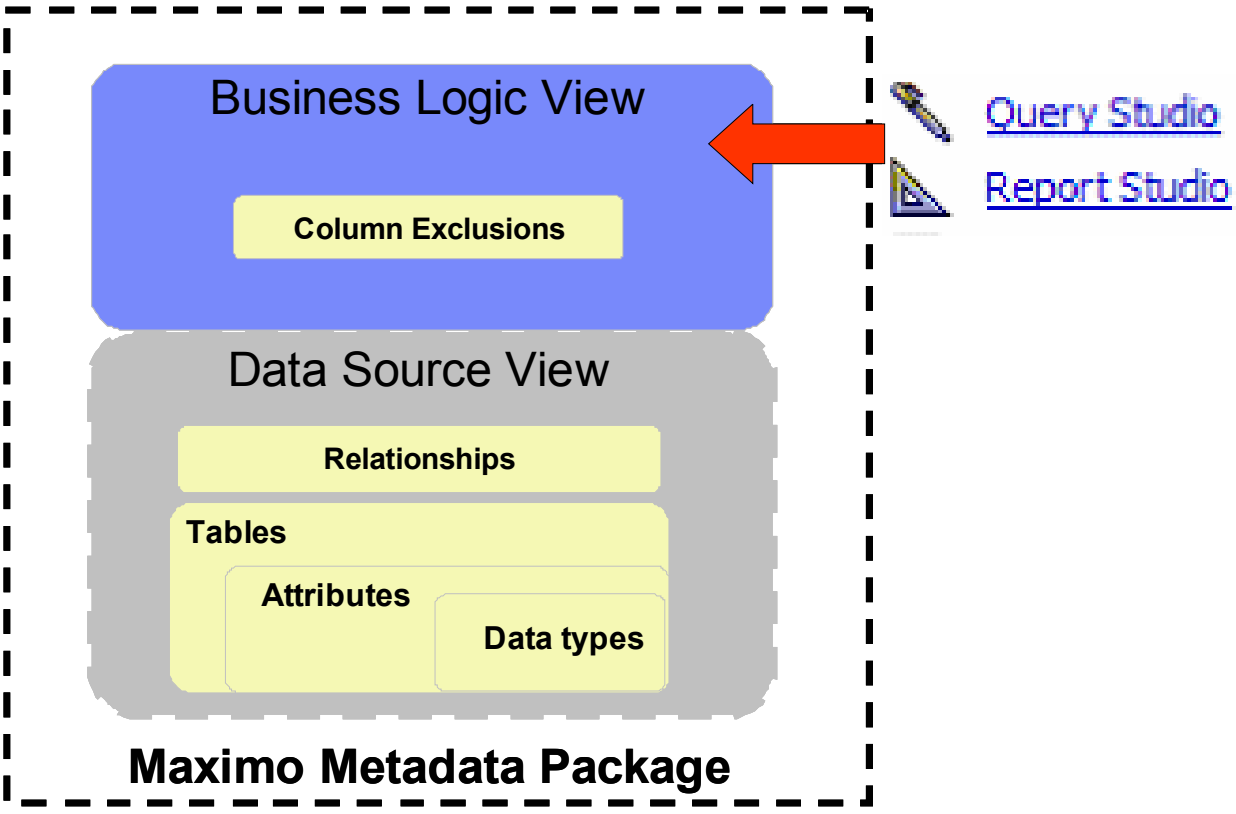
Data Source View

The Data Source View will provide a logical representation of the physical tables and views defined in the Maximo database. Cognos Source Query subjects are used to represent these data structures in the Maximo metadata model

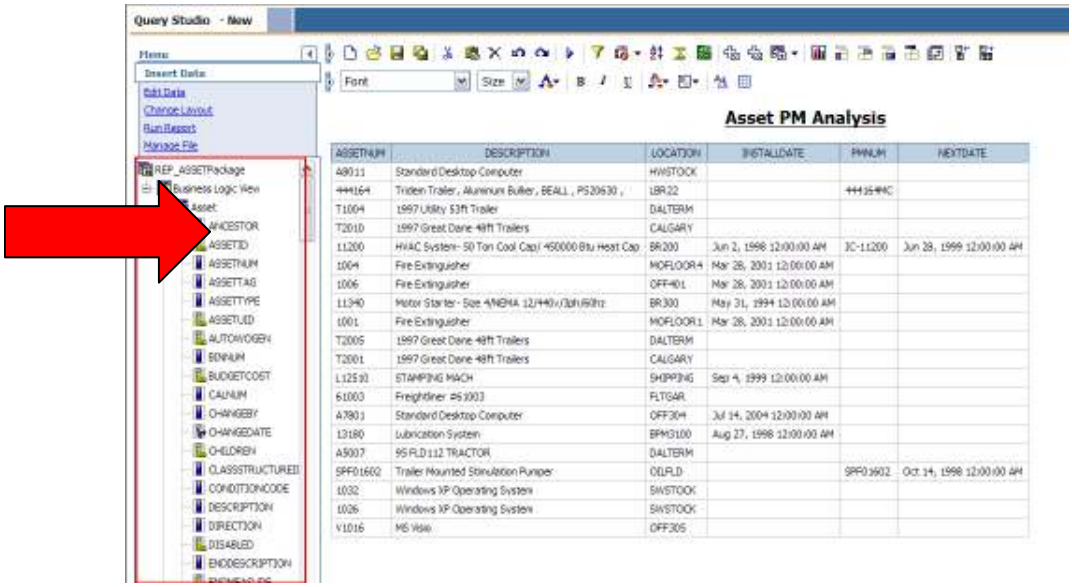
Business Logic View

The Business Logic View is responsible of providing all the necessary metadata for Query Studio and Report Studio application consumption.

The Business Logic View provides a layer of abstraction between business logic and their underlying data sources. In Maximo, business logic is represented by business objects and data sources are represented by the table and view components defined at the database level.



The Business Logic View is used by the developer within the Cognos Query Studio or Report Studio to create reports. This is shown in the screenshot below of Query Studio where the Business Logic View is expanded on the left hand side of the page.

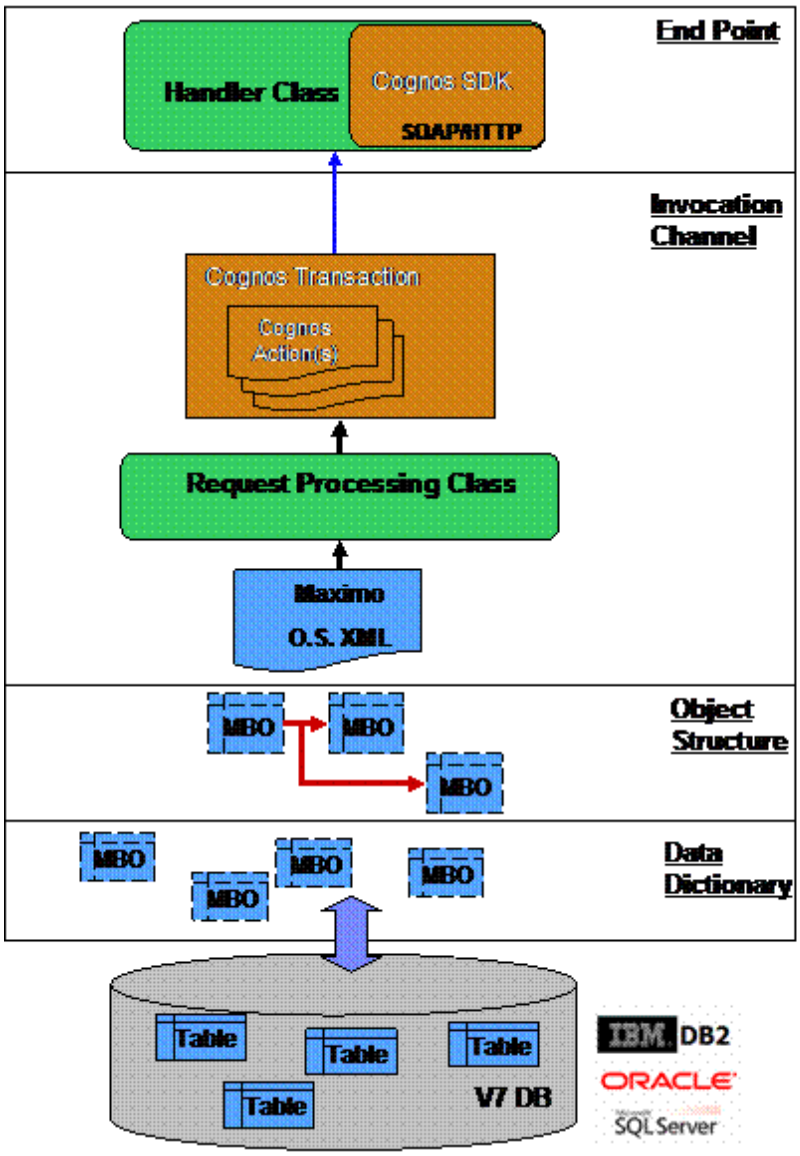


ASSETNUM	DESCRIPTION	LOCATION	INSTALLDATE	PMNUM	NEXTDATE
A8011	Standard Desktop Computer	HWSTOCK			
444164	Triden Trailer, Aluminum Bulker, BEALL , PS20630 ,	LBR22		444164MC	
T1004	1997 Utility 53ft Trailer	DALTERM			
T2010	1997 Great Dane 48ft Trailers	CALGARY			
11200	HVAC System- 50 Ton Cool Cap/ 450000 Btu Heat Cap	BR200	Jun 2, 1998 12:00:00 AM	3C-11200	Jun 28, 1999 12:00:00 AM
1004	Fire Extinguisher	MOFLOOR4	Mar 28, 2001 12:00:00 AM		
1006	Fire Extinguisher	OFF401	Mar 28, 2001 12:00:00 AM		
11340	Motor Starter- Size 4/NEMA 12/440v/3ph/60hz	BR300	May 31, 1994 12:00:00 AM		
1001	Fire Extinguisher	MOFLOOR1	Mar 28, 2001 12:00:00 AM		
T2005	1997 Great Dane 48ft Trailers	DALTERM			
T2001	1997 Great Dane 48ft Trailers	CALGARY			
L12510	STAMPING MACH	SHIPPING	Sep 4, 1999 12:00:00 AM		
61003	Freightliner #61003	FLTSAR			
A7801	Standard Desktop Computer	OFF304	Jul 14, 2004 12:00:00 AM		
13180	Lubrication System	BPM3100	Aug 27, 1998 12:00:00 AM		
A5007	95 FLD112 TRACTOR	DALTERM			
SPF01602	Trailer Mounted Stimulation Pumper	OILFLD		SPF01602	Oct 14, 1998 12:00:00 AM
1032	Windows XP Operating System	SWSTOCK			
1026	Windows XP Operating System	SWSTOCK			
V1016	MS Visio	OFF305			

Metadata Publishing Process

General Architecture

The Metadata Publishing Process is an end-to-end synchronous integration scenario that enables Maximo to communicate ROS data structures to Cognos 8 BI Server.



Notes on Process

1. The Maximo metadata is the same as the Business Objects defined in the Maximo Data Dictionary

2. Object Structures provide "functional" context to a group of Business Objects. (ex Purchasing, Work orders etc)

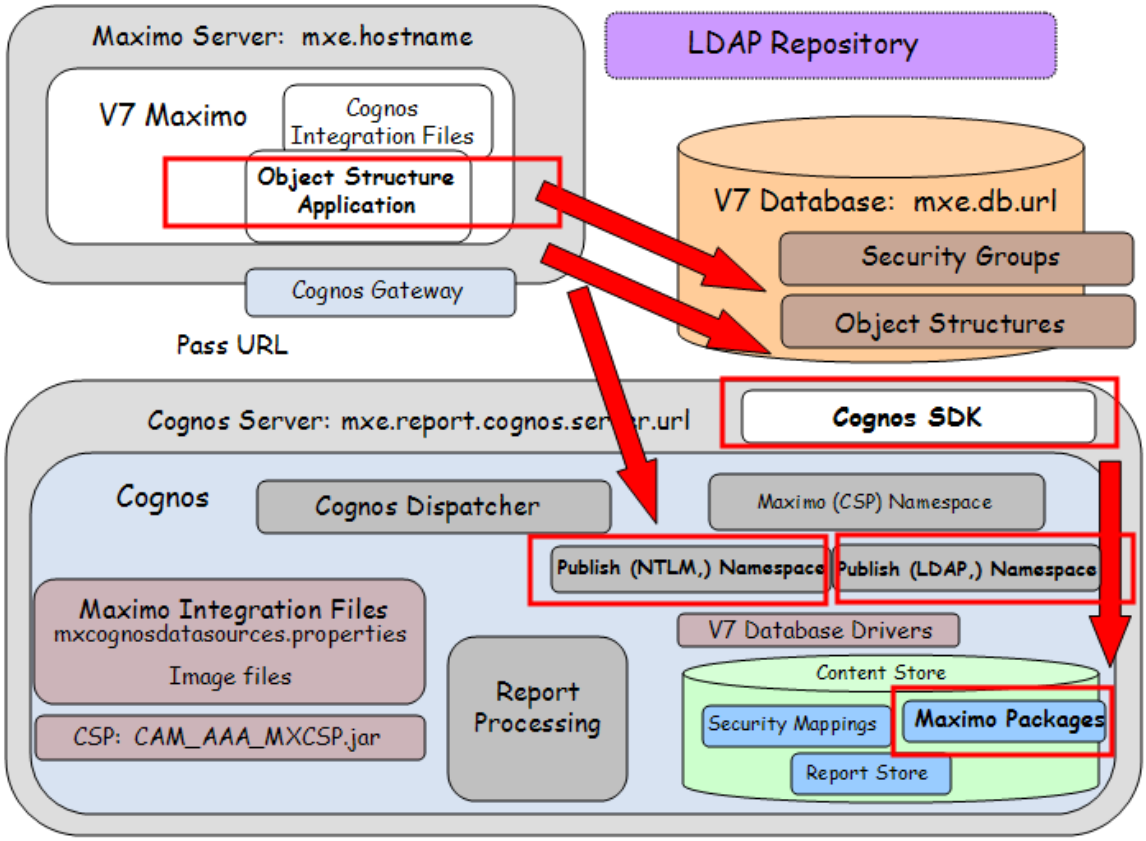
3. Invocation Channels support the required processing functionality to convert an object structure into a Cognos Transaction. Invocation Channels leverage End Point connectivity logic to request the execution of a service in a context other than Maximo.

4. End Points support the required processing functionality to leverage Cognos SDK libraries to invoke metadata modeling services available via Cognos Business Intelligence Server. The referred services provide a standard interface for Cognos metadata creation and package publishing.

Metadata Publishing Process Execution

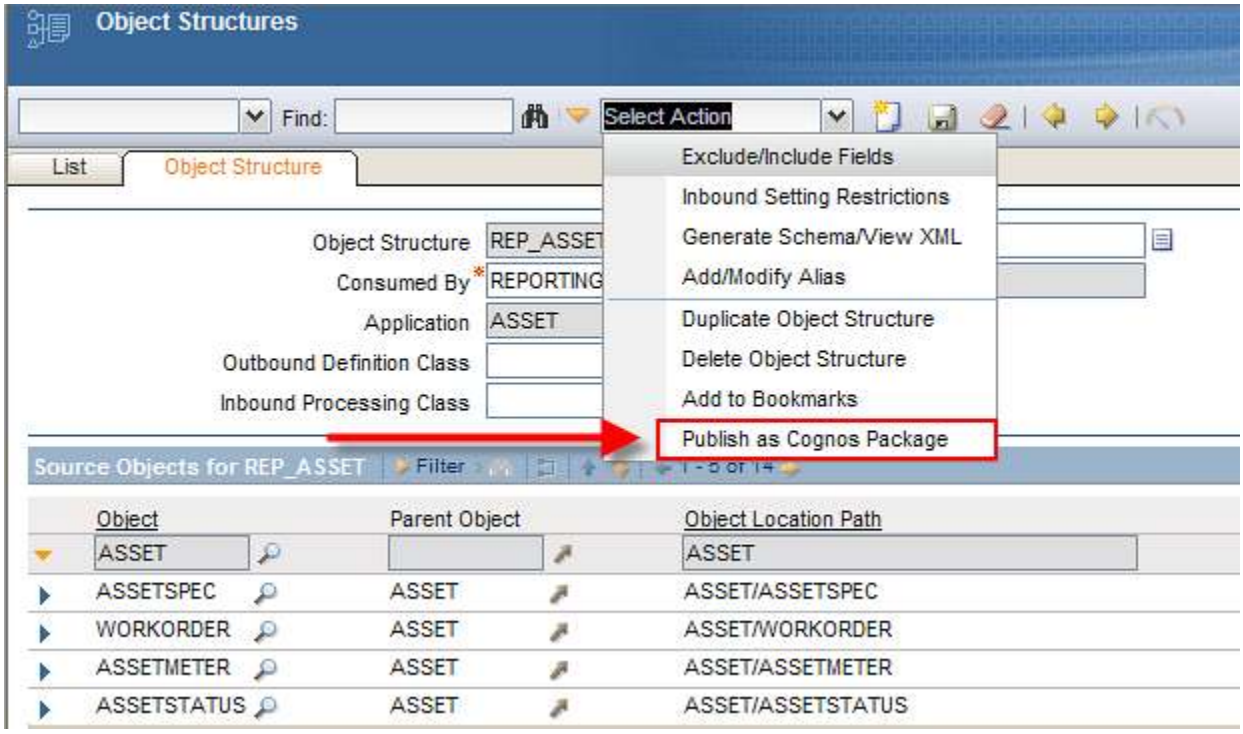
The Cognos meta data publishing process is initiated from the Object Structure application in the Version 7 environment. As noted above, information on the specific ROS is taken from the Maximo database, and utilizing either the NTLM or LDAP namespace, the Cognos SDK is invoked to enable the publishing of the package. The end result of this process is the Cognos packages in the Cognos Content store.

This process is shown at a top level in the diagram below.



Metadata Publishing Process

The Metadata Publishing process described above is initiated from a Select Menu Action option in the Object Structure Application. This menu option is available out of the box to the System Administrator security group only. If other security groups require access to the 'Publish as Cognos Package' action, you will need to grant them access in the Security Group application.

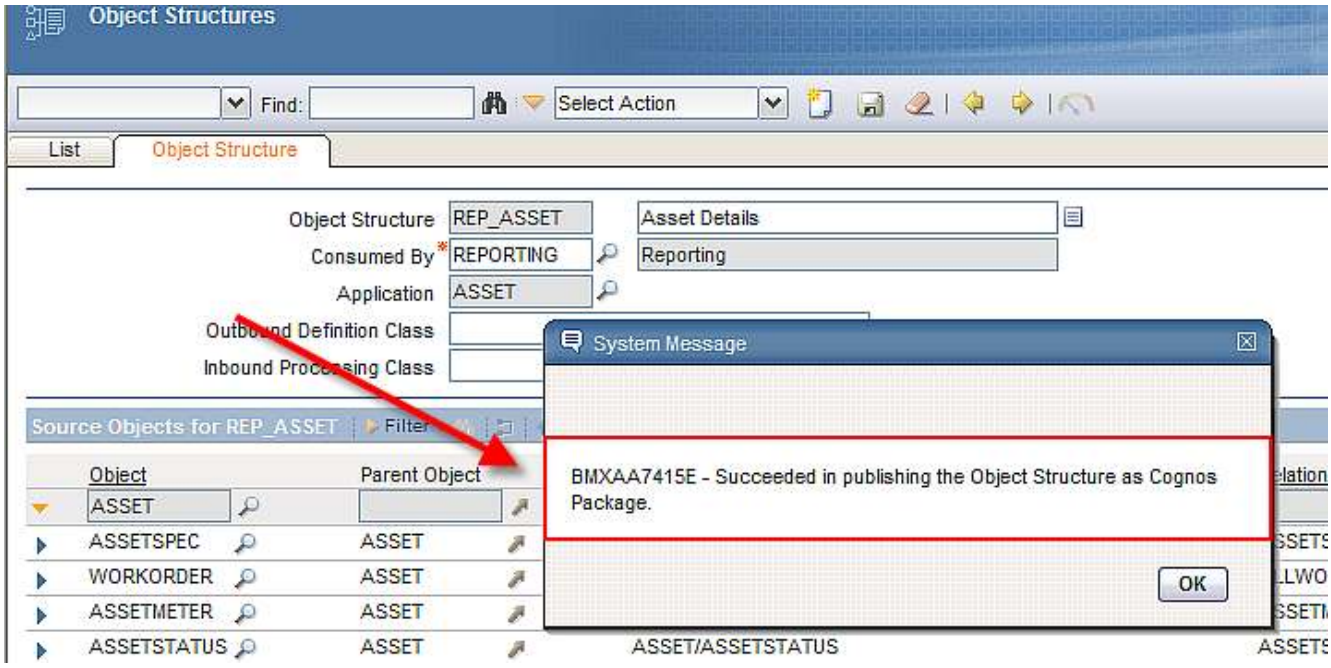


When you select the Publish as Cognos package action, the execution of the REP_MXINTOBJECT invocation channel is initiated.

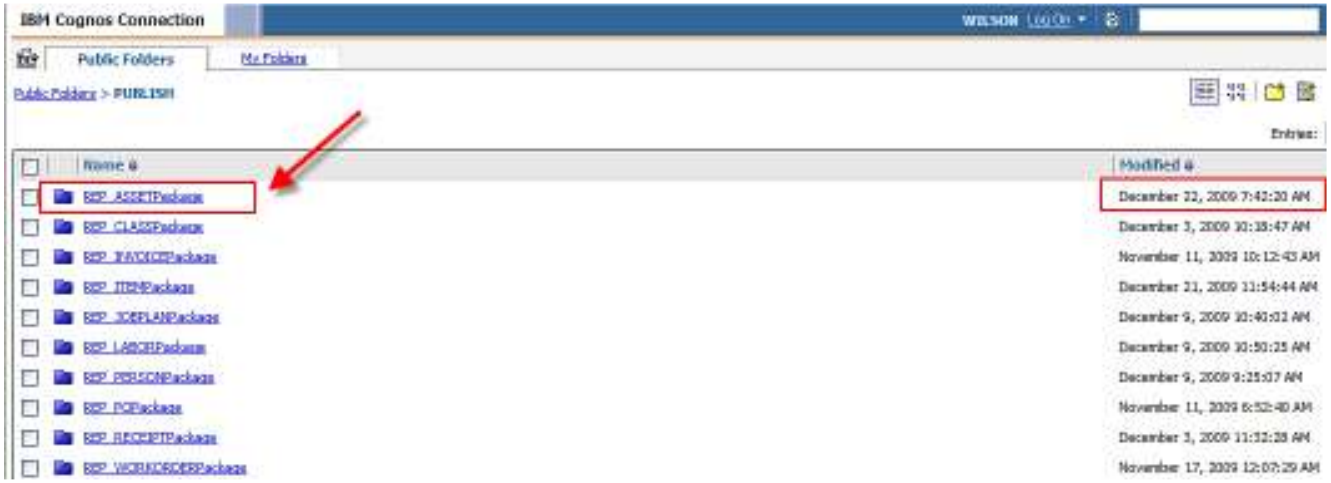
The invocation channel integration component implements all the processing logic to generate and publish Maximo metadata as Cognos package. Specifically, the actions are:

1. Maximo metadata associated with the selected ROS is identified
2. ROS data structure is created
3. ROS data structure is transformed to Maximo metadata
4. Maximo metadata is translated into Cognos Actions
5. Cognos transaction is created
6. Cognos transaction is published to Cognos 8 BI server as a package within the Cognos Content Store

The time required to publish the package will vary depending on your particular environment and the size of the package being created. At the end of the publishing process a dialogue will display the result of the publishing process:

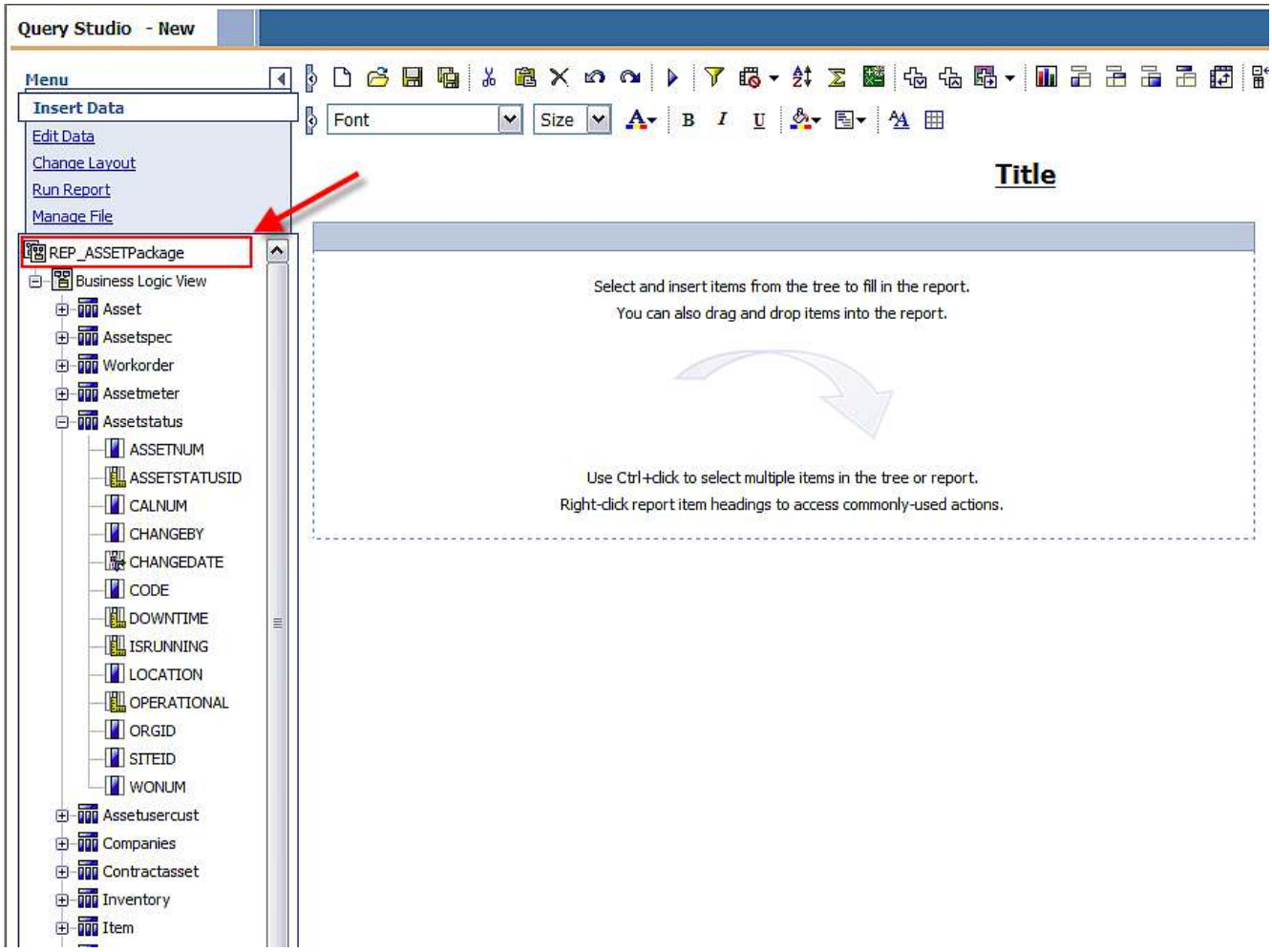


After the publishing process is successfully executed, you will be able to work with the published metadata package via Cognos 8 reporting tools. The metadata package will be uniquely identified in the Cognos 8 Content Store by the following naming convention: <ObjectStructureName>Package



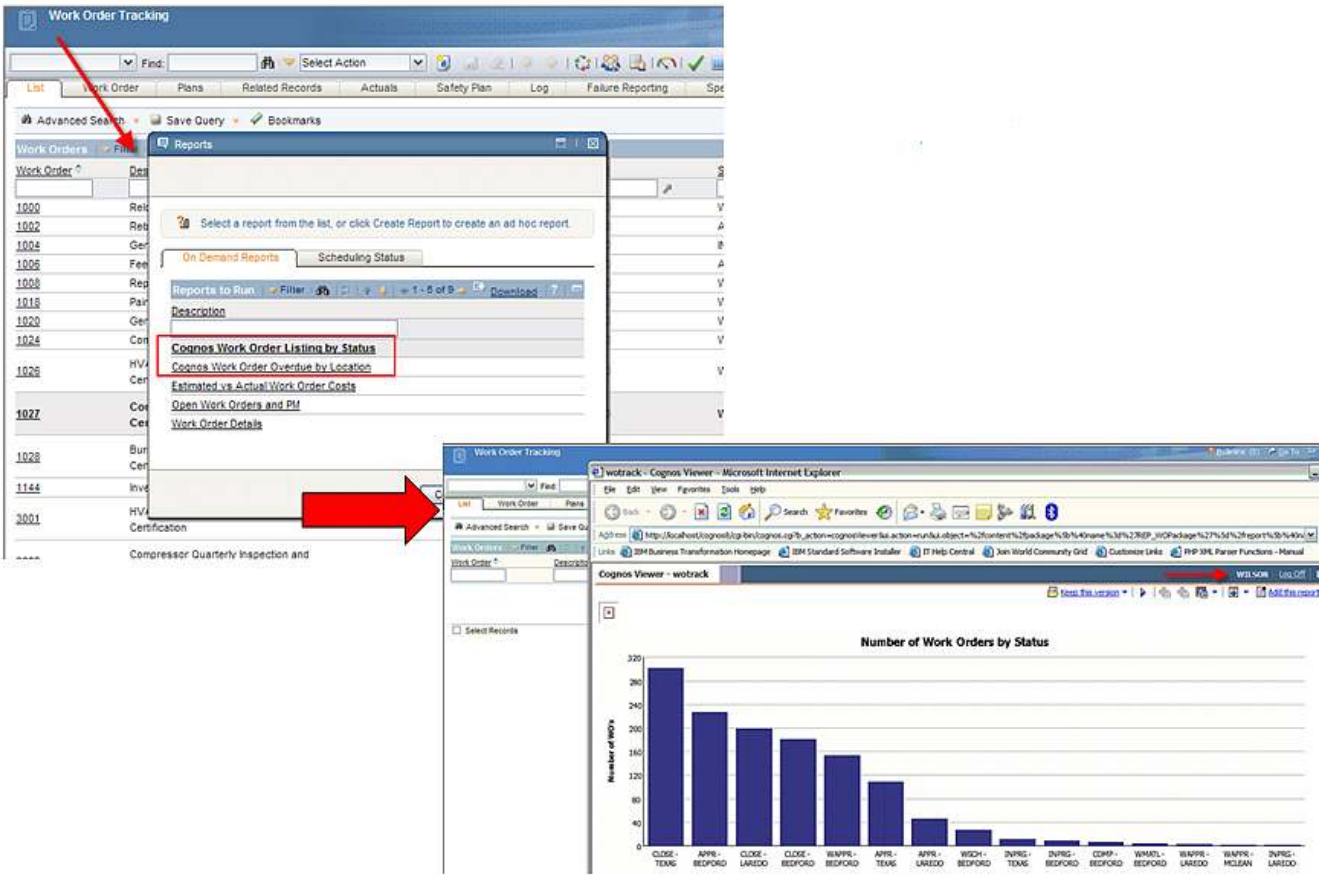
When displayed in Query Studio or Report Studio, the metadata content presents the same data structure configuration as its corresponding Reporting Object Structure with the Objects, Attributes and their corresponding relationships.

In the screenshot below, the REP_ASSET ROS has been published to Cognos. When it is opened in Cognos Query Studio, its objects including – Asset, Assetspec, Workorder, Assetmeter and Assetstatus - display. Then, when one of the Objects is expanded, (Assetstatus) its attributes display.



Maximo Cognos Report Integration

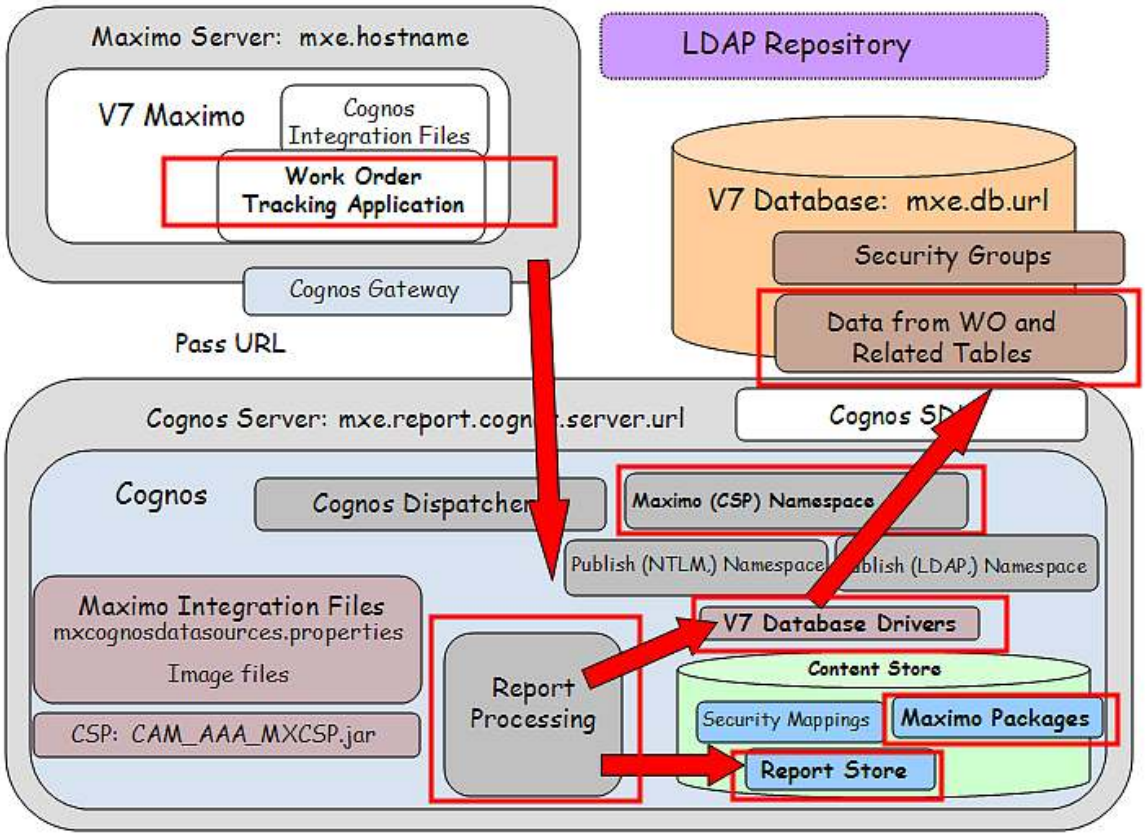
The Maximo Cognos Report Integration enables users to see the Cognos Report from within the Maximo Applications, pass the dynamically selected record set to the configured Cognos Report, and display the Cognos Report within the Cognos Portal via a silent log-in.



Report Execution Architecture

When the user selects a Cognos report to run from within the Maximo framework, after the authentication process, the Cognos report engine will be invoked. Cognos then executes the report by taking a combination of the report data from the Maximo 7 database, along with the report design and meta data package from the Cognos Content Store.

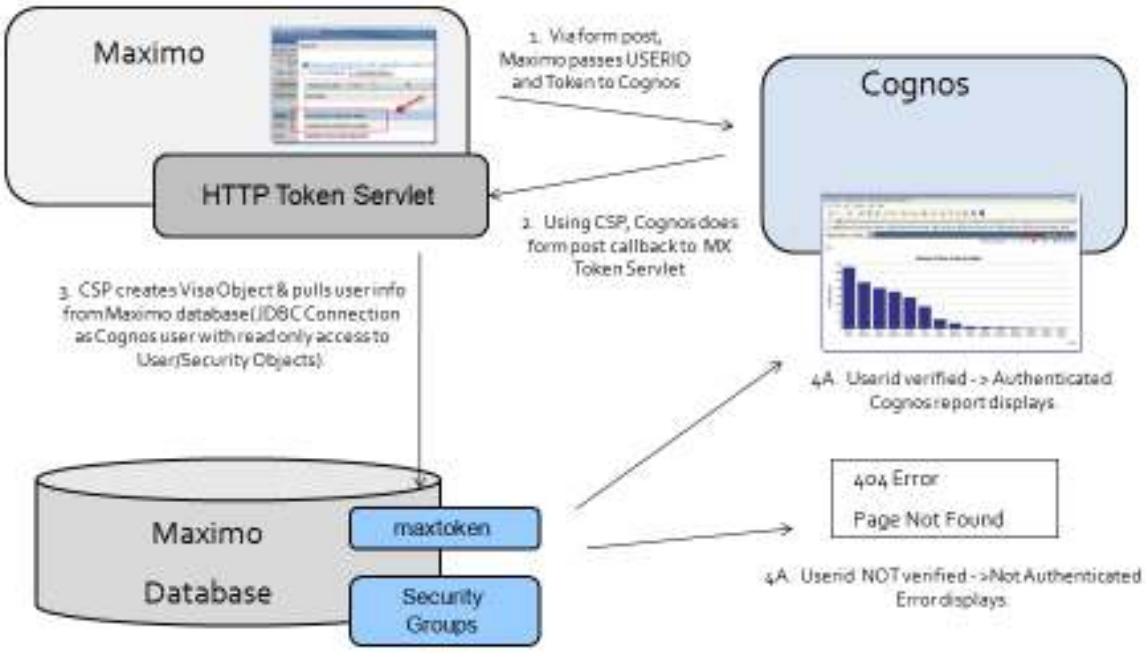
This process is shown at a top level in the diagram below.



Security Authentication

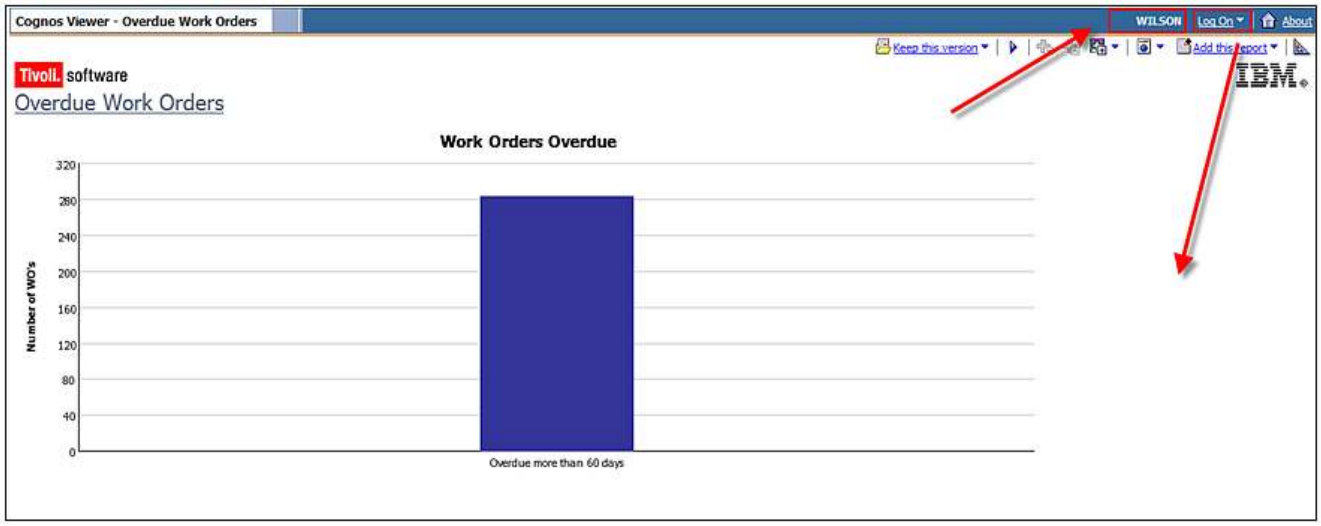
To enable a silent login from Maximo to the Cognos Server, security authentication is required. This authentication is required to either a Maximo Database where the security groups are held or a LDAP Repository

In order for Cognos to authenticate the Maximo User, the username and a randomly generated token will be passed to Cognos. Cognos will authenticate the token via an HTTP Servlet within the Maximo application. This process is shown in the diagram below.



Once the Maximo User is authenticated, they will be silently logged into Cognos as the Maximo User and a separate Cognos Browser Session will appear.

Depending on the Cognos environment that is enabled, the user may also see a separate 'Log On' on the top right hand side of the Cognos Portal. This occurs if there are Multiple Namespaces (in addition to the Maximo Namespace) that the User can Sign into. This may be a common occurrence in client sites with multiple namespaces for multiple uses of the Cognos Products.

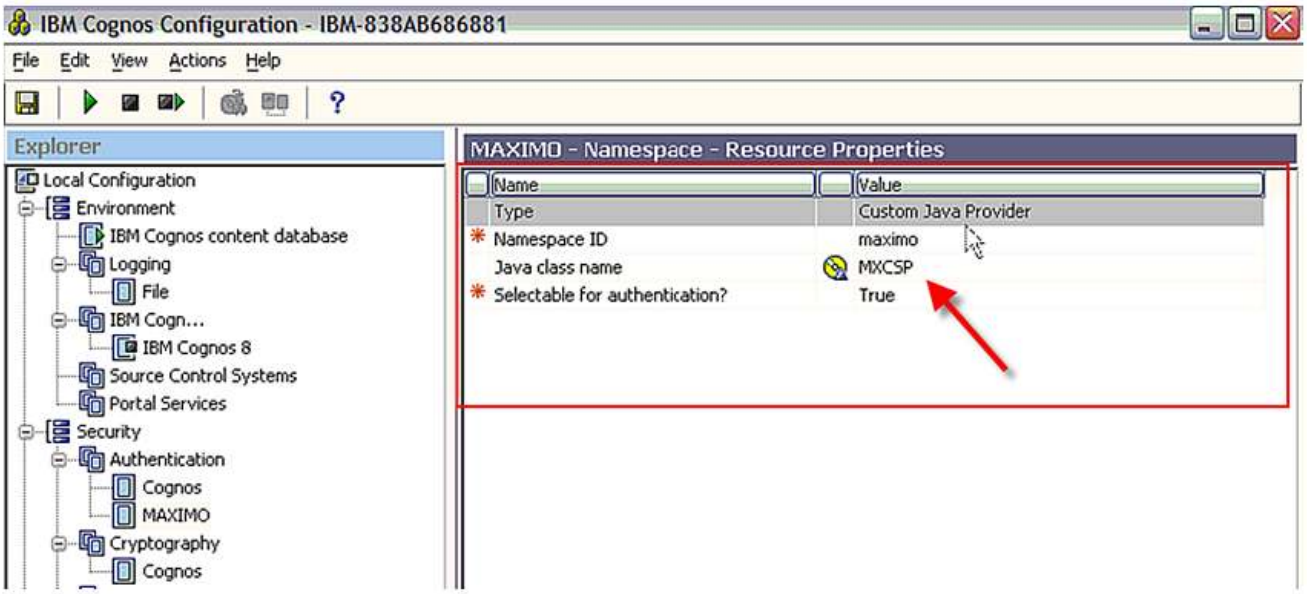


Notes:

1. If multiple users are utilizing the same machine, they must sign out of Maximo and close the Maximo browser session before another user signs into Maximo.
    - If you re-use the existing Maximo browser session as a different Maximo user to execute a Cognos report - the data shown in the resulting Cognos report may not correspond to the current logged in user.

CSP: Custom Security Provider

The key component to the Security Authentication process is the CSP, or Custom Security Provider. The CSP is enabled during the Maximo and Cognos integration installation by (1) Copying CSP Jar File from Maximo to Cognos and (2) Associating a new Maximo Namespace to the CSP.

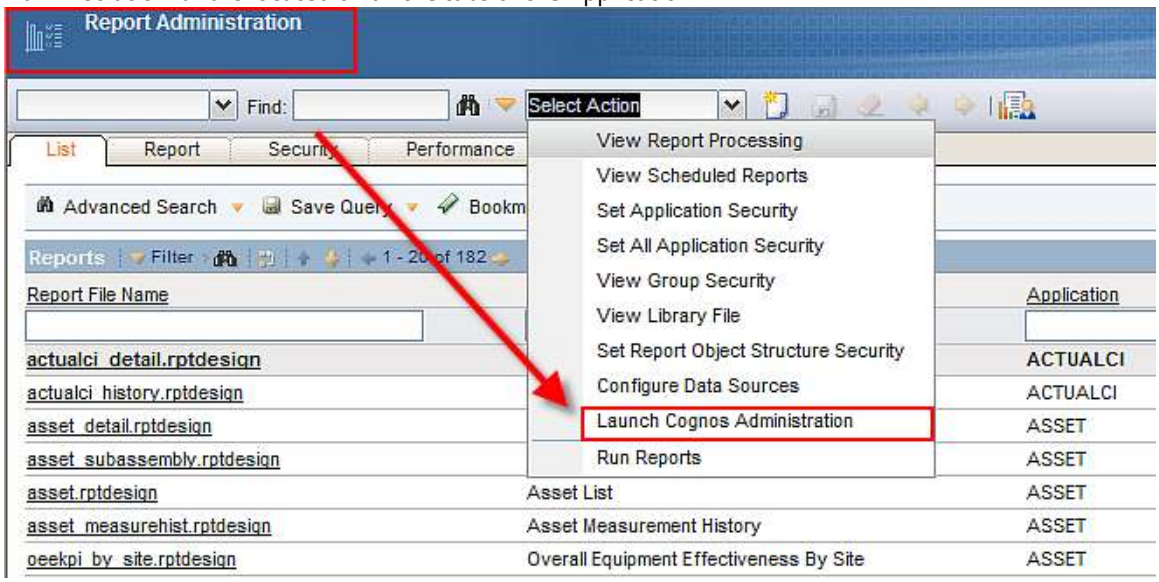


Maximo Report Administration Cognos Access

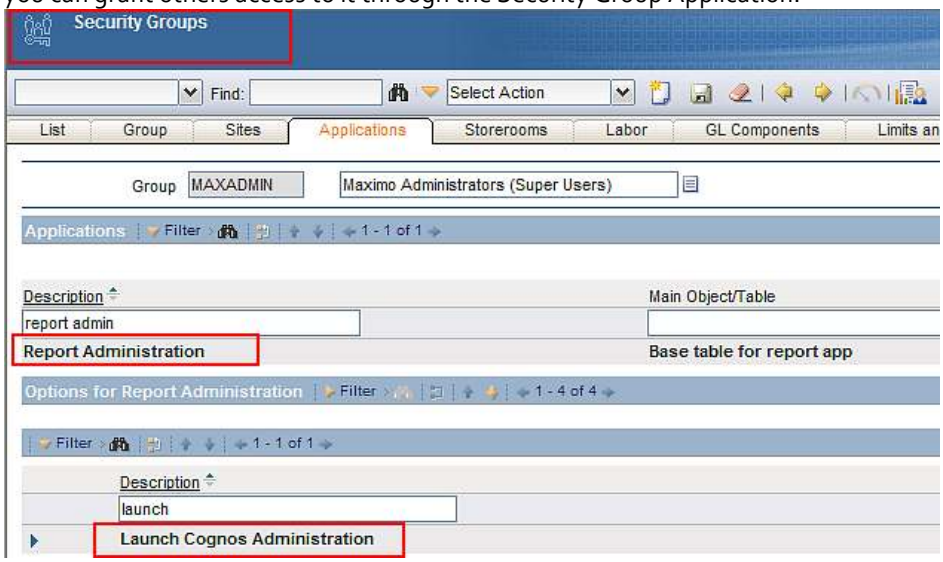
The Maximo Cognos User authentication process is dependant on the user starting in a V7 Application and launching to Cognos. This is required so the userid and token can be passed to Cognos.

However, an Administrator may need to access Cognos Administration to set security authorization for the Maximo Security Groups. If the administrator logs in directly to the Cognos Administration Tools and tries to access the Maximo Security Groups he will receive an error because he can not be authenticated.

To resolve this, an action is available to directly launch into the Cognos Administration Tool (Cognos Connection) from the Report Administration Application. This action is called 'Launch Cognos Administration' and is located on all the tabs of the Application.

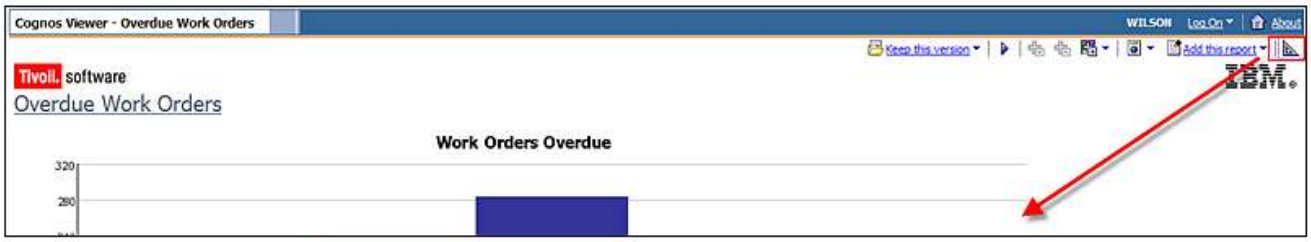


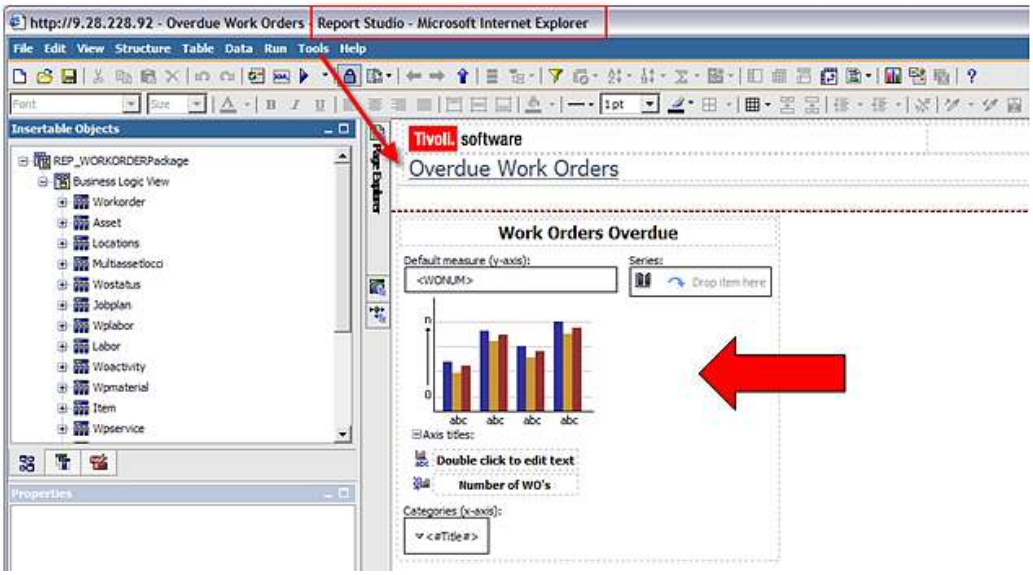
By default, the MAXADMIN group is the only security group with access to it out of the box. However, you can grant others access to it through the Security Group Application.



Security Authorization

Once the Maximo user is silently logged into the Cognos Portal, he may be able to perform other actions within Cognos. For example, within the Cognos Portal, User Wilson can access the right most icon highlighted by the arrow. Once he does this, the report opens up in Cognos Report Studio, and the user could modify it.



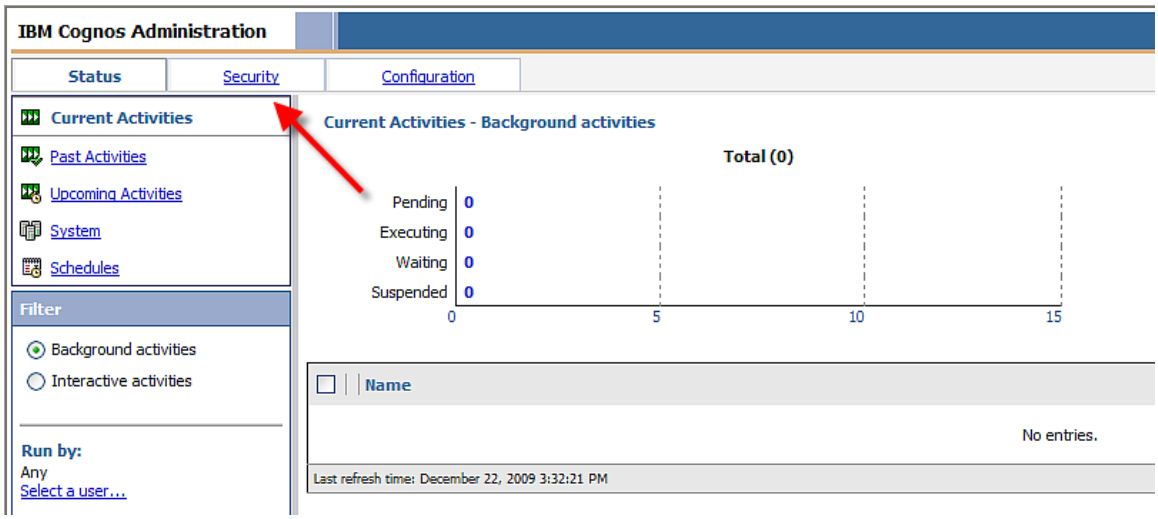


Enabling users the ability to modify reports is great in many cases, however, this type of functionality access must be configurable to determine who should and should not have access to it.

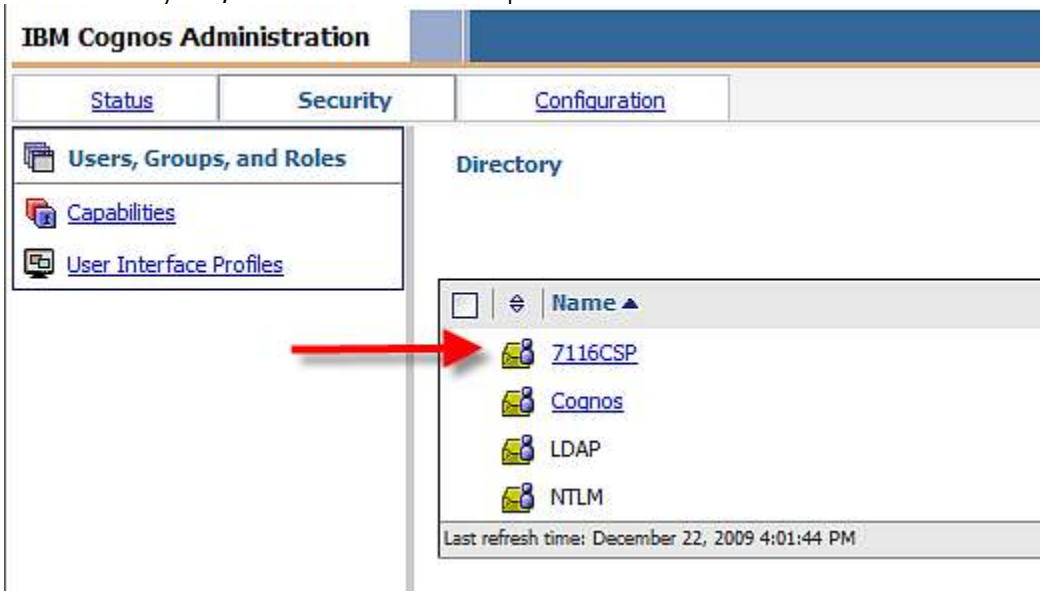
Security Authorizations determine which actions the user has access to within Cognos. Security Authorizations for Cognos Privileges are set in the Cognos Administration Application at the Maximo Security Group Level. These privileges define what Reports the user can execute from the Cognos Portal and what privileges (ex. Only view reports, or actually have the ability to create, modify and delete reports) the user has. To enable this, the Cognos Administrator needs to specify what privileges each Security Group has in the Cognos Administration Tool.

To enable setting of the Security Authorizations, Cognos will use a JDBC Connection to the Maximo database to retrieve the Maximo Security Group and User information. This JDBC Connection is made using the values defined in the mxcognosdatasources.properties file located in <maximo>\reports\cognos\c8\configuration. This enables the Maximo Security Groups to be set once in Maximo, and enables Cognos to retrieve that information dynamically.

To set the Security Authorizations, the Administrator would launch to the Cognos Administration Tool from Maximo's Report Administration Application. He is brought to the page below, and then clicks on the Security Tab.

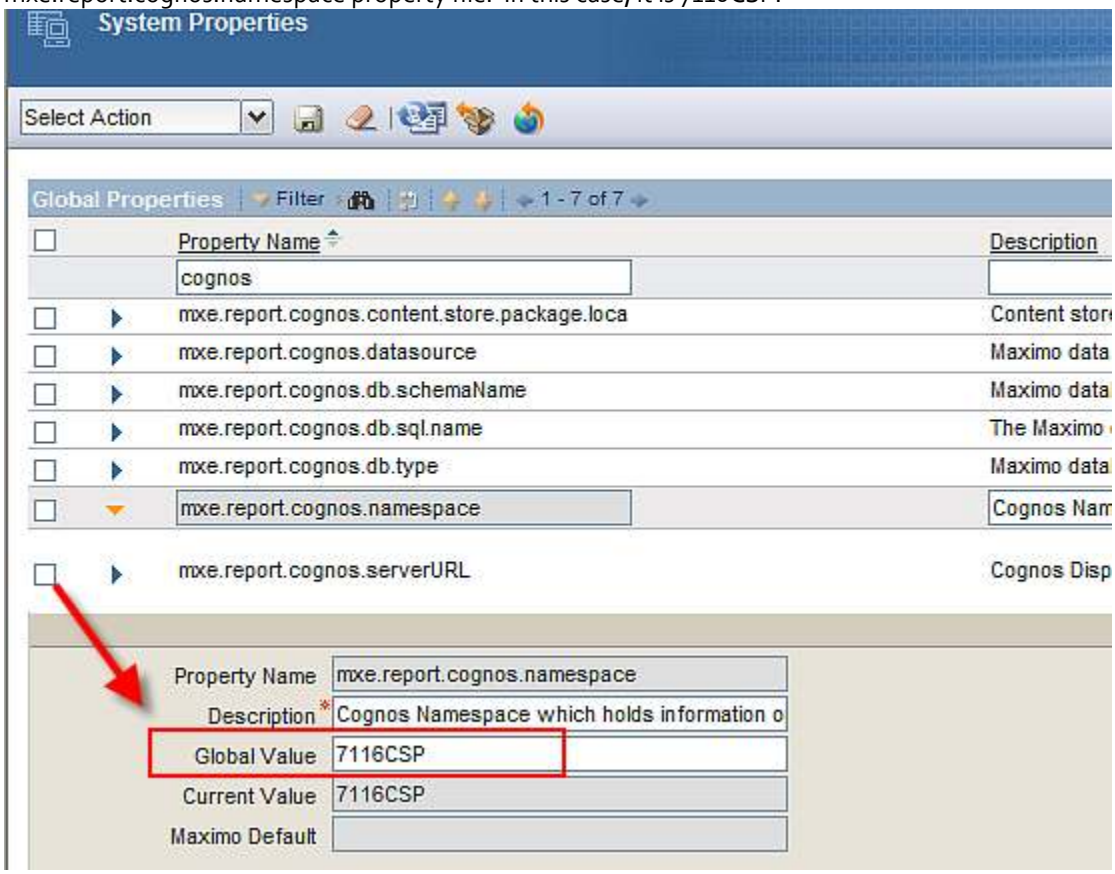


On the Security Tab, he sees the list of Namespaces that have been enabled.

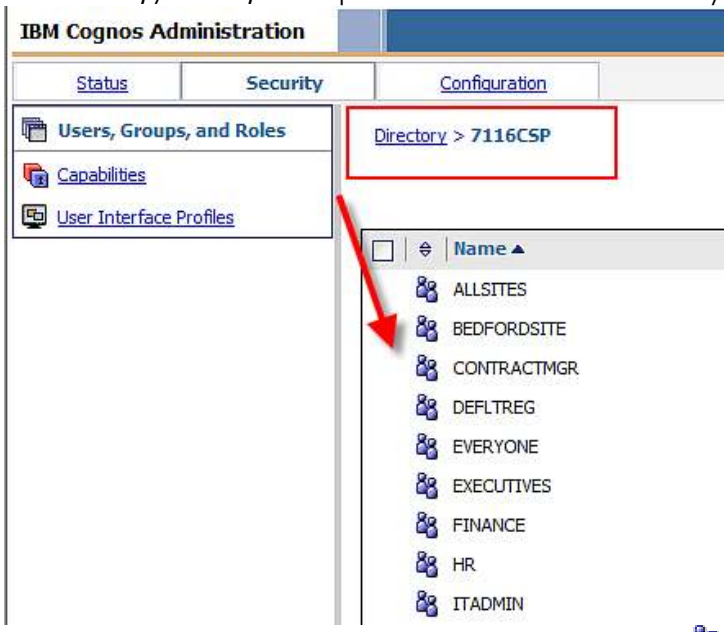


Maximo Namespace

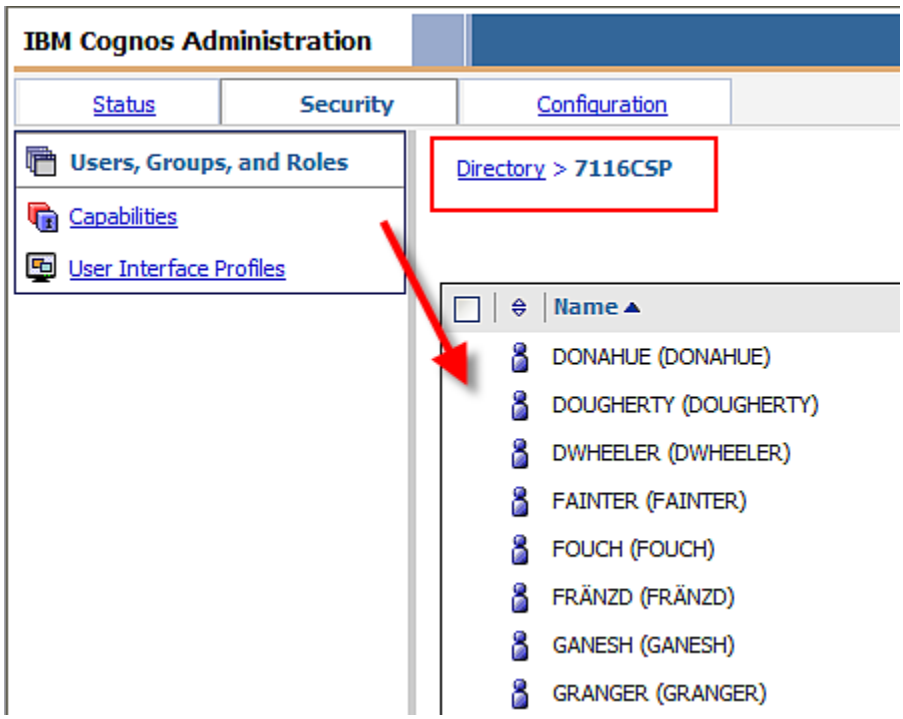
The Admin selects the Maximo Namespace that has been configured via the mxe.report.cognos.namespace property file. In this case, it is 7116CSP.



The Maximo, 7116CSP, Namespace contains the Maximo Security Groups



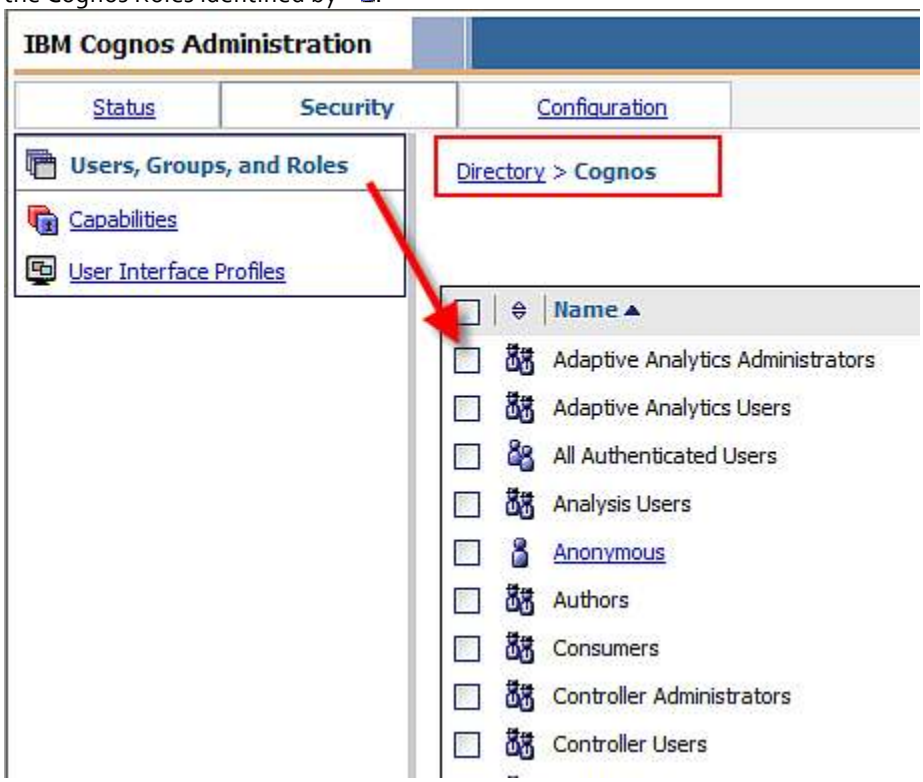
It also contains users. Notice Security Groups are identified as and Users are identified as .


IBM Cognos Administration
Status
Security
Configuration
Users, Groups, and Roles
Capabilities
User Interface Profiles
Directory > 7116CSP
Name
DONAHUE (DONAHUE)
DOUGHERTY (DOUGHERTY)
DWHEELER (DWHEELER)
FAINTER (FAINTER)
FOUCH (FOUCH)
FRÄNZD (FRÄNZD)
GANESH (GANESH)
GRANGER (GRANGER)

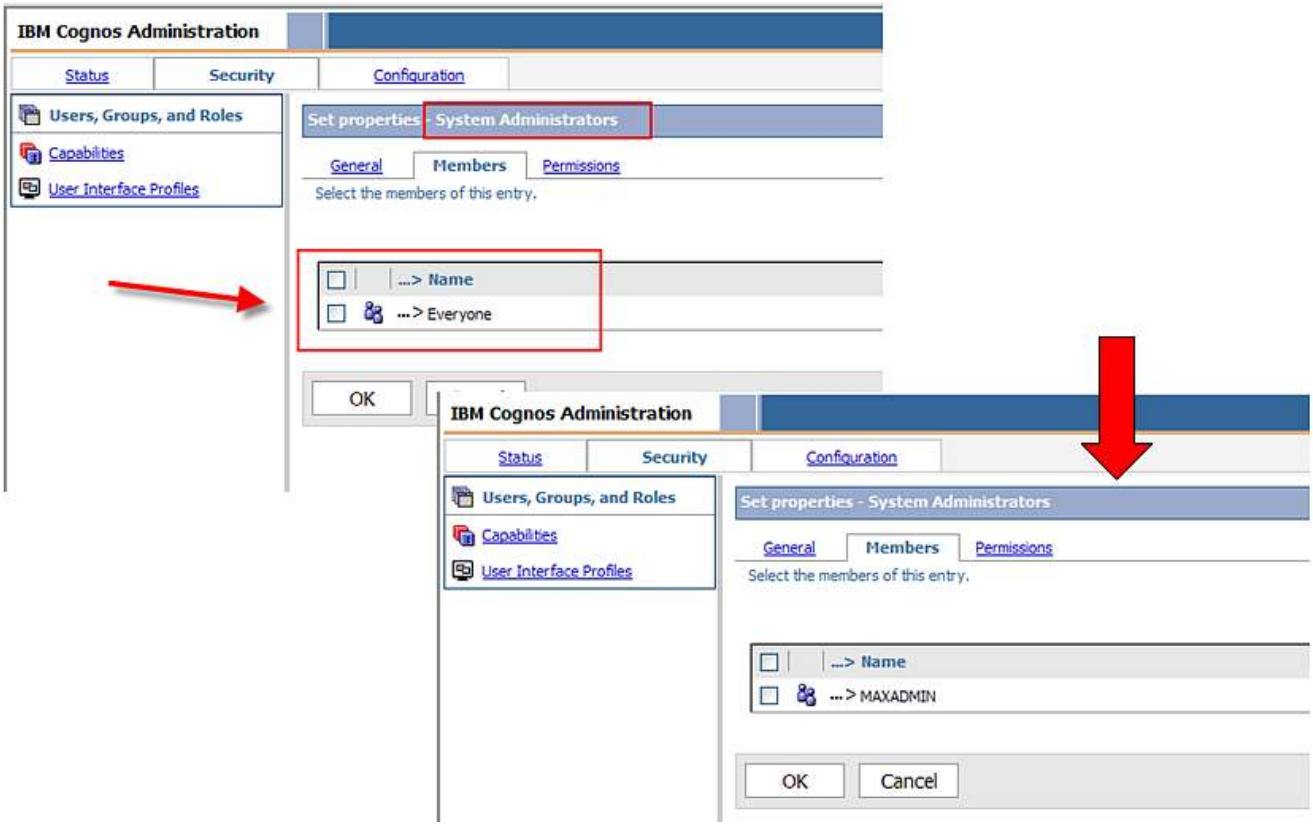
Cognos Namespace

Click back to the Security Page and notice the Cognos Namespace.

The Cognos Namespace contains information on default Cognos Users and Groups – but also contains the Cognos Roles identified by .



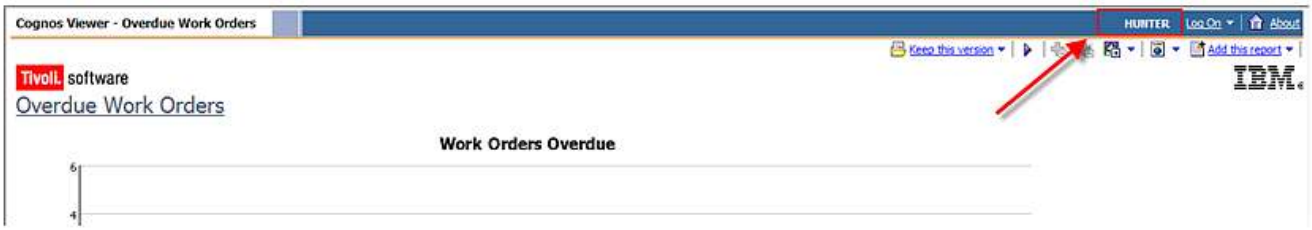
To set Cognos Authorizations, first review the default values. For example, if you select the Cognos Role of System Administrators under the Cognos Namespace, you will see that the EVERYONE Security Group has access to this functionality. You may want to re-evaluate that access and only grant that security to the Maximo Administrator.



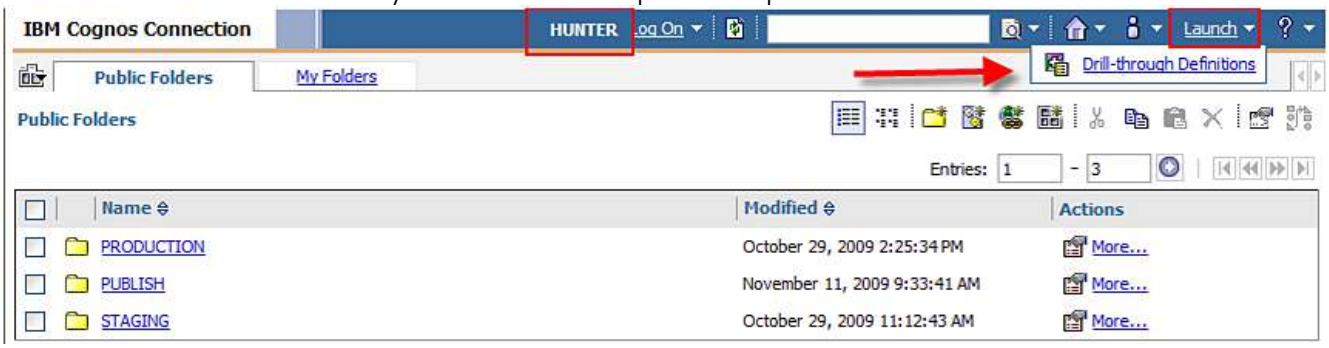
Other Cognos Roles that you may want to evaluate and remove access to the EVERYONE Group include Authors, Data Manager, Query Users, and Express Authors. The Common Cognos Roles and a brief description of each are shown in the table below.

Roles	Description
Consumers	Read and Execute Public Content, like Reports
Query Users	Same Permissions as Consumers + Query Studio
Authors	Same Permissions as Query Users + Report Studio
Report Administrators	Administer Public Content. Also, Access to Query Studio and Report Studio
Server Administrators	Administer Servers, Dispatchers and Jobs
Directory Administrators	Administer Content of Namespaces: Groups, Accounts, Contacts, Distribution Lists Etc

After applying your unique security Authorizations, you can see the different security settings that are enabled. The screenshots below show User Hunter from the MAINTSUP Group has been given access to run reports only.



User Hunter is not able to access any Administration or Report Development Tools.



This is in contrast to user Wilson from MAXADMIN who was granted security authorization to both Cognos Report Development and Administration Tools;

Security Notes:

1. For the Security Authorization Process, the Maximo and Cognos Installation guide details how clients can configure a new V7 database user to be used exclusively for the mxcognosdatasources.properties file.

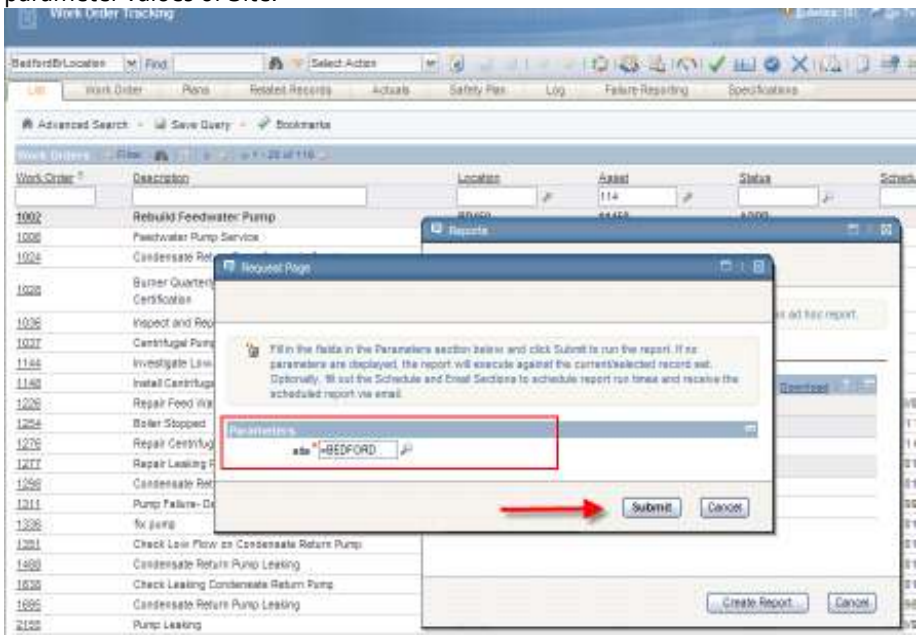
Types of Maximo Cognos Reports

When an End User submits a request to execute a Cognos Report from Maximo, Maximo submits a form post to the Cognos Web Application and includes as parameters all of the information needed to execute the report.

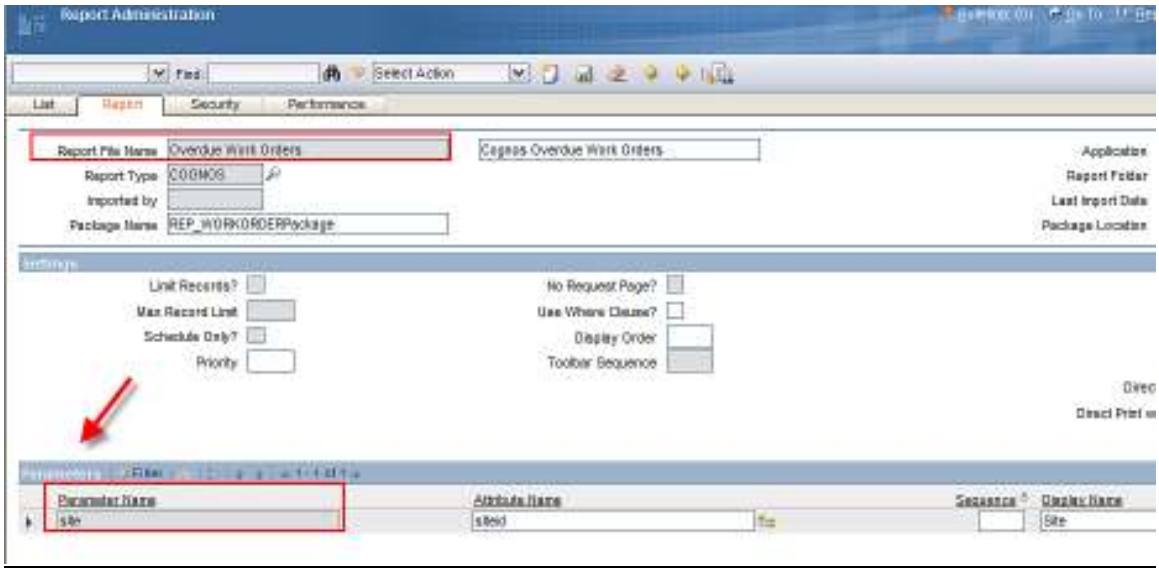
Users can execute 2 different types of Cognos Reports. The first type is Parameterized Reports, and the second type is Launch in Context, or Application Reports.

Parameterized Reports

Parameterized Reports are quickly identifiable as they contain specific parameters or filters that the user inputs on the Maximo Request Page. These values are then passed to Cognos, which uses them to further filter the report data. An example of this is shown below – notice that it contains a distinct parameter values of Site.

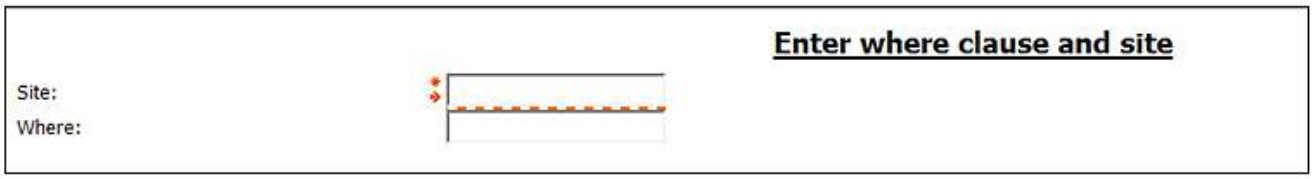


The Overdue Work Order report contained in this release is an example of a Parameterized Report. Its corresponding record from the Report Administration Application is shown below. Notice under the parameter section, it has a Site Parameter listed.



Parameterized Reports can be executed from within the Maximo Applications, from the Report Menu or the Report List Portlet in Maximo. Additionally, they can be executed from within the Cognos Connection.

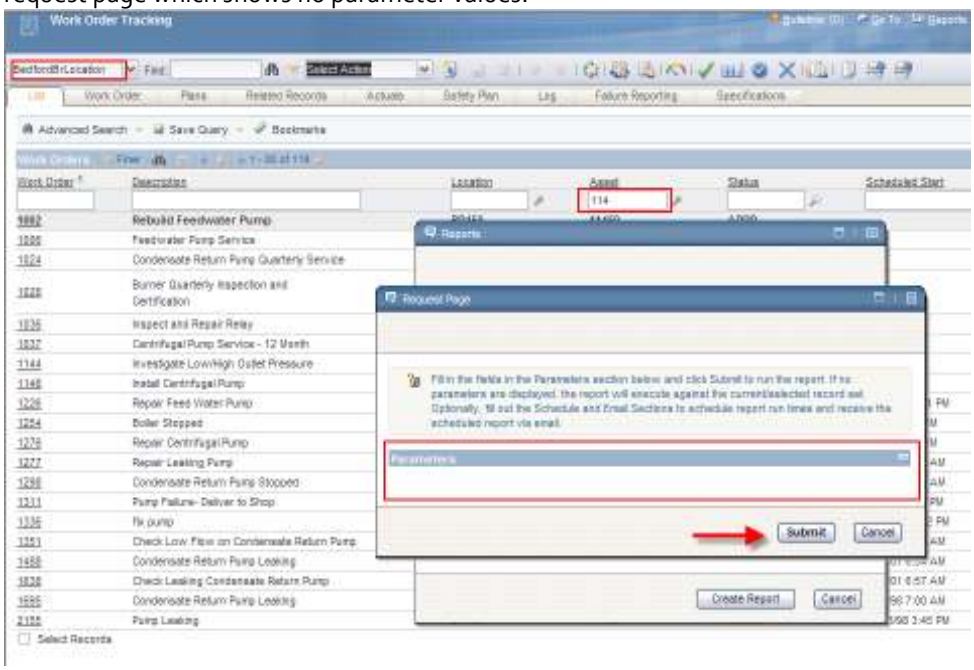
However, it is important to note that if they are executed from within the Cognos Connection, the parameter interface that the user sees is based on Cognos Functionality. No Maximo Lookups are available and no validation of the user inputted values occurs. The user is responsible for inputting the correct parameter values when executing these reports from the Cognos Portal. This interface is shown below.



Application Reports

Application Reports are often referred to reports using the Application's Current/Selected Record Set or Launch in Context Reports. For ease of identification, these reports are referred to as Application Reports because their main purpose is to provide list or detailed information on specific record data within an application.

These reports do not contain any user inputted parameters. They can be quickly identified by their request page which shows no parameter values.



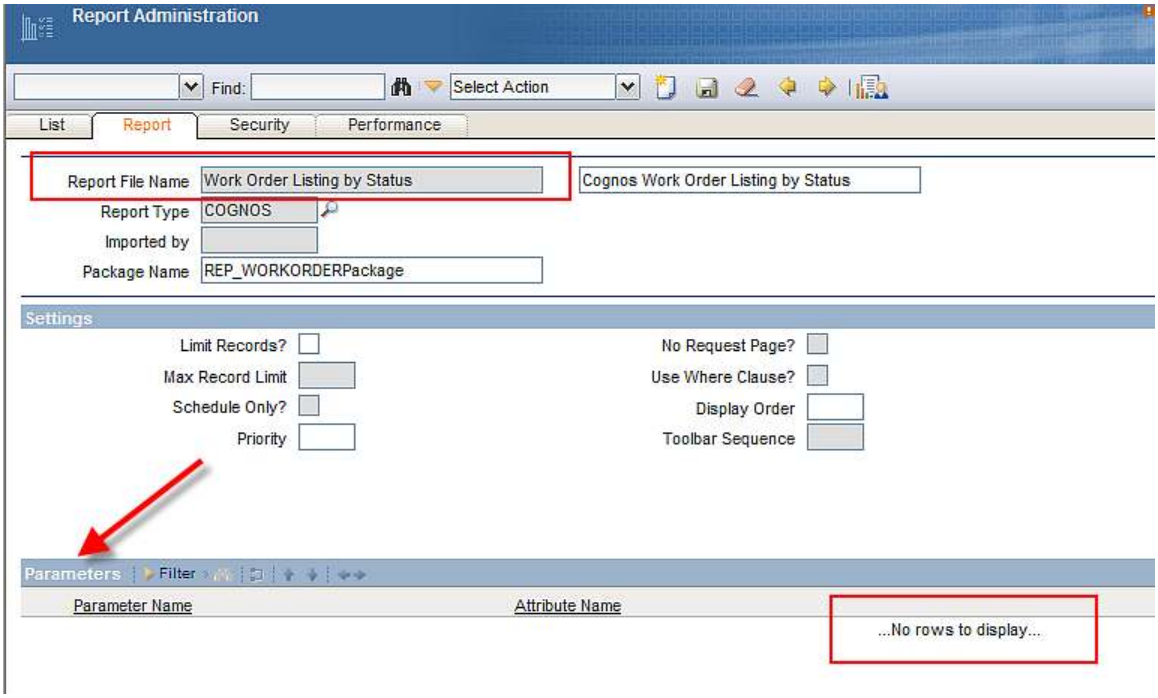
The application's query and/or filter are used to dynamically filter the Application Report results. In the example above, the user is in the Work Order Tracking Application, and has both a default query of 'BedfordBRLocation' and a filter on Asset of '114'. This translates to an SQL query like

(siteid like '%BEDFORD%') and (location like '%BR') and (assetnum like '114%')

Application Reports enable the dynamic passing of the user's application query to the Cognos report at run time. The user does not have to reenter these filter values on Maximo's request page again.

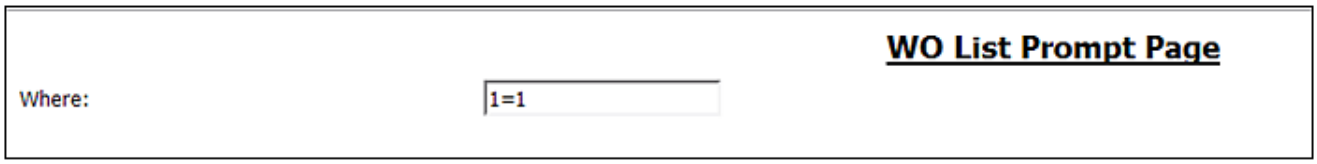
Application Reports enable endless flexibility of the report. Instead of defining set parameter values like Site or Status, the user is given a tremendous amount of flexibility in defining his filters/parameters within the application and passing them to the report.

The Work Order Listing by Status contained in this release is an example of an Application Report. Its corresponding record from the Report Administration Application is shown below. Notice under the parameter section, it has NO parameters listed.



Application reports should be executed from within the Maximo Application so the application filter can pass to the Cognos Report. Additionally, they can be executed from within the Cognos Connection.

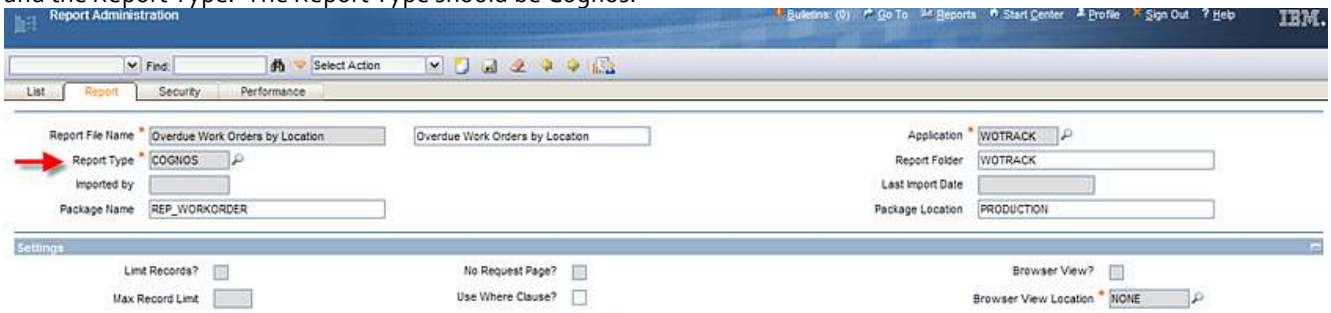
If the Application report is executed from within the Cognos Connection, the parameter interface that the user sees is based on Cognos Functionality. This interface is shown below. This report will execute against all values in the database since no parameter vales are defined and the user's Maximo site and data restrictions are not available within the Cognos Portal.



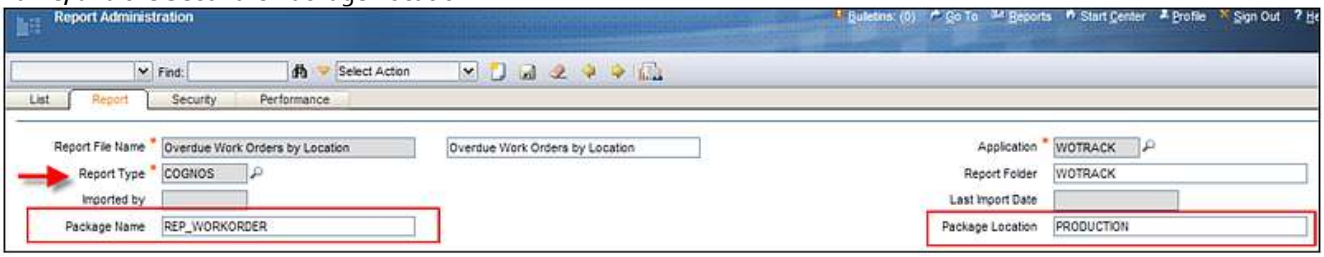
For more information on setting security for Maximo Reports within the Cognos Portal, please reference the Best Practices Section.

Registering Cognos Reports in the Maximo Report Admin Application

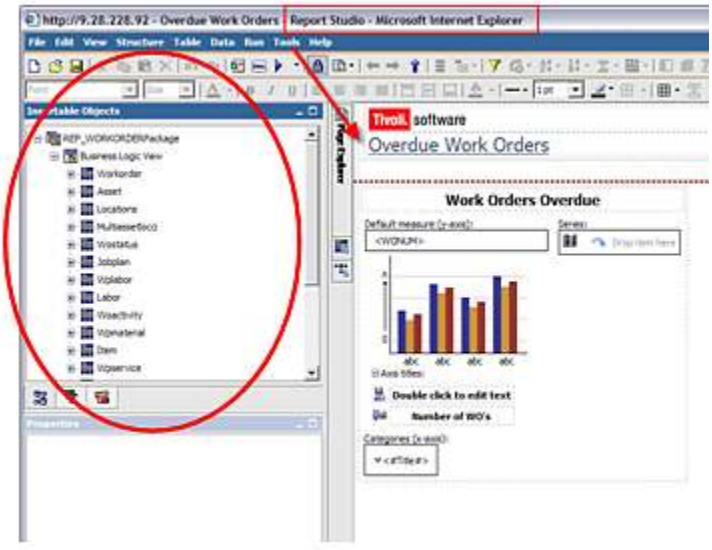
To enable Cognos Reports to be visible to users within the Maximo Applications, they must be registered in Maximo's Report Administration Application. To do this, access the Report Admin Application, and insert a new record. Input the Cognos Report Name, the Maximo Application it should be accessed from and the Report Type. The Report Type should be Cognos.



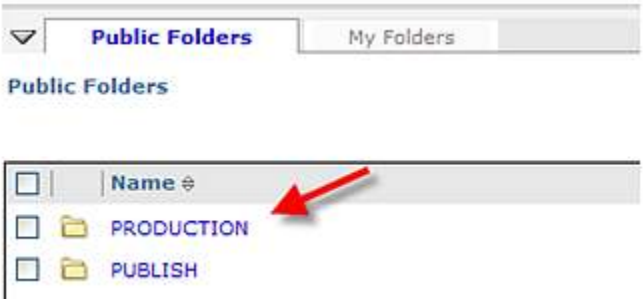
When you select the Cognos Report Type, two other fields conditionally display. The first is Package Name, and the Second is Package Location.



The Package Name is the name of the Cognos Package that the report is based on. In this example, the Package Name is REP_WORKORDER.

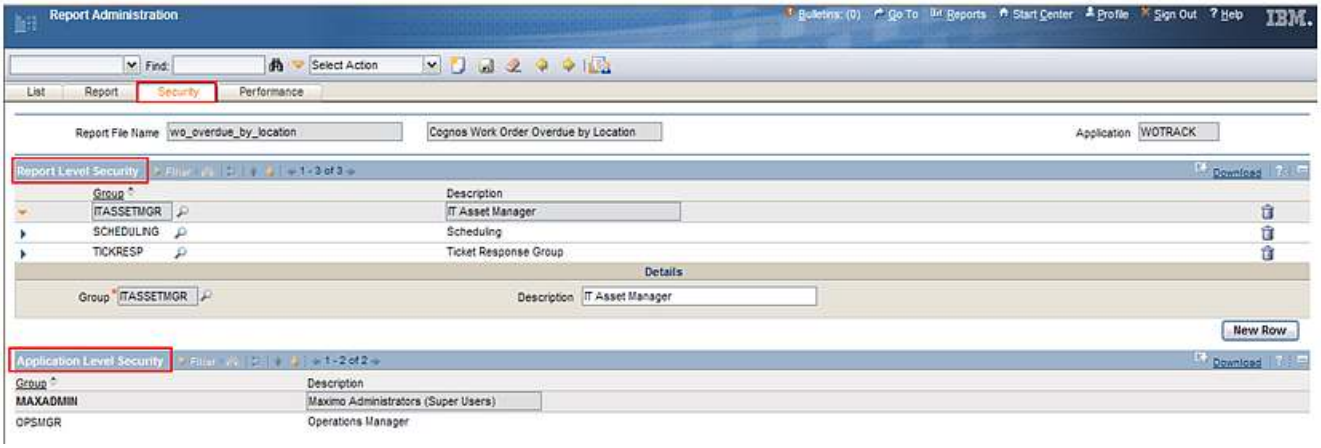


The Package Location is the folder where the Package is located in Cognos.

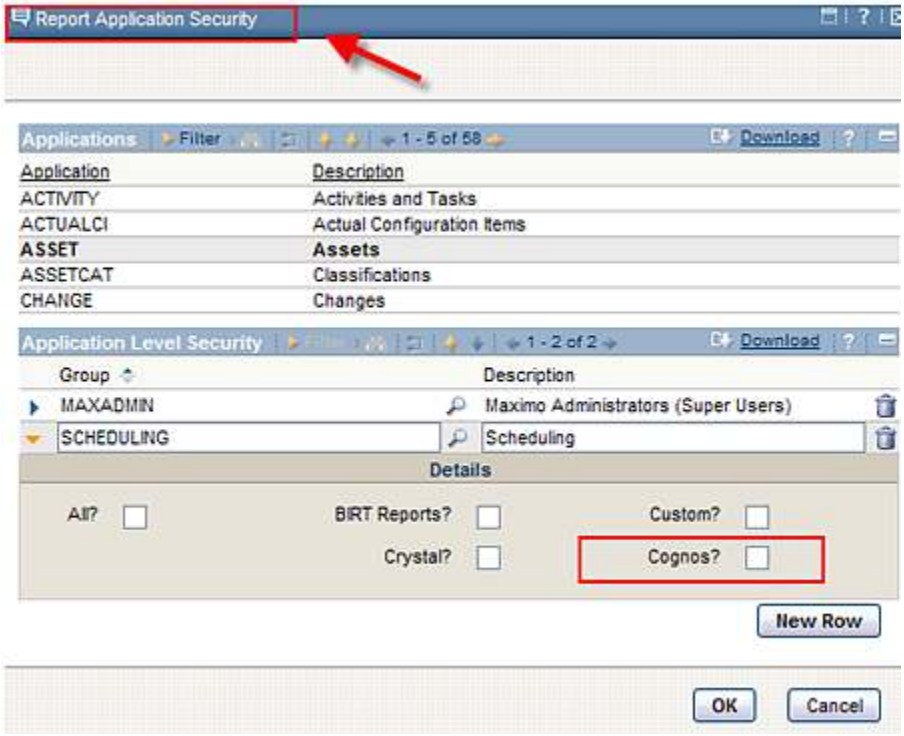

Public Folders
My Folders
Public Folders
Name
PRODUCTION
PUBLISH

Defining Security Group Access to Cognos Reports in Maximo

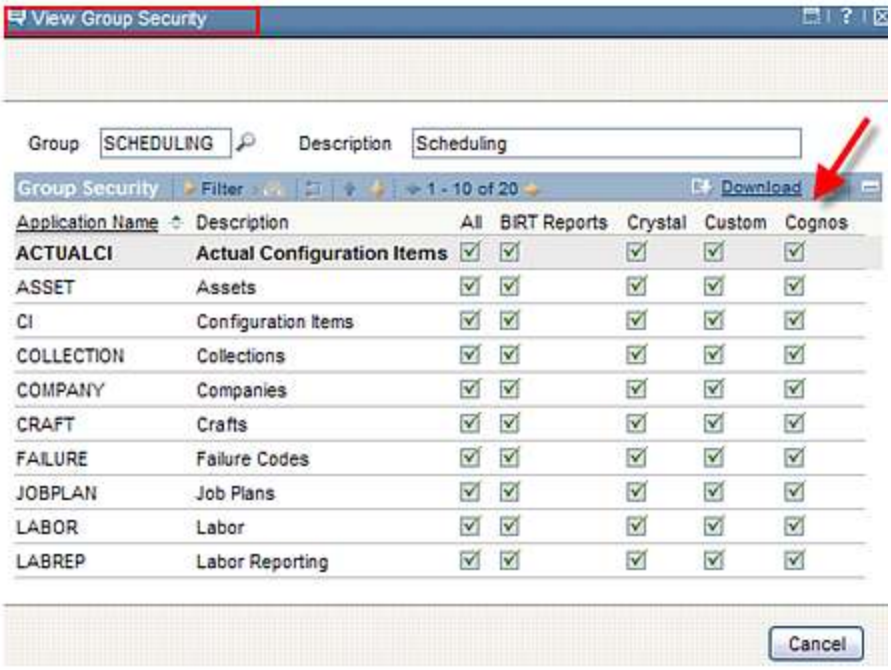
After registering the Cognos Report, define which Security Groups have access to see and execute the report from within the Maximo Applications. You can do this by clicking on the Security Tab of the selected report, and add individual Report Level Security. This will give access to this report for the configured Security Group.



If you have a number of reports registered to a Maximo Application, you may want to grant access to all of the reports via a single action. To do this, select 'Set Application Security' from the Report Admin Action Menu. Select the Application, add the Security Group and then specify if they should have access to All Report Types, or any of the other report options shown below.



Additionally, you can view what Report Application Access has been granted to a selected Security Group via the View Group Security Action from Report Admin. The example below shows that the Scheduling Security Group has report access to 20 different applications – meaning they can see any of the registered reports within those 20 different applications.


View Group Security
Group SCHEDULING
Description Scheduling
Group Security
Filter
1 - 10 of 20
Download
Application Name
Description
All
BIRT Reports
Crystal
Custom
Cognos
ACTUALCI
Actual Configuration Items
ASSET
Assets
CI
Configuration Items
COLLECTION
Collections
COMPANY
Companies
CRAFT
Crafts
FAILURE
Failure Codes
JOBPLAN
Job Plans
LABOR
Labor
LABREP
Labor Reporting
Cancel

Maximo Cognos Reporting Details

Conditions and Limitations

Below is a listing of functionality conditions and limitations Maximo Cognos Integration 7.1.1.6 Release.

1. The Integration is specific to the Cognos Reporting 8.4 Release.

2. Localization of reports. The ability to localize reports – including their labels, titles and individual data – is not enabled for this initial integration. Additionally, the ability to localize the metadata layer is not included. If a client wants to localize Cognos reports for their individual Maximo instances, they will be responsible for that functionality in this release.

3. Maximo Data Restrictions are only applied if the Cognos Report is executed from Maximo. If a Cognos Report is executed directly from the Cognos Portal, Maximo data restrictions can not be applied.

4. Two Maximo Reports are included with this release. The purpose of these reports is for clients to test and debug the Maximo Client Integration. These reports are delivered in English Only.

5. There is no automated installer for this functionality. Cognos will be installed separately by the client, and the install of the integration functionality will be performed manually by defining property values, and copy/pasting the required files. For information on installing the integration, see the Reference Materials section at the end of this guide.

6. The Maximo Metadata Publishing Process requires Cognos SDK libraries to be referenced by Application Server. These include:

cognos-axis.jar
cognosClient.jar

7. The Maximo metadata is based on Report Object Structures (ROS). Non-persistent objects and attributes are not included in the ROS.

8. Only SIMPLE relationships between business objects are supported by the metadata publishing process. Any relationship with SQL where clause syntax involving more than column to column relationship is considered a COMPLEX relationship, and is not supported for Cognos Package Publishing. For more details on this, see page 7.

9. Maximo base services 7.1.1.6 fixpack supports only NTLM and LDAP namespaces for metadata publishing. The CSP is a separate namespace and can not be used for metadata publishing.
10. Administration of Maximo-Cognos Reports is required in two separate tools. The ability to run and access reports for security groups will be defined in Maximo. Additionally, what Cognos functionality is enabled, and which Maximo-Cognos Reports a user can access will also be set in the Cognos Administration tool.

11. The current V7 embedded reporting functionality which deeply engulfs reporting in the various applications is not reproduced in this integration offering. Examples of the specific reporting functionality not included in this integration include:

A. Scheduling or Emailing Cognos Reports within the Maximo Applications.

B. Viewing, canceling or rescheduling a Cognos Report within the Maximo Applications.

C. Browser View: Enabling a Cognos Report to display in the Cognos Portal via a 1 Click Action from an Application's toolbar icon in Maximo.

D. One Click Direct Print: Enabling a Cognos Report print directly to a user's default printer via a 1 Click Action from an Application's toolbar in Maximo.

E. Direct Print with Attachments: Enabling the Cognos Report print directly to a user's default printer along with any printable attachments it may have (ex. xls, doc, pdf, jpeg)

F. Direct Print on Status Change: Automatically printing a Cognos Report on record status change.

G. Schedule Only: Configuring a Cognos Report as 'Schedule Only' – so it can only be executed via a schedule and not executed immediately.

H. Reserved Processing Times: Defining the days/times of the week that a report can be executed.

I. The ability to perform database updates from reports.

Platform Restrictions

The Maximo Cognos Integration can be enabled thru a client's license of the Cognos 8.4 Reporting Products, or thru the Tivoli ® Common Reporting (TCR) 1.3 Enablement. The list below captures known Platform Restrictions at this time.

Cognos: The following lists platforms currently not supported in the Cognos 8.4 Release

1. Microsoft® Internet Explorer 8.

2. Mozilla Firefox

For a complete listing of the Cognos Supported Products, please reference the URL below:

http://www-01.ibm.com/support/docview.wss?rs=3442&uid=swg27014110

Tivoli Common Reporting (TCR): The following lists platforms currently not supported in the Tivoli Common Reporting 1.3 release:

1. Microsoft® Internet Explorer 8.

2. Oracle WebLogic Server . IBM WebSphere® Application Server is the only supported application server.

3. Additionally, cross platform application servers are not supported For example, deploying Maximo on WebLogic Server, and Tivoli Common Reporting with Cognos on Websphere Application Server is not a supported platform.

4. An LDAP-enabled environment must be used. Tivoli Common Reporting is not able to authenticate with security groups held in a relational database.

5. The BIRT Engine that is available for deployment from the TCR Install is not supported by Maximo. Therefore, you should select to not install the BIRT Engine during the TCR Install program. If you want to use BIRT with your Maximo based products, you should utilize the BIRT Engine that is deployed through the Maximo Framework.

6. This initial release of the Maximo Cognos Integration through TCR is supported for English only.

Signing out of Maximo and Cognos

1. Multiple Maximo Users

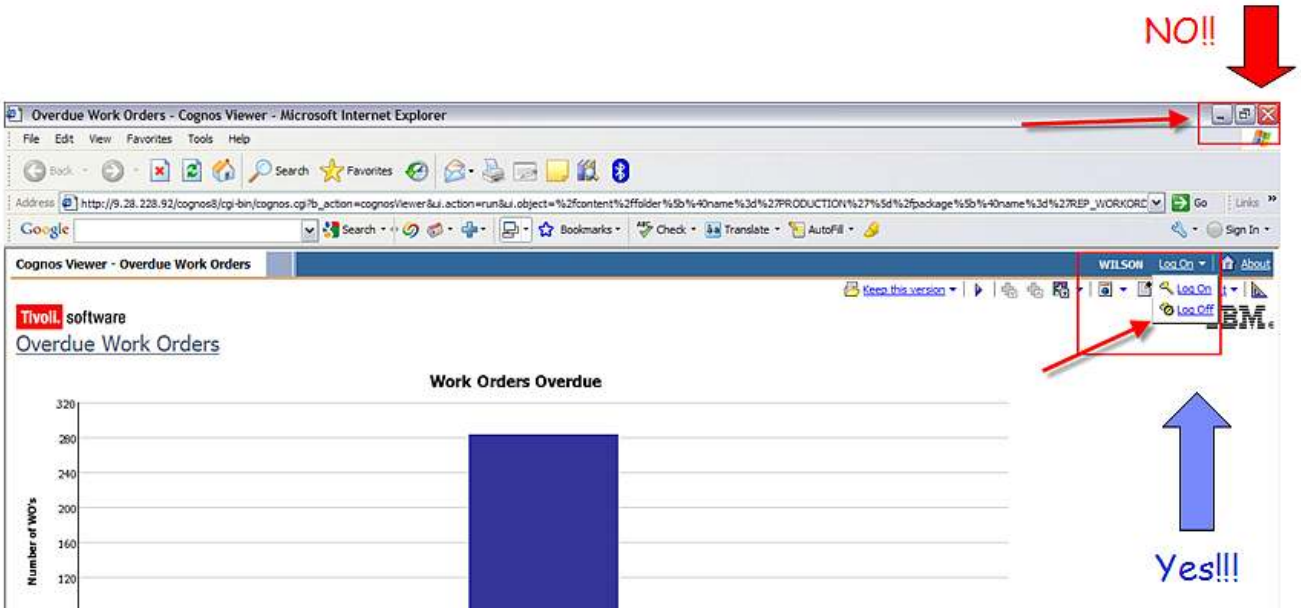
If multiple users are utilizing the same machine, they must sign out of Maximo and close the Maximo browser session before another user signs into Maximo.

- If you re-use the existing Maximo browser session as a different Maximo user to execute a Cognos report - the data shown in the resulting Cognos report may not correspond to the current logged in user.

2. Logging off the Cognos Session

When a Maximo User executes a Cognos Report, they are brought to the Cognos Portal. After reviewing their report, they may want to exit Cognos by closing the browser in the top right side of the screen. If the user does this – it will only close the browser session – it will not log the user off of Cognos.

The user must log off of Cognos by selecting the 'Log Off' feature as noted below. Once logged off, they can close the browser session. If a user does not log off properly, they may receive old or cached data the next time they execute a report.



**Note: This only applies in non-LDAP Environments.

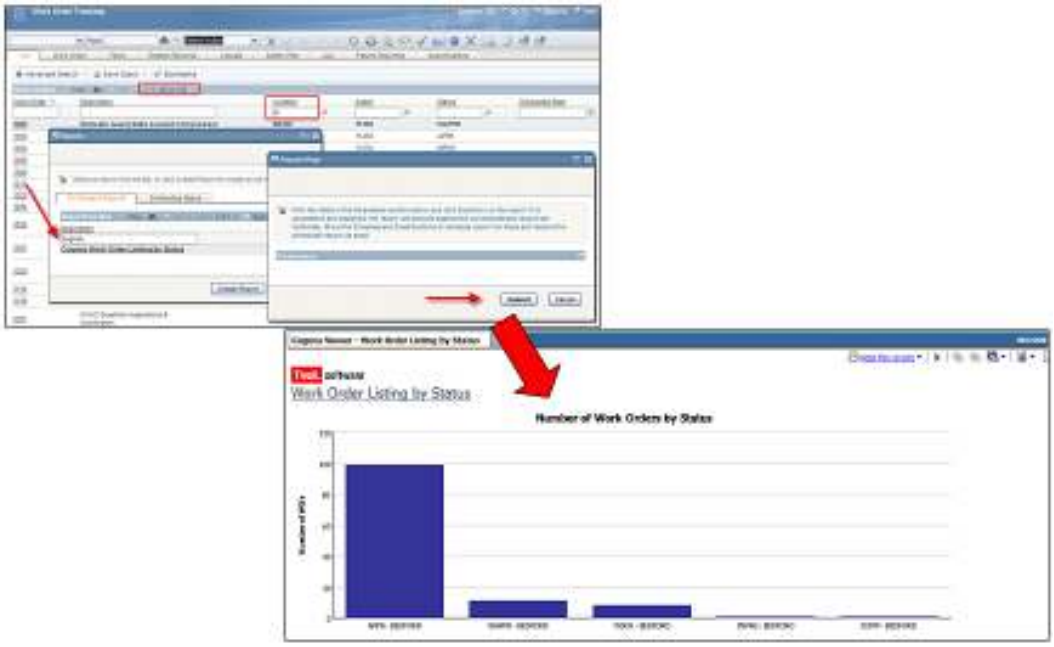
Inactivity Timeout Setting

For the Maximo Cognos Integration, it is recommended that the Administrator set the Inactivity Timeout Setting from its default value of 3600 seconds to a smaller value like 900 seconds (15 minutes) in the Cognos Administration Tool.

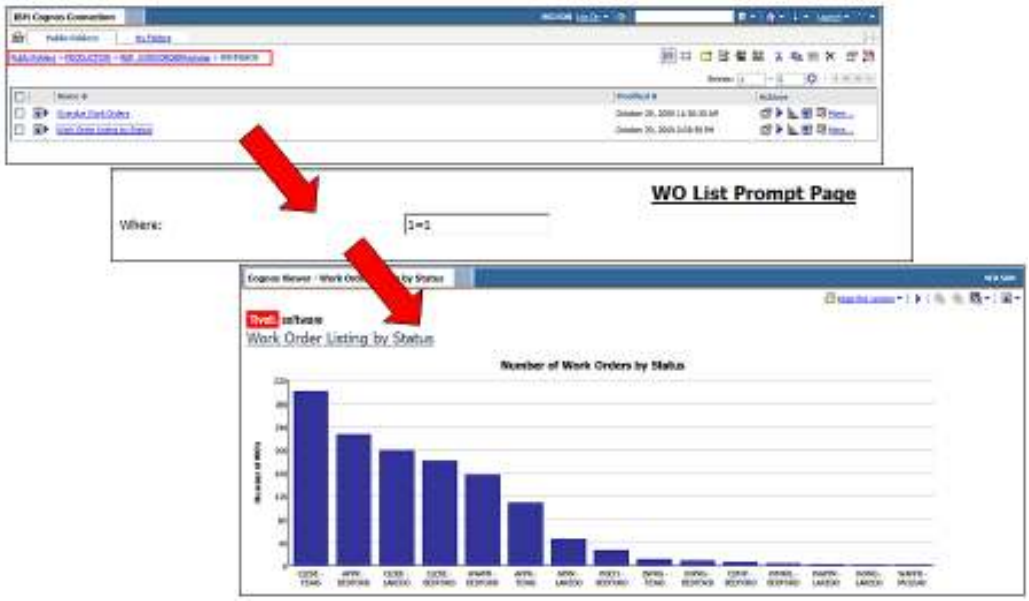
Executing Maximo Reports within the Cognos Portal

When a Maximo User executes a Cognos Report and is brought to the Cognos Portal, they can execute other Maximo reports directly from the Cognos Portal. At this point, the user's site and data restrictions that were available in Maximo are no longer available. Therefore, any Maximo reports generated direct from the Cognos Portal will not contain Maximo site and data restrictions.

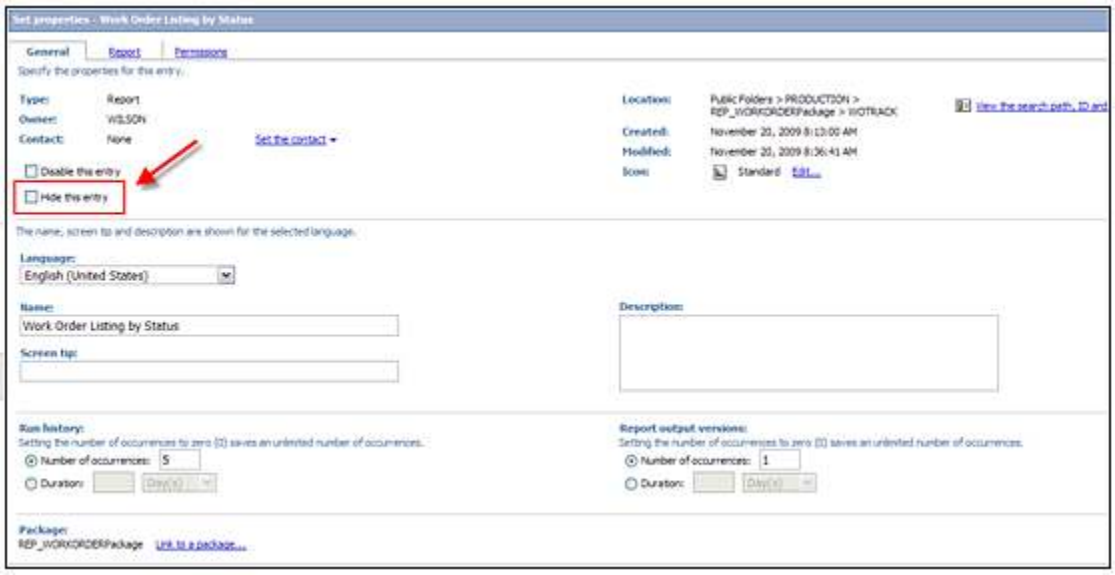
For example, when user Wilson executes this Work Order Listing by Status report from Maximo, the Cognos Report displays with only data for the Site he has access to – Bedford.



However, if Wilson executed the same Work Order Listing by Status report from Cognos, his site and data restrictions are not available from Maximo. The report would execute against all records. Wilson would then see data from other sites as shown below.



This may be fine for some of your users, but may not be for others. In those cases, you may want to 'hide' the Maximo Cognos Report within the Cognos Portal. This will only enable users to execute reports directly from Maximo. To do this, for the selected report, the Administrator will enable the 'Hide this entry' Value for Selected Security Groups.



Property Settings

Name	Description	Used By
mxe.report.cognos.serverURL	Cognos Dispatcher/Gateway URI. It is used to launch Cognos reports. For example: http://myhost:port/cognos8/cgi-bin/cognos.cgi OR http://myhost:port/p2pd/servlet/dispatch/ext * the .../ext URL should only be used in a deployed Cognos environment. Otherwise the images won't be available	Integration
mxe.report.cognos.namespace	Cognos CSP Namespace which holds information on Users, Security Groups and Roles.	Integration
mxe.report.cognos.db.type	Required system property that defines the database type from which metadata will be extracted. Valid property values include: DB2 (IBM DB2®), OR (Oracle), SS (SQL Server)	Package Publishing
mxe.report.cognos.db.sql.name	Required system properties (for Maximo installations running SQL Server database).Identifies the catalogue name associated with the SQL Server database	Package Publishing
mxe.report.cognos.db.schemaName	Required system property that defines the database schema name from which the metadata will be extracted **This value MUST be provided in UPPERCASE. If it is not, the package creation process will fail with an error of 'Invalid Schema Name'.	Package Publishing
mxe.report.cognos.datasource	Optional system property that defines the data source to which the metadata package will be associated with.	Package Publishing
mxe.report.cognos.content.store.package.location	Optional system property that defines a location under to the Cognos Content Store PUBLIC folder where the metadata package will be created The package location specified in this property MUST exist in the Cognos Content Store, under the PUBLIC folder BEFORE initiating the publish process	Package Publishing
mxe.rest.webappurl	Optional system setting used when MXCSP is used for authentication. This setting used to validate token issued by Version 7 instance.	Token Authentication when Executing Reports

End Point Property Settings

CONTENT_STORE_PACKAGE_LOCATION	Identifies a location under the Cognos Content Store PUBLIC folder where the metadata package will be created. When provided, this end point property overrides the system level value defined by mxe.report.cognos.content.store.package.location When the end point property is not provided, Maximo metadata packages are created under the PUBLIC folder.
DATA_SOURCE_NAME	Identifies the Data Source Connection to which the metadata package is associated with. When provided, this end point property overrides the system level value defined by mxe.report.cognos.datasource.
NAMESPACE_ID	Identifies the Cognos Security Namespace to be used when publishing Maximo metadata. The only supported namespaces for Publishing are NTLM and LDAP.
PASSWORD	Password to be used when authenticating with Cognos Business Intelligence server
PROJECT_BASE_DIR	Identifies a file system location at the Cognos Business Intelligence Server where metadata project will be created prior to its publishing Under the specified file location a sub-folder is created. Naming convention of sub-folder is: <ObjectStructureName>_<PublishingDate>_<PublishingTime>
URL	Identifies the URL to be used to establish a connection with Cognos Business Intelligence integration service. The URL value to be used should be the EXTERNAL DISPATCHER URI
USERNAME	Username to be used when authenticating with Cognos Business Intelligence Server.

Developing Maximo Cognos Reports in Report Studio

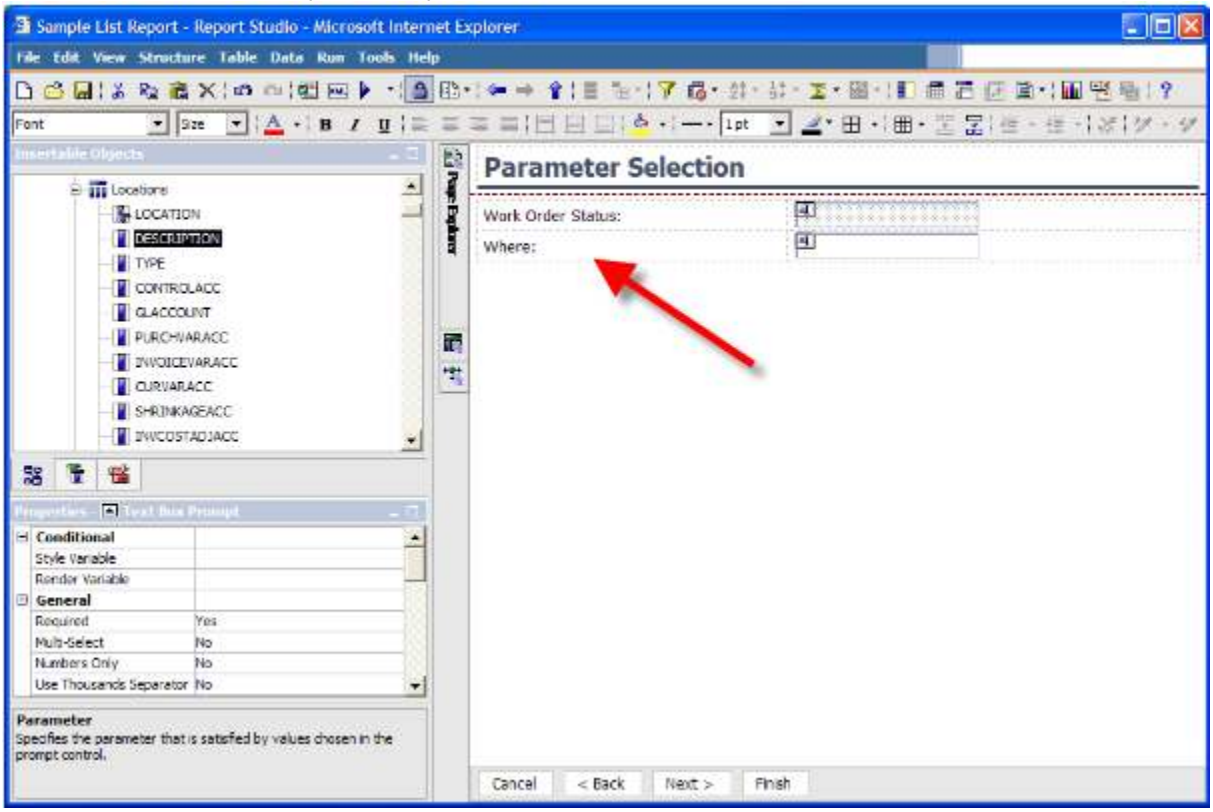
As noted earlier in this guide, there are two types of Cognos reports – enterprise reports created in Cognos Report Studio, and ad hoc reports created in Cognos Query Studio. The section below details how to include the Maximo Where Clause in your Cognos Report Studio custom reports. These steps are necessary for Maximo to pass application and data restriction information to the Cognos Report.

Maximo Where Clause

The Maximo WHERE Clause includes critical user and application query information. In order to dynamically pass this information from Maximo to Cognos each time a report is executed, each report's design file must include the Maximo WHERE clause. The section below details how to add the WHERE clause to reports within Report Studio.

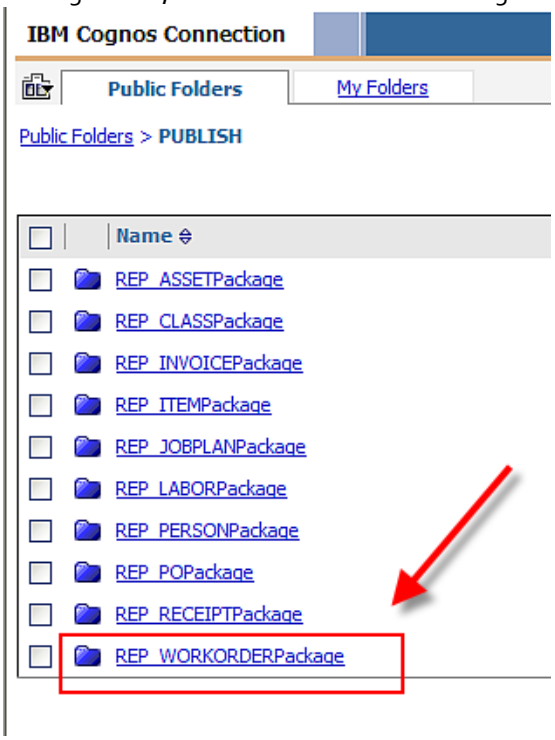
Notes:

1. This section is intended for a Report Developer.
2. For details on Query Studio reports, see the next section below.

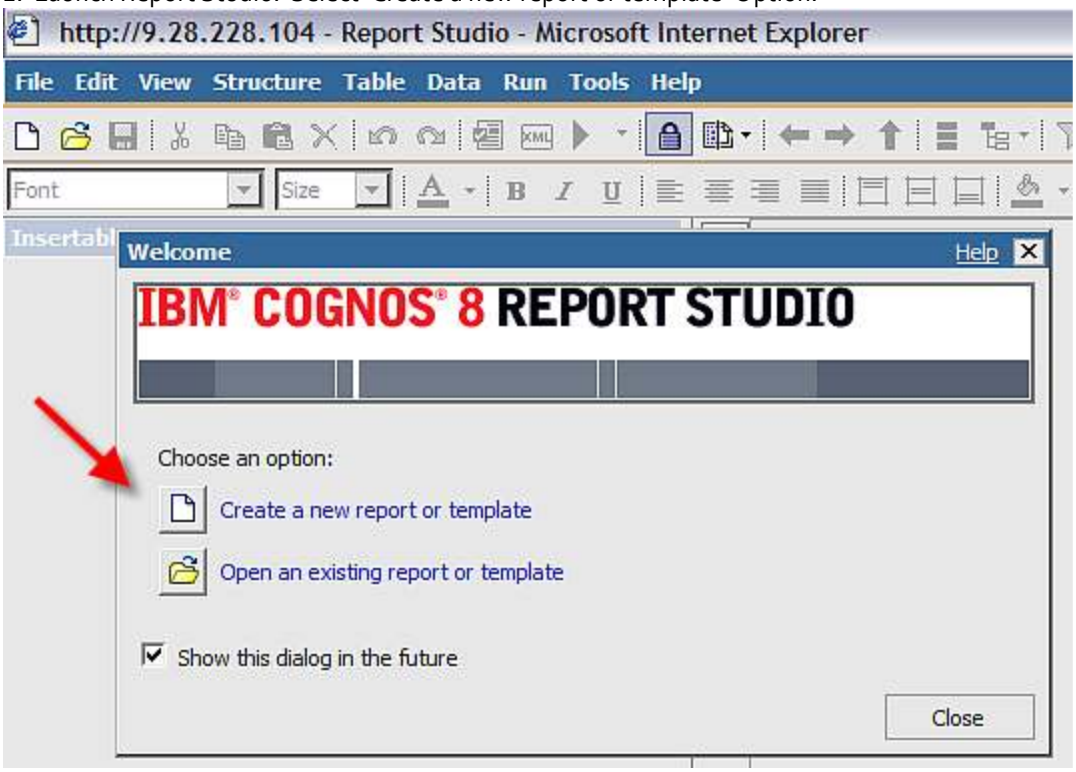


Including the Maximo Where in Custom Reports

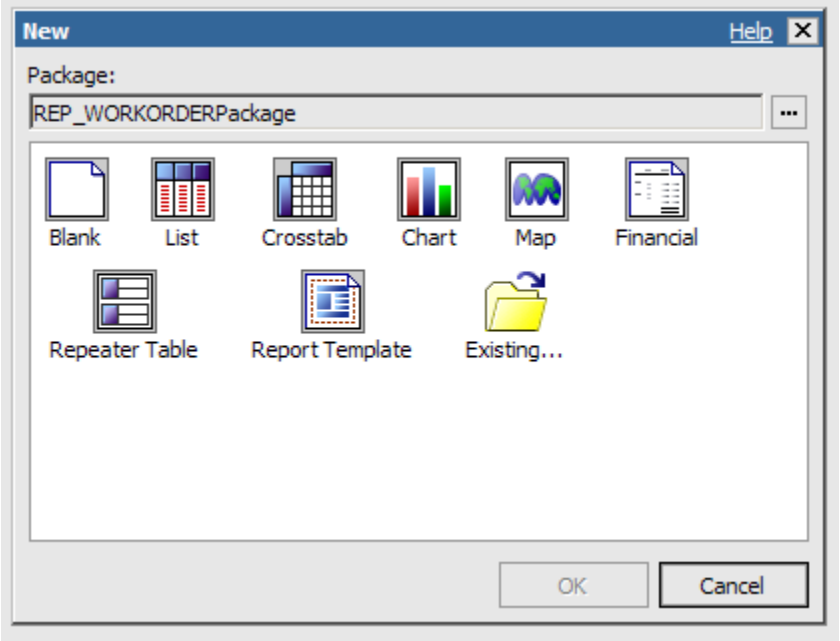
1. The example below details how to include the Where Clause in a custom report using the Work Order Package. First, access the Work Order Package.



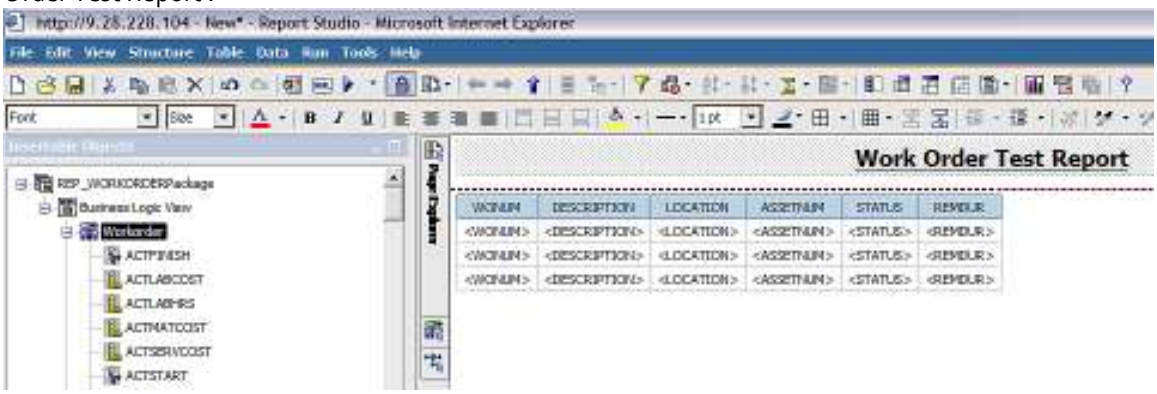
2. Launch Report Studio. Select 'Create a new report or template' Option.



3. Select the List Report

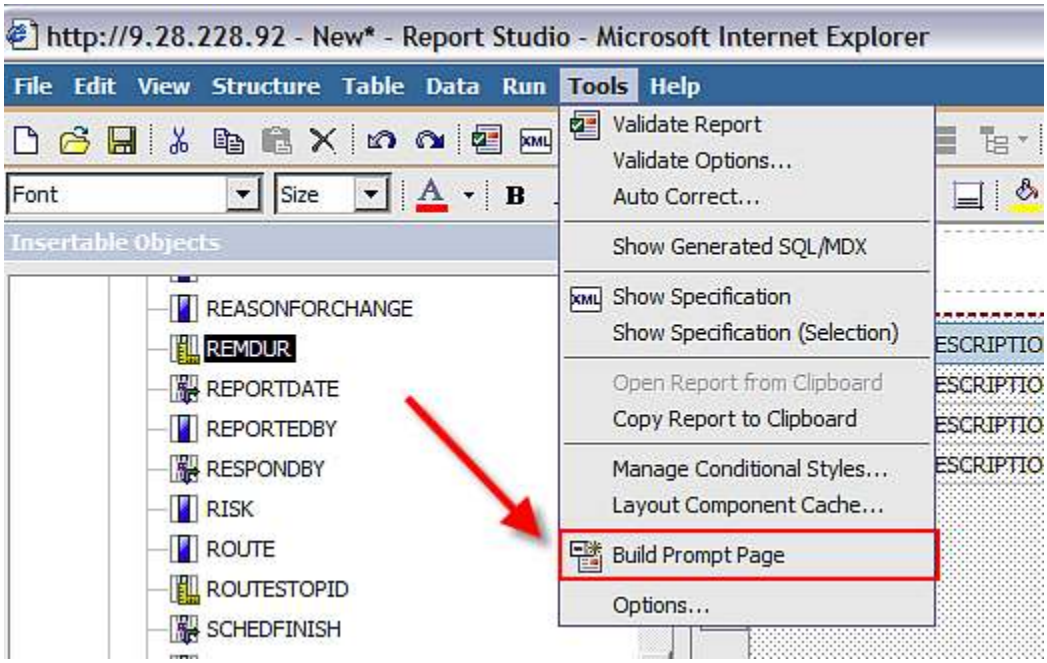


4. Next, add a few fields from the Work Order Object to create a simple list report. Add a title like 'Work Order Test Report'.

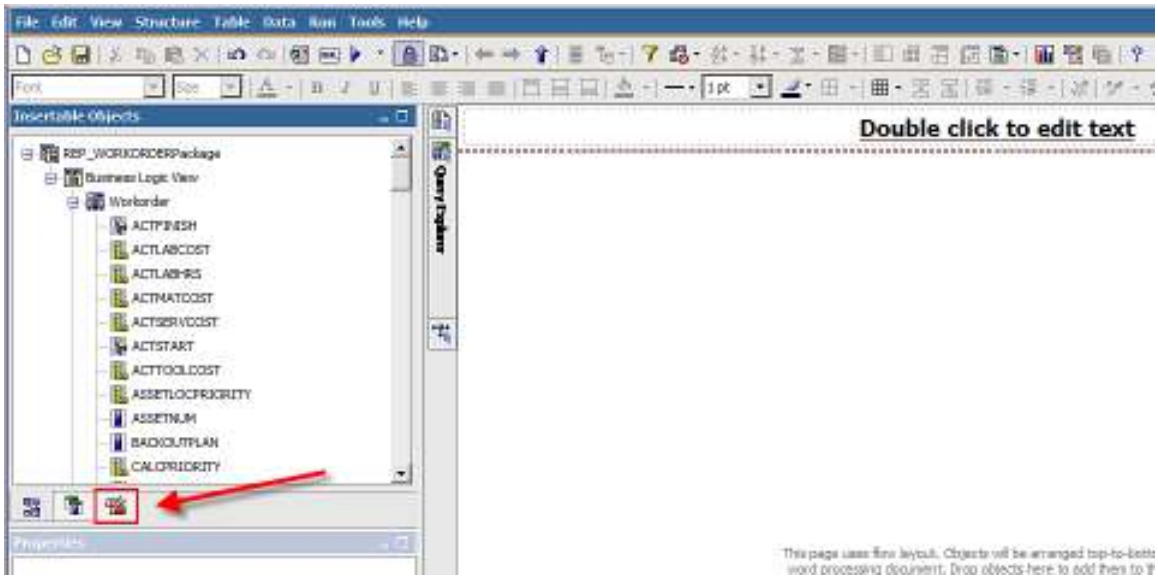


5. Access the Prompt Page to create parameters for the report. You can do this by clicking on the icon highlighted below from the Cognos Toolbar

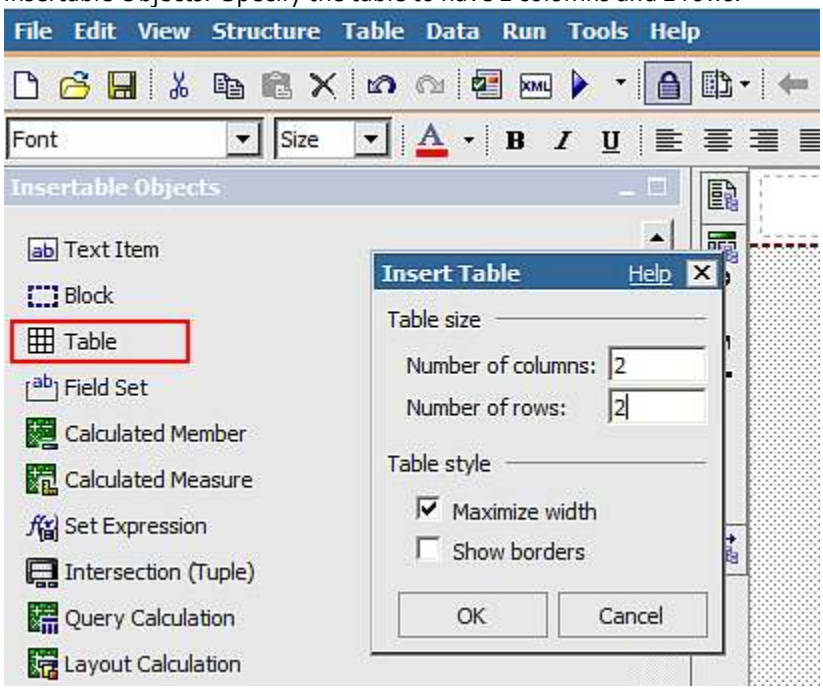
Or you can select 'Build Prompt Page' from the Tools Menu Option.



6. When the prompt page displays, click on the Toolbox View highlighted below.

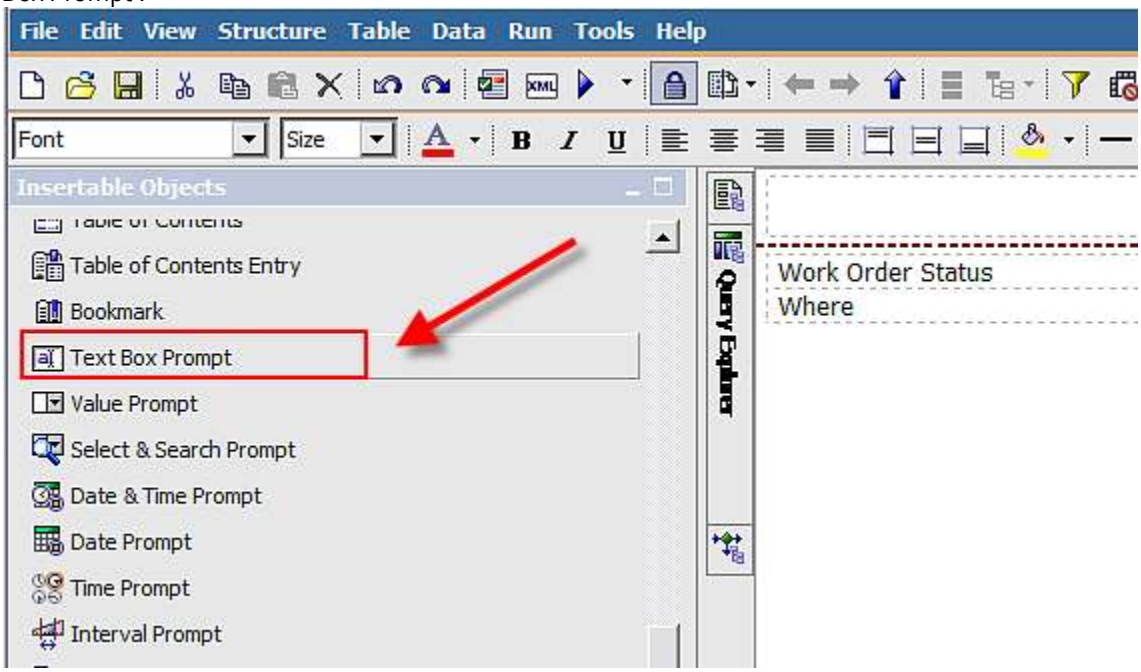


7. First, add a table which will hold the 2 parameter values and their labels. To do this, select Table under Insertable Objects. Specify the table to have 2 columns and 2 rows.

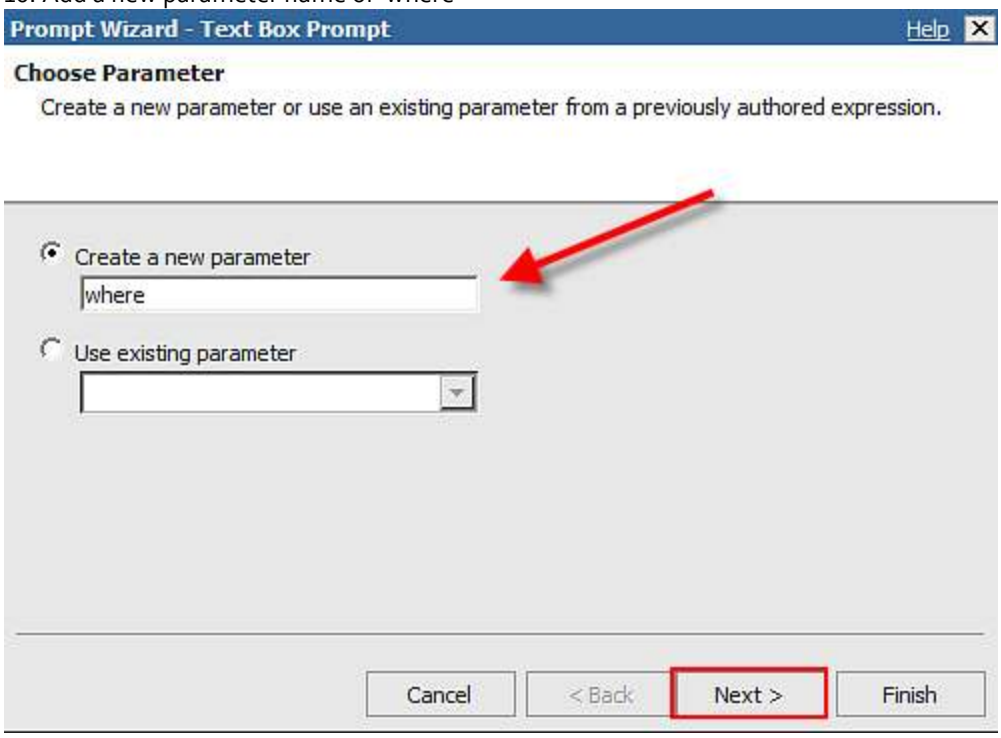


8. Navigate to the first column on the left. Add the labels for the parameters by selecting Text Item. Add a value of 'Work Order Status'. Repeat for a value of 'Where'.

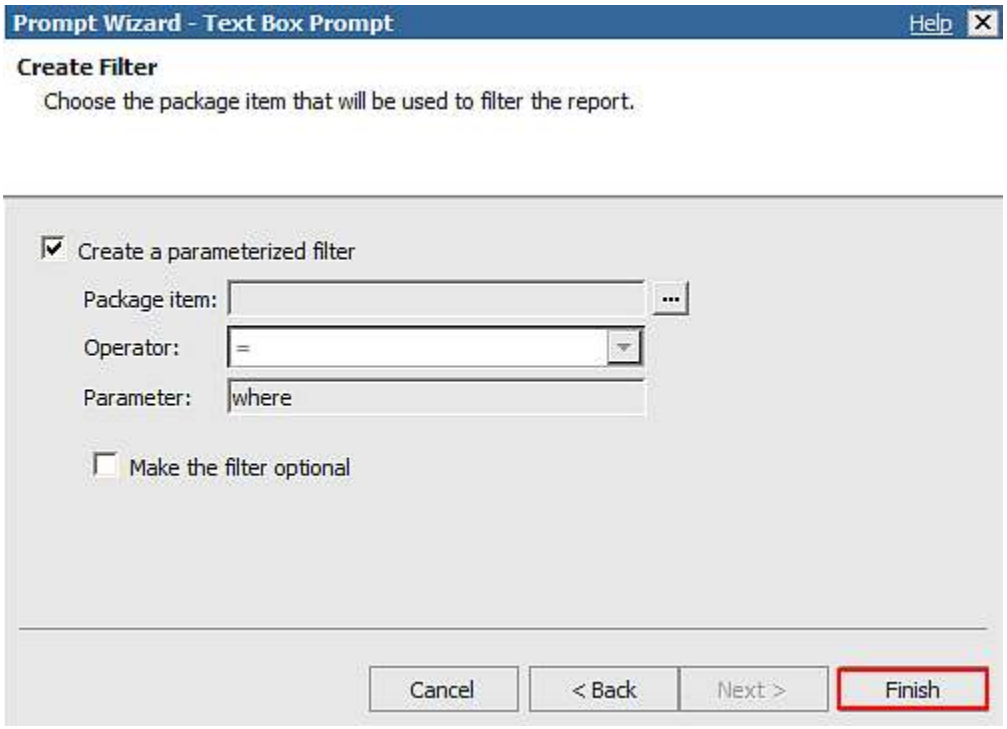
9. Next, highlight the where parameter. Scroll down on the Insertable Objects Section, and select 'Text Box Prompt'.



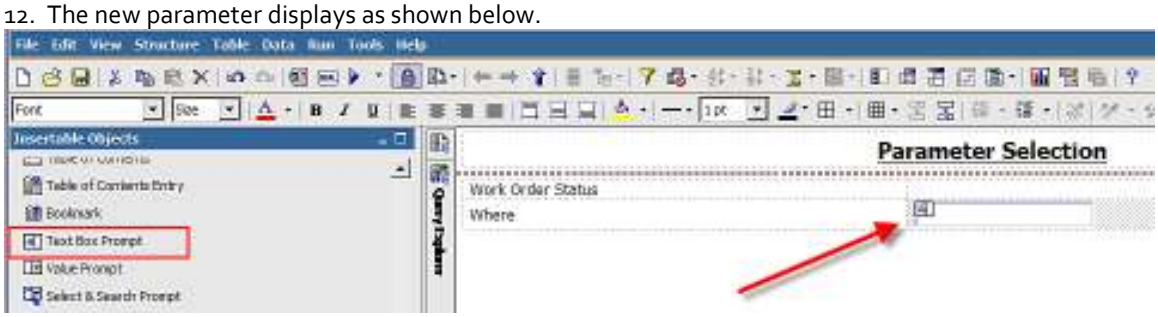
10. Add a new parameter name of 'where'



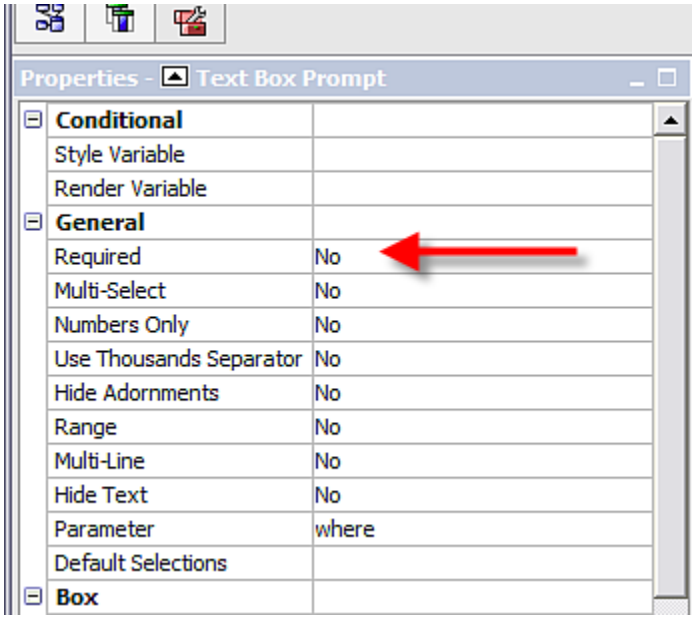
11. Click Next to complete the parameter creation.



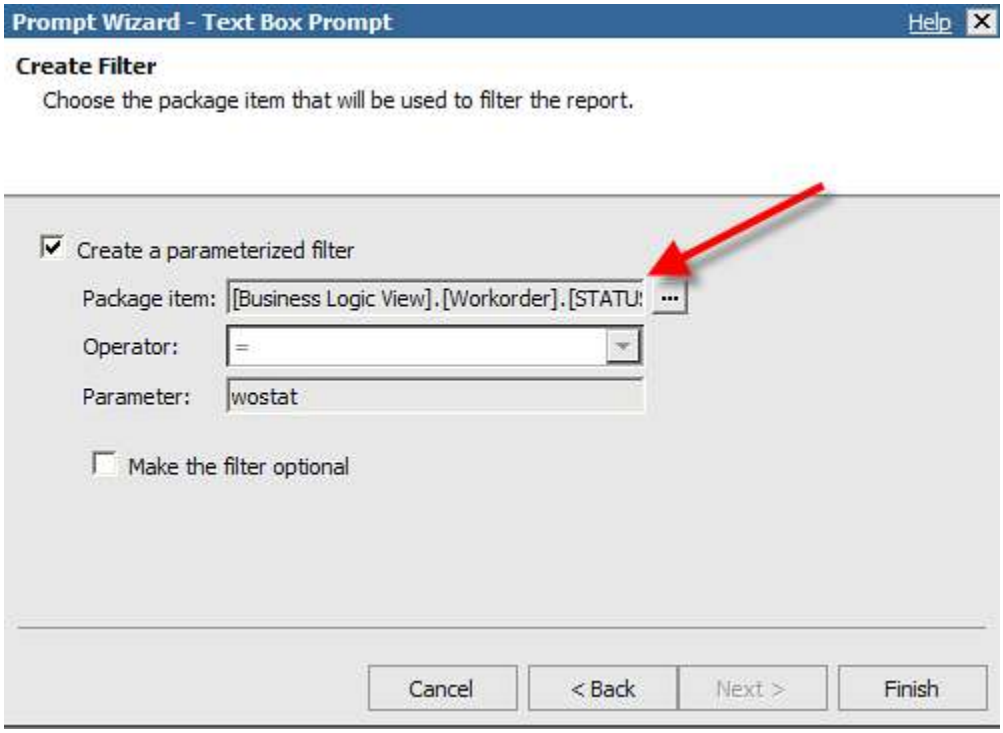
12. The new parameter displays as shown below.



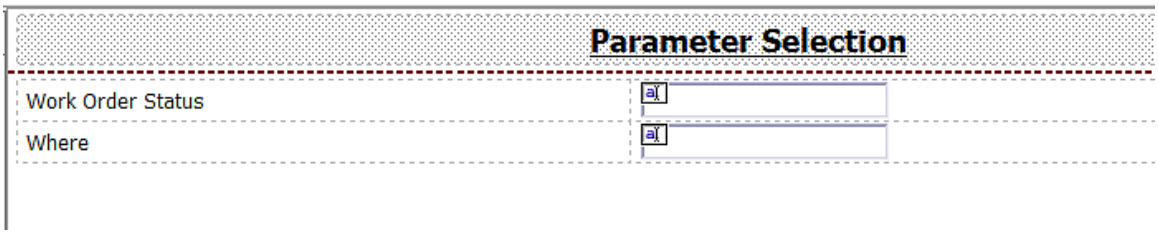
13. Review its property settings. Make sure the 'Required' Value is set to No. This will enable the report to execute direct from the Cognos Portal when the Maximo where clause is not available.



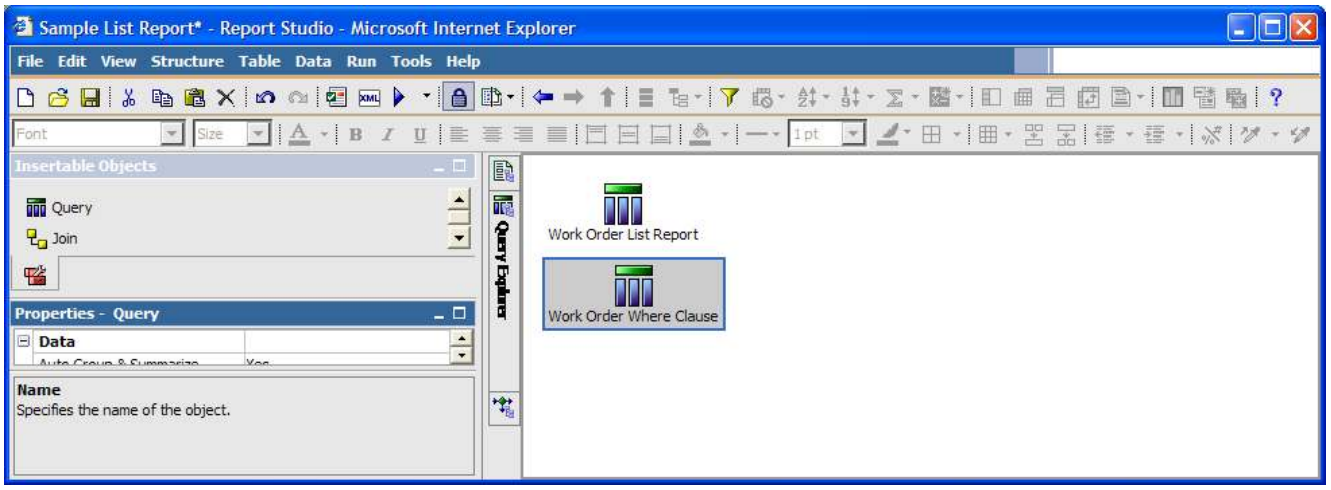
14. Next, repeat the process to add another parameter – wostat, which is displayed to the user as 'Work Order Status'. Make sure to select the status field from the Work Order Package as shown below. This parameter should have its Required Field set to Yes.



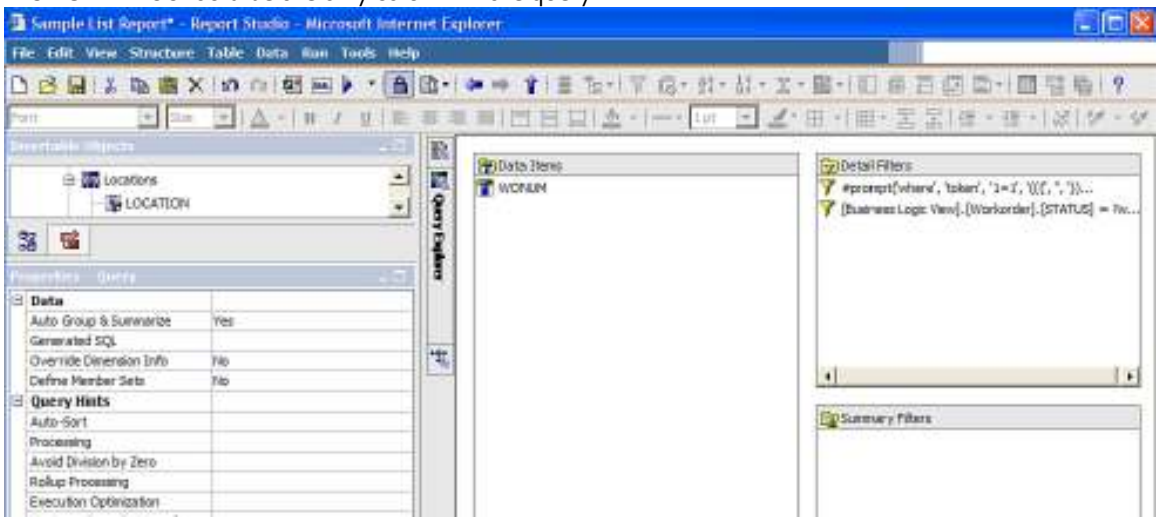
Your parameters will then display as shown below.



15. The query for the report does not have filters attached to it. You must apply the where clause parameter in a specific way. In this example, the status parameter will be applied as a filter together with the where clause. To do this, bring up your queries. Add a new query called "Work Order Where Clause".

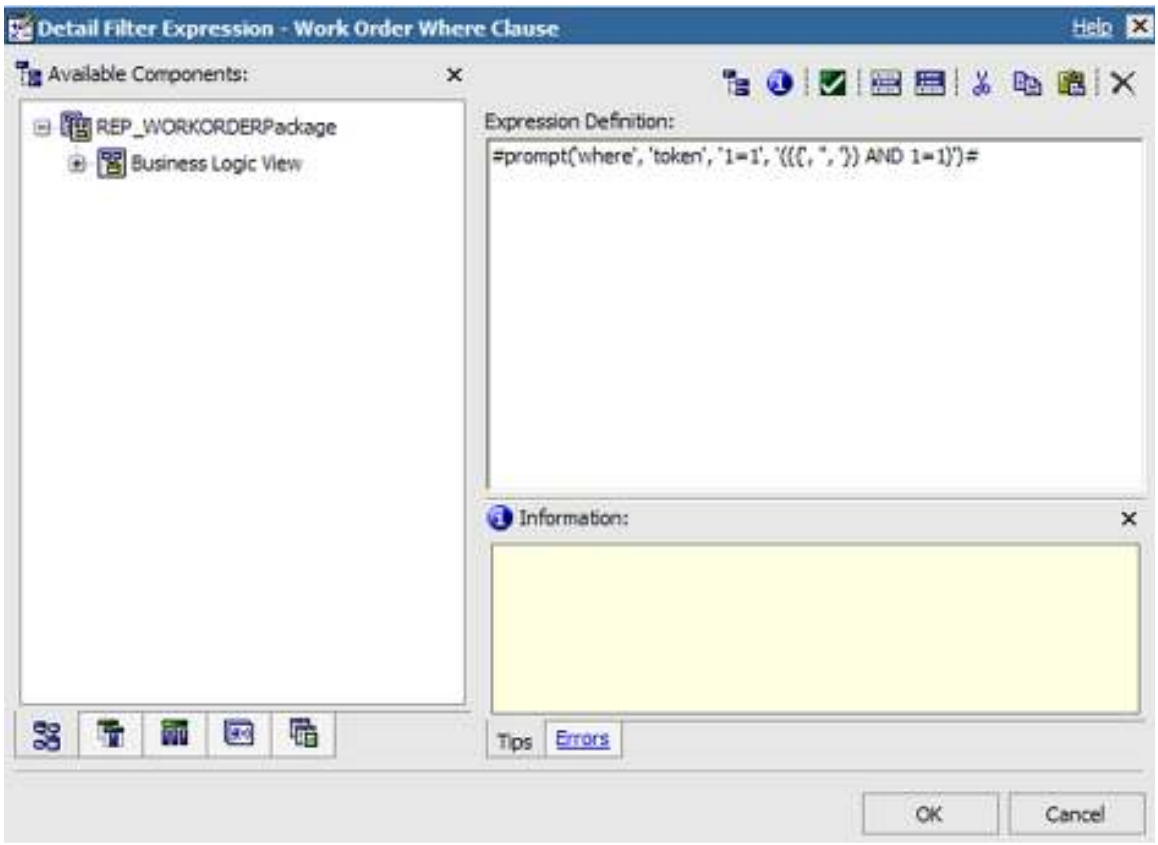


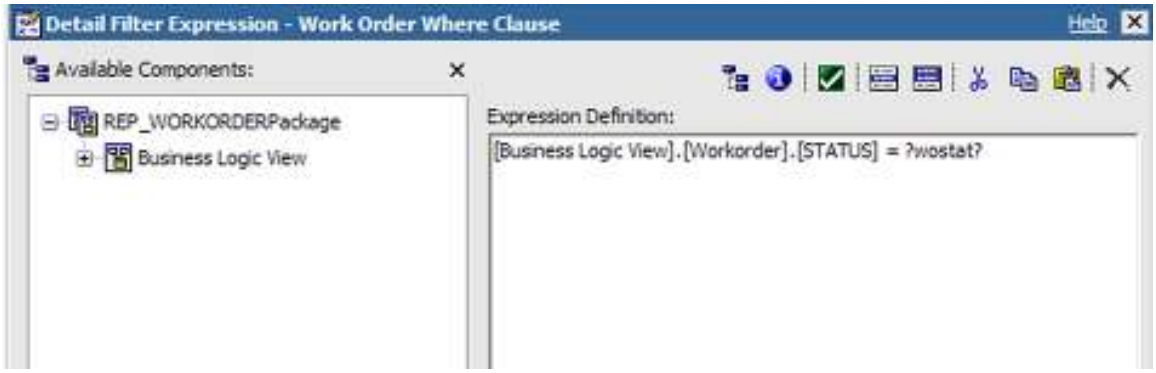
16. From the "Insertable Objects" pane, add "[Business Logic View].[Workorder].[WONUM]" as WONUM. This should be the only column in the query.



17. Add two filters, one filter for the where clause,
#prompt('where', 'token', '1=1', '(({', '', '}) AND 1=1)')#

And one for the wostatus,
[Business Logic View].[Workorder].[STATUS] = ?wostat?



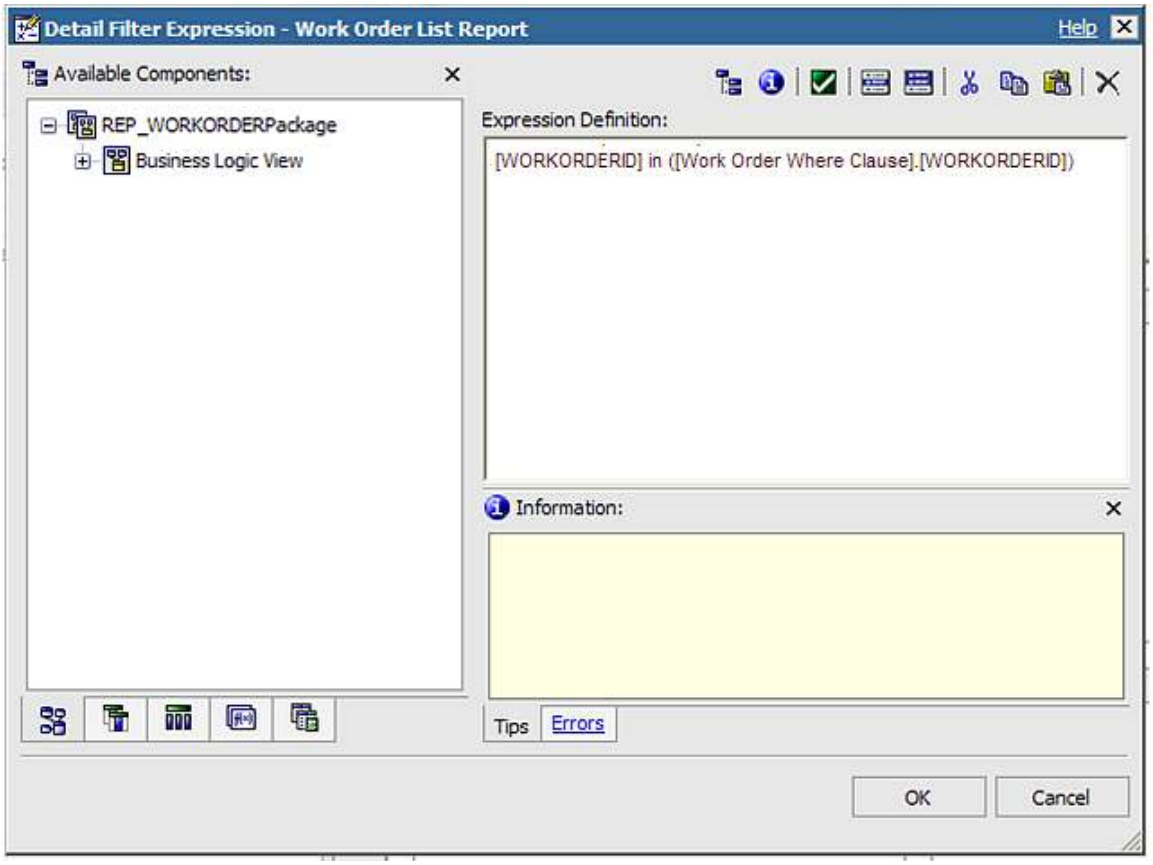


18. This query enforces the where clause passed from Maximo. This "restriction" query needs to be applied to the main query. You would also need to apply this restriction query to all queries that need to be restricted by the Maximo where clause.

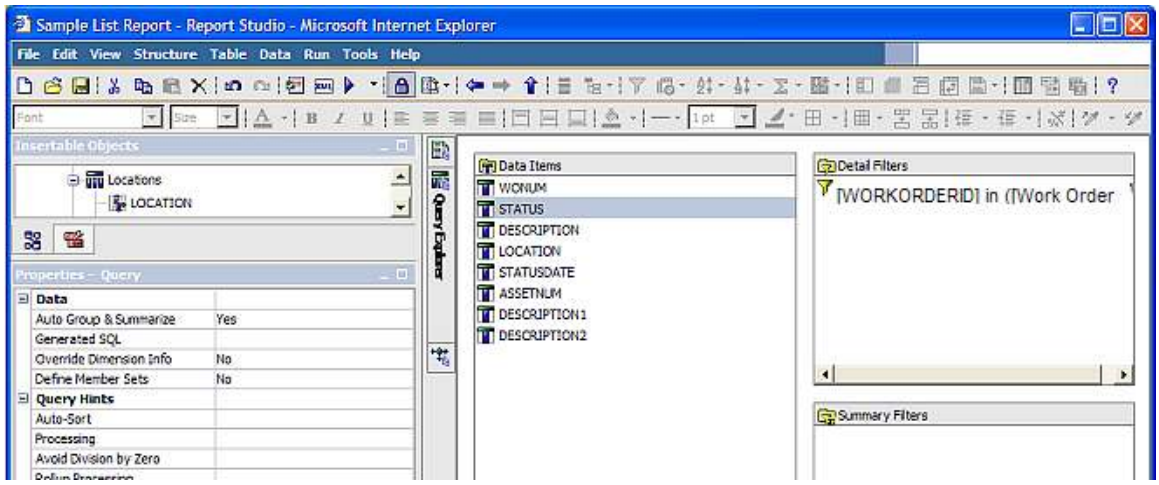
To do this, bring up your main query and add a filter for the restriction,
[WORKORDERID] in ([Work Order Where Clause].[WORKORDERID])

If you don't have a WORKORDERID column to your query, you need to add it, but you do not need to display it on your report.

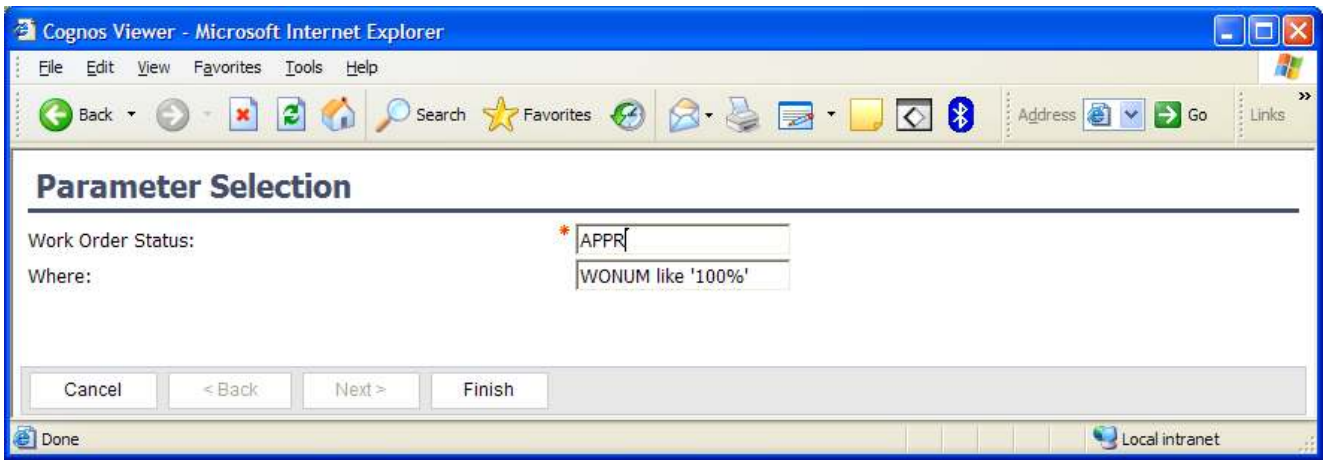
In this example, WORKORDERID is the unique key for the Package, REP_WORKORDER. If you were using another package, use the unique main table key column. For example, REP_ASSETPackage would use ASSETUID.

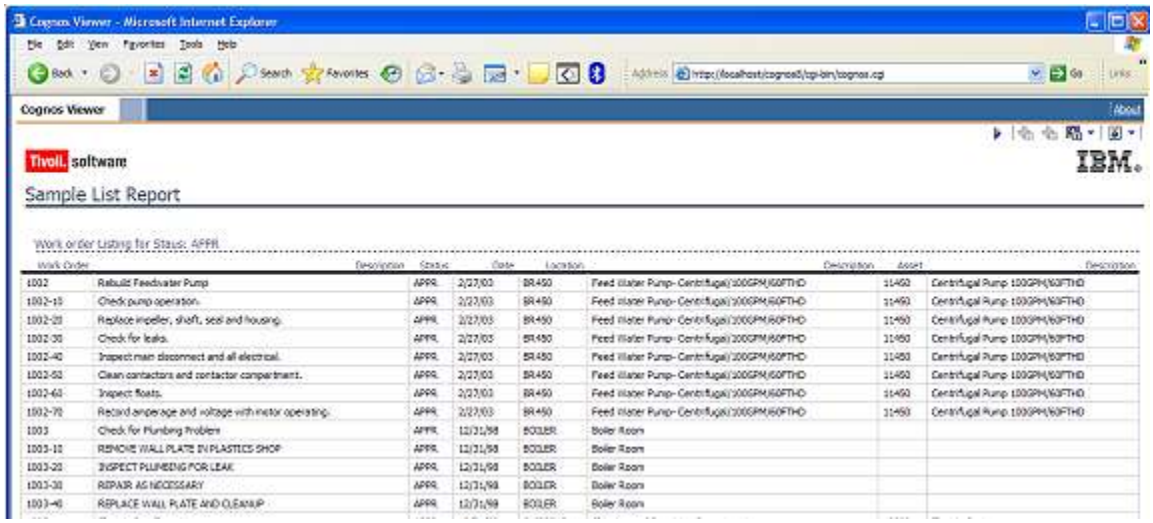


This is how the main query looks after the restrictive filter has been applied.

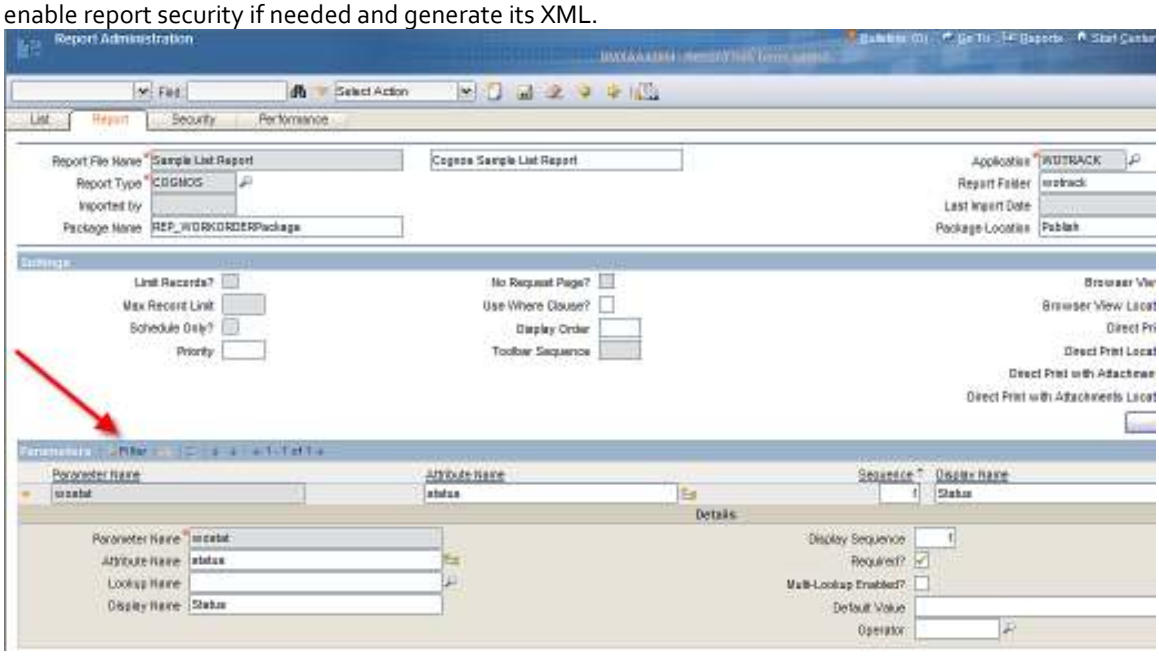


19. Test your report and notice that the 2 parameters you defined display.





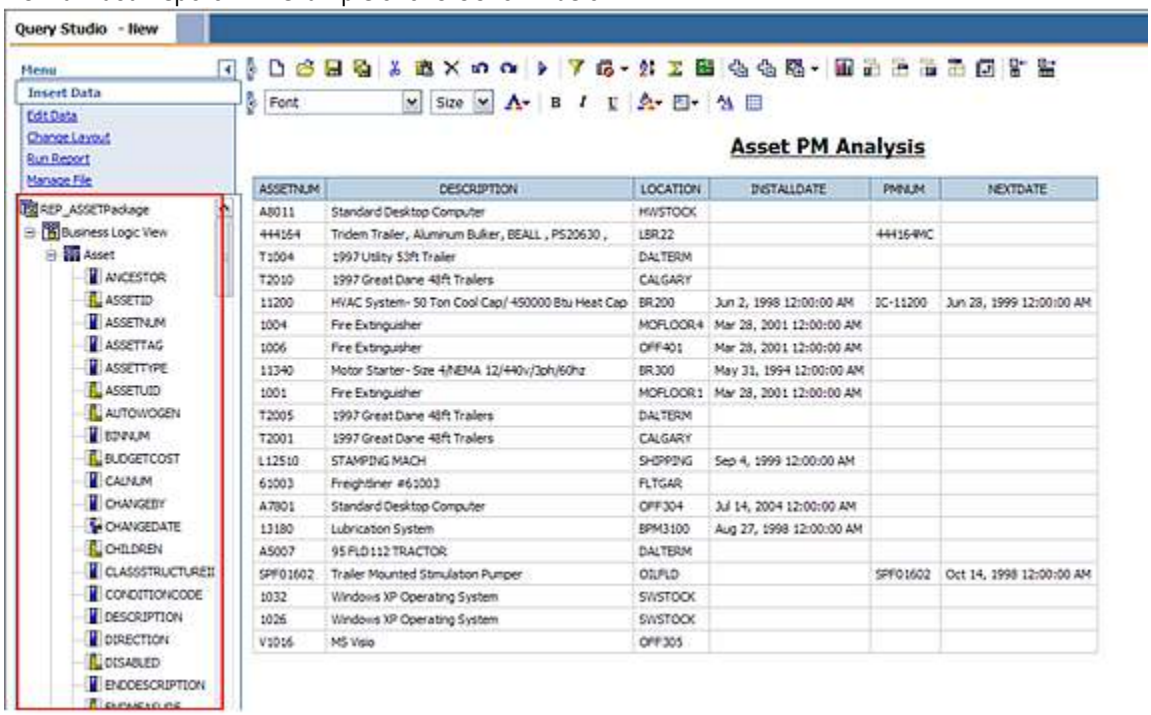
20. After you have completed developing your report, register it in the Maximo Report Administration Application. This will enable its access from within the Maximo. Make sure to include any parameters that require user input, like wostat. You do not have to include the where parameter. Save the entry, enable report security if needed and generate its XML.



Developing Maximo Cognos Reports in Query Studio

The second type of Cognos report you can create is a Cognos Query Studio report. These reports are known as Ad Hoc reports, and are intended for report developers or business users who need to create 'on the fly' reports for individual project or business needs.

Like reports created in Cognos Report Studio, Query Studio reports begin by using one of the Maximo Cognos packages. The user first selects the Maximo-Cognos Package, and then begins dragging/dropping fields from the package into his report palette to develop the report he needs. Additionally, he can add calculations, graphs, filters and a number of other functionality components for his individual report. An example of this is shown below.



ASSETNUM	DESCRIPTION	LOCATION	INSTALLDATE	PMNUM	NEXTDATE
A8011	Standard Desktop Computer	HWSTOCK			
444164	Tridem Trailer, Aluminum Bulker, BEALL , PS20630 ,	LBR22		444164MC	
T1004	1997 Utility 53ft Trailer	DALTERM			
T2010	1997 Great Dane 48ft Trailers	CALGARY			
11200	HVAC System- 50 Ton Cool Cap/ 450000 Btu Heat Cap	BR200	Jun 2, 1998 12:00:00 AM	IC-11200	Jun 28, 1999 12:00:00 AM
1004	Fire Extinguisher	MOFLOOR4	Mar 28, 2001 12:00:00 AM		
1006	Fire Extinguisher	OFF401	Mar 28, 2001 12:00:00 AM		
11340	Motor Starter- Size 4/NEMA 12/440v/3ph/60hz	BR300	May 31, 1994 12:00:00 AM		
1001	Fire Extinguisher	MOFLOOR1	Mar 28, 2001 12:00:00 AM		
T2005	1997 Great Dane 48ft Trailers	DALTERM			
T2001	1997 Great Dane 48ft Trailers	CALGARY			
L12510	STAMPING MACH	SHIPPING	Sep 4, 1999 12:00:00 AM		
61003	Freightliner #61003	FLTGAR			
A7801	Standard Desktop Computer	OFF304	Jul 14, 2004 12:00:00 AM		
13180	Lubrication System	BPM3100	Aug 27, 1998 12:00:00 AM		
A5007	95 FLD 112 TRACTOR	DALTERM			
SPF01602	Trailer Mounted Stimulation Pumper	OILFLD		SPF01602	Oct 14, 1998 12:00:00 AM
1032	Windows XP Operating System	SWSTOCK			
1026	Windows XP Operating System	SWSTOCK			
V1016	MS Visio	OFF305			

Unlike the Cognos Report Studio reports, however, ad hoc reports created in Query Studio are unable to be accessed directly from the Maximo applications. Any report accessed from Maximo must be able to accept the Maximo 'where clause' that is being passed. Because a query studio report cannot do this without significant manipulation, Query Studio reports can only be accessed directly from the Cognos Portal.

If you want to create a Query Studio report and have it accessed from Maximo, you must manually manipulate its code to add the Maximo 'where clause' – and it then changes from a Query Studio report to an Enterprise, Report Studio report. This modified Query Studio report would then be registered in Maximo's Report Administration application as report type 'Cognos'. To add the Maximo 'where clause' follow the steps noted in the section above titled 'Adding Maximo Where Clause in Cognos Report Studio Reports'.

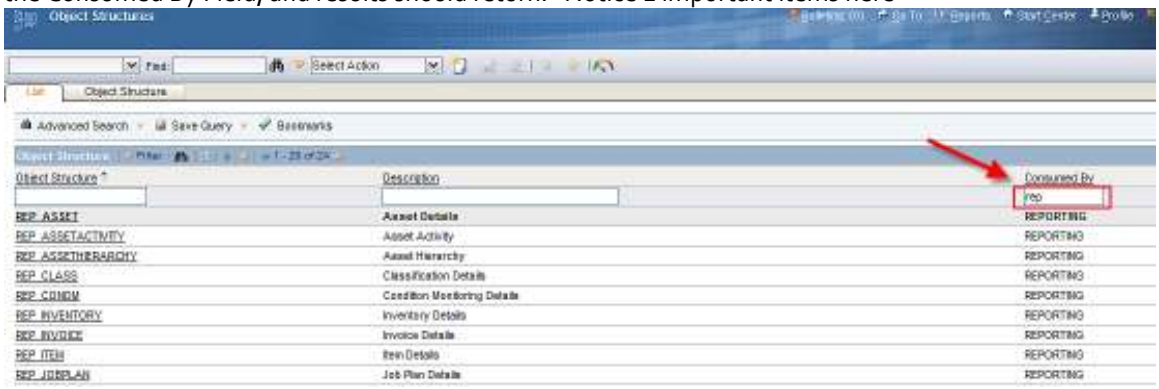
Creating Report Object Structures for Cognos Packages

Report Object Structures (ROS) can be used to dynamically create the Maximo Cognos Packages or Metadata. These enable your report developers to quickly begin creating reports in Cognos Report Studio and Cognos Query Studio.

A number of ROS are delivered with Maximo out of the box, but you may want to create your own to reflect your individual business needs. The steps below detail how to create a new ROS using the Purchase Requisition (PR) Application as an example. It details the steps and business rules involved.

Please note that creating ROS is setup work that should be performed by a developer or administrator who is very familiar with the Maximo database and database concepts. Without this knowledge, the ROS can be setup incorrectly, leading to incomplete or misleading data in the Cognos Reports.

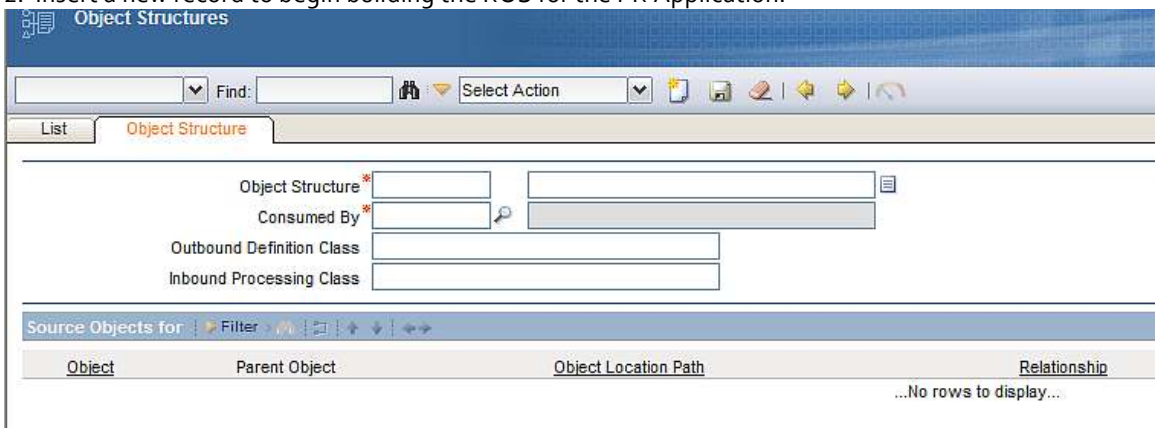
1. Go to the Object Structure Application by accessing Integration -> Object Structures. Filter on rep in the Consumed By Field, and results should return. Notice 2 important items here



A. Report Object Structures are identified with the unique attribute of consumed by of 'REPORTING'. If this is not done, the ROS will not be enabled for Cognos Package Publishing. To enable this, a Value of REPORTING with a Description of 'Reporting Application' is used in the SYNONYMDOMAIN Table for DOMAINID = 'INTUSEWITH'.

B. Secondly, it is recommended that you use a naming convention to quickly identify the ROS. The ROS delivered to you use the naming convention of 'REP_Application Name'. (For example, REP_PR). You can choose to either continue with this naming convention, or utilize one that may be more applicable to your environment.

2. Insert a new record to begin building the ROS for the PR Application.

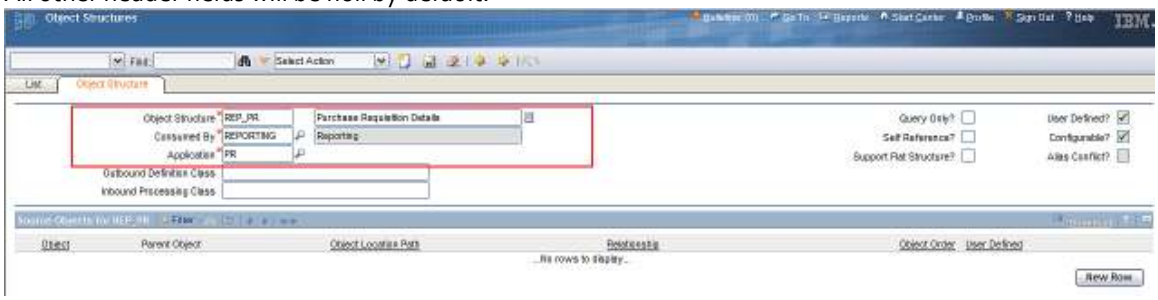


3. The top level of a ROS identifies the application it is associated with. Since this ROS is for the PR Application, whose main table is PR (MAXAPPS.MAINTBNAME), an Object Structure called REP_PR will be created. The standard naming convention will be utilized, so the following values will be entered:

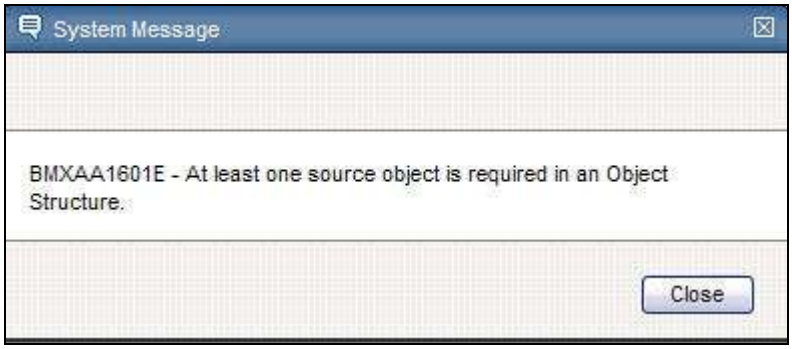
Object Structure: REP_PR
Description: Purchase Requisition Details
Consumed By: REPORTING (Selected from Value List)
Application: PR

*Note: When you select the Consumed By of Reporting, the Application Name conditionally appears. This is required as this associates the ROS to an application.

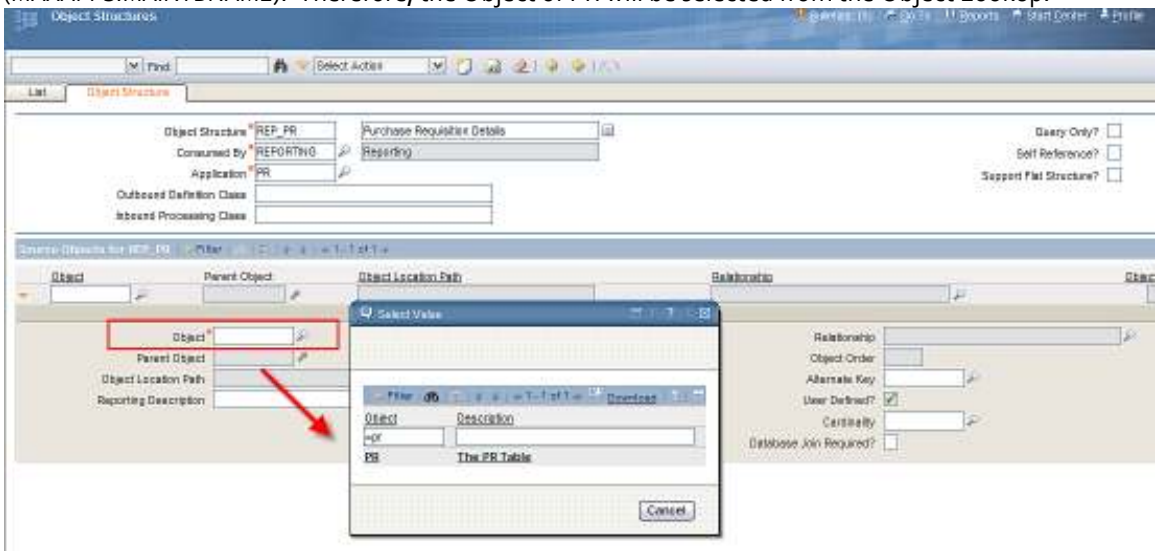
All other header fields will be null by default.



The record can not be saved at this point. If you try to save it, the following appears:

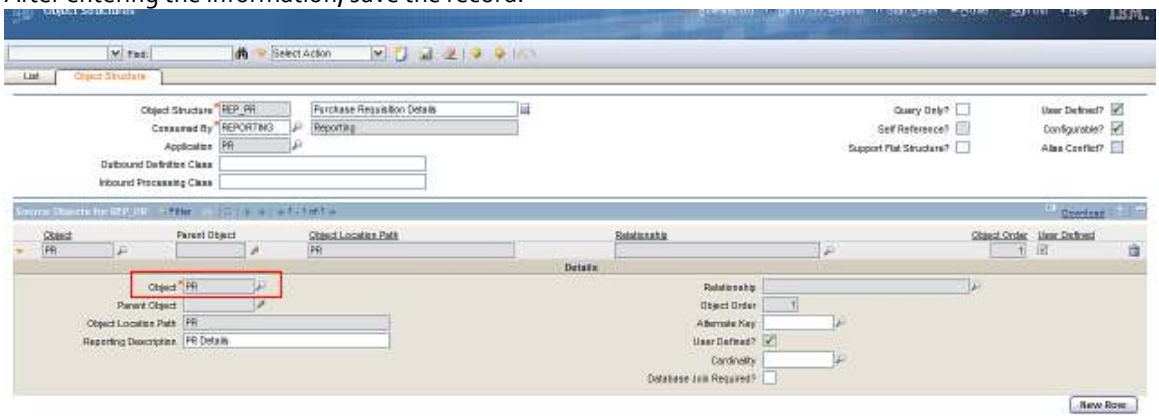


4. Next, you must define at least one source object for the ROS. The Main Object (Table) for the application will be the Parent Source Object. Again, this will be the main table of the application (MAXAPPS.MAINTBNAME). Therefore, the Object of PR will be selected from the Object Lookup.



5. The Parent Source Object (PR) must (1) have a Parent Object of null and (2) have an Object Order of 1.

After entering the information, save the record.



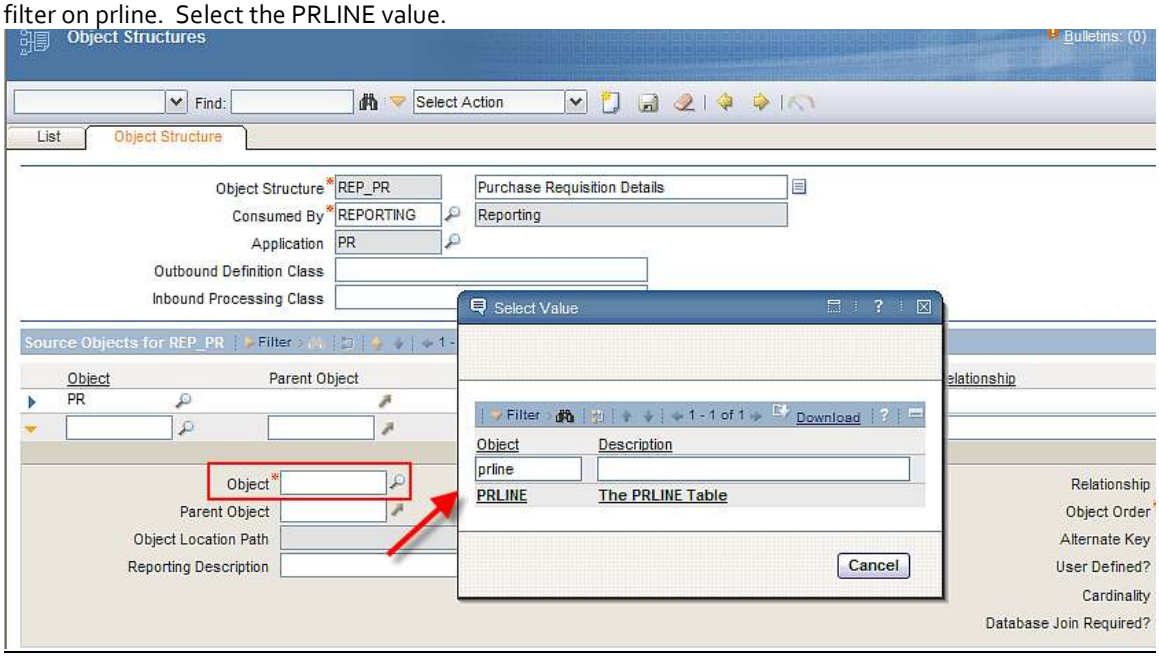
Next, any child or grandchildren categories must be defined as Source Objects to the parent. These Source Objects are also known as the Categories for the Application's QBR. They are the database tables (objects) related to the parent via maxrelationships.

Three children will be created in our example: PR Lines, Companies, Terms and Conditions.

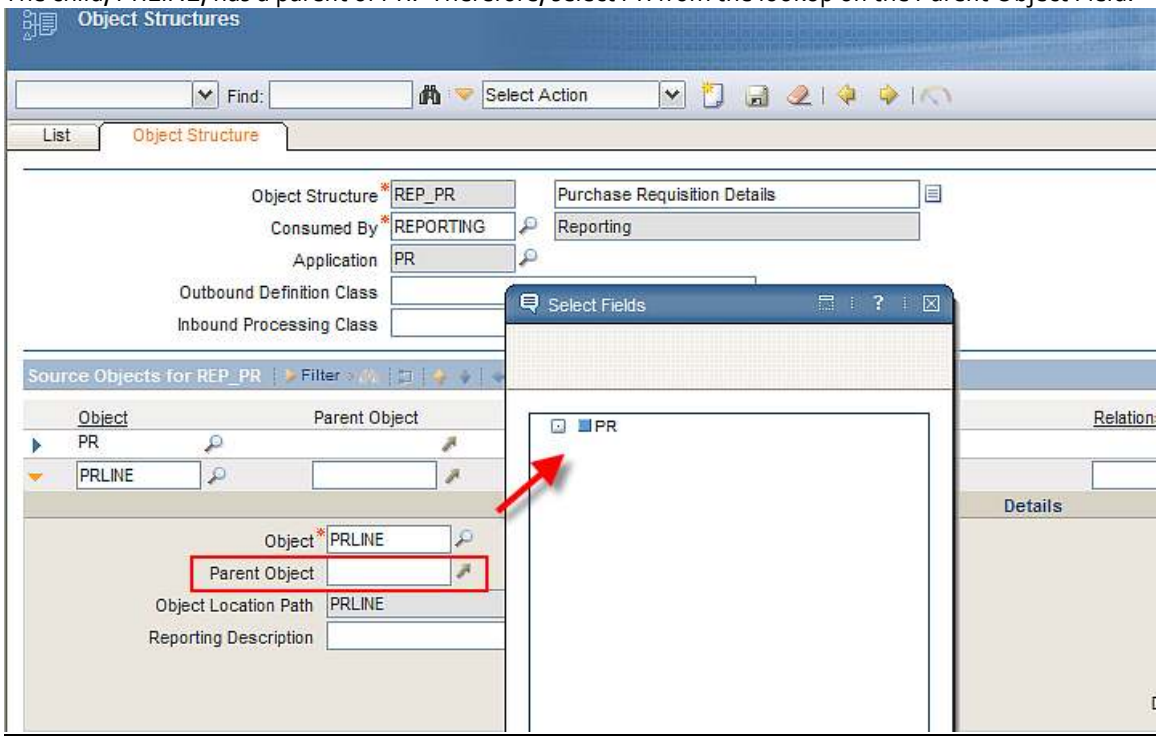
PR

- PR Lines
- Companies
- Terms and Conditions

6. To do this, click New Row in the Source Object Section. In the object field, click on the lookup and filter on prline. Select the PRLINE value.

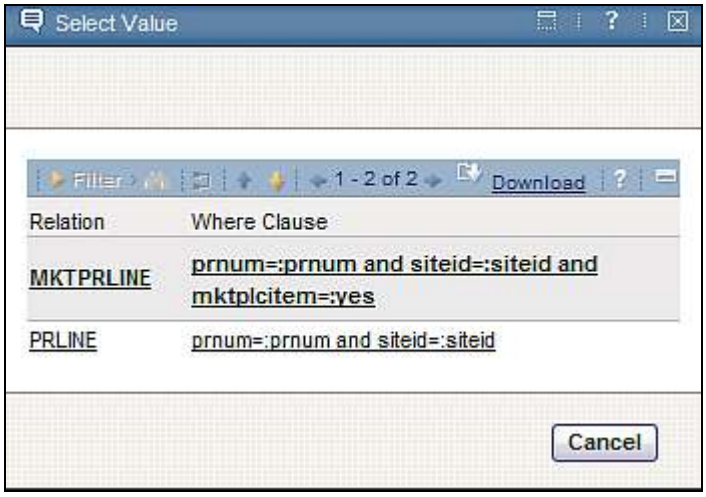


The child, PRLINE, has a parent of PR. Therefore, select PR from the lookup on the Parent Object Field.



After selecting the Parent Object of PR, the read only field of Object Location Path is updated to be 'PR/PRLINE' to indicate the hierarchy path.

7. Next, select the Relationship between the Parent PR and the Child PRLINE Table by clicking on the relationship lookup. This lookup displays values from the maxrelationship table.
*select * from maxrelationship where parent = 'PR' and child = 'PRLINE'*

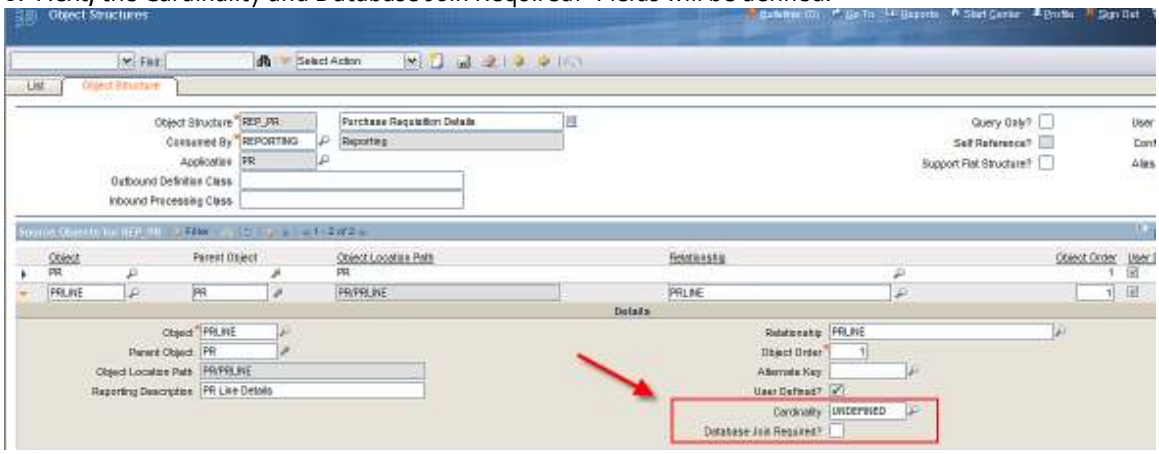


Select the correct relationship for the ROS you are creating.

Notes:
A. As noted above on pages 6 and 7, the Cognos Metadata publishing process implemented in Maximo Base Services 7.1.1.6 fix pack ONLY SUPPORTS column to column relationships (simple relationships).

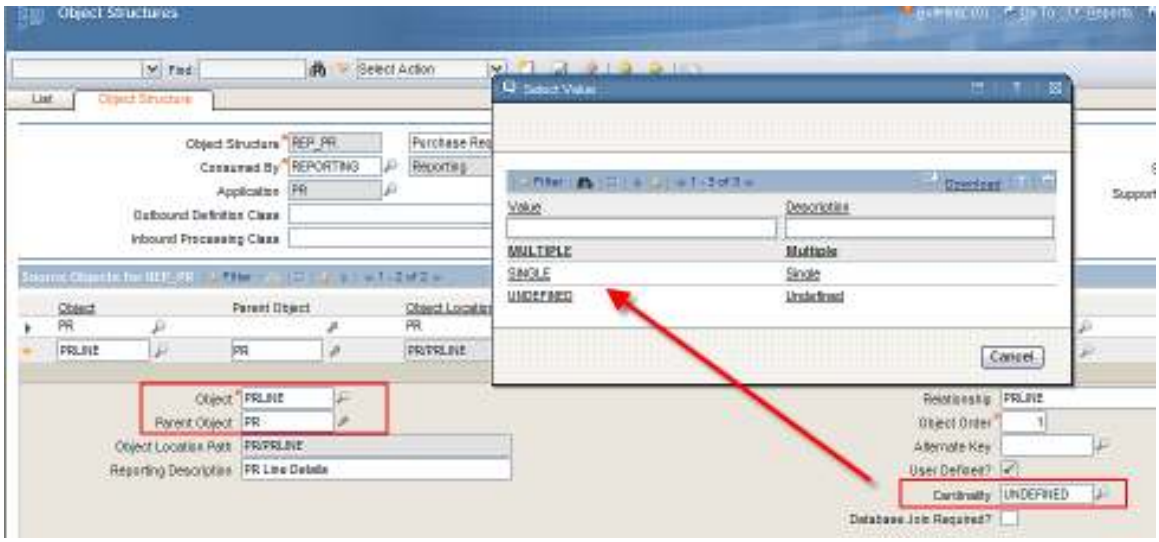
B. Additional best practices for selecting the correct relationship are contained at the end of this section.

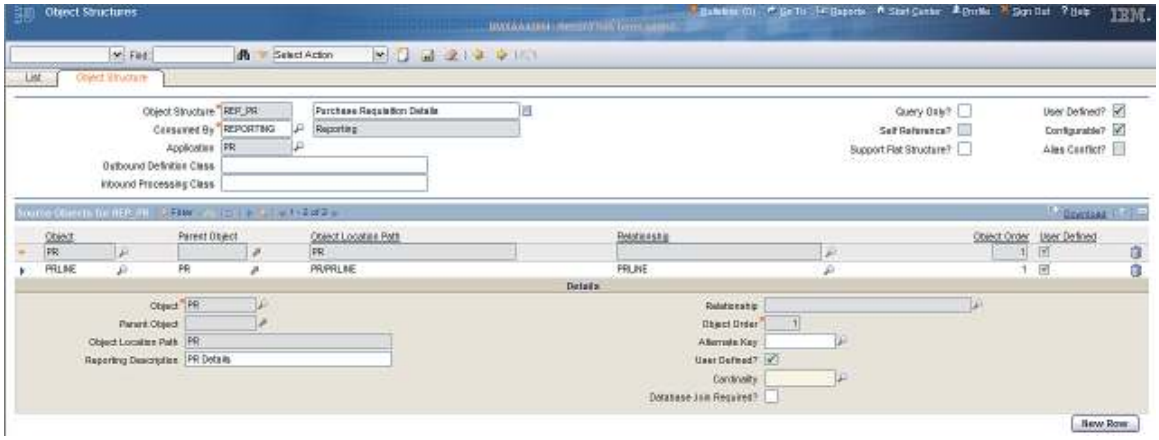
8. Next, the Cardinality and Database Join Required? Fields will be defined.



The cardinality value defaults to UNDEFINED, which assumes a multiple relationship. Select the relationship type that is applicable. In this example, Multiple is selected because multiple PR Lines can be associated to a single PR. (One to Many, or 1:N Relationship)

Enable the 'Database Join Required Field' if for every PR Record there is a corresponding record in the PR Line table.

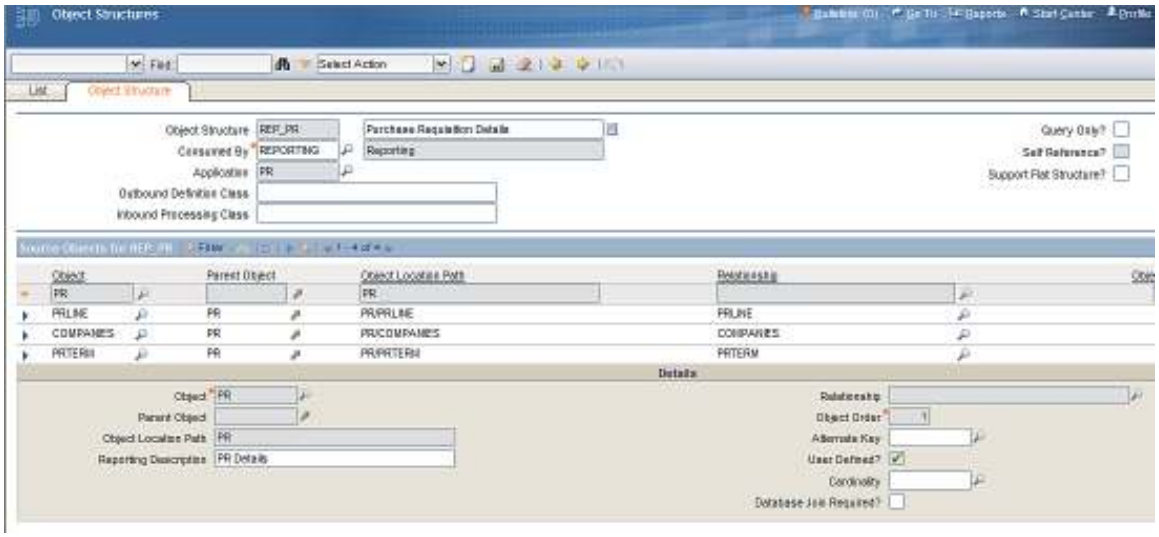




10. After saving, Click New Row again and repeat this process of adding a Source Object for the Child PR Companies and PR Terms. Notice that when you click on the Parent Object lookup this time, you can start to view how the ROS hierarchy is being built.

- PR
  - PRLINE
  - COMPANIES
  - PRTERM

11. Save the ROS with the new Companies and PRTERM Child objects.


Object Structures
Find
Select Action
List
Object Structure
Object Structure REF_PR
Purchase Requisition Details
Consumed By REPORTING
Reporting
Application PR
Outbound Definition Class
Inbound Processing Class
Query Only?
Self Reference?
Support Flat Structure?
Object
Parent Object
Object Location Path
Relationship
PR
PRLINE
COMPANIES
PRTERM
Details
Object PR
Parent Object
Object Location Path PR
Reporting Description PR Details
Relationship
Object Order 1
Alternate Key
User Defined?
Cardinality
Database Join Required?

Excluding Persistent Fields from Source Objects

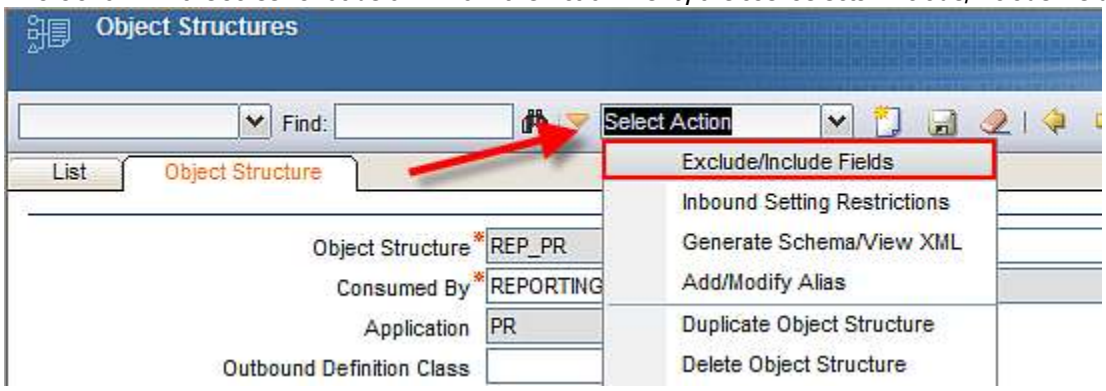
This next section is optional. However, it is highly recommended that you review its functionality as it will improve the 'Usability' features of Cognos Reporting for your users.

By default, when a ROS is created, the fields available in each Category are the Persistent Fields of the Object. Any non-persistent object fields will not be available in the ROS and consequently, the Cognos Package.

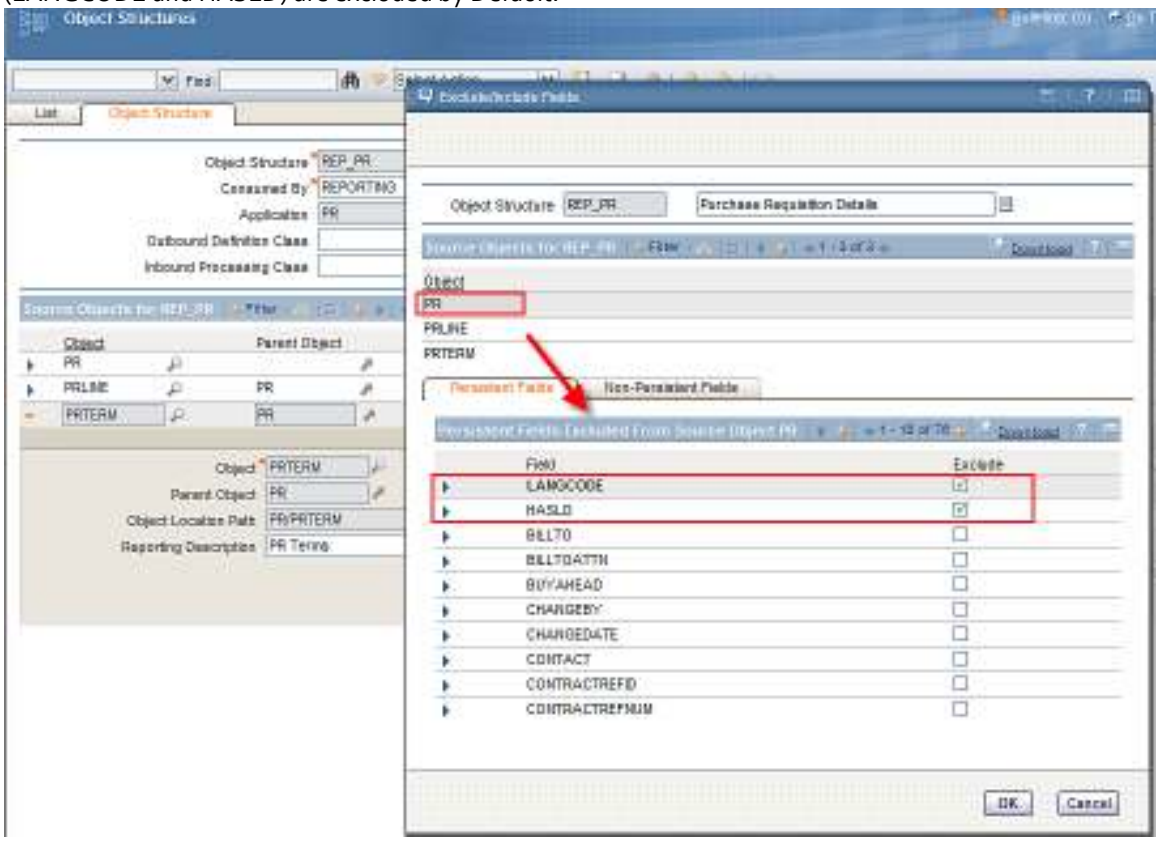
Please note however, that the number of persistent fields for each category could be very large. Additionally, some fields may repeat themselves between the parent and the child. (ex: PR Number exists in both the Parent PR Object and the Child PR Line Object.)

Therefore, to reduce these potentially massive amounts of fields that the user has to filter through, the Object Structure Action of Excluding/Including fields can be used. This functionality enables the administrator to refine the field selection for each Source Object used by Reporting. Without this functionality, the vast amounts of data available to the user creating his Cognos Reports could become un-manageable.

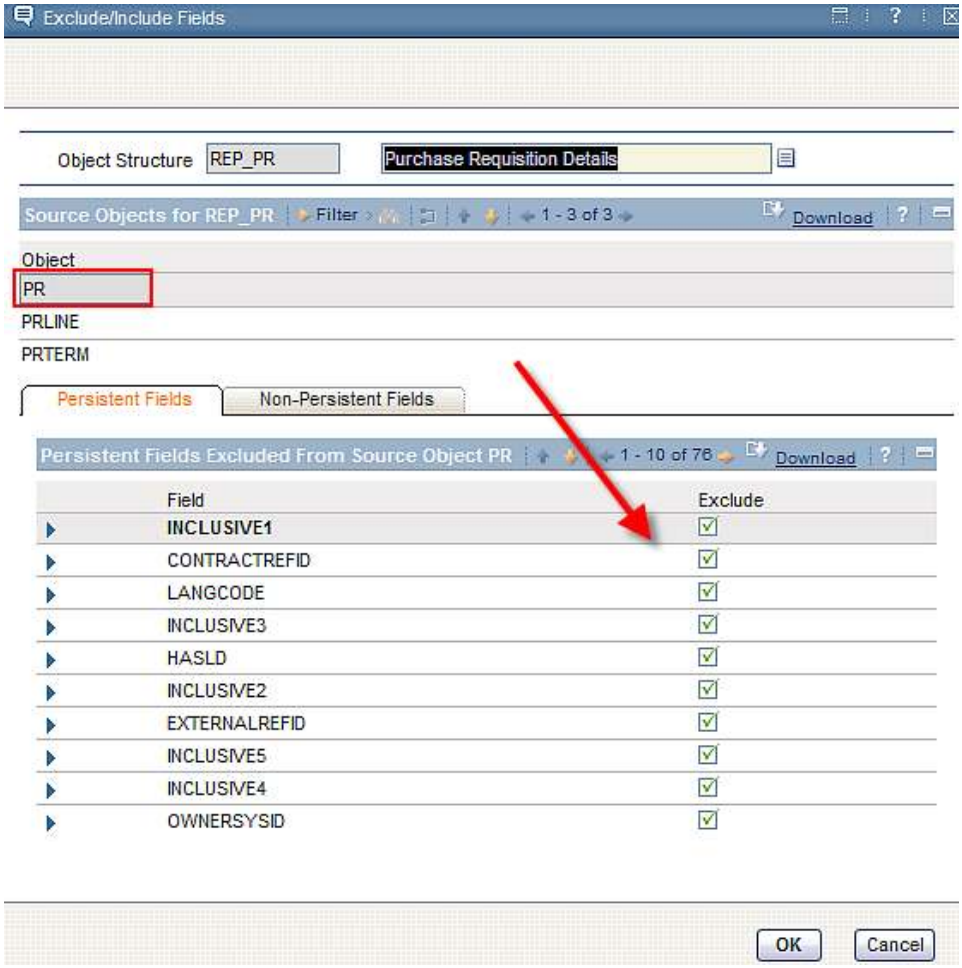
This is shown in the screen shot below. From the Action Menu, the user selects 'Exclude/Include Fields'.



For each of the Source Objects, the Admin can enable the check box to Exclude all the fields he does not want to display for the Source Object. The screen shot below shows the Parent PR Object, 2 fields (LANGCODE and HASLD) are excluded by Default.



The Admin can then choose to exclude any other PR Fields that would not be used by the end user creating an Ad Hoc Report. An updated example is shown below.



Again, this is an optional mechanism that can be utilized to reduce the potentially overwhelming number of persistent database fields displayed to the end user during the Cognos Report Creation.

Any excluded fields are held in the MAXINTOBJCOLS table. Therefore, only the *persistent* fields that are NOT contained in the MAXINTOBJCOLS table will display as available Category Fields.

Note that even though Non-Persistent fields are displayed in this dialog in the Object Structure Application, they can not be used for Reporting Objects. This is because reports execute directly against the database (persistent fields). Reports do not execute against the objects, therefore, non-persistent fields can not be used in Ad Hoc Reporting.

Best Practices on Creating ROS for Cognos Packages

1. Individuals creating Report Object Structures must be very familiar with the Maximo Database Structure and Maxrelationships. Additional information on the Database Structure can be obtained from the

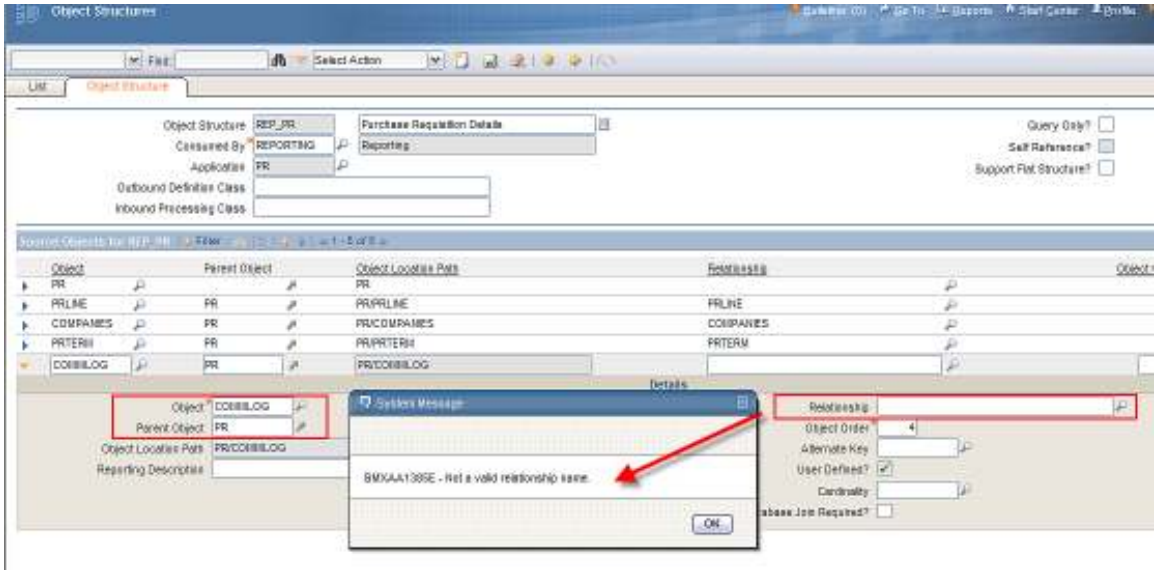
Entity Relationship Diagram (ERD) for V7. This diagram can be obtained at IBM's OPAL Site at the URL below.

http://www-01.ibm.com/software/brandcatalog/portal/opal/details?catalog.label=1TW10MA25

2. The relationships used between the parent and child object can only be simple relationships for publishing report object structures as Cognos Packages.

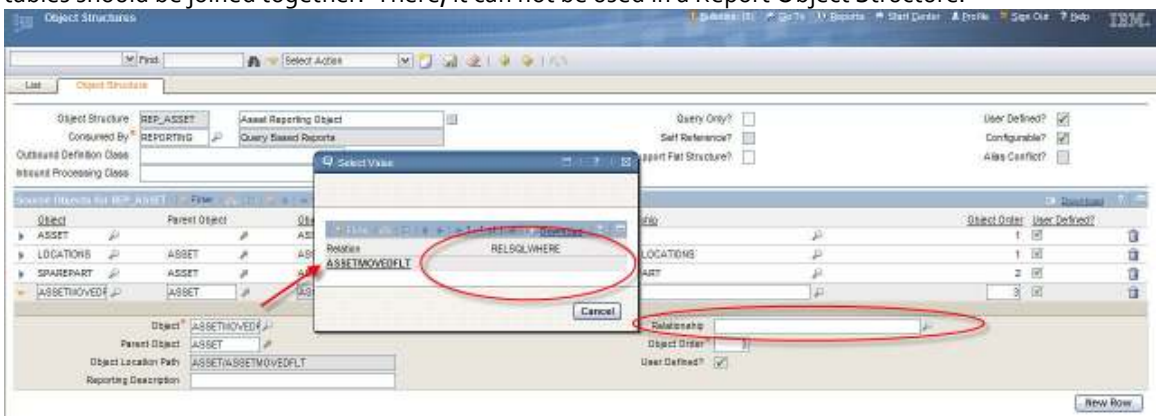
3. Each Source Object must have a relationship to the Parent Source Object to be valid. Without the relationship, the tables can not be joined, causing the QBR Report to error out.

This is shown by continuing with the PR ROS. The COMMLOG Object will be added as a child of PR. However, COMMLOG has no relationship to the PR Parent. When you try to create this ROS entry, either an error or no relationships are displayed in the relationship lookup. Therefore, COMMLOG can not be added as a child of PR in the ROS.



4. Source Objects must be joined to their parents with relationships where the database sql is defined in its maxrelationship. If the source object has a null database sql, it can not be used in a reporting object structure as it will give invalid results.

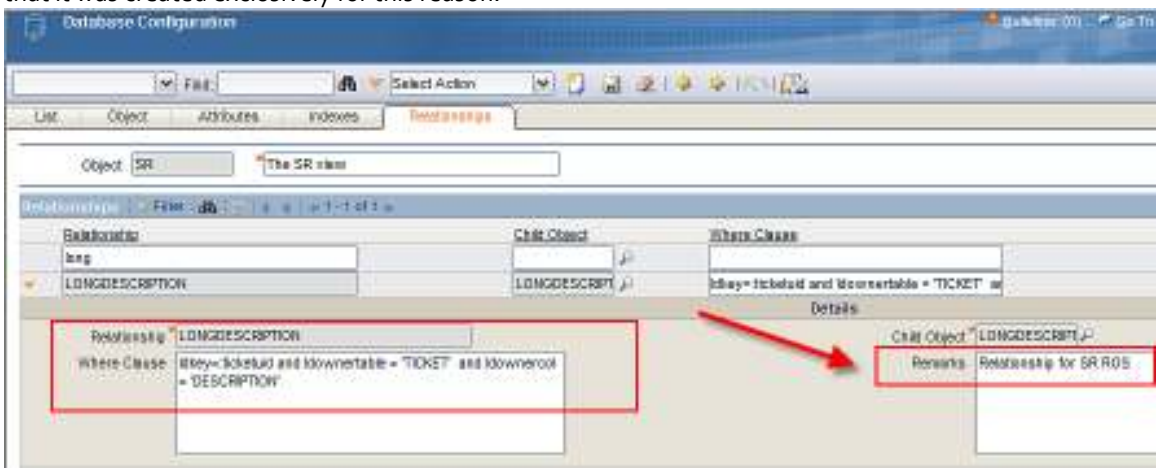
This is shown below using an Asset ROS example. A Child Object of ASSETMOVEDFLT is added to the Parent Asset Object. When clicking on the relationship lookup, notice that its database sql is null. Even though a maxrelationships exists between the two tables, there is no database sql on how those two tables should be joined together. There, it can not be used in a Report Object Structure.



5. There are no limits to the numbers of source objects that a client can utilize in a ROS. As long as each Source Object has a valid Maxrelationship, it can be added as a category.

6. ROS can be created against Database Views along with Database Tables, as long as the Database Views are valid Maximo Objects. An example of a Parent Object that is a Database View is TOOLITEM for the application Tools.

7. You may find it useful to create your own unique maxrelationships to be used in the ROS. This can help you better manage and understand the relationships used in your Cognos Reports. An example of this is a Long Description Relationship added below for the SR ROS – note that its description highlights that it was created exclusively for this reason.



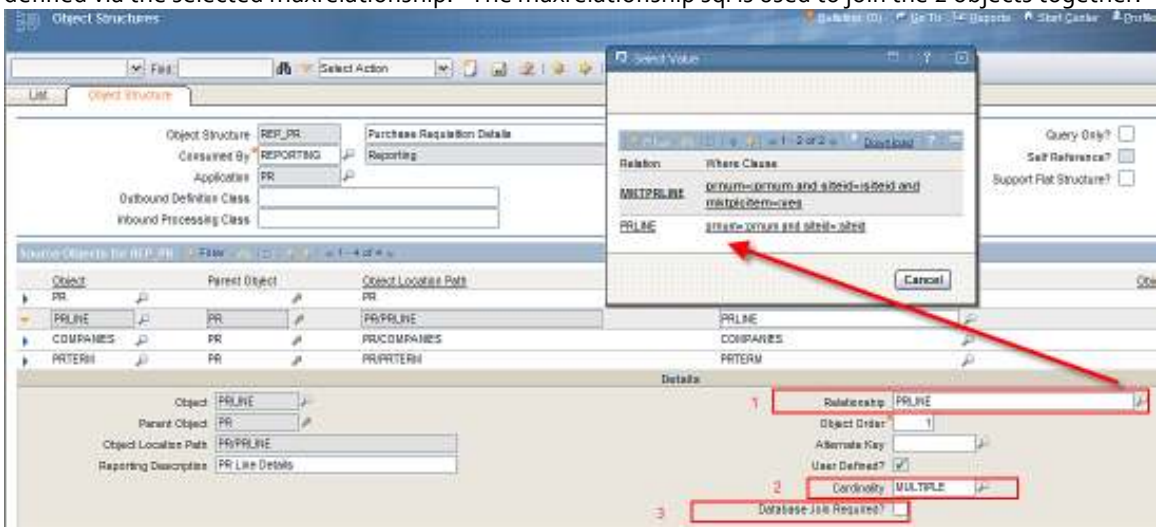
Understanding Database Joins and Cardinality

The Report Object Structures create a hierarchy of related categories for an application. The ROS utilize three critical pieces of information which becomes the basis of the report sql for the Report. These 3 components are:

1. How are the objects joined together?
2. What type of Cardinality is used between the joined objects?
3. Is the Database Join between the 2 Objects required?

Each of these is very critical as they determine what data is returned in the report. If the values are set incorrectly, the data returned to the user will either be incorrect or un-usable.

The three areas are highlighted below. The first component – how are the objects joined together – is defined via the selected maxrelationship. The maxrelationship sql is used to join the 2 objects together.

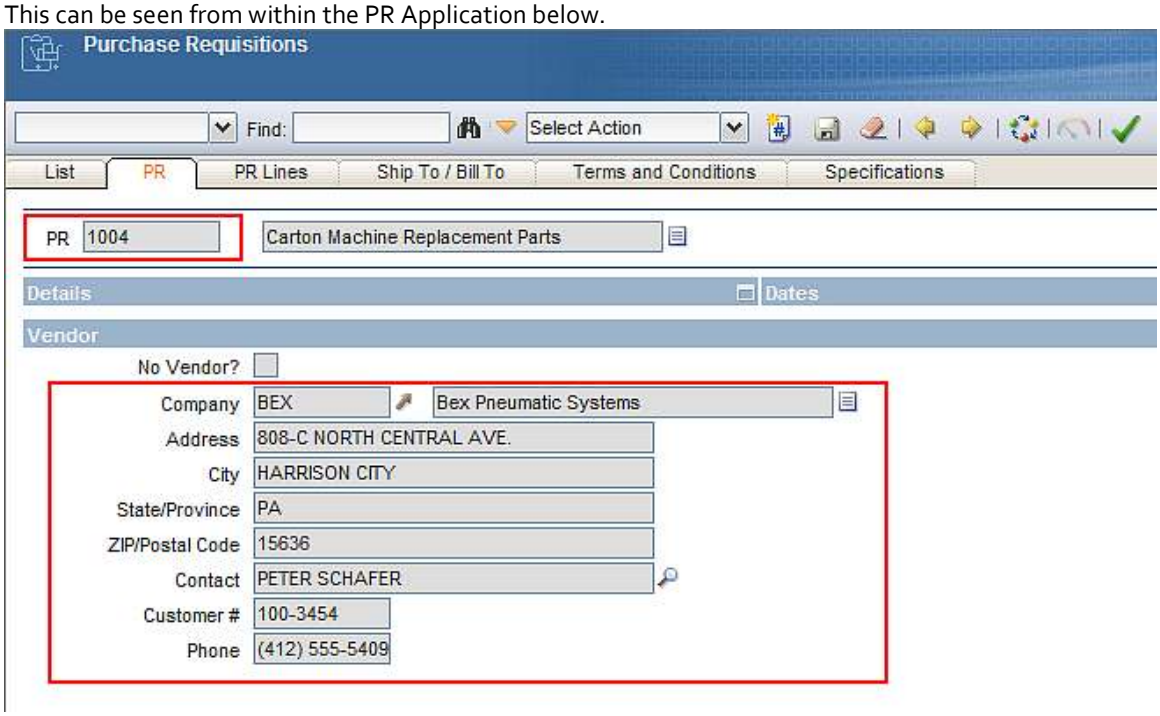


The other two fields – Cardinality and Database Join Required – are unique to ROS. The values for these fields are held in MAXRELATIONSHIPS, and more details are below.

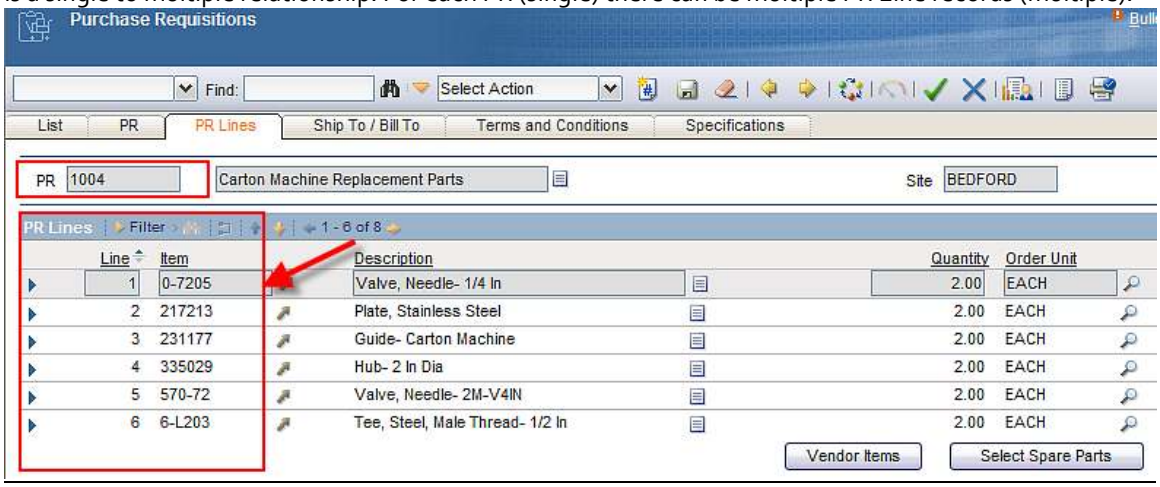
Cardinality

Cardinality is a database term defining the type of relationship. In the case of reporting, there are 2 types: One-to-one or One-to-many. One-to-one relationships are known as Single Relationships, whereas One-to-many are Multiple Relationships.

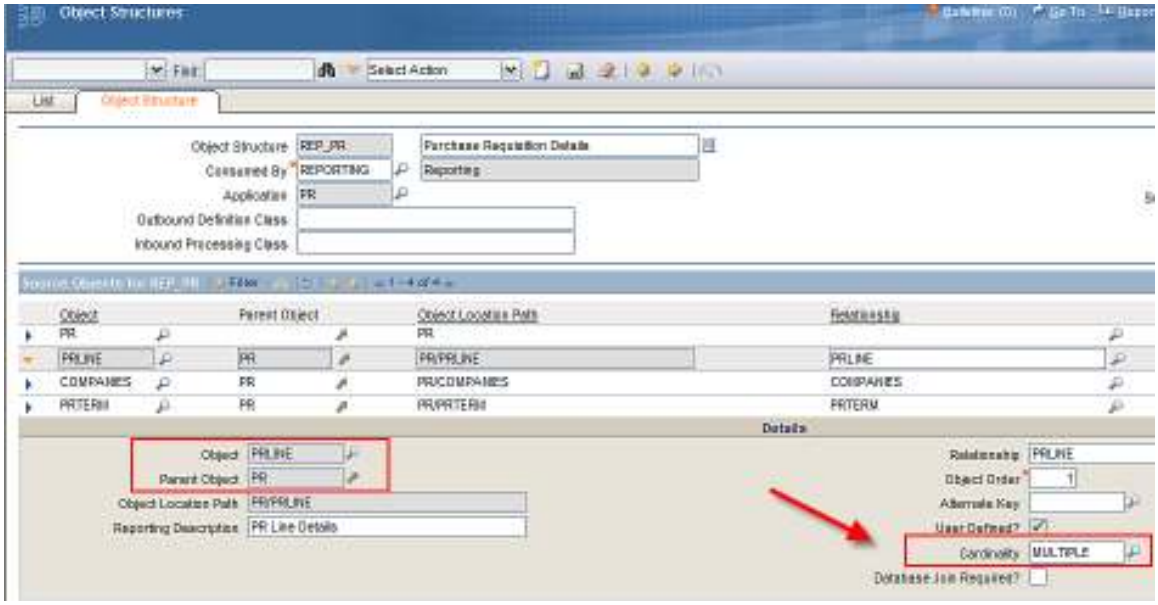
If it is a single relationship, it means it is a one to one relationship (1:1). In the example below, the PR-Companies Relationship is a single relationship as only a single Company can be associated to a single PR. This can be seen from within the PR Application below.



If it is a multiple relationship, it means it is a one to many relationship. (1:N) The PR-PR Lines Relationship is a single to multiple relationship. For each PR (single) there can be multiple PR Line records (multiple).



Once the relationships between objects are understood, the cardinality can be set properly within the Object Structure Application. This screen shot shows the Multiple Cardinality, or 1:N Relationship for PR to PRLINE.



The MAXRELATIONSHIP.CARDINALITY field is a domain field with 3 values: Single, Multiple or undefined.

1. The default value is UNDEFINED.
2. Values of Undefined, Null and Multiple are all treated as Multiple relationships.

Database Joins

The type of database join between two tables determines the data that is returned in a report. There are 2 types of joins. A required database join, and an optional, or left outer join.

If the join is defined as required, or an inner join, a '1' will be used in the MAXRELATIONSHIP.DBJOINREQUIRED field. This type of join will only return results that have corresponding data in both tables. These inner joins limit the data that is returned.

If the join is defined as NOT required, or an outer join, its value will be '0'. This is the default value. This type of join will return results that may or may not have corresponding data.

Looking further at the relationship between the PR to PR Line table -
If the MAXRELATIONSHIP.DBJOINREQUIRED = '1', only PRs with entries in the PRLINE table will be returned in the report.

If the MAXRELATIONSHIP.DBJOINREQUIRED = '0', any PR – with or without entries in the PRLINE table - will be returned in the report.

In this case, you can create and save a PR without defining any PRLINES, so the DBJOINREQUIRED = 0.

REFERENCE MATERIALS

The following lists additional references available at the time this guide was prepared. To locate these documents, access this IBM Maximo Wiki Page:

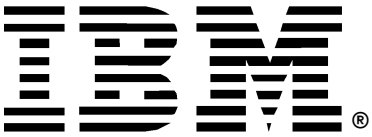
https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20Maximo%20Asset%20Management/page/Reporting%20Documentation

or its shortened url of http://t.co/3qgidEXj6L

This page contains the latest listing of report reference materials, including description, revision levels and hyperlinks to the documentation

Report Detail Guides

Document Name	Description	Version	Reference Number	Revision #	Last Posting Date	BLog* Posting
V75 ReportBooklet	Contains listings, file names, descriptions, details on parameters, formatting (grouping, sorting) and a pdf copy of each of the OOB (Out of the Box) Delivered Reports.	7.5	1497942		4/26/2011	Delivered Reports
V71 ReportBooklet	Contains listings, file names, descriptions, details on parameters, formatting (grouping, sorting) and a pdf copy of each of the OOB (Out of the Box) Delivered Reports.	7.1	1305005	4	12/28/2009	
V7 Delivered Report Comparison	Comparison of the delivered reports from the Maximo 6x, 7.1 and 7.5 releases	7.1, 7.5	1566746		10/3/2011	What's in and Out
V75 Report Feature Guide	Details how the embedded report engine is utilized, including a review of the file structure, installation and database structure. Includes information on Security, Scheduling, Administration, Queuing, and Property Files.	7.5	1498433	3	7/20/2012	
V71 Report Feature Guide	Details how the embedded report engine is utilized, including a review of the file structure, installation and database structure. Includes information on Security, Scheduling, Administration, Queuing, and Property Files.	7.1.x	1305020	10	3/15/2012	
V75 QBR Ad Hoc Reporting	Details how users can Create and Execute Ad Hoc Reports, and the Administrative setup work involved, including how to create Report Object Structures.	7.5	1498285	5	1/4/2013	
V71+ QBR Ad Hoc Reporting	etails how users can Create and Execute Ad Hoc Reports, and the Administrative setup work involved, including how to create Report Object Structures.	7.1.1.6+	1417417	7	1/14/2013	



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