

IBM® Watson IoT

Maximo Asset Management – Version 7.6 Releases

Maximo Cognos Feature Guide

Revision 4

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1 Overview

In the Maximo® 7.6 Release, an integration to the IBM Cognos® BI Reporting tools is available. This integration extends the current suite of reporting tools that Maximo enables into a deeper level of Strategic Reporting. The Maximo Cognos integration enables you to further analyze all the powerful Maximo data that exists so you can make the best business decisions possible for your unique business environments.

As a Maximo client, you are entitled directly to these tools with the Maximo 76 release. This entitlement includes a variety of powerful Cognos Reporting tools that will be referenced throughout this guide.

A key feature of this integration is the user of Maximo's Integration Framework to automatically create the Cognos metadata layer. The metadata layer is used by developers to create Cognos 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 are based off of the Maximo Applications, like Assets, Work Order or Job Plans. These packages can 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, your object customizations can be incorporated. This is a key design point as the vast majority of our clients extend the Maximo database. Therefore, your unique database customizations will be picked up dynamically – so you do not have to expend significant time and efforts in determining individual table relationships needed for package creation.

This document includes details on the integration architecture, security, and the meta data publishing process. Throughout the guide, references and best practices are reviewed, including creating Report Object Structures for package publishing.

Finally, it is the assumption of this document that you already have the Maximo Cognos Integration installed. Details on the Maximo Cognos Install can be found in the installation documents referenced at the end of this guide.

Notes:

1. This document is specific to the Maximo 7.6 release. For information earlier Maximo versions, reference the Reference Material section at the end of this guide.
2. Beginning with Maximo 76, the Cognos BI Server entitlement is directly enabled with Maximo. TCR (Tivoli Common Reporting) is no longer used in Maximo 76.

1.1 Cognos Products

A variety of powerful, enterprise Cognos tools are available to you with the Maximo 76 release including (1) Cognos BI Server (2) Framework Manager (3) Cognos Insight (4) Life Cycle Manager and (5) Dynamic Query Analyzer

(1) Cognos BI Server: The Cognos BI Server is the main component of the Maximo-Cognos integration. The BI Server is what you install and configure in the Maximo Cognos Installation guide. The BI Server is made up of a number of key products accessible via its portal or the Cognos Connection

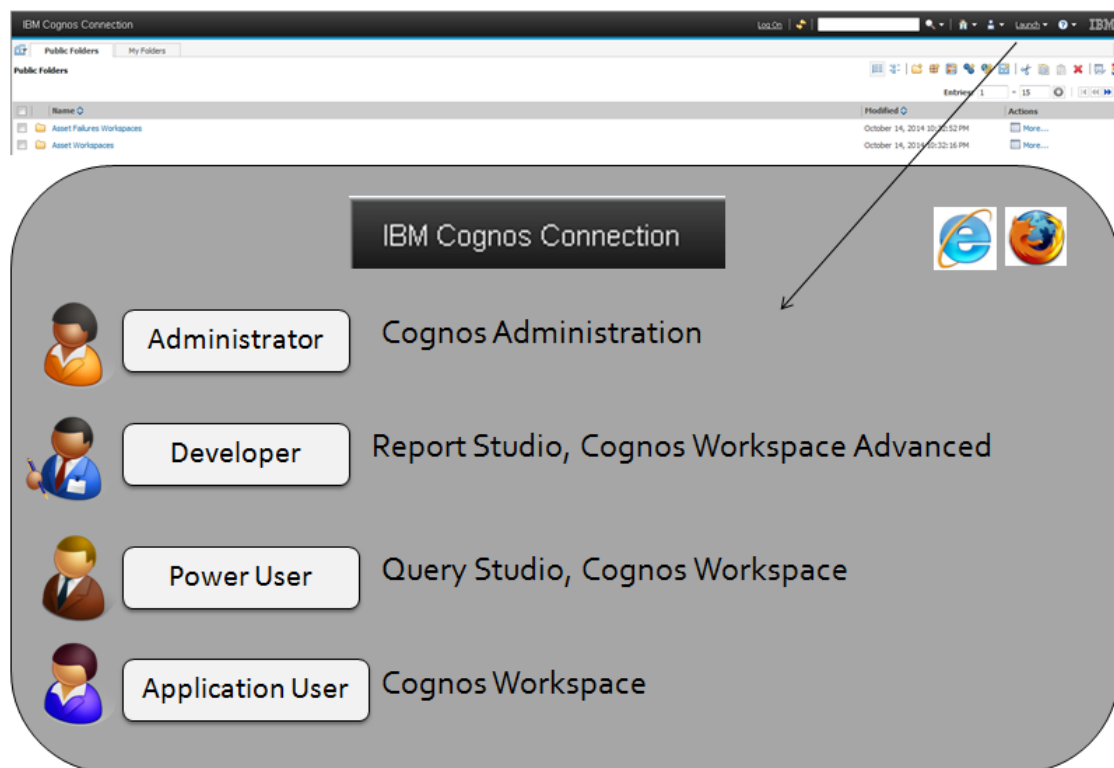
Cognos Administration: Used by the Administrator to set security, import content and manage performance

Report Studio: Report development tool 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.

Workspace Advanced: Newest development tool for report developers. The developer does not have as much control on the layout of these reports as compared to Report Studio, however, they can be quickly created for use in the Workspace tool

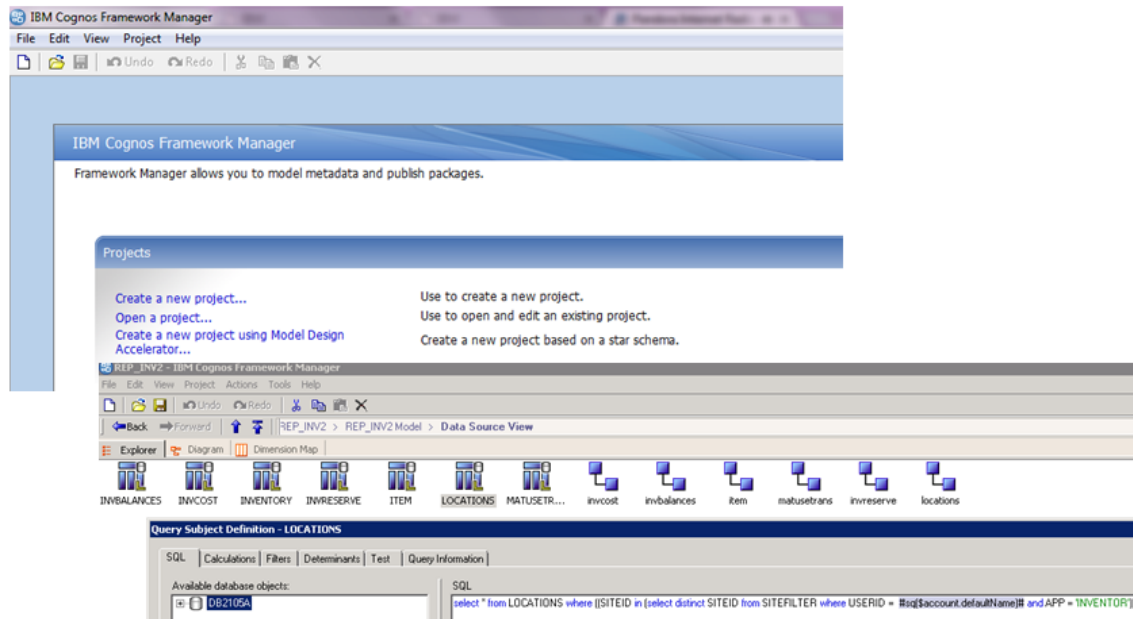
Query Studio: Ad hoc reporting tool for power users to create individual reports for their business or project needs. Query Studio reports can only be accessed from the Cognos Portal.

Workspace: End User tool which contains multiple reports within a single palette or page. Users can dynamically filter the data, change graph types and add/remove reports for ease of analysis.



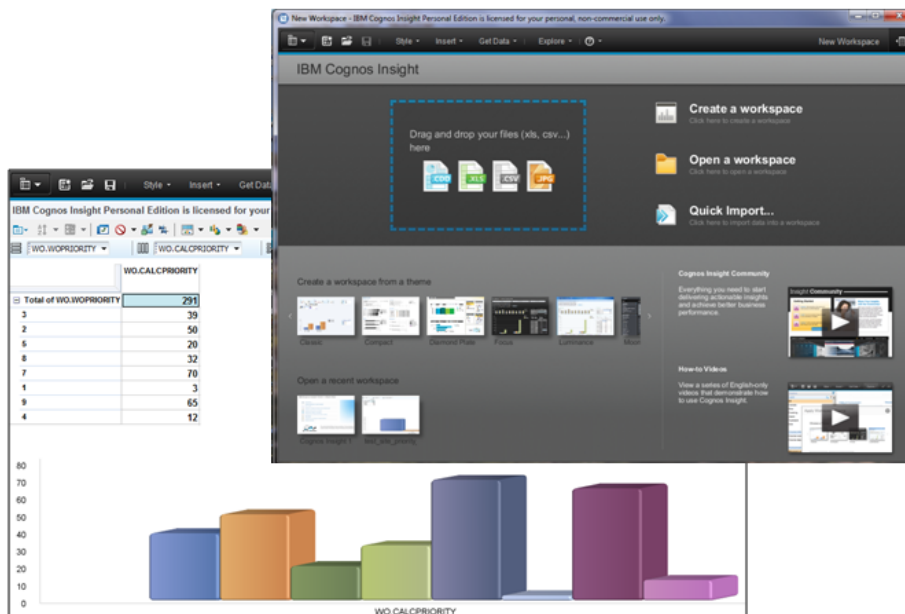
(2) Framework Manager (FM)

FM is a windows based, client tool which should be installed on an Administrator's machine. You will be required to access this tool if you are going to modify published or delivered models, or modify data source names or schema of the delivered Cognos content.



(3) Cognos Insight

This new, powerful Cognos tool may be useful to a subset of your power users. It is installed outside of the Maximo-Cognos integration, and can utilize different forms of data sources (.ex csv files). Reference this url for details on installing and utilizing Cognos Insight http://www.ibm.com/developerworks/data/library/cognos/upgrade_and_migration/bi/page579.html



(4) Life Cycle Manager

This web based report upgrade tool can help your administrators compare Cognos reports when performing upgrades. Although you may not utilize this tool initially in a new environment, it may become useful for you in the future as it provides a visual comparison of legacy and new reports, along with providing benchmark times for the old and new content. This tool is only available for 32-Bit Windows environments. Reference this url for details on installing and utilizing Cognos Insight

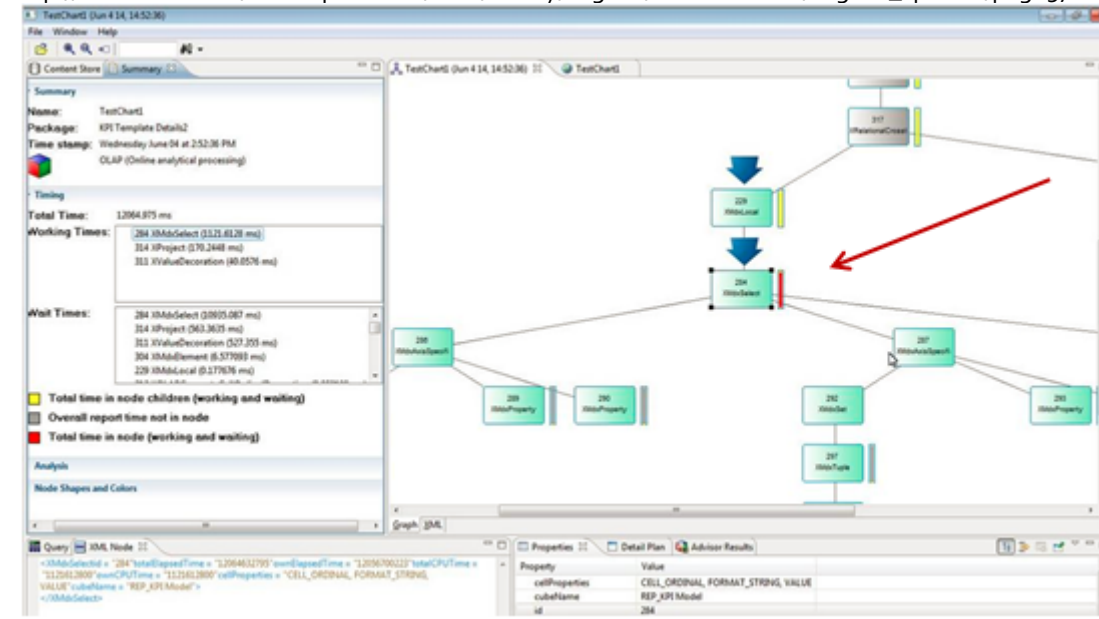
http://www.ibm.com/developerworks/data/library/cognos/upgrade_and_migration/bi/page579.html

Name	Status	DQPT enabled	Progress	Options
Release Report as of Dec 31 2008	No Differences	0 0	100%	[Icon]
Backup vs. Actual	No Differences	0 0	100%	[Icon]
Customer Returns and Refundation	No Differences	0 0	100%	[Icon]
Employee Training by Year	No Differences	0 0	100%	[Icon]
Employee Training by Year and Role	No Differences	0 0	100%	[Icon]
Global Market Report	No Differences	0 0	100%	[Icon]
Manager Profile	No Differences	0 0	100%	[Icon]
Product Movement	No Differences	0 0	100%	[Icon]
Positions to Fill	No Differences	0 0	100%	[Icon]
Promotion Success	No Differences	0 0	100%	[Icon]
Quantity Sold vs. Shipped and Inventory	No Differences	0 0	100%	[Icon]
Recruitment Report	No Differences	0 0	100%	[Icon]
Return Quantity by Order Method	No Differences	0 0	100%	[Icon]
Returned Items	No Differences	0 0	100%	[Icon]
Returns by Country, Product Orders and Complaints in 2010	No Differences	0 0	100%	[Icon]
Returns by Order Method	No Differences	0 0	100%	[Icon]
Returns by Order Method - Promoted Chart	No Differences	0 0	100%	[Icon]
Returns by Subcategory 2010	No Differences	0 0	100%	[Icon]
Sales Commission for Central Europe	No Differences	0 0	100%	[Icon]
Sales Growth True Case Study	No Differences	0 0	100%	[Icon]
Succession Report	No Differences	0 0	100%	[Icon]
Top 10 Products for 2010	No Differences	0 0	100%	[Icon]

(5) Dynamic Query Analyzer:

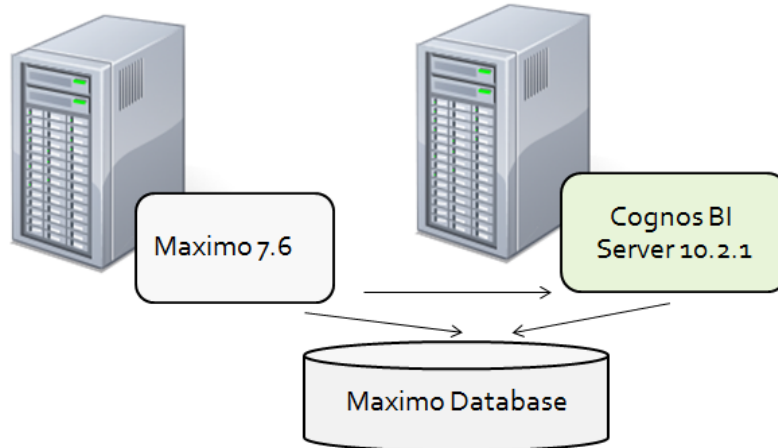
This Administration tool provides a visual analysis of meta data package performance, with potential areas highlighted in red. Reference this url for more information:

http://www.ibm.com/developerworks/data/library/cognos/infrastructure/cognos_specific/page578.html

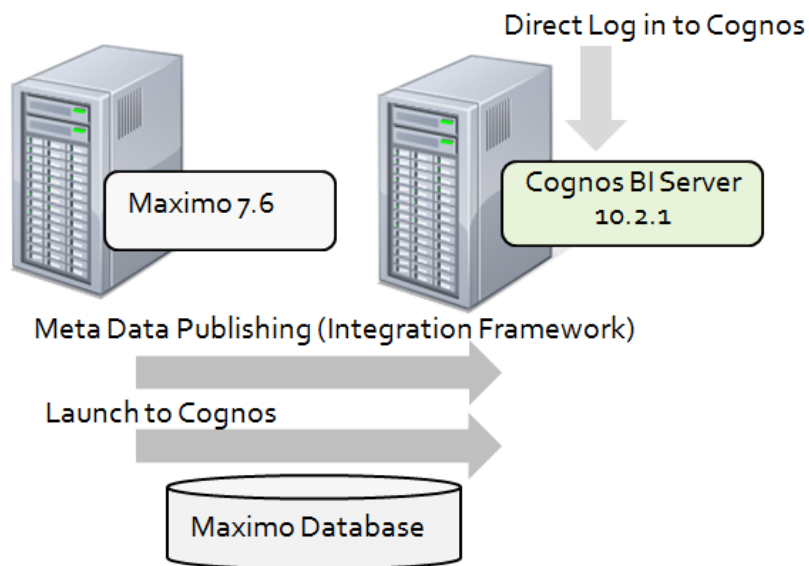


2 Integration Architecture

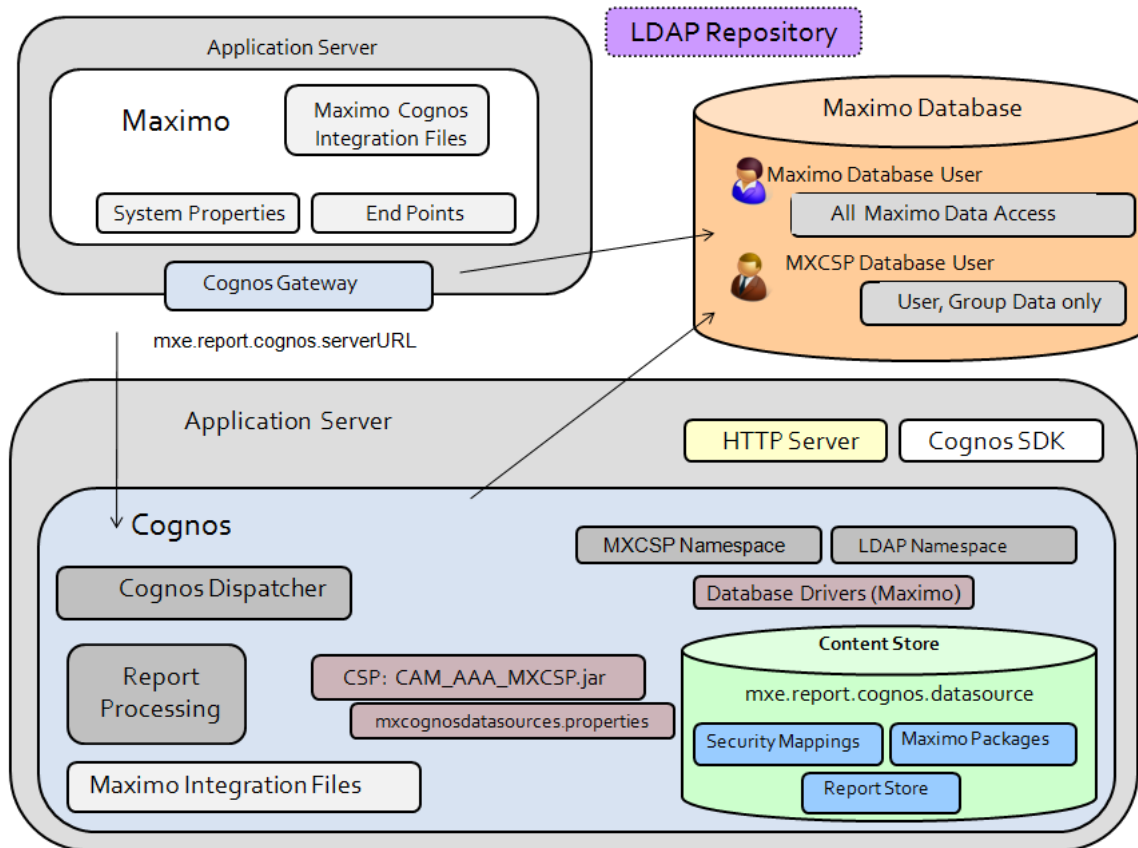
At a top level, there are three major components in the integration which are (1) Maximo 76 (2) Maximo database and (3) Cognos BI Server 10.2.1. The Maximo database can be the production database or a replicated copy, and it is recommended that Cognos be installed separately from Maximo.



Drilling down into these components highlights the key processes of the integration including the Meta data publishing from Maximo to Cognos, along with the different access points to Cognos. These include launching directly to Cognos from Maximo, or logging in directly to the Cognos portal.



The diagram below shows a continued drilldown into the architecture. Your individual environment may vary depending on your security repository and your deployment. However, key components that will be referenced are displayed here - including namespaces, content store components and security group repositories.



3 Maximo Metadata

Cognos requires pre-joined objects, or a metadata, for report development and execution. The metadata encapsulates the complexity of Maximo's physical database definition, and exposes a user friendly view of Maximo's business objects definitions.

Starting with Maximo 76, Maximo delivers Cognos reports and workspaces as content often referred to as the 'BI Packs.' This content includes metadata models on which the reports and workspaces were developed.

However, you may need to create your own metadata that reflects your unique customizations. It is estimated that over 90% of Maximo clients customize the database by adding attributes, cloning applications, or applying business partner solutions. These modifications make your database unique - and requires a unique Cognos metadata.

Maximo provides tools to streamline the development of this metadata. Capitalizing on its Integration Framework, Report Object Structures (ROS) form the Cognos metadata packages. This metadata defines the tables, attributes and relationships that Cognos uses to reference Maximo data content.

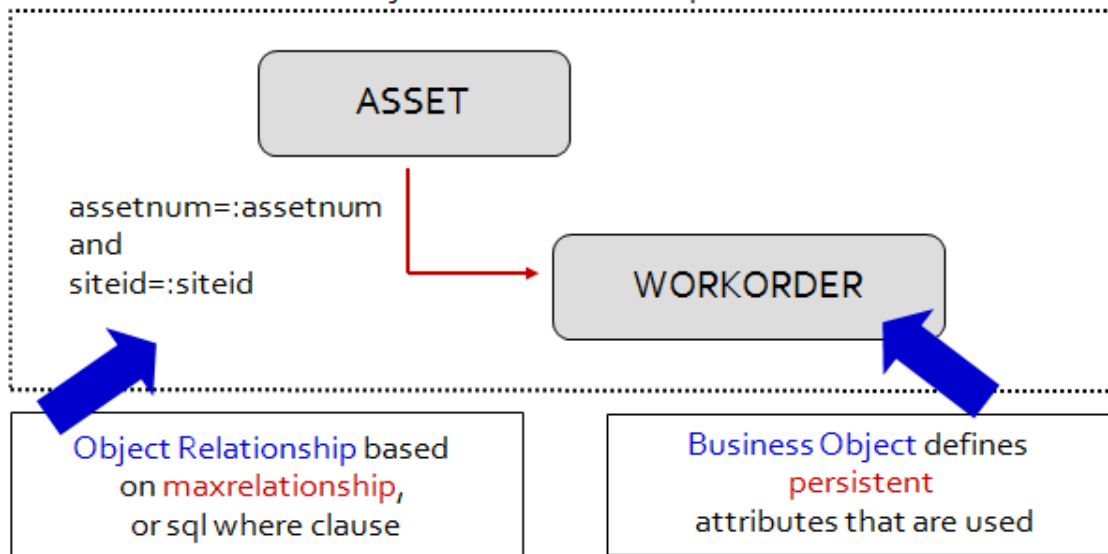
3.1 Report Object Structures

Maximo metadata models are based on Report Object Structures (ROS). ROS provide a collection of the business objects, and their associated relationships. The ROS are typically developed around an application - like Assets, Inventory or Workorder - and multiple ROS can be associated to an application.

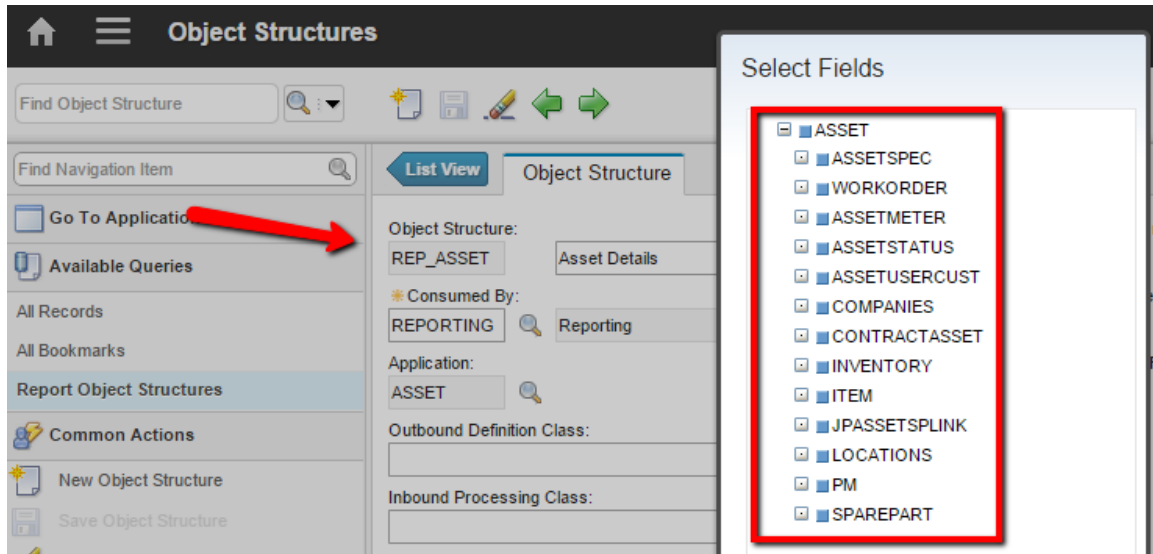
ROS: REP_ASSET

Description: Asset and WO Details

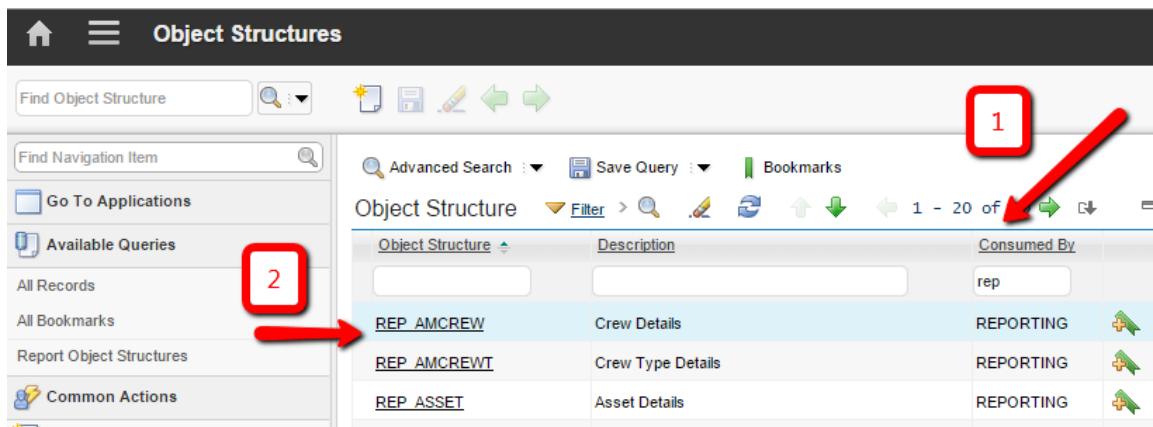
Collection of Business Objects and Relationships



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 multiple children objects.

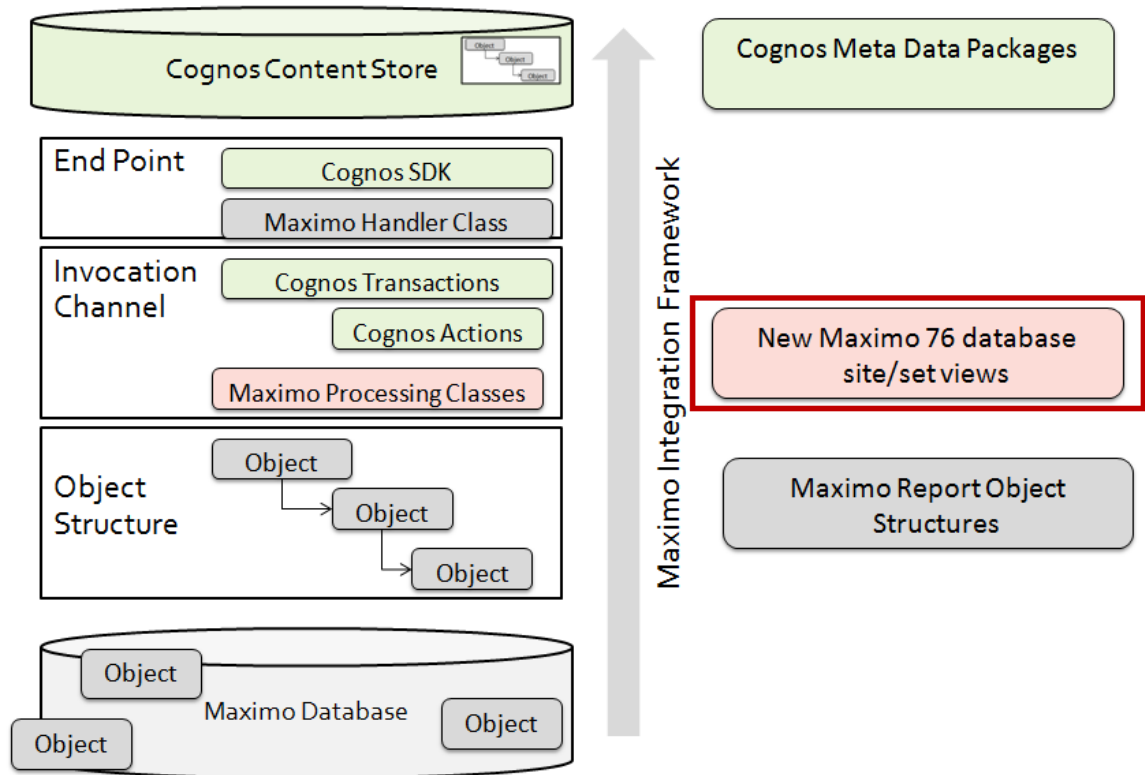


More information on ROS, including Cardinality, Database Join Required and Business Rules, can be found in the section titled '*Creating Report Object Structures for Cognos Packages*' later in this guide.



General Architecture

The Metadata Publishing Process is an end-to-end synchronous integration scenario that enables Maximo to communicate ROS data structures to Cognos. This process has been significantly updated in Maximo 76 to include new database views to insure the user only sees the Site, Organization or Set data that is available to them.



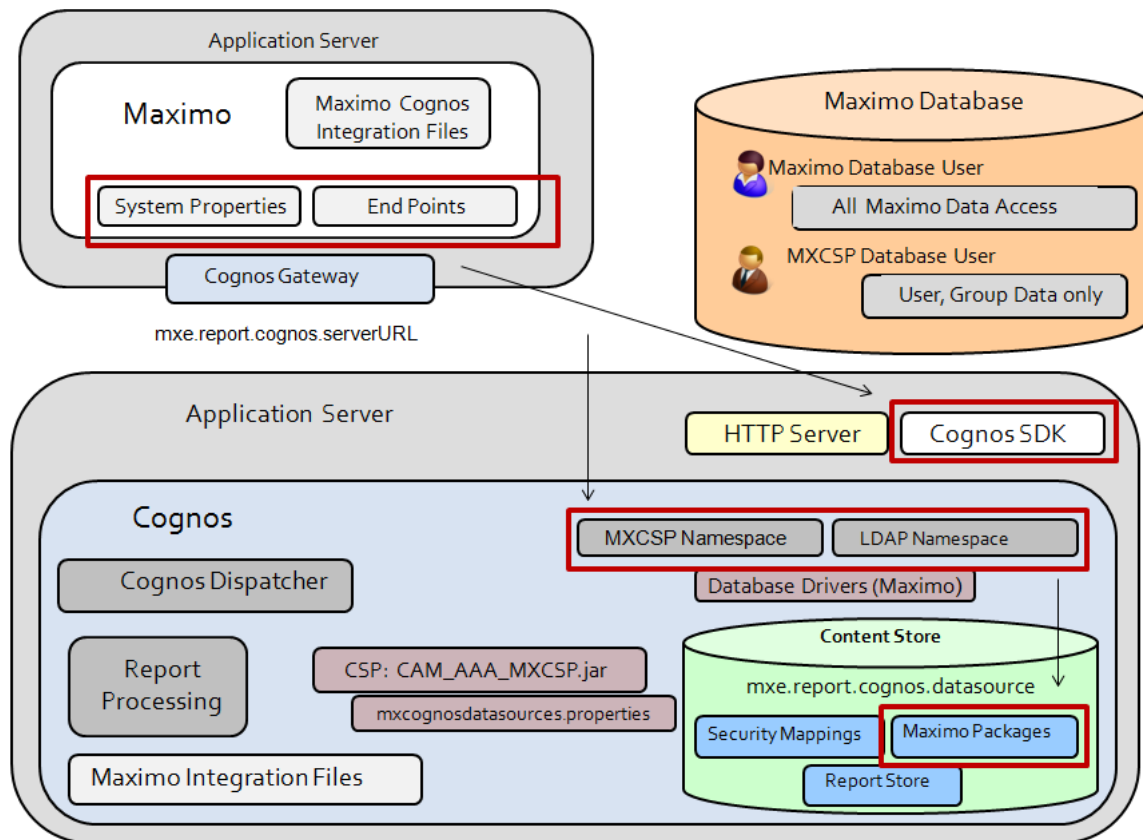
Notes on Meta Data Publishing Process

1. The Maximo metadata is the same as the Business Objects defined in the Maximo Data Dictionary
2. Invocation Channels convert object structure to Cognos Transactions. They leverage End Point connectivity logic to request the execution of Cognos services.
 - Additionally, in Maximo 76, Maximo processing classes have been added to apply the database site, organization and set views to the individual objects in the ROS.
3. End Point processes leverage Cognos SDK libraries to invoke Cognos metadata modeling services.

3.2 Metadata Publishing Process Execution

Once a ROS is created, the Cognos meta data publishing process shown above is initiated from the Object Structure application in Maximo. The information on the ROS is taken from the Maximo database, and utilizing either the MSCSP 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 main components used in this process are highlighted below.



3.2.1 Metadata Publishing and the Object Structure Application

To execute this process from Maximo, access the Object Structure application. Navigate to a ROS (consumed by = reporting) and select 'Publish as Cognos Package' from the Action menu.

Note: You may need to grant security access on this action. To do this, go the Security Group application, and grant 'Publish as Cognos Package' access in the Object Structure application.

When you select the Publish as Cognos package action, 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 the Cognos server as a package to the Content Store

The time required to publish the package will vary depending on your particular environment and the size of the package being created. Once it has been completed successfully, a message will display.

BMXAA7415E - Succeeded in publishing the Object Structure as Cognos Package.

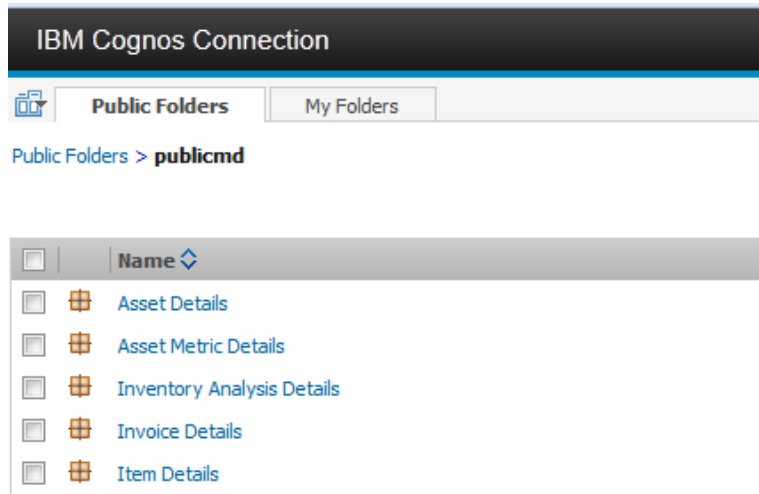
You can then launch directly to Cognos via the action 'Cognos Reporting' to view the published metadata.

The screenshot displays the 'Object Structures' application interface. The 'Object Structure' tab is active, showing details for 'REP_PERSON' (Person Details). The 'Consumed By' field is set to 'REPORTING' (Reporting). The 'Application' field is set to 'PERSON' (PERSON). The 'Outbound Definition Class' and 'Inbound Processing Class' fields are empty. The 'Select Action' dropdown menu is open, showing the following options: Exclude/Include Fields, Inbound Setting Restrictions, Generate Schema/View XML, Add/Modify Alias, Advanced Configuration, Duplicate Object Structure, Delete Object Structure, Add to Bookmarks, Publish as Cognos Package, Cognos Reporting, and Object Application Authorization. The 'Cognos Reporting' option is highlighted. Below the dropdown, the 'Source Objects for REP_PERSON' table is visible, showing a list of objects and their relationships.

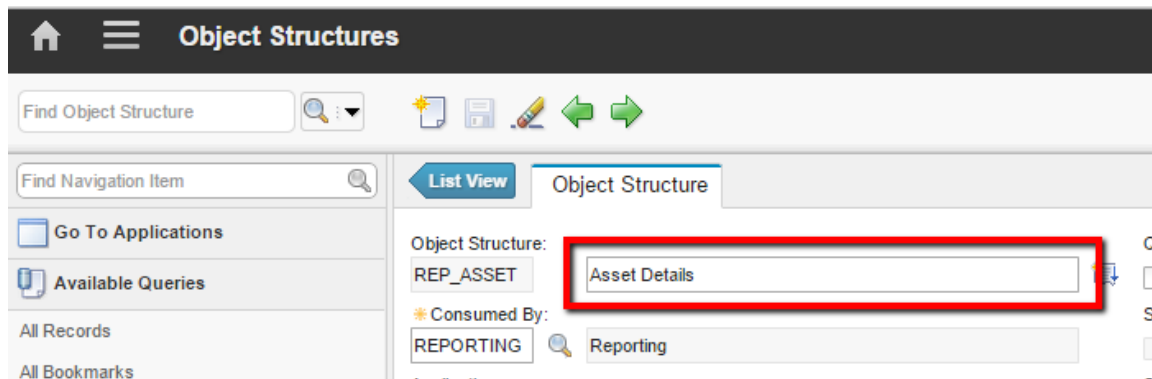
Object	Parent Object	Object Location Path	Relationship
PERSON		PERSON	
PHONE	PERSON	PERSON/PHONE	PHONE

Once in Cognos, navigate to the Published Package Location. The published packages are available at the folder specified via the MXCOGNOS endpoint's CONTENT_STORE_PACKAGE_LOCATION property.

In the screen shot below, the publishing location is defined as 'publicmd'. Within this folder, there are a number of published packages, which are identified by the description of the Report Object Structure



The Maximo metadata package is identified in the Cognos Portal and in the Cognos Content Store by its Report Object Structure's description field, MAXINTOBJECT.DESCRPTION.



3.2.2 New Metadata Security restrictions in Maximo 76

Starting with Maximo 76, new site, organization and set restrictions are applied to the metadata publishing process. This new restriction enable that the user will only see the Site, Organization or Set data that he has access to whether creating or running a report within Cognos.

The restrictions are applied at each object level within the Report Object Structure. These restrictions do not have to be added to the ROS - the publishing process automatically applies the restrictions.

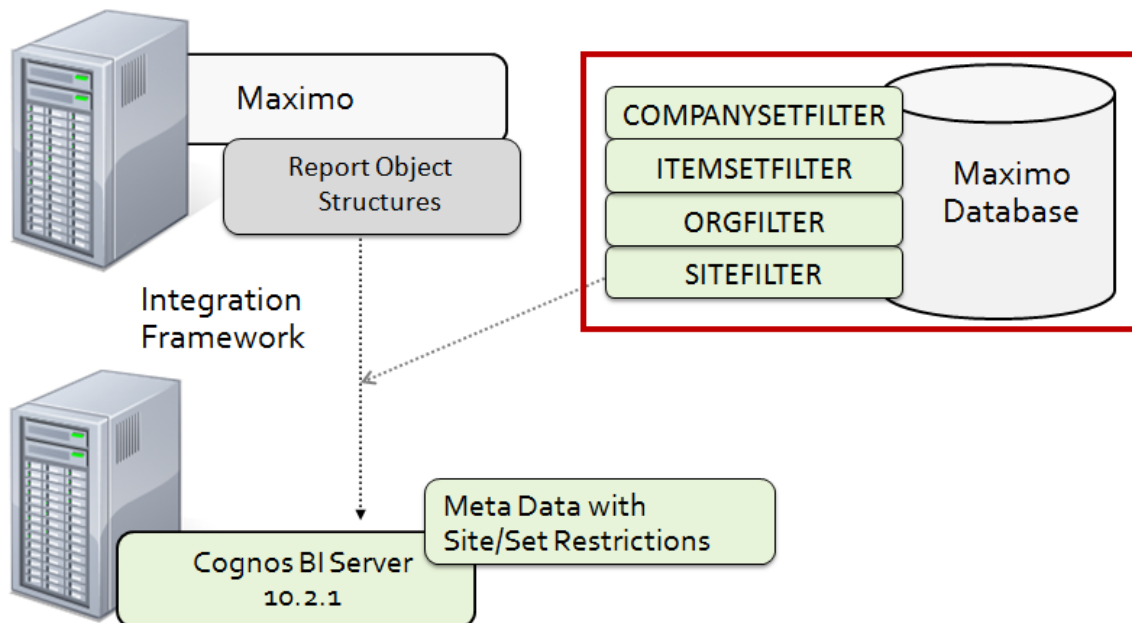
Because Maximo does not hold these restrictions in the database, four new database views were created in Maximo 76. These views and the restrictions they hold are:

SITEFILTER: Site Restrictions

ORGFILTER: Organization Restrictions

ITEMSETFILTER: Item Set Restrictions

COMPANYSETFILTER: Company Restrictions



Enabling this feature are a variety of 8 different data filters that may be applied to the various Maximo objects, including Site, Organization or Item Set filters. These data filters are listed in the table below, along with the new Database View that correlates to the filter, and an example object and ROS where you can find this.

	Filter	Database View	Example Object and Report Object Structure
1	Company Set	COMPANYSETFILTER	
2	Item Set	ITEMSETFILTER	ITEM included in REP_ITEM
3	Org	ORGFILTER	LABOR included in REP_LABOR
4	Org Site	ORGFILTER and SITEFILTER	ASSETLOCUSERCUST. Not currently included in a ROS
5	Site	SITEFILTER	WORKORDER included in REP_WORKORDER
6	System Site	SITEFILTER	
7	System Org	ORGFILTER	
8	System Org Site	SITEFILTER and ORGFILTER	JOBPLAN included in REP_JOBPLAN

Some of the database views may be utilized more frequently than others, including the Site and Organization Views. Other views, Company Set, SystemSite and SystemOrg, as shown are used less frequently or not at all. However, they are available for the Maximo Industry Solutions, Client Customizations or Business Partner Add-on Solutions which may utilize them.

During the publishing process, each object is evaluated to determine which restriction will be applied to it using this sql:

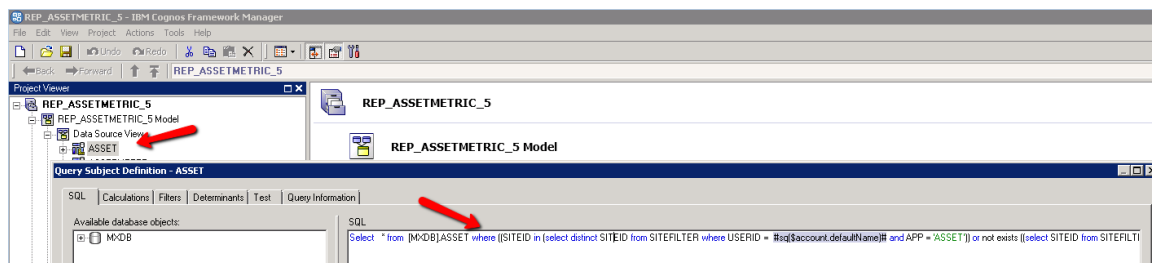
```
select siteorgtype from MAXOBJECT where objectname = 'x'
```

These restrictions are then applied to the objects by appending their where clause. The applied database views are not visible within the ROS in the Integration Object Structure application. They are only visible when viewing the published package in Cognos Framework Manager. An example of this is shown with the Asset Object. Prior to 76, its sql in FM would have been

```
Select * from [MXDB]ASSET
```

Starting with 76, its sql has been appended to include the restrictions as a where clause, so it now becomes

```
Select * from [MXDB]ASSET
where ((SITEID in (select distinct SITEID from SITEFILTER where USERID = #sq($account.defaultName)# and APP = 'ASSET')) or not exists ((select SITEID from SITEFILTER where USERID = #sq($account.defaultName)# and APP = 'ASSET'))))
```

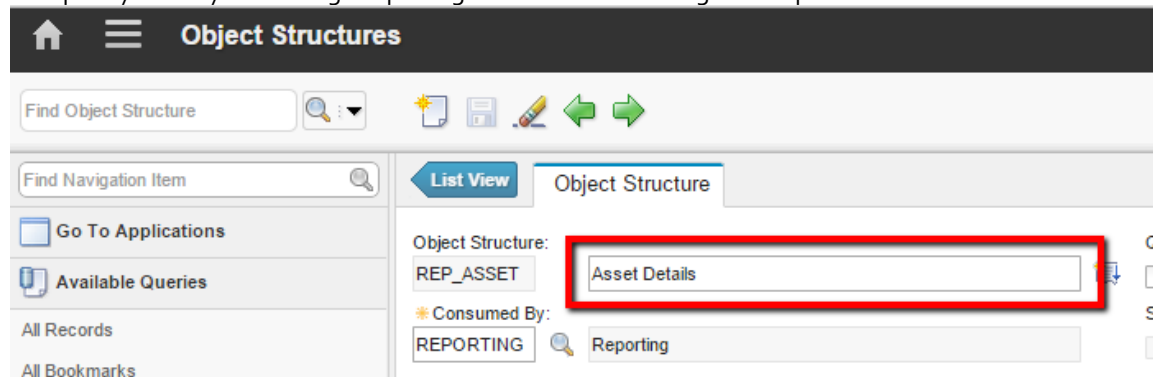


Notes:

1. Some objects may not have a Site, Organization or Set Filter. In these cases, no filter is applied to the object. An example of this is WOSERVICEADDRESS.

3.2.3 Metadata Publishing and Package Names

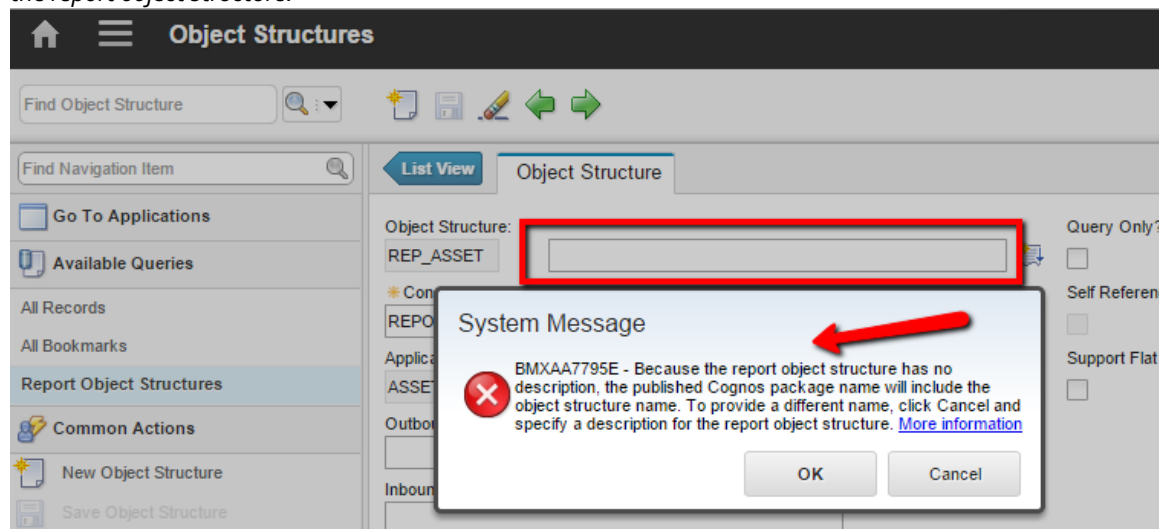
As noted above, when a report object structure is published to Cognos, it is identified in the Cognos Portal by its Report Object Structure's description field as shown below. The description is used so users can quickly identify which Cognos package to select for creating their reports.



Because the description is used, there are a few key business rules to remember –

1. If a ROS does not have a description value, and you select the action to publish it, you will be prompted to enter a description value. If you do not enter a description, the value of the object structure name (ex. REP_PR) will be used to identify the package in Cognos.

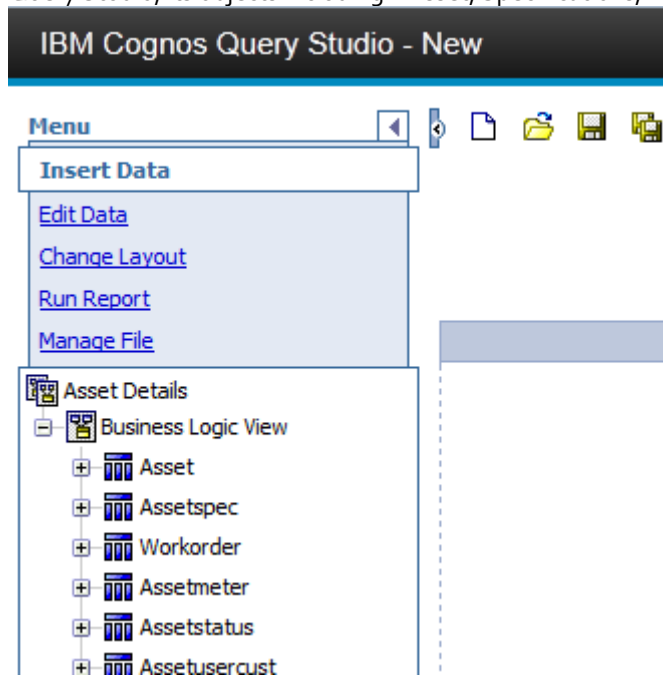
BMXAA7795E - Because the report object structure has no description, the published Cognos package name will include the object structure name. To provide a different name, click Cancel and specify a description for the report object structure.



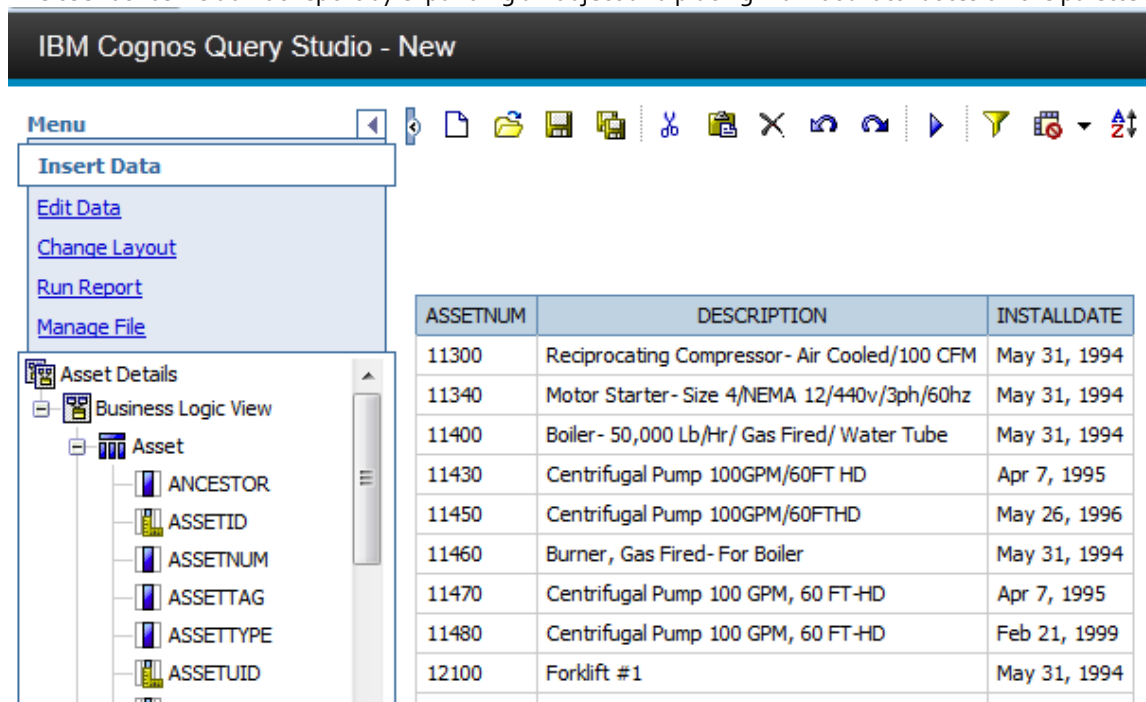
2. When publishing, the description will be verified to determine if it is unique. If it is not a unique text value, the package will be unable to be published, and you will be prompted to enter a unique value.
3. [] cannot be used in the ROS description as Cognos cannot accept these characters

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

The Asset Details ROS has been published to Cognos as shown below. When it is opened in Cognos Query Studio, its objects including – Asset, Specifications, Work Order and more - display.



The user builds his ad hoc report by expanding an object and placing individual attributes on the palette.



3.2.4 Metadata Model Data Source and Business Logic Views

The metadata publishing process creates a "layered data model" based on two different relational model views to properly represent the Maximo objects and relationships.

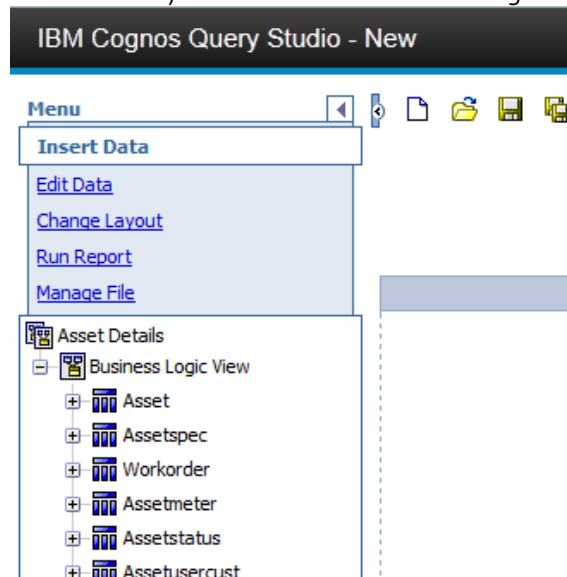
Data Source View

The Data Source View provides 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

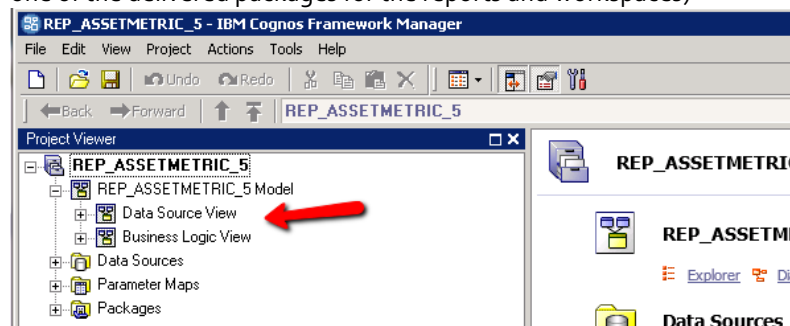
Business Logic View

The Business Logic View provides the necessary metadata for the Query Studio and Report Studio tools. It 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 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.



This can also be seen by opening a published package in Framework Manager. To do this, navigate to the Cognos directory specified by the Maximo End Point Value, PROJECT_BASE_DIR. Locate the applicable package, expand its folder and open the resulting .cpf file in Framework Manager. (This example shows one of the delivered packages for the reports and workspaces)



3.2.5 Maximo Meta data and Multi Language Environments

This next section is applicable only if you have a multi-language environment.

Meta Data Publishing in Base Language

To publish a Cognos Package from Maximo's Object Structure Application, your administrator must be logged into Maximo in the Base Language of the environment. The base language is identified by the Maxvars value 'baselanguage'.

select * from maxvars where varname = 'BASELANGUAGE'				
1:53	INS	[2/13/15 12:05:07 AM GMT] Script executed - (0)		
1	VARNAME	VARVALUE	ORGID	SITEID
2	-----	-----	-----	-----
3	BASELANGUAGE	EN	{null}	{null}
				MAXVARSID

				340

If your administrator is logged in Maximo in a secondary language and tries to publish a ROS to Cognos, he will receive an error message. To prevent secondary language administrators from doing this, you should utilize the condition 'PUBLISH01' for the sigoption 'Publish as Cognos Package' as shown below.

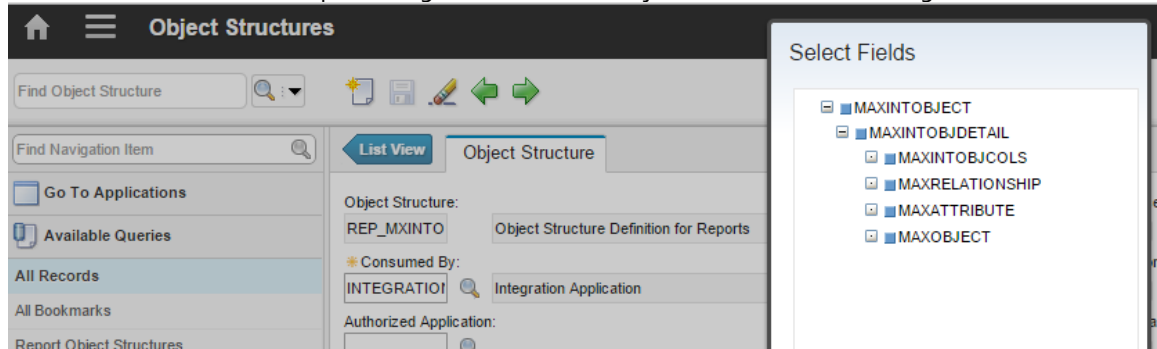
The screenshot shows the 'Security Groups' application in Maximo. The left sidebar contains a 'More Actions' section with 'Cognos Reporting' highlighted. The main area shows the configuration for the 'MAXADMIN' group, specifically the 'Applications' tab. Under 'Object Structures', the 'Publish as Cognos Package' action is configured with the condition 'PUBLISH01'. The details section shows the condition is 'PUBLISH01' and the type is 'CLASS'.

The PUBLISH01 condition hides this action when the object structure is not a ROS, or the administrator is not in the base language of the system.

If you do not enable this condition on the sigoption for your secondary language administrators who may be using this action, they will be able to see the 'Publish as Cognos Package Action'. However, when they initiate it, they will receive an error.

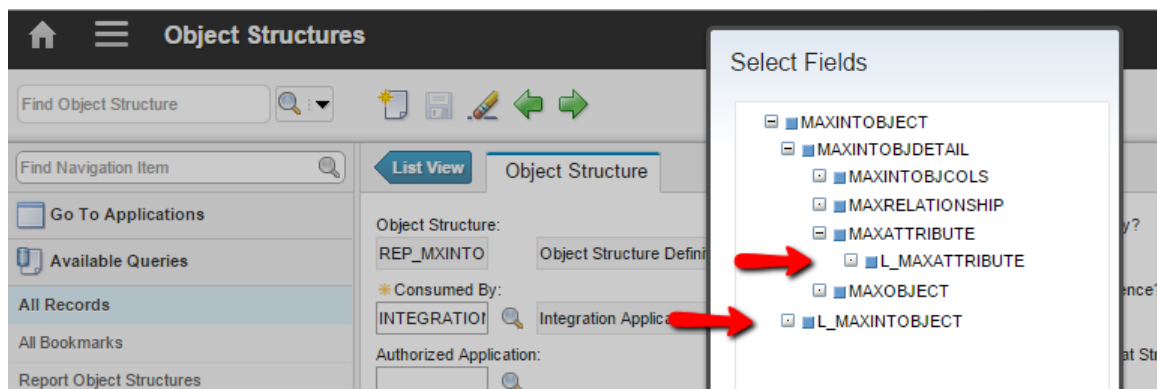
Configuring Object Structures to publish packages in multiple languages

To enable the Report Object Structures to publish the package name in multiple languages, you must configure the Object Structure Definition for Reports, REP_MXINTO. This is an Integration Object Structure which enables the publishing of the database objects and attributes to Cognos as shown below.



To enable multiple localized Cognos Package names to publish, you must add two additional child objects for the localized versions of the object and attribute as shown in the chart and diagram below.

Parent	Child Object	Relationship to Use
MAXINTOBJECT	L_MAXINTOBJECT	ML_DESCRIPTION
MAXATTRIBUTE	L_MAXATTRIBUTE	ML_TITLE



Note:

If you only want a subset of your languages to publish, you can modify the L_MAXINTOBJECT relationship to include only selected languages. For example you could modify the relationship to read "ownerid=:maxintobjectid and description is not null and langcode='FR'". After this change is applied, only the base language and French will be included in the published package.

3.3 Upgrading Maximo Cognos Packages to Version 7.6

Beginning with Maximo 7.6, site, organization and set restrictions are applied to the Cognos packages during publishing. This work is all done by the Maximo processes - there are no additional database objects or views that need to be added to the Report Object Structures.

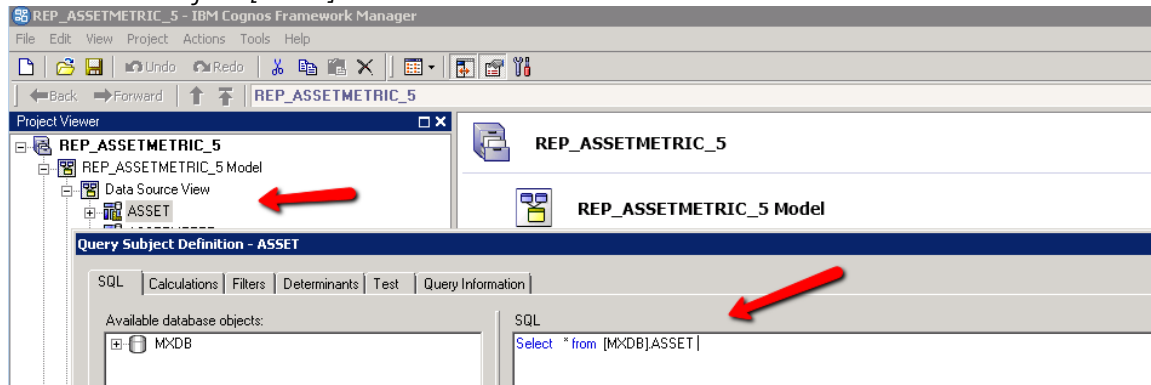
If you have published or created meta data prior to Maximo 76, these new site, organization and set restrictions will not be included in your meta data. If you want these to be available on your metadata, you can do the following

- A. Republish your Report Objects Structures in Maximo 7.6. This will create an updated package, which would contain the site, organization and set restrictions, and is the best option if you have not modified the published packages.
- B. Modify your models in Cognos FM to include the new restrictions. This is a very manual process, but if your model has extensive customizations, it may be the best solution.

The steps to modify your pre-Maximo 76 model in Cognos FM are listed below.

1. Review your existing model in FM to confirm which Maximo Report Object Structure it was based on. In this example, a REP_ASSETMETRIC_5 model is shown. Under Data Source View, navigate to the Asset object. Double click on it and notice its sql

*Select * from [MXDB]ASSET*

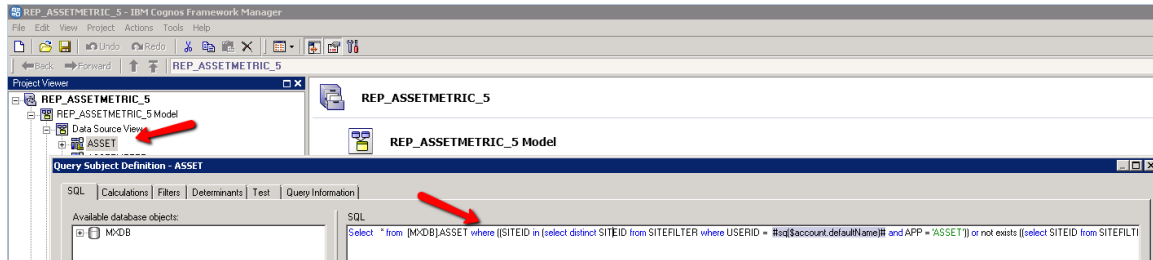


2. Then, go to your Maximo 76 environment. Bring up the associated ROS and publish it. This will create a base ROS model in 76 which includes the site, organization and set restrictions.

3. Next, access FM. Open up the newly published ROS. Navigate to the same Asset object - and look at its sql. The sql in 76 is significantly different than the earlier 71 and 75 versions as a new where clause brings over the applicable site, organization or set restrictions.

Select * from [MXDB]ASSET

where ((SITEID in (select distinct SITEID from SITEFILTER where USERID = #sq(\$account.defaultName)# and APP = 'ASSET')) or not exists ((select SITEID from SITEFILTER where USERID = #sq(\$account.defaultName)# and APP = 'ASSET'))))



4. Copy/paste the new where clause for the object to your existing pre-76 model. You will have to carefully repeat this for each object until each one has a where clause applied.

5. Once you have updated all the objects in your pre-76 model, save it. Then, republish the model so its reports and workspaces use the updated content.

If needed, the steps to publish a package are included at the end of this guide in the section titled 'Publishing Cognos Packages from FM'

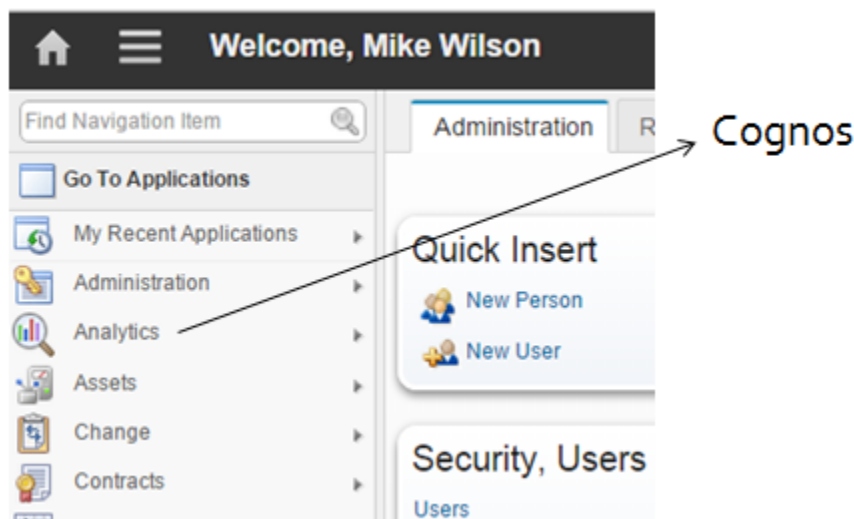
4 Maximo Cognos Report Access

In Maximo 76, the focus is on enabling multiple access points for the business user to access Cognos. These access points and how to enable them are noted below

1. Analytics - Cognos Reporting
2. From within configured applications, by selecting 'Cognos Reporting' from the Action Menu
3. Via a direct sign in to the Cognos Portal
4. By launching to a specific Cognos report from Maximo
5. Accessing the Cognos Administration tool from Maximo's Report Administration

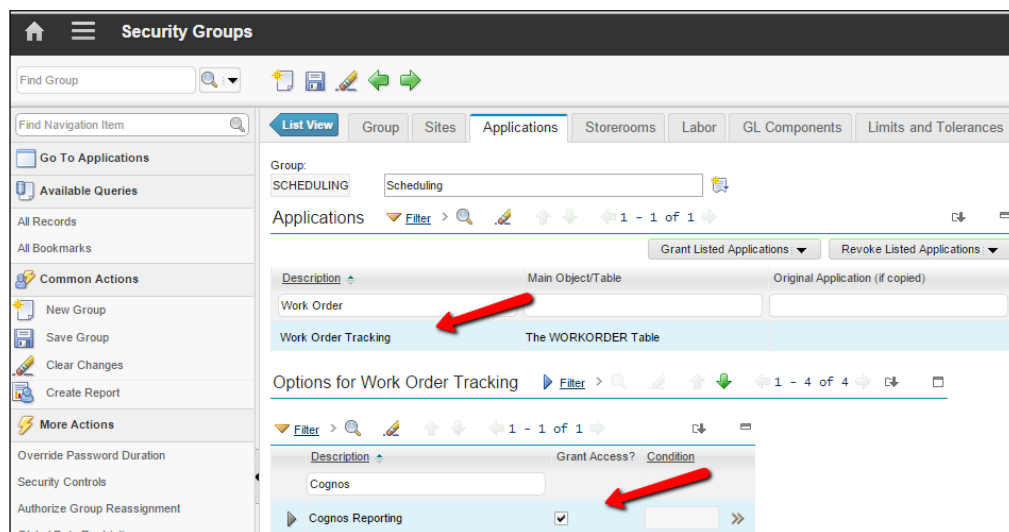
1. Analytics - Cognos Reporting

This is a new access point introduced in Maximo 76. Its purpose is to launch the user quickly to Cognos without having to go thru an application. To enable access to this option, you must grant the security group access to the 'Cognos Reporting Application' in the Security Groups application.



2. From within configured applications, by selecting 'Cognos Reporting' from the Action Menu

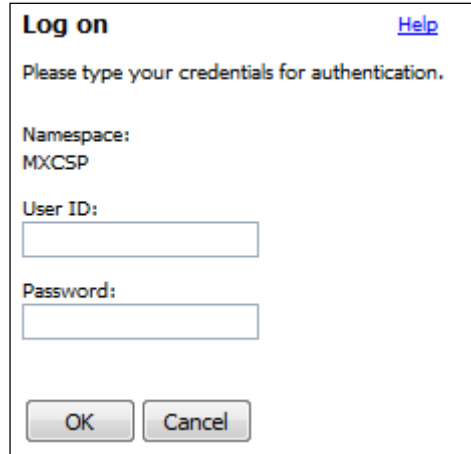
To enable this access, you must grant sig option access to the 'Cognos Reporting' Action for the selected application and security group in the Security Groups application.



3. Via a direct sign in to the Cognos Portal

This is also a new feature introduced in Maximo 76. It is designed for those Maximo Users whose primary purpose is to analyze data, so we need to get them to Cognos as quickly as possible.

With this option, the Maximo user signs into the Cognos portal with his Maximo Username and password. The url that is used for this feature is defined by the new property setting:
mxe.report.cognos.maxappurl



The image shows a 'Log on' dialog box with a 'Help' link in the top right corner. Below the title bar, it says 'Please type your credentials for authentication.' There are two input fields: 'User ID:' and 'Password:'. At the bottom, there are 'OK' and 'Cancel' buttons. The 'Namespace:' is set to 'MXCSP'.

4. By launching to a specific Cognos report from Maximo

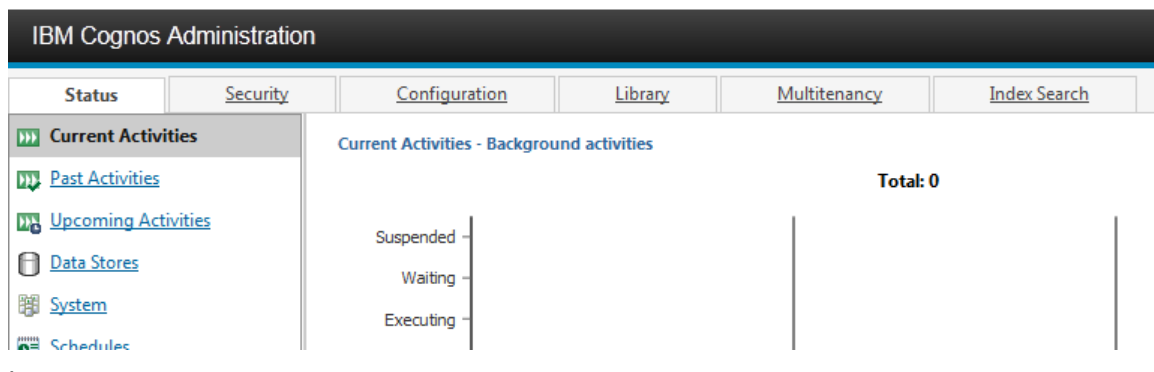
This feature enables a Maximo user to see specific Cognos reports within their Maximo applications. The user then enters specific parameter values, or applies the application query and submits his report request. He is then silently brought over to Cognos where his Cognos report displays.

To enable this feature, Cognos reports must be developed to include a Maximo where parameter. This feature is available in Cognos reports created in Report Studio. Additionally, the Cognos report must be registered in the Maximo Report Administration application. Details on this process are provided at the end of the guide in the section titled 'Configuring Report Studio reports to be accessible in Maximo'.

Note: The Maximo 76 delivered reports and workspaces have been configured to be accessible from Cognos only

5. Accessing the Cognos Administration tool from Maximo's Report Administration

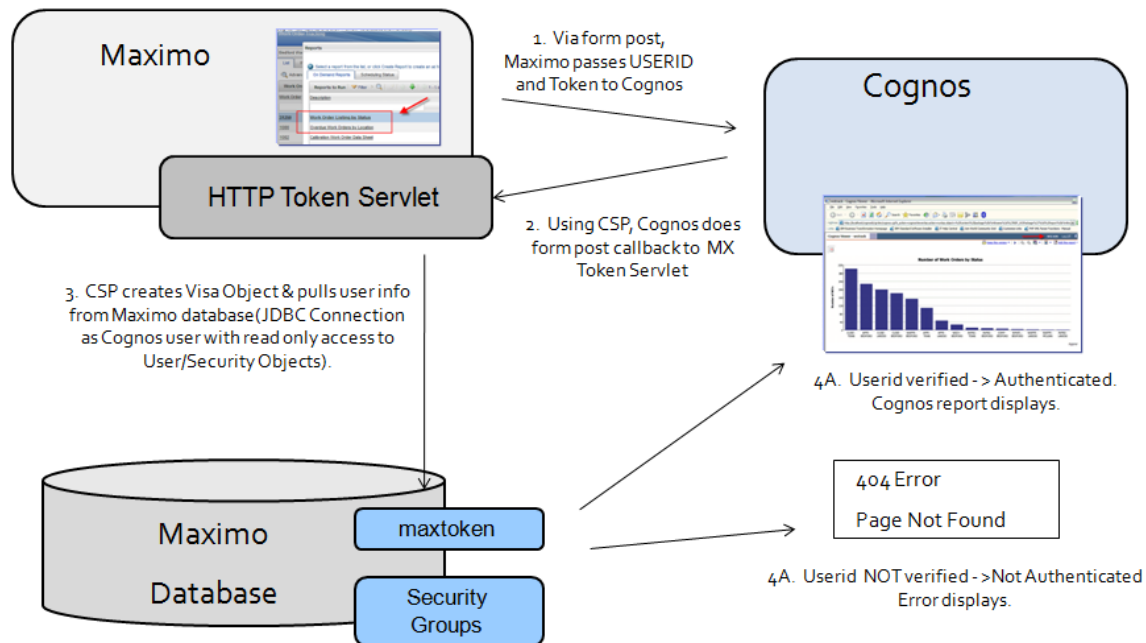
An administrator may need to access Cognos Administration to set security authorization for the Maximo Security Groups. The action 'Launch Cognos Administration' is available from the Report Administration application for this purpose, and Sig option access must be granted for this. Once the admin selects this action, they are taken directly to the Cognos Administration tool



4.1 Security Authentication

To enable a silent login from Maximo to the Cognos Server, security authentication is required. This is required for 4 of the 5 access points listed above - with the exception of the Direct Log into the Cognos Portal. Additionally, this authentication is required to either a Maximo Database where the security groups are held or a LDAP Repository

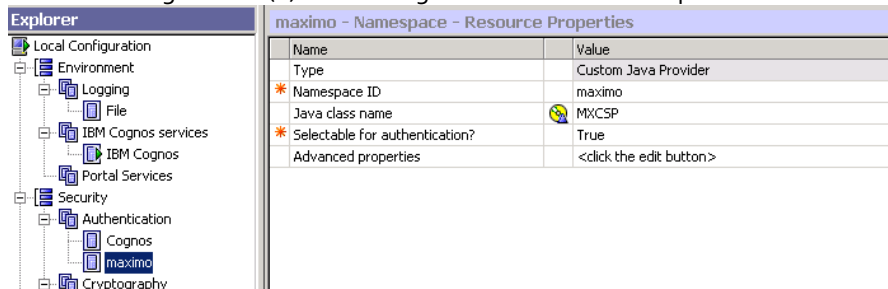
In order for Cognos to authenticate the Maximo User, the username and a randomly generated token will be passed to Cognos. Cognos will authenticate the token via an HTTP Servlet within the Maximo application. This process is shown in the diagram below.



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.

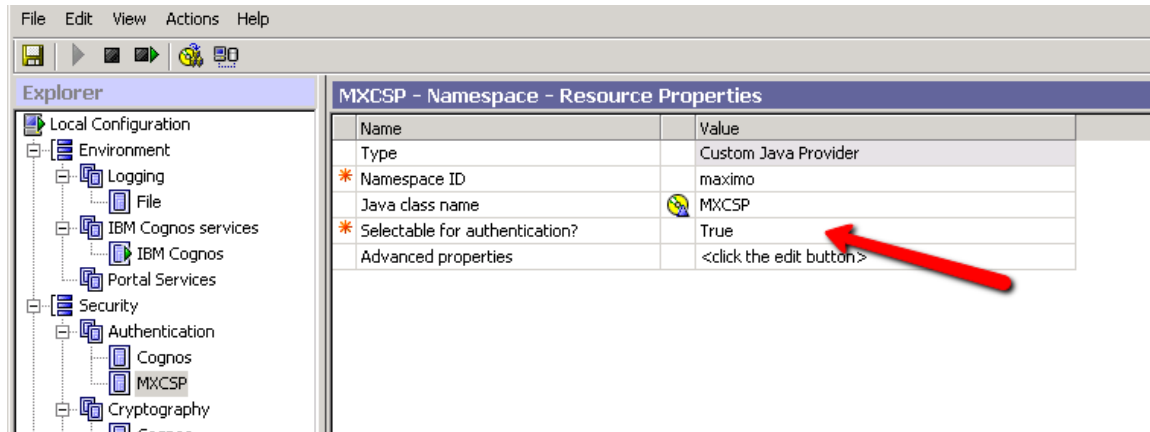
The key component to the Security Authentication process is the CSP, or Custom Security Provider. The CSP is enabled during the Maximo and Cognos integration installation by (1) Copying CSP Jar File from Maximo to Cognos and (2) Associating a new Maximo Namespace to the CSP.



4.1.1.1 Maximo 76 FM Security Authentication

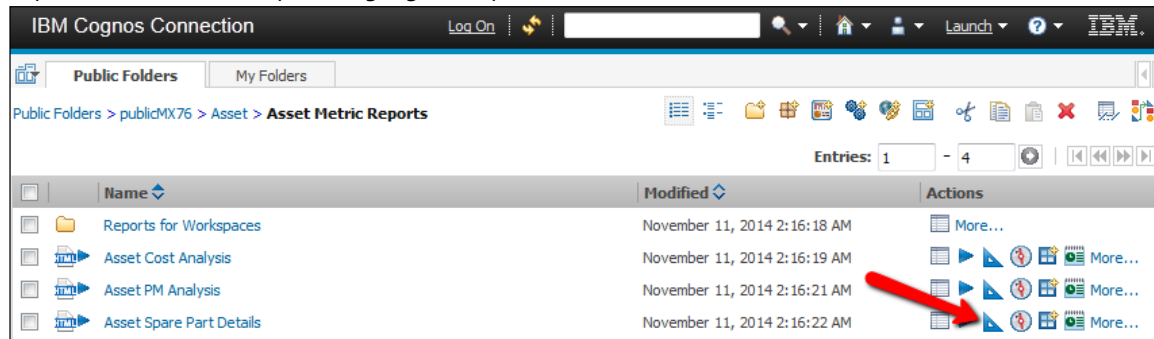
Starting with Maximo 7.6, when accessing Framework Manager (FM) you will be prompted to enter your username and password. You must enter these values to be validated with your Maximo user credentials.

If you are not presented with a username and password, confirm your authentication is set to True in Cognos Configuration.



4.2 Security Authorization

Once a 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, the user could select an action to open a report in Report Studio and modify it as highlighted by the red arrow.

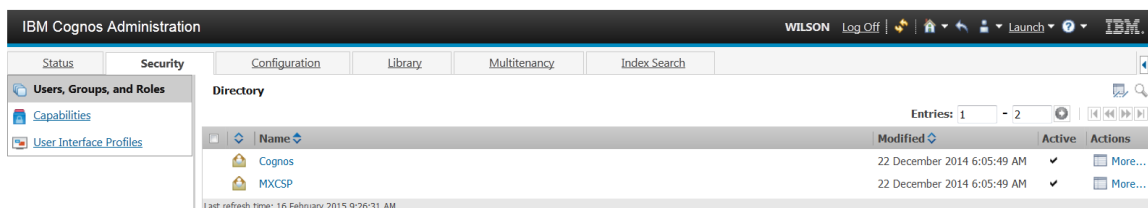


Enabling users the ability to modify reports is useful in many cases, however, this type of functionality access must be configurable to determine who should and should not have access to it.

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.

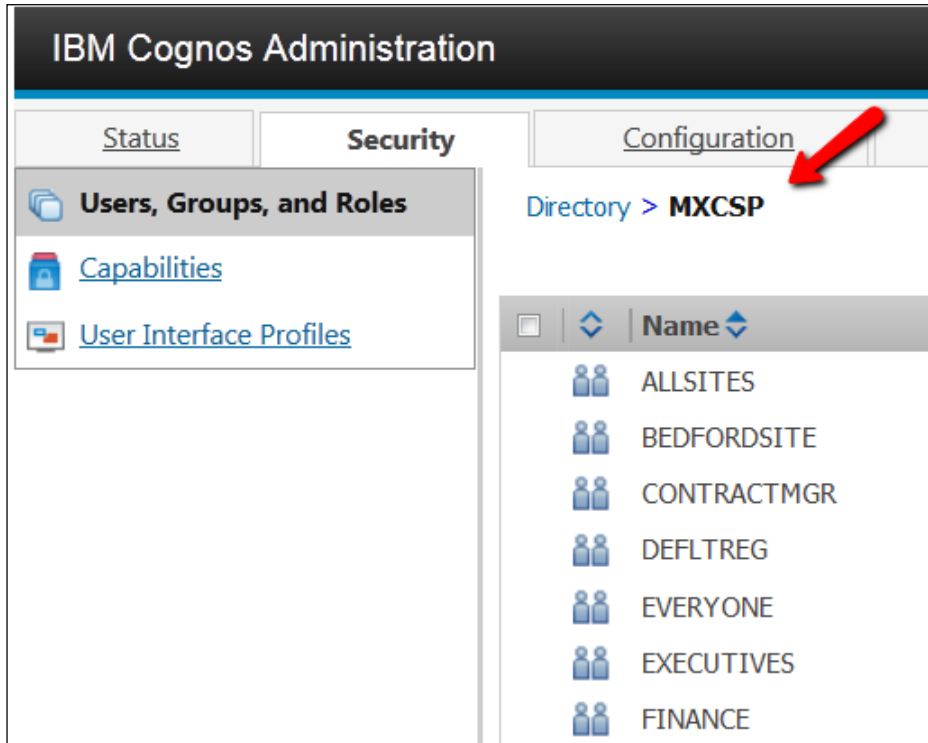
To enable setting of the Security Authorizations, Cognos uses a JDBC Connection to the Maximo database to retrieve the Maximo Security Group and User information. This JDBC Connection is made using the values defined in the `mxccognosdatasources.properties` file located in `<maximo76>\reports\cognos\c10\configuration`. 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, access the Cognos Administration Tool and click on the Security Tab. A list of Namespaces should display.

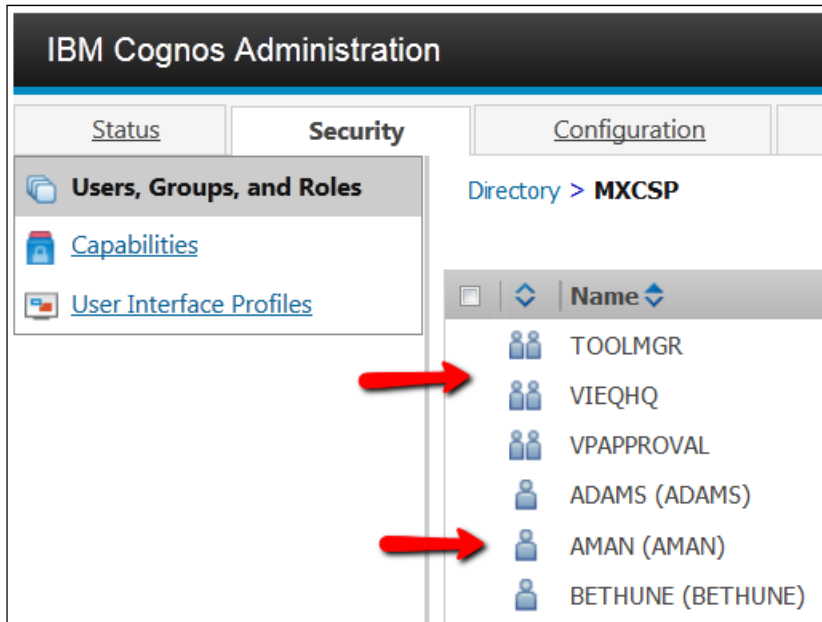


Maximo Namespace


Your administrator should select the Maximo Namespace that has been configured via the `mxe.report.cognos.namespace` property file. In this example, the namespace is MXCSP. This Maximo namespace contains the Maximo Security Groups and users.

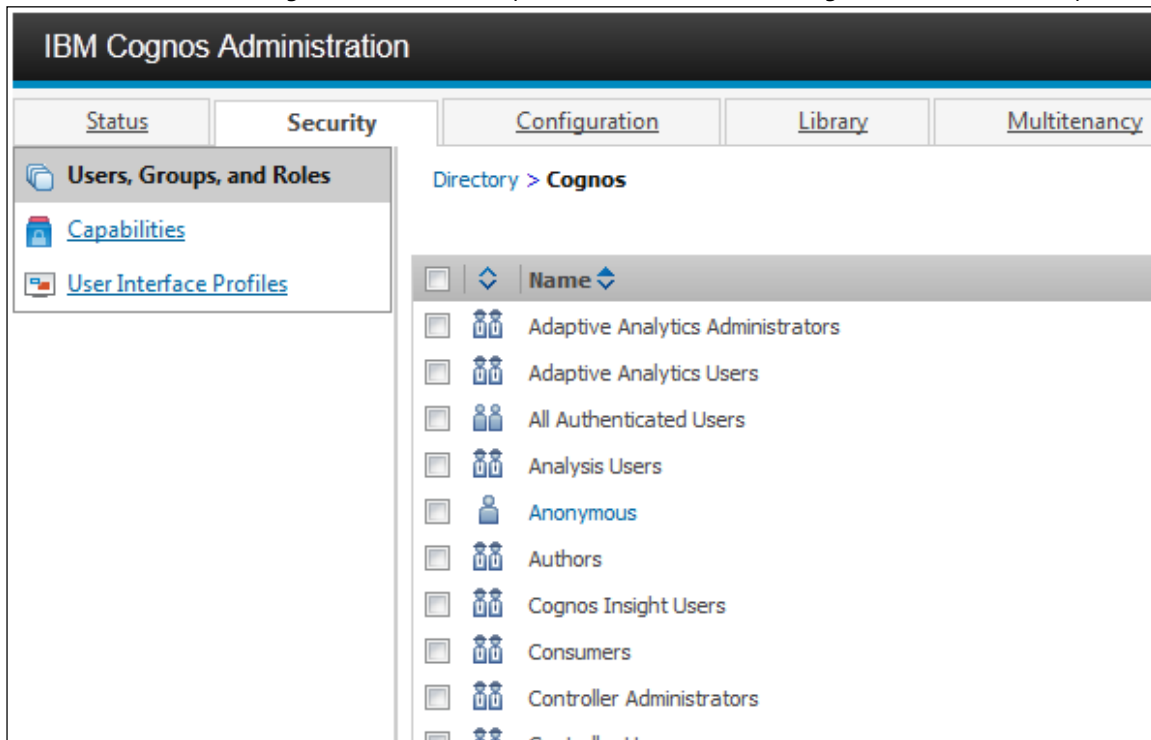


It also contains users. Notice Security Groups are identified as  and Users are identified as .

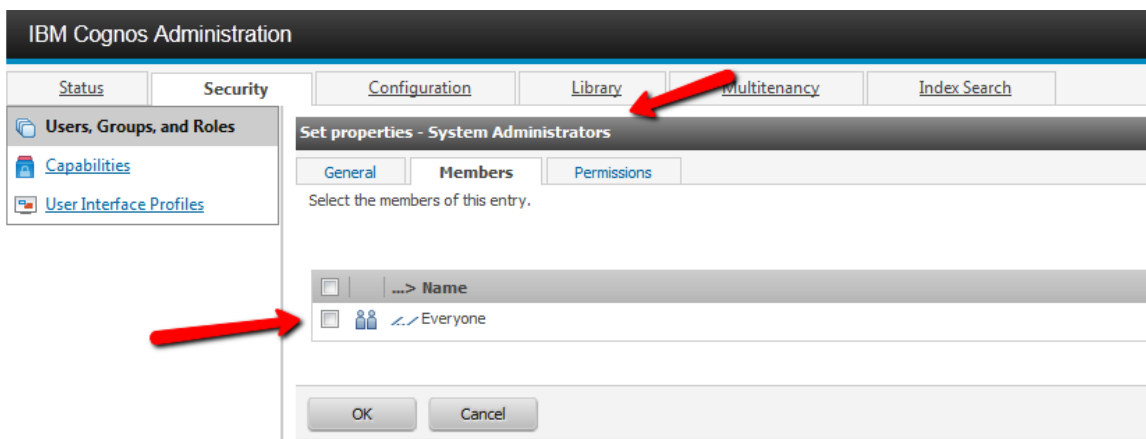


Cognos Namespace

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, you must first review the default values. For example, if you select the Cognos Role of System Administrators under the Cognos Namespace, you will see the EVERYONE Security Group. You want to confirm that the EVERYONE security group does not have this access.



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

Notes:

1. For more details on setting Cognos security, reference the Cognos 10.2 manuals referenced at the end of this guide.
2. For the Security Authorization Process, the Maximo and Cognos Installation guide details how clients can configure a new Maximo database user to be used exclusively for the mxccognosdatasources.properties file.

5 Creating Report Object Structures for Cognos Packages

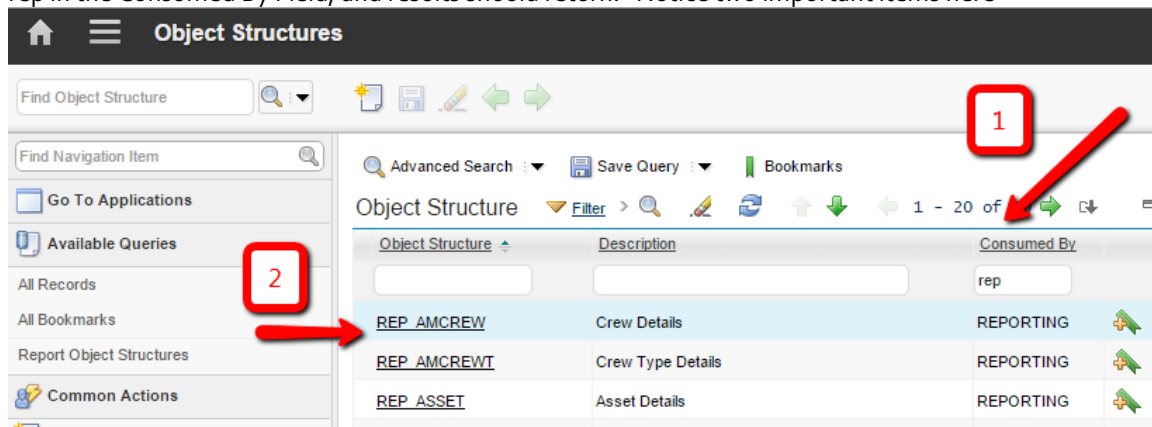
Report Object Structures (ROS) can be used to dynamically create the Maximo Cognos Packages or Metadata. These enable your report developers to quickly begin creating reports in the variety of tools that Cognos provides.

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.

Note: ROS only include persistent attributes. Non-persistent attributes are not included.

Creating or modifying ROS 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. Navigate to the Object Structure Application by accessing Integration -> Object Structures. Filter on rep in the Consumed By Field, and results should return. Notice two important items here -



A. ROS must be identified by 'Consumed By' is 'REPORTING'. If this is not done, the ROS will not be enabled for Cognos reporting.

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

2. Next, a new ROS for the Purchase Requisition (PR) application will be created. This process is very similar to other parent – child relationship building in Maximo. To start, insert a new record.

The top level of a ROS identifies the application where it will be used. 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

All other header fields should be null by default.

Find Object Structure

Find Navigation Item

Go To Applications

Available Queries

All Records

All Bookmarks

Report Object Structures

Common Actions

New Object Structure

Save Object Structure

Clear Changes

Application Import

Application Export

More Actions

Exclude/Include Fields

Object Structure: REP_PR PR Details

Consumed By: REPORTING Reporting

Application: PR

Outbound Definition Class:

Inbound Processing Class:

Query Only? ☐

User Defined? ☒

Self Reference? ☐

Configurable? ☒

Support Flat Structure? ☐

Alias Conflict? ☐

Source Objects for REP_PR

Object	Parent Object	Object Location Path	Relationship	Object Order	User Defined?
There are no rows to display.					

New Row

The record cannot be saved at this point. If you try to save the record, the following error will appear:

BMXAA1601E - At least one source object is required in an Object Structure

3. Next, define the parent source object for the ROS, which is the main object for the application. Again, this is the main table of the application (MAXAPPS.MAINTBNAME). The Parent Source Object (PR) must (1) have a Parent Object of null and (2) have an Object Order of 1.

In the description field, enter a value that your users will immediately recognize.

Find Object Structure

Find Navigation Item

Go To Applications

Available Queries

All Records

All Bookmarks

Report Object Structures

Common Actions

New Object Structure

Save Object Structure

Clear Changes

Application Import

Application Export

More Actions

Exclude/Include Fields

Inbound Setting Restrictions

Generate Schema/View XML

Add/Modify Alias

Advanced Configuration

Duplicate Object Structure

Delete Object Structure

Add to Bookmarks

Publish as Cognos Package

Object Application Authorization

Object Structure: REP_PR PR Details

Consumed By: REPORTING Reporting

Application: PR

Outbound Definition Class:

Inbound Processing Class:

Query Only? ☐

User Defined? ☒

Self Reference? ☐

Configurable? ☒

Support Flat Structure? ☐

Alias Conflict? ☐

Source Objects for REP_PR

Object	Parent Object	Object Location Path	Relationship	Object Order	User Defined?
PR		PR		1	<input checked="" type="checkbox"/>

Details

Object: PR

Parent Object:

Object Location Path: PR

Reporting Description: Purchase Requisition

Relationship:

Object Order: 1

Alternate Key:

User Defined? ☒

Cardinality:

Database Join Required? ☐

4. Next, any child or grandchildren categories must be defined as Source Objects to the parent. 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

5. To do this, click New Row in the Source Object Section. Enter the information as noted below

Object Field: This is the child object name. Click on the lookup and select the PRLINE.

Parent Object: Parent object of the child. Enter PR for the parent object of the child, PRLINE.

Object Location Path: Read only field which populates after enter Parent Object Value.

Reporting Description: The value that appears to the developer in the Cognos tools.

Relationship: The relationship between the Parent PR and the Child PRLINE. Select this value by clicking on the relationship lookup. This lookup displays values from the maxrelationship table.

*select * from maxrelationship where parent = 'PR' and child = 'PRLINE'*

Cardinality: Defines the relationship between the parent and child object. Its default value is UNDEFINED, which assumes a multiple relationship. In this example, Multiple is selected because multiple PR Lines can be associated to a single PR.

Database Join Required?: Enable the 'Database Join Required Field' if for every PR record there is a corresponding record in the PR Line table. In this case, the database join is not required.

The screenshot shows the 'Object Structures' configuration window. The 'Object Structure' section is set to 'REP_PR' with details for 'PR'. The 'Consumed By' section shows 'REPORTING' and 'Reporting'. The 'Application' is 'PR'. The 'Outbound Definition Class' and 'Inbound Processing Class' are empty. The 'Source Objects for REP_PR' table shows a new row being added with 'Object' as 'PRLINE', 'Parent Object' as 'PR', 'Object Location Path' as 'PR/PRLINE', and 'Relationship' as 'PRLINE'. The 'Details' section shows 'Object' as 'PRLINE', 'Parent Object' as 'PR', 'Object Location Path' as 'PR/PRLINE', 'Reporting Description' as 'PR Line Details', 'Relationship' as 'PRLINE', 'Object Order' as '1', 'Alternate Key' as empty, 'User Defined?' as checked, 'Cardinality' as 'MULTIPLE', and 'Database Join Required?' as unchecked. A 'Select Value' dialog box is open, showing a list of relationships between MKTPRLINE and PRLINE. The 'PRLINE' relationship is selected. Red arrows point to the 'Object' field (PRLINE), the 'Parent Object' field (PR), and the 'Cardinality' field (MULTIPLE) in the configuration form.

6. Save your changes. 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

7. Once you have added COMPANIES and PRTERM child objects, save the ROS.

List View

Object Structure

Object Structure:

REP_PR

PR Details

Consumed By:

REPORTING

Reporting

Application:

PR

Outbound Definition Class:

Inbound Processing Class:

Query Only?

☐

User Defined?

☒

Self Reference?

☐

Configurable?

☒

Support Flat Structure?

☐

Alias Conflict?

☐

Source Objects for REP_PR

Filter > 1 - 4 of 4

Object	Parent Object	Object Location Path	Relationship	Object Order	User D
PR		PR		1	<input checked="" type="checkbox"/>
PRLINE	PR	PR/PRLINE	PRLINE	1	<input checked="" type="checkbox"/>
COMPANIES	PR	PR/COMPANIES	COMPANIES	2	<input checked="" type="checkbox"/>
PRTERM	PR	PR/PRTERM	PRTERM	3	<input checked="" type="checkbox"/>

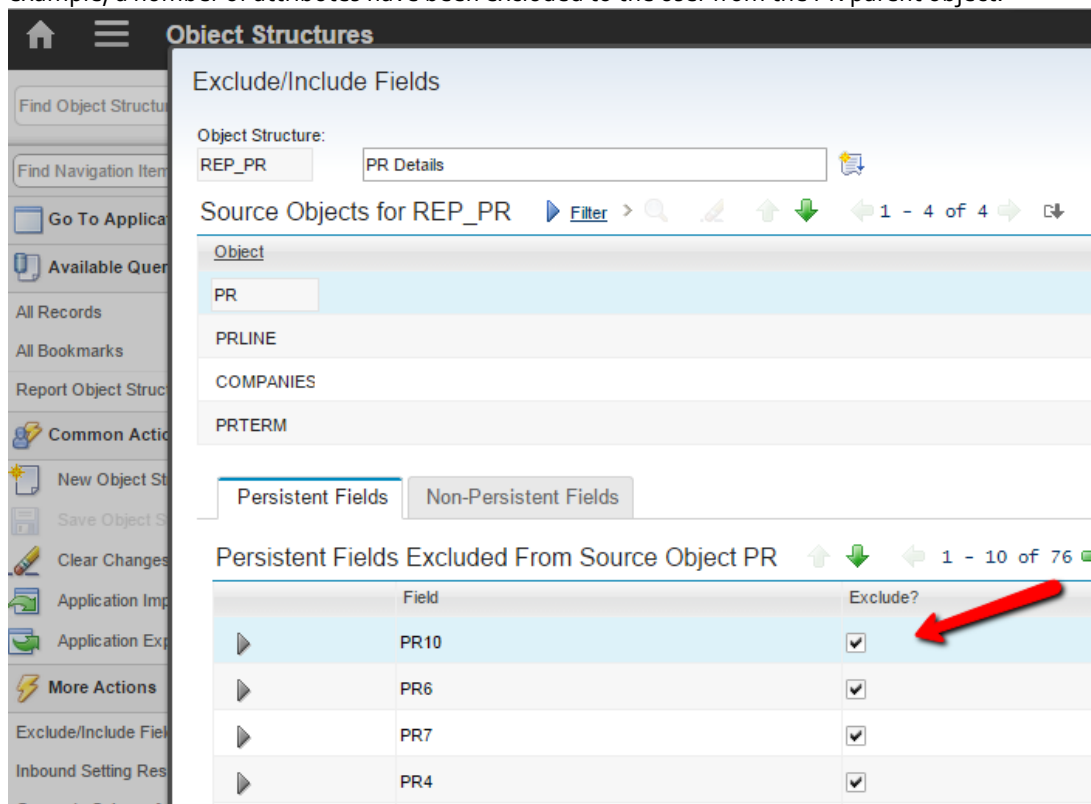
5.1 Best Practice: Excluding Persistent Fields from ROS

When you create a ROS, each persistent attribute is included in every object specified in the ROS. This can quickly accumulate to a very large number of fields, including extra, integration and duplicate fields.

To reduce the potentially high amounts of fields that the user or developer has to filter through, the Object Structure Action of Excluding/Including fields can be used. This enables the administrator to refine the field selection for each object used by reporting. Without this functionality, vast amounts of data available when creating a report can become un-manageable.

It is highly recommended to use this feature to enhance the usability of reporting for your users.

To enable this feature, select 'Exclude/Include Fields' from the Action Menu in Object Structures. Navigate thru each object, and define the attributes that you do not want to display to your users. In this example, a number of attributes have been excluded to the user from the PR parent object.



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

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

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.

5.2 Additional Information on Creating ROS for Cognos Packages

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 query for the report. These three components are:

1. How are the objects joined together?
2. What type of Cardinality does the joined objects use?
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 could 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 within the report’s design file to join the two objects together.

Object	Parent Object	Object Location Path	Relationship	Object Order	User Defined?
PR		PR		1	<input checked="" type="checkbox"/>
PRLINE	PR	PR/PRLINE	PRLINE	1	<input checked="" type="checkbox"/>
COMPANIES	PR	PR/COMPANIES	COMPANIES	2	<input checked="" type="checkbox"/>
PRTERM	PR	PR/PRTERM	PRTERM	3	<input checked="" type="checkbox"/>

Object:
PRLINE

Parent Object:
PR

Object Location Path:
PR/PRLINE

Reporting Description:
PR Line Details

Relationship:
PRLINE

Object Order:
1

Alternate Key:
☐

User Defined?
☒

Cardinality:
MULTIPLE

Database Join Required?
☐

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 on each of these two fields is below.

5.2.1 Cardinality

Cardinality is a database term defining the type of relationship. In the case of reporting, there are two 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). Using our example, 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.

The screenshot shows the 'Purchase Requisitions' application interface. The 'PR' tab is selected, displaying details for PR 1006, 'Stores Purchase', at Site BEDFORD, with Status APPR. A red arrow points to the 'Vendor' section, which shows 'No Vendor?' as a checkbox, 'Company' as 'ATI' (linked to 'Atlantic Trading, Inc'), 'Address' as '39 MAPLE AVE', 'City' as 'SOMERVILLE', and 'Internal?' as a checkbox. Other fields include 'Storeroom', 'Storeroom Site', and 'Freight Terms'.

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).

The screenshot shows the 'Purchase Requisitions' application interface with the 'PR Lines' tab selected. It displays a table of PR Lines for PR 1006. A red arrow points to the 'PR Lines' tab. The table has columns: Line, Item, Description, Quantity, Order Unit, Unit Cost, Line Cost, Tax, and Distributed?.

Line	Item	Description	Quantity	Order Unit	Unit Cost	Line Cost	Tax	Distributed?
1	217213	Plate, Stainless Steel	2.00	EACH	7.59	15.18	0.76	
2	584-L0	Lockwasher- 1/2 In	1.00	EACH	625.00	625.00	31.25	

Below the table are buttons: Vendor Items, Select Spare Parts, Contract Items, View Contracts, Distribute Costs, and New Row.

Once the relationships between objects are understood, the cardinality can be set properly within the Object Structure Application. The MAXRELATIONSHIP.CARDINALITY field is a domain field with three values: Single, Multiple or undefined.

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

5.2.2 Database Join Required

The type of database join between two tables determines the data that is returned in a report. It is probably one of the most important aspects in defining the report relationships.

There are two types of joins. A required database join, and an optional, or left outer join. The type of join used in the maxrelationship will determine the type of data returned in the report.

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.

5.3 ROS Business Rules

A listing of key Business Rules to take into consideration when creating ROS are listed below

1. Each Child, or Source Object, must have a relationship to the Parent Source Object to be valid. Without the relationship, the tables cannot be joined, causing the report to error out.

This is shown in the PR ROS below. JOBPLAN is added as a child of PR. However, JOBPLAN has no relationship to the PR parent as shown by the null values in the relationship lookup. Therefore, JOBPLAN cannot be added as a child of PR in the ROS.

The screenshot shows the 'Details' tab of a ROS configuration. The 'Object' field is set to 'JOBPLAN'. The 'Parent Object' is 'PR'. The 'Object Location Path' is 'PR/JOBPLAN'. The 'Reporting Description' is empty. The 'Relationship' field is empty. The 'Object Order' is '4'. The 'Alternate Key' is empty. The 'User Defined?' checkbox is checked. The 'Cardinality' is empty. The 'Database Join Required?' checkbox is unchecked. A 'Select Value' dialog box is open, showing a table with columns 'Relation' and 'Where Clause'. The 'Relation' column contains 'PR/JOBPLAN' and the 'Where Clause' column is empty. A red arrow points to the 'Where Clause' column.

2. Each child, or source object, must be joined to its parent with relationships where the database sql is defined. If the source object has a null database sql, it cannot be used 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. Therefore, it cannot be used in a Report Object Structure.

The screenshot shows the 'Source Objects for REP_ASSET' table. The table has columns: Object, Parent Object, Object Location Path, and Relationship. The 'Object' column contains 'ASSETMOVEDFLT'. The 'Parent Object' is 'ASSET'. The 'Object Location Path' is 'ASSET/ASSETMOVEDFLT'. The 'Relationship' field is empty. A 'Select Value' dialog box is open, showing a table with columns 'Relation' and 'Where Clause'. The 'Relation' column contains 'ASSETMOVEDFLT' and the 'Where Clause' column is empty. A red arrow points to the 'Where Clause' column.

3. The relationship used between a child and a parent must not contain any non-persistent fields. Only persistent attributes can be used in reporting.

An example that highlights this is with the REP_LOCATION ROS. The ROS was extended to include the child object, LOCHIERARCHY to the parent object, LOCATIONS. The relationship INVSYSTEM_PARENT was selected, which is defined as

location=:parent and **systemid=:systemid** and siteid=:siteid

However, because systemid is a non-persistent field, the relationship cannot be used within the ROS to create a report.

If you are unsure if a field is persistent or not, go to the Database Configuration application. Select the Object, and then go to the Attributes tab. Search on the selected attribute, and under its Advanced section, see if the Persistent? Field is checked. If it is not, the field is non persistent and cannot be used in a ROS maxrelationship.

The screenshot shows the 'Database Configuration' application interface. On the left is a sidebar with navigation items like 'Go To Applications', 'Available Queries', 'All Records', 'All Bookmarks', 'Common Actions', and 'More Actions'. The main area is divided into tabs: 'List View', 'Object', 'Attributes', 'Indexes', and 'Relationships'. The 'Attributes' tab is active, showing a table of attributes for the 'LOCATIONS' object. The table has columns for 'Status', 'Attribute', 'Description', 'Type', 'Length', and 'Scale'. One attribute, 'SYSTEMID', is highlighted. Below the table is a 'Details' section with fields for 'Attribute', 'Title', 'Description', 'Class', 'Domain', 'Default Value', 'Alias', and 'Status'. A red arrow points to the 'Attribute' field, which contains 'SYSTEMID'. Below the 'Details' section is an 'Advanced' section with checkboxes for 'Entity', 'Column', 'Persistent?', 'Must Be?', 'Audit Enabled?', and 'Multilanguage Supported?'. A red arrow points to the 'Persistent?' checkbox, which is currently unchecked.

4. Additional restrictions exist on the format of the where clause used in the object relationships:

a. Dates in bind variables are not supported. For example, the following relationship from CALENDAR to WORKPERIOD may not be used:
calnum=:calnum and workdate between :startdate and :enddate and orgid=:orgid

b. Replacement variables such as :&username& are not supported. The variables :yes and :no can be replaced with 1 and 0 for use in object relationships

5. 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 reports. An example of this is can be found at this public wiki page <http://ibm.co/1DUKSGq>

6. 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 Maximo's Entity Relationship Diagrams (ERD) at the url below -

<https://www-304.ibm.com/software/brandcatalog/ismlibrary/details?catalog.label=1TW10MA25>

7. 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.

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

9. New features have been added in Maximo 76 which enable the use of the same object multiple times in the same ROS.

10. Additionally, in Maximo 76, the types of relationships between the parent and child have been updated. In prior releases, only simple or column to column relationships, could be used such as wonum=:wonus and siteid=:siteid.

In 76, publishing has been extended to support things where a column equals an hardcoded value or relationships that include "or" groups. Examples of the newly supported relationships include

woid=:woid and ldownwertable='WORKORDER'
- previously, ldownwertable=VALUE would have been "complex"

woid=:woid or wonum=:wonus
- previously, 'or' would have failed

(woid=:woid and wonum=:wonus) or (wonus is null)
- previously 'wonus is null' would fail and the 'or' would fail because of the brackets

woid>1000
- previously it would fail on > or < operations

Maxrelationships that include filters and/or sub-selects are considered complex relationships, and 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 relationships that are not supported for Cognos meta data publishing include

woid:woid and wonum in (select wonum from asset)
- This is not supported because of the 'in' and sub selects

assetnum=:assetnum and siteid=:siteid and linetype not in (select value from synonymdomain where domainid='LINETYPE' and maxvalue='TOOL')
- This is not supported because of the 'not in' and sub selects

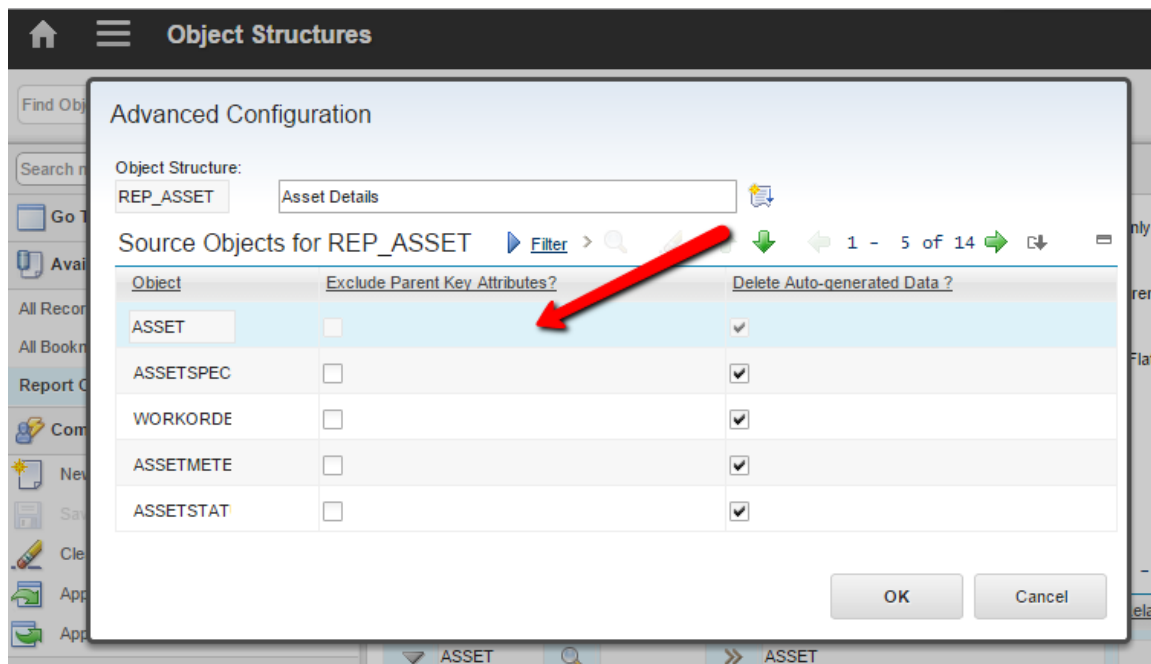
11. You may find that some of the delivered Report Object Structures available from Maximo are not supported for Cognos Publishing, including REP_WOPLANACT. This occurs because of relationships like JOBPLAN, which include subselects as highlighted below.

jpnum=:jpnum and ((orgid=:orgid and siteid=:siteid) or (orgid=:orgid and siteid is null) or (orgid is null and siteid is null)) and **status in (select value from synonymdomain where domainid='JOBPLANSTATUS' and maxvalue ='ACTIVE')**

Because these ROS can be used in other features of Maximo, including Result Sets and Maximo Ad hoc reporting, they are still included.

12. By default when you create a ROS, its 'Exclude Parent Key Attributes' fields for the individual objects is set to false as shown below. This dialog can be accessed via the action 'Advanced Configuration'.

This dialog is intended for other Object Structures used for Integration and Migration. When an Object Structure is used for Reporting, this setting must remain false or you may receive unexpected results.



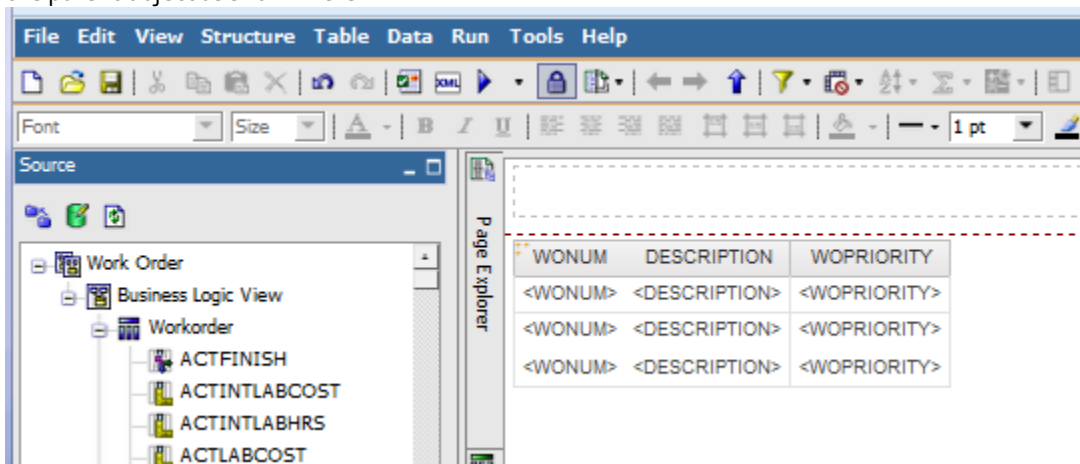
6 Accessing Report Studio reports from Maximo

Maximo provides a number of access points to run Cognos reports. If you want to access and run a Cognos report from within a Maximo application, you must update the Cognos Report Studio report to include the Maximo Where Clause as a parameter value.

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 have a where parameter. There are many different ways to do this, and the example below shows one way to do this. The section details how to add the where clause to reports created in Report Studio.

Note: This section is intended for a Report Developer, and applies to Report Studio reports only.

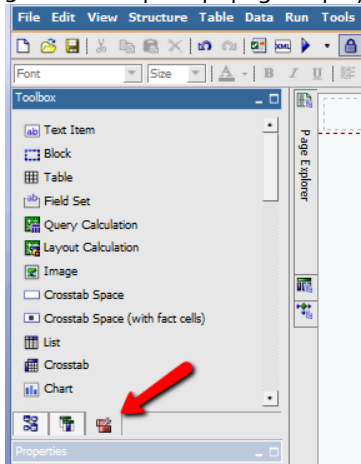
1. To explain this process, a new sample test report will be created. Launch Report Studio, and open a published package. Then, select create New report, and select Listing report. Add a few attributes from the parent object as shown here.



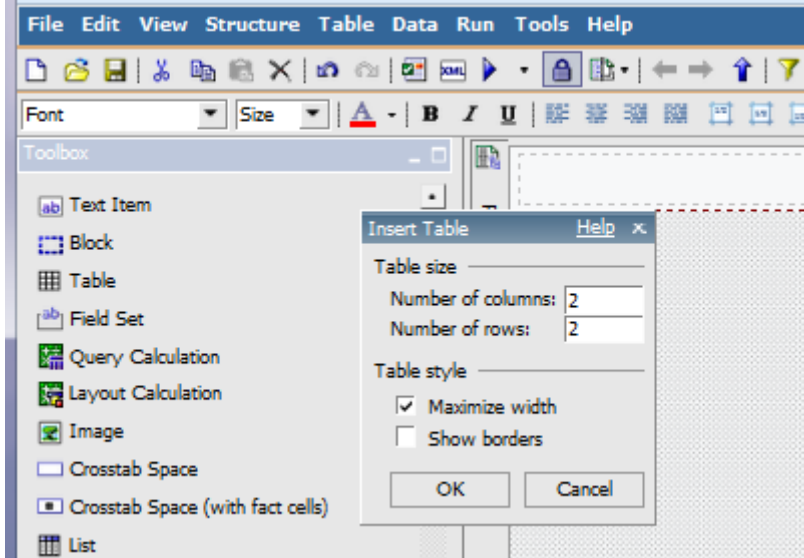
2. Access the Prompt Page to create parameters for the report. You can do this by clicking on the icon from the toolbar, or you can select 'Build Prompt Page' from the Tools Menu Option.



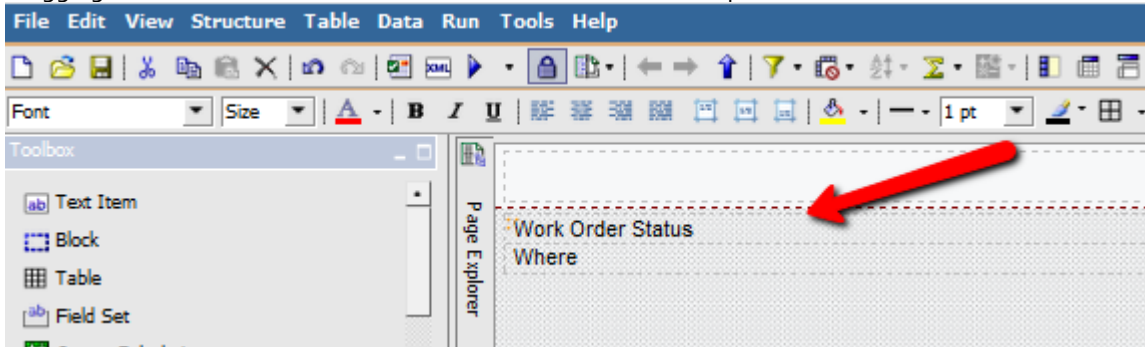
3. When the prompt page displays, click on the Toolbox View highlighted below.



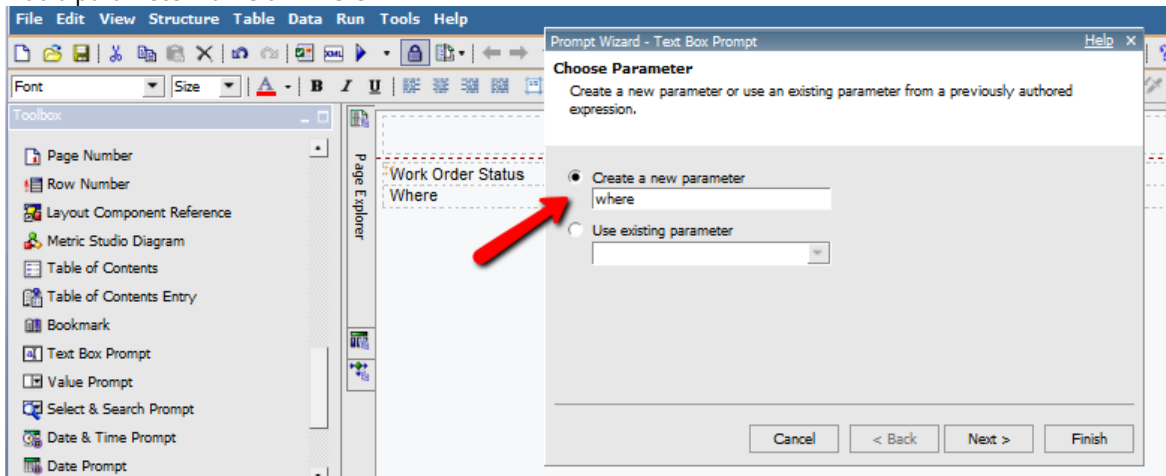
4. Add a table to 2 parameter values. To do this, select Table under Insert Objects. Specify the table to have 2 columns and 2 rows, and Click OK. Enter a Table name like 'Parameter Values'.



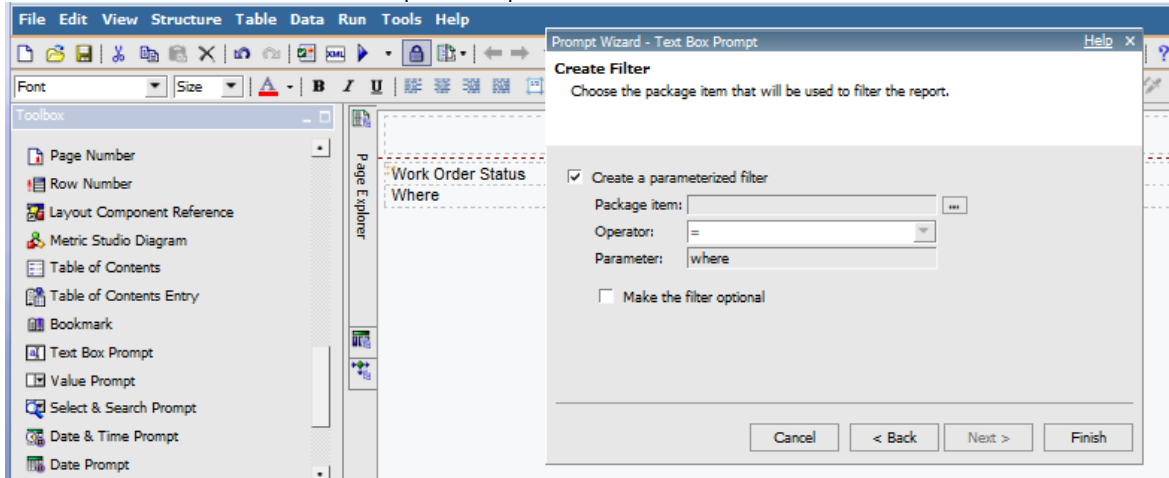
5. Navigate to the first column on the left. Add the labels for the parameters by selecting Text Item, and dragging it to the column. Add a value of 'Work Order Status'. Repeat for a value of 'Where'.



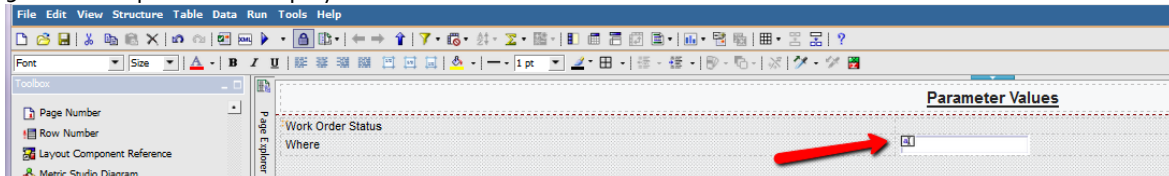
6. Highlight the where parameter. Scroll down on the Insert Objects Section. Select 'Text Box Prompt'. Add a parameter name of 'where'



8. Click Next and then Finish to complete the parameter creation.

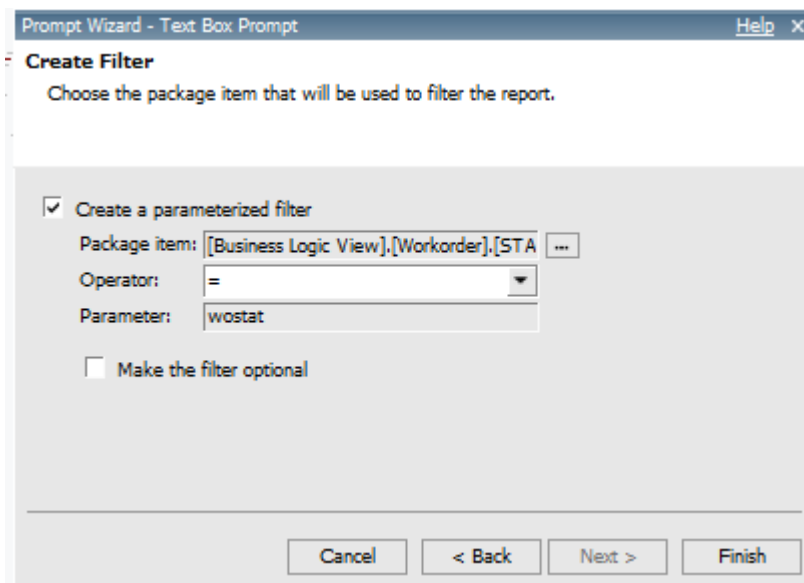


9. The new parameter displays as shown below.

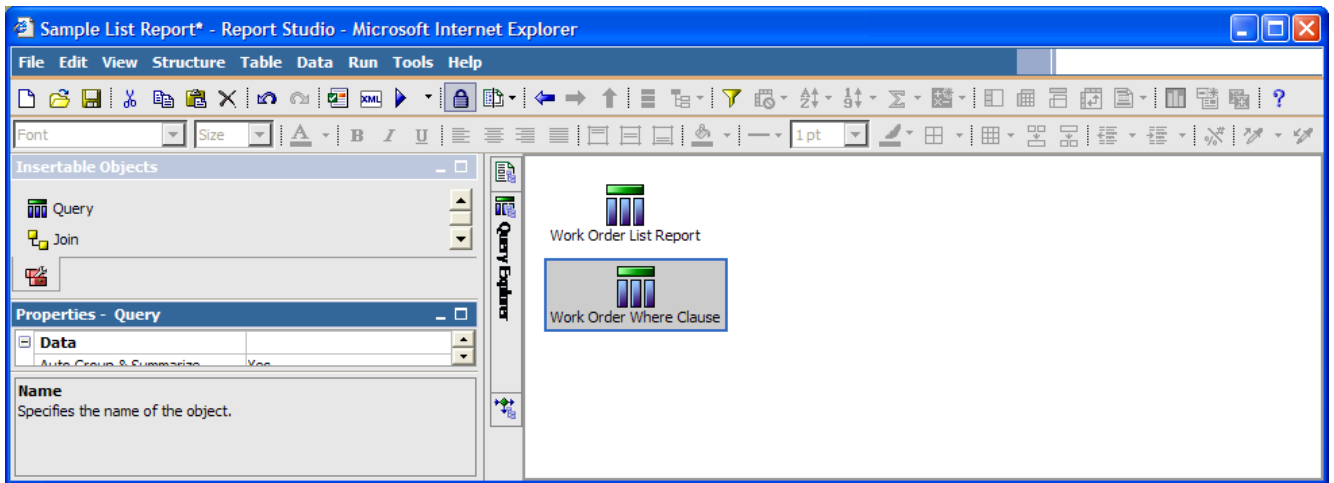


10. Review its property settings. Make sure the 'Required' Value is set to No so the report can execute from the Cognos Portal when the Maximo where clause is not available.

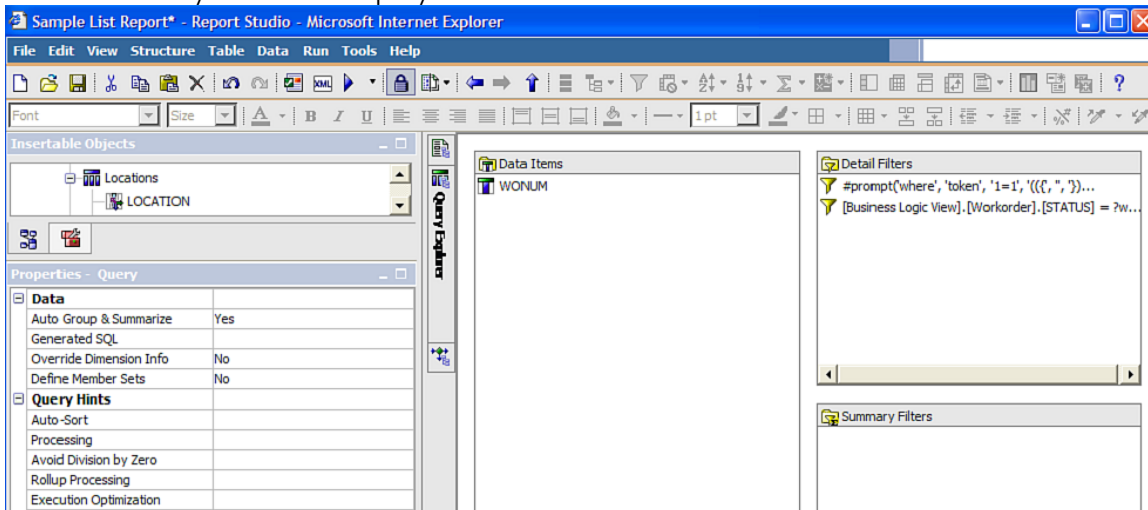
11. Next, repeat the process to add another parameter – wostat, which is displayed to the user as 'Work Order Status'. Make sure to select the status field from the Work Order Package as shown below. This parameter should have its Required Field set to Yes. After this, you should have both parameters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



12. 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".

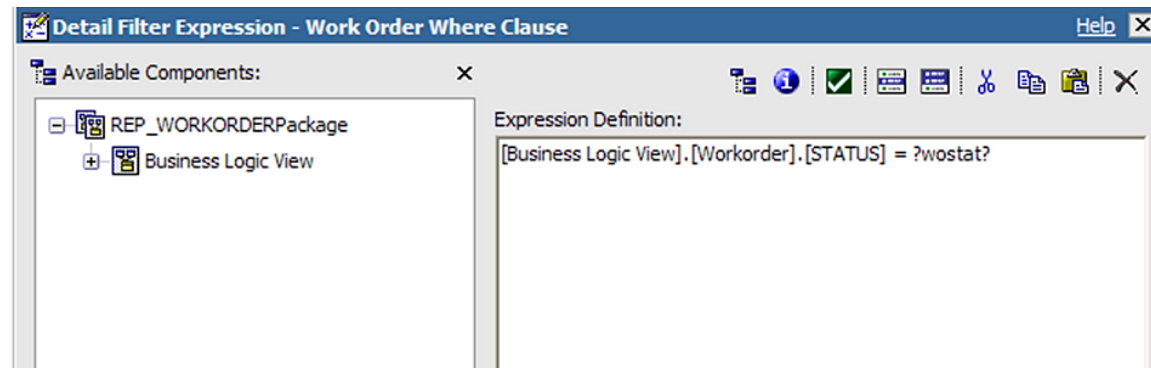
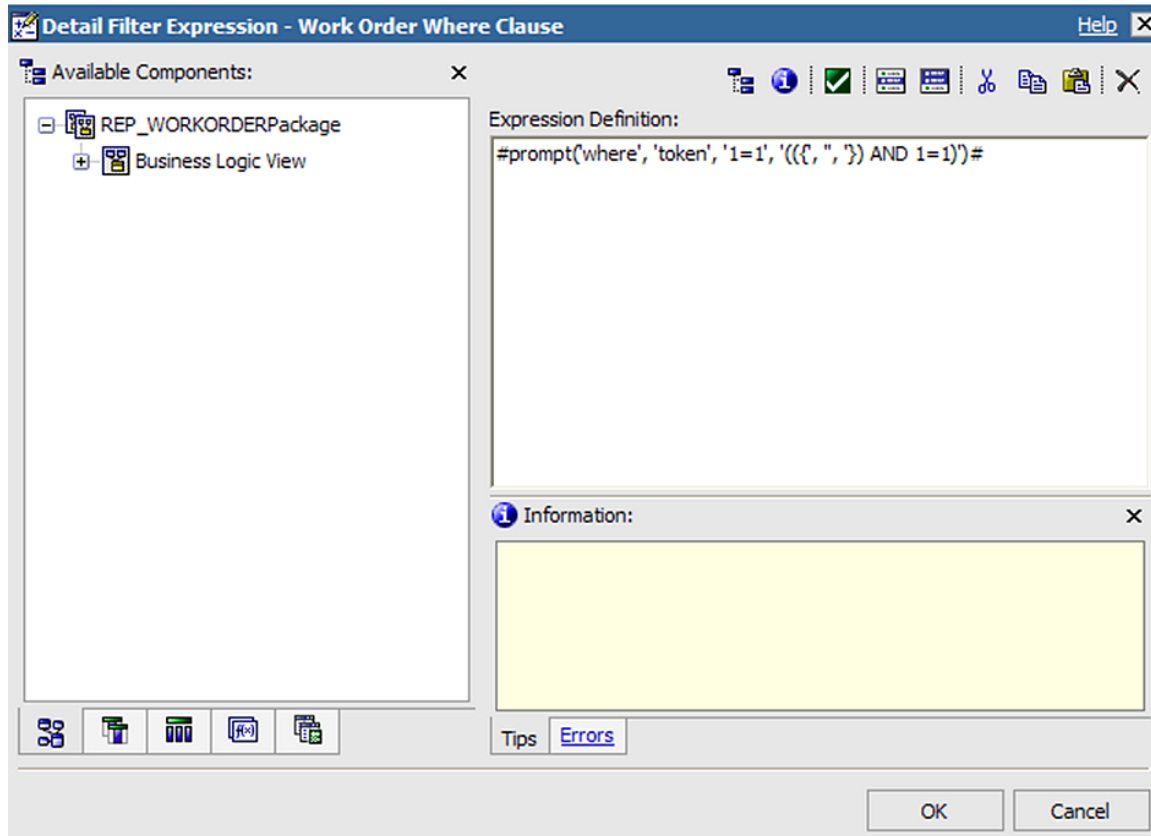


13. From the "Insertable Objects" pane, add "[Business Logic View].[Workorder].[WORKORDERID]". This should be the only column in the query.



14. 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?

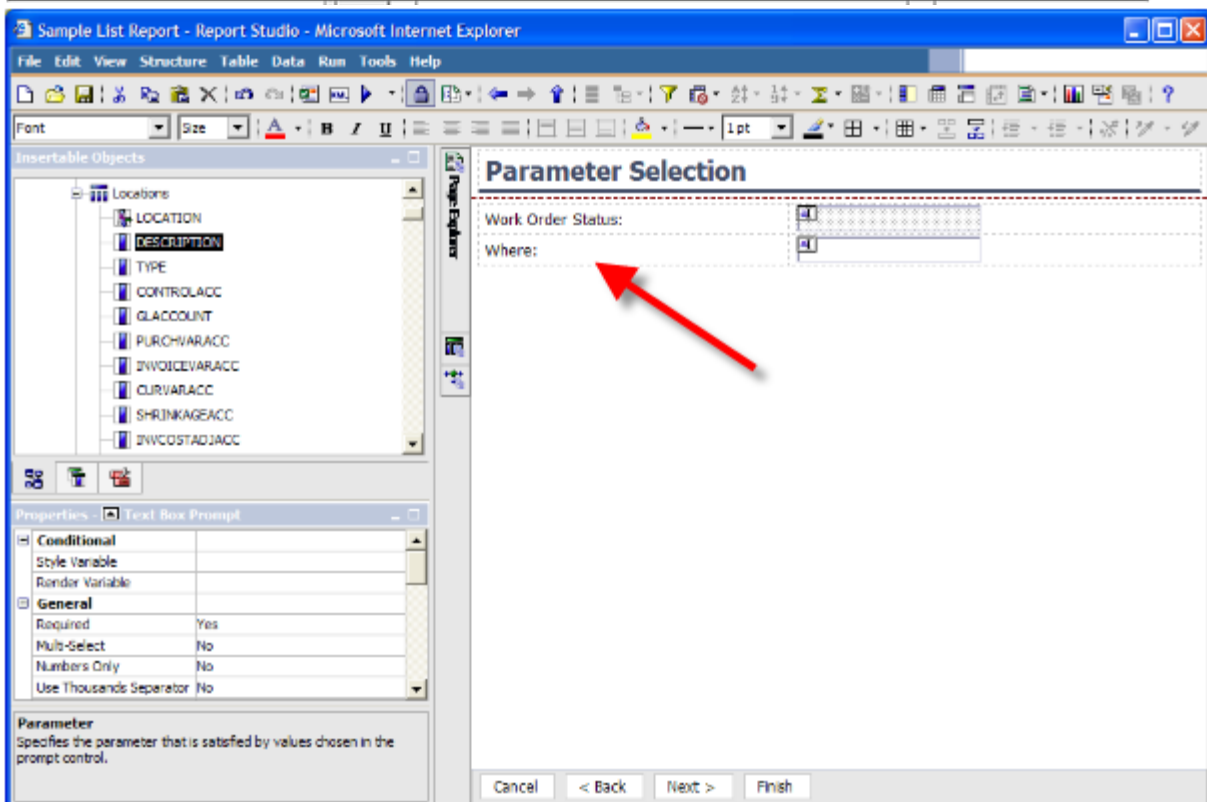
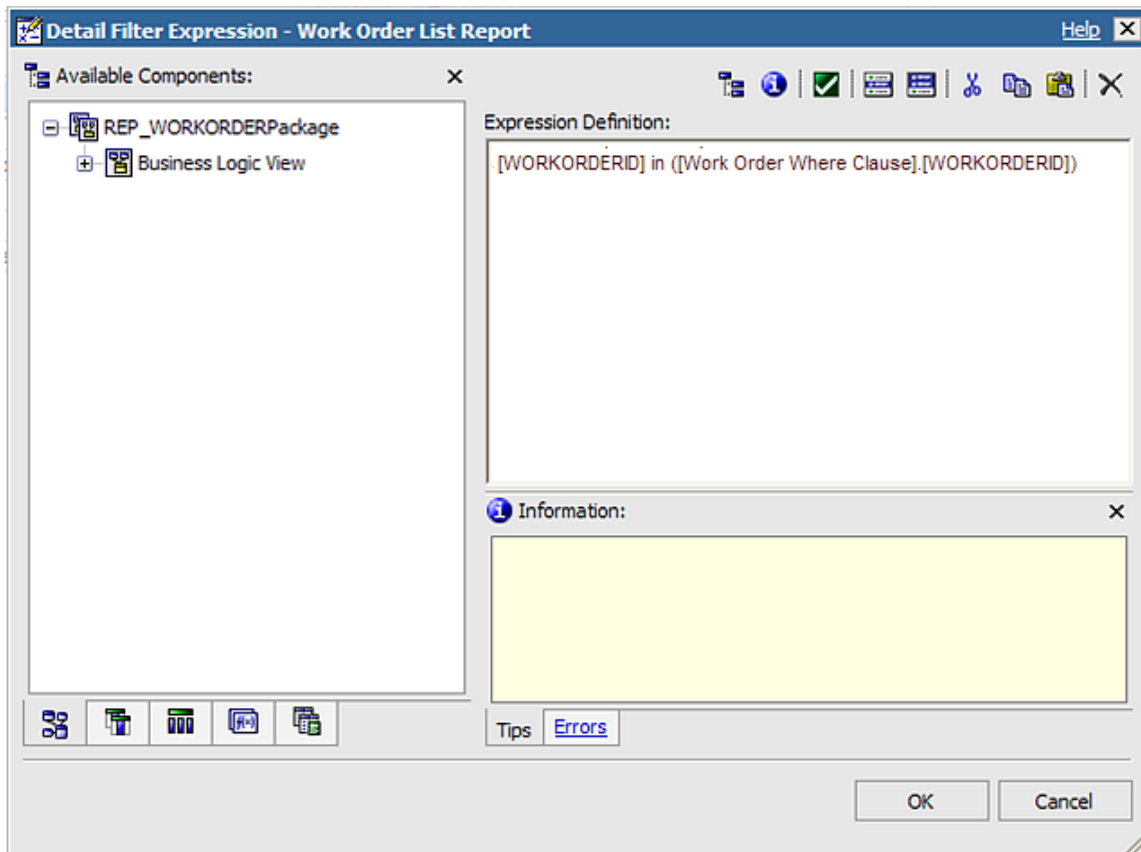


15. This query enforces the where clause passed from Maximo. This “restriction” query needs to be applied to the main query. You would also need to apply this restriction query to all queries that need to be restricted by the Maximo where clause.

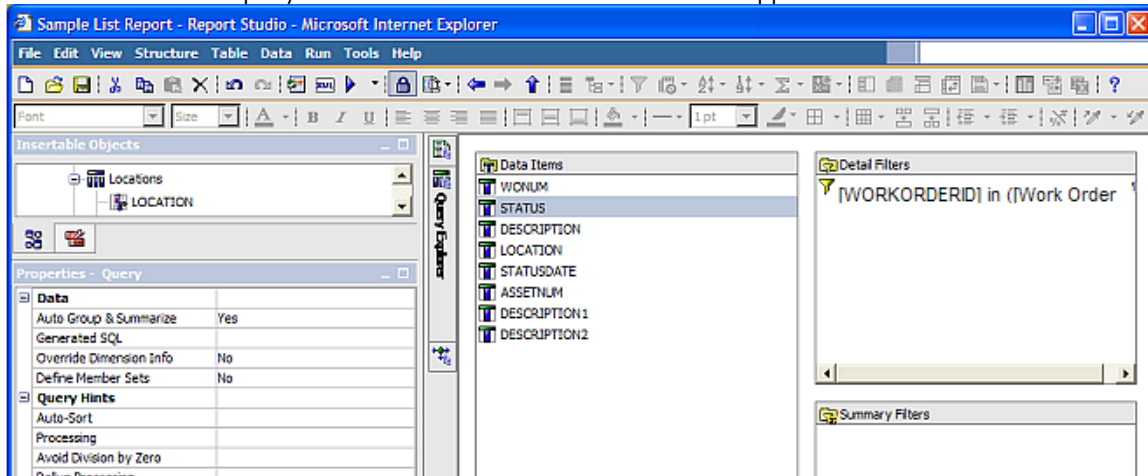
To do this, bring up your main query and add a filter for the restriction,
[WORKORDERID] in ([Work Order Where Clause].[WORKORDERID])

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.

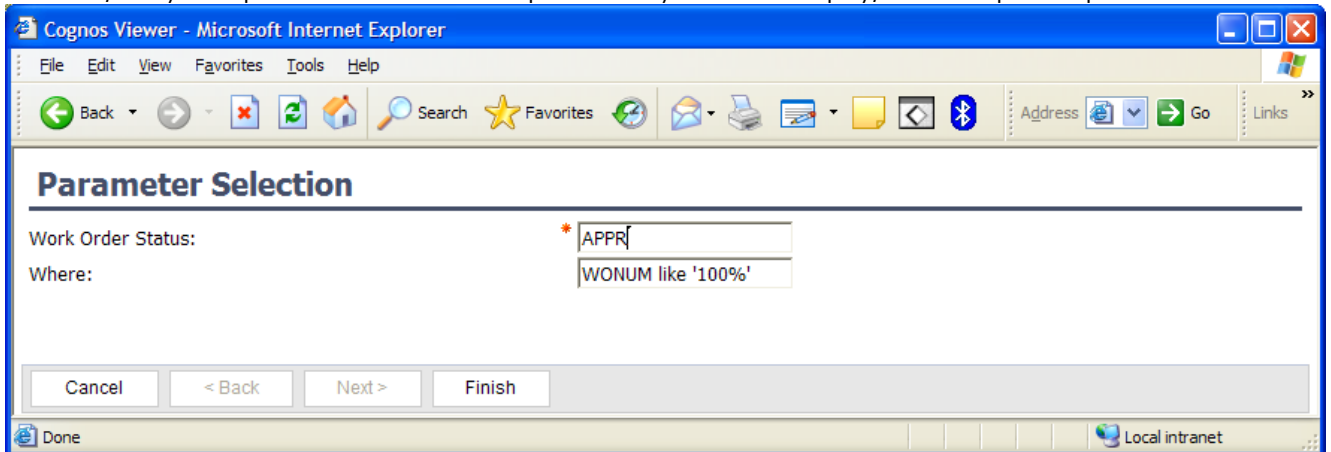
In this example, WORKORDERID is the unique key for the Package, REP_WORKORDER. If you were using another package, use the unique main table key column. For example, REP_ASSETPackage would use ASSETUID.



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

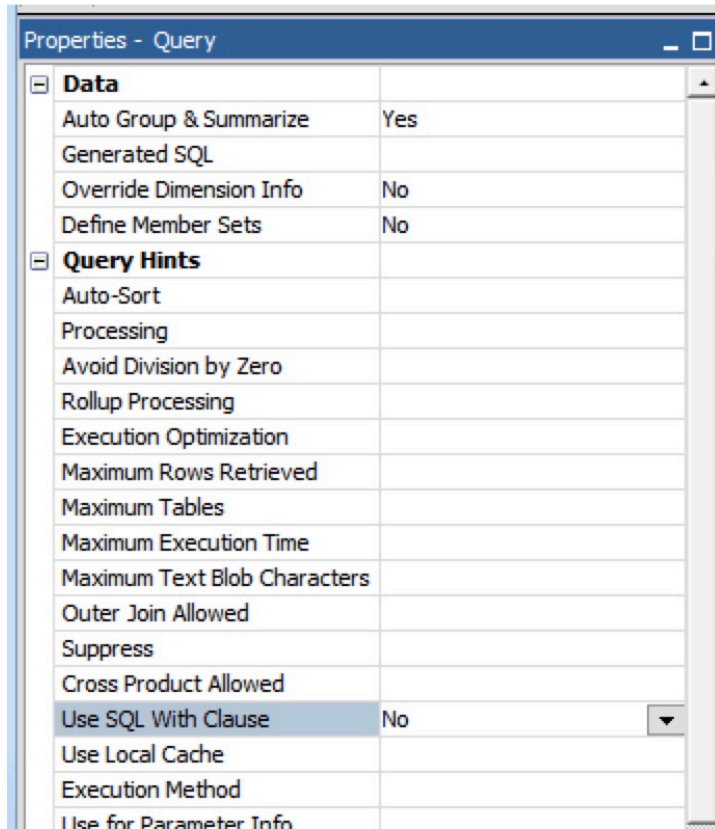


16. Then, test your report and notice that the 2 parameters you defined display, and the report output.



17. Note: If you only want to pass the Maximo Where clause to the report – you must modify the setting within Report Studio on the query property "Use Sql With Clause" to equal "No".

When you are passing where clauses from Maximo to Cognos, this functionality must be explicitly turned off.

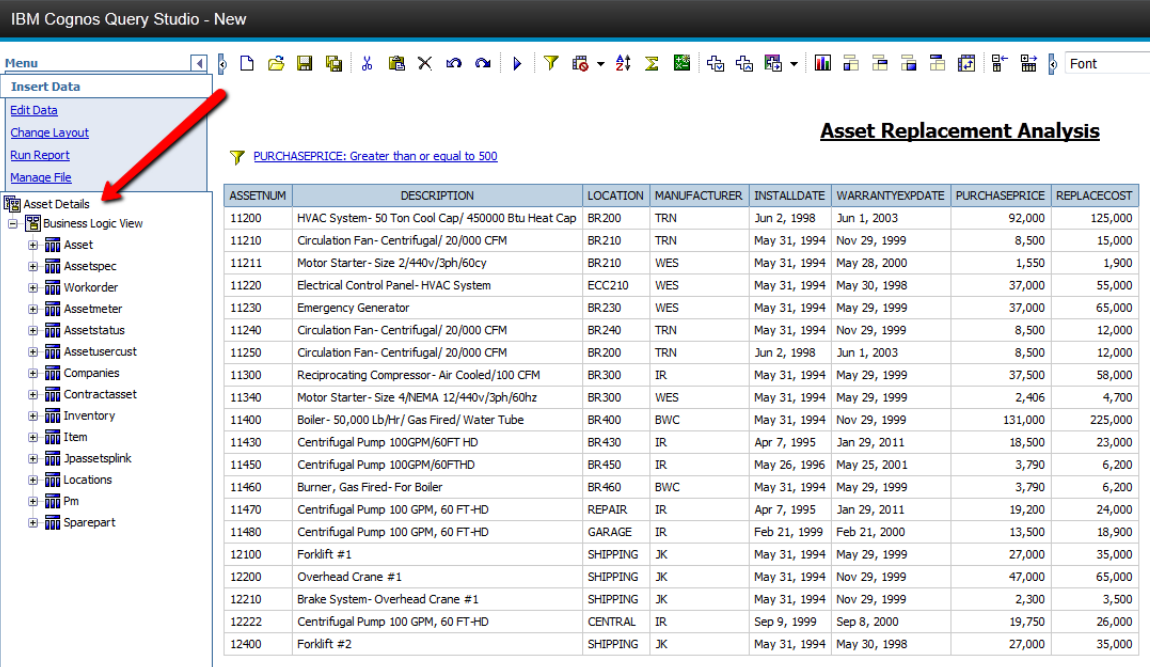


18. After you have completed developing your report, register it in the Maximo Report Administration Application. This will enable its access from within the Maximo. Make sure to include any parameters that require user input, like wostat. You do not have to include the where parameter. Save the entry,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

6.1 Developing Maximo Cognos Reports in Query Studio

Users can create Ad Hoc reports in Query Studio for their individual project or business needs.

Like reports created in Cognos Report Studio, Query Studio reports can utilize the published 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.



The screenshot displays the IBM Cognos Query Studio - New interface. On the left, a menu is visible with options: Insert Data, Edit Data, Change Layout, Run Report, and Manage File. A red arrow points to the 'Run Report' button. Below the menu is a tree view showing 'Asset Details' and various asset-related categories like Asset, Assetspec, Workorder, Assetmeter, Assetstatus, Assetusercust, Companies, Contractasset, Inventory, Item, Assetsplink, Locations, Pm, and Sparepart. The main area shows a report titled 'Asset Replacement Analysis' with a filter 'PURCHASEPRICE: Greater than or equal to 500'. The report is a table with columns: ASSETNUM, DESCRIPTION, LOCATION, MANUFACTURER, INSTALLDATE, WARRANTYEXPDATE, PURCHASEPRICE, and REPLACECOST. The table contains 24 rows of asset data.

ASSETNUM	DESCRIPTION	LOCATION	MANUFACTURER	INSTALLDATE	WARRANTYEXPDATE	PURCHASEPRICE	REPLACECOST
11200	HVAC System- 50 Ton Cool Cap/ 450000 Btu Heat Cap	BR200	TRN	Jun 2, 1998	Jun 1, 2003	92,000	125,000
11210	Circulation Fan- Centrifugal/ 20/000 CFM	BR210	TRN	May 31, 1994	Nov 29, 1999	8,500	15,000
11211	Motor Starter- Size 2/440v/3ph/60cy	BR210	WES	May 31, 1994	May 28, 2000	1,550	1,900
11220	Electrical Control Panel- HVAC System	ECC210	WES	May 31, 1994	May 30, 1998	37,000	55,000
11230	Emergency Generator	BR230	WES	May 31, 1994	May 29, 1999	37,000	65,000
11240	Circulation Fan- Centrifugal/ 20/000 CFM	BR240	TRN	May 31, 1994	Nov 29, 1999	8,500	12,000
11250	Circulation Fan- Centrifugal/ 20/000 CFM	BR200	TRN	Jun 2, 1998	Jun 1, 2003	8,500	12,000
11300	Reciprocating Compressor- Air Cooled/100 CFM	BR300	IR	May 31, 1994	May 29, 1999	37,500	58,000
11340	Motor Starter- Size 4/NEMA 12/440v/3ph/60hz	BR300	WES	May 31, 1994	May 29, 1999	2,406	4,700
11400	Boiler- 50,000 Lb/Hr/ Gas Fired/ Water Tube	BR400	BWC	May 31, 1994	Nov 29, 1999	131,000	225,000
11430	Centrifugal Pump 100GPM/60FT HD	BR430	IR	Apr 7, 1995	Jan 29, 2011	18,500	23,000
11450	Centrifugal Pump 100GPM/60FTHD	BR450	IR	May 26, 1996	May 25, 2001	3,790	6,200
11460	Burner, Gas Fired- For Boiler	BR460	BWC	May 31, 1994	May 29, 1999	3,790	6,200
11470	Centrifugal Pump 100 GPM, 60 FT-HD	REPAIR	IR	Apr 7, 1995	Jan 29, 2011	19,200	24,000
11480	Centrifugal Pump 100 GPM, 60 FT-HD	GARAGE	IR	Feb 21, 1999	Feb 21, 2000	13,500	18,900
12100	Forklift #1	SHIPPING	JK	May 31, 1994	May 29, 1999	27,000	35,000
12200	Overhead Crane #1	SHIPPING	JK	May 31, 1994	Nov 29, 1999	47,000	65,000
12210	Brake System- Overhead Crane #1	SHIPPING	JK	May 31, 1994	Nov 29, 1999	2,300	3,500
12222	Centrifugal Pump 100 GPM, 60 FT-HD	CENTRAL	IR	Sep 9, 1999	Sep 8, 2000	19,750	26,000
12400	Forklift #2	SHIPPING	JK	May 31, 1994	May 30, 1998	27,000	35,000

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.

6.2 Registering Cognos Reports in Maximo's Report Administration

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 Administration application, and insert a new record. Input the Cognos Report Name, and the application it should be accessed from and the Report Type. The Report Type should be Cognos.

The screenshot shows the 'Report Administration' application interface. The 'Report' tab is selected. The 'Report File Name' field contains 'CognosWorkOrderBacklog'. The 'Report Type' dropdown is set to 'COGNOS'. The 'Application' dropdown is set to 'WOTRACK'. The 'Report Folder' field is empty. The 'Package Name' field contains 'REP_WORKORDER'. The 'Package Location' field contains 'PUBLISH'. The 'Last Import Date' and 'Imported by' fields are empty.

When you select the Cognos Report Type, Package Name and Package Location display.

- Package Name is the name of the Cognos Package that the report is based on.
- Package Location is the folder where the Package is located in Cognos.

Then, fill in the balance of the settings for the report record, including any parameter values. When you have entered all the information, save the record and generate the request page.

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. Click 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.

The screenshot shows the 'Report Administration' application interface with the 'Security' tab selected. The 'Report File Name' is 'CognosWorkOrderBacklog' and the 'Cognos Work Order Backlog Report' is displayed. The 'Report Level Security' section shows a table with one row: 'PLANNING' with description 'Planning'. The 'Application Level Security' section shows a table with two rows: 'OPSMGR' with description 'Operations Manager' and 'SCHEDULING' with description 'Scheduling'.

Group	Description
PLANNING	Planning

Group	Description
OPSMGR	Operations Manager
SCHEDULING	Scheduling

Also, users may inherit security access to this report if they have been granted access via Application level security. In this case, both the OPSMGR and SCHEDULING security groups have access to this report. They were previously granted access via the 'Set Application Security' action. When using this, you can specify all report types, or a selected subset.

Report Application Security

Applications Filter > 🔍 1 - 1 of 1

Application	Description
WOTRACK	Work Order Tracking

Application Level Security Filter > 🔍 1 - 2 of 2

Group	Description
OPSMGR	Operations Manager
SCHEDULING	Scheduling

Details

All?	BIRT Reports?	Cognos?	Custom?
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

New Row

OK Cancel

Additionally, you can view what Report Application Access has been granted to a selected Security Group via the View Group Security Action from Report Administration. 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: Description:

Group Security Filter > 🔍 1 - 10 of 20

Application Name	Description	All?	BIRT Reports?	Custom?	Cognos?
ACTUALCI	Actual Configuration Items	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ASSET	Assets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CI	Configuration Items	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
COLLECTION	Collections	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
COMPANY	Companies	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CRAFT	Crafts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FAILURE	Failure Codes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
JOBPLAN	Job Plans	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LABOR	Labor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LABREP	Labor Reporting	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Cancel

7 Maximo Cognos Reporting Considerations

Below is a listing of functionality considerations to review for the Maximo Cognos Integration 7.6 Releases.

1. There is no automated installer for this functionality. Both Maximo and Cognos are installed separately, and then the integration installation is performed. Information on the installation is in the Reference Materials section at the end of this guide.
2. Maximo enables rich text formatting to be applied to long descriptions. However, only a subset of rich text is supported for Cognos reports. For more details, access this url
http://pic.dhe.ibm.com/infocenter/cx/v10r1m0/index.jsp?topic=%2Fcom.ibm.swg.ba.cognos.ug_cr_rptstd.10.1.0.doc%2Fc_rich_text_item_supported_elements.html
3. In Maximo 76, multi-tenant architecture was introduced. This feature is not supported for Maximo Cognos reporting.
4. If you are using BiDi languages, review the two tech notes below which provide special considerations for configuring Cognos reports and date parameters.

Enabling bidirectional language support in Maximo Cognos reports
<http://www-304.ibm.com/support/docview.wss?uid=swg21687562>

Calendar parameters in Maximo Cognos reports for bidirectional languages
<http://www-304.ibm.com/support/docview.wss?uid=swg21687563>

5. Administration of Maximo-Cognos Reports is required in two separate tools. The ability to run reports for security groups is defined in Maximo. Additionally, what Cognos functionality is enabled, and which Maximo-Cognos Reports a user can access is defined in the Cognos Administration tool.
6. All features of the Maximo 76 embedded reporting functionality are not reproduced in the Cognos reporting solution. Examples of the specific reporting functionality not supported 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 report to display in the Cognos Portal by clicking on an icon in a Maximo application's toolbar
 - 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.

J. In Maximo 76, a number of configurable security performance settings were introduced including Number of Scheduled reports, Report Server Limits, Ad Hoc Preview Limits. These settings are not applicable to Cognos reports.

7.1 Best Practices

The following lists Best Practices for the Maximo Cognos Integration.

1. 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 highlighted by the red arrow 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.

2. 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.

3. Maximo Cognos Architecture

- It is highly recommended that Cognos be installed on a server separate from Maximo
- Additionally, you may want to configure Cognos to utilize a replicated copy of your production database

8 Miscellaneous

8.1 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.

You can execute two 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 report's 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.

Parameter Name	Attribute Name	Sequence	Display Name	Required?
site	siteid	1	Site	Yes

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.

Site:

Where:

Enter where clause and site

Application Reports

Application Reports are often referred to reports using the Application's Current/Selected Record Set or Launch in Context Reports. Their primary purpose is to provide information on specific record data without requiring the user to input the query values via parameters.

These reports do not contain any user inputted parameters as shown from its Report Administration entry .

The screenshot shows the 'Report Administration' window for the 'Cognos Work Order Backlog Report'. The interface includes a left-hand navigation pane with options like 'Go To Applications', 'Available Queries', and 'Common Actions'. The main area displays report details: Report File Name (CognosWorkOrderBacklog), Report Type (COGNOS), Application (WOTRACK), Report Folder (WOTRACK), and Package Name (REP_WORKORDER). A red arrow points to the 'Settings' tab, which is currently selected. Below the settings, there is a 'Parameters' section with a table header: 'Parameter Name', 'Attribute Name', 'Sequence', 'Display Name', and 'Required?'. The table is empty, showing 'There are no rows to display.' and a 'New Row' button.

Application Reports enable the dynamic passing of the user's application query to the Cognos report at run time. The user does reenter these filter values on the report's request page in Maximo.

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.

Application reports are best executed from within the Maximo application so the application filter can properly pass to the Cognos Report.

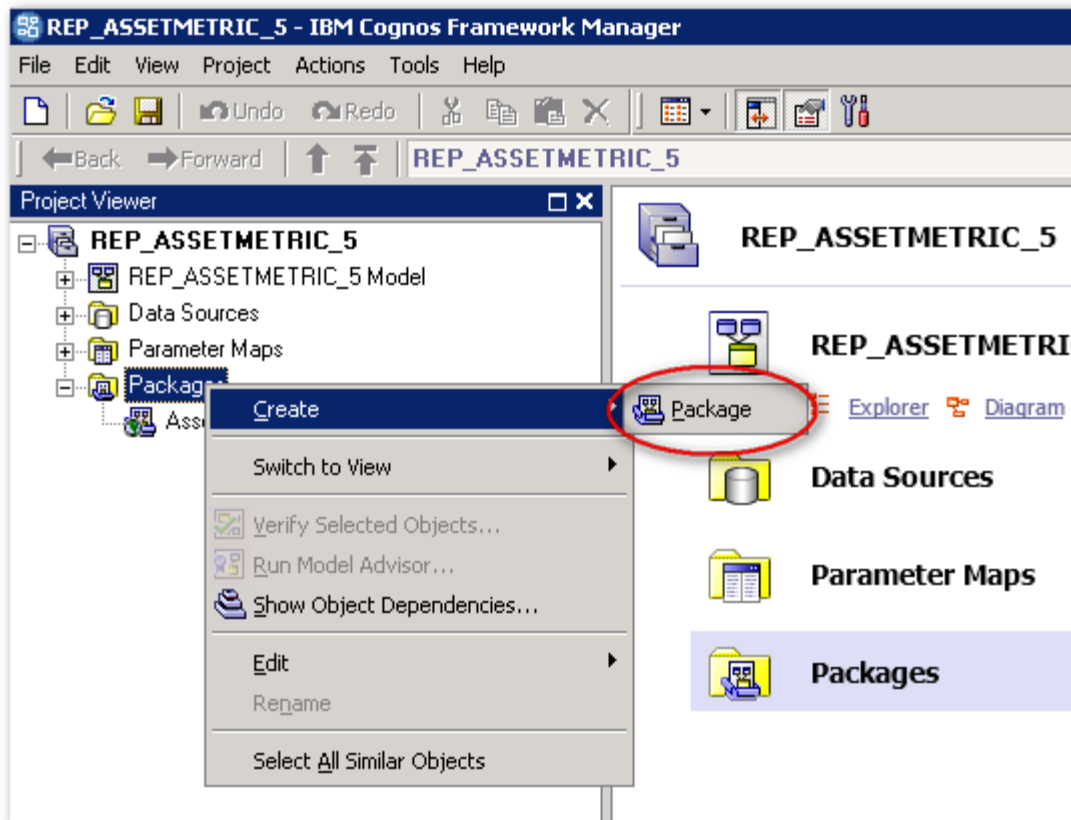
These reports can also be executed from within the Cognos Connection, however, Maximo's application filter will not be available. This report will execute against all values - while filtering for the user's Site, Organization and Set restrictions - and display the report in Cognos.

The screenshot shows a 'WO List Prompt Page' with a 'Where:' label and a text input field containing the text '1=1'.

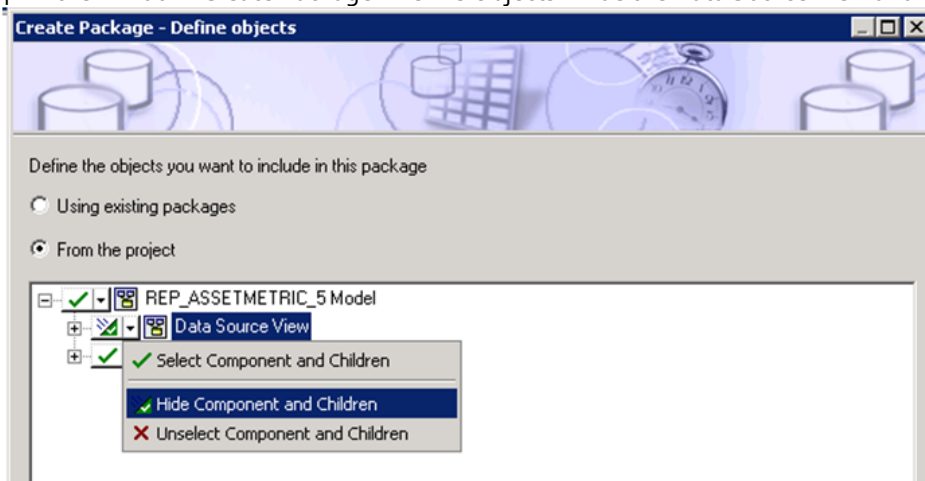
8.2 Publishing Cognos Packages from FM

Follow the steps below if you have made modifications to a model in FM, and need to publish its package to the Cognos Content Store.

1. Within FM, open up the modified model.
2. From the menu, highlight the package. Right click on it and select 'Create-Package'.

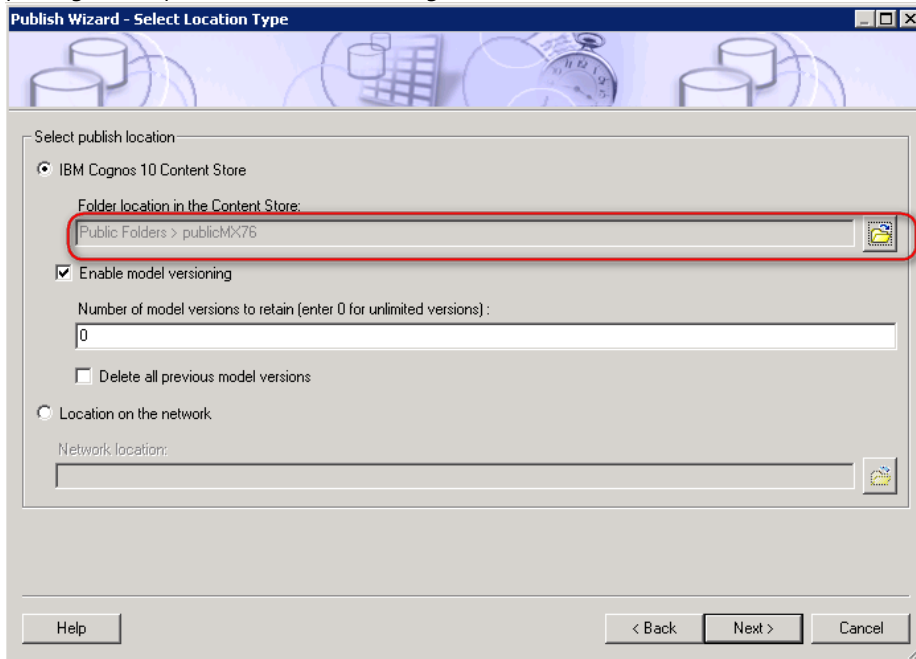


3. In the Window: Create Package - Provide Name. Input a name for the new package and click Next. (Note: To replace the existing package, the package name must be the same as existing package name)
4. In the Window: Create Package - Define Objects. Hide the Data Source View and click Next.



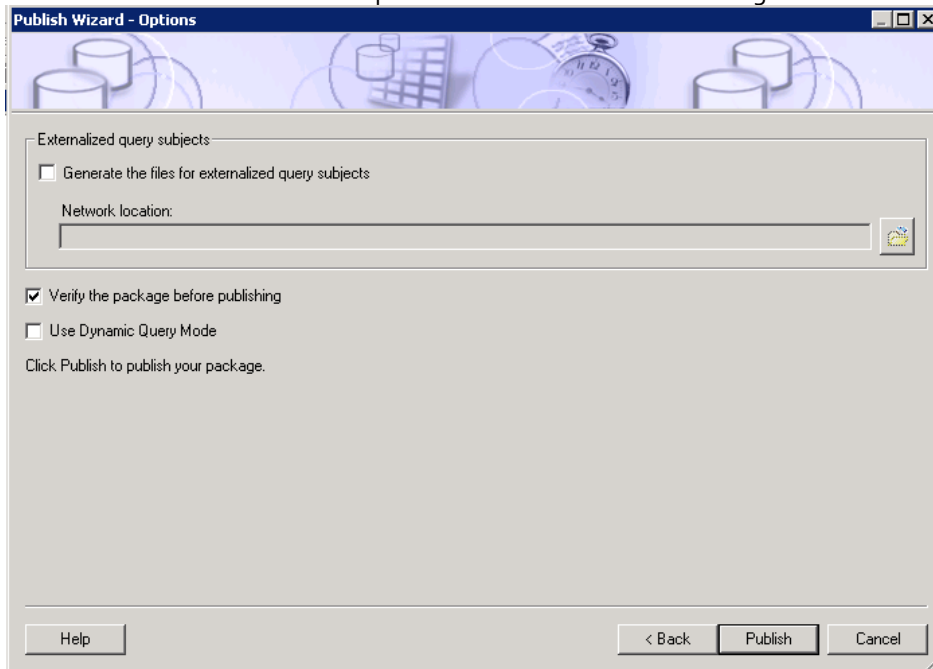
5. In Window: Create Package - Select Function Lists. Click Finish without doing anything in the Window. A message prompts asking if you'd like to publish the package. Click Yes.

6. In Window: Publish Wizard - Select Location type. Browse to the folder that you'd like to locate the package. Keep all other default settings. Click next.



7. In Window: Publish Wizard - Add Security. Click Next without any changes.

8. In Window: Publish Wizard - Options. Click Publish with all settings as default.



9. Wait until Verifying model process is completed. A prompt message displays asking whether to publish and replace existing models. Click **Yes**. Wait until verifying process complete, click **Close**.

8.3 Internet Explorer display issues

If you are using Internet Explorer, and the report registers properly and connects to Cognos properly but fails to render with the error message similar to this:

CM-REQ-4158 The search path

"/content/folder[@name='publicmd']/package#@na#e='Person

Details'#/report[@na#e='TestPersonRpt2']" is invalid. An object may contain invalid syntax, or an unsupported character, or the user account in the namespace may not have sufficient privileges. Check the object to ensure that the target destination location does not contain special characters.

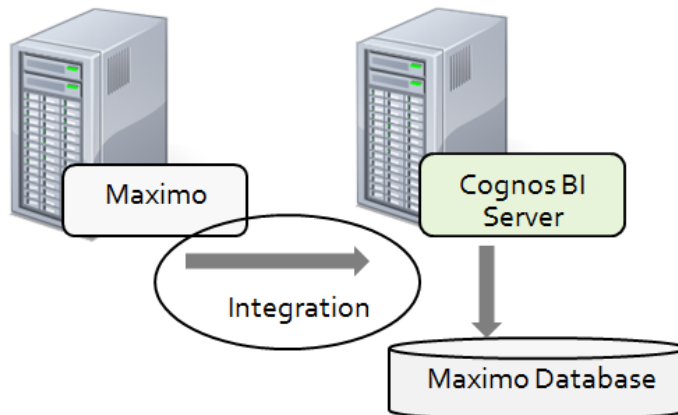
To resolve the issue, the XSS filter in IE must be disabled by following the steps below:

1. Access Internet Explorer
2. Hit Alt key on keyboard
3. Click on Tools , internet options
4. Click on security tab
5. Click on Custom level
6. Scroll down to Enable XSS FILTER "Under Scripting"
7. Place a check mark for Disable XSS FILTER and click on Ok
8. Click ok to close the properties windows
9. Restart Internet Explorer.

Additional reference materials for Maximo76 and Cognos can be found below

Maximo 76 Cognos 10.2.1 Integration Installation Document

<http://www-01.ibm.com/support/docview.wss?uid=swg21692347>



Maximo 76 BI Documentation:

<https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20Maximo%20Asset%20Management/page/Maximo%2076%20BI%20Documentation>

Maximo 76 BI Recorded Demos:

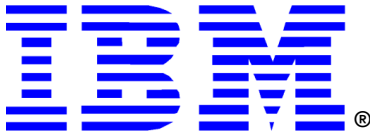
<https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20Maximo%20Asset%20Management/page/Maximo%2076%20BI%20Recordings>

Cognos 10.2.1. Documentation:

<http://www-01.ibm.com/support/docview.wss?uid=swg27024067>

Cognos 10.2.1 Supported Product Matrix:

<http://www-01.ibm.com/support/docview.wss?uid=swg27037784>



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