Release 6.2.1

Implementation Guide
Reconciliation Module
First Edition (January 2007)
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<th>IBM Product</th>
<th>Third-Party Information</th>
</tr>
</thead>
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Contents

About This Guide ................................................................. v
  Audience ................................................................. v
  Related Documentation ............................................... v
  Support ................................................................. vi

Chapter 1: Reconciliation Module Overview .......................................... 1-1
  Reconciliation Module Applications ..................................... 1-2
  Understanding Maximo Classifications .................................. 1-3
    IT Asset Structure and Classification .................................. 1-3
    Deployed Asset Structure ............................................. 1-4
  Understanding the Reconciliation Process ............................... 1-4
    Initialization Phase .................................................. 1-4
    Link Phase ........................................................... 1-5
    Comparison Phase ................................................... 1-7
  Setting Up a Reconciliation ............................................. 1-7
  Scheduling the Reconciliation Process ................................... 1-7

Chapter 2: Setting Up a Reconciliation ............................................. 2-1
  Setting Up Task Filters ................................................ 2-1
    Task Filter Components .............................................. 2-2
  Setting Up Link Rules .................................................. 2-3
    Link Rule Components ............................................... 2-3
    Creating Link Rules .................................................. 2-5
    Modifying Link Rules ............................................... 2-6
    Duplicating Link Rules .............................................. 2-6
    Deleting Link Rules .................................................. 2-6
  Setting Up Comparison Rules .......................................... 2-6
    Comparison Rules Components ....................................... 2-8
      Asset Filter Clauses ................................................ 2-8
      Deployed Asset Filter Clauses .................................... 2-15
      Matches Found Clauses ............................................. 2-19
      Attributes Equality Clauses ....................................... 2-22
    Creating Comparison Rules ......................................... 2-24
    Modifying Comparison Rules ....................................... 2-24
    Duplicating Comparison Rules ..................................... 2-25
    Deleting Comparison Rules ......................................... 2-25
  Setting Up Reconciliation Tasks ....................................... 2-25
    Reconciliation Task Components ................................... 2-27
    Creating Reconciliation Tasks ..................................... 2-28
    Modifying Reconciliation Tasks .................................... 2-28
    Duplicating Reconciliation Tasks .................................. 2-29
    Deleting Reconciliation Tasks ..................................... 2-29

Chapter 3: Viewing Results of a Reconciliation .................................. 3-1
  Results of the Reconciliation Process ................................ 3-1
  Link Results Application .............................................. 3-2
    Viewing Link Results ................................................ 3-2
    Deleting Link Results ................................................ 3-2
  Reconciliation Results Application .................................... 3-3
About This Guide

This guide explains how to use the IBM® Maximo® Asset Management Reconciliation module applications to reconcile the two types of information Maximo maintains about information technology (IT) assets: IT asset data and deployed asset data.

This section explains how this guide can help you to use IBM Maximo. It also provides information about other IBM Corporation resources available to you, such as additional documentation and support.

Audience

This guide is written for IT asset managers, system administrators, and other personnel responsible for reconciling IT asset data against deployed asset data collected by an asset discovery tool. The Reconciliation module applications are administrative applications.

Related Documentation

For more information about Maximo, refer to the following documentation:

<table>
<thead>
<tr>
<th>Document</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IBM Maximo Finance Manager's Guide</strong></td>
<td>Describes how IBM Maximo completes financial transactions and how to set up general ledger accounts.</td>
</tr>
<tr>
<td><strong>IBM Maximo Installation Guide</strong></td>
<td>Describes how to install and configure the following software:</td>
</tr>
<tr>
<td></td>
<td>▼ Application server</td>
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<tr>
<td></td>
<td>▼ IBM Maximo</td>
</tr>
<tr>
<td></td>
<td>▼ Actuate®</td>
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<tr>
<td><strong>Maximo Multisite Administrator’s Guide</strong></td>
<td>Describes how to configure IBM Maximo for a Multisite implementation.</td>
</tr>
<tr>
<td><strong>IBM Maximo Online Help</strong></td>
<td>Provides step-by-step procedures for Maximo applications.</td>
</tr>
<tr>
<td>Document</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>IBM Maximo Reconciliation Implementation Guide</td>
<td>Describes how to use the IBM Maximo Reconciliation module to reconcile the two types of information that IBM Maximo maintains about information technology (IT) assets: IT asset data and deployed asset data.</td>
</tr>
<tr>
<td>IBM Maximo Report Administration and Development Guide</td>
<td>Describes how to use Actuate to design and administer IBM Maximo reports.</td>
</tr>
<tr>
<td>IBM Maximo System Administrator’s Guide</td>
<td>Describes database configuration, security, and other administrative level applications and tasks.</td>
</tr>
<tr>
<td>IBM Maximo User’s Guide</td>
<td>Provides an overview of the Maximo end user applications. It also describes how the IBM Maximo applications interact with each other.</td>
</tr>
<tr>
<td>IBM Maximo Workflow Implementation Guide</td>
<td>Provides information about how to use IBM Maximo to plan, design, build, test, implement, and manage Workflow processes.</td>
</tr>
<tr>
<td>IBM Maximo Enterprise Adapter (MEA) System Administrator’s Guide</td>
<td>Describes how to configure and use the IBM MEA.</td>
</tr>
</tbody>
</table>

**Support**

IBM Maximo users with a valid Annual Customer Support Plan (ACSP) can obtain product support online at Support Online: support.mro.com.

Support Online includes information about product releases, software patches, and documentation updates. To find the most current version of a document, refer to the Knowledge Base on this site.
The Reconciliation module applications let you compare two kinds of information technology (IT) asset data stored in the IBM Maximo Asset Management database. Maximo maintains two distinct sets of information technology asset data in two different modules, the Assets module and the Deployed Assets module.

Assets Module

- Assets Module — Maximo maintains asset records for purchased or leased IT assets in the Assets application. You create these records in the Assets application or when you use the Receive Rotating Items action in the Receiving application. An IT asset is an asset with a class structure identifier that belongs to the top-level IT classification used in your enterprise.

Deployed Assets Module

- Deployed Assets Module — In addition to asset information in the Assets applications, the Deployed Assets module applications in Maximo maintain data collected directly from assets actually installed in your enterprise. To gather this data, asset discovery tools (such as Microsoft® SMS or IBM Tivoli® Configuration Manager) scan computers, network devices, and network printers deployed in your enterprise and record information about the hardware and software installed on those assets. The IBM Maximo Integration Composer, an integration tool for aggregating IT asset data, imports the collected data into Maximo. You view this data in the Deployed Assets module applications—Computers, Network Devices, and Network Printers.

NOTE In this guide, the term IT asset refers to information technology assets maintained in the Assets application. The term deployed asset refers to asset data maintained in the Deployed Assets module applications.

Reconciliation Module

The Reconciliation module applications let you configure a behind-the-scenes process that reconciles the IT asset information maintained in the Assets module applications against the deployed asset data maintained in the Deployed Assets module applications.

The reconciliation process identifies successful matches between IT assets and deployed assets as well as discrepancies and variances between the two. Your enterprise can use this reconciliation to determine whether the IT assets actually deployed comply with corporate plans and whether the changes over an asset's life cycle are in compliance with corporate policies. Discrepancies might be caused by a variety of factors, including:

- incorrect data entry
- reconfigured equipment
- retired equipment
Reconciliation Module Applications

The Reconciliation module includes six applications that let you perform the following tasks:

- Configure a behind-the-scenes reconciliation process to reconcile the IT asset information maintained in the Assets module applications against the deployed asset data maintained in the Deployed Assets module applications.
- View the results of the reconciliation.

Reconciliation Tasks
To define the parameters for a reconciliation, you create a reconciliation task in the Reconciliation Tasks application. The reconciliation task includes one or more link rules that determine which IT asset to compare with a deployed asset. You can limit the scope of a reconciliation task by including a task filter that specifies a subset of either assets or deployed assets to reconcile. You also have the option to further refine your reconciliation by defining one or more comparison rules that identify specific objects or attributes of an IT asset to compare with objects or attributes of a deployed asset.

Reconciliation Results
After you define a reconciliation task, you use the Cron Task Setup application in the Configuration module to schedule execution of the task. After Maximo executes the reconciliation task, it displays the results in the Reconciliation module’s Link Results and Reconciliation Results applications. Maximo also displays reconciliation results when you select Asset Details from the Select Action menu on the Asset tab in the Assets application. In addition, Maximo also uses reconciliation result information in reports.

Reconciliation Applications
The Reconciliation module includes the following six applications:

- **Reconciliation Tasks** – This application combines one or more link rules and, if necessary, a task filter and one or more comparison rules into a reconciliation task. If you do not define a task filter for a reconciliation task, Maximo compares all top-level IT assets with all deployed assets when it processes the reconciliation task. This application also lets you specify how Maximo reports results for comparison rule evaluations—all results, failed reconciliations, or successful reconciliations.

- **Task Filters** – This application defines a subset of either assets or deployed assets to reconcile.

- **Link Rules** – This application defines a link between a top-level IT asset and a computer, network printer, or network device in deployed assets. The link rule establishes the basis of the comparison by identifying the object and attribute in IT assets to link to a specific attribute in deployed assets.

- **Comparison Rules** – This application identifies objects or attributes of a child or parent IT asset to compare with objects or attributes of a child or parent deployed asset when Maximo executes a reconciliation task.
Understanding Maximo Classifications

To fully understand the reconciliation process, it is important to understand the asset structure and classification hierarchy used for IT assets in Maximo and to understand how those structures differ from the structure for deployed assets.

IT Asset Structure and Classification

Asset Hierarchy

In Maximo, IT assets (that is, assets maintained in the Assets application, not deployed assets) participate in two separate structural hierarchies—the asset hierarchy and the classification hierarchy.

Classification Hierarchy

To distinguish IT assets from other types of assets for purposes of reconciliation, administrators set up a classification hierarchy in addition to the asset hierarchy. To classify IT assets, when configuring Maximo, administrators modify the database directly by setting a Maximo variable (MAXVAR), ITASSET, equal to the class structure identifier (CLASSSTRUCTUREID) of the top-level IT classification. Any asset that belongs to the hierarchy of the top-level IT class structure identifier is an IT asset for purposes of reconciliation. The default root IT asset classification is “IT(UNSPEC).”

When evaluating reconciliation tasks, Maximo processes only assets that belong to the IT asset classification hierarchy. In some cases children of a top-level IT asset might not belong to the IT asset classification hierarchy and consequently will not be included in IT assets when Maximo executes a reconciliation task.

Moved Assets

Reconciliation processes only assets where the moved flag is set to false. If the moved flag for an IT asset is set to true, Maximo does not include it in reconciliation results.
Deployed Asset Structure

Deployed assets have a well-defined hierarchical object structure. The top-level deployed asset is always one of the following three types: computer, network printer, or network device. There are 14 types of objects that are children of a computer. A computer can exist without any instances of children. A computer can have multiple child instances. There is one type of child object that can be associated with a network device, but a network device can exist without any child instances. Network printers do not have child objects.

Understanding the Reconciliation Process

The reconciliation process is controlled by a reconciliation task set up in the Reconciliation Tasks application. A reconciliation task record combines a task filter (optional), one or more link rules, and one or more comparison rules (optional) into a specific job task that Maximo executes using the Cron Task Setup application.

Link Rules

When you set up a reconciliation task, you define one or more link rules that establish the basis of a reconciliation by identifying the object and attribute of a top-level IT asset to reconcile with a specific attribute of a deployed asset. Link rules are generally based on a serial number and/or asset tag. When Maximo executes the reconciliation task, a link rule might successfully identify a relation between an IT asset and a deployed asset, or it might not be able to identify a successful link.

Comparison Rules

If Maximo establishes a successful link, it processes any comparison rules in the reconciliation task, applying the comparison rules one by one to each linked pair of IT asset and deployed asset objects. A comparison rule compares either instances of the top-level objects and their children (a matches found comparison) or attributes of the top-level objects and their children (an attributes equality comparison). For example, you can determine whether a computer in deployed assets has word processing software that matches the word processing software recorded for that computer in the IT asset data.

The reconciliation process includes the following steps:

1. Initialization Phase – Determine which set of assets to evaluate.
2. Link Phase – Determine whether there is a link or match between an item in IT assets and an item in deployed assets and create result records for both successful and failed links.
3. Comparison Phase – If a successful link occurs and the reconciliation task includes one or more comparison rules, compare the IT asset with the deployed asset and create comparison result records based on parameters defined in the comparison rule.

Initialization Phase

The purpose of the reconciliation process is to compare IT assets with deployed assets. When setting up a reconciliation task, it is important to consider which of the two sets of assets, IT assets or deployed assets, is the
Understanding the Reconciliation Process

basis or leading set for comparison. When Maximo performs a reconciliation, it takes the first asset in the leading set and compares it with all assets in the subordinate set one at a time.

You use a task filter to specify a subset of either IT assets or deployed assets to evaluate. Maximo determines the leading set based on the type of the task filter specified in the reconciliation task. If you specify a task filter with the type Asset, IT assets are the leading set; if you specify a task filter with the type Deployed Asset, deployed assets are the leading set. By default, if a reconciliation task has no task filter, Maximo selects all IT assets for the leading set. If you want to use deployed assets as the basis of a reconciliation, you must use a deployed asset task filter.

In the initialization phase of the reconciliation process, the reconciliation engine reads in reconciliation task information and determines whether or not there is a task filter. If there is a task filter, the engine creates a subset of the assets (either IT assets or deployed assets) specified in the task filter and selects all of the assets in the subordinate set.

For example, if you want to produce a report of all IT assets that do not have corresponding deployed assets, define an IT asset filter so that Maximo uses IT assets as the leading set. Conversely, if you want to produce a report of all deployed assets that do not have corresponding IT assets, define a deployed asset filter so that Maximo uses deployed assets as the leading set.

Link Phase

In the link phase, Maximo attempts to find a match or link between each asset in the leading set and an asset in the subordinate set. Maximo compares assets in the leading set to the whole subordinate set in the following manner.

Maximo selects the first asset in the leading set and looks for a match in the subordinate set using the first link rule in the reconciliation task.

▼ If Maximo finds a match for the asset in the leading set, it checks the subordinate set for additional matches.

■ If Maximo finds any additional matches, it generates a multiple match exception record for the Reconciliation Results application.

■ If Maximo does not find additional matches, it generates a record for the Link Results application.

▼ If evaluation of the link rule does not yield a match to an asset in the subordinate set, Maximo processes the next link rule. Maximo processes cascading link rules in order until the first match or until the end of the cascading rule list.

▼ If Maximo processes all link rules and finds no match, it creates an exception record for the Reconciliation Results list.

▼ It is possible for two different leading assets to link to one subordinate asset. If that happens, Maximo creates an exception record.

The following diagram illustrates how Maximo processes the leading set using link rules:
Understanding the Reconciliation Process

Processing the Leading Set

1. Process all assets in the leading set
2. More assets in the leading set?
   - Yes: Select the next asset from the leading set
   - No: Continue
3. More link rules?
   - Yes: Evaluate the next cascading link rule
   - No: Continue
4. Link rule yields a match in the subordinate set?
   - Yes: Are there multiple matches?
     - Yes: Create multiple assets record for Reconciliation Results list
     - No: Continue
   - No: Create record for Link Results list

Stop processing leading set
Comparison Phase

If Maximo finds a successful match between the asset in the leading set and the asset in the subordinate set, it processes any comparison rules included in the reconciliation task.

Setting Up a Reconciliation

Maximo reconciles IT assets and deployed assets by performing a rule-based compare operation defined by a system administrator. Administrators use Reconciliation module applications to define a reconciliation task and then use the Cron Task Setup application in the Configuration module to set up a cron task to execute the reconciliation task. After the cron task executes the reconciliation task, authorized Maximo users can view results of the reconciliation in the Link Results and Reconciliation Results applications in the Reconciliation module.

You use the following steps to set up and execute a reconciliation:

1. Set up a task filter. A task filter is optional.
2. Define link rule(s).
3. Define comparison rule(s). Comparison rules are optional.
4. Set up a reconciliation task.
5. Create a cron task to execute the reconciliation.
6. View results of the reconciliation.

Scheduling the Reconciliation Process

Because reconciliation tasks process data imported into Maximo from external sources, you must exercise caution when scheduling reconciliation tasks. Scheduling is an important consideration because it affects the reliability of the data and the allocation of computer resources. For more information about scheduling reconciliations, see Chapter 4, "Scheduling Reconciliations," on page 4-1.
This chapter provides an overview of the steps required to set up a reconciliation. It discusses setting up task filters, link rules, comparison rules, and reconciliation tasks. For detailed, step-by-step instructions for each procedure, refer to online help for the Task Filters, Link Rules, Comparison Rules and Reconciliation Tasks applications in IBM Maximo Asset Management.

Setting Up Task Filters

A task filter record specifies a subset of either IT assets or deployed assets that you want to evaluate when you execute a reconciliation task. A task filter is an optional component of a reconciliation task that you can use to limit the scope of a reconciliation task. You use the Task Filters application to set up task filters.

Examples

You can set up a deployed asset task filter based on a specific site such as Boston. In this case the reconciliation task evaluates all top-level IT assets but evaluates deployed assets only at the Boston site.

You can set up an asset task filter (asset filters apply to IT assets maintained in the Assets application) based on a specific site such as Boston. In this case the reconciliation task evaluates top-level IT assets only at the Boston site but evaluates all deployed assets.

Once you create a task filter, you use the Reconciliation Tasks application to associate the filter with a specific reconciliation task, and Maximo applies the task filter each time the reconciliation task is executed. Setting up a task filter for a reconciliation task is optional. If you do not define a task filter for a reconciliation task, Maximo compares all top-level IT assets with deployed assets.

You use the Task Filters application to perform the following actions:

▼ Create a new task filter.
▼ Delete a task filter.
▼ Duplicate a task filter.
▼ Modify an existing task filter.
The Task Filters application has the following tabs:

- List – to search Maximo for task filters.
- Task Filter – to define new task filters and view, edit, and delete existing task filters.

**Task Filter Components**

A task filter includes the following components:

- Filter name – a unique name (specified in the Filter field) that identifies the task filter.
- Description (optional) – a brief description of the task filter.
- Filter type – type (specified in the Filter Type field) of task filter. The type selected determines whether a filter selects IT assets or deployed assets. A task filter can apply to either one, but not both.
- Filter clause(s) – In the Task Filter Clauses table window, you must define at least one clause that specifies an attribute and a value for the task filter. You can create multiple attribute clauses for a task filter.

If you create multiple clauses that specify different attributes, Maximo processes the clauses using logical AND between the clauses. For example, if you set up a task filter for deployed assets based on the Site and Role attributes, Maximo selects only assets at the specified site with the specified role; both criteria must be met.

If you create multiple clauses for the same attribute, Maximo processes the clauses using logical OR between clauses. For example, if you create a task filter for assets with two filter clauses for Site, one for Boston and one for New York, Maximo selects records that have either Boston or New York as a site.

To specify an attribute, you select from a pre-defined value list. The values in the list depend on whether you select Asset or Deployed Asset in the Filter Type field. For Asset, the following attributes are available:

- Asset Class Structure
- Custodian
- GL Account
- Organization
- Site
- Status
- Usage

For Deployed Asset, the following attributes are available:

- Asset Class
- Organization
- Site
- System Role
Setting Up Link Rules

A link rule is a required component of a reconciliation task. Link rules establish the basis for reconciliation by identifying which top-level IT asset to reconcile with a computer, network printer, or network device in deployed assets. A link rule is generally based on serial number and/or asset tag. For example, you can define a link rule to link the serial number of a computer in deployed assets with a serial number on a computer in IT assets.

Once you create a link rule, you use the Reconciliation Tasks application to associate the link rule with a specific reconciliation task, and Maximo applies the link rule each time it executes the reconciliation task. When Maximo executes the reconciliation task, it evaluates each link rule on the task and attempts to match the IT asset object and attribute defined in the rule with the deployed asset attribute defined in the rule.

Maximo evaluates link rules in a reconciliation task in a cascading sequence, based on the sequence numbers, until it finds a match or until it reaches the end of the cascading rule list. If Maximo finds a match, it displays the link result in the Link Results application. If Maximo does not find a match or finds multiple matches, it displays discrepancies in the Reconciliation Results application.

You use the Link Rules application to perform the following actions:

- Create a new link rule.
- Delete a link rule.
- Duplicate a link rule.
- Modify an existing link rule.

The Link Rules application has the following tabs:

- List – to search Maximo for link rules.
- Link Rule – to define new link rules and view, edit, duplicate, and delete existing link rules.

Link Rule Components

A link rule consists of the following elements:

- Link name – a unique name (specified in the Link field) that identifies the link rule.
- Description (optional) – a brief description of the link rule.
- Link clause(s) – In the Link Clauses table window, you must define at least one clause that defines a relation (or link) between a top-level IT asset and a computer, network printer, or network device in deployed assets. Each link clause identifies an object and attribute in IT assets to link to a specific attribute in deployed assets when Maximo executes a reconciliation task.
NOTE The Link Clauses table window displays selected fields for each clause. To view all fields for a clause, select a row and click View Details.

The following table describes the elements of a link clause.

**Link Clauses**

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Rules/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence</td>
<td>Number that specifies the order in which to process the clause.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be unique.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be greater than 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The default is increments of ten in ascending order.</td>
</tr>
<tr>
<td>Open Parenthesis (...)</td>
<td>Marks the beginning of an expression. Parenthesis marks group expressions to control the order of operations when you use multiple clauses joined by a logical operator (AND or OR).</td>
<td>Optional. However, for each open parenthesis, there must be a corresponding close parenthesis.</td>
</tr>
<tr>
<td>Asset Object</td>
<td>Identifies the target object in IT assets.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list that includes two possible values:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ ASSET (Asset)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ ASSETSPEC (Asset Specification)</td>
</tr>
<tr>
<td>Asset Class Structure</td>
<td>When you select ASSETSPEC (Asset Specification) as the asset object, this field identifies a specific asset class structure for reconciliation.</td>
<td>▼ Mandatory if ASSETSPEC is selected for the asset object.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list. Values in the list are asset class structure identifiers for the top-level IT asset objects.</td>
</tr>
<tr>
<td>Asset Class Structure</td>
<td>Brief description for Asset Class Structure.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset Classification</td>
<td>Displays the classification for the selected asset class structure.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td>Asset Attribute</td>
<td>Identifies the specific attribute of the asset object to reconcile.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list. Values in the value list are determined by the asset object selected.</td>
</tr>
<tr>
<td>Asset Attribute Title</td>
<td>Title of the asset attribute.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td>Operator</td>
<td>Identifies the type of link between asset and deployed asset.</td>
<td>The equals (=) operator is read-only; it cannot be changed.</td>
</tr>
<tr>
<td>Deployed Asset Object</td>
<td>Identifies the target object DEPLOYEDASSET.</td>
<td>The DEPLOYEDASSET value in this field is read-only; it cannot be changed.</td>
</tr>
</tbody>
</table>
Creating Link Rules

You can create link rule records from the List tab or from the Link Rule tab in the Link Rules application.

Before you can save a link rule, you must satisfy the following requirements:

- The link rule name must be unique.
- You must create at least one link rule clause.
- Clauses must be valid expressions. When you save a comparison rule, Maximo uses the following rules to determine whether clauses are valid expressions. If Maximo determines a clause is not valid, it displays an error message and does not save the comparison rule.
  - Each open parenthesis must have a corresponding close parenthesis.
  - The number in the Sequence field must be unique.

**NOTE** If you enter sequence numbers in random order, Maximo sorts the clauses and displays them in ascending numerical order when you save the record.

- All rows except the row with the highest sequence number must have a value specified in the Sequence Operator field.
- The row with the highest sequence number must not have a sequence operator (After Maximo sorts the clauses, this is the last row in the table window.).

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Rules/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployed Asset Attribute</td>
<td>Identifies the specific attribute in DEPLOYEDASSET to reconcile.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list. Values in the list depend on DEPLOYEDASSET.</td>
</tr>
<tr>
<td>Close Parenthesis ...)</td>
<td>Marks the end of an expression. Parenthesis marks group expressions to control the order of operations when you use multiple clauses joined by a logical operator (AND or OR).</td>
<td>Optional. However, for each close parenthesis, there must be a corresponding open parenthesis.</td>
</tr>
<tr>
<td>Sequence Operator</td>
<td>When more than one link clause exists, this operator prescribes how the current clause relates to the next clause in the sequence.</td>
<td>▼ Required if a link rule consists of more than one clause.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Must be empty for the last row in the sequence (that is, the row with the highest sequence number).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list that includes the following values:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ AND</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ OR</td>
</tr>
</tbody>
</table>
Setting Up Comparison Rules

Modifying Link Rules

You use the Link Rule tab in the Link Rules application to modify an existing link rule. You can change the data in the description field or in existing fields in link clauses. You cannot change the name of the link rule in the Link field.

When you save a modified link clause, Maximo evaluates the link rule to determine whether the clauses are valid expressions; if a clause is not valid, Maximo displays an error message and does not save the link rule.

Duplicating Link Rules

You select Duplicate Link Rule from the Select Action menu on the Link Rule tab in the Link Rules application to duplicate an existing link rule. You can use this procedure to create a new link rule based on an existing one. Once you duplicate the link rule, Maximo clears the Link field, and you must enter a new name for the duplicated link rule.

Deleting Link Rules

You select Delete Link Rule from the Select Action menu on the Link Rule tab in the Link Rules application to delete a link rule. Use this procedure if you no longer want to use the link rule defined in the link rule record.

You cannot delete a link rule if it is associated with a task defined in the Reconciliation Tasks application. If you attempt to delete a link rule associated with a task, Maximo displays an error message.

Setting Up Comparison Rules

A comparison rule identifies object(s) or attribute(s) of child or parent IT assets to compare with object(s) or attribute(s) of child or parent deployed assets when Maximo executes a reconciliation task. For example, you can set up a comparison rule to compare software on computers in IT assets with software on computers in deployed assets. You can set up the following types of comparison rules:

▼ Attributes equality – specifies which attribute or attributes of a child or parent IT asset to compare with a specific attribute or attributes of a child or parent deployed asset. For example, you can compare the disk size of an IT asset to the disk size of a deployed asset’s hard disk.

▼ Matches found – specifies the ratio of IT asset object instances to deployed asset object instances to look for in the comparison. A matches found comparison does not match specific attributes; it checks for the presence of selected objects in both IT assets and deployed assets.

To create a comparison rule, you must specify either a matches found clause or an attributes equality clause, but not both. You can also define an asset filter or a deployed asset filter that limits your comparison to a subset of assets or deployed assets. A matches found clause requires an asset filter or a deployed asset filter or both.
Once you create a comparison rule, you use the Reconciliation Tasks application to associate the rule with a specific reconciliation task, and Maximo includes the comparison rule each time it executes the reconciliation task. A comparison rule is an optional component of a reconciliation task, and a task can include more than one comparison rule. When Maximo executes the reconciliation, it does not apply comparison rules unless a link rule defined in the task establishes a successful link between a top-level IT asset and a computer, network printer, or network device in deployed assets.

You can view results of comparison rule evaluations in the Reconciliation Results application. When setting up a reconciliation task in the Reconciliation Tasks application, you can choose one of the following options for comparison results:

- all results, both successful and failed matches
- instances where the IT asset failed to reconcile against the deployed asset
- instances where the IT asset successfully matched the deployed asset

You use the Comparison Rules application to perform the following actions:

- Create a new comparison rule.
- Delete a comparison rule.
- Duplicate a comparison rule.
- Modify an existing comparison rule.

**Comparison Rule Tabs**

The Comparison Rules application has the following tabs:

- List – to search Maximo for comparison rules.
- Comparison Rule – to define new comparison rules and to view, edit, and delete existing comparison rules. The comparison rule tab includes the following subtabs:
  - Asset Filter Subtab – to define one or more asset filter clauses that specify a subset of IT assets to reconcile against deployed assets when you use a comparison rule.
  - Deployed Asset Filter Subtab – to define one or more deployed asset filter clauses that specify a subset of deployed assets to reconcile against IT assets when you use a comparison rule.
  - Matches Found Subtab – to define one or more matches found clauses that specify the ratio of asset object instances to deployed asset object instances in the comparison.
  - Attributes Equality Subtab – to define one or more attributes equality clauses that identify the specific attribute or attributes of a child or parent IT asset to compare with a specific attribute or attributes of a child or parent deployed asset.
Setting Up Comparison Rules

Comparison Rules Components

A comparison rule includes the following components:

▼ Comparison name – a unique name (specified in the Comparison field) that identifies the comparison rule.

▼ Description (optional) – a brief description of the comparison rule.

▼ Asset filter clause(s) – an asset filter is optional; however, if you include matches found clauses, you must have an asset filter, a deployed asset filter, or both.

▼ Deployed asset filter clause(s) – a deployed asset filter is optional; however, if you include matches found clauses, you must have an asset filter, a deployed asset filter, or both.

▼ One of the following definitions:
  ■ Matches found – to specify the ratio of asset object instances to deployed asset object instances in the comparison.
  ■ Attributes equality – to define clauses to identify the specific attribute or attributes of a child or parent IT asset to compare with a specific attribute or attributes of a child or parent deployed asset.

Asset Filter Clauses

An asset filter is a component of a comparison rule defined in the Comparison Rules application. You use the Asset Filter subtab on the Comparison Rule tab in the application to create asset filters. On the Asset Filter subtab, you define asset filter clauses that specify a subset of IT assets to reconcile against deployed assets when you use a comparison rule. Each clause identifies an object and/or attribute in IT assets to evaluate when Maximo processes a comparison rule.

When working with comparison rules, it is important to understand that all filtering and comparisons work on sets of objects and to be aware of the way expressions operate with sets in reconciliation comparison. To designate which output objects to select, an asset filter clause defines one of the following conditions:

▼ Select an asset if the selected attribute matches a specified value based on the operator selected. Using the operator specified in the clause, Maximo evaluates the top-level IT asset and all its IT asset children and selects any assets that match the value specified.
Example

Select assets manufactured by Dell.

**Manufacturer Asset Filter Example**

![Manufacturer Asset Filter Example Diagram]

**NOTE** The filter selects any IT asset from the hierarchy with the manufacturer Dell.

▼ Select an asset if the selected attribute of a class specification matches a specified value. Using the operator specified in the clause, Maximo evaluates the top-level IT asset and all its IT asset children and selects any assets that belong to the class specified in the clause. Any asset that has a different class is skipped. Then the filter uses the operator to evaluate the attribute value and selects all assets that match the value specified.

Example

Select desktops with less than 256 Mb of RAM

**Desktop Asset Filter Example**

![Desktop Asset Filter Example Diagram]

▼ Select an asset if the specified classification exists. Maximo evaluates the top-level IT asset and all its IT asset children and selects all instances that have the specified class.

Example

Select assets if Office Suite exists.
### Office Suite Asset Filter Example

The following table describes the elements of an asset filter clause.

**Asset Filter Clauses**

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Rules/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence</td>
<td>Number that specifies the order in which to process the clause.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be unique.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be greater than 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The field cannot be blank.</td>
</tr>
<tr>
<td>Open Parenthesis (...)</td>
<td>Marks the beginning of an expression. Parenthesis marks group expressions to control the order of operations when you use multiple clauses joined by a logical operator (AND or OR).</td>
<td>Optional. However, for each open parenthesis, there must be a corresponding close parenthesis.</td>
</tr>
<tr>
<td>Asset Object</td>
<td>Identifies the target object in the IT assets.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list that includes two possible values:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ ASSET</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ ASSETSPEC</td>
</tr>
<tr>
<td>Asset Class Structure</td>
<td>When you select ASSETSPEC (Asset Specification) as the asset object, this field identifies a specific asset class structure for the asset filter.</td>
<td>▼ Mandatory if you select ASSETSPEC for the asset object.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list. Values in the list are asset class structure identifiers for the assets that belong to the top-level IT asset objects.</td>
</tr>
<tr>
<td>Asset Class Structure</td>
<td>Displays a description of the selected asset class structure.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset Classification</td>
<td>Displays the classification for the selected asset class structure.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td>Field</td>
<td>Function</td>
<td>Rules/Requirements</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Asset Attribute</td>
<td>Identifies the specific attribute of the asset object or asset class structure to use for the asset filter.</td>
<td>▼ Optional.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list. The asset object selected determines which values Maximo displays in the value list.</td>
</tr>
<tr>
<td>Asset Attribute Title</td>
<td>Displays the title of the asset attribute selected.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td>Operator</td>
<td>Identifies the operator for the asset attribute specification.</td>
<td>Mandatory if you select an asset attribute. Otherwise the field is read-only. For more information about available operators, see &quot;Attribute Definition Operators&quot; on page 2-12.</td>
</tr>
<tr>
<td>Value</td>
<td>Specifies a value for the asset attribute selected.</td>
<td>▼ If you do not select an asset attribute, the field is read-only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ If you select an asset attribute, the field is mandatory unless you select NOTEMPTY or NOTNULL as an operator. If you select NOTEMPTY or NOTNULL, the field is read-only.</td>
</tr>
<tr>
<td>Close Parenthesis ...)</td>
<td>Marks the end of an expression. Parenthesis marks group expressions to control the order of operations when you use multiple clauses joined by a logical operator (AND or OR).</td>
<td>Optional. However, for each close parenthesis, there must be a corresponding open parenthesis.</td>
</tr>
<tr>
<td>Sequence Operator</td>
<td>When more than one clause exists, this operator prescribes how the current clause relates to the next clause in the sequence.</td>
<td>▼ Required if an asset filter consists of more than one clause.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Must be empty for the last row in the sequence (that is the row with the highest sequence number).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list that includes the following values:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ AND</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ OR</td>
</tr>
</tbody>
</table>
### Attribute Definition Operators

<table>
<thead>
<tr>
<th>Operator</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>=</td>
<td>Select the attribute if its value is equal to the value specified.</td>
<td>Attribute: SITEID Operator: = Value: Bedford</td>
</tr>
<tr>
<td>&lt;</td>
<td>Select the attribute if its value is less than the value specified.</td>
<td></td>
</tr>
<tr>
<td>&lt;=</td>
<td>Select the attribute if its value is less than or equal to the value specified.</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>Select the attribute if its value is greater than the value specified.</td>
<td></td>
</tr>
<tr>
<td>=&gt;</td>
<td>Select the attribute if its value is greater than or equal to the value specified.</td>
<td></td>
</tr>
<tr>
<td>&lt;&gt;</td>
<td>Select the attribute if its value is not equal to the value specified (that is, any value that is greater than or less than the value specified).</td>
<td></td>
</tr>
<tr>
<td>LIKE</td>
<td>Select the attribute if it matches a sample specified as value.</td>
<td>LIKE Maximo Enterprise Suite</td>
</tr>
<tr>
<td>NOTEMPTY</td>
<td>Select the attribute if its value is not null and it is not empty.</td>
<td></td>
</tr>
<tr>
<td>NOTLIKE</td>
<td>Select the attribute if it is any value other than the value specified.</td>
<td></td>
</tr>
<tr>
<td>NOTNULL</td>
<td>Select the attribute if any value exists at all.</td>
<td></td>
</tr>
</tbody>
</table>

### Wildcard Use

You can use a “wildcard” character or characters with letters or numbers to indicate you want to find records that begin with, end with, or contain those letters/numbers. The Reconciliation module applications use standard Maximo wildcard rules. The following table describes the four wildcard characters available in Maximo.
Wildcard Characters

<table>
<thead>
<tr>
<th>Character</th>
<th>Description</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>asterisk</td>
<td>Stands for any number of characters (zero, one, or multiple) in the specified position.</td>
</tr>
<tr>
<td>%</td>
<td>percent sign</td>
<td>Stands for any number of characters (zero, one, or multiple) in the specified position.</td>
</tr>
<tr>
<td>_</td>
<td>underscore</td>
<td>Stands for a single character in the specified position.</td>
</tr>
<tr>
<td>?</td>
<td>question mark</td>
<td>Stands for a single character in the specified position.</td>
</tr>
</tbody>
</table>

Wildcard Character Examples

<table>
<thead>
<tr>
<th>Enter ...</th>
<th>to find ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>123* or 123%</td>
<td>records that start with 123, such as 123, 12345, 123ABC, etc.</td>
</tr>
<tr>
<td>*123 or %123</td>
<td>records that end in 123, such as 123, 5123, or PUMP123.</td>
</tr>
<tr>
<td>*123% or %123%</td>
<td>records that contain 123, such as 123, 1234, PUMP123, or XX12300Valve.</td>
</tr>
<tr>
<td>Elec* or Elec%</td>
<td>records that contain words that start with “Elec,” such as electric, electromagnetic, or electrode.</td>
</tr>
<tr>
<td>123? or 123_</td>
<td>any four-character records that start with 123, such as 1234, 1230, 123g, etc.</td>
</tr>
<tr>
<td>_18 or ?18</td>
<td>any three-character records that end with 18, such as 418 or J18.</td>
</tr>
</tbody>
</table>

There should be no space between the wildcard character and the other characters.

If the specified value contains no wildcard characters, it is compared as %<value>%%. For example, %3% returns all records with the number three anywhere in the string.

To look for the *, %, _, or ? as characters without using them as wildcard characters, duplicate the character. For example, DAY_ _THREE finds the match DAY_THREE value but not DAY12THREE.

Logical AND/OR

An asset filter can be a logical expression made of multiple clauses using the logical operators AND and OR. Operations on clauses are binary; that is, two values are considered at a time. Clauses are evaluated from left to right. You can use parentheses to alter the order of operations. By default, AND has a higher priority than OR; consequently, if no parentheses are present, operands joined by AND are processed first.
When Maximo processes two clauses joined with the logical operator OR, it selects an object for the output set if it meets the criteria of either of the two clauses. If the object matches one of the specified criteria, Maximo selects it.

When Maximo processes two clauses joined with the logical operator AND, it selects an object for the output set only if it meets the criteria of both clauses.

When evaluating a filter’s clause(s), in order to ensure that the correct set of output objects is created for the comparison rule, Maximo always fully evaluates all clauses; that is, Maximo does not apply any shortcuts to the logical expression even if it becomes obvious before all clauses are evaluated that the expression will succeed or fail.
Deployed Asset Filter Clauses

A deployed asset filter is a component of a comparison rule defined in the Comparison Rules application. You use the Deployed Asset Filter subtab on the Comparison Rule tab in the application to create deployed asset filters. On the Deployed Asset Filter subtab, you define deployed asset filter clauses that specify a subset of deployed assets to reconcile against IT assets when you use a comparison rule. Each clause identifies an object and/or attribute in deployed assets to evaluate when Maximo processes a comparison rule.

When working with comparison rules, it is important to understand that all filtering and comparisons work on sets of objects and to be aware of the way expressions operate with sets in reconciliation comparison. To designate which output objects to select, a deployed asset filter clause defines one of the following conditions:

▼ A specified attribute of the deployed asset object selected corresponds to a specific value based on the operator selected, for example a software suite has a suite name like Microsoft Office:

**Office Suite Deployed Asset Filter Example**

The following table describes the elements of a deployed asset filter clause.

▼ An instance of a selected deployed asset object exists.

**Operating System Deployed Asset Filter Example**

The following table describes the elements of a deployed asset filter clause.
## Deployed Asset Filter Clauses

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Rules/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence</td>
<td>Number that specifies the order in which to process the clause.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be unique.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be greater than 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The field cannot be blank.</td>
</tr>
<tr>
<td>Open Parenthesis (...)</td>
<td>Marks the beginning of an expression. Parenthesis marks group expressions to control the order of operations when you use multiple clauses joined by a logical operator (AND or OR).</td>
<td>Optional. However, for each open parenthesis, there must be a corresponding close parenthesis.</td>
</tr>
<tr>
<td>Deployed Asset Object</td>
<td>Identifies the target object in the deployed assets.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list.</td>
</tr>
<tr>
<td>Deployed Asset Attribute</td>
<td>Identifies the specific attribute of the deployed asset object to reconcile.</td>
<td>▼ Optional.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list. Values in the value list are determined by the deployed asset object selected.</td>
</tr>
<tr>
<td>Deployed Asset Attribute Title</td>
<td>Displays the title of the deployed asset attribute.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td>Operator</td>
<td>Identifies the operator for the deployed asset attribute specification.</td>
<td>Mandatory if you select an asset attribute. Otherwise the field is read-only. For more information about available operators, see &quot;Attribute Definition Operators&quot; on page 2-12.</td>
</tr>
<tr>
<td>Value</td>
<td>Specifies a value for the deployed asset attribute selected.</td>
<td>▼ If you do not select a deployed asset attribute, the field is read-only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ If you select a deployed asset attribute, the field is mandatory unless you select NOTEMPTY or NOTNULL as an operator. If you select NOTEMPTY or NOTNULL, the field is read-only.</td>
</tr>
<tr>
<td>Close Parenthesis ...)</td>
<td>Marks the end of an expression. Parenthesis marks group expressions to control the order of operations when you use multiple clauses joined by a logical operator (AND or OR).</td>
<td>Optional. However, for each close parenthesis, there must be a corresponding open parenthesis.</td>
</tr>
<tr>
<td>Sequence Operator</td>
<td>When more than one clause exists, this operator prescribes how the current clause relates to the next clause in the sequence.</td>
<td>▼ Required if a deployed asset filter consists of more than one clause.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Must be empty for the last row in the sequence (that is the row with the highest sequence number).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list that includes the following values:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ AND</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ OR</td>
</tr>
</tbody>
</table>
A deployed asset filter can be a logical expression made of multiple clauses using the logical operators AND and OR. Operations on expressions are binary; that is, two values are considered at a time. Expressions are evaluated from left to right. You can use parentheses to alter the order of operations. By default, AND has a higher priority than OR; consequently, if no parentheses are present, operands joined by AND are processed first.

**Example**

\[
\text{ClauseA AND ClauseB AND ClauseC}
\]

is evaluated as

\[
(\text{ClauseA AND ClauseB}) \text{ AND ClauseC}
\]

Result

\[
\text{AND Clause C}
\]

**Example**

\[
\text{ClauseA OR Clause B AND ClauseC AND ClauseD OR ClauseE}
\]

is evaluated as

\[
(\text{ClauseA OR ((Clause B AND ClauseC) AND ClauseD)) OR ClauseE}
\]

Result

\[
(\text{ClauseA OR ( Result AND ClauseD)) OR ClauseE}
\]

Result

\[
\text{OR Clause E}
\]

**Logical OR**

When Maximo processes two clauses joined with the logical operator OR, it selects an object for the output set if it meets the criteria of either of the two clauses. If the object matches one of the specified criteria, Maximo selects it.

**Logical AND**

When evaluating two clauses joined with the logical operator AND, Maximo first checks the type of objects specified (for example, processor, computer system, operating system) in the two clauses. If both clauses specify objects of the same type, Maximo selects only objects that are specified in both clauses. This means that only the objects that are specified in both clauses joined by the AND operator go to the output set.

When one of the clauses joined by the logical operator AND yields an empty set, Maximo does not select any objects for the output set.

When the clauses do not yield an empty set and specify objects of different types (for example, computer system and processor), Maximo selects an object if it meets the criteria of either of the two clauses, the same way it would select objects if using the logical operator OR.

This behavior of the logical AND for deployed assets might seem counterintuitive at first, but consider the case when the filter is designed to select all Dell systems with CPUs that have a speed less than 1 GHz. A filter for this situation must have at least two clauses—one that selects computer
Setting Up Comparison Rules

systems with the manufacturer Dell and another that selects CPUs with speeds less than 1 GHz. These two clauses are joined with a logical AND, but they contain different types of objects. The comparison rule will yield a successful result if both the clauses produce a non-empty set and Maximo finds objects that match either the computer system (COMPUTERSYSTEM) or processor (DPACCPU) values specified in the filter.

Example 1A

You can specify processors with speed less than 1GHz in the following way:

\[(\text{DPACCPU.MAXSPEED} < 1 \text{ AND DPACCPU.SPEEDUNIT='GHERTZ'})\]

In this case, the output set will contain only objects of type Processor that have the speed unit GHz and at the same time a numerical value less than 1.

Example 1B

You can also specify processors with speed less than 1GHz in the following way:

\[(\text{DPACCPU.MAXSPEED} < 1000 \text{ AND DPACCPU.SPEEDUNIT='MHERTZ'})\]

In this case, the output set will contain only objects of type Processor that have the speed unit MHz and at the same time a numerical value less than 1,000.

Example 2

To specify all processors with speed less than 1GHz, you can use the following expression:

\[(\text{DPACCPU.MAXSPEED} < 1 \text{ AND DPACCPU.SPEEDUNIT='GHERTZ'}) \text{ OR } (\text{DPACCPU.MAXSPEED} < 1000 \text{ AND DPACCPU.SPEEDUNIT='MHERTZ'})\]

The output set will contain only objects of type Processor that have a speed less than 1GHz, whether the unit of speed is expressed in GHz or MHz.

Example 3

To specify all processors with speed less than 1GHz not made by Intel, you can use the following expression:

\[
((\text{DPACCPU.MAXSPEED} < 1 \text{ AND DPACCPU.SPEEDUNIT='GHERTZ'}) \text{ OR } (\text{DPACCPU.MAXSPEED} < 1000 \text{ AND DPACCPU.SPEEDUNIT='MHERTZ'})) \text{ AND } \text{DPACCPU.CMANUFACTURER NOT LIKE Intel}
\]

The output set will contain only objects of type Processor with a speed less than 1GHz (whether the speed unit is MHz or GHz), and with a converted manufacturer name that does not contain the literal “Intel”.

Example 4

To specify all computers manufactured by Dell with processors not made by Intel that have a speed less than 1GHz, you can use the following expression:

\[
\text{COMPUTERSYSTEM.CMANUFACTURER=Dell} \text{ AND } ((\text{DPACCPU.MAXSPEED} < 1 \text{ AND DPACCPU.SPEEDUNIT='GHERTZ'}) \text{ OR } (\text{DPACCPU.MAXSPEED} < 1000 \text{ AND DPACCPU.SPEEDUNIT='MHERTZ'})) \text{ AND } \text{DPACCPU.CMANUFACTURER NOT LIKE Intel})
\]
The output set will contain entries only if Maximo finds objects that separately meet both of the following criteria:

- An object of the type Computer System with a converted manufacturer name equal to Dell.

and

- An object of type Processor, which has a speed less than 1 MHz (without regard to the unit of measurement for the speed) and which also has a converted manufacturer name that does not contain the literal “Intel”.

**NOTE** In all examples where literals are compared, case sensitivity of the reconciliation task is a factor.

When evaluating a filter, in order to ensure that the correct set of output objects is created for the comparison rule, Maximo always fully evaluates all clauses; that is, Maximo does not apply any shortcuts to the logical expression even if it becomes obvious before all clauses are evaluated that the expression will succeed or fail.

**Matches Found Clauses**

A matches found definition is a component of a comparison rule defined in the Comparison Rules application. You use the Matches Found subtab on the Comparison Rule tab in the application to create matches found clauses. A matches found clause specifies the acceptable ratio of asset object instances to deployed asset object instances in the comparison after Maximo applies the asset and/or deployed asset filter.

Each clause identifies an object in IT assets and an object in deployed assets to evaluate; the clause also includes an operator that specifies the number of instances of the asset object and the number of instances of the deployed asset object.

The following table describes the elements of a matches found clause.
## Setting Up Comparison Rules

### Matches Found Clauses

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Rules/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sequence</strong></td>
<td>Number that specifies the order in which to process the clause.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be unique.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be greater than 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The field cannot be blank.</td>
</tr>
<tr>
<td><strong>Open Parenthesis (...)</strong></td>
<td>Marks the beginning of an expression. Parenthesis marks group expressions to control the order of operations when you use multiple clauses joined by a logical operator (AND or OR).</td>
<td>Optional. However, for each open parenthesis, there must be a corresponding close parenthesis.</td>
</tr>
<tr>
<td><strong>Asset Object</strong></td>
<td>Identifies the target object in the IT assets.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list that includes two possible values:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ ASSET</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ ASSETSPEC</td>
</tr>
<tr>
<td><strong>Asset Class Structure</strong></td>
<td>When you select ASSETSPEC (Asset Specification) as the asset object, this field identifies a specific asset class structure for the asset filter.</td>
<td>▼ Mandatory if you select ASSETSPEC for the asset object.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list. Values in the list are asset class structure identifiers for the assets that belong to the top-level IT asset objects.</td>
</tr>
<tr>
<td><strong>Asset Class Structure Description</strong></td>
<td>Displays a description of the selected asset class structure.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td><strong>Asset Classification</strong></td>
<td>Displays the classification for the selected asset class structure.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td><strong>Operator</strong></td>
<td>Identifies the number of instances allowed for the asset and deployed asset in the comparison rule.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list that includes the following operators:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ At least 1 to at least 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ At least 1 to exactly 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Exactly 1 to at least 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Exactly 1 to exactly 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Exactly N to exactly N</td>
</tr>
<tr>
<td><strong>Deployed Asset Object</strong></td>
<td>Specifies the deployed asset object for reconciliation.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list.</td>
</tr>
<tr>
<td><strong>Close Parenthesis ...)</strong></td>
<td>Marks the end of an expression. Parenthesis marks group expressions to control the order of operations when you use multiple clauses joined by a logical operator (AND or OR).</td>
<td>Optional. However, for each close parenthesis, there must be a corresponding open parenthesis.</td>
</tr>
</tbody>
</table>
### Setting Up Comparison Rules

The following table describes the operators you can use to define the ratio between asset object instances and deployed asset object instances:

**Matches Found Operators**

<table>
<thead>
<tr>
<th>Operator</th>
<th>Description</th>
</tr>
</thead>
</table>
| At least 1 to at least 1 | At least one asset exists, but you can have more than one;  
**and**  
at least one deployed asset exists, but you can have more than one. |
| At least 1 to exactly 1 | At least one asset exists, but you can have more than one;  
**and**  
only one deployed asset exists. |
| Exactly 1 to at least 1 | Only one asset exists;  
**and**  
at least one deployed asset exists, but you can have more than one. |
| Exactly 1 to exactly 1 | Only one asset exists;  
**and**  
only one deployed asset exists. |
| Exactly N to exactly N | N assets exist;  
**and**  
N deployed assets exist,  
where N is the same number for each. |
### Attributes Equality Clauses

An attributes equality definition is a component of a comparison rule defined in the Comparison Rules application. You use the Attributes Equality subtab on the Comparison Rule tab in the application to create attributes equality clauses that identify the specific attribute or attributes of a child or parent IT asset to compare with a specific attribute or attributes of a child or parent deployed asset when Maximo processes a comparison rule.

The following table describes the elements of an attributes equality clause.

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Rules/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence</td>
<td>Number that specifies the order in which to process the clause.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be unique.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The number must be greater than 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ The field cannot be blank.</td>
</tr>
<tr>
<td>Open Parenthesis (…)</td>
<td>Marks the beginning of an expression. Parenthesis marks group expressions</td>
<td>Optional. However, for each open parenthesis, there must be a corresponding close</td>
</tr>
<tr>
<td></td>
<td>to control the order of operations when you use multiple clauses joined</td>
<td>parenthesis.</td>
</tr>
<tr>
<td></td>
<td>by a logical operator (AND or OR).</td>
<td></td>
</tr>
<tr>
<td>Asset Object</td>
<td>Specifies the asset object for reconciliation.</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Selected from a value list that includes two possible values:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▫ ASSET</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▫ ASSETSPEC</td>
</tr>
<tr>
<td>Asset Class Structure</td>
<td>When you select ASSETSPEC (Asset Specification) as the asset object, this</td>
<td>▼ Mandatory if you select ASSETSPEC for the asset object.</td>
</tr>
<tr>
<td></td>
<td>field identifies a specific asset class structure for the asset in the</td>
<td>▼ Selected from a value list. Values in the list are asset class structure</td>
</tr>
<tr>
<td></td>
<td>attributes equality clause.</td>
<td>identifiers for the assets that belong to the top-level IT asset objects.</td>
</tr>
<tr>
<td>Asset Class Structure</td>
<td>Displays a description of the selected asset class structure.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset Classification</td>
<td>Displays the classification for the selected asset class structure.</td>
<td>Read-only field.</td>
</tr>
<tr>
<td>Asset Attribute</td>
<td>Identifies the specific attribute of the asset object or asset class</td>
<td>▼ Mandatory.</td>
</tr>
<tr>
<td></td>
<td>structure to use for the asset in the attributes equality clause.</td>
<td>▼ Selected from a value list. The asset object selected determines which values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximo displays in the value list.</td>
</tr>
<tr>
<td>Asset Attribute Title</td>
<td>Displays the title of the asset attribute selected.</td>
<td>Read-only field.</td>
</tr>
</tbody>
</table>
### Setting Up Comparison Rules

#### Field | Function | Rules/Requirements
--- | --- | ---
Operator | Identifies the operator for the reconciliation. | Mandatory. The equals (=) operator is read-only; it cannot be changed.
Deployed Asset Object | Specifies the deployed asset object for reconciliation. | ▼ Mandatory. ▼ Selected from a value list.
Deployed Asset Attribute | Identifies the specific attribute of the deployed asset object to reconcile. | ▼ Mandatory. ▼ Selected from a value list. The deployed asset object selected determines which values Maximo displays in the value list.
Deployed Asset Attribute Title | Displays the title of the deployed asset attribute selected. | Read-only field.
Deployed Asset Unit of Measure Attribute | Identifies the unit of measurement attribute when the asset attribute selected requires a unit of measurement, such as megabytes or kilobytes. | ▼ Optional. ▼ Available only if the asset object is ASSETSPEC.
Deployed Asset Unit of Measure Attribute Title | Displays the title of the deployed asset unit of measure attribute. | Read-only field.
Close Parenthesis ...) | Marks the end of an expression. Parenthesis marks group expressions to control the order of operations when you use multiple clauses joined by a logical operator (AND or OR). | Optional. However, for each close parenthesis, there must be a corresponding open parenthesis.
Sequence Operator | When more than one clause exists, this operator prescribes how the current clause relates to the next clause in the sequence. | ▼ Required if an asset filter consists of more than one clause. ▼ Must be empty for the last row in the sequence (that is the row with the highest sequence number). ▼ Selected from a value list that includes the following values:
  - AND
  - OR

---

**NOTE** Sometimes you might want to compare attributes with a unit of measurement attribute. For example, if you are trying to determine whether the amount of RAM on a notebook in IT assets matches the amount of RAM on a notebook in deployed assets, you select RAMSIZE for an attribute. When you specify the parameters for the deployed asset in the comparison, you can specify RAMUNIT as a unit of measurement attribute. Maximo successfully matches the IT asset to the deployed asset only if the value and measurement unit of the IT asset is equal to the value and measurement of deployed asset. 1 GBYTE matches to 1 GBYTE; it does not match to 1GB.
Creating Comparison Rules

You use the Comparison Rules application to create comparison rules you can add to a reconciliation task. You can create comparison rule records from the List tab or from the Comparison Rule tab in the application.

Before you can save a comparison rule, you must satisfy the following requirements:

- The comparison rule name must be unique.
- You must create either a matches found clause or an attributes equality clause, but not both.
- If you create a matches found clause, you must have an asset filter or a deployed asset filter or both.
- Clauses must be valid expressions. When you save a comparison rule, Maximo uses the following rules to determine whether clauses are valid expressions. If Maximo determines a clause is not valid, it displays an error message and does not save the comparison rule.
  - Each open parenthesis must have a corresponding close parenthesis.
  - The number in the Sequence field must be unique.

  **NOTE** You can enter sequence numbers in random order; when you save a record, Maximo sorts the clauses and displays them in ascending numerical order.

  - All rows except the row with the highest sequence number must have a value specified in the Sequence Operator field.
  - The row with the highest sequence number must not have a sequence operator (After Maximo sorts the clauses, this is the last row in the table window.).

Modifying Comparison Rules

You use the Comparison Rule tab in the Comparison Rules application to modify an existing comparison rule. You can perform any of the following modifications:

- Change the data in the description field or in existing fields in asset filter clauses, deployed asset filter clauses, matches found clauses, or attributes equality clauses. You cannot modify the name in the Comparison field.

- Add new asset filter, deployed asset filter, matches found, or attributes equality clauses.

- Delete existing asset filter, deployed asset filter, matches found, or attributes equality clauses.

  **NOTE** If the comparison rule has a matches found clause, you must have at least one asset filter or deployed asset filter clause. If you attempt to delete the last filter clause on a comparison rule that
has a matches found clause, Maximo displays an error message and does not delete the clause.

Duplicating Comparison Rules

On the Comparison Rule tab, you can select Duplicate Comparison Rule from the Select Action menu to duplicate existing comparison rules. You can use this procedure to create a new comparison rule based on an existing one. Once you duplicate the comparison rule, Maximo clears the Comparison field, and you must enter a new name for the duplicated comparison rule.

Deleting Comparison Rules

You can select Delete Comparison Rule from the Select Action menu on the Comparison Rule tab to delete comparison rules. You delete comparison rules if you no longer want to use the rule defined in the comparison rule record. When you delete a comparison rule, Maximo deletes all asset filter, deployed asset filter, matches found, and attributes equality clauses associated with the rule.

You cannot delete a comparison rule if it is associated with a reconciliation task defined in the Reconciliation Tasks application. If you attempt to delete a comparison rule associated with a reconciliation task, Maximo displays an error message.

Setting Up Reconciliation Tasks

Before you can execute a reconciliation to compare IT assets with deployed assets, you must set up a reconciliation task. A reconciliation task record combines a task filter (optional), one or more link rules, and one or more comparison rules (optional) into a specific job task that Maximo executes using the Cron Task Setup application.

You use the Reconciliation Tasks application to perform the following actions:

- Create a new reconciliation task.
- Delete a reconciliation task.
- Duplicate a reconciliation task.
- Modify an existing reconciliation task.

The Reconciliation Tasks application has the following tabs:

- List – to search Maximo for tasks.
- Reconciliation Task – to define new tasks and to view, edit, duplicate, and delete existing tasks.

A reconciliation task consists of three primary components—task filter, link rule (required), and comparison rule:

Task Filter (optional)

A task filter specifies a subset of either IT assets or deployed assets to evaluate when Maximo executes a reconciliation task. You can apply only one task filter to a reconciliation task. If you do not define a task filter, Maximo
evaluates all top-level IT assets against deployed assets. Task filters apply only to link rules, not comparison rules.

**Link Rule (required)**

A reconciliation task must include one or more link rules. A link rule establishes the basis for reconciliation by identifying which top-level IT asset to match with a computer, network printer, or network device in deployed assets. If you add multiple link rules, you must assign a sequence number to each rule to specify the order in which to process the rule. Sequence numbers and link rule names must be unique for each rule. When Maximo executes the reconciliation task, it evaluates each link rule and attempts to match the IT asset object and attribute specified in the rule with the deployed asset attribute specified in the rule.

Maximo evaluates link rules in a cascading sequence, based on the sequence numbers, until it finds a match or until it reaches the end of the cascading rule list. When Maximo finds a match for an asset (or deployed asset if you use a deployed asset task filter), it adds the link found to the link results list and does not process any more link rules for that asset (or deployed asset). Maximo then attempts to find a match for the next asset (or deployed asset). If Maximo does not identify a successful link, it lists link failures in the Reconciliation Results application. Link failures occur when the reconciliation process finds no link or finds multiple links.

**Comparison Rule (optional)**

A comparison rule is an optional component that identifies object(s) or attribute(s) of a child or parent IT asset to compare with objects or attribute(s) of a child or parent deployed asset when Maximo executes a reconciliation task. You can add one or more comparison rules to a reconciliation task. If you add a comparison rule, you must select a value in the **Comparison Results** field on the Reconciliation Task tab to specify what kind of comparison results to display in the Reconciliation Results application. Maximo processes comparison rules only if it makes a successful link between a top-level IT asset and deployed asset.

**Scheduling Tasks**

When you schedule a reconciliation task in the Cron Task Setup application, you must use the name specified in the **Reconciliation Task** field in the Reconciliation Tasks application to set up the cron task. Maximo lets you schedule cron tasks for multiple reconciliation tasks. You cannot delete reconciliation task records that are associated with a cron task.

When Maximo executes a reconciliation task, it lists results in the Link Results application and in the Reconciliation Results application. For more information about viewing link results and reconciliation results, see Chapter 3, "Viewing Results of a Reconciliation," on page 3-1.
Reconciliation Task Components

A reconciliation task includes the following components:

- **Reconciliation task name** – a unique name (specified in the **Reconciliation Task** field) that identifies the reconciliation task.

- **Description** – a brief description of the reconciliation.

- **Task filter (optional)** – You specify a task filter for the reconciliation task by selecting a task filter in the **Task Filter** field. When you select a task filter, Maximo displays the type for the selected filter in the **Filter Type** field.

- **Filter type** – type of task filter associated with the reconciliation task, either asset or deployed asset

- **Case sensitivity specification** – The **Is Case Sensitive?** check box specifies whether or not the reconciliation task is case sensitive. Selecting the check box makes all elements of the reconciliation task case sensitive, including the task filter and any link rules and comparison rules associated with the task.

- **Comparison results specification** – The **Comparison Results** field specifies what kind of result records to add when a comparison rule is included in the reconciliation task. This field is not active unless you define a comparison rule.

- **Link Rule(s)** – In the Link Rules table window, you specify one or more link rules for the reconciliation task. The Link Rules table window on the Reconciliation Task tab displays the following information about the link rules used in the reconciliation task:
  - **Sequence** – sequence number to specify the order in which to process the link rule when multiple link rules exist
  - **Link** – unique name to identify the link rule
  - **Description** – link rule description

- **Comparison Rule(s) (optional)** – In the Comparison Rules table window, you specify one or more comparison rules for the reconciliation task. The Comparison Rules table window on the Reconciliation Task tab displays the following information about the comparison rules used in the reconciliation task:
  - **Comparison** – unique name to identify the comparison rule
  - **Description** – comparison rule description
Creating Reconciliation Tasks

You use the Reconciliation Tasks application to create reconciliation tasks that you can schedule for execution using the Cron Task application. You can create reconciliation task records from the List tab or from the Reconciliation Task tab in the application.

From the Reconciliation Task tab, you can clickDetail Menu icon next to the Task Filter, Link, and Comparison fields to select one of the following options:

- Open a Select Value dialog box to choose from a set of existing task filters, link rules, or comparison rules.
- Go to the selected application. Once you are in the application, you can create a new task filter, link rule, or comparison rule; or you can select an existing record and modify it. You can return the value to the Reconciliation Tasks application. You can also return to the Reconciliation Tasks application without selecting a value.

Modifying Reconciliation Tasks

You use the Reconciliation Task tab in the Reconciliation Tasks application to modify an existing reconciliation task. On this tab, you can change the following reconciliation task fields:

- Description field
- Is Case Sensitive? check box

You cannot change the name of the reconciliation task in the Reconciliation Task field.

You can also modify the components of the reconciliation task—task filter, comparison rule(s), or link rule(s).

Modifying the Task Filter

You can select a different task filter or you can delete a task filter. You can also go to the Task Filters application and create a new task filter or modify the values in an existing task filter and return the new or modified task filter to the Reconciliation Tasks application.

Modifying Link Rules

You use the Link Rules table window on the Reconciliation Task tab in the Reconciliation Tasks application to modify existing link rules on a reconciliation task. You can add a new link rule to a task or delete an existing link rule from a task. You cannot change the name of an existing link rule.

Modifying Comparison Rules

You use the Comparison Rules table window on the Reconciliation Task tab in the Reconciliation Tasks application to modify comparison rules on an existing task. You can add a new comparison rule to a task or delete an existing comparison rule from a task. You cannot change the name of an existing comparison rule.
Duplicating Reconciliation Tasks

You select **Duplicate Reconciliation Task** from the Select Action menu on the Reconciliation Task tab in the Reconciliation Tasks application to duplicate an existing task. You can use this procedure to create a new reconciliation task based on an existing one. Once you duplicate the reconciliation task, Maximo clears the **Reconciliation Task** field, and you must enter a new name for the duplicated reconciliation task.

Deleting Reconciliation Tasks

You select **Delete Reconciliation Task** from the Select Action menu on the Reconciliation Task tab in the Reconciliation Tasks application to delete an existing reconciliation task. You cannot delete a reconciliation task if it is associated with any cron task.
This chapter discusses how to view results created in the Link Results and Reconciliation Results applications when a reconciliation task is executed.

Results of the Reconciliation Process

When IBM Maximo Asset Management processes a reconciliation task, it produces results from link rule evaluations and, if the task included one or more comparison rules, comparison rule evaluations. Maximo displays successful link results in the Link Results application; it displays link failures in the Reconciliation Results application. Maximo displays results from comparison rule evaluations in the Reconciliation Results application.

Link Results
You use the Link Results application to view all successful one-to-one links between a top-level IT asset and a computer, network printer, or network device in deployed assets. A successful link means that a link rule in a reconciliation task matched a top-level IT asset with a computer, network printer, or network device in deployed assets.

Reconciliation Results
You use the Reconciliation Results application to view the following types of results:

- Link Failures – A link failure occurs when Maximo does not find a successful one-to-one link between the top-level IT asset and a deployed computer, network device or network printer specified in a link rule. Link failures occur when the reconciliation process finds no links or finds multiple links.

- Comparison Rule Results – Authorized users can view results from comparison rule evaluations. The results Maximo provides in the Reconciliation Results application depend on the value you select in the Comparison Results field when you set up a reconciliation task in the Reconciliation Tasks application. Based on parameters set up in the Reconciliation Tasks application, Maximo provides one of the following result sets:
  - all results, both successful and failed
  - instances where the IT asset failed to reconcile against the deployed asset
  - instances where the IT asset successfully matched the deployed asset
You use the Link Results application to view and delete link results produced when Maximo executes a reconciliation task and successfully links an IT asset to a deployed asset. Records in the Link Results application are read-only; you cannot edit the records.

When you set up a reconciliation task, you define one or more link rules that establish the basis of a reconciliation by identifying the attribute of a top-level IT asset to compare with a specific attribute of a deployed asset. Link rules are generally based on a serial number and/or asset tag. When the reconciliation task is executed, a link rule might successfully identify a relation between IT assets and deployed assets, or it might not be able to identify a successful link.

The Link Results application displays a single page that lists the successful one-to-one links between IT assets and deployed assets. A successful link means that a link rule in a reconciliation task identified a match between a top-level IT asset and a computer, network printer, or network device in deployed assets. For each asset in the list, Maximo displays the most recent link result.

You use the Link Results application to perform the following actions:

- View link results.
- Delete link results.

## Viewing Link Results

To view link result records, open the Link Results application in the Reconciliation module. Maximo lists the successful one-to-one links that occur when a link rule in a reconciliation task identifies a relation between a top-level IT asset and a computer, network printer, or network device in deployed assets. For each asset in the list, Maximo displays the following information about the most recent link:

- site at which the asset is located
- name of the link rule used to link the asset to the deployed asset
- date and time the link result record was created
- Asset – unique identifier for the linked IT asset
- Deployed Asset – unique identifier for the linked deployed asset

## Deleting Link Results

You use the Link Results application in the Reconciliation module to delete link results. You can delete selected link results or all link results displayed in the table window. If appropriate, you can apply a filter to retrieve selected link results and then delete all link results displayed in the Link Results table window.
Actions taken in Maximo outside of the Link Results application can also delete link results. If you move an asset from one site to another or if you delete an asset, Maximo deletes link results for the asset. If you use the Computers, Network Printers, or Network Devices application to delete a computer, network printer, or network device record associated with a record in the Link Results application, Maximo also deletes the results record from Link Results.

To delete a link result, use the following procedure:

1. Open the Link Results application in the Reconciliation module.

2. In the Link Results table window, select one of the following options:

   ▼ To delete all link results retrieved in the table window, use the following procedure:

   a. From the Select Action menu, select **Delete Link Result(s)**. Maximo displays a confirmation dialog box asking you to confirm that you want to delete all rows.

   b. On the deletion confirmation dialog box, click **Yes**. Maximo deletes the all link results displayed in the table window.

   ▼ To delete selected link results, use the following procedure:

   a. In the Link Results table window, click the record selection check box for each record you want to delete.

   b. After you have selected the check box for each record you want to delete, select **Delete Link Result(s)** from the Select Action menu. Maximo displays a confirmation dialog box asking you to confirm that you want to delete selected rows.

   c. On the deletion confirmation dialog box, click **Yes**. Maximo deletes the selected link results.

**Reconciliation Results Application**

You use the Reconciliation Results application to view results generated when Maximo executes a reconciliation task. Maximo displays the following reconciliation results in the Reconciliation Results application:

▼ Data that results from execution of a comparison rule. The specific kind of comparison rule data depends on a parameter set in the Reconciliation Tasks application, which allows you to select one of the following options for comparison results when you set up a reconciliation task:

- all results, both successful and failed matches
- instances where the IT asset failed to reconcile against the deployed asset
- instances where the IT asset successfully matched the deployed asset
Reconciliation Results Application

- Link failures that occur when Maximo executes a reconciliation task but finds no link or finds multiple links between a top-level IT asset and a computer, network printer, or network device in deployed assets.

If you want to view only link rule failure or comparison rule results, you can use the advanced search feature to set up a filter that selects either link rule results or comparison rule results.

You use the Reconciliation Results application to perform the following actions:

- View reconciliation results.
- Delete reconciliation results.

The Reconciliation Results application has the following tabs:

- List – to search Maximo for reconciliation results.
- Reconciliation Result – to view and delete reconciliation results.

Viewing Reconciliation Results

You use the Reconciliation Result tab in the Reconciliation Results application to view reconciliation results. Each record displayed on this tab is the result of a comparison between a top-level IT asset and a computer, network printer, or network device in deployed assets. Maximo displays the following information for each reconciliation result record:

- Rule – name of the link rule or comparison rule that generated the entry. If multiple link rules exist and Maximo found no matches for any of the cascading link rules, it displays the name of the reconciliation task.

- Message – message that describes the result of the reconciliation.

- Created Date – date and time the reconciliation result record was created.

- Top-Level Asset – the top-level IT asset that Maximo compared to the deployed asset.

- Deployed Asset – unique database identifier of the deployed asset. All components of a deployed asset have the same identifier; for example, hard drives and software on a computer have the same identifier as the computer.

For comparison results, Maximo also displays the following information:

- The Asset Information table window displays the following information about the IT asset evaluated:
  - Asset Object – asset object or the class identifier if the attribute specified is a class attribute
  - Asset Attribute – attribute of the asset object or of its class
  - Asset Value – value for the asset attribute
Reconciliation Results Application

- **Asset Unit of Measure** – unit of measurement for the asset attribute
- **Top Level Site** – site of the top-level IT asset evaluated
- **Asset** – asset number of the IT asset evaluated

The Deployed Asset Information table window displays the following information about the deployed asset evaluated:

- **Deployed Asset Object** – deployed asset object
- **Deployed Asset Attribute** – deployed asset attribute
- **Deployed Asset Value** – value for the deployed asset attribute
- **Deployed Asset Unit of Measure** – unit of measurement for the deployed asset attribute
- **Deployed Asset Key Field** – key field for the deployed asset
- **Deployed Asset Key Value** – value for the key field of the deployed asset

In some cases fields displayed on the Reconciliation Result tab are empty. For example, Maximo might not be able to determine a value based on the rule definition. In some cases, multiple operations performed on different objects fail to produce results. Maximo displays the maximum amount of unambiguous information available.

To view reconciliation results, in the Reconciliation Results application, on the List tab, click the reconciliation result record you want to view. Maximo displays the selected reconciliation result record on the Reconciliation Result tab.

If you want to view only link rule failure or comparison rule results, you can use the advanced search feature to set up a filter that selects either link rule results or comparison rule results. The following sections of this chapter explain how to set up a filter to select comparison rule results or link failure results.

### Viewing Comparison Rule Results

The Reconciliation Results application displays both comparison results and link rule failure results. If you want to view only comparison rule results, you can use the advanced search feature to set up a filter that selects only comparison rule results. To set up a filter for comparison rule results, you search for all records that have a C as the first character in the **Message Key** field in the More Search Fields dialog box. To open this dialog box, you select **More Search Fields** from the Advanced Search menu.

**NOTE** The results Maximo displays in the Reconciliation Results application depend on the parameter you select in the **Comparison Results** field when you set up a reconciliation task in the Reconciliation Tasks application, where you can choose either all results, successful comparison results, or failed comparison results.

To view comparison rule results, use the following procedure:
1 On the List tab in the Reconciliation Results application, click Advanced Search. Maximo displays the Advanced Search menu.


3 In the Message Key field, enter a C and click Find. Maximo displays comparison rule results in the table window on the List tab.

4 To open a record, click the underlined record identifier in the Rule column. Maximo displays the result record on the Reconciliation Result tab.

The following table describes the result messages Maximo displays for comparison rules in the Reconciliation Results application.
## Comparison Rule Result Messages

<table>
<thead>
<tr>
<th>Message Key</th>
<th>Message</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>No IT assets were retrieved by the comparison filter.</td>
<td>The comparison rule has an IT asset filter, and Maximo did not retrieve any IT assets when applying this filter.</td>
</tr>
<tr>
<td>C2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>No deployed assets were retrieved by the comparison filter.</td>
<td>The comparison rule has a deployed asset filter, and Maximo did not retrieve any deployed assets when applying this filter.</td>
</tr>
<tr>
<td>C3</td>
<td>Matches found comparison has succeeded.</td>
<td>The number of IT asset objects and the number of deployed asset objects (after Maximo applied any applicable filter(s)) matched the ratio specified in the rule.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you specify ASSET for Asset Object:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Maximo counts the top-level IT asset and all children of that asset.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ If you specify an asset filter, Maximo counts the IT assets selected by the filter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you specify ASSETSPEC for Asset Object:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ Maximo counts assets with the class identifier specified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▼ If you specify an asset filter, Maximo counts all IT assets with the specified class identifier selected by the filter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximo always lists the deployed asset object.</td>
</tr>
<tr>
<td>C4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Attribute equality comparison has succeeded.</td>
<td>The attributes for the IT asset and the deployed asset (and, if applicable, their measurement units) match exactly.</td>
</tr>
<tr>
<td>C5</td>
<td>Matches found comparison has failed.</td>
<td>The number of IT asset objects and the number of deployed asset objects (after Maximo applied any applicable filter(s)) did not match the ratio specified in the rule.</td>
</tr>
<tr>
<td>C6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Attribute equality comparison has failed.</td>
<td>The attributes for the IT asset and the deployed asset (or, if applicable, their measurement units) did not match exactly.</td>
</tr>
<tr>
<td>C7</td>
<td>No authorized asset object for attribute equality comparison.</td>
<td>This result message occurs only when ASSETSPEC is selected for Asset Object. The message indicates that Maximo did not find any IT asset with the class specified.</td>
</tr>
<tr>
<td>C8</td>
<td>No deployed asset object for attribute equality comparison.</td>
<td>Maximo did not find any of the deployed asset objects specified by the comparison rule.</td>
</tr>
<tr>
<td>C9</td>
<td>No authorized and deployed asset object for attribute equality comparison.</td>
<td>Maximo did not find any IT asset object or deployed asset object specified in the comparison rule.</td>
</tr>
</tbody>
</table>

<sup>a</sup>If a comparison rule has both an asset filter and a deployed asset filter and neither filter returns any records, Maximo might display both C1 and C2 messages for the same assets.

<sup>b</sup>The number of attribute equality comparisons processed by an attributes equality comparison rule is equal to the number of the objects in the leading set (The leading set is determined by the type of task filter in the reconciliation task. For more information about task filters and leading sets, see "Initialization Phase," on page 1-4.) For every comparison, the result is either a success or failure. Maximo writes these.
results to the Reconciliation Results application based on the parameter you set for Comparison Results in the Reconciliation Tasks application. In that application, you specify whether you want all results, only successful results, or only failed comparison results.

Messages C3 and C4 indicate that Maximo successfully matched the IT asset and deployed asset when the comparison rule was processed. All other messages indicate that Maximo did not successfully match an IT asset to a deployed asset.

Viewing Link Rule Failure Results

If you want to view only link rule failure results, you can use the advanced search feature to set up a filter that selects only link rule results. To set up a filter for link rule failures, you search for all records that have an L as the first character in the Message Key field in the More Search Fields dialog box. To open this dialog box, you select More Search Fields from the Advanced Search menu.

To view link rule failure results, use the following procedure:

1. On the List tab in the Reconciliation Results application, click Advanced Search. Maximo displays the Advanced Search menu.
3. In the Message Key field, enter an L and click Find. Maximo displays link rule failure results in the table window on the List tab.
4. To open a record, click the underlined record identifier in the Rule column. Maximo displays the result record on the Reconciliation Result tab.

The following table describes the link failure messages Maximo might display.

<table>
<thead>
<tr>
<th>Message Key</th>
<th>Message Comment</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>L01</td>
<td>No authorized IT assets were retrieved in task TASK_NAME.</td>
<td>Leading Set in the Reconciliation Task: Assets Reason for Link Failure: When Maximo processed the specified reconciliation task (that is, &lt;TASK_NAME&gt;), it did not retrieve IT assets from the database.</td>
</tr>
<tr>
<td>L02</td>
<td>No deployed assets were retrieved in task TASK_NAME.</td>
<td>Leading Set in the Reconciliation Task: Deployed Assets Reason for Link Failure: When Maximo processed the specified reconciliation task (that is, &lt;TASK_NAME&gt;), it did not retrieve deployed assets from the database.</td>
</tr>
<tr>
<td>Message Key</td>
<td>Message</td>
<td>Comment</td>
</tr>
<tr>
<td>-------------</td>
<td>---------</td>
<td>---------</td>
</tr>
</tbody>
</table>
| L03         | This IT asset has no matching deployed asset. | Leading Set in the Reconciliation Task: Assets  
Reason for Link Failure: Maximo did not find a deployed asset that matched the IT asset in the leading set.  
In the **Rule** field:  
▼ If one link rule exists, Maximo displays the link rule name.  
▼ If multiple link rules exist, Maximo displays the reconciliation task name.  
The **Deployed Asset** field is empty.  
The **Top Level Site** and **Asset** field in the Asset Information table window display IT asset data. |
| L04         | This deployed asset has no matching IT asset. | Leading Set in the Reconciliation Task: Deployed Assets  
Reason for Link Failure: Maximo did not find an IT asset that matched the deployed asset in the leading set.  
In the **Rule** field:  
▼ If one link rule exists, Maximo displays the link rule name.  
▼ If multiple link rules exist, Maximo displays the reconciliation task name.  
The **Deployed Asset** field displays deployed asset data.  
The **Top Level Site** and **Asset** fields in the Asset Information table window are empty. |
| L05         | This IT asset links to more than one deployed asset. | Leading Set in the Reconciliation Task: Assets  
Reason for Link Failure: When Maximo processed the reconciliation task, the link rule specified in the **Rule** field found more than one deployed asset that matched the IT asset in the leading set. |
| L06         | This deployed asset links to more than one IT asset. | Leading Set in the Reconciliation Task: Deployed Assets  
Reason for Link Failure: When Maximo processed the reconciliation task, the link rule specified in the **Rule** field found more than one IT asset that matched the deployed asset in the leading set. |
| L07         | This IT asset links to more than one deployed asset due to different cascading rules. | Leading Set in the Reconciliation Task: Assets  
Reason for Link Failure: When Maximo processed the reconciliation task specified in the **Rule** field, cascading link rules found more than one deployed asset that matched the IT asset in the leading set. |
| L08         | This deployed asset links to more than one IT asset due to different cascading rules. | Leading Set in the Reconciliation Task: Deployed Assets  
Reason for Link Failure: When Maximo processed the reconciliation task specified in the **Rule** field, cascading link rules found more than one IT asset that matched the deployed asset in the leading set. |
Maximo generates the following messages when there is no task filter or when the task filter has the type Asset: L01, L03, L05, L07.

Maximo generates the following messages when the task filter has the type Deployed Asset: L02, L04, L06, L08.

### Deleting Reconciliation Results

You use the Reconciliation Results application to delete reconciliation results. On the List tab you can delete selected reconciliation results or all reconciliation results in the table window. You can also select a reconciliation result record, view it on the Reconciliation Result tab, and delete the selected record from the Reconciliation Result tab.

The Reconciliation Results application displays both comparison results and link rule failure results. If you want to delete only link rule failure results or comparison rule results or a subset of these, you can use the advanced search feature to set up a filter that selects a specific set of results to display in the table window on the List tab. You can then delete all results in the table window or select specific results and delete them.
Filtering Reconciliation Results

To set up a filter before deleting reconciliation results, use the following procedure:

1. On the List tab in the Reconciliation Results application, click **Advanced Search**. Maximo displays the Advanced Search menu.

2. On the Advanced Search menu, select **More Search Fields**. Maximo displays the More Search Fields dialog box.

3. If appropriate, in the **Message Key** field, select one of the following options:
   - Enter a C and click **Find**. Maximo displays comparison rule results in the table window on the List tab.
   - Enter an L and click **Find**. Maximo displays link rule failure results in the table window on the List tab.

Deleting from the List Tab

To delete reconciliation results from the List tab, use the following procedure:

In the Reconciliation Results application, on the List tab, select one of the following options:

- **To delete all reconciliation results retrieved in the table window:**
  1. From the Select Action menu, select **Delete Reconciliation Result(s)**. Maximo displays a confirmation dialog box asking you to confirm that you want to delete all rows.
  2. On the deletion confirmation dialog box, click **Yes**. Maximo deletes the all reconciliation results displayed in the table window.

- **To delete selected reconciliation results:**
  1. To select specific reconciliation result records, on the List tab, select the **Select Records** check box at the bottom of the List tab table window. Maximo displays a Select Row check box next to each row in the table window.
  2. In the List table window, click the Select Row check box for each record you want to delete.
  3. After you have selected the check box for each record you want to delete, select **Delete Reconciliation Result(s)** from the Select Action menu. Maximo displays a confirmation dialog box asking you to confirm that you want to delete selected rows.
  4. On the deletion confirmation dialog box, click **Yes**. Maximo deletes the selected reconciliation results.

Deleting from the Reconciliation Result Tab

To delete reconciliation results from the Reconciliation Result tab, use the following procedure:

1. In the Reconciliation Results application, on the List tab, click the reconciliation result you want to delete. Maximo displays the selected reconciliation result record on the Reconciliation Result tab.
2 From the Select Action menu, select **Delete Reconciliation Result(s)**. Maximo displays a confirmation dialog box asking you to confirm that you want to delete the record.

3 On the deletion confirmation dialog box, click **Yes**. Maximo deletes the reconciliation result record.
Scheduling Reconciliations

Because reconciliation tasks process data imported into IBM Maximo from external sources, you must exercise caution when scheduling reconciliation tasks. This chapter discusses how to schedule reconciliations and effectively integrate the reconciliation process with data imports from the IBM Maximo Integration Composer (Integration Composer). The timing of deployed asset data migration must be carefully coordinated with the reconciliation process; for example, you should not attempt to reconcile deployed assets against IT assets if you have not yet imported deployed asset data into Maximo. Scheduling is an important consideration because it affects the reliability of the data and the allocation of computer resources.

Data Reliability

Data might be unreliable if any of the following conditions exist:

- **Maximo executes a reconciliation task before the Integration Composer imports deployed asset data.**

  To collect deployed asset data, an asset discovery tool, such as IBM Tivoli Configuration Manager or Microsoft SMS, scans computers, network devices, and network printers deployed in your enterprise and records information about the hardware and software installed on those assets. The Integration Composer processes the collected data and imports it into Maximo. To ensure that Maximo compares IT asset data with the most current deployed asset information, you should schedule reconciliations to occur after the Integration Composer imports deployed asset data.

- **The Integration Composer imports data and Maximo processes a reconciliation task simultaneously.**

  Flawed data might result if an Integration Composer migration and a reconciliation task occur simultaneously. The two processes must never overlap, and you must schedule migrations and reconciliation tasks so that Maximo does not execute the two processes at the same time.

- **Maximo executes a reconciliation task before executing the software suites cron task.**

  If your company uses the Software Suite Setup application in Maximo to define software suites, to ensure that software suites are properly identified, you should execute the cron task that processes software suites before you execute reconciliation cron tasks.
Maximo processes multiple reconciliation tasks that include overlapping data.

Administrators can set up multiple cron task instances to run reconciliation tasks. If different reconciliation tasks are set up to process overlapping sets of IT assets and/or deployed assets, the results are unpredictable.

**Recommended Sequence of Operations**

To ensure data reliability, use the following sequence of events:

1. Collect data about deployed assets using an asset discovery tool, such as IBM Tivoli Configuration Manager.

2. Use the Integration Composer to import deployed asset data into Maximo. For more information about importing data with the Integration Composer, refer to the *IBM Maximo Integration Composer System Administrator’s Guide* and/or the Integration Composer Help.

3. If you use the Deployed Assets Administration module applications to standardize naming conventions, set up software suites, or define software usage display options, you should make any changes necessary in those applications. For more information about these applications, refer to online help for the Adapter Conversion, Manufacturer Conversion, Operating System Conversion, Processor Conversion, Software Conversion, Software Suite Setup, and Software Usage Setup applications. You can also find information about these applications in the *IBM Maximo System Administrator’s Guide* and *IBM Maximo User’s Guide*.

4. Execute the cron task that identifies software suites.

5. Execute the cron task that processes reconciliation tasks.

**Resource Allocation**

Because the reconciliation process demands a large amount of server resources, run reconciliations at a time when the server is least busy, such as late evening.
Setting Up a Reconciliation Cron Task

You define reconciliation tasks in the Reconciliation Module applications, but you set up the schedule that actually executes the task in the Cron Task Setup application. A reconciliation task record combines a task filter (optional), one or more link rules, and one or more comparison rules (optional) into a specific job task that Maximo executes using the Cron Task Setup application. Before you can run the reconciliation process, you must define a cron task to set up a schedule for executing the process. The name you enter in the Reconciliation Task field for the reconciliation task is the parameter in the cron task that identifies which reconciliation task to process.

Defining a Cron Task

The cron task must point to the following class:

```java
psdi.app.recontask.engine.ReconCronTask
```

The following example illustrates a cron task that schedules a reconciliation to determine whether the RAM on servers in deployed assets is in compliance with corporate requirements.

**Cron Task Example**

Note that the **Class** field contains the class file for the reconciliation process. The **Value** field for the parameter RECONTASKNAME in the Cron Task Parameters table window contains the reconciliation task name entered in the **Reconciliation Task** field in the Reconciliation Tasks application.
Scheduling Cron Tasks

**CAUTION** Maximo lets you schedule cron tasks for multiple reconciliation tasks. If different reconciliation tasks are set up to process overlapping sets of IT assets and/or deployed assets, the results are unpredictable. Be sure that you do not set up multiple reconciliation tasks with overlapping schedules.

In addition, you should schedule cron tasks for reconciliation so that the Integration Composer imports data into Maximo before Maximo processes reconciliation tasks. You should also schedule reconciliation cron tasks so that Maximo will not process Integration Composer imports and reconciliation cron tasks simultaneously.
This chapter provides sample reconciliation scenarios to illustrate how to use the Reconciliation module applications. It includes an example of a matches found reconciliation as well as an example of an attributes equality reconciliation.

The examples illustrate how to set up task filters, link rules, and comparison rules.

Software Suite Compliance (Matches Found Example)

In this sample scenario, IBM Maximo Asset Management reconciles IT asset records for computers at the McLean site with deployed asset records to determine whether the Microsoft Office suite is installed as expected on computers in deployed assets. In other words, the records in the Assets application indicate that you have Microsoft Office installed on certain computers; does your asset discovery tool report instances of Microsoft Office on the corresponding computers in deployed assets?

To process this reconciliation, you define a reconciliation task that selects IT asset records at the McLean site for evaluation. For this subset of records, Maximo then uses a link rule based on serial number to search for a match between a computer in IT assets and a computer in deployed assets. If Maximo succeeds in matching an IT asset to a deployed asset, it processes the comparison rule on the reconciliation task, which evaluates software suites on the deployed asset to determine if there is at least one instance of Microsoft Office for each instance of Microsoft Office in IT assets. Note that if Maximo does not succeed in establishing a link between the IT asset and a deployed asset, Maximo reports link failure results that you can view in the Reconciliation Results application.

**CAUTION**

It is extremely important in the case of software suite reconciliations to coordinate deployed asset data migrations using the Integration Composer, software suite setup using the Software Suite Conversion application in Maximo, scheduling a cron task for software suite setup, and scheduling the cron task for reconciliation. For more information about integrating these operations, see "Scheduling Software Suite Reconciliations" on page 5-8.
Setting Up the Reconciliation Task

Because the Reconciliation Tasks application lets you go to the Task Filters, Link Rules, and Comparison Rules applications to retrieve existing values or create new records, you can set up most parameters from the Reconciliation Tasks application. The following steps describe the task filter, link rule, and comparison rule to set up. You can find step-by-step instructions for creating these components of the reconciliation task in the online help provided for each application in Maximo.

For this reconciliation task, you create the following components:

- asset task filter for McLean IT assets
- link rule that matches serial number in IT assets with the corresponding serial number in deployed assets
- comparison rule that looks for instances of the Microsoft Office suite in IT assets and deployed assets.

To set up the reconciliation task, use the following steps:

1. Define a task filter to select only IT assets at the McLean site. To do this you specify the following parameters:

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSET</td>
<td>SITEID</td>
<td>McLean</td>
</tr>
</tbody>
</table>

   When you use this task filter (shown in the following example), Maximo selects IT assets at the McLean site for the leading set in the reconciliation.

Example of a Task Filter for the Software Compliance Scenario
2 Define a link rule (shown in the following example) that searches deployed assets for a match to serial numbers in IT assets. To define this link rule, you set up the following parameters:

- To specify the IT Asset:

  * Asset Object: ASSET
  * Asset Attribute: SERIALNUM

- To specify the deployed asset:

  * Deployed Asset Object: DEPLOYEDASSET
  * Deployed Asset Attribute: SERIALNUMBER

**Example of a Link Rule for the Software Compliance Scenario**

3 Define a deployed asset filter for the comparison rule (shown in the following example) that selects deployed assets that have the Microsoft Office software suite. To set up the deployed asset filter, you select the following parameters:

  * Deployed Asset Object: DPACSWSUITE
  * Deployed Asset Attribute: SUITENAME
  * Operator: LIKE
  * Value: MSOFFICE
Example of a Deployed Asset Filter for the Comparison Rule for Software Compliance

In this case, Maximo will select software suites with a suite name like MSOFFICE and apply the comparison rule to those deployed assets.

4. In addition, you add a matches found clause (shown in the following example) to the comparison rule that specifies you want to find at least 1 instance of the deployed asset object for each instance of the IT asset. To define the matches found clause, you set up the following parameters:

- To specify the IT asset:
  
  **Asset Object** ASSETSPEC
  
  **Asset Class Structure** 1231 (which is Office Suite as shown in the **Asset Class Structure Description** field)

- The **Operator** for the comparison is AtLeast1toAtLeast1.

- To specify the deployed asset:

  **Deployed Asset Object** DPACSWSUITE
Example of a Matches Found Clause for the Comparison Rule for Software Compliance

In this case, for each instance of Office Suite in IT assets, the reconciliation process determines whether there is also an instance in deployed assets.

5. Set up a reconciliation task (shown in the following example) that combines the following components into a reconciliation task that you can schedule in the Cron Task Setup application:

- asset task filter for McLean IT assets
- link rule that matches serial number in IT assets with the corresponding serial number in deployed assets
- comparison rule that looks for instances of the Microsoft Office suite in IT assets and deployed assets.
Example of a Reconciliation Task for Software Compliance Scenario

Note that the **Comparison Results** field for this reconciliation task specifies All results. Consequently, Maximo reports both successful comparison results and failed comparison results for this task.

Note also that the **Is Case Sensitive?** check box is empty. Consequently, no components of the reconciliation are case sensitive.

6. In the Cron Task Setup application, define a cron task to schedule execution of the software compliance reconciliation task. Because software suite data is affected by the Integration Composer data migration schedules and by parameters set in other Maximo applications, you should exercise caution when scheduling reconciliations involving software suites. For more information about scheduling considerations, see "Scheduling Software Suite Reconciliations" on page 5-8.

Viewing Reconciliation Results

You can view reconciliation results in the Link Results application and in the Reconciliation Results application.

**Link Results Application**

In the Link Results application, you can view the successful links established between an IT asset and a deployed asset. In the following example, Maximo displays link results for the McLean site. Each row indicates a link between a computer in IT assets and a computer in deployed assets. For example, there is a match between IT asset 1,453 and deployed asset 85.
Reconciliation Results Application

In the Reconciliation Results application, on the List tab, you can view reconciliation results for the comparison rule that evaluated software suites. On the List tab, you can see the result found for each link between an IT asset and a deployed asset. In the following example, Microsoft Office suite was located on both top-level IT asset 19998 and deployed asset 85.

Reconciliation Results List Tab for Software Compliance Scenario

If you click that row in the table window, Maximo displays details on the Reconciliation Result tab, as shown in the following example.

Reconciliation Results Reconciliation Result Tab for Software Compliance Scenario
Scheduling Software Suite Reconciliations

When you reconcile software suites, execute the following steps in the order given to ensure that Maximo uses the most current software suite data for reconciliation:

1. Use the Integration Composer to import deployed asset data into Maximo. For more information about importing data with the Integration Composer, refer to the IBM Maximo Integration Composer System Administrator's Guide and/or the Integration Composer Help.

2. Use the Manufacturer Conversion, Software Conversion, and Software Suite Setup applications in the Deployed Assets Administration module applications to set up software suite data.

**Manufacturer Conversion Application**

Manufacturer conversions are necessary because the asset discovery tools that collect data for the Deployed Assets applications do not use consistent naming conventions, and you might have various names assigned to the same manufacturer. For example, discovery tools often include variations such as IBM Corporation and IBM Corp. in the manufacturer name. Your enterprise might want to use only the name IBM. You can use the Manufacturer Conversion application to translate variations in a manufacturer's name to a standard naming convention and control how Maximo displays the imported data.

**Software Conversion Application**

Software conversions are necessary because the asset discovery tools that collect software data do not use consistent hardware and software naming conventions, and you might have various names assigned to the same software application. For example, when describing software applications, discovery tools often include version and release numbers in the software application name, such as IBM Tivoli Configuration Manager 4.2 or IBM Tivoli Configuration Manager 4.2.3. Your enterprise might want to track only instances of IBM Tivoli Configuration Manager without specifying a version number. You can use the Software Conversion application to control how Maximo displays the imported data.

**Software Suite Setup Application**

Software suite definitions are necessary because the asset discovery tools used to collect data about deployed software applications typically collect information only about individual software applications, not software suites. You use the Software Suite Setup application to specify which software applications belong to a software suite.

You cannot add an application as a component to a software suite record unless the software application exists as a software conversion record.

3. Create a cron task for software suite setup.

Software suite identification is a background process, and you must set up a cron task in the Cron Task Setup application in Maximo to schedule the software suite identification process. When the cron task is run, Maximo uses the suite definitions in the Software Suite Setup application to identify software suites and update software suite information. Additions, changes, and deletions made to software suite setup records do not affect software suite data displayed in Maximo until the cron task is executed.

For more information about setting up cron tasks, see Chapter 4, "Scheduling Reconciliations," on page 4-1.
4. Set up a reconciliation task for software suite reconciliation.

5. Create a cron task to schedule execution of the software suite reconciliation task.

RAM Compliance (Attributes Equality Example)

In this sample scenario, Maximo evaluates IT asset records for notebooks at the McLean site to determine whether the RAM on the notebooks in IT assets matches the RAM actually installed on notebooks in deployed assets. In other words, the records in the Assets application indicate that I have a specific amount of RAM on a notebook; does my asset discovery tool report the same amount of RAM on the corresponding notebook in deployed assets?

To process this reconciliation, you define a reconciliation task that selects IT asset records at the McLean site for evaluation. For this subset of records, Maximo then uses a link rule based on serial number to search for a match between an IT asset and a deployed asset. If Maximo succeeds in matching an IT asset to a deployed asset, it processes the comparison rule on the reconciliation task, which compares the RAM on the notebooks in IT assets to the RAM on the computers in deployed assets to determine if the amounts match.

Setting Up the Reconciliation Task

For this reconciliation task, you create the following components:

- Asset task filter to select notebooks at McLean from IT assets
- Link rule that matches serial number in IT assets with the corresponding serial number in deployed assets
- Comparison rule that compares RAM on notebooks in IT assets to RAM on computers in deployed assets at the McLean site.

To set up the reconciliation task, use the following steps:

1. In the Task Filters application, you define a task filter to select notebooks at the McLean site, as shown in the following example.

Example of a Task Filter for Attributes Equality Scenario
2 In the Link Rules application, you define a link rule that searches deployed assets for a match to serial numbers in IT assets, as shown in the following example.

Example of a Link Rule for Attributes Equality Scenario

![Example of a Link Rule for Attributes Equality Scenario](image)

3 In the Comparison Rules application, define a deployed asset filter that selects only computers at the McLean site, as shown in the following
example. To set up the deployed asset filter, you select the following parameters:

**Deployed Asset Object**  COMPUTERSYSTEM  
**Deployed Asset Attribute**  SITEID  
**Operator**  =  
**Value**  McLean

**Example of a Deployed Asset Filter in a Comparison Rule for Attributes Equality Scenario**

4 In the Comparison Rules application, you also define a comparison rule (shown in the following example) with an attributes equality clause that specifies an object and attribute in IT assets to compare with an object and attribute in deployed assets. To define the attributes equality clause, you set up the following parameters:

▼ To specify the IT asset:

**Asset Object**  ASSETSPEC  
**Asset Class Structure**  1221 (which is notebook as shown in the **Asset Class Structure Description** field)  
**Asset Attribute**  RAMSIZE

▼ The **Operator** for the comparison is **=**.
To specify the deployed asset:

**Deployed Asset Object**: COMPUTERSYSTEM

**Deployed Asset Attribute**: RAMSIZE

**Deployed Asset Unit of Measure Attribute**: RAMUNIT

---

**Example of Attributes Equality Clause in a Comparison Rule for Attributes Equality Scenario**

---

5 In the Reconciliation Tasks application, set up a reconciliation task (shown in the following example) that combines the following components into a reconciliation task that you can schedule in the Cron Task Setup application:

- asset task filter for McLean IT assets
- link rule that matches serial number in IT assets with the corresponding serial number in deployed assets
- comparison rule that compares RAM on notebooks in IT assets to RAM on computers in deployed assets.
Example of a Reconciliation Task for Attributes Equality Scenario

To create a reconciliation task, select a task filter and one or more link rules. The task filter identifies a subset of assets (if or deployed) to maximize link and compare. You can apply a filter based on asset class, function, account, organization, site, or system role. After the reconciliation task is defined, you must use the Task Setup application to schedule the reconciliation task.

<table>
<thead>
<tr>
<th>Reconciliation Task</th>
<th>Filter Type</th>
<th>Matched</th>
<th>Link Rules</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM Compliance</td>
<td>Asset</td>
<td></td>
<td>Serial Number only</td>
<td>Check for deletion from authorized res.</td>
</tr>
</tbody>
</table>

A link rule identifies the attributes used to associate, or link, IT assets to deployed assets when a reconciliation task is executed. Each reconciliation task must have at least one link rule. For multiple links, enter a sequence number to specify the order in which to apply each rule. Unlike are processed in a cascading sequence. If IT assets or deployed assets do not match a link, Maximo evaluates the next link in the sequence to determine whether there is a match.

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Link</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Serial Number only</td>
<td></td>
</tr>
</tbody>
</table>

A comparison rule identifies the specific attributes of child or parent IT assets to compare with child or parent deployed assets when a reconciliation task is executed. Comparison rules are optional, and a reconciliation task can include more than one comparison rule.

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM Compliance</td>
<td>Check for deletion from authorized res.</td>
</tr>
</tbody>
</table>

Note that in the Comparison Results field for this reconciliation task specifies All results. Consequently Maximo will report both successful comparison results and failed comparison results for this task.

Viewing Reconciliation Results

In the Reconciliation Results application, on the List tab, you can view reconciliation results for the comparison rule that evaluated RAM compliance.

Reconciliation Results List Tab for Attributes Equality Scenario

Maximo displays the results for failed comparisons as shown in the following example. Note that the value in the Asset Value field does not match the value in the Deployed Asset Value field.
**Failed Comparison Result for the Attributes Equality Scenario**

Maximo displays the results for successful comparisons as shown in the following example. Note that the value in the Asset Value field matches the value in the Deployed Asset Value field.

**Successful Comparison Result for the Attributes Equality Scenario**
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A

asset filter clauses 2-8
Assets module 1-1
attribute definition operators 2-12
attributes equality
defined 2-6
attributes equality clauses 2-22

C

comparison rule results 3-5
messages 3-7
comparison rules 2-6
components 2-8
creating 2-24
deleting 2-25
duplicating 2-25
modifying 2-24
Comparison Rules application 2-6
cron task
defining 4-3
scheduling 4-4
customer support iv-vi

D

deployed asset
hierarchy 1-4
deployed asset filter clauses 2-15
Deployed Assets module 1-1

I

IT asset
classification 1-3
defined 1-1
hierarchy 1-3

L

leading set 1-4

link clauses 2-4
link results 3-1
deleting 3-2
viewing 3-2
Link Results application 3-2
link rule failure results
messages 3-8
viewing 3-8
link rules 2-3
components 2-3
deleting 2-6
duplicating 2-6
modifying 2-6
Link Rules application 2-3

M

matches found
defined 2-6
matches found clauses 2-19
operators 2-21
Moved Assets 1-3

O

online support iv-vi

R

reconciliation cron task 4-3
Reconciliation Module applications 1-2
reconciliation process 1-4
reconciliation results
deleting 3-10
viewing 3-1
Reconciliation Results application 3-3
reconciliation tasks 2-25
components 2-27
creating 2-28
deleting 2-29
duplicating 2-29
modifying 2-28
scheduling 1-7
setting up 1-7
Reconciliation Tasks application 2-25
Index

S

sample reconciliation scenarios 5-1
attributes equality 5-9
matches found 5-1
scheduling reconciliations 4-1
support, online iv-vi

T

task filters
   components 2-2
   filter type 2-2
Task Filters application 2-1

W

wildcard characters 2-12