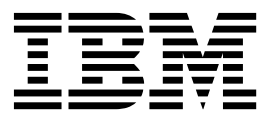


IBM Maximo Asset Configuration Manager  
Version 7 Release 6

*Guide*





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## Note

Before using this information and the product it supports, read the information in “Notices” on page 135.



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This edition applies to version 7, release 6, modification 6 of IBM® Maximo® Asset Configuration Manager and to all subsequent releases and modifications until otherwise indicated in new editions.



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## Chapter 1. Maximo Asset Configuration Manager product overview

You use IBM Maximo Asset Configuration Manager to manage the configuration of high-value, complex, and regulated assets such as aircraft, rail vehicles, engines, weapon systems, and so on. Maximo Asset Configuration Manager is a rules-based configuration management system that was originally developed against the requirements of MIL-STD-1388-2B, a United States military standard that uses the Logistics Support Analysis Record (LSAR) but applies equally to commercial assets.

Maximo Asset Configuration Manager ensures that the actual physical build of an asset meets the requirements of an allowable configuration. Its Build Data Interpreter (BDI) provides comprehensive status derivation for aircraft and other configuration-managed assets. For example, the Build Data Interpreter checks an actual aircraft, position by position, to ensure that its configuration rules comply with its nominated configuration. The Build Data Interpreter reports the status of noncompliant assets in the Assets (CM) application. It also alerts you to problem assets through color-coded data in various applications.

Maximo Asset Configuration Manager provides the capability to display the structure of an asset as of a past date. This feature is in the Assets (CM) application. The Assets (CM) application also displays maintenance, meter, installation, and removal history as of a past date. Maximo Asset Configuration Manager contains applications that are designed specifically for asset configuration management. Some applications are enhanced versions of standard IBM Maximo Asset Management applications. These enhanced applications include fields, features, and actions that are specific to asset configuration management.

---

### What's new in Maximo Asset Configuration Manager 7.6.6

New features and capabilities in Maximo Asset Configuration Manager 7.6.6 help your organization achieve greater efficiency in asset management.

#### **Edit active technical records**

You can edit attributes of an active technical record so that the applicability and engineering embodiment processes accurately define the requirements of the technical record. You can prevent preventive maintenance records from being created automatically for assets after the status of a technical record is changed to active. Learn more about editing active technical records.

#### **Create work orders for discrepancy records**

You can define if a work order is created by default for all Flight Log Book discrepancy records so that the airline will comply with regulatory requirements. Learn more about managing flight log book records.

---

### What's new in Maximo Asset Configuration Manager 7.6.5

New features and capabilities in Maximo Asset Configuration Manager 7.6.5 help your organization achieve greater efficiency in asset management.

## **Temporarily extend preventive maintenance**

By using the new PM Extensions application, you can specify a temporary extension for a PM record and maintain regulatory compliance. When a PM record is extended, the date or meter reading that marks when the PM is due is moved forward by an amount that you specify so that more time is allowed to complete the requirements of the PM. An extension applies to one interval per PM so that during the following intervals, work can continue as originally scheduled. Learn more about the PM Extensions application.

## **Manage quantities of serialized assets in a build position**

You can now add, remove, and edit quantities of serialized assets in a single build position. You can also specify the minimum, maximum, and default quantity for a build position. Learn more about build positions.

## **Manage the timing of inspection**

You can complete whichever occurs last (WOL) management for a group of maintenance plans to specify that inspection automatically begins after whichever maintenance plan is completed last. Learn more about preventive maintenance.

## **Customize default statuses for assets**

Enhancements in the Organizations application mean that you can now customize the default and available statuses for assets. Learn more about assets.

---

## **What's new in Maximo Asset Configuration Manager 7.6.4**

Maximo Asset Configuration Manager 7.6.4 is a maintenance release that continues the features that are available in previous versions.

---

## **What's new in Maximo Asset Configuration Manager 7.6.3**

New features and capabilities in Maximo Asset Configuration Manager 7.6.3 help your organization achieve greater efficiency in asset management.

### **Associate systems with models to standardize definitions and specify configuration rules for the systems**

You can now define a master list of systems that can be applied to multiple models to standardize engineering definitions. To better understand system dependencies and relationships, you can now view functional representations of an asset and its systems and also see which systems are associated with a particular build position. These insights can help you to define system-specific configuration rules. Learn more about associating systems with models.

### **Use the new Asset Roles and Capabilities application to manage the operational readiness of assets**

By using the new application, you can define asset roles and capabilities and specify the relationships between roles, capabilities, and systems. You can also identify the configuration status of an asset to determine whether it can satisfy specified roles. Learn more about the new Asset Roles and Capabilities application.

## **Filter and sort the records on the Maintenance Plan tab of the Assets application**

You can now find tasks more easily in the Assets application, because you can filter and sort on a wider selection of columns than previously possible.

---

## **What's new in Maximo Asset Configuration Manager 7.6.2.1**

This release includes changes that help you manage maintenance and specify when items can be substituted for other items.

### **Greater flexibility in managing maintenance planning**

This release features a number of enhancements to give you greater control when you plan maintenance. You can now specify when preventive maintenance was last done and next due. You can associate a technical record with the range of item numbers that the technical record applies to. Also, to save time, you can update the **Active Date Reviewed** field simultaneously for multiple maintenance plan records. Learn more about managing maintenance planning.

### **Replacing items is made easier with interchangeability rules**

You can now define interchangeability rules for the item numbers that are associated with the build positions on a model. You can specify that one item can be replaced by another, that either of two items can replace each other, or that an item can be replaced only by an item with the same item number. Learn more about interchangeability.

---

## **What's new in Maximo Asset Configuration Manager 7.6.2**

This release includes a performance enhancement in the build data interpreter (BDI) service. This release also comes with the option to configure a multitenancy environment.

### **Extension of validation by the BDI service**

The BDI service now supports validation for aircraft weight and balance reporting and revised support for minimum equipment lists. Support for a multitenancy environment is also added. Learn more about the BDI service.

### **Configure a multitenancy environment to reduce IT infrastructure costs**

Selecting the multitenancy installation option creates a separation of the database to enable multiple independent tenant entities to co-exist in the same instance of the database. Individual tenants within a multitenancy environment can maintain their own data, configurations, workflow, and reports. The multitenancy option is intended for use, primarily, by hosting companies that want to reduce IT infrastructure costs. After you perform a multitenancy installation, you cannot revert to a non-multitenancy deployment. Learn more about configuring a multitenancy environment.

---

## What's new in Maximo Asset Configuration Manager 7.6.1

The enhancements in this release include features that improve compliance in technical records and expand configuration types for configuration-managed items. This release also includes a redesigned build data interpreter that speeds validation and improves performance.

### Technical records

Relate technical records to other technical records so that design changes are tracked for compliance. Define a range of frequency iterations, which specifies how many times inspections are completed to comply with the requirements of the technical record. Add a terminating action to a technical record to define a condition that is required for the termination of recurring inspections, such as when a certain level of physical wear is recorded. Learn more about technical records

### Software items

Configuration-managed items can now represent software items. Define software items, add software items to builds, and define configuration rules for software items. You can also apply all future upgrades to configuration-managed items. Learn more about software items

### Version control of maintenance programs

Manage and track the maintenance program of master preventive maintenance and preventive maintenance records at the model and variation level. Create multiple revisions of a master PM or PM record to retain the history of modifications to a maintenance program. You can also download a snapshot of the maintenance program for an asset at any point in time. Learn more about version control of maintenance programs

### Build data interpreter

A new build data interpreter (BDI) service provides asynchronous validation of changes that affect engineering reference data. Validation is speedier and performance is enhanced.

### Mobile work management

Use the new mobile application to add, remove, and replace assets. Select or search for a work order and browse the asset hierarchy until you find the asset that you want to add, remove, or replace.

---

## Features in previous releases of Maximo Asset Configuration Manager

New features and capabilities in Maximo Asset Configuration Manager help your organization achieve greater efficiency in asset management, maintenance, and processes.

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## New in Maximo Asset Configuration Manager release 7.5

New features in Maximo Asset Configuration Manager release 7.5 are concentrated in maintenance planning, the build data interpreter (BDI) engine, minimum equipment lists, and slot planning.

The following new features are provided in Maximo Asset Configuration Manager:

- You can create a minimum equipment list (MEL) to define the minimal acceptable configuration rules for an asset. Minimum equipment lists are validated by using the build data interpreter (BDI) engine and can be deferred by using the work order deferral process.
- In the PM Master (CM) and Preventive Maintenance (CM) applications, you can now reset the job plan sequence.
- To support maintenance planning and forecasting activities, you can add average meter readings in the Assets (CM) application.
- You can extend the PM due date or meter in the Master PM (CM) and Preventive Maintenance (CM) applications.
- You can specify frequency iterations in the Master PM (CM) and Preventive Maintenance (CM) applications.
- The reference master PM record and the inherited master PM record are provided for managing the maintenance of fleets.
- You can create PM job plans that are based on maintenance locations. You can change the job plan at the next occurrence of the preventive maintenance. The job plan can revert to its original form after the completion of the work order that is associated with the PM record.
- You can define, manage, and validate slot planning to facilitate and manage fleet planning and maintenance forecasting.
- If a component is not available in your supply chain, as a last option, you can remove the component from one asset and install it on another asset.
- The Logs (CM) application, now named Log Book (CM), is also enhanced to include the capability to record component removal or installation and labor recording.
- The Maintenance Planning (CM) application is enhanced to manage duplicate tasks.
- Enhancements to the BDI engine improve the validation of assets.
- The BDI engine also provides configurable map codes to check for predetermined errors and conflicts.
- You can use the BDI engine to process maintenance plan and to process node levels to allow the configuration of the BDI processing of build nodes and their children.

### New in Maximo Asset Configuration Manager 7.5.1.1

The enhancements to Maximo Asset Configuration Manager 7.5.1.1 include features that improve the usability of several applications and also a feature that links replenishments and munitions to inventory management processes.

#### Tracking of replenishments

Replenishment activities in the Flight Log Book application can now be related to inventory management processes. You can more accurately track and manage replenishments across your fleets.

#### Tracking of munitions

Loading and unloading munitions, which are recorded in the Flight Log

Book application, can now be related to inventory management processes. You can more accurately track and manage munitions across your fleets.

#### **Dynamic formulas**

You can create formulas that are specific to the individual models. You can create a dynamic meter that uses a dynamic formula. The search for dynamic meters uses the meter name and the model ID to determine which dynamic formula to use.

#### **Usability of the cannibalization process**

You can now use the cannibalization process until the work order is in the closed, completed, or canceled status.

#### **Usability of the Maintenance Locations (CM) application**

Slot dates can now be extended to accommodate changes in the scope and length of asset maintenance. You are able to see when the extension of dates creates a conflict with an existing slot, and, if appropriate, automatically update the start and finish dates of the associated work package.

#### **Improved usability of the Models application**

The automatic creation of work orders now works more logically with the mandatory requirement of the position in the model. The **Create WO** check box is read-only until the **Mandatory** check box is selected.

## **New in Maximo Asset Configuration Manager 7.5.1**

The enhancements of Maximo Asset Configuration Manager 7.5.1 include features that improve maintenance scheduling, enhance the definition of models, and improve functioning with other products.

#### **Receiving new production assets**

You can add spare parts, measurement points, warranty contracts, and meter average attributes to models to define the engineering requirements of all possible build configurations. When you create assets in the New Assets Assembly application, then, depending on the model, any spare parts, measurement points, warranty contracts, and meter average attributes are automatically added to the asset.

You can define maintenance activities for specific positions in the build that are in compliance with the Maintenance Steering Group-3 (MSG-3) standard. When assets are created that are based on the model, the MSG-3 attributes are automatically associated with the asset. [Learn more](#)

#### **Maintaining production assets**

A new feature for flight log books is included that is similar to traditional paper-based flight log books. You can track the condition of aircraft components, modules, and safety parts. You can see the overall condition of the aircraft and create discrepancy records to identify required maintenance. [Learn more](#)

You can implement a progressive inspection program (PIP) to define maintenance tasks that are on a fixed schedule. [Learn more](#)

#### **Operating with other applications**

Maximo Asset Configuration Manager version 7.5.1 is now more closely aligned with IBM Maximo Asset Management, particularly in an environment with multiple sites.

You can now use Maximo Asset Configuration Manager and IBM Maximo for Transportation together as an efficient and effective solution.



You can use IBM Maximo Asset Management Scheduler to update forecasts on PM records of configuration-managed items to more efficiently schedule work.

### **Usability**

Usability was improved in areas that were identified by user enhancement requests. Enhancements include optionally specifying registration numbers for assets, identifying when the due date for a maintenance task can be changed to the last day of the month, tracking the hours that are due for a component aircraft, and adding the receipt date of an asset to the Assets (CM) application.

---

## **Multitenancy information for Maximo Asset Configuration Manager**

Multitenancy provides data isolation for each tenant that is hosted by a system provider. Customers can be administered as tenants, which means that each customer's data and customer-level business processes can be isolated from data and processes for other customers.

Multitenancy features are available when IBM Maximo Asset Management version 7.6 or later with Multitenancy is installed.

### **Multitenancy documentation**

If multitenancy features are available to you, you can learn how to configure and use those features from the following resources:

- The implementation and administration PDF guide and help plug-ins for system providers are installed with the product in a documentation .zip file. The documentation .zip file contains a readme file that describes how to deploy the help plug-in. These files are intended only for system providers. System providers must follow the instructions in the readme file to ensure that the system provider help files are not made available to tenants.
- The help plug-in for tenants that includes system provider tenant users is installed with the product and can be deployed by the system provider and made available to all tenants. This help content is also available online in Maximo Asset Management v7.6.0.8 Multitenancy information in IBM Knowledge Center.

### **Global administrator access to product applications**

Typically, global administrators configure the product for all tenants. If a global administrator needs to work with applications that are specific to Maximo Asset Configuration Manager, they must be granted access to those applications manually. The product enabler does not grant this access.

---

## **Accessibility features for Maximo Asset Configuration Manager**

Accessibility features for Maximo Asset Configuration Manager assist users who have disabilities, such as restricted mobility or limited vision, to use information technology content successfully.

### **Accessibility features**

Maximo Asset Configuration Manager includes the following major accessibility features:

- Supports interfaces that are commonly used by screen readers.

- Can be operated by using only the keyboard.
- Provides documentation in an accessible format.
- Allows the user to access the interfaces without inducing seizures due to photo-sensitivity.

Maximo Asset Configuration Manager uses IBM Installation Manager to install the product. You can read about the accessibility features for IBM Installation Manager at [http://www.ibm.com/support/knowledgecenter/SSDV2W\\_1.8.4/com.ibm.help.common.accessibility.doc/topics/ceaccess.html?lang=en](http://www.ibm.com/support/knowledgecenter/SSDV2W_1.8.4/com.ibm.help.common.accessibility.doc/topics/ceaccess.html?lang=en)

Maximo Asset Configuration Manager uses the latest W3C Standard, WAI-ARIA 1.0 (<http://www.w3.org/TR/wai-aria/>), to ensure compliance with US Section 508 (<http://www.access-board.gov/guidelines-and-standards/communications-and-it/about-the-section-508-standards/section-508-standards>) and Web Content Accessibility Guidelines (WCAG) 2.0 (<http://www.w3.org/TR/WCAG20/>). To take advantage of accessibility features, use the latest release of your screen reader in combination with the latest web browser that is supported by this product.

Maximo Asset Configuration Manager contains a screen reader check box. The **Use Screen Reader** check box is in the User tab of the Users application. When you select the check box, the user interface is optimized to work with a screen reader. The Accessibility Help window provides details on general navigation, menu navigation, and hot keys. Click **Accessibility Help** from the toolbar of the product to access the help window. To use the accessibility tools to read reports, you must access the reports in Microsoft Excel. In the reports applications, select the **Run Reports** option. With this option, you can email an .xls file version of a report to yourself at a scheduled time.

The Maximo Asset Configuration Manager online product documentation in IBM Knowledge Center is enabled for accessibility. The accessibility features of IBM Knowledge Center are described at <https://www.ibm.com/support/knowledgecenter/help#accessibility>.

## Keyboard navigation

Maximo Asset Configuration Manager uses the following keyboard shortcuts.

*Table 1. Keyboard shortcuts for general navigation*

Action	Keyboard shortcut
Move from one interface element to the next.	Tab key
Select buttons, links, and menu options.	Enter key
Select or clear a check box.	Spacebar
Display field help for the field that is in focus.	Alt+F1

*Table 2. Keyboard shortcuts for global navigation*

Link name	Keyboard shortcut
Bulletins	Alt+B
Go To	Alt+G
Reports	Alt+R
Start Center	Alt+C
Profile	Alt+P

*Table 2. Keyboard shortcuts for global navigation (continued)*

Link name	Keyboard shortcut
Sign Out	Alt+S
Help	Alt+H
Return	Alt+R
Return with Value	Alt+W

*Table 3. Keyboard shortcuts for application-specific actions*

Action	Applications	Keyboard shortcut
Assign Labor	Assignment Manager	Ctrl + Alt + L
Finish Assignment	Assignment Manager	Ctrl + Alt + F
Interrupt Assignment	Assignment Manager	Ctrl + Alt + U
Select Work Date	Assignment Manager	Ctrl + Alt + W
Start Assignment	Assignment Manager	Ctrl + Alt + T
Start Timer	Activities, Changes, Incidents, Problems, Releases, and Service Requests	Ctrl + Alt + B
Stop Timer	Activities, Changes, Incidents, Problems, Releases, and Service Requests	Ctrl + Alt + E

*Table 4. Keyboard shortcuts for toolbar actions*

Action	Keyboard shortcut
Insert New Record	Ctrl+Alt+I
Save Record	Ctrl+Alt+S
Clear Changes	Ctrl+Alt+C
Previous Record	Ctrl+Alt+P
Next Record	Ctrl+Alt+N
Change Status	Ctrl+Alt+A
Create KPI	Ctrl+Alt+K
Put record in edit mode or release record from edit mode	Ctrl+Alt+L

*Table 5. Keyboard shortcuts for tables*

Action	Keyboard shortcuts
Next Row	Ctrl+down arrow
Previous Row	Ctrl+up arrow
Open/Close Table Window Filter	Ctrl+Z
Next Page	Ctrl+right arrow
Previous Page	Ctrl+left arrow

Table 6. Keyboard shortcuts for dates

Action	Keyboard shortcuts
Insert today's date	Ctrl+SHIFT+7
Move forward one day	ALT+up arrow
Move back one day	ALT+down arrow
Move forward one month	Ctrl+SHIFT+0
Move back one month	Ctrl+SHIFT+9
Move forward one year	Ctrl+SHIFT+up arrow
Move back one year	Ctrl+SHIFT+down arrow

Table 7. Non-standard keyboard shortcuts

UI element	Action	Standard UI response	Deviation
Radio buttons	To move between radio buttons, press the Right and Left arrows.	The radio buttons are selected as the user moves through them.	The radio buttons are highlighted but not selected as the user moves through them. A radio button is selected only when the user presses Spacebar or Enter on the highlighted radio button.
Tree view	To select a node, press Enter.	When the user presses Enter, the default action is performed for a node.	Nodes might have zero, one, or two actions.  If a node has 2 actions and a user navigates to an element by using the arrows, when the user presses Enter the default action is performed. When the user presses Enter a second time, the secondary action is performed.

## Interface information

Maximo Asset Configuration Manager has the following accessibility characteristics:

- If PDF files are included, the files have limited accessibility support. With PDF documentation, you can use optional font enlargement, high-contrast display settings, and you can navigate by keyboard alone. All PDF documentation is also available in HTML format.
- Maximo Asset Configuration Manager online product documentation is available in IBM Knowledge Center, which is viewable from a standard web browser.
- Maximo Asset Configuration Manager does not have audio features in its interface.

- You can use supported screen readers with the user interface.
- You use the **Go To** menu to navigate to any of the applications that you have access to. The **Go To** menu is a cascading menu that is three levels deep at its deepest point. You can use the screen reader with the **Go To** menu. The following instructions apply to both the standard navigation and the side navigation menu and describe how to get started with the screen reader:
  1. To get to the **Go To** menu press Alt+G.
  2. When you open the menu, the screen reader reads the first application in the menu. If the screen reader does not read the entry, restart the screen reader.
  3. Navigate the list of applications in the menus by using the arrow keys.
  4. The screen reader indicates whether a menu item has submenus. To get to a submenu, press the right arrow or enter.
  5. Press the left arrow to move up a level in the hierarchy. If you press the left arrow at the highest level of the **Go To** menu, you leave the menu completely.
  6. Press the Enter key to enter an application.
- The Maximo Asset Configuration Manager user interfaces do not have content that flashes 2 - 55 times per second.

The Maximo Asset Configuration Manager web user interfaces rely on cascading style sheets to render content properly and to provide a usable experience. The application provides an equivalent way for low-vision users to use a user's system display settings, including high-contrast mode. You can control font size by using the device or web browser settings.

The Maximo Asset Configuration Manager web user interface does not rely on cascading style sheets to render content properly and to provide a usable experience. However, the product documentation does rely on cascading style sheets. IBM Knowledge Center provides an equivalent way for low-vision users to use a user's system display settings, including high-contrast mode. You can control font size by using the device or browser settings.

The Maximo Asset Configuration Manager web user interface includes WAI-ARIA navigational landmarks that you can use to quickly navigate to functional areas in the application.

## Related accessibility information

In addition to standard IBM help desk and support websites, IBM has established a TTY telephone service for use by deaf or hard of hearing customers to access sales and support services:

TTY service 800-IBM-3383 (800-426-3383) (within North America)

## IBM and accessibility

For more information about the commitment that IBM has to accessibility, see IBM Accessibility ([www.ibm.com/able](http://www.ibm.com/able)).



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## Chapter 2. Installing Maximo Asset Configuration Manager

The installation of Maximo Asset Configuration Manager involves running an installation program and a configuration program, both of which are started from the launchpad.

---

### Planning to deploy IBM Maximo Asset Configuration Manager

IBM Maximo Asset Configuration Manager 7.6.6 must be installed with IBM Maximo Asset Management 7.6.0.8. Your environment can also include IBM Maximo Asset Management Multitenancy 7.6.0.8.

#### System requirements for IBM Maximo Asset Configuration Manager

Before you install Maximo Asset Configuration Manager, ensure that your environment meets the hardware and software requirements. Administrative user rights are required.

A complete list of hardware and software requirements is available in the System Requirements section of the Maximo Asset Management wiki.

You can install Maximo Asset Configuration Manager in the following environments:

##### Enterprise system

Maximo Asset Configuration Manager 7.6.6 can be installed on the administrative workstation where Maximo Asset Management 7.6.0.8 is installed.

##### Mobile apps

Before you install the mobile apps, you must install IBM Maximo Anywhere 7.6.2 or a later version. Maximo Anywhere includes required components that must be installed on the Maximo Asset Configuration Manager administrative workstation. The required components include OSLC object structures and licenses that enable a set of applications in Maximo Asset Management.

As part of the app installation, you must deploy another collection of required components on the Maximo Asset Configuration Manager administrative workstation.

##### Maximo Asset Management Multitenancy

Maximo Asset Configuration Manager 7.6.6 can be installed with Maximo Asset Management Multitenancy 7.6.0.8, and Maximo Asset Configuration Manager is enabled for all tenants except the system provider tenant.

---

### Installing Maximo Asset Configuration Manager

You must install Maximo Asset Configuration Manager in the same program group where Maximo Asset Management is installed.

## Before you begin

Ensure that IBM Maximo Asset Management 7.6.0.8 is installed on the computer where you are installing Maximo Asset Configuration Manager 7.6.6.

For more information, see the installation topics for Maximo Asset Management 7.6.0.8 IBM Knowledge Center ([www.ibm.com/support/knowledgecenter/SSLKT6\\_7.6.0.8/com.ibm.mam.doc/mam\\_install/c\\_installing\\_feature\\_pack.html](http://www.ibm.com/support/knowledgecenter/SSLKT6_7.6.0.8/com.ibm.mam.doc/mam_install/c_installing_feature_pack.html)).

For information about upgrading to Maximo Asset Management 7.6 from an earlier version of Maximo Asset Management, see the Maximo Upgrade Resources website ([www.ibm.com/support/docview.wss?uid=swg21266217](http://www.ibm.com/support/docview.wss?uid=swg21266217)).

## About this task

The configuration tool is launched automatically when the installation wizard is complete. It is called IBM Tivoli®'s process automation engine configuration tool.

After you are done using the configuration tool, the Maximo Asset Configuration Manager application starts automatically.

## Procedure

1. Download the Maximo Asset Configuration Manager product software from IBM Passport Advantage® and extract the installation image to a local directory.
2. Start the launchpad by double-clicking the launchpad file.

Option	Description
Windows	launchpad64.exe
UNIX or Linux	launchpad.sh

3. On the Install IBM Maximo Asset Configuration Manager pane, click **Install**.
4. Depending on the package that you are installing, you might be required to click **Install** or **Update** and click **Next**.
5. After you accept the terms in the license agreement, select the option to use the existing package group **IBM Tivoli's automation suite**.
6. Complete the installation wizard.
7. In the configuration tool, select **Update the database with the UpdateDB Lite feature**.
8. Verify the application version and current state.
9. To complete the deployment, run both the pre-processing and post-processing options, and click **Finish**.
10. When the installation is complete, verify that the Maximo Asset Configuration Manager component was installed. Log in to Maximo Asset Configuration Manager and view the system information from the **Help** menu.

## What to do next

When the installation and configuration steps are complete, you can configure Maximo Asset Configuration Manager to meet your business needs.



## Automatically updating the database and building and deploying the EAR file

If you deferred the configuration step during installation, you can use the configuration tool to update the Maximo database and build and deploy the EAR file.

### Before you begin

Ensure that the installation of Maximo Asset Configuration Manager is complete.

### About this task

If you do not want to use the graphical interface, you can use the command line tool to perform the same operations.

### Procedure

1. Start the configuration tool by double-clicking the ConfigUI file in the *install\_home/ConfigTool* directory.
2. On the home screen of IBM Tivoli's process automation engine configuration tool, select **Update the database with the UpdateDB Lite feature**.
3. Complete the screens in the configuration tool.

## Manually building and deploying the EAR file

If you do not use the configuration program, you must manually update the Maximo database and build and deploy the EAR file. The manual process is required for environments that use Oracle WebLogic Server.

### Building the EAR file

To deploy the product, you must update the Maximo database and build and deploy the Maximo EAR file.

### Procedure

1. Change to the *install\_home\maximo\tools\maximo* directory and run the **updatedb** command.
2. If languages other than English are installed on the system, run the following command:  

```
install_home\maximo\tools\maximo\TDToolkit.bat -pmpupdateacm  
-useexpander
```
3. Change to the *install\_home\maximo\deployment* directory and run one of the following commands:

Option	Description
WebSphere® Application Server	<b>buildmaximoearwas8</b>
Oracle WebLogic Server	<b>buildmaximoear</b>

### Deploying the EAR file on WebSphere Application Server

Deployment of the Maximo EAR file is required before you can use the product on WebSphere Application Server.

### Before you begin

Ensure that you have updated the Maximo database and built the EAR file.

## About this task

The EAR file is installed on WebSphere Application Server during the Maximo Asset Management installation.

Replace the parameters in the command syntax with the values in your deployment. For more information, see “Command syntax for deploying the EAR file on WebSphere Application Server.”

## Procedure

Deploy the Maximo EAR file by opening a command prompt and running the following command:

```
websphere_home\jac1\solutions\DeployApplication.[bat|sh] WASAdminUserName  
WASAdminPassword "MAXIMO" WASNodeName WASApplicationServerName  
"install_home\maximo\deployment\default\maximo.ear" WASVirtualHost  
WASWebServerName
```

## Command syntax for deploying the EAR file on WebSphere Application Server:

You use parameters in the command syntax when you manually deploy the EAR file on WebSphere Application Server.

### Parameters

*WASAdminUserName*

A WebSphere Application Server Network Deployment account that has deployment privileges.

*WASAdminPassword*

The password of the user who is specified in the *WASAdminUserName* parameter.

*WASNodeName*

The name of the WebSphere Application Server Network Deployment node.

*WASApplicationServerName*

The name of the WebSphere Application Server Network Deployment application server.

*WASVirtualHost*

The name of the WebSphere Application Server Network Deployment virtual host.

*WASWebServerName*

The name of the WebSphere Application Server Network Deployment web server.

## Deploying the EAR file on WebLogic Server

After you build the EAR file, you must deploy it from the WebLogic Server console.

## Before you begin

Ensure that you have updated the Maximo database and built the EAR file.

## About this task

The Maximo EAR file is installed on WebLogic Server during the Maximo Asset Management installation.

Deploying the EAR file starts the application server.

## Procedure

1. Open a command prompt and change to the following directory:

Operating system	Location
Windows	<i>weblogic_home</i> \user_projects\domain\mydomain
UNIX	<i>weblogic_home</i> /mxadmin/oracle/user_projects/domains/mydomain

2. Start WebLogic Server.

Option	Command
Windows	startWebLogic.cmd
UNIX or Linux	./startWebLogic.sh

3. Specify the WebLogic Server user name and password.
4. Log in to the WebLogic Server console at <http://hostname:7001/console>
5. In the WebLogic Server console, follow the instructions to deploy the *maximo.ear* file.

## What to do next

The configuration tool does not deploy the EAR file on Oracle WebLogic Server. You must manually deploy the EAR file.

---

## Installing the mobile apps

The installation process involves running the installation and configuration programs on one or more computers.

### Before you begin

Ensure that you have installed the required components for IBM Maximo Anywhere 7.6.2 or a later version on the computer where Maximo Asset Configuration Manager is installed.

Ensure that you have added users to the ANYWHERE\_TECHNICIAN security group. For more information, see Adding users to the Maximo Anywhere security groups ([www.ibm.com/support/knowledgecenter/SSPJLC\\_7.6.2/com.ibm.si.mpl.doc/install/t\\_add\\_users\\_security.html](http://www.ibm.com/support/knowledgecenter/SSPJLC_7.6.2/com.ibm.si.mpl.doc/install/t_add_users_security.html)).

If you plan to install the Maximo Asset Configuration Manager mobile apps on a designated build computer, copy the apps and the Maximo Anywhere compressed file to the target computer.

Before you can build and deploy mobile apps on the build computer, your system requires either the Android, iOS, or Windows development tools. For more

information, see IBM Knowledge Center ([www.ibm.com/support/knowledgecenter/SSPJLC\\_7.6.2/com.ibm.si.mpl.doc/install/t\\_set\\_up\\_buildserver.html](http://www.ibm.com/support/knowledgecenter/SSPJLC_7.6.2/com.ibm.si.mpl.doc/install/t_set_up_buildserver.html)).

## About this task

A set of required components must be installed on the administrative workstation to extend Maximo Asset Configuration Manager for the mobile apps.

## Procedure

1. On the Maximo Asset Configuration Manager computer, extract the compressed file that contains the mobile app.
2. From the extracted file, start the launchpad.
3. On the Install IBM Maximo Asset Management Required Components pane, click **Install** and complete the installation wizard. If you accept the default selection, the configuration program starts automatically.
4. In Tivoli's process automation engine configuration tool, select **Update Database and Build and Deploy Application EAR Files** and complete the configuration tool.
5. To install the mobile app on the computer where Maximo Anywhere is installed, copy the compressed file for the mobile app to the target computer.
6. On the Maximo Anywhere computer, extract the compressed file to a local directory.
7. From the extracted file, start the mobile app launchpad.
8. On the Install or Update IBM Maximo Anywhere Work Execution for Complex Assets pane, click **Install**.
9. Complete the installation wizard.
10. Update the platform by running the following command:  

```
build update-platform  
build
```
11. Build and deploy the mobile apps by following the instructions in IBM Knowledge Center ([www.ibm.com/support/knowledgecenter/SSPJLC\\_7.6.2/com.ibm.si.mpl.doc/build\\_deploy/t\\_ctr\\_build\\_deploy\\_apps.html](http://www.ibm.com/support/knowledgecenter/SSPJLC_7.6.2/com.ibm.si.mpl.doc/build_deploy/t_ctr_build_deploy_apps.html)).

---

## Installing the build data interpreter service for Maximo Asset Configuration Manager

Maximo Asset Configuration Manager uses a high-performance build data interpreter (BDI) service to validate operational changes to configuration-managed assets against the reference data and rules that are configured for the associated model. You must install the BDI service on the database server of your Maximo Asset Configuration Manager deployment.

## About this task

The BDI service requires Oracle Java™ Runtime Environment 6 or a later version.

After you install the BDI service, you configure it for your environment.

To uninstall the BDI service, browse to the *install\_home\tools\v8\cmd* directory, right-click the *delete.bat* file, and click **Run as Administrator**.

## Procedure

1. Browse to the *install\_home\tools\v8* directory and open the *v8.ini* file in a text editor.
2. Set the *database* variable to either **db2**, **oracle**, or **sqlserver**.
3. Specify the corresponding *xdb-connect* and *xdb-login* variables for the database.
  - a. Complete the JDBC string by using the *<host>:<port>/<service>* values.
  - b. Specify the database administrator user name and password.
4. Save and close the *v8.ini* file.
5. Optional: Test the configuration.
  - a. Run *install\_home\tools\v8\cmd\v8-service-test.cmd*. This command starts the V8 listener in the foreground.
  - b. Run *install\_home\tools\v8\cmd\v8-service-test-client.cmd*. This command repeatedly sends a test message *<TX>* every three seconds to the service and prints the received response *<RX>*.
6. Browse to the *install\_home\tools\v8\cmd* directory, right-click the *install.bat* file, and click **Run as Administrator**.
7. From the **Start** menu, select **Administrative Tools > Services**, right-click the V8 service, and click **Properties**.
8. In the properties window, on the **Log On** tab, specify an account that has administrator rights and privileges and click **Apply**.
9. On the **General** tab, specify the startup type, start the service, and click **OK**.
10. Log in to Maximo Asset Configuration Manager as an administrator.
11. Go to the System Properties application, select **Filter**, and search for the property **psdi.plusa.v8hostname**.
12. In the **Global Value** field, replace *<localhost>* with either the server host name or the IP address of the computer where V8 is running.
13. If you change the port number in the *v8.ini* file, then you must replace the port number 1608 in the **psdi.plusa.v8hostname** system property.
14. Save the property. To make the change active, click **Live Refresh**.

---

## Installing the build data interpreter service for Maximo Asset Configuration Manager Multitenancy

Maximo Asset Configuration Manager uses a high-performance build data interpreter (BDI) service to validate operational changes to configuration-managed assets against the reference data and rules that are configured for the associated model. You must install the BDI service on the database server of your Maximo Asset Configuration Manager Multitenancy deployment.

### About this task

Before you install the BDI service, ensure that Maximo Asset Configuration Manager is installed and configured for multitenancy operation.

The BDI service requires Oracle Java Runtime Environment 6 or a later version.

After you install the BDI service, you configure it for your environment.

To uninstall the BDI service, browse to the *install\_home\tools\v8\cmd* directory, right-click the *delete.bat* file, and click **Run as Administrator**.

## Procedure

1. Browse to the *install\_home\tools\v8* directory and open the *v8.ini* file in a text editor.
2. Ensure that the *database* variable is set to **db2**.
3. Specify the corresponding *xdb-connect* and *xdb-login* variables for the database.
  - a. Complete the JDBC string by using the *<host>:<port>/<service>* values.
  - b. Specify the database administrator user name and password.
4. Save and close the *v8.ini* file.
5. Optional: Test the configuration.
  - a. Run *install\_home\tools\v8\cmd\v8-service-test.cmd* to start the V8 listener in the foreground.
  - b. Run *install\_home\tools\v8\cmd\v8-service-test-client.cmd*. A test message *<TX>* is sent to the service every three seconds and the received response *<RX>* is printed.
6. Reopen the *v8.ini* file in a text editor and add the following parameter:  
**v8-mt-config = v8mt.xml**. This parameter activates multitenancy mode and specifies the multitenancy configuration file name. The file is stored in the *v8* home folder, for example *install\_home\tools\v8\resources\v8mt.xml*.
7. To activate Minimum Equipment List functionality in Maximo Asset Configuration Manager, set the **v8-options** parameter to **MEL**.
8. Save and close the *v8.ini* file.
9. Open a command line and start the Local Users and Groups program. The Local Users and Groups program is located in your operating system folder, for example, *C:\Windows\winsxs\lsusrmgr.msc*.
10. Click on the **Users** folder and, from the **Action** menu, click **New User**.
11. In the **User name** field, type *V8USR* and specify a password.
12. Clear the **User must change password at next logon** checkbox.
13. Select the **Password never expires** checkbox.
14. Click **Create**.
15. Open the *v8mt.xml* configuration file in a text editor, and update the **<v8dbpassword>** parameter.
16. Save and close the *v8mt.xml* file.
17. From the *install\_home\tools\v8\cmd* folder, run the **v8-mt-install.cmd** command.

---

## Installing silently

A silent installation is useful for installing the product components on any computers that are configured in the same way.

### Installing Maximo Asset Configuration Manager silently

Instead of using the installation programs, you can run commands by using a generated response file from the initial installation of Maximo Asset Configuration Manager.

#### Before you begin

To create a response file during the installation of Maximo Asset Configuration Manager, open a command prompt and set the **record** environment variable to

true. Then, start the Maximo Asset Configuration Manager launchpad. The response file is generated in the home directory of the user ID that started the program.

Alternatively, you can modify one of the sample response files that are provided in the installation image.

Ensure that the values in the response file are valid for the target system. The **installLocation** parameter and the **profile id** parameter must correspond with the existing Maximo Asset Management instance.

## Procedure

1. Copy the compressed installation image and response files to the target computer.
2. On the target computer, open a command prompt and change directory to the location of the Installation Manager program.

Option	Description
<b>Windows</b>	cd C:\Program Files\IBM\InstallationManager\ eclipse\tools\
<b>Linux and UNIX</b>	cd /opt/IBM/InstallationManager/eclipse/tools/

3. Silently start Installation Manager by running the following command:

```
imcl -input responsefilename
-log logfile -acceptLicense
```

The **-input** parameter determines the path to the response file, and the **-log** parameter determines the path to where the log files are written. The **-acceptLicense** parameter is used to accept the license automatically. For example, on Windows, run the following command:

```
imcl -input C:\tmp\ACM_Silent_ResponseFile.xml
-log C:\tmp\silent_install_log.xml -acceptLicense
```

4. After Maximo Asset Configuration Manager is installed, update the Maximo Asset Management configuration and then rebuild and redeploy the application EAR file from the command line.

Option	Description
<b>WebSphere Application Server</b>	From the R:\IBM\SMP\ConfigTool\scripts directory, run the <b>reconfigurePae</b> command. reconfigurePae -action updateApplication [-updatedb] [-deploymaximoeear] [-deployhelpear] [-wasuser userid] [-waspwd password]

Option	Description
WebLogic Server	<ol style="list-style-type: none"> <li>1. From the R:\IBM\SMP\ConfigTool\scripts directory, run the <b>reconfigurePae</b> command.  reconfigurePae  -action updateApplication  [-updatedb]</li> <li>2. Build the application EAR file.  cd <i>install_home</i>\maximo\deployment  buildmaximoear // build Maximo EAR</li> <li>3. Deploy the application EAR file manually to the application server.</li> </ol>

## Silent mode: Installing the mobile apps

Instead of using the installation programs, you can install the required components and the app by running commands and sample response files.

### Before you begin

The response files are provided in the app installation images. One response file is used to install the required components on the Maximo Asset Configuration Manager computer and is named *ACM\_maximo\_Silent\_ResponseFile.xml*. The other response file is used to install the mobile app on the Maximo Anywhere computer and is named *ACM\_Work\_Execution\_CA\_App\_Silent.xml*.

Ensure that the values in the response file are valid for the target system. The **installLocation** parameter and the **profile id** parameter must correspond with the existing Maximo Asset Management instance.

### About this task

This silent installation procedure has the same requirements as a non-silent installation of the mobile apps.

### Procedure

1. On the computer where Maximo Asset Configuration Manager 7.6.6 is installed, extract the compressed installation image.
2. Update the silent response file by following the commented instructions that are located inside the silent response file. Sample silent response files can be found under the *SilentResponseFiles* directory of the installation image
3. Open a command prompt and change directory to the location of the Installation Manager program.

Option	Description
Windows	cd C:\Program Files\IBM\InstallationManager\eclipse\tools\
Linux and UNIX	cd /opt/IBM/InstallationManager/eclipse/tools/

4. Silently start Installation Manager by running the following command:

```
imcl -input responsefilename
-log logfile -acceptLicense
```



The **-input** parameter determines the path to the response file and the **-log** parameter determines the path to where the log files are written. The **-acceptLicense** parameter is used to accept the license automatically. For example, run the following command:

```
imcl -input C:\tmp\ACM_Maximo_Silent_ResponseFile.xml  
-log C:\tmp\silent_install_log.xml -acceptLicense
```

5. To install the mobile apps on the computer where Maximo Anywhere is installed, copy the compressed installation images to the target computer.
6. Extract the compressed file and repeat steps 2-3. Replace the response file name in the command with the *ACM\_Work\_Execution\_CA\_App\_Silent.xml* file.

---

## Installing help locally

Product help for Maximo Asset Configuration Manager is provided online in IBM Knowledge Center. If you want to install help locally, you can download IBM Knowledge Center and help packages from Fix Central.

### Installing help

You can download help packages from Fix Central that contain the same documentation packages that are available online in IBM Knowledge Center. You add the help packages and configuration files to a local installation of IBM Knowledge Center

#### Procedure

1. To download a locally-installable version of IBM Knowledge Center and help packages from Fix Central, follow the instructions at <http://www-01.ibm.com/support/docview.wss?uid=swg24041962>.
2. Extract the IBM Knowledge Center package to the location where you want to install it. The default installation location is C:\KnowledgeCenter. If you install IBM Knowledge Center to a different location, you must update the path value in the *taxonomy.properties* file for each help package that you install.
3. Extract a help package to a temporary location. The extracted files include one or more plugin folders, a properties file and a taxonomy file.
4. Copy all com.ibm.prod.doc plugin folders from the help package to the *install\_home/KnowledgeCenter/usr/content/KCXhtml* directory.
5. Copy the properties file to the configuration directory, for example to *install\_home/KnowledgeCenter/usr/conf/SSLKT6\_7.6.0.7.properties*.
6. Open the *taxonomy.properties* file in a text editor and update the path value, if necessary, to point to the installed location. For example, change the value of the Path property from C:/KnowledgeCenter/usr/content/KCXhtml to E:/IBM/SMP/KnowledgeCenter/usr/content/KCXhtml, where IBM Knowledge Center is installed at E:/IBM/SMP/KnowledgeCenter.
7. Replace the *install\_home/KnowledgeCenter/usr/taxonomy/KC\_taxonomy.ditamap* with the version of the KC\_taxonomy.ditamap file that is included in the help package.
8. In the *install\_home/KnowledgeCenter/bin* directory, click **startKC.bat** on Windows or **startKC.sh** on Linux or AIX® to start IBM Knowledge Center.
9. In a browser, open [http://install\\_home:port/kc](http://install_home:port/kc) to view the product help, for example <http://127.0.0.1:9090/kc>.
10. In Maximo Asset Configuration Manager, redirect the application help links to point to your local installation of IBM Knowledge Center:
  - a. In the System Properties application, filter for mx.help properties.

- b. Change the `mxe.help.host` and `mxe.help.port` properties to the host and port values for your local installation of IBM Knowledge Center, such as the default host value of 127.0.0.1 and default port value of 9090.
  - c. Change the `mxe.help.path` property value from `/support/knowledgecenter/` to `/kc/`.
  - d. Save the changes and click **Live Refresh** to update the values in the product database.
11. To stop IBM Knowledge Center, in the `install_home/KnowledgeCenter/bin` directory, click **stopKC.bat** on Windows or **stopKC.sh** on Linux or AIX.

## IBM Knowledge Center configuration

IBM Knowledge Center requires minimal configuration to run help packages for IBM products in your local environment. You can also configure it to provide different content in separate instances of IBM Knowledge Center or to run existing Eclipse help plugins in IBM Knowledge Center.

### Changing the IBM Knowledge Center URL

If you install IBM Knowledge Center on your local computer, when you start the server, the help is available in a browser at the default URL of `http://localhost:9090/kc`. The host value changes, depending on where you install IBM Knowledge Center. If the default port is already in use, you can change the port value in the `kc_ant.properties` file in the `etc` directory.

If you want to provide different help to different audiences or if you want to host help for product versions that are not compatible with each other, you can install multiple instances of IBM Knowledge Center on the same computer. You rename the additional instances to unique directory names, such as `KnowledgeCenter2` and `KnowledgeCenter3`, and you configure the `kc_ant.properties` file in the `etc` directory so that each instance runs on a different port.

### Maintaining taxonomy files

Each product version in the IBM software catalog has a unique taxonomy value that forms part of the URL for the product help on `www.ibm.com`. For example, the taxonomy value for Maximo Asset Management, version 7.6.0.7, is `SSLKT6_7.6.0.7`, and the URL for the product welcome page is `http://www.ibm.com/support/knowledgecenter/SSLKT6_7.6.0.7/com.ibm.mam.doc/welcome.html`. The `taxonomy.properties` file and the `KC_taxonomy.ditamap` file control the taxonomy values in IBM Knowledge Center.

Each help package includes a `taxonomy.properties` file that is specific to the product version. You must add this file to the `usr/conf` directory in IBM Knowledge Center. If you add help packages for multiple products to IBM Knowledge Center, the `usr/conf` directory must contain a separate `taxonomy.properties` file for each help package.

The `KC_taxonomy.ditamap` file lists each product version in the IBM software catalog, and the file is frequently updated as new products and new versions of products are released. A basic version of the `KC_taxonomy.ditamap` file is provided as a placeholder in the `usr/taxonomy` directory in IBM Knowledge Center but it does not contain a comprehensive list of product taxonomy values. You must replace this placeholder file with the version of the `KC_taxonomy.ditamap` that is included in the help package.

When you add multiple help packages to IBM Knowledge Center, each help package includes a `KC_taxonomy.ditamap` file. Because of the dynamic nature of this file, the included `KC_taxonomy.ditamap` files might be at different versions. Always use the most recent version of the file because taxonomy values are added to the file incrementally.

## Troubleshooting

When you start IBM Knowledge Center after adding a new help package, index and cache files are created to enable faster search and retrieval of help topics. If the new help topics do not show in a browser, check if subdirectories were created for the product version in the `runtime/diskcache` and `runtime/index` directories. If these subdirectories were not created, check that the `taxonomy.properties` file exists in the `usr/conf` directory and that it contains the correct path to the main help plugin in the `usr/content/KCXhtml` directory. If the `taxonomy.properties` is in the correct location and contains the correct path to the help plugin, it is likely that you forgot to add the latest version of the `KC_taxonomy.ditamap` to the `usr/taxonomy` directory.

After troubleshooting, before you start IBM Knowledge Center, you can delete the product version subdirectories in the `runtime/diskcache` and `runtime/index` directories, to ensure that the content is fully refreshed.

## Help components

Help components include a locally-installable version of IBM Knowledge Center and help packages that contain content plugins for product versions. You can download a locally-installable version of IBM Knowledge Center to deploy help packages in your local environment.

### IBM Knowledge Center

A standalone help system that includes a WebSphere Application Server Liberty, version 8.5.5.x, embedded server. IBM Knowledge Center is distributed to Maximo customers on <https://www-933.ibm.com/support/fixcentral/>. IBM Knowledge Center is available for Windows, Linux, or AIX platforms and you can run IBM Knowledge Center on a local computer, server, or read-only media.

After you extract the IBM Knowledge Center package, you add product help packages to it to deploy help in your local environment. You can use IBM Knowledge Center to host help packages for several products at the same time, if the products are on compatible release versions. If you want to host help packages that are not compatible with one another, you can run additional instances of IBM Knowledge Center that you configure to run on different ports.

### Help packages

Contain the same documentation that is available on <http://www.ibm.com/support/knowledgecenter> and include one or more content plugins that contain topics in their appropriate directories and the navigation files that control the table of contents for the topics. Help packages also include the following files that are required by IBM Knowledge Center:

- A `taxonomy.properties` file contains the taxonomy value for the product version and the path to the main `toc.ditamap` file for the plugin or plugins in the help package.

- The `KC_taxonomy.ditamap` file lists the taxonomy values for all products in the IBM software catalog. A basic version of this file is included in IBM Knowledge Center but this version of the file is not up-to-date. The `KC_taxonomy.ditamap` file that is included in the help package is the current version of the file when the help package is created.

Help packages include instructions for where to add the plugins and the additional files to IBM Knowledge Center.

#### **IBM Knowledge Center versions**

The locally-installable versions of IBM Knowledge Center are based on IBM Knowledge Center, version 1.5. This version has a different look and feel to IBM Knowledge Center, version 2.0, which is on <http://www.ibm.com/support/knowledgecenter>. The functionality is similar but there are some differences in navigation and search. PDF creation is not supported on the locally-installable version.

When a locally-installable IBM Knowledge Center, version 2.0, is available, it will be distributed to customers who want to update their local version.

## **Maximo Asset Management documentation library**

The help packages in the documentation library mirror the product catalog and installation environment. Either the Maximo Asset Management help package or the Maximo Asset Management Multitenancy help package must be installed in the same IBM Knowledge Center environment where you install help packages for industry solutions and add-on products.

The Maximo Asset Management and Maximo Asset Management Multitenancy help packages contain multiple plug-ins. Help packages for industry solutions and add-on products contain one or more plug-ins. When a help package contains multiple plug-ins, one plug-in acts as the navigation plug-in. A navigation plug-in contains the main `toc.ditamap` file that controls the table of contents for all plug-ins in the help package. The `taxonomy.properties` file that is included in the help package specifies the path to the main `toc.ditamap` file.

Maximo Asset Management and Maximo Asset Management Multitenancy help packages include reuse plug-ins. These plug-ins contain topics only. Consuming plug-ins control the table of contents and metadata for the reused topics. The content is used extensively by other help plug-ins and you must install reuse plug-ins in IBM Knowledge Center to provide coherent content and ensure that links resolve.

### **Maximo Asset Management help package**

This help package includes the following plug-ins:

#### **`com.ibm.mam.doc`**

Navigation plug-in, containing the welcome page and product overview, and help for planning, getting started, and managing financial processes.

#### **`com.ibm.mam.inswas.doc`**

Help for installing Maximo Asset Management on WebSphere Application Server.

#### **`com.ibm.mam.inswl.doc`**

Help for installing Maximo Asset Management on Oracle WebLogic Server.

#### **`com.ibm.mbs.doc`**

Reuse plug-in, containing help for administering Maximo Asset

Management, application design, workflow design, working with Migration Manager, implementing high availability, and application help.

**com.ibm.mif.doc**

Reuse plug-in, containing help for integrating Maximo Asset Management data with external applications.

**com.ibm.support.mbs.doc**

Reuse plug-in, containing troubleshooting and support information for Maximo Asset Management and for industry solutions and add-on products. Troubleshooting topics for industry solutions and add-on products are visible only if that help plug-in is installed in IBM Knowledge Center.

## **Maximo Asset Management Multitenancy help package**

This help package contains a subset of the plug-ins in the Maximo Asset Management help package and the content is aimed at tenants in a multitenancy environment. You cannot install Maximo Asset Management plug-ins and Maximo Asset Management Multitenancy plug-ins in the same instance of IBM Knowledge Center environment. If you want to support both libraries, you must configure separate instances of IBM Knowledge Center to support them.

This help package includes the following plug-ins:

**com.ibm.mt.doc**

Navigation plug-in, containing the welcome page and product overview, and help topics for planning, getting started, and managing financial processes. Content also includes topics that are specific to a tenant in a multitenancy environment.

**com.ibm.mbs.doc**

Reuse plug-in. Topics are filtered to exclude information that is not relevant to tenants in a multitenancy environment.

**com.ibm.mif.doc**

Reuse plug-in. Topics are filtered to exclude information that is not relevant to tenants in a multitenancy environment.

## **Industry solution and add-on help packages**

The help packages for industry solutions and add-on products are intended for use with the associated version of the Maximo Asset Management help package. You can check which version of Maximo Asset Management or Maximo Asset Management is a prerequisite for an industry solution or add-on product version at <https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20Maximo%20Asset%20Management/page/Other%20Maximo%20products%20system%20requirements>. You can install non-recommended versions of help packages together but some links might not resolve or some of the features that are described in topics might not be available to users.



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## Chapter 3. Configuring initial data and options

After installation is complete, you configure initial data and options to prepare the product for your environment and business requirements.

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### Defining values in dynamic value lists (DVL)

A dynamic value list (DVL) contains configuration-managed (CM) values that are used as the predefined and selectable values for field lookups. A DVL is defined at the item set level. Fields that use a DVL record can display only the records that are in the associated item set.

#### Values in dynamic value lists (DVL)

You can create and manage configuration-managed (CM) value records and define the CM values that are included in a dynamic value list (DVL). A dynamic value list is a group of CM values that share the same type value.

The CM values that you add to a dynamic value list become the predefined and selectable values for field lookups. The selectable field lookup values are filtered according to the CM value types. The name of the CM value type typically identifies the field name for which the dynamic value list applies.

For example, a dynamic value list with a CM value type of SYMPTOMS contains a list of values that can help you to define the **Symptom** field value on an event record. You can track symptoms of events for an asset according to the detailed information that is on the CM value record that you have selected from the dynamic value list.

The CM value records that you create in the DVL Setup (CM) application can also include the following information that relates to the defined CM value type:

##### CM value findings

The information about the CM position code of a configuration management or label system. The CM value findings can also include the information about the zone, condition, and the disruption index for the CM position.

##### CM value applicability

The information about the series, or the model group and the specific model within a series. The selectable series and model values are filtered according to the selected CM position value. The CM value applicability can also include the information about the variation, build item, and CM item for the selected model.

#### How findings data is used with configuration-managed (CM) values

You can add findings data to a configuration-managed (CM) value record to define the CM position information that relates to the defined CM value type. The CM position is the code of the build position record that is associated with the dynamic value list record. The CM value findings can also include the information about the zone, condition, and the disruption index for the selected CM position.

The association between a CM position and a CM value is essential in capturing and tracking the detailed event information in the Events Management (CM) application. Event symptoms, failures, and actions can be tracked according to the defined CM position, series, and item information that you define on a CM value record.

For example, you can use the following CM value finding data to track the symptoms of a build position on an event record in the Events Management (CM) application:

- CM value - Engine problem
- Type - SYMPTOMS
- CM position - Engine
- Zone - Fan belt
- Condition - Used
- Disruption index - 1 (minor disruption)

### **Applicability values for configuration-managed (CM) values**

You can add applicability values to a configuration-managed (CM) value record to define the series and model information that relates to the defined CM value type. The CM value applicability values can also include the information about the variation, build item, and CM item for the selected model.

The association between the series, model information, and a CM value is essential in capturing and tracking the detailed event information in the Events Management (CM) application. Event symptoms, failures, and actions can be tracked according to the defined CM position, series, and item information that you define on a CM value record.

For example, you can use the following CM value applicability values to track the symptoms of a build position on an event record in the Events Management (CM) application:

- CM value - Electrical problem
- Type - SYMPTOMS
- CM position - 2410
- Series - Boeing
- Model - 757
- Variation - 200
- Build item - Battery
- CM item - 123456

## **Creating configuration-managed (CM) values**

You can create a configuration-managed (CM) value record to define the values that are part of a dynamic value list (DVL). The CM values and dynamic value lists that you create can be used throughout the product. The CM values that are on a dynamic value list become the selectable information for field lookups.

### **About this task**

The CM value records are stored at the item set level. The selectable field lookup values are filtered according to the CM value types. The name of the CM value type identifies the field name for which the dynamic value list applies.



The CM value records can also include the findings and applicability information that relate to the CM value type. The CM value findings define the information about the CM position code of a configuration management or label system. The CM value applicability defines the information about the series, or the model group and the specific model within a series.

### **Procedure**

1. In the DVL Setup (CM) application, click the **New DVL Setup** icon.
2. Specify values for the type, value, and description.
3. Save the record.

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## **Maintaining fleet definitions**

To effectively manage your assets, you can create fleet definitions, which group similar assets together for the purpose of managing and performing tasks, such as updating meters.

### **Fleet definitions**

To manage your business assets effectively, you can group your configuration-managed assets into logical groups called fleets and can define fleet attributes. For example, you can group all the rail cars on a particular line together and then update meter readings for the entire fleet.

You can add, view, modify, or delete fleet definitions. The following information can be included in a fleet definition:

- Fleet name
- Model
- Configuration
- Class
- Fleet meters
- Fleet attributes

### **Meter usage loads for fleets**

To simplify entering metadata, you can create and manage the meter usage loads of predefined fleets in the system. You can then view the fleets and their relevant meter records and can update the meter records in a single tab.

Before you use this application, you must create fleet definitions and optionally set default fleet meter types in the Fleet Management (CM) application.

After the fleet usage load record is created, it is in the Draft state. You can then enter meter readings on the Fleet Assets tab. After you have entered all of the meter readings, you can change the status of the record to Approved. All of your new meter readings are updated to the individual asset records that are included in the fleet.

## **Creating fleet definitions**

A fleet definition logically groups related assets for the purposes of meter reading entry and preventive maintenance tasks. This grouping of assets can be shared by model, variation, or asset attribute values. For example, you can create a fleet of aircraft engines to enable rapid entry of meter reading values in the Fleet Usage Load (CM) application.

## Before you begin

Before you create a fleet definition, you must set the asset attributes in the Models application (CM) and Asset Attributes Setup (CM) application.

### Procedure

1. In the Fleet Management (CM) application, on the toolbar, click the **New Fleet Management** icon.
2. Specify a unique identifier for the fleet.
3. Specify any other required information for the fleet.
4. Specify values for model and variation.
5. Optional: To provide specific attributes for an asset fleet, in the Fleet Definition Attributes table, add as many rows as required and select the values for the fields.
6. Optional: If you want to specify meters for the fleet, in the Fleet Utilization table, add as many rows as required and select the values for the fields. Each combination of utilization value and utilization by period must be unique.
7. Save the record.

### Updating fleet definitions

If you change the fleet definition and must have the changes updated immediately, you can evaluate the fleet definitions without waiting for the cron task. You can opt to evaluate all fleet definitions or only the current fleet definitions.

### Procedure

1. In the Fleet Management (CM) application, select a fleet definition record.
2. Update the fleet definitions:
  - To update only the active fleet definitions, from the **Select Action** menu, select **Evaluate Current Fleet Definition**
  - To update all fleet definitions, **Select Action** menu, select **Evaluate Fleet Definition**

### Scheduling the updating of fleet definitions

You can schedule and run a cron task to periodically check for any changes to all the fleets and the associated assets. For example, if you add a new meter to a fleet, the cron task identifies the new meter and adds it to all affected assets in the fleet. The cron task runs every three hours.

### Procedure

1. In the Cron Task Setup application, on the toolbar, click the **New Cron Task Definition** icon.
2. On the **Cron Task** tab, set the cron task name to "EvalFleets" and specify "Evaluate ALL Fleets" as the cron task description.
3. Set the class to `psdi.plusa.app.plusafleet.PlusACMEvaluateAllFleetsCronTask`.
4. Set the access level to FULL.
5. In the Cron Task Instances table, set the cron task instance name to "ALL Fleets".
6. Specify "3h,\*,\*0,\*,\*,\*,\*,\*,\*" as the schedule for the cron task instance.
7. Keep the default values for the **Run as User** field and the **Active** check box.
8. Save the record.

## Creating fleet usage loads

To simplify data entry and manage assets in a highly regulated industry, you can create fleet usage load records to manage the meter life usage of asset fleets. After you create a fleet usage load record, you can then update meters for the entire fleet using a single tab in the application.

### Before you begin

Before you create fleet usage loads, you must create fleet definitions in the Fleet Management (CM) application.

### Procedure

1. In the Fleet Usage Load (CM) application, click the **New Fleet Usage Load** icon.
2. Select the fleet name.
3. If you did not set default fleet values in the Fleet Management (CM) application, specify the values for the **Meter 1**, **Meter 2**, **Reading Type 1**, and **Reading Type 2** fields.
4. Save the record.

---

## Setting up asset attributes

Asset attributes records define the status of an asset in relation to its meter life use and configuration on a specified date. You use the Asset Attributes (CM) application to create asset attribute set up records.

### Asset attribute records

You can create user-defined attributes for assets to record and maintain a history of attribute changes over the life of an asset. Each time the attribute value is changed, the date and time of the change is recorded. You can also choose to record a meter count when an attribute value is changed.

You create and manage attributes and their associated values for an asset. You can also determine whether all the child asset records inherit the asset attribute values that are associated to a parent asset record.

When an attribute change is saved, all previously defined values for the selected attribute are recorded for future reference and analysis. You associate the attribute values and attribute changes to an asset in the Asset Attributes (CM) application.

### Creating asset attribute setup records

An asset attribute setup record defines asset attributes and their associated values. You use asset attributes to define the status of an asset in relation to its meter life use and configuration on a specified date.

### Procedure

1. In the Asset Attributes Setup (CM) application, click **New Asset Attributes Setup**.
2. Specify a name and description for the asset attribute.
3. Optional: Specify a site or an organization. You can define an asset attribute record at the system, organization, or site level. If you specify a site, the value for the organization is automatically specified.

4. Optional: If you do not want child assets to inherit the asset attribute values that are associated with an asset record, clear the **Overwrite Subs** check box.
5. Optional: If you want the asset attribute record to be replicated in the target site when an asset is transferred to that site, select the **Transfer on Site Move** check box. An asset attribute record is transferred to the target site only both the attribute and attribute value are valid in the target site. For example, an asset attribute record is defined at the site level in the BEDFORD site. If you transfer the asset to the NASHUA site, the asset attribute cannot be replicated in the NASHUA site.
6. In the Asset Values table, add a row and specify a value for the asset attribute.
7. Optional: Specify whether the attribute value is visible for selection in the Asset Attributes(CM) application.
8. Optional: Specify whether the attribute value is used as the default attribute setup value.
9. Specify values for associated values that are used in reporting.
10. Save the record.

---

## Configuring model options for organizations

When you create models for configuration-managed assets, you specify values such as the label system and meters. Configure this data before you start defining models.

### Procedure

1. In the Organizations (CM) application, select an organization and then select the **CM Options** action.
2. In the CM Options window, specify the default label system that you plan to use.
3. Optional: Select the following check boxes if you want to enable that functionality:
  - a. **Record Meter Offsets**
  - b. **Update Asset Location on Installation.**
  - c. **Manage Fuel, Replenishments, and Munitions in the Inventory Applications**
4. Click **OK**.
5. Select the **System Settings** action.
6. In the System Settings window, specify whether configuration-managed PMs are included in Maximo Asset Management Scheduler and whether warnings are displayed when configuration-managed PMs are rescheduled by Maximo Asset Management Scheduler.
7. Click **OK**.

---

## Configuring validation options for models

The build data interpreter (BDI) service validates operational changes to configuration-managed assets against the reference data and rules that are defined for the associated model. After you install the BDI service, you configure it for your environment.

## Build data interpreter service

The build data interpreter (BDI) service provides multithreaded support to manage synchronous and asynchronous validation requests.

### Service threads

The BDI service includes the following threads:

#### daemon thread

Monitors and controls active configuration-managed components.

#### monitor thread

Periodically processes transactions in a queue that is stored in the PLUSAANTRAN table in the Maximo database.

#### VREX thread

Periodically processes the entire fleet of end items, in a way that is similar to cron task processing.

### Service cache

The BDI service stores records in a cache to speed retrieval and performance. You can configure a cache mode setting that controls whether the BDI service uses existing files from the cache or rebuilds files from the Maximo database. The cache can operate in any of the following modes:

#### normal-cache mode

The service uses existing cache files that were built and maintained when the service was last run. If no existing cache files exist, the service builds them incrementally.

#### rebuild-cache mode

The service deletes any existing cache files and starts rebuilding its cache from the Maximo database. Depending on the size of the database, a full rebuild can take a long time.

#### quick-start mode

The service deletes any existing cache files and rebuilds its cache files from the Maximo database. In quick-start mode, the service rebuilds the deleted files incrementally.

When the service starts in rebuild-cache mode, if the Maximo database is small, the BDI service takes a few minutes to start. If the Maximo database is large, for example, during performance testing, the service can take hours or days to start. For testing purposes, you can use a filter to reduce the number of records that are loaded into the cache when the service starts. For example, if you set the *v8-cache-filter* initialization variable to ABC%, only asset records with an asset number that starts with ABC are loaded into the cache.

### BDI service command line interface example

A command line interface, which is located at *<install\_home>\v8\vex.cmd*, provides access to the service for administration and testing. The following example shows how to perform a status validation check:

1. Enter 1 to connect to the BDI service.
2. Enter VR to show responses.
3. To validate the current configuration, enter VC:9999, where 9999 is the ID of an end item asset.

4. Enter VL:9999;1;2 where 1 is a configuration ID and 2 is a revision number.
5. Enter VL:9999;3/4;5 where 3 and 4 are other configuration IDs and 5 is a revision number. The VL command validates a list and you can add an unlimited number of configuration IDs to the list.
6. Enter VU to run the BDI service in update mode.
7. Enter x to disconnect from the BDI service.

## Configuring the validation service

You configure the build data interpreter (BDI) utility to run as a service in your environment. The service monitors and validates the status of configuration-managed assets and supports synchronous and asynchronous validation requests.

### About this task

During installation, the database values for the service are configured in a service initialization file, and other default values are set. You can review and modify the service configuration values that are in the initialization file.

### Procedure

1. In a text editor, open the `<install_home>/v8.ini` file.
2. Configure the *service-address* variable to use the location where the service is hosted. The service client can be located anywhere on the network and uses this value to connect to the host.
3. Optional: If you do not want to use the default port number of 1608, configure the *service-listener-port* variable.
4. Configure the *socket-timeout-secs* variable to the number of seconds of inactivity on an established connection before the connection times out. If you do not specify a value, the default value of 180 seconds is used. Test messages that are sent by the service client are not considered to be an activity when determining when the connection times out.
5. Configure the frequency at which threads are processed.

Option	Description
<i>daemon-pulse-secs</i>	The number of seconds that elapse between the sending of daemon thread pulse messages. If you do not specify a value, the default value of 60 seconds is used.
<i>monitor-pulse-secs</i>	The number of seconds that elapse between the sending of monitor thread pulse messages. If you do not specify a value, the default value of 60 seconds is used.
<i>vrex-pulse-mins</i>	The number of minutes that elapse after the VREX thread processes all end items before the VREX thread runs again. If you do not specify a value, the default value of 60 minutes is used.

6. Configure the cache mode.
7. To apply these changes to the initialization file, stop the BDI service and restart it.

## Configuring a start center portlet to display BDI information

You use the Result Set portlet to define that assets must be displayed with the BDI color coding, BDI status value, date and time.

## Procedure

1. Add the **ACM Result Set** portlet to the Start Center.
2. On the portlet setup, select the **BDI\_ASSETS** query.
3. On the **Column Display** tab, select the columns you want the portlet to display. You have to select the **PLUSARBDICOLOR** column to display the assets with the BDI color coding.
4. Save the setup.





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## Chapter 4. Setting restrictions on records

You can use the Security Groups application to set restrictions on who can view records, such as assets or models. For example, you can limit the viewing of models to the technical and maintenance personnel.

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### Specifying restrictions for user groups

You can restrict the access of users to assets, related records, and models, by setting restrictions for user groups based on the user group type or asset attributes.

#### Before you begin

To restrict access based on an asset attribute or to restrict access to models, the **Security Restriction** check box for the attribute or model must be selected in the Asset Attributes Setup (CM) application.

#### Procedure

1. In the Security Groups (CM) application, on the **List** tab, select a user group.
2. On the **ACM Restrictions** tab, in the Asset Attribute Restrictions table, specify attributes and values to allow the user group access to assets with these attributes and values.
3. In the Model Restrictions table, specify the models that the user group can access.
4. In the Entity Restrictions table, define an SQL statement.
5. Save the user group.



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## Chapter 5. Planning for regulatory compliance

Maintenance activities on complex assets are highly-regulated and must comply with the standards set down for their industry. In Maximo Asset Configuration Manager, you can configure scheduled maintenance programs that are compliant with Manufacturing Steer Group (MSG-3) standards, define operator maintenance programs and import manufacturer maintenance planning documents, and design progressive inspection programs and create technical records.

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### MSG-3 compliance

Maintenance Steering Group-3 (MSG-3) is a standard for developing scheduled maintenance tasks and intervals that are acceptable to regulatory authorities, operators, and manufacturers. The MSG-3 standard outlines the general organization and decision processes for the efficient scheduling of maintenance for an aircraft or powerplant.

### MSG-3 inspections

Scheduled maintenance includes inspections that are designed to detect damage or potential points of failure on an aircraft. MSG-3 compliance also involves the identification of parts that are important to the maintenance or structural integrity of the aircraft.

#### MSG-3 inspection types

The MSG-3 domain defines the MSG-3 inspection types. You can modify the inspection types to meet the requirements of your organization. You select the MSG-3 inspection type on PM records, master PM records, job plans, and work orders. The following MSG-3 inspection types are defined by default:

##### **Lubrication-Servicing (LU-SV)**

A group of maintenance tasks that involve lubricating or servicing an item. These tasks are designed to maintain the safety and reliability of the aircraft.

##### **Operational-Visual Check (OP-VC)**

A visual check to observe an item and determine whether the item is fulfilling its intended purpose.

##### **Inspection-Functional Check**

A quantitative check to determine whether an item is performing within specified limits.

##### **General visual inspection (GVI)**

A visual examination of an interior area, exterior area, installation, or assembly to detect obvious damage, failure, or irregularity. A general visual inspection typically is made under the normally available lighting conditions. The inspection might require the use of stands, ladders, or platforms to reach the area that is under inspection.

##### **Detailed inspection (DET)**

An intensive examination of a specific item, installation, or assembly to detect damage, failure, or irregularity. The inspection typically involves more lighting sources. Surface cleaning or elaborate access procedures might also be required.

**Special detailed inspection (SDI)**

An intensive examination that involves the extensive use of specialized inspection techniques or equipment. Intricate cleaning, substantial access, or disassembly procedures might also be required.

**Restoration**

The work that is required to return an item to a serviceable standard. For example, an engine part might require a thorough cleaning.

**Discard**

The removal of an item after it reaches a specified limit. For example, an engine part might be discarded after 1000 flight hours.

**MSG-3 inspection details**

Some MSG-3 fields are specific to a position on a model. The following position-specific fields can be applied in the Models application, New Asset Assemblies application, New Asset Assemblies - Receiving application, Master PMs (CM) application, Preventive Maintenance (CM) application, Job Plans (CM) application, Work Order Tracking (CM) application, and the Assets (CM) application.

**Maintenance significant item (MSI)**

An item whose failure might have serious consequences for the safety and operation of the aircraft.

**Structurally significant item (SSI)**

A detail, element, or assembly that contributes significantly to carrying flight, ground, pressure, or control loads. The failure of a structurally significant item might affect the structural integrity that is necessary for the safety of the aircraft.

The following MSG-3 information is specified on PM records, master PM records, job plans, and work orders to indicate details that are important for the performance of maintenance activities on the aircraft:

**Access defined inspections**

Indicates whether significant removal or displacement procedures are necessary to complete the maintenance task. Knowing whether access is required to complete a maintenance task allows for more efficient scheduling of maintenance. For example, a scheduled maintenance task requires the removal of an engine. You can schedule the task to coincide with regularly scheduled quarterly maintenance in which the engine is removed as part of the procedure.

**Corrosion prevention and control programs (CPCP)**

A routine collection of maintenance tasks that maintain the resistance of an aircraft to corrosion caused by age and chemical or environmental interaction.

**Maintenance effects**

Indicates the primary aim of the maintenance: safety, operational, or environmental. The list of values is stored in the Maintenance Effects Type domain and can be modified to meet the requirements of your organization.

**Zonal inspections**

An inspection method that is used to inspect structurally significant items (SSI). You can create and maintain zonal inspection programs in the Zones application.

## Scenario: Managing the maintenance of an engine in accordance with the MSG-3 standard

ABC Airline takes delivery of a new aircraft whose engine is scheduled for maintenance in accordance with the MSG-3 standard. The process of MSG-3 compliance includes defining model data, confirming details for the new asset assembly, and creating master PM records for the maintenance tasks.

### Background

ABC Airline plans to maintain the engine of a new aircraft in accordance with the MSG-3 standard. Carlos, the planning engineer, is responsible for defining the maintenance requirements and creating the associated records for master PMs and job plans.

### Step 1: Define the MSG-3 compliance in the model data

In the Models application, Carlos creates a new record for the engine and selects the **MSG-3** check box. On the **Build Hierarchy and Position Rules** tab, Carlos defines the build items and selects the items that are structurally significant or significant for maintenance. Carlos uses the Zones application to indicate which zones are associated with the inspection.

### Step 2: Create master PM records to define the maintenance tasks that are associated with MSG-3 compliance

In the Master PM application, Carlos creates master PM records to define the routine maintenance that is required for the engine to operate efficiently. The master PM record is associated with the CM item master record for the engine. One of the master PM records that Carlos creates is for a detailed inspection of the engine to check for signs of corrosion. After he specifies the general information for the master PM record, Carlos selects the **MSG-3** check box to see the fields that are related to MSG-3 compliance.

Carlos indicates that this position in the model is significant maintenance that it is related to a corrosion prevention and control program. Because the inspection requires the removal and disassembly of the engine, Carlos selects the **Access** check box. Carlos uses the Zones application to select the applicable engine zones. Carlos indicates that the inspection is a special detailed inspection and that the inspection has an operational effect.

Carlos adds a job plan to the master PM records so that the job plan is automatically copied to all the associated PM records. The PM records are created by the Build Data Interpreter (BDI) when the assets are created. Alternatively, Carlos can choose to create the associated PM records by clicking the **Create Associated PMs** action.

### Step 3: Confirm the MSG-3 details in the new asset assembly data

In the New Asset Assemblies application, Carlos creates an asset assembly record for the engine. When he specifies the model, the MSG-3 compliance fields are automatically completed with the data that he defined for the new engine. Carlos confirms that the details are correct, and then he clicks the **Create Asset** action to create the asset record for the new engine.

## Results

The PM records that Carlos created are available for the maintenance supervisor to assign. When the work is due, the work orders are automatically created by the BDI. The maintenance supervisor then assigns the work orders to qualified maintenance crew members for completion.

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## Managing regulatory requirements with progressive inspection programs

A progressive inspection program (PIP), which is also known as fixed-frequency maintenance, involves creating a maintenance program that is based on a fixed schedule. The schedule can be based on regulatory requirements.

### Defining progressive inspection programs

A progressive inspection program (PIP) is defined by the creation of a group of master PM records that are linked together and are based on a fixed frequency, such as an interval of 50 flight hours. The PIP is a cycle that repeats after the last master PM record is completed.

#### About this task

A PIP is typically used to divide a large inspection into several smaller pieces of work. For example, an annual inspection might require you to ground an aircraft for two weeks to complete all of the work. Instead of performing the annual inspection once a year, you can divide the inspection into six phases, each of which is due after 300 hours.

When a master PM record is created in a PIP group, any associated PM records automatically inherit the settings for the PIP. If your maintenance program applies only to a single asset, you can define your PIP in preventive maintenance (PM) records instead of in master PM records. The process of defining a PIP in PM records is the same as defining a PIP in master PM records.

You can define a PIP for meter-based frequencies and configuration-managed assets only.

#### Procedure

1. In the Master PMs (CM) application, create a master PM record.
2. Specify the fields that are required for the master PM record.
3. In the PIP Information section, select the **Fixed Frequency** check box.
4. Specify a name for the PIP group.
5. Specify the sequence number.
6. Click the **Frequency** tab, and on the **Meter Based Frequency** tab, specify the frequency, alert, and warning details. The frequency units value for each PM in the PIP sequence must be the same. For example, you can specify a frequency of 50 flight hours, an alert at 48 flight hours, and a warning at 45 flight hours.
7. Optional: On the **Sequence** tab, specify the job plan that is used for completing the tasks for this phase of the PIP. Assigning a job plan to each master PM in a PIP ensures that the work is divided throughout the inspection program.

8. Create as many master PM records as your PIP requires. For example, if your PIP consists of six phases, you create five duplicate master PM records.
  - a. Select the **Duplicate Master PM** action. The PIP information is copied, and the PIP sequence number is automatically updated with the next number in the sequence. The frequency information on the **Meter Based Frequency** tab is the copied.
  - b. Optional: On the **Sequence** tab, change the job plan.
9. Link each master PM record in the PIP group to the next master PM record in the sequence.
  - a. Open a master PM in the PIP group.
  - b. In the master PM Actions section, add a deactivate action. Set the secondary master PM record to the identification number of the current master PM. When the associated work order is completed, the master PM record is deactivated. This deactivation completes this phase of the PIP.
  - c. In the master PM Actions section, add an activate action. Set the secondary master PM record to the identification number of the next master PM record in the PIP sequence. When the associated work order is completed and the original master PM record is deactivated, the next master PM record in the PIP group is activated. This activation moves the PIP to the next phase of inspection.
10. Save the record.

## Progressive inspection programs

In a progressive inspection program (PIP), aircraft maintenance is divided into phases and occurs at fixed intervals. For example, an aircraft requires a maintenance inspection is completed every 300 hours. Instead of completing the entire inspection at 300 hours, the tasks are divided into six inspections that are completed consecutively at intervals of 50 flight hours.

You create a master PM for each phase of your PIP. The master PM records are collectively known as your PIP group and share a PIP group name. The PIP sequence number identifies the order in which the master PM records are completed. For each master PM record, you specify the frequency at which the inspection occurs, such as every 50 flight hours. After you create a master PM record, you can specify a job plan to define the tasks that are created during the phase of the PIP.

After you create all the master PM records for your PIP, you link the records together with activation and deactivation actions. These actions ensure that only one master PM record is active at a time. After the work orders that are associated with a master PM record are completed, fixed frequency count for the master PM is increased by one, and the next master PM record in the sequence is activated. This process continues until the last master PM record, and the PIP starts over with the first master PM record.

Defining the PIP in master PM records is an efficient method of developing the maintenance program. However, if your maintenance program applies only to a single asset, you can define your PIP in preventive maintenance (PM) records instead. The process of defining a PIP in PM records is the same as defining a PIP in master PM records.

When you create a PIP for a new aircraft or a new inspection process, you are able to start the PIP with the first master PM record in the PIP group. However, you might add a PIP that is already in progress. For example, you divide a

maintenance inspection into a PIP that consists of six inspections that are completed every 50 hours. The first two phases of the inspection are already completed before you add the aircraft and the PIP to Maximo Asset Configuration Manager. You must define the entire PIP and then set the fixed frequency counters for the first two master PM records to 1 to indicate that those phases of the PIP are already complete.

## Resetting initial PIP due counts

The initial PIP due count is used to determine when the first maintenance event is due. Subsequent maintenance events for the same PM record are then offset by the initial PIP due count. You might need to reset the initial PIP due count at any point during the aircraft lifecycle.

### About this task

Only one PM record can be active in a PIP at any time.

### Procedure

1. In the **List** tab of the Assets (CM) application, select the asset whose initial PIP due count you want to change.
2. Click the **Maintenance Plan** tab and select the **Set Initial PIP Due Count** icon, which is located next to the PIP group in the table row.
3. Specify the new initial PIP due count.
4. Save the record.

### Results

The initial PIP due count is changed, which changes the PM record that is next due. For example, if you set the initial PIP due count to 2, the next PM record that is due is the 3rd record in the sequence.

## Resetting fixed frequency counters

When a preventive maintenance (PM) record in a PIP cycle is reset because the associated work order is complete, the next due point is always the point that is specified by the PIP sequence. However, you might need to reset the PIP sequence by using the **Set Fixed Frequency Counter** action in the associated PM record.

### Before you begin

By default, the **Set Fixed Frequency Counter** action is not available. You must enable the action in the Security Groups (CM) application.

### About this task

Only one PM record can be active in a PIP at any time.

### Procedure

1. In the **List** tab of the Assets (CM) application, select the asset whose PIP you want to change.
2. In the **Maintenance Plan** tab, open the associated PM record.
3. Select the **Set Fixed Frequency Counter** action and specify the new fixed frequency count. For example, you define a PIP that is already in its third



phase. You must increase the fixed frequency counters for the first two PM records by 1 to indicate that the records were completed.

4. Save the record.

## Results

On the PM record, the **Fixed Frequency Count** field indicates the number of times that the work orders associated with the master PM are completed.

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## Creating technical records

Technical records generate critical time-dependent maintenance or design change tasks that typically apply to an entire fleet. Technical records can affect asset configurations, maintenance plans, and other reference data for a specific set of assets in one or more models.

### Technical records

Technical records contain information, such as airworthiness directives or customer service notices, from vendors, manufacturers, and regulatory agencies. Technical records can trigger maintenance events and affect work planning forecasts.

The Technical Records (CM) application stores technical records from manufacturers, vendors, regulatory agencies, and others. Technical records can have complex criteria to define which assets they affect. The Technical Records (CM) application tracks the following information:

- Identifying details
- Affected asset
- Maintenance plans, which include preventive maintenance (PM) records and job plans for implementing work requirements
- Status or method of compliance of each affected asset
- Related technical records

When you create a technical record, you can specify whether an upgrade is applied to multiple assets. Typically, software items are updated in this manner. You can upgrade all the software within the top-level asset at the same time, including the child assets that are in build positions that are defined on the technical record.

Multiple maintenance plans, each with an associated job plan, can be created for a technical record. Each maintenance plan is used to create a PM record for each affected asset. The PM records are used to create work orders to implement the requirements of the technical record. When you specify a maintenance plan for a technical record, you can optionally select to automatically complete all associated maintenance plans. By using this option, when any individual work order is completed, all PM records that are generated from the technical record for a particular asset are automatically completed. If you choose not to automatically complete all associated maintenance plans, you avoid deactivating associated maintenance plans, and each PM record work order must be completed individually. You can also select to complete all associated maintenance plans before the method of compliance is reported for each of the associated asset.

When you specify a maintenance plan for a technical record, you can define a range of frequency iterations so that regulatory compliance is maintained. A frequency iteration defines how many times inspections are completed to comply with the requirements of the technical record.

On the **Maintenance Plan** tab, you can define and view frequency iterations by clicking **Frequency Iterations**. When you create a frequency iteration, you can specify whether the PM record is deactivated when the last frequency iteration is completed. You can change whether the PM record is deactivated only during the last frequency iteration. If you add iterations during the last iteration, the check box for deactivated the PM records after the last frequency iteration is set to read-only.

A frequency iteration can be time-based or meter-based. You have flexibility in defining a frequency iteration, and iterations can occur at different intervals. For example, you can define a frequency iteration that consists of three meter-based iterations: the first inspection occurs every 10,000 miles for two iterations. The second inspection occurs at 25,000 miles for three iterations, and the third inspection occurs at every 50,000 miles. You can also define alert and warning intervals for each frequency iteration.

- The first and second inspections occurs after 10,000 miles each
- The third inspections occur after 25,000 miles

Technical records include the following types of records from manufacturers, vendors, and regulatory agencies:

- Airworthiness directives
- Configuration rule-change documentation
- Customer service notices
- Engineering and design publications
- Fleet-level and component-level projects

Technical records are managed at the item set level because technical records are associated with models and configuration-managed items. When you create a technical record, you can specify an organization and a site to further limit the applicability of the technical record. For example, you can opt not to specify the site and organization so that the technical record applies to the entire item set. If the technical record applies only to the assets that are stored at a single site, you can specify that site so that the technical record has limited applicability.

You can add a terminating action to a technical record. A terminating action defines a condition that is required in order for a recurring inspection to be terminated, for example, a certain level of physical wear is recorded. Terminating actions are useful because not every requirement in a technical record can be reduced to a series of programmable statements. Terminating records ensure compliance with the requirements of the technical record.

You can track design changes and requirements by relating technical records. A related technical record can provide information, define a relationship that requires action when maintenance events occur, or define a relationship to a modification record. Relating a technical record to a modification record creates a complete record of the engineering design standard.

You can edit some attributes of an active technical record to ensure that the applicability and embodiment processes accurately define the requirements of the technical record. Before you edit an active technical record, assess the impact of your planned changes. Changes to an active technical record can require manual updates to PM records or work orders that are associated with the technical record. For example, you update the item number or serial range of an applicable asset that was already embodied. If the updated item number means that the asset is no

longer applicable, you must manually change the embodiment status of the asset to not applicable. Similarly, if you update an interval or threshold on a maintenance plan that is associated with a technical record, you must manually update the associated PM records.

You can use the **Edit Technical Record** action to edit an active technical record. When you select the **Edit Technical Record** action, you can edit build items, item numbers, serial ranges, and models. You can also add maintenance plans that are associated with the technical record. You can delete maintenance plans only if they have not generated any PM records. If a maintenance plan has generated PM records, you can select the **Deactivate PM** check box on the **Maintenance Plan** tab to change the status of all associated PM records to inactive. On the **Technical Record** tab, clear the **Create PMs** check box to prevent PM records from being automatically created for assets that are associated with an active technical record.

To make technical changes to other attributes of a technical record, create a superseding record and specify the superseding publication and the supersedence date on the original technical record.

Enterprises typically must maintain and report the status of their technical records to external regulatory agencies.

## Examples of using technical records

The records department of your enterprise receives a new bulletin, directive, notice, or other type of publication. This publication might come from a manufacturer, vendor, regulatory body, or another authorized department in the enterprise. You create a technical record to document the new information and attach any supporting electronic documentation. You establish criteria to identify the assets that are affected by the technical record. Criteria can include position, part number, serial number range, models, or configurations of models. You can create initial PM records, job plans, and possibly follow-up PM records that establish work requirements. You can also enter PM actions to define the interaction among PM records. Other technical records might deactivate the PMs.

If your records department receives a new bulletin, directive, notice, or other publication that supersedes an existing technical record. You define the superseding technical record. Then, you open the superseded technical record and change it to point to the superseding technical record. The status of the superseded technical record is changed from Active to Superseded.

Your enterprise receives a new asset and decides that it is a configuration-managed asset. You create an asset record for it and designate it as configuration-managed. The build data interpreter identifies the technical records that the new asset must comply with PMs and any work orders that are necessary to initiate the compliance process are generated for any technical records that the new asset must comply with.

A regulatory body or an internal audit department notifies your enterprise that it plans to investigate the incorporation status of one or more technical records. You create a report to identify the compliance of assets that are associated with the applicable technical records.

## Technical record statuses

A technical record can have a status of Draft, Active, Inactive, or Superseded.

Table 8. Technical record statuses

Status	Description	Updates	Deletion	Status changes
Draft	The technical record is incomplete.	Can only update fields in the Details section.	Allowed.	Can change to Active.
Active	The technical record is complete. Associated PMs, schedules, and work orders are generated and tracked.	Can update fields in the Superseded By section of the <b>Technical Record</b> tab.  Members of a security group that enables the <b>Edit Technical Record</b> action can make minor edits, such as to correct a spelling.	Not allowed.	Can change status to Inactive.  When an authorized user edits a technical record, the status does not change. A new row is added to the <b>View Status History</b> window that records the reason the user provided for making the changes.
Inactive	The technical record is not complete and is not tracked.	Cannot be updated.	Allowed.	Can change to Active.
Superseded	Another technical record replaced the original record. The original technical record is obsolete.	Can update the <b>Superseding Publication</b> and <b>Supersedence Date</b> fields on the <b>Technical Record</b> tab.	Allowed.	Cannot change a status to Superseded manually. The status is changed to Superseded automatically when you supersede a record on the <b>Technical Record</b> tab.

## Creating technical records

A technical record identifies and tracks the technical specifications, affected assets, work requirements, and related preventive maintenance (PMs).

### Procedure

1. In the Technical Records (CM) application, click the **New Technical Record** icon.
2. If the **Publication** field is empty, enter a value.
3. Enter a description in the **Title** field.
4. If the item number of multiple asset records are to be updated when work is completed, select the **Apply Multiple Upgrades** check box.

5. Optional: To limit the applicability of the technical record, specify an organization or site.
6. Specify values for the **Type** field and the **Required By** field.
7. Enter the date when the technical record takes effect.
8. In the **Revision**, **Chapter**, **Paragraph**, and **Part** fields, enter values that correspond to the original document. The combination of these values must be unique to this technical record.
9. Optional: In the **Narrative** field, enter the details for the technical record. For example, you can add the following details to the field:
  - Objectives of the technical record
  - Requirements
  - Asset selection criteria
  - Effective date
  - Conditions when corrective action is necessary
  - Details of the work that is necessary
  - Termination conditions
10. If you use maintenance plans, on the Maintenance Plans tab, specify completion details:

Option	Description
To complete all preventive maintenance (PMs) when the technical record is complete	Select the <b>Complete Associated Maintenance Plans</b> checkbox.
To complete all maintenance plans before the method of compliance is reported	Select the <b>Complete All Maintenance Plans Before Method of Compliance</b> checkbox.

11. Save the technical record.

## Adding affected models and serial numbers

Because technical records can require corrective action, you can identify models and serial numbers affected by a technical record, if the status of the technical record is Draft. The build data interpreter (BDI) uses the model and serial number criteria to identify affected assets.

### Procedure

1. In the Technical Records (CM) application, select the technical record for which you want to identify affected models.
2. On the **Models** tab, click **Auto Create**.
3. Optional: To change the serial range in an existing row, update the **Serial Range Expression** field.
4. Optional: To add another model or serial range expression, duplicate the row.
5. Optional: Delete any unnecessary rows.
6. Save the technical record.

## Adding affected build items

Because technical records can require corrective action, you can add build items that are affected by a technical record. The build data interpreter (BDI) uses the build item criteria to identify affected assets that are associated with the build item. If the status of the technical record is Draft, you can add the build item criteria.

## Procedure

1. In the Technical Records (CM) application, select the technical record for which you want to identify affected build items.
2. On the **Build Items** tab, add a new row and enter a position name.
3. Optional: In the **Operative Date** field, enter the date when tracking of the build item begins.
4. Optional: In the **Mandatory Date** field, enter the date when tracking of the build item must begin. You can extend the mandatory date by entering the number of days deferred in the **Auto Deferral** field.
5. Optional: In the **Inoperative Date** field, enter the date when the build position becomes inoperative.
6. Save the technical record.

## Adding affected build positions

Because technical records can require corrective action, you can identify the build positions that are affected by a technical record. Build positions identify a model, configuration, build position, and CM item. The build data interpreter (BDI) uses the build position criteria to identify affected assets.

## Before you begin

The **Build Positions** tab displays build positions associated with the criteria that you identified on the **CM Items** tab or **Build Items** tab. Before you identify build positions, save updates to the **CM Items** or **Build Items** tab.

## Procedure

1. In the Technical Records (CM) application, select the technical record for which you want to identify affected build positions.
2. On the **Build Positions** tab, add new rows or click **Auto Create** to automatically create rows based on the data on the **CM Items** tab or **Build Items** tab.
3. Optional: Update the values in the existing rows.
4. Optional: Add model or serial range expression.
5. Optional: Delete any unnecessary rows.
6. Save the technical record.

## Adding affected CM items

Because technical records can require corrective action, you can specify configuration-managed (CM) items that are affected by the record, if the record is in Draft status. For example, you can add a CM item that must be removed from production assets because of the technical record.

## About this task

You can specify an individual CM item or a range of CM items for which the record is effective. Valid CM item ranges include a comma, a two-dot ellipsis, or a combination of commas and ellipses. The following examples are all valid CM item ranges:

- A1000..A1999
- A1000,B100,C100
- A1000,B100,C100 A1000..A1999,B100,C100

If you specify a CM item range, the format is validated by the build data interpreter (BDI) service. The BDI uses the CM item information to identify the assets that are affected by the technical record.

### Procedure

1. In the Technical Records (CM) application, select the technical record for which you want to identify affected CM items.
2. On the CM Items tab, add a new row and enter a CM item or a CM item range.
3. Optional: In the **Serial Range Expression** field, enter one or more serial numbers or ranges of serial numbers.
4. Optional: In the **Inoperative Date** field, enter the date that the CM item becomes inactive.
5. Optional: To supersede the CM item, specify the superseding CM item number.
6. Optional: In the **Operative Date** field, enter the date when the superseding CM item becomes effective.
7. If you plan to rework a superseded CM item to create the superseding CM item and you want to update affected assets to point to the superseding item, select the **Upgrade** check box.
8. Save the technical record.

### Creating associated preventive maintenance (PM) records

A preventive maintenance (PM) can be associated with an active technical record. A cron task constantly checks for readiness to create PM records. You can also generate PMs immediately to schedule the work that a technical record requires.

### Procedure

1. In the Technical Records (CM) application, select the technical record for which you want to create associated PMs.
2. Select the **Create Associated PMs** to view the affected assets for which you have not created an associated PM.
3. Select the assets for which you want to create associated PMs.
4. Click **OK** to generate associated PMs for the selected assets.

### Superseding technical records

You supersede a technical record to replace it with a new technical record, due to a change in requirements. After you define the new technical record, you update the original record with information about the new record. The status of both technical records must be Active.

### About this task

You do not supersede a technical record to make minor changes that do not affect the technical requirements. To make minor, non-technical updates, you select the **Edit Technical Record** action.

### Procedure

1. In the Technical Records (CM) application, create a technical record for the superseding publication.
2. Change the status of the technical record to Active.
3. On the **Technical Record** tab, select the older technical record.
4. In the Superseded By table, enter the supersedence date.

5. In the **Publication** field, specify the identifier of the superseding technical record that you created.
6. Save the technical record. The status of the original technical record is changed to Superseded. A relationship of type SUPER is created between the superseded and superseding technical records. Any associated PMs without work orders are removed.

### Removing references to superseding technical records

When you want to reactivate a superseded technical record, you remove the reference to the superseding technical record. Removing the reference does not delete the superseding technical record.

#### Procedure

1. In the Technical Records (CM) application, select the superseded technical record.
2. In the Superseded By table, clear the **Publication** field.
3. Save the technical record. The record is saved with a status of Active.

### Specifying maintenance plan requirements

Maintenance plans are used to correct issues identified by technical records. Maintenance plans can be date-based, meter-based, or maintenance-event-based. A maintenance plan can generate multiple PM records or can indicate limitation on assets based on usage criteria. For example, an asset with fewer than 500 hours can require maintenance within 200 hours.

#### About this task

You can specify up to three meters per maintenance plan.

#### Procedure

1. In the Technical Records (CM) application, display the technical record for which you want to enter maintenance requirements.
2. On the Maintenance Plan tab, add a new row.
3. To enter date-based criteria, enter dates for when the work requirements are tracked and when the work requirements must be completed.
4. To enter meter-based criteria, enter a meter name and do one or more of the following:
  - To specify that maintenance is required within a specific number of flight hours, engine cycles, or engine starts, enter the number in the **Count** field.
  - To specify that maintenance is required when the selected meter reaches a specific reading, specify the reading in the **Count** field and specify a date in the **Reference Date** field.
  - To specify that maintenance is required only on assets with a meter reading greater than a specific value, enter the value+1 in the **From Count** field.
  - To specify that maintenance is required when the meter reading falls between two values, enter the values in the **From Count** field and the **To Count** field.
5. In the **Serial Range Expression** field, specify one or more serial numbers that are associated with the maintenance plan.
6. If the maintenance plans must be completed in sequence, specify the sequence in the **Sequence** field.



7. If the maintenance plan is activated by another maintenance plan or record, specify the maintenance plan or record details in the **Activated by Record** field or **Activated by Maintenance Plan** field.
8. If you want the maintenance plan to recur, select the **Recurring** check box.
9. To perform the required maintenance for a scheduled PM, enter the PM number in the **Due Master PM** field.
10. To enter asset limitations, enter a value in the **Limit Meter** field.
  - In the **From Count** field, enter the minimum meter reading to which the date-based, meter-based, or maintenance-event-based criteria apply.
  - In the **To Count** field, enter the maximum meter reading to which the date-based, meter-based, or maintenance-event-based criteria apply.
11. Save the record.

## Specifying methods of compliance

Many highly regulated industries require the tracking and compliance of technical records. You can specify the method of compliance (MOC) for an asset that does not require maintenance.

### About this task

You can specify methods of compliance for applicable and non-applicable asset records. A non-applicable asset record shares a build item or item number with a mandatory technical record. But, the record does not need to comply with the technical record, because it does not share other information with the technical record such as a serial number or modification status.

When a mandatory technical record is received, you can create a maintenance plan for each instruction in the technical record so that the technical record can be completely embodied by the asset. However, some assets that are included in the affected model might not need to comply with one or more of the maintenance plans. If this situation occurs, you must specify a justification for the non-compliant assets.

### Procedure

1. In the Technical Records (CM) application, display the technical record that you want to update.
2. On the **Asset Status** tab, select the asset for which you want to add the MOC.
3. In the **MOC** field, enter the method of compliance.
4. If the asset is not required to comply with one or more associated maintenance plans, in the **Justification** field, specify a justification for the non-compliant asset.
5. Save the technical record.



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## Chapter 6. Planning maintenance

You can monitor asset conditions, locations, and materials availability to assist in the maintenance planning process. You can also use maintenance data to predict the needs of future maintenance.

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### Slot planning

A *slot* is a submaintenance location, which can represent a maintenance road within a rail depot or an area of an aircraft hangar where maintenance activities are completed. Each slot can have its own capability, calendar and shift, and any number of availability periods that are associated with it. The availability periods are either automatically created in bulk in the selected calendar or shift or by selecting adding rows and creating individual periods.

The mobile and dynamic nature of configuration-managed (CM) assets makes the planning and scheduling of maintenance activities complex. Often, the asset that requires maintenance is not in the correct location at the correct time. These discrepancies lead to logistical difficulties and inefficiencies because maintenance capacity must be used to its maximum extent to be efficient and competitive. To overcome this problem, the maintenance location resources are defined as slots, which identify locations that can complete specific maintenance activities on certain asset types. Assets are only assigned to the slot when the degree of certainty is high that the asset is available for the assignment.

The availability period for each slot is specified by its associated calendar or shift, capability, start and end dates, job plan, and other definitions. Assets can be allocated to the maintenance slot either manually in the Maintenance Locations (CM) application or by using the Maintenance Planning (CM) application.

You can change the start and end dates for the slot's availability period. If the new dates overlap with existing slot dates, the **Conflict** check box is automatically selected, and the row color changes to red. You can save the slot when the conflict exists. You can opt to update the scheduled dates for the associated work package based on changes that are made to the dates of the availability period. You can remove the work package from the availability period.

Slot planning capability is compatible with, but not reliant on, Maximo Asset Management Scheduler. The slot planning capability also includes the ability to manage unplanned activity and technical records updates.

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### Maintenance planning

Maintenance planning involves the monitoring of asset conditions to assess the need for maintenance work in the short term. Decisions in maintenance planning are based on the availability of tools, labor, and facilities.

Maintenance planning typically occurs before work orders are generated. The goal is to maximize efficiency and reduce costs by scheduling work to take advantage of available time, resources, and facilities. You can package scheduled maintenance required by preventive maintenance (PM) records to ensure that all maintenance is carried out in a timely and efficient manner.

Work packages provide visibility into upcoming planned maintenance operations, which provides the opportunity to make the most of the planned maintenance. For example, if you know that you have a certain number of labor hours available over a certain period of time, you can add PMs to the work package, and then generate work orders.

You use the Maintenance Planning (CM) application to create, view, edit, and delete work package records of preventive maintenance (PM) records that are associated with asset parts. You also use the application to manage each PM on only one tab and can use the **Generate Work Orders** action to create work orders from the work packages. The work packages have their own identification numbers.

If you want to assign more preventive maintenance records (PMs) to a work package after you create the work package, you must ensure that the work package status is Draft, Approved, or In Progress. You cannot assign a PM to more than one work package.

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## Maintenance forecasting

You use the Maintenance Forecasting (CM) application to forecast a preventive maintenance (PM) for an asset or an asset fleet. You can forecast the maintenance periods based on a feasibility evaluation, the associated PM events, and the resources available for the maintenance.

You can also calculate the maintenance impact on PM event numbers, resources, and costs.

### Creating maintenance forecasting records

To improve maintenance processes and work efficiency, you can create maintenance forecasting records to specify the basic information that is used when predicting preventive maintenance needs for assets or asset fleets.

#### Before you begin

Before you create a maintenance forecasting, you must set the values for fleet utilization by period in the Fleet Management (CM) application.

#### Procedure

1. In the Maintenance Forecasting (CM) application, click **New Maintenance Forecasting** and specify a unique identifier for the maintenance forecasting record on the **Forecast Summary** tab.
2. Select an asset or asset fleet.
3. Optional: Specify a positive or negative percentage amount for the forecast factor to increase or decrease the maintenance forecasting.
4. Select a forecast date range or a fixed period for the maintenance forecasting.
5. Save the record.

## Generating forecast results for maintenance forecasting records

To improve maintenance efficiency and fleet performance, you can generate forecast results to predict preventive maintenance needs for assets or asset fleets. After you create a maintenance forecasting, you can calculate and list the forecast results for the maintenance forecasting.

### Procedure

1. In the Maintenance Forecasting (CM) application, on the **List** tab, select a maintenance forecasting record.
2. From the **Select Action** menu, select **Forecast Now**. The forecast results are listed on the **Forecast Summary** tab and **Forecast Detail** tab.

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## Creating preventive maintenance records

Preventive maintenance (PM) records are used to generate the work orders that specify the scheduled maintenance work. PMs can contain job plan and corresponding safety plan information that is copied to work orders. You can enable version control of PM records to track revisions of PMs.

## Alert intervals and warning intervals

Alert intervals and warning intervals are used to monitor scheduled maintenance. An alert interval is the point at which a work order is generated. A warning interval is the point at which a warning is issued to inform you that a preventive maintenance (PM) record is almost overdue.

You configure these intervals on the **Frequency** tab of the Preventive Maintenance (CM) application. The Assets (CM) application color-codes warnings and overdue PMs.

The alert interval and warning interval can represent a combination of one or more meter-based values and only one time-based value. Time-based values can be based on one of the following measures of time:

- The number of days after the active date of a PM.
- A percentage of elapsed time between the active date and the due date of a PM.
- The number of days before the due date of a PM.

### Example of work order generation

The following example shows when the build data interpreter generates a work order for PM records with a 120-day frequency attribute and different state attributes. The default state attribute for a new record is Absolute from Active.

*Table 9. Example of when work orders are generated*

Frequency	Alert and warning interval state	Alert interval	When a work order is generated
120 (days)	Absolute from Active	80	80 days after the active date of the PM record.

Table 9. Example of when work orders are generated (continued)

Frequency	Alert and warning interval state	Alert interval	When a work order is generated
120 (days)	Percent of Frequency from Active	66.7	After two-thirds of the time between the active date and due date of the PM has elapsed.
120 (days)	Absolute Prior to Due	40	40 days before the due date of the PM record.

You specify the state attribute and the initial alert interval and warning interval when you add a PM record. If you later update the state attribute, the build data interpreter adjusts the intervals as shown in the following examples:

Table 10. Example of changes to the alert and warning interval state values

Frequency	Original value for the alert and warning interval state	Updated value for the alert and warning interval state	Alert interval	Warning interval
120 (days)	Absolute from Active	Not applicable	80	90
120 (days)	Not applicable	Percent of Frequency from Active	66.7	75
120 (days)	Not applicable	Absolute Prior to Due	40	30
120 (days)	Not applicable	Absolute from Active	80	90

## Due date expressions

A due date expression specifies due dates that are not standard (for example, not every *n* days, weeks, months, or years). For example, you might have an aircraft engine that requires a maintenance check on the last day of each month.

You enter due date expressions on the **Frequency** tab of the Preventive Maintenance (CM) application. Use the standard three-letter abbreviation for months. Days of the month do not require a leading zero (for example, 1 or 2 is valid).

The due date expression uses the following valid syntax:

- Valid parameters
  - day
  - week
  - month
  - year
  - firstdayofmonth
  - lastdayofmonth
  - hour

noon  
midnight  
every/  
weekday/

2. Valid expressions

=  
<>  
>=  
<=  
and  
or

3. Suffix for additional directives

colon (:)

## Examples of due PMs

You can combine these parameters to define the next due date of a preventive maintenance (PM) record, as shown in the following examples.

Table 11. Example due date expressions for PMs

Scenario	Due date expression
PM is due on the last day of every other month:	due: month = every/2 and day = lastdayofmonth
PM is due before midnight on the third Monday of every month. However, if the year is 2005, the PM is due on June 1	due: a or b a: weekday = monday/3 and hour = midnight b: year = 2005 and month = Jun and day = 1

## Version control of master PM records

The maintenance program for an asset consists of master PM records that are associated with a configuration-managed (CM) item, which is associated with a model record. When the master PMs for a model are aggregated together with other records, such as technical records and deferred work orders, they constitute the maintenance program. Version control of the master PM records helps an organization to maintain regulatory compliance.

You can enable version control of master PM and PM records in the Organizations (CM) application. When you create a master PM record, the numbering of the versions starts. If changes to the master PM record are required, the version number of the master PM record increments by 1, and the status is changed to pending revision. After you save the changes, you can set the status of the master PM record to active. You cannot revert to previous versions.

You can opt to create the associated PM records for the master PM record. The associated PM records are created with a revision number of 0 and a status of active. You can also choose to update associated PM records with any changes that are made to the master PM record. If an update is required, then the associated PM record is duplicated, and its status set to revised. The PM record is then updated with the changes from the master PM, and its revision number is increased by 1. You can select the Override Updated from Master PM checkbox on a PM record so that updates from the master PM record are not made to the PM record.

When a PM record is revised, the PM Revised check box is selected on any open work orders that are associated with the revised record. The worker who is assigned to a work order that is associated with a revised PM record can decide whether to proceed with the work order. Alternatively, the worker can cancel the work order so that a new work order is created for the revised record.

You can use the **View Revision History** action to view the version history of the master PM record to see all past revisions. The version history includes the previous maintenance history is required. The version history can support an audit after an incident or can be useful when you plan future maintenance programs.

## PM Extensions (CM) application

You use the PM Extensions (CM) application to define and manage one-time extensions to due dates or meter counts that are associated with preventive maintenance (PM) records.

In the Master PM (CM) and Preventive Maintenance (CM) applications, on the **Frequency** tab, you select the **Extendable** check box to specify that associated PMs can be extended. You can create PM extensions in the PM Extensions (CM) application or on the **Extensions** subtab of the **Planning** tab in the Preventive Maintenance (CM) application. If you create a PM extension in the Preventive Maintenance (CM) application, a new record is automatically created in the PM Extensions (CM) application.

To specify that the duration of the PM extension is subtracted from the next due date or due count, you select the **Subtract Extension From Next Deadline** check box. Only the proportion of the extension period that was used is subtracted from the next deadline.

When the related work order is completed, the status of the PM extension is automatically set to complete. Only one active PM extension can be associated with a PM at any time. If you cancel a PM extension, the due date or due count of the PM reverts to the original value.

If you want to permanently extend PM deadlines, you must update the frequency details of the PM in the Master PM (CM) or Preventive Maintenance (CM) application.

### Example

A PM is scheduled to run every 100 days and has a due date of 1 Dec 2016. You create a PM extension to extend the due date by 10 days. The following table shows how the next due date of the PM is calculated:

*Table 12. Calculation of the next due date*

Original due date	Extension	Extended due date	Actual completion date	Subtract Extension From Next Deadline check box	Calculation of next due date	Next due date
1 Dec 2016	10 days	11 Dec 2016	11 Dec 2016	Cleared	11 Dec 2016 + 100 days	21 March 2016
1 Dec 2016	10 days	11 Dec 2016	11 Dec 2016	Selected	11 Dec 2016 + 100 days - 10 days	11 March 2016



Table 12. Calculation of the next due date (continued)

Original due date	Extension	Extended due date	Actual completion date	Subtract Extension From Next Deadline check box	Calculation of next due date	Next due date
1 Dec 2016	10 days	11 Dec 2016	6 Dec 2016	Cleared	6 Dec 2016 + 100 days	16 March 2016
1 Dec 2016	10 days	11 Dec 2016	6 Dec 2016	Selected	6 Dec 2016 + 100 days - 5 days	11 March 2016

## Creating PM extensions

You create preventive maintenance (PM) extensions to extend the due date or meter count of scheduled PMs.

### About this task

After you create the PM extension, a reviewer assesses the extension and can approve it by changing the status of the extension to active.

### Procedure

1. In the Preventive Maintenance application, open the PM that you want to extend.
2. On the **Frequency** tab, in the Special Frequency Information section, select the **Extendable** check box.
3. On the **Planning** tab, in the **Extensions** sub tab, specify the duration of the extension.
4. Optional: Select the **Subtract Extension From Next Deadline** check box to specify that the duration of the extension is subtracted from the next due date or due count. Only the proportion of the extension period that was used is subtracted from the next deadline.
5. Optional: Enter the details of the regulatory authority and the regulatory approver.
6. Change the status of the PM extension to waiting for approval.

### Results

The due date or due count on the PM is extended by the specified value.

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## Managing work packages

To minimize disruption and increase efficiency in your maintenance process, you can group maintenance requirements into a work package and perform all the maintenance at the same time.

### Work packages

Since mobile assets operate across a range of locations, it is important to minimize maintenance visits. When you create a work order, you receive alerts about the current due, expected due, and outstanding deferred maintenance for related

parent and child assets. You can bundle some or all of these maintenance requirements into a work package and perform all the maintenance at the same time.

### Example of the use of a work package

An operator discovers a problem that requires repair, for example, a broken landing light. Maintenance personnel retrieve the appropriate information about the asset and create a work order. When the maintenance personnel save or approve the work order, they create a work package to search for upcoming maintenance for related assets. They find that a 3000-hour inspection is due in 150 hours. Since the asset is available for maintenance now, they can do all the work now and not have to retrieve the asset a second time. They can generate an additional work order for the 3000-hour inspection or defer the work until a later date.

If maintenance personnel choose to generate the additional work order for the 3000-hour inspection, they create a work package that contains both work orders and perform all the work at the same time.

### Status of work packages

You can set a work package to the following statuses: Draft, On Hold, Approved, In Progress, and Complete. The actions that you can do on a work package depend on the work package status.

The following list describes the statuses of a work package and what you can do to a work package in each status:

Status	Actions
Draft	Indicates that a work package is in the preparation stage. You can assign preventive maintenance records (PMs) to a work package or remove the PMs from it.
Approved	Indicates that you can generate work orders to a work package. In this status, you can still assign PMs to a work package.
In Progress	Indicates that a work package and the associated work orders are being worked on. You can assign PM records to the work package and create work orders. If you change the work package status to In Progress, the status of each associated work order does not change.
On Hold	Indicates that a work package is locked down. All the fields become read-only. You cannot change the work package unless you change the status to Draft, Approved, or In Progress.
Complete	Indicates that all the associated work orders are complete or deferred. All the fields become read-only and you cannot change the work package. If any associated work order is incomplete or open, you cannot change the work package status to Complete.

## Creating work packages

You can bundle current due, expected due, and deferred maintenance for an asset. You also can include maintenance for related child and parent assets in the work package.

### About this task

The eligible work orders to compound the package cannot be canceled, closed, or completed, and they cannot belong to another work package.

After you create a package, you can view its work orders on the **Plans** tab.

### Procedure

1. In the Work Order Tracking (CM) application, select the first work order that you want to include in a package.
2. Select the **Create Work Package** action.
3. Optional: Change the value in the **Work Package** field. The new value must be unique for all work packages.
4. To browse for work orders on a higher-level asset, specify that asset in the **Include Asset** field.
  - To include work orders for assets that are children, grandchildren, and so on, of the **Asset** and **Include Asset** fields, select the **Include Children** check box.
  - To include work orders for the **Asset** and **Include Asset** fields only, clear the **Include Children** check box.
5. Select the **Create Work Package** check box.
6. Click **Refresh**.
7. Select the work orders that you want to add to the work package and click **OK**.

## Changing the status of work packages

You can change the status of a work package. You can close a work package only if all work orders in the package are canceled, closed, or completed.

### About this task

If any work order does not meet that criteria, you can perform one of the following actions:

- Change the status of the work order, without canceling the **Change Status** action.
- Remove the work order from the package.

### Procedure

1. In the Work Order Tracking (CM) application, select the work package. The identifier of the work package is in the **Parent WO** field of the work orders that are in the package. Enter that value in the **Work Order** field on the **Work Order** tab.
2. From the **Select Action** menu, select **Change Status**.
3. Select the new status from the **New Status** list.
4. Click **OK**. One of the following options occurs:
  - a. If the **New Status** is not Closed, the application changes the status of the work package and its work orders to the **New Status** value.

- b. If the **New Status** is Closed and all work orders in the package are canceled, closed, or completed, the application changes the status of the work package to Closed.
  - c. If the **New Status** is Closed and any work order in the package is not canceled, closed, or completed, the Work Order Change Status window displays the work orders with an invalid status.
- 5. If option c happens, perform the following actions:
  - a. Remove or change the status of the work orders that are not canceled, closed, or completed.
  - b. Save the record and then click **OK**.

### Changing the status of work orders in a package

You use the **Change Status** action in the Work Order Tracking (CM) application to close a work order. You can close a work package only if all work orders in the package are canceled, closed, or completed.

#### About this task

If any work orders do not meet that criteria, the Work Order Change Status window displays those work orders. You can remove or close the work orders without canceling the **Change Status** action.

#### Procedure

1. In the Work Order Change Status window, perform one of the following actions for each row in the Items table window:
  - To remove a work order from the package, select the corresponding **Remove** check box.
  - To close a work order, select the corresponding **Change Status** check box.
2. Click **OK**.

### Removing work orders from work packages

You can remove work orders from a work package.

#### Procedure

1. In the Work Order Tracking (CM) application, select any work order that is in the work package that you want to update.
2. From the **Select Action** menu, select **Work Package > Remove Work Orders**.
3. Select the work orders you want to remove and click **Remove**.

## Creating work packages for preventive maintenance records

To work efficiently and streamline your maintenance operations, you can create work packages for preventive maintenance (PM) records that are associated with asset parts. Creating work packages for PMs allows you to manage all the PM records on one tab. Each PM can be assigned only to one work package.

#### Procedure

1. In the Maintenance Planning (CM) application, click **New Work Package**.
2. On the **Maintenance Planning** tab, select the PM records that you want to assign to the work package.
3. From the **Select Action** menu, select **Copy Selected PMs to Work Package**.
4. On the **Work Package** tab, specify the scheduled dates and the maintenance location.

5. Save the work package. The total number of PM events, costs, maintenance hours, and the assigned PMs are listed.

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## Managing work orders

A work order specifies a particular task and the labor, materials, services, and tools that are required to complete the task. You can also associate configuration-managed (CM) items with work orders and create work orders that are a result of the cannibalization process.

### Job plans

A job plan is a detailed description of work that is performed for a work order. You use the Job Plans (CM) application to specify and manage maintenance review board (MRB) numbers, capabilities, classes, and categories for job plans.

A job plan generally contains tasks and the estimated labor, labor hours, materials, services, and tools that are required for the work. To ensure that work on an asset is performed safely, you can add work assets and associate safety plans that can be used when work is performed.

You can specify the MRB number, capability, class, and category for a job plan.

You can specify which organizations and sites can use the information that is on the job plan and its tasks. If you do not specify this information, the job plan can be used in any site of any organization.

You can apply job plans to preventive maintenance (PM) records, routes, and work orders. After a job plan becomes a work plan on a work order, you can change the work plan without affecting the job plan.

You also can create a job plan from a work plan that you use frequently.

## Creating work orders

You can create work orders to specify the required work for a particular asset and location.

### Cannibalization process overview

To meet operational requirements and to dispatch an asset, you must replace a defective component, but your inventory balance might be zero. By using the cannibalization process, you can remove the component from a serviceable asset and install it on another.

The regular maintenance procedure is completed by issuing a replacement component from inventory, installing it, completing the work and releasing the asset into service. However, you might have zero balance available from inventory and the lead time to obtain a replacement exceeds the operational schedule requirements.

In this case, a cannibalization (robbery) process can be authorized. The required component is removed from a designated asset (the donor asset), inspected, and installed on the unserviceable asset (the receiver asset). You can use the cannibalization process at any point until the work order is completed, closed, or canceled.

When the work is completed, the asset is dispatched into service. A work order is issued against the donor asset to generate the demand against inventory by following regular procedure. Any reservations that are made against the receiver asset must be canceled or transferred to the donor asset.

The cannibalization process is a relatively common practice that must be rigorously managed and controlled to maintain regulatory and safety compliance. Efficiency is also a priority, because the cannibalization process is typically applied under operational pressure and tight deadlines.

You use the **Materials** tab, under the **Plans** tab of the Work Order Tracking (CM) application, to specify and approve a cannibalization process. The cannibalization details show on the **Robbery details** section, when you select the **Robbery** check box. You can have a robbery action for each item line.

You might consider using the cannibalization process in the following situation:

- If you specify an item number and the availability check shows that there is no stock, and
- If you have the asset under the AOG status.

This validation is not enforced, and the **Robbery** check box is available for selection despite of these conditions.

### Cannibalization process status changes

The cannibalization process can assume different statuses while procedures are applied.

Table 13. Statuses of the cannibalization (robbery) process

Status	Description	Validation
PENDG (pending)	The default status when the robbery action is created.	You can specify this status if the <b>Robbery</b> check box is not selected.
NAPPR (not approved)	The robbery action is not approved, and all other fields are read only.	None
APPR (approved)	The robbery action is approved.	You cannot specify this status if the <b>Robbery</b> check box is not selected.
COMP (complete)	The robbery action is complete, and the donor asset is available to be issued to the receiver asset.	You must specify all fields. You cannot specify this status if the <b>Robbery</b> check box is not selected.
CANC (canceled)	The robbery action is no longer required. The user is responsible for canceling any associated work orders, purchasing records, and others.	You cannot specify this status if the <b>Robbery</b> check box is not selected.

### Example of the cannibalization process

A passenger aircraft is due to depart at 13:00 with 250 fare-paying passengers. Two hours prior to departure, an essential component for flight operations fails. The mechanics investigate and conclude that a replacement part is required. An interrogation of available inventory reveals that there is a delivery of the required component in 12 hours time.

The decision is made by maintenance control – the flight must not be delayed. A replacement component is removed from an aircraft that is not scheduled to fly until the next day. The component is inspected and installed in the faulty aircraft.

A work order is issued against the donor aircraft to be completed before the flight time, on the next day.

### Cannibalization statuses

Using the cannibalization (robbery) process, you can remove a component from a serviceable asset and install it on another. The cannibalization process can assume different statuses while procedures are applied.

A regular maintenance procedure is completed by issuing a replacement component from inventory, installing it, completing the work and releasing the asset into service. However, you might have zero balance available from inventory and the lead time to obtain a replacement exceeds the operational schedule requirements.

In this case, a cannibalization (robbery) process can be authorized. The required component is removed from a designated asset (the donor asset), inspected, and installed on the unserviceable asset (the receiver asset).

During the procedure, the cannibalization process can assume different statuses:

*Table 14. Statuses of the cannibalization (robbery) process*

Status	Description	Validation
PENDG (pending)	The default status when the robbery action is created.	You can specify this status if the <b>Robbery</b> check box is not selected.
NAPPR (not approved)	The robbery action is not approved, and all other fields are read only.	None
APPR (approved)	The robbery action is approved.	You cannot specify this status if the <b>Robbery</b> check box is not selected.
COMP (complete)	The robbery action is complete, and the donor asset is available to be issued to the receiver asset.	You must specify all fields. You cannot specify this status if the <b>Robbery</b> check box is not selected.
CANC (canceled)	The robbery action is no longer required. The user is responsible for canceling any associated work orders, purchasing records, and others.	You cannot specify this status if the <b>Robbery</b> check box is not selected.

## Installing and removing assets

When completing the work required in a work order, you must remove and install the asset specified in the work orders.

### Installation and removal of assets

When performing maintenance work orders, you must install or remove the asset associated with those work orders. For example, you remove an engine from an aircraft for maintenance purposes, and when the maintenance work is complete, you must reinstall the engine on the aircraft.

You can use the **Install/Remove Asset** action in the Work Order Tracking (CM) application or the **Install Asset** button on the **Materials** subtab of the **Actuals** tab to install an asset. In both cases, the corresponding build position must be serialized.

The following information applies if you access the Install/Remove window through the **Materials** subtab on the **Actuals** tab:

- On the **Materials** subtab, in the Rotating Asset field, you can specify a rotating asset that is also a CM item, which is used as the value for the child asset.
- On the **Materials** subtab, you can specify a value in the **Actual Date** field to use as the transaction date.
- You can install the child asset only to a build position that is valid for the CM item associated with the asset.

To record meter offsets, select the **Record Meter Offsets** check box in the CM Options window in the Organizations (CM) application. You access that window through the **CM Options** action in the Organizations (CM) application.

## Installing assets

In the Work Order Tracking (CM) application, you can install assets to build positions. For example, you remove an engine from an aircraft for maintenance purposes. After the maintenance tasks are performed, you reinstall the engine on the aircraft.

### Procedure

1. In the Work Order Tracking (CM) application, select the work order for the asset that you want to install.
2. From the **Select Action** menu, select **Install/Remove Asset**.
3. Select the node that contains the build position to which you want to install the asset, and click **OK**.
4. If the **Transaction Date** field is empty, specify the date and time of the removal.
5. If the **Asset** field in the Installation Details table is empty, specify the child asset.
6. Optional: Update the value in the **Actual Count** field.
7. Click **OK**.

### Results

The application saves the record and triggers the build data interpreter (BDI). If you installed the asset to a position where an asset is installed already, the BDI creates a position and installs the asset to the new position.

## Removing assets

You can remove assets that are associated with a work order if the corresponding build position is serialized. For example, you have a work order for maintenance on an engine. Before you start the work, you must remove the engine from the aircraft.

### Procedure

1. In the Work Order Tracking (CM) application, select the work order for the asset that you want to remove.
2. From the **Select Action** menu, select **Install/Remove Asset**.
3. Select the node that contains the build position from which you want to remove the asset, and click **OK**.
4. If the **Transaction Date** field is empty, specify the date and time of the removal.
5. Select the **Remove Asset** check box.
6. If you plan to move the asset to a new location, specify a value in the **Remove to Location** field.
7. If the removed asset requires additional work, specify a value in the **Follow on Work Type** field.



8. Optional: Update the value in the **Actual Count** field.
9. Click **OK**.

## Results

If the build data interpreter (BDI) is configured to run, work orders are no longer generated for PMs that are associated with the equipment that you removed.

## Deferring work orders

When you are unable to complete a work order, you can defer the work order. For example, if you did not have the required materials for the work order, you can defer the work order and set a status for it.

### Status of deferrals

You may need to defer a work order if, for example, the material required to perform the service did not arrive on time. In this case, you would set a deferral for the work order and assign a status to it.

Deferrals can have the following status values:

Status	Additional information
Active	<ul style="list-style-type: none"> <li>A work order can have only one active deferral.</li> <li>All fields except <b>Status</b> become read-only.</li> <li>If you select the <b>Adjust</b> check box that corresponds to the deferral, the application sets the scheduled completion date of the work order to the deferred date.</li> <li>You can add extensions to the deferral.</li> <li>The application changes the status of all previous deferrals and extensions to Superseded.</li> </ul>
Cancelled	<ul style="list-style-type: none"> <li>If extensions exist, you cannot change the deferral status to Cancelled.</li> <li>All fields become read-only.</li> <li>The application changes the status of the original deferral and all extensions to Cancelled.</li> <li>You can delete a canceled deferral.</li> </ul>
Pending	<ul style="list-style-type: none"> <li>You cannot create an extension for a pending deferral.</li> <li>The application changes the status of all previous deferrals to Superseded.</li> <li>You can delete a pending deferral.</li> </ul>
Superseded	<ul style="list-style-type: none"> <li>If extensions exist, you can change the deferral status to Superseded.</li> <li>All fields become read-only.</li> <li>You can delete a superseded deferral.</li> </ul>

## Deferring work orders

You can defer a work order or extend a deferral on a work order that is not canceled, closed, or completed. For example, you defer a work order if the material required to complete the work did not arrive on time.

## Procedure

1. In the Work Order Tracking (CM) application, select a work order.
2. From the **Select Action** menu, select **Deferrals**.
3. In the Deferrals table, insert a row and specify values for the type, reason, and source of the work order.
4. In the **Duration** field, specify the length of the deferral (in days).
5. To change the scheduled completion date of the work order to the deferred date, select the **Adjust** check box. The date changes when you change the status of the work order to Active.
6. Optional: Change the status of the work order to Active.
7. Save the work order, then click **OK**.

## Results

The scheduled start date is updated according to the duration of the deferral period. If a deferral extension supersedes the original deferral period, the scheduled start date is further extended.

### Extending deferrals:

You can create one or more extensions to a work order deferral, for example, in case you have a lack of resources or materials. The status of the most recent extension must be active.

## Procedure

1. In the Work Order Tracking (CM) application, select a work order.
2. From the **Select Action** menu, select **Deferrals**.
3. Select the deferral that you want to extend.
4. In the Deferral Extensions table, add a row and specify values for the type, reason, and source of the work order.
5. In the **Duration** field, specify the length of the deferral (in days).
6. To change the scheduled completion date of the work order to the deferred date, select the **Adjust** check box. The update occurs when you change the status of the work order to Active.
7. Save the record, then click **OK**.

## Results

The deferral is extended for one more deferral period. The original extended date is superseded, and the deadline dates for the deferral period are updated.

### Changing the status of extensions:

You can change the status of an extension to a deferral if the deferral is not canceled, closed, or completed.

### About this task

A deferral can have only one active extension. If you create a second active extension, the application changes the status of the first active extension to superseded.

### Procedure

1. In the Work Order Tracking (CM) application, select a work order.
2. From the **Select Action** menu, select **Deferrals**.
3. In the Deferrals table, select the deferral that you want to update.
4. In the Deferral Extensions table, select the extension that you want to update.
5. Click the **Change Status** icon.
6. Select the new status.
7. Click **OK**.

## Recording meter readings

When you record meter readings for configuration-managed assets, you can record the actual or delta values.

### Specifying meter readings

You can add meter readings to an asset and location . You specify meter readings as either actual or delta values. You can specify meter readings for any date and time starting on the date and time when the asset was created

### Before you begin

Before you add meter readings to an asset and location by using the Work Order Tracking (CM) application, you must set the initial readings on the related asset.

### Procedure

1. In the Work Order Tracking (CM) application, on the **List** tab, select a work order record.
2. From the **Select Action** menu, select **Enter Meter Readings**.
3. Select a meter name and a meter reading type.
4. Select a value for count date and time.
5. Specify a meter value.
6. Add a location meter reading and specify any related information.
7. Click **OK** and save the record.

### Modifying offsets to meter usage

You can correct offsets to meter usage. The meter must be related to an asset that you installed or removed.

### Procedure

1. In the Work Order Tracking (CM) application, select the work order associated with the asset that you want to update.
2. From the **Select Action** menu, select **Install/Remove Asset**.
3. Select the node that contains the build position that you want to update and click **OK**.
4. If the **Transaction Date** field is empty, specify the date and time of the removal.
5. Update the value in the applicable **Actual Count** field.
6. Click **OK**.

---

## Managing events

You can record data on events, which can be planned activities, such as regular maintenance, or unplanned occurrences, such as a fuel leak. Capturing the data can assist in the process of improving asset performance and reliability.

### Events in the configuration management process

You can record information about events that are related to your assets. An event can be planned, such as scheduled maintenance, or unplanned, such as a fuel leak.

Events provide in-service event capture data that is used to improve asset performance and reliability. Recording and analyzing events is a vital to providing services to clients and to increasing profitability of associated contracts. Recording events is relevant for large fleet operators and original equipment manufacturers (OEM), who provide service contracts for maintenance, repair, and overhaul activities.

Events capture data that provide information on how assets are used and when assets require maintenance. Analysis of events data can reveal the possible impact of failure and how asset design can be improved to increase reliability and safety. Events information includes all the attributes associated with the event, including life usage, asset configuration, operator, location, actions associated with service restoration and associated findings.

An event is a planned or unplanned occurrence that resulted in an action being taken. An event can include the following information:

- A symptom that describes the incident or problem, such as high vibration or cockpit warning message.
- A reaction that describes the action taken in response to the symptom, such as shutting down an engine or turning back to the airport.
- One or more subsequent actions that describe the activities taken to diagnose and recover from the event, such as details of repaired parts.

You use the Events Management (CM) application to record information about events that are related to assets. You can also add information about the actions that are taken in response to an event, and about the findings related to the event or its actions. You can add information about maintenance messages, such as Flight Deck Effects, that are related to an event. You cannot delete an event if it has related events, or if the event is listed as a related event on another record.

### Creating events

An event is a planned or unplanned event, such as a yearly inspection or a fuel leak, that results in an action. The information recorded in events can be used to improve asset performance and reliability. An event typically consists of symptoms, reactions, actions, and findings.

#### Procedure

1. In the Events Management (CM) application, click the **New Event** icon.
2. Select the asset to which this event is related.
3. Enter a title for the event.
4. Optional: Edit the event date and time.
5. Select the event type and category.

6. Optional: Enter information related to the event, for example, the location or event owner.
7. Optional: Add further information about the event on the other tabs.
8. Save the event.

### **Adding findings to an event**

When you research an event, you can record your analysis and solutions as a finding. You can enter information about findings that are related to the main event or to its actions. You can use findings for analysis and decision-making, such as trying to improve the performance of the asset.

#### **Procedure**

1. In the Events Management (CM) application, select the event for which the action occurred.
2. On the **Findings** tab, from the **Select Action** menu, select **Findings Navigator**.
3. Select the findings you want to add.
4. Click **Return**.
5. Optional: Mark one finding as the primary finding for the event by selecting the **Primary** check box.
6. Save the event.

### **Adding maintenance messages to an event**

You can add information about maintenance messages that are related with an event, for example, Flight Deck Effects.

#### **Procedure**

1. In the Events Management (CM) application, select the event for which you want to add the maintenance message.
2. In the **Maintenance Messages** tab, add a new row and select the type of message.
3. Select the message number.
4. Save the event.

### **Adding actions to an event**

An action is triggered by the reporting of a planned event, such as a yearly inspection, or an unplanned event, such as a fuel leak. You can add information about actions that were taken. For example, an action after a yearly inspection might include the issuing of a service bulletin.

#### **Procedure**

1. In the Events Management (CM) application, select the event for which the action occurred.
2. On the **Actions** tab, add a new row and select a value for the action.
3. Enter any relevant information.
4. Save the event.

### **Associating related event tickets with events**

To improve event management, you can add information about other event tickets that are related to the main event.

### **Procedure**

1. In the Events Management (CM) application, select the event for which the action occurred.
2. On the **Event Matrix** tab, click **Select Tickets**.
3. On the Select Ticket window, select the tickets you want to associate with the event and click **OK**.
4. Save the event.

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## Chapter 7. Defining engineering reference data for assets

When you receive an asset, such as an aircraft or a train, you must create engineering reference data for it. The engineering reference data specifies the configurations that are allowed for the asset and how it is maintained. During day-to-day operations, the build data interpreter (BDI) uses the engineering reference data to ensure that any changes to the asset are valid.

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### Defining models

A model defines the allowable configuration of an asset. You create models in the Models (CM) application.

#### Models overview

A model defines the engineering reference data for an asset. A model contains a collection of build items that include configuration-managed (CM) items, configurations, and configuration rules. The build data interpreter (BDI) service validates changes to a configuration-managed part to ensure that operational changes to the associated asset comply with the model definition.

#### Build items and parts

A model can represent a top-level asset, such as an airplane or a train, or it can represent an equipment subassembly, such as an engine or a locomotive. A build item represents a part or an assembly of parts.

For example, in a model that represents an aircraft, a build item for the engine can contain a CM items assembly that makes up the engine. Build items are organized in a hierarchy to represent the physical hierarchy of the aircraft and equipment.

When the assets are operational, any changes to their statuses are validated against the rules that are defined for the associated parts on the model.

#### Configurations

Each model has a default configuration with a configuration type of variant. You can create configurations at the following levels:

##### Sibling

A configuration that is at the same level as the selected node.

**Child** A configuration that is a level under the selected node.

##### Model system

A configuration that is at the top-level node of the hierarchy of the model system.

#### Build positions

A build position indicates the location at which you can install a build item. You can define build positions at a sibling level to a build item or at a child level beneath it. When you specify a build position, you can configure the following features for it:

- Provide position information to support regulatory compliance.
- Add formulas for calculated meters that are created in the Meters application.
- Add spare parts for the position.
- Add measurement points for condition monitoring.
- Associate the position with warranty contracts.
- Configure information about the access items that must be opened and closed to work on this position.
- Associate the position with the zone or zones where the build item is located.

You can move the positions of build items in the hierarchy tree. When you move a node, the LCN is recalculated. The logistics support analysis record (LSAR) control number (LCN) indicates where a node is within the build hierarchy. For example, an engine that is attached to an aircraft has an LCN code of L0008, which means that the engine is on the eighth build position under the airframe. The following table describes the moves that you can make when you right-click a node in the hierarchy tree:

Action	Description	Application action
Move up	Move the selected LCN up one position.	Subtracts 1 from LCN suffix. All subpositions inherit the move. If an LCN with the new value exists, it is moved down.
Move down	Move the selected LCN down one position.	Adds 1 to the LCN suffix. All subpositions inherit the move. If an LCN with the new value exists, it is moved up.
Push up	Move the selected LCN up one position.	Subtracts 1 from LCN suffix. All subpositions inherit the move. If an LCN with the new value exists, it is pushed up.
Push down	Move the selected LCN down one position.	Adds 1 to the LCN suffix. All subpositions inherit the move. If an LCN with the new value exists, it is pushed down.

## Model systems

A model system represents a functional capability of the design of an aircraft. When you define a model system in a model, you create a configuration relationship between the model system and the model. You can view the model systems that are associated with an aircraft by using the functional hierarchy view.

Build positions represent the model systems that are in functional relationships with an aircraft model. For example, an electrical model system can be represented by multiple build positions in an aircraft model.



## Associated engineering reference data

When you specify engineering reference data in a number of other applications, you can associate those records with specific build positions. You can view the following associated records for builds position in the Models application:

- CM items
- Master PMs
- Meter records
- Labels
- Zones

## Configuration rules

Configuration rules define which build positions and CM items are valid for a specific model or configuration. In the Models application, you select which of the primary configuration rules apply to the following data:

- Minimum equipment list (MEL) rules for a model
- Build positions
- CM items
- Labels
- Formulas

Additionally, you can create secondary rules that apply to primary rules to specify the conditions when changes are validated to an asset. You specify secondary rules in the form of Boolean expressions in the **Advanced** tab of the Models application.

## Model revisions

A revision is a snapshot of a model and its configuration rules at a specific time. After you create a revision, you can update the model without affecting the revision. The BDI service monitors revisions that are in the active status, and only active revisions are used to validate the configurations of assets. The status of a revision is set according to the following rules:

- The revision is set to a status of pending if an active date set for the revision that is in the future.
- The revision is set to a status of inactive if an inactive date for the revision and the active date is in the past.
- The revision is set to active when the active date is current.

When you create a revision on the **Configurations** tab, you can select whether to allow different automatic upgrade options for assets.

## Series of related models

You can group related models together into a series and define event groups that affect all models in the series. For example, for a series of related aircraft engines, if a fuel leak occurs in one model in the series, you can check other models in the series for the symptoms of the fuel leak.

You can associate a series with models, build positions, and dynamic value list (DVL) values.

## Weight and balance

You define the units of measurement that are used to measure the weight and balance of all aircraft that are associated with a model. In the Models application, you define the units of measurement for the following attributes:

- Weight
- Arm
- Moment

## Creating models

The fundamental building block of the configuration management system is the model. A model defines the allowable configuration of an asset and is used to validate operational changes to assets.

### Before you begin

Before you start to define models, you must configure options, such as the default label system, the label width, the position code width, EBNF control, recorded meter offsets, and predicted life. Use the **CM Options** action in the Organizations (CM) application to configure the options.

### Procedure

1. In the Models (CM) application, click **New Model** and specify a name in the **Model** field.
2. Specify the label system of the model.
3. Specify values for the logistics support analysis record (LSAR) control number (LCN) structure and the top-level LCN.
4. Optional: If you want to install this model on another model, select the **Installable** check box.
5. Add build items to the model:
  - a. In the Build Items section, click **New Row** and specify its name. The same name is set as the part number of the default CM item for the build item.
  - b. Add values for the label system, label, and default positions.
6. Add CM items to build items:
  - a. Select a build item and in the CM Items section, click **New Row**.
  - b. Specify the part record to add to the build item.
7. Save the model.

### Creating configurations of models

A configuration is a version of the model that is based on an existing model, but has a different composition or different attributes. Configurations can track similar but different assets, such as different versions of an engine.

### Procedure

1. In the Models (CM) application, select a model.
2. On the **Configurations** tab, right-click the node for which you want to create a configuration and select either **New Child** or **New Sibling**.
3. In the **Configuration** field, specify a value.
4. If the configuration is an abstract configuration, select the **Abstract** check box.
5. Click **OK**.

6. Optional: On the **Configurations** tab, you can use the **New System** button to associate a model system with the model.
7. Save the model.

### Defining secondary configuration rules

To specify additional conditions to use when a primary configuration rule is used to validate an asset, you can create secondary configuration rules. You add Boolean expressions to the existing rules, which are then used as dependencies when the rules are applied to assets.

#### Procedure

1. In the Models (CM) application, select the model.
2. On the **Advanced** tab, in the CM Rules table, select a rule.
3. In the **Secondary Expression** field, specify a Boolean expression.
4. Click **Compile**.
5. Save the model.

## Configuration-managed build positions

You can create a configuration-managed build position record that contains a position code that is associated with a system and series combination. The build position record also contains information about the associated model and CM items.

Build position records can include the following information:

- The series that defines a group of models
- The position code that defines the hierarchical build position of the model
- The associated CM item number and zone values

The values that you associate with the build position record can help support the following asset, aircraft or component configuration capabilities:

- The ability to capture failure modes and causes for unrelated assets
- The use of dynamic value lists
- Event-reporting capabilities for the asset

You can use a build position record in a value record in the DVL Setup(CM) application. When you create a CM value record, the finding and applicability values that are available for selection are filtered by the selected build position. When you associate a build position and a CM value, you can capture detailed event information for an asset. Event symptoms, failures, and actions can be tracked according to the defined build position, series, and item information that is on a CM value record.

### Aircraft zones

Zones are designated physical areas of an aircraft that identify where maintenance activities occur. A maintenance task can span multiple zones.

In the Zones application, you can create, delete, or activate zones on an aircraft. You can create and duplicate a hierarchy of zones by specifying parent or children zone records. All zone hierarchies must be linked to an aircraft model. The Zone application stores information at the item set level, which facilitates associating a zone hierarchy to a model.

## Configuring build positions

You add build positions for build items in the Models application, in the Build Hierarchy and Positions tab. You can view the physical build hierarchy or functional hierarchy that are defined for a model.

### Adding build positions

A build position indicates the location at which you can install a build item, which represents a group of item numbers that are related by function. A new sibling build position is at the same level as the selected node while a new child build position is a level beneath the selected node.

#### Procedure

1. In the Models (CM) application, select a model and then click the **Build Hierarchy and Position Rules** tab.
2. In the **Hierarchy Tree** subtab, right-click the node to which you want to add the build position and select either **New Child** or **New Sibling**.
3. Specify the build item to add to the position.
4. Specify additional information on the subtabs.

Option	Description
<b>Position List</b>	Specify regulatory information.
<b>Formulas</b>	Add a formula for a calculated meter.
<b>Spare Parts</b>	Add spare parts.
<b>Condition Monitoring</b>	Add measurement points for condition-enabled parts.
<b>Related Assets</b>	List the end item assets that are related to the current model.
<b>Warranty</b>	Associate warranty contracts with the build position. You can also specify that items in this position inherit warranty contracts from items in parent build positions.
<b>Access</b>	Add information about access items, including the time that it takes to open them and close them and the zone or zones where the position is located.

5. Optional: Select the **Related Systems** subtab to view the model systems that are associated with the selected build position.
6. Save the record.

### Creating build position master records

You can create a build position record to define a position code and its associated system and series combination. You can also create a build position record to define the CM item numbers and the zones that are associated with the build position record.

#### Procedure

1. In the Build Position Master (CM) application, click the **New Build Position Master** icon.
2. Specify values for the **System** and **Position Code** fields.
3. Optional: Specify the series to which the build position belongs.

4. Optional: If you want the build position to capture failure modes and causes for unrelated assets, select the **Phantom Position** check box.
5. In the CM Items table, add a new row and specify a CM item value.
6. In the Zones table, add a new row and specify the zone value that is associated with the CM item.
7. Save the build position master.

## Grouping related models in a series

A series record groups related models. You can associate a series with models, definition value list (DVL) values, and build positions. You can define event groups for a series, which establishes common reporting criteria.

### Procedure

1. In the Series (CM) application, click **New Series**.
2. Enter a name for the new series.
3. Optional: Specify description, comments, or a message to be included in reports.
4. On the **Series** tab, in the Event Group table, add a new row and specify a name for the new event group.
5. Select the event group type, and specify which reports can be configured for group events based on a group name.
6. In the Group Contents table, add a new row and select a code type and a code. Include a new row for each code that you want to add to the event group.
7. Save the series.

## Configuration of maintenance events for models

Events can automate maintenance activities for models, which are based on rectification periods for minimum equipment list (MEL) items, rework levels, and formulas that calculate meter events on build positions.

### Rectification periods for MEL items

The category of a minimum equipment list (MEL) item determines how long maintenance can be deferred on a MEL item after it is reported for rectification or maintenance. The following table describes the predefined categories:

*Table 15. Categories that the define the rectification periods of MEL items*

Category	Consecutive days	Description
A	1	Items in this category must be rectified within one day after discovery.
B	3	Items in this category must be rectified within three days after the day of discovery.
C	10	Items in this category must be rectified within ten days after the day of discovery.
D	120	Items in this category must be rectified within one hundred and twenty days after the day of discovery.

The category determines the time elapsed, in consecutive days, between the day of discovery and the date the MEL item must be available for use again. The day of discovery is the date when the MEL item was reported for maintenance.

## Rework levels for maintenance events on models

Tracking rework levels, such as the number of hours since the most recent overhaul or the number of cycles since the asset was new, provides a detailed and efficient way to manage maintenance activities. Maintenance plans are based on a number of different criteria, including the life usage that was consumed after a maintenance activity was performed.

Your company can track different criteria for different assets, depending on their use and construction. You can set rework levels for a model to customize the maintenance events and criteria that are tracked to assist in the management and upkeep of your assets.

In the Models application, use the **Rework Level Dialog** action to specify rework levels. Examples of rework levels include inspection, overhaul, repair, and modification.

## Formulas for calculated meters

You can create a formula to calculate specific instances of a meter that you must track for maintenance purposes. For example, you can track when inspections are required after a specified number of engine starts. Formulas are defined at the system-level.

You use the **Formulas** subtab in the Models (CM) application to create a mathematical formula to apply to a meter value.

### Example of creating a formula

You want to track maintenance requirements for an inspection that is cycled on every 1.5-meter starts. In the Meters application, you create a meter named S1 to represent engine starts. The pilot records engine starts after every flight. The inspection is due every 30 cycles. The formula is a simple mathematical formula with the name of the meter enclosed in brackets. For this example, you create the following formula for the build position that contains the master PM for the inspection:  $[S1] * 1.5$

Because the inspection is due every 30 cycles, the inspection is due every 20 engine starts ( $20 * 1.5 = 30$ ).

### Example of creating a dynamic formula

You want a way to track engine hours that takes into account the fact that some engines run for some time before the flight takes off. Some models require a formula of Engine Hours =  $1.1 * \text{Flight Hours}$ , but other models require a formula of Engine Hours =  $1.2 * \text{Flight Hours}$ .

The name of a dynamic meter begins with a \$ character. When a search is made for a dynamic meter, the search is for both the dynamic meter and the model ID of the asset that is associated with it. In the Meters application, you create a dynamic meter that is named \$EH to represent the engine hours. In the Models (CM) application, you create a dynamic formula that is named \$EH and enter  $[FLTHRS] * 1.2$  in the **Formula** field.

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## Defining engineering reference data for assets

When you receive an asset, such as an aircraft or a train, you must create engineering reference data for it. The engineering reference data specifies the configurations that are allowed for the asset and how it is maintained. During day-to-day operations, the build data interpreter (BDI) uses the engineering reference data to ensure that any changes to the asset are valid.

### Configuring CM items

A configuration-managed (CM) item is a part number that is under configuration-management control. A default CM item is created when you define a model. You configure CM items and create new ones in the CM Item Master (CM) application.

#### Configuration-managed items

Configuration-managed (CM) items are generated automatically when you create models. You can also view and create CM items in the Item Masters (CM) application. You also manage CM items in your inventory and issue them to work orders, locations, and assets.

#### Inventory of CM items

CM items are available in the Inventory (CM) application, where you can record storeroom balance, condition, inventory costs, reorder details, and other management information for CM items.

The following activities help to manage CM items:

- Identify and track rotating assets that are associated with a rotating item.
- Identify and track items that have a related CM item record.
- List all assets for which a CM item is listed as a subassembly or a spare part.
- Create default items for fuel, replenishments, and munitions if you plan to manage these items in your inventory.

#### Issue and transfer of CM items

In the Issues and Transfers (CM) application, you can issue CM items and tools to a work order, to a location, to an asset, or against a general ledger account either within a site or across sites within an organization. You can define the CM item, the model, and the configuration that is associated with an asset that you issue.

You can transfer CM items and tools from one storeroom to another, either within the same site, across sites in an organization, or across organizations. When you transfer CM items between storerooms, the storeroom balances are adjusted automatically. You can also return CM items and tools to a storeroom, but only if they are in the same site. You can perform transfers within your organization without an internal purchase order. Transfers to a different organization require an internal purchase order, and the organizations must share the same item set.

#### CM item masters

In the Item Master(CM) application, you can create CM items and associate them with parts, master PMs, and items in Maximo Asset Management. You also specify the format of the serial numbers for the part, and you can specify serial number ranges that use this format.

The Models (CM) application uses the serial numbers and serial range expressions to establish configuration rules for models and configurations of models. The Assets (CM) application uses the serial numbers and serial range expressions to validate assets configurations by using those configuration rules.

### **Examples of serial formats**

To specify the format for a serial number, the letter A represents alphabetic characters, the number 9 represent numbers, and any special characters can represent separators. The following examples show a valid format and an invalid format:

- A-9999 is a valid serial format.
- X-9999 is not a valid serial format because it contains the letter X.

### **Examples of serial range expressions**

All serial numbers in a serial range must be in a valid serial format. You can specify multiple serial numbers and serial ranges at the same time by using the following construction:

- To specify multiple individual serial numbers, separate them with a comma and no space, such as A-0001,A-0100,A-2020.
- To specify a range of serial numbers, separate the first and last number of the range with two periods and no spaces, such as A-2001..A-2999.
- To specify a combination of individual numbers and ranges, separate the entries with a comma and no space. You can enter numbers and ranges in any order, such as A-0001,A-0100,A-2001..A-2999,A-4001..A-4999.

### **Issues and transfers:**

You use the Issues and Transfers (CM) application to issue configuration-managed (CM) items or tools directly to a work order, to a location, to an asset, or against a general ledger account either within a site or across sites within an organization. You can also return an item or a tool to a storeroom within a site.

You can transfer items or tools from one storeroom to another within a site, across sites within an organization, or across organizations. In addition, you can use a courier and determine when an item is currently in transit.

Consider the following when transferring or returning items or tools:

- You cannot return items or tools across sites or across organizations.
- You can define the CM item, model, and variant associated with an asset to be issued.
- When you transfer items or tools from one storeroom to another between sites and organizations, the balance is adjusted accordingly.
- If you are transferring an item or a tool between storerooms within a site or across sites within one organization, you can do so with or without an internal purchase order.
- If you are transferring an item or a tool across organizations, you must have an internal purchase order and the organizations must share the same item set.



## Examples of defining CM items

A configuration-managed (CM) item is a part that has a catalog number. CM items are associated with the model that is used to validate operational changes to assets. You can cross-reference a CM item to an IBM Maximo Asset Management item master.

Maximo Asset Configuration Manager maintains a cross-referenced catalog of item records for the following purposes:

- For creating and managing system-generated items that represent models and configurations of models
- For creating temporary or locally-tracked items, such as items that are procured locally on a temporary basis
- For achieving specific goals, such as changing the part number of an item retrospectively or adding a local part to the catalog

### Example of a new model

Your company receives a new model of aircraft. You configure the model in the Models (CM) application. The Models (CM) application generates a new CM item and its identifier corresponds to the identifier of the model. You can change the identifier of the model at any time, for example, to correct the original identifier or rename the model. The Models(CM) application changes the identifier of the CM item to match the new identifier of the model.

### Example of a new configuration of a model

Your company needs a new configuration of an aircraft. You add the configuration in the Models (CM) application. The Models (CM) application generates a new CM item and its identifier corresponds to the identifier of the configuration. If you change the identifier of the configuration, the Models (CM) application changes the identifier of the CM item to match it.

### Example of local parts

Your company procures a locally-manufactured part and plans to serialize the part and install it on a parent asset. You do not know whether your company plans to procure the part in the future. You do not know whether the person who procured the part has permission to add the part to Maximo Asset Management. You add the part in the CM Item Master (CM) application and you can cross-reference the CM item with an existing item in Maximo Asset Management.

### Example of a change to a Maximo Asset Management item number

Because of a technical record or a user error, you must change an outdated or incorrect Maximo Asset Management item number. You cannot change the item master, but you can change the CM item. You change the part in the CM Item Master (CM) application and you can change the cross-reference to an item record in Maximo Asset Management.

### Example of the addition of a local item to the Maximo Asset Management Item catalog

Your company decides to use conventional means to procure and stock a temporary part. You use the **Add to Item Master** action in the CM Item Master (CM) application to add the part to the Item catalog in Maximo Asset

Management. You also create or update a cross-reference between the CM Item and Item Master records.

### Example of a software item

As a configuration engineer for a national rail operator, you are responsible for defining and managing the configuration of complex assets. You can create a CM item that is identified as a software item so that you can effectively manage the configuration of the train to ensure safety and regulatory compliance. In the CM Item Master (CM) application, you create a CM item and specify that the category of the item is software. The category is copied from the CM item master to the build item category in the model. In the Models (CM) application, you can open the **Build Hierarchy and Position Rules** tab and view the software item. The value of the **Indicator** field is W, which indicates that the CM item is software. You can select the **Software** icon to view the software-associated items.

### Configuring CM items

A default configuration-managed (CM) item is created when you define a model. You create and modify CM items in the CM Item Master application.

#### Before you begin

Before you can create a CM item, you must first create the related model in the Models (CM) application, create master PMs for the CM item in the Master PM (CM) application, and create an asset assembly in the New Asset Assemblies (CM) application.

#### Procedure

1. In the CM Item Master (CM) application, click the **New CM Item** icon.
2. In the **Part** field, specify a value.
3. Optional: Specify a revision to the part.
4. Specify the format of known serial numbers that are associated with the part.
5. In the **Item** field, specify the value of the corresponding IBM Maximo Asset Management item number.
6. If the CM item is for software, in the **Category** field, select **Software**.
7. In the Serial Ranges for CM Item table, add a new row and specify values in the **Serial Range UOC** and **Serial Range Expression** fields.
8. In the Master PMs for CM Item table, add a new row and specify a value for the master PM.
9. Save the CM item.

### Creating item masters from CM items

You can associate a configuration-managed (CM) item with one or more assets which are automatically defined as rotating items.

#### About this task

The Item Master(CM) application adds the part as if you added it by using the Item Master application. If you plan to use the new item in applications other than the Maximo Asset Configuration Manager applications, add information in additional fields as needed.

## Procedure

1. In the Item Master (CM) application, select the CM item.
2. Select the **Add to Item Master** action.
3. Click **OK**.

## CM item masters

You use the CM Item Masters application to view configuration-managed (CM) item master records that are related to item master records. You can also define items that are stocked in your storerooms and group them in an item set that can be shared by the organizations that use the item set.

When you create an item record, define the main attributes, such as the commodity codes, the order, and issue units, and whether an item is lotted, rotating, or condition-enabled. You can also specify any alternate items that you can use in its place and a list of the condition codes that you want applied to the item. The safety hazards and tax codes that you apply to an item are specific to a single organization.

Use the Item Master (CM) application to perform the following tasks:

- Create condition-enabled items to track the value of an item as its condition changes.
- Create item kits that are collections of items that you issue as a single unit.
- Add items to one or more storerooms.
- View CM item master records that are related to item master records.
- Specify the safety hazards and tax codes that vary by organization.
- Define other information related to an item, such as vendors that carry the item, specifications for the item, and the parts needed to build an item assembly structure.
- Attach outside documents that relate to an item.



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## Chapter 8. Maintaining production assets

When working with production assets, you create and maintain operational in-service data. This data refers to the information you need to complete your daily tasks, such as creating an asset record, installing it to a build position, creating asset assemblies, adding meter readings, creating preventive maintenance records, and managing history.

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### Creating assets

Configuration-managed assets are the physical representation of the models and items that you define in the reference data. You can validate changes to the status of the asset based on the configuration rules and the reference data that is specified in the associated model.

### Configuration-managed assets

The information for the physical builds of aircraft and other complex configuration-managed (CM) assets are stored in asset records. Assets are tracked and can be validated according to configuration rules and the reference data in models.

Using the Assets (CM) application, you can perform the following tasks:

- Search for asset records.
- View, modify, add, or delete production assets.
- Create the asset hierarchy and view the subassemblies and parts of an asset.
- View, modify, add, or delete safety records for an asset.
- View or add metering information for an asset.
- View the initial (anchor), indirect (derived), and direct readings for each meter installed on an asset.
- Add, view, modify, or delete unplanned maintenance events that were open on a date that you specify. Unplanned maintenance is related to problems recorded on trip logs.
- View and download all of the preventive maintenance records and technical records that are associated with an end item and all of its child assets.
- Specify or view the specification for the asset as recorded in the Classifications application.
- View the history of the asset, alerts, and warnings that are issued by the build data interpreter.
- Create and view maintenance plan projections.
- Change the registration number, serial number, or CM item for the asset. For example, you can change the tail number of an aircraft.

### Configuration rules

Configuration rules that apply to aircraft and equipment, are rules that are used to validate compliance with the model. The build data interpreter (BDI) uses the configuration rules to determine whether an asset complies with the reference data in the corresponding model.

Configuration rules exist for the following elements:

- Build positions
- CM items
- Labels
- Maintenance plans
- Formulas

Configuration rules can be positive or negative. A positive rule indicates that the corresponding build position, CM item, or other element is valid for the corresponding model or variation and build position. A negative rule indicates that the build position, CM items, or other element is not valid.

A rule is positive if the corresponding check box on the applicable subtab is selected, and a rule is negative if the check box is clear. You enable and disable configuration rules on the subtabs of the **Position Rules** tab in the Models(CM) application.

If an asset does not comply with the rules for the corresponding configuration, the build data interpreter (BDI) identifies the unusable asset in the Assets (CM) application. For example, the build data interpreter identifies an asset that contains a CM items where the configuration rule is disabled for that model.

Configuration rules can be primary or secondary. You can enable or disable a primary rule on the subtabs of the **Position Rules** tab. A secondary rule is dependent on a primary rule. You create secondary rules, in the form of Boolean expressions, on the **Advanced** tab of the Models (CM) application.

#### **Converting assets to new configurations:**

After you check the build data interpreter (BDI) status of an alternative configuration for an asset, you can convert the asset to the new configuration. Converting to a new configuration can result in the creation or removal of maintenance events or positions.

#### **About this task**

When you use the BDI to convert assets, the following actions are performed:

- Primary and secondary configurations are converted.
- The new configurations that you convert become the current configurations.
- Any required maintenance events or build positions are created.
- Details about any noncompliant components are listed in the Problems table.

#### **Procedure**

1. In the Assets (CM) application, select an asset and click the **View** tab.
2. Specify the date on which you want to use the configuration for the asset.
3. Select **BDI Status** action.
4. In the Alternative Configurations tab, select alternative configuration options from the list of configurations that are available for assets with the current model. The available configurations are grouped by type and you can select just one configuration for each type.
5. Click **Validate Configuration**. The Configurations Status for Selected Configurations table refreshes and lists any problems with the alternative configuration.

6. Click **Apply Configuration** to convert to the alternative configuration or click **Reset** to restore the original configuration.
7. Click **OK** and save the asset.

### Updating the status of asset configurations:

You can update the status of any asset configuration. When you update the status of the current configuration, the application creates any required maintenance events and build positions for the current configuration.

#### Procedure

1. In the Assets (CM) application, select the asset and click the **View** tab.
2. In the **As Of Date** field, specify a past date or the current date.
3. From the **Select Action** menu, select **BDI Status**.
4. Select the configuration you want to update.
5. To prevent the build data interpreter (BDI) from updating the asset to the latest allowed revision,
  - a. Specify the required revision number in the **Revision** field.
  - b. Select the **Hold Revision** check box.
6. Click **Validate Configuration**. The BDI checks the selected configuration and provides details about any noncompliant asset in the Problems table.
7. Save the asset.

### Downloading all PM and technical records for CM items

You can download a snapshot of your maintenance program from any date for any configuration-managed item. Downloading the PM records and technical records that comprise your maintenance program can help ensure correct maintenance and adherence with regulatory requirements.

#### About this task

If you have large maintenance program, you can download the snapshot of the maintenance program asynchronously in the background to limit any potential issues with system performance. To download in the background, specify an email address and use the **Download via Email** button. After the download of the maintenance program is completed, a notification email that contains an attachment is sent to the specified email address.

#### Procedure

1. In the Assets (CM) application, on the **View** tab, open the **Maintenance Plan** tab for the asset, and click **Display All**.
2. In the Maintenance Program dialog box, specify the filter criteria to identify which PM records that you want to download. The **As of Date** field is used to determine which PM records were active for the asset hierarchy at the specified time.
3. Click **Refresh**.
4. Click **Download**.

### Validation of the status of operational assets

The build data interpreter (BDI) validation service checks aircraft and other configuration-managed assets, position by position. The BDI ensures that assets comply with the configuration rules defined for the associated models.

By using the **BDI Status** action, you can see the status of noncompliant assets, including problem codes and reasons for noncompliance. Other windows and tabs in the Assets (CM) application are color-coded to indicate the severity of noncompliant assets.

The following table lists the status information that the BDI validation service generates.

Color of text	Problem code	Error or informational message	Cause of error
Red	AOG	Aircraft is AOG	An open aircraft on ground (AOG) work order exists for the asset.
Red	BMR	Invalid position	The BDI validation service cannot find a valid configuration-managed build for the asset.
Red	EBD	Event overdue	An open maintenance event exceeds the due date or meter reading.
Red	ENR	Event needs review	Someone must validate the active date on a maintenance event that was created by the BDI validation service.
Red	ISR	Invalid install/remove history	Overlapping installation or removal history exists for the asset or for a position on the asset.
Red	SEI	Empty mandatory position	A mandatory build position is empty.
Red	SIR	Invalid part installed	Because of the established configuration rules, the part installed in the build position is not valid for the model, variation, or revision.
Red	SMM	Missing mandatory position	A mandatory build position is missing. If the BDI validation service updates or converts the configuration, a position is created and the status becomes an empty mandatory position (SEI).
Red	SSR	Duplicate part/serial	Multiple assets have the same CM item and serial number.
Red	XDP	Invalid part installed	The part that is installed in the build position is not valid because of a cross-structural or higher part check in the established configuration rules.
Amber	EBW	Event beyond warning	An open maintenance event exceeds the warning date or meter reading.
Amber	NAD	Non-AOG discrepancy	An open non-aircraft on ground incident exists.
Green	BMD	Empty extra position	According to the configuration rules, an existing empty build position is unnecessary. When the build data interpreter updates or converts the configuration, the build position is removed.
Green	EID	Extra event	According to the configuration rules, an existing maintenance event is unnecessary. If no associated work order exists, the build data interpreter removes the maintenance event when the configuration is updated or converted.
Green	EMC	Event missing	A required maintenance event is missing. When the build data interpreter updates or converts the configuration, it creates the maintenance event.
Green	SMO	Missing optional position	An optional build position, which the configuration rules require, is missing. When the build data interpreter updates or converts the configuration, it creates the build position.
Blue	SEO	Empty optional position	Empty optional positions exist, but they are valid.
Black	EBA	Event beyond alert	An open maintenance event exceeds the alert date or meter reading.



Color of text	Problem code	Error or informational message	Cause of error
Black	SED	Empty mandatory deferred position	An existing mandatory build position is empty, but an associated deferred work order exists.

You can use the **BDI Status** action to check compliance at any time.

#### Color-coding in the Assets (CM) application:

Various windows and tabs in the Assets (CM) application are color-coded to indicate the severity of noncompliant assets. You can see at a glance which assets are compliant and which have problems.

The BDI Status window lists the status and cause of noncompliance. You access this window through the **BDI Status** action in the Assets(CM) application.

The following table lists the subtabs and windows that contain color-coded data:

Tab, subtab, or window	Access through
List tab	-
View tab (display of asset structure)	-
Maintenance Plans subtab	View tab
Maintenance History subtab	View tab
Select Value (Asset field) icon	Install/Remove > Install/Remove action
Build Data Interpreter Status window	Build Data Interpreter Status action

The following table lists the meaning and general status of color-coded data:

Color of text	Description	Status of asset
Red	Indicates a serious problem.	INVALID
Amber	Indicates a maintenance problem that can lead to a serious problem if no one corrects it.	WARNING
Green	Indicates that the build data interpreter found a missing maintenance event or build position when it checked the status of an alternate (non-current) configuration. When the build data interpreter converts the configuration, it creates the missing record.	CONVERSIONS PENDING
Blue	Empty optional position, but configuration is valid.	OK
Black	No problem.	OK

### **BDI queue status:**

The BDI Queue Status (CM) application is used to monitor the processing of assets by the build data interpreter (BDI). The statuses of the assets and the long description for eventual errors in processing are displayed for analysis and correction.

The statuses can be one of the following values:

#### **COMPLETE**

The BDI has finished processing the asset.

#### **ERROR**

The BDI found an exception during processing. The error message and Java stack trace are displayed to the user. This section is collapsed by default.

### **Cost accumulation**

Costs are accumulated whenever you create a work order to maintain an asset. Costs are also transferred in the hierarchy to the parents of the asset being maintained.

For example, if you have a hierarchy of three assets in which asset one is the parent of asset two and asset two is the parent of asset three, costs for work on asset three are transferred to asset two and asset one.

## **Asset Roles and Capabilities application**

You can create, assign, and edit asset roles and capabilities. Roles specify the capabilities that an asset requires to perform the role.

### **Asset capability records**

In the Asset Roles and Capabilities application, you can create five types of asset capability records:

#### **Capability**

Describes a required dependent asset capability.

#### **Specification**

Describes a required part number specification name and value.

#### **Variant**

Describes a variant configuration that the asset must comply with.

#### **System**

Describes a system variation that the asset must comply with.

#### **Technical Record**

Describes a technical record that must be fulfilled by the aircraft.

You can associate a role record with multiple asset capability records, and the asset capability records inherit the properties of the role record. You can also assign a role record to multiple aircraft records, and both the role record and any associated asset capability records inherit the qualities of the aircraft.

### **Roles and Capabilities tab**

On the **Roles and Capabilities** tab, you can view and edit role and asset capability records.

If the current record is a role or asset capability record, you can specify details about the record in the **Definition** and **Advanced** subtabs. In the **Definition** subtab, you add a new row to create a new asset capability record or to select an existing record. In the **Advanced** subtab, you can view or edit configuration specification language (CSL) statements for the child asset capability records that are in the **Definition** subtab. CSL statements describe the relationship between the records. Any changes to the CSL statements are validated when you save the parent record.

When you create a new record, the record is automatically put in PNDREV status. If you change the status of a parent capability or role record to ACTIVE, all child records that are in DRAFT or PNDREV status are automatically made ACTIVE. To delete a record, the record must be in DRAFT status. A role record cannot be put in INACTIVE status if it is assigned to one or more assets.

You can revise a record by using the Revision action. When you revise a record, the older version of the record is saved in a REVISED status and does not appear on the List tab. The newer record is given the higher revision number and set to PNDREV status. To delete a record or cancel a revision of a record, the record must be in PNDREV status

## Related Assets tab

On the **Related Assets** tab, you can view the assets that are related to a role record. You associate an asset with a role in the Assets application by using the BDI Status dialog box. After you apply a role to an asset, you can validate the association to ensure that the asset meets the requirements of the role.

## Creating production assets

Configuration-managed assets are the physical representations of complex models and items that you define in the reference data. You can validate operational changes to the status of the asset based on the configuration rules and the reference data that is defined in the model.

### Procedure

1. To create production assets choose one of the following options:

Option	Description
To create production assets	Select the Assets (CM) application.
To create configuration-managed assets	Select the New Asset Assemblies (CM) application.
To create an asset that is not configuration-managed	Select the Assets (CM) application.

2. In the Assets (CM) application, click the **New Asset** icon.
3. Specify a value for the asset.
4. Specify values for the position, CM item, and rotating item.
5. If the asset is an end item and you entered a CM item, specify values for the registration, model, configuration, and revision.
6. Save the asset.

## Adding direct readings to assets

You can add actual or delta meter readings for an asset. You can specify meter readings for any date and time after an asset is created. The asset life is calculated based on the date that you specify for the meter reading.

### Before you begin

Before you add meter readings to an asset in the Assets (CM) application, you must set the initial readings on the related asset.

### Procedure

1. In the Assets (CM) application, on the **List** tab, select an asset record.
2. On the **Direct** subtab of the **View** tab, specify a meter reading for the parent asset or child asset.
3. Specify a meter name and a meter reading type.
4. Specify a count date and time.
5. Specify a meter value. If you specify an actual meter reading, the system calculates the delta meter reading and vice versa.
6. Click **OK** and save the record.

## Editing asset life offsets

Life offsets affect the calculation of meters and can result in different meter readings. The end item count at installation and end item count at removal are life offsets. You can edit the life offset of child assets.

### Procedure

1. In the Assets (CM) application, on the **List** tab, select an asset record.
2. On the **View** tab, specify the as of date information.
3. On the asset V-tree, right-click the node that you want to edit and select **Edit Offsets**.
4. Specify values for the actual count for the end item count at installation and at removal.
5. Click **OK** and save the record.

## Installing assets in serialized build positions

When you have assets that have serial numbers and are classified as rotating items, you can install the assets in serialized build positions.

### Procedure

1. In the Assets (CM) application, select the top-level asset, and click the **View** tab.
2. In the **As Of Date** field, enter the date on which you want to install the asset.
3. Right-click the node that contains the build position to which you want to install the asset and select **Install/Remove**.
4. Specify the installation details.
5. Optional: Specify the associated work order and end item count.
6. Save the asset.

### Results

The application updates the record. If you installed the asset to a position where an asset was already installed, the build data interpreter (BDI) creates a position.

The BDI then installs the assets in a new position.

### Installing assets in non-serialized build positions

A non-serialized asset is a representation of a part, such as a screw or bolt, that does not have a serial number but is required by the designed model. You can track non-serialized assets by specifying the minimum and maximum quantity required in a non-serialized build position.

#### About this task

In the Assets (CM) application, the non-serialized build positions are identified in pink within the asset V-tree hierarchy. For example, a fuel pump mounting is a tracked asset that has a serial number. The 12 bolts that secure the pump to the structure are vital to the integrity of the asset but they are not tracked as serialized parts. The 12 bolts are defined as a non-serialized position with a maximum quantity of 12 and a minimum quantity of 12. When the asset is validated, the quantity of bolts installed is evaluated.

#### Procedure

1. In the Assets (CM) application, select the top-level asset and select the **View** tab.
2. In the **As Of Date** field, enter the date on which you want to install the asset.
3. Right-click the node that contains the build position and select **Non-Serialized Build Position**.
4. Add a new row.
5. Specify the installation details.
6. Specify the number of assets that you installed in the build position, the date and time when you installed the assets in the build position, and the work order associated with the installation.
7. Optional: Add comments about the installation in the **Memo** field.
8. Click **OK** and save the asset.

### Removing assets from serialized build positions

You can remove assets from serialized build positions. For example, if maintenance needs to be done on an asset, you can remove the asset to complete the maintenance.

#### Procedure

1. In the Assets (CM) application, select the top-level asset and click the **View** tab.
2. Right-click the node that contains the build position where the asset is installed and select **Install/Remove**.
3. Select the **Remove Asset** check box.
4. If you plan to move the asset to a new location, specify a value in the **Remove to Location** field.
5. If the removed asset requires a work order, specify a value in the **Follow on Work Type** field so that a work order is created for the removed asset.

### Removing assets from non-serialized build positions

You can remove assets from non-serialized build positions. To remove assets entirely, enter a negative value. For example, if you have a non-serialized build position that contains 12 bolts that hold a fuel pump assembly in place, enter -1 if you removed all of the bolts.

### Procedure

1. In the Assets (CM) application, select the top-level asset and click the **View** tab.
2. Right-click the node that contains the build position and select **Non-Serialized Build Position**.
3. Add a new row.
4. Specify the removed asset information.
5. In the **Quantity** field, specify the number of assets that remain in the build position or specify a negative number if you removed all of the assets from the build position.
6. Specify the date and time when you removed the asset in the build position and the work order associated with the removal.
7. Optional: Add any comments you need about the removal in the **Memo** field.
8. Click **OK**.
9. Save the asset.

### Managing assets in your inventory

You can manage assets as part of your inventory from within the Assets (CM) application. For example, you can change item numbers, issue items from a storeroom, and apply item assembly structures to assets.

### Updating the installation and removal history of asset records

If an incorrect date is entered for the installation or removal of an asset, you can update the history to correct the error.

### Procedure

1. On the **View** tab in the Assets (CM) application, in the **As Of Date** field, specify the current date or a past date.
2. Locate the node and asset that you want to update.
3. On either the **Parent History** subtab or the **Child History** subtab, change or remove the installation date or removal date.
4. Save the record.

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## Creating asset assemblies

To facilitate management of complex assets, you can create a virtual asset assembly and generate asset records for its subassemblies and individual pieces of equipment.

### New Asset Assemblies

Assets can have thousands of tracked components and it can take days to identify and initialize the component data. To facilitate the management of assets, virtual versions of the assets are created by using the associated model.

By using the New Asset Assemblies (CM) application, you can add, view, or modify subassemblies of a new asset assembly. You can also perform the following actions:

- Generate a virtual version of an asset by using the associated model.
- Assign asset numbers and serial numbers to subassembly components.
- Assign meters to end items and the subassemblies of end items.

A new asset assembly remains separate from production assets until you confirm that the new assembly is ready for production. This process is also known as phase in or induction.

### Creation of production assets

After you create an asset assembly and generate its meters and subassemblies, you can modify the asset assembly as needed. When the asset data is verified and ready for production, you can then create the production asset or create asset records for the components of an existing production asset.

You can perform these activities using the **Create Asset** action in the New Asset Assemblies (CM) application. This action checks all the data in the new asset assembly, then generates an asset record for the end item and its components. Depending on the complexity of the asset, this action can take a long time to finish. The newly created assets are then available in the Assets(CM) application.

You can create a production asset only if the status of the new asset assembly is Active. Also, the status of any IBM Maximo Asset Management item masters that are associated with CM items must be Active. After you change the status of a new asset assembly to Active, you cannot update the record.

### System-generated asset numbers and serial numbers

To speed up the creation of records, system-generated asset numbers and serial numbers can be assigned to subassembly components.

The generated values are shown on the **Sub Assembly Details** tab. The **Create Sub Assemblies from CM Build** action uses the following values from the **New Asset** tab to generate prefixes and serial numbers:

Field	Data type	Maximum character length of concatenated prefix and suffix
Asset Prefix	Alphanumeric	12
Asset Suffix	Integer	12
Serial Prefix	Alphanumeric	15
Serial Suffix	Integer	15

The asset prefix value is used for every asset number that it generates. The asset suffix value is used for the first asset number that it generates. The value is then increased by 1 for subsequent suffixes. For example, if you enter A- in the **Asset Prefix** field and 0001 in the **Asset Suffix** field, the following asset numbers are generated: A-0001, A-0002, A-0003, and so on.

Likewise, the serial prefix value is used for every serial number that it generates. The serial suffix value is used for the first serial number that it generates. The value is then increased by 1 for subsequent suffixes.

## New Asset Assemblies Receiving

Some assets, such as aviation and rail asset assemblies, have thousands of tracked components, which can take days to identify and initialize the component data. To receive multiple assets at a time, you can use the New Asset Assemblies Receiving (CM) application. The New Asset Assemblies Receiving (CM) application features the receipt of either a single asset and subassemblies or multiple assets within a single session.

With the New Asset Assemblies Receiving (CM) application, you can add, view, or modify subassemblies of various asset assemblies at a time. Use the **Multiple assets** and **Apply to all** check boxes to specify the multiple receipt of these assets.

A new aircraft or equipment record is automatically created for all received rotatable parts.

New asset assemblies remain separate from production assets until you confirm that the assemblies are ready for production. This process is also known as phase in or induction.

## Creating asset assemblies

An asset assembly defines an asset and generates virtual asset records for its components and subassemblies. You can generate virtual asset records for the components and subassemblies of a new or existing asset.

### Procedure

1. In the New Assets Assembly (CM) application, create a record.
2. Optional: If you want to generate a virtual assembly for an existing asset, specify a value in the **Existing Asset** field.
3. Specify the configuration-managed (CM) item and model for the asset.
4. Specify the status that you want to assign to the asset when it is generated.
5. Optional: Modify the receipt date if required.
6. Specify the spare parts, measurement points and warranty contracts to generate when the asset is created
7. Generate the asset numbers and serial numbers:
  - To generate asset numbers for the subassembly components, specify values in the **Asset Prefix** and **Asset Suffix** fields.
  - To generate serial numbers for the subassembly components, specify values in the **Serial Prefix** and **Serial Suffix** fields.
8. Save the asset assembly. The application saves the new asset assembly with a Draft status.

### Specifying initial meter readings

After you generate a list of meters, you can assign an initial reading to a meter. Specifying the initial meter readings provides more data when the assembly becomes ready for production. You can perform this procedure only if the status of the new asset assembly is Draft.

### Procedure

1. In the New Assets Assemblies (CM) application, select the new asset assembly that you want to update.
2. In the **New Asset** tab, in the **Meters** tab, select the meter that you want to update.
3. Specify a date for the initial reading.
4. Specify a value for the initial count.
5. Specify the average calculations information. You can only use continuous or delta meters.

Option	Description
To use all readings to calculate the average:	Specify All.



Option	Description
To use a specific number of days to calculate the average:	Specify <b>Sliding Days</b> . In the <b>Sliding Window Size</b> field, specify the number of days.
To use a specific number of readings to calculate the average:	Specify <b>Sliding Readings</b> . In the <b>Sliding Window Size</b> field, specify the number of readings.
To set the average reading and never recalculate it:	Specify <b>Static</b> . In the <b>Average Units/Day</b> field, specify the value to use to calculate the average.

6. Save the asset assembly.

## Specifying subassembly details

You can add, view, modify, or delete the components, meters, and initial readings associated with a subassembly. You can update this information only if the status of the new asset assembly is DRAFT.

### About this task

In the Models application, on the **Build Hierarchy and Position Rules** tab, on the **Position** subtab, the **Default Quantity** field affects how many rows are added to the Sub Assemblies table. For example, if the value in the **Default Quantity** field is 5, then five rows are automatically created in the Sub Assemblies table.

### Procedure

1. In the New Asset Assemblies (CM) application, select the new asset assembly that you want to update, and click the **Sub Assembly Details** tab.
2. Optional: Specify or update values in the Sub Assemblies table.
3. To show the meters and initial readings that are associated with a subassembly, select the subassembly from the Sub Assemblies table.
4. Optional: Specify or update values that are in the Initial Readings table.
5. Save the asset assembly.

## Generating meters for new asset assemblies

To increase efficiency and reduce risk of error when setting up new asset assemblies for complex assets, you can generate a list of meters. The meter information is retrieved from the corresponding model.

### Procedure

1. In the New Asset Assemblies (CM) application, select the new asset assembly for which you want to generate a list of meters.
2. From the **Select Action** menu, select **Create Meters from CM Build**.
3. Save the asset assembly.

## Assigning meters to end items or subassemblies

You can assign a meter to the parent record in an asset assembly and you can assign the meter to the parent records of subassemblies. You can also specify initial meter readings to prepopulate the records that will be created.

### About this task

This procedure applies only if the status of the new asset assembly is Draft.

### Procedure

1. In the New Asset Assemblies (CM) application, on the **New Asset** tab, select the new asset assembly.
2. Assign the meters:
  - To assign a meter to the end item, select the corresponding **Copy to End Item** check box in the Initial Readings table.
  - To assign a meter to every subassembly in the new asset assembly, select the corresponding **Force Copy to Sub Assemblies** check box.
3. Save the asset assembly. The **Sub Assembly Details** tab shows the meters that apply to subassemblies.

### Generating subassemblies

To increase efficiency and reduce risk of error when you are setting up new asset assemblies for complex assets, you can generate subassemblies for a new asset assembly. You can perform this action only if the status of the new asset assembly is Draft.

### Procedure

1. In the New Asset Assemblies (CM) application, select the new asset assembly for which you want to generate subassemblies.
2. On **New Asset** tab, specify the asset numbers or serial numbers.
3. From the **Select Action** menu, select **Create Sub Assemblies from CM Build**.
4. Save the asset assembly.

---

## Managing changes to asset attributes

Asset attribute change records provide the ability to track and report on changes throughout the life of the asset aircraft or piece of equipment.

### Asset attributes

Asset attributes are user-defined attributes that you can create and use to maintain a record of attribute changes over the life of an asset. Each time the attribute value is changed, the date and time of the change is recorded. You can also choose to record a meter count when an attribute value is changed.

You define the name of the attribute and a list of possible values in the Asset Attributes Setup (CM) application. In the Asset Attributes (CM) application, you can create asset attribute change records to create, manage, and assign an attribute change that is applied to an asset. You also can add new asset meter values when an attribute change record is created. Asset attribute change records track and report on changes throughout the life of the asset.

In the Assets (CM) application, you can view the asset attributes and the attribute changes. The asset attribute, the attribute changes, and the meter values are shown from the date that you select in the **As of Date** field. Meter reading values are recorded in the Life at Asset Attribute Change window. The asset meter readings and the attribute values are used to update the meter life value of an asset.

### Asset meter life

Highly regulated and safety-critical environments track and manage complex asset. Typically, multiple asset meter readings, also known as meter life values, are recorded to track asset meter use. An asset meter can record flying hours, cycles, miles traveled, or engine starts.

Two types of meter readings are used to track asset:

- An actual or hard count records the current asset meter reading.
- Delta or soft count records the difference between the last asset meter reading and the current asset meter reading.

## Creating asset attribute change records

An asset attribute change record applies an attribute change to an asset. Asset attribute change records provide the ability to track and report on changes throughout the life of the asset.

### Before you begin

To ensure that asset attributes are available for selection, you first must create attribute values in the Asset Attribute Setup (CM) application.

### About this task

When you save an attribute change record, it becomes read-only and cannot be modified. You can view the asset attributes and the asset attribute changes in the Assets (CM) application. The attributes and the attribute changes are listed based on the value specified in the **As of Date** field.

### Procedure

1. In the Asset Attributes (CM) application, click the **New Asset Attribute** icon.
2. Specify the asset, attribute name, value, and change date.
3. Optional: In the **Comments** field, specify notes that are associated with the attribute change.
4. Save the record.

## Updating meter readings for assets

To maintain accurate records and update any incorrect meter readings, you can change initial or direct meter readings for assets retrospectively.

### Procedure

1. In the Assets (CM) application, select the top-level asset and click the **View** tab.
2. In the **As Of Date** field, specify the current date or a past date. The application displays the asset structure as it existed on the specified date.
3. Click the node that you want to update.
4. Click the type of meter you want to update.
5. In either the **Initial** subtab or **Direct** subtab, add a meter reading or change the date of the meter reading.
6. Save the asset.



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## Chapter 9. Maintaining aircraft by using flight log books

Similar to paper-based log books, flight log books provide an electronic record of flight information and maintenance operations for aircraft and aircraft training devices. When maintenance is required, you can log discrepancies and corrective actions.

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### Flight log books

A flight log book holds information for one aircraft only. During the lifecycle of the aircraft, the same flight log book is used to record and maintain information about that specific aircraft. The flight log book includes information about the aircraft and its flight data, discrepancies, maintenance, and personnel.

#### Flight log book setup records

Flight log books are used by the defense and commercial aircraft sectors to report aviation quality and maintenance. The number of engines, fuel tanks, and replenishment types for an aircraft can vary. To accommodate these variations, you create flight log book setup records that are used as templates to report your type of aircraft maintenance.

A flight log book setup record is a template for the specified model and variation. For example, you create a flight log book setup record for the x\_jet model. This fighter jet has two engines, three fuel tanks, and two types of munitions. A flight log book that is created for an x\_jet aircraft automatically shows and collects data for the two engines, three fuel tanks, and two types of munitions. If you do not specify a variation, then the flight log book setup record applies to all variations of the model.

#### Flight log book records

Flight log books provide an intuitive way for pilots, mechanics, and flight engineers to view and record data that is related to aircraft serviceability. When flight log books are in the active status, you can add flight data records to document information about flight data, personnel, replenishments, and munitions.

A flight log book tracks an aircraft through its lifecycle by displaying and collecting information that is related to the following statuses:

##### Flight log book status

Indicates that status of the flight log book record, such as draft, active, inactive, or locked. When you create a flight log book, it is in the draft status. You cannot add flight data records until you change the status of the flight log book to active. The status of the flight log book is not linked to the serviceability of the aircraft.

##### Aircraft status

Indicates the current condition of the aircraft, such as grounded, limited release to service, or released to service. The aircraft status is directly linked to open discrepancies. Only one aircraft status is associated with each flight log book record.

### Discrepancy status

Indicates whether faults exist that affect the serviceability of the aircraft. If there are multiple discrepancy records, the one with the most severe status is linked to the aircraft status. For example, a flight log book has two discrepancy records. One discrepancy relates to a broken light, and the aircraft is allowed to fly under certain conditions. The other discrepancy relates to a crack in the fuselage, which requires immediate attention. Because of the severity of the second discrepancy, the status of the aircraft is grounded.

### Deferral status

Indicates the status of a discrepancy that is deferred for later action. A deferral is a formal process for delaying the completion schedule of maintenance items. A deferral might be required for reasons such as the inability to obtain spare parts, accessibility, or operational imperatives.

You create flight data records to store the details that are associated with the aircraft's flights, such as departure and arrival times, on-block and off-block times, intermediate stops, meter values, personnel details, and replenishments. Only one flight data record can be active at a time.

You can use the inventory applications to track replenishments and munitions by using the inventory issues and returns processes. For non-rotating returns, you can select the default item for a replenishment. For configuration managed munition assets, you can select from the list of candidate items based on the configuration rules that are associated with the build item.

If you are tracking munitions in the inventory applications, you can track the loading of munitions, expending of munitions, and unloading of munitions on active flight log book records. You can track both rotating items, such as air-to-air missiles, and non-rotating items, such as cannon rounds. The tracking of non-rotating items stops after they are expended.

When you are tracking munitions, you add a row in the **Munitions** tab, select an option from the **Type** field for the process that you are tracking: LOAD, EXPENDED, or UNLOAD. You then select the build item. You are then able to enter data into the fields based on whether the munition is rotating or non-rotating, and the total quantities are automatically calculated. After you save the record for a rotating munition, the transaction is validated and the asset move occurs. For example, if you are recording a loading of an air-to-air missile, you select the serial number and can optionally select a work order. When the record is saved, the missile is installed on the asset, because it was previously issued from the storeroom to the asset, location, or work order.

Flight log books provide a way to track maintenance issues through the creation of discrepancy records. When the flight log book is active, you can create discrepancy records that are related to a flight data record. You can define post-flight inspection procedures in the flight log book setup record. Then, when you create a flight data record, a discrepancy is automatically created to ensure completion of the post-flight inspection. You can create a discrepancy for a work order when a work order is created. You can also create a discrepancy after a work order is created by using the **Create Discrepancy** action. You can also set mandatory failure reporting and include additional details on failures, such as failure codes and failure classifications. If a discrepancy exists for a work order, the **Related Discrepancy** check box for the work order record is automatically selected.

Discrepancy records require corrective action to ensure that the aircraft is maintained according to regulatory requirements. The discrepancy record includes a code for the planned corrective action, a failure code, and a failure classification. When you save the discrepancy record, the discrepancy status is grounded. Depending on your security profile, you can change the status of the discrepancy record to allow usage of the aircraft. For example, if the fault does not affect the structural and mechanical integrity of the aircraft, you can change the status to limited release to service in accordance with regulatory requirements.

## Revision of flight log book setup records

If changes to the template are required, the flight log book setup record is raised in revision and the status is changed to pending revision. After you save the changes, you can set the status of the flight log book setup record to active.

You can change the flight log book type for a specific flight log book and apply the latest revision of the flight log book setup record. For example, a new munition type is added to the flight log book setup record of the x\_jet model. You can open a flight log book for a specific x\_jet aircraft and change the flight log book type to the latest revision. Then, the flight log book of the x\_jet aircraft includes information for this new munition type.

You can apply this action to multiple flight log books by selecting the same flight log book setup record from the **List** tab of the Flight Log Book application.

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## Enabling the inventory management process for flight log books

The inventory issue and returns process can be used for replenishments and for the loading and unloading of munitions in the Flight Log Book application. When you track replenishments and munitions in the inventory applications, you can more accurately manage your inventory and can conduct replenishment and munitions firing analysis for your entire fleet.

### Procedure

1. In the Organizations (CM) application, select an organization, and then select **Select Action > CM Options**.
2. Select the check box for managing fuel, replenishments, and munitions in the inventory applications.
3. In the Item Master (CM) application, create default CM items for the fuel, replenishments, and munitions that your fleet uses.

---

## Creating flight log book setup records

The flight log book setup record provides the flexibility to create a flight log book record that is tailored to an aircraft and the regulations that are required in the country of registration of the aircraft. You create a flight log book setup record to configure how the flight log book record displays and collects information for a specific aircraft.

### Procedure

1. In the Flight Log Book Setup application, click the **New Record** icon, and specify the type of the flight log book setup record.
2. In the **Flight Log Book Setup** tab, specify the model and configuration. The combination of model and configuration must be unique for each active flight

log book setup record. If the flight log book setup record applies to all configurations of the selected model, do not specify the configuration.

3. Optional: In the **Details** section, specify whether munitions are used.
4. Optional: Specify whether status symbols are displayed in the flight log book record. Default symbols identify the statuses of the flight log book setup records and the flight log book records. If your implementation requires different symbols, you must provide the icons in a .gif file for each of the statuses.
5. Optional: Specify whether failure reporting is mandatory. Mandatory failure reporting requires that the pilot or mechanic provide details of the failure in discrepancy records.
6. Optional: Specify whether post-flight inspections are required. If post-flight inspections are required, add a job plan to the record.
7. Specify engines, meters, fuel tanks, and replenishments that represent the build items in the associated model and configuration.
8. Optional: Specify the munitions details.
9. Change the status of the record to ACTIVE.

### What to do next

In the Flight Log Book application, create flight log book records for the aircraft in your fleet. The flight log book record is automatically based on the flight log book setup record that exists for the aircraft model and configuration.

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## Managing flight log book records

After you create a flight log book record, you create a flight record for each flight, recording the flight details, meter readings, and replenishment requirements. You can associate a flight record with discrepancy records and you can defer discrepancy records.

### Creating flight data records

After a flight is completed, you create a flight data record to store information on the flight's arrival and departure times, meter data, personnel, aircraft status, and replenishments.

#### Before you begin

Only one flight data record can be active at a time. If an existing flight data record is active, you must change the status of the record to closed before you can save a new flight data record.

#### Procedure

1. In the Flight Log Book application, open the aircraft's flight log book.
2. On the **Flight Record** tab, update the meter data for the block hours, flight hours, flight cycles, and aircraft aging meters.
3. In the **Flight Data** section, select **New Row** to create a new flight data record.
4. In the flight data record, specify the departure and arrival information for the flight.



5. Optional: Select the **Intermediate Stop** check box to indicate whether the flight includes an intermediate stop. If the flight includes an intermediate stop, specify the arrival time, depart time, on-blocks time, and off-blocks time for the intermediate stop.
6. On the **Flight Crew** sub tab, specify the information for the flight crew.
7. On the **Replenishments** sub tab, specify the information for fuel, oil, and any other replenishments that are used during the flight, such as oxygen or munitions.
8. Save the flight data record.

## What to do next

If you want to update meter data in a new flight data record after the record is saved, select the **Adjustment** check box in the flight data record, and specify the reason for the adjustment in the **Adjustment Reason** field.

Any discrepancies that are discovered during the flight can be associated with the flight data record, but discrepancies cannot be associated with or during an adjustment to a flight data record.

## Creating discrepancies and corrective actions

Depending on the overall aircraft status, you can report discrepancies and change the aircraft status. You can resolve the discrepancy by recording the corrective action and completing the discrepancy. If more work is needed to complete the discrepancy, you can generate the corresponding work orders.

### About this task

If mandatory failure reporting is required for the aircraft, then you must specify failure information on the **Failure Details** tab. Whether failure reporting is mandatory is defined in the aircraft's flight log book setup record.

### Procedure

1. In the **List** tab of the Flight Log Book application, select a record.
2. To report the discrepancy and its corrective action, click the **Aircraft Inspection and Maintenance** tab and specify the details of the discrepancy:
  - a. Specify the discrepancy information and the corrective action. The default discrepancy status is GROUNDED, but you can change it to another status.
  - b. In the **Aircraft Inspection and Maintenance** tab, specify the report type, such as PIREP for pilot reported or MIREP for mechanic reported.
  - c. In the **Failure Details** tab, specify a failure classification and a failure code. When a work order is generated from a discrepancy record, the failure classification and code is included in the work order.
  - d. Optional: To create a work order to complete the correction, click the **Create WO** icon. The work orders that you create are linked to the discrepancy records that you created.
  - e. Optional: To defer the corrective actions, click the **Create Deferral** icon.
3. Save the record.

## Creating deferrals from discrepancy records

If a corrective action for a discrepancy cannot be completed, you can defer the action.

## About this task

You create a deferral from a discrepancy record. When the discrepancy is deferred, the deferral record remains open until the corrective action is completed. Work order records are generated for the corrective actions that you log for the aircraft.

Work orders are always associated with deferrals, and corrective actions are recorded in the work order. When the work order is complete, the deferral status is also changed to complete. The deferral record that is associated with the flight log book is also completed by using the details from the completed work order.

## Procedure

1. In the Flight Log Book application, select a discrepancy record and create a deferral for it. A deferral and a work order are created for the discrepancy.
2. In the Deferrals dialog box, specify the details of the deferral, including time or the meter-based duration. Select the **Adjust** check box if you want the deferral date to update the scheduled completion date of the work order.
3. From the **Work Order** field for the discrepancy, navigate to the new work order and complete necessary information.
4. Select the Deferrals action, and in the Deferrals dialog box, fill in details and activate the deferral. The target start date of the work order is updated with the deferred date.
5. Activate the work order. The active deferral updates the extended due points, which are the meter reading or dates at which inspections or maintenance tasks are due. The information for the extended due points from the flight log book deferral record is shown on the **Maintenance Planning** tab of the Assets (CM) application.

## Results

In the flight log book record, on the **Deferred Maintenance** tab, you can view the updated deferral and discrepancy information.

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## Maintaining logs

You create and maintain logs to track information such as trip details, problems that occurred during a trip, maintenance recommendations, work orders, and crew certifications.

### Use of logs in the maintenance process

You can create and maintain logs. Logs include information such as trip details, problems that occurred during a trip, maintenance recommendations, and work orders. Logs also contain information about the crew and crew certifications.

### Example of problems that require future repairs

A pilot notices a small chip in the windshield during a pre-flight inspection. The pilot reports the problem in the Log Book (CM) application. Maintenance personnel review the log. They determine that the chip does not affect the operation of the aircraft currently, but the windshield requires eventual replacement.

The maintenance personnel escalate the issue to a work order through the Log Book (CM) application. They replace the windshield during a scheduled maintenance visit.

### Example of problems that require immediate repairs

A pilot notices an intermittent hydraulic pressure lamp on the main landing gear during a flight. The pilot records the issue on the **Log Problems** subtab.

Maintenance personnel review the log when the aircraft arrives at the terminal. They determine that the warning light has a short. The maintenance personnel creates a work order to replace the indicator lamp before the aircraft can leave the gate.

### Example of crew certifications

As a matter of routine recordkeeping, the pilot records the following information about the crew in the **Crew Reporting** subtab:

- Time as pilot in command
- Instrument flight time
- Number of cycles

### Example of an asset log

An operator receives an assignment to operate an asset for a specific purpose. As part of the dispatch, an inspector inspects the asset before the asset goes into operation. An inspector can be a member of the maintenance personnel. This inspection can be a formal process with a checklist or an informal process, for example, a walk around the asset to observe it. Depending on the number and type of discrepancies that the inspector finds, maintenance personnel might remove the asset from operation. The inspector records any noted discrepancies which maintenance personnel review.

During the operation of the asset, the inspector also notes and records any discrepancies. Upon completion of the operation, maintenance personnel review the discrepancies.

Maintenance personnel can clear recorded discrepancies or convert them to work orders. If maintenance personnel initiate work orders, the application cross-references the log discrepancy with the work order. Maintenance personnel review previous issues reported against the asset to determine its status.

## Log statuses

You can manage the status of a record in the Log Book (CM) application to ensure that the release to service of the asset is in accordance with regulatory requirements.

Standard status management capabilities can be used in the Log Book(CM) application to clear an asset, for example, an aircraft or rail vehicle, for operation. The following statuses and interaction descriptions are available.

*Table 16. Statuses of log records.*

Status	Description
Active	This status is default when a new log record is created.

Table 16. Statuses of log records. (continued)

Status	Description
Release to service	This status indicates that the asset (aircraft, engine, locomotive) is in a serviceable condition according to the organization regulatory requirements. Log records can have this status even if there are open problem records associated.
Operational	This status indicates that the asset is in an operational state with deferred problems. The log record assumes this status during an operational period with multiple operations/sort activities happening.
Closed	The log record is closed and further changes are not allowed. The log can only be closed if there are no open problem records associated.

## Creating logs

Logs can fulfill the requirements of regulatory authorities, for example, the Federal Aviation Administration (FAA), or internal requirements. Logs include information about any number of trips by the same aircraft.

### Procedure

1. In the Log Book (CM) application, click the **New Log** icon, and specify a log value.
2. Specify the tail number of the aircraft, which is the asset number.
3. Record details of the trip.
4. Report any problems that occurred during the trip.
5. Record the crew and crew certifications.
6. Save the log.

### Adding meter readings to log assets and locations

To ensure the meter life value of the assets are accurate, you can add meter readings to log assets. You specify meter readings as either actual values or delta values, which is the difference between the last reading and the current reading.

### Before you begin

Before you add meter readings to log assets, you must set the initial readings on the related asset.

### Procedure

1. In the Log Book (CM) application, on the **List** tab, select a log record.
2. From the **Select Action** menu, select **Enter Meter Readings**.
3. Select a meter name and a meter reading type. If you specify actual meter readings, delta meter readings are calculated. If you specify delta meter readings, actual meter readings are calculated.
4. Select a value for the count date and time.
5. Specify a meter value.
6. Add a location meter reading and specify any related information.
7. Click **OK** and save the record.

### Creating work orders from logs

You can generate one or more work orders for problems that occurred during a trip. Work orders can be created after a problem has been reviewed by the maintenance personnel and when they determine that a work order is required.

This practice ensures that work orders are not created for problems that are closed by the maintenance personnel during their review.

### **About this task**

When you create a work order, you can select problems from a list. The list contains entries where no work order was not previously created for a log trip, or assets. The list also contains entries where the **Create WO for Related Asset** check box on the **Log Problems** subtab is selected on a problem record.

### **Procedure**

1. In the Log Book (CM) application, select the log and trip for which you want to generate a work order.
2. From the **Select Action** menu, select **Create Work Orders**.
3. Select one or more problems.
4. Click **Create Work Orders**. You can view the corresponding work order number in the **Work Order** field of the **Log Problems** subtab.
5. Save the log.



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## Chapter 10. Managing the purchasing process

To ensure your purchasing process complies with the standards and regulations of your industry, you can create capability records and maintain vendor information for maintenance locations.

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### Purchase requisitions

You use the Purchase Requisitions (CM) application to create and manage purchase requisitions for configuration-managed (CM) items, for supplies, or for services. You can also use this application to create purchase orders from purchase requisitions.

A purchase requisition (PR) is a written request issued internally to a purchasing department to order items or services.

You can create two types of purchase requisitions:

#### **Internal purchase requisitions**

Used for requesting the transfer of materials from another company storeroom.

#### **External purchase requisitions**

Used for requesting the purchase of the necessary materials from an outside vendor. You can specify the vendor.

---

### Purchase orders

You use the Purchase Orders (CM) application to create and manage purchase orders for configuration-managed (CM) items. A purchase order is an authorized order from a purchasing agent or department to an internal supplier or external vendor.

With this application, you can create change orders. You can also generate internal purchase orders against another storeroom. A storeroom-to-storeroom purchase can be thought of as a transfer order or an internal purchase order since the product uses the Purchase Orders(CM) application and the Issues and Transfers application to track these types of item movements.

You can create purchase orders by using the following methods:

- From the Purchase Orders (CM) application
- From the Purchase Requisitions (CM) application
- From a request for quotation (RFQ) in the Request for Quotation (CM) application
- From the Inventory (CM) application using the inventory reorder actions
- From the Purchase Contracts application by creating a release

---

### Request for quotations

You use the Request for Quotations (CM) application to create and manage request for quotations (RFQ) for configuration-managed (CM) items. Based on the quotations, you can assess the vendor who best meets your needs.

An RFQ is a request that you send out to one or more potential vendors. To list a vendor on the Request for Quotations (CM) application, the vendor must have a record in the Companies application. In the Request for Quotations (CM) application, you can specify line items, required delivery dates, and other conditions that you want the vendor to meet for the delivery of an item or a service.

You can create an RFQ for any of the following conditions:

- The stock count of an item is less than a certain level, and you must place another bulk order.
- A requisition is received for an item or for a service that requires a quotation each time because of price or other requirements.
- Someone at your site requests a quote for an item or for a service. It can be for a stocked item or for a non-stocked item, such as a special order.
- You need to do commodity bulk buying for a certain period of time. This is typically for many items with common commodity codes. The quotation might not be copied to a purchase order immediately, but the pricing is set.

When you receive the quotations from the vendors, you insert them into the Request for Quotations (CM) record one line at a time. At the end of the process, you review the quotations and award one quotation for each line. The quotations are then converted to one or more purchase orders or contracts, depending on the procurement flow within your organization.

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## Adding CM items to purchasing records

You can improve the efficiency and compliance of your purchasing process by associating a configuration-managed (CM) item with a line item within the purchasing record. The CM item is then used for validation of the purchasing record

### Procedure

1. In the Purchase Orders (CM), Purchase Requisitions (CM), or Request for Quotations (CM) application, open a record. The status of the record must be WAPPR (waiting for approval).
2. Select the line you want to edit, or add a new line.
3. In the Line Item table, select the **CM Item** check box.
4. In the CM Details table, specify a value, model, configuration, and label for the CM item.
5. Optional: Add a CM capability.
6. Save the purchasing record.

---

## Receipts

In a large enterprise, you can have a centralized purchasing department for several sites. Each individual site receives its own materials and services. The Receiving (CM) application allows both materials and services, including configuration-managed items, to be received and recorded in the database when they are delivered to a site.

You can perform the following tasks using the Receiving (CM) application:

- You can add a conversion factor, for example, from case to each, to the database.
- You can add a unit of measure, for example, feet or gallons, to the database.



- You can receive configuration-managed items.
- You can approve the receipt of an item that requires inspection.
- You can bookmark a record so that you can view it at a later time.
- You can enter asset numbers and other assets data when receiving rotating items.
- You can modify a conversion factor.
- You can modify a unit of measure.
- You can run reports.

---

## Maintenance location records

Detailed information about vendors, manufacturers, and other maintenance locations are contained in the maintenance location records.

Vendors can have parent maintenance locations. A single company can have multiple vendor locations. Using reports, you can determine total year-to-date expenditures with a single organization, regardless of its location. Maintenance location information must be entered in the Maintenance Locations (CM) application first so that other modules, such as Inventory and Purchasing, can access the information.

With the Maintenance Locations (CM) application, you can perform the following tasks:

- You can associate commodity codes with a vendor.
- You can add a commodity group to the database.
- You can add or modify a commodity code in a commodity group.
- You can bookmark a record so that it can be viewed at a later time.
- You can create a maintenance location record.
- You can duplicate a record.
- You can view contract information related to the maintenance location.
- You can delete a record.

The following rules apply to the deletion of maintenance location records:

- Maintenance location records that have been referenced in other applications (such as Purchase Orders, Invoices, and Contracts) might not be deleted.
- Maintenance location records that have associated branch records might not be deleted. To delete a maintenance location record with associated branch records, you must first remove all the branch associations.

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## Capability overview

Capability records contain specialist information about a vendor, manufacturer, or location. A capability is often, but not necessarily, indicated by a license or certificate, signifying proficiency in a particular skill or skills. Some certificates have expiration dates and individuals who hold the certificates must renew them periodically.

You use the Capability (CM) application to create capabilities and certification requirements for capabilities. Using their maintenance location records, you can associate companies with a capability. You can also view capabilities associated with a particular maintenance location record and can renew and change the status of their capabilities.

You can search for capability records; create, modify, view, or delete capabilities; and add, update, or view the maintenance location records associated with a capability. You can renew the certificate and change its status for each company which holds a certificate. You can also view historical capability information for each company for a specific capability.

## Capabilities and purchasing records

Capabilities refer to the approvals, certificates, and other formal records that define the ability of the organization to provide goods and services. Certain industries maintain assets that are subject to regulatory control, and require traceability for items and services relating to maintaining these assets.

You define capability records in the Capabilities (CM) application. A capability is often, but not necessarily, a license or certificate that signifies proficiency in a particular skill or skills. A governing board can award a certificate. Some certificates have expiration dates and individuals who hold the certificates must renew them periodically.

After capability records are created, you can add capabilities to the following types of purchasing records:

- Purchase orders
- Purchase requisitions
- Requests for quotations

To add a capability to a purchasing record, you must first select the **CM Capability** check box on the **Lines** tab. Then you can use the **Select Capability** button on the **Terms and Conditions** tab to select the specific capability.

## Status changes

When you no longer need to use a capability, you can change the status of that record to inactive. You can change the status for a capability record or can change the status for an individual maintenance record. For example, if a certain maintenance location loses its certification, you can change the capability for only that location to inactive. Other locations and vendors can still have the capability.

### Capability status changes

If you change the status of a capability to inactive, that capability cannot be associated with a maintenance location. However, maintenance location records that are already associated with the capability are unaffected by this change in capability status.

In the Capability (CM) application, you use the **Change Status** action to change the status of capabilities.

### Capabilities status changes for maintenance locations

You can change the status of a capability associated with a maintenance location record. The status change of the capability is applicable only for that maintenance location record; the overall status of the capability is not changed.

## Creating capabilities

To track qualifications and ensure that vital maintenance and vending are supplied by qualified individuals, you can create capabilities and certification requirements for capabilities.

### Procedure

1. On the toolbar, click the **New Capability** icon and specify a unique identifier in the **Capability** field. This identifier must be unique within an organization.
2. Specify a description and the type of capability.
3. If a certificate is required for the capability, select the **Certificate Required** check box.
4. Optional: You can specify the duration period and the required use period for the certificate.
5. Optional: You can specify class and category, which are prerequisites for the capability in the Class/Category table.
6. Save the capability.

### Associating maintenance locations with capability records

Some highly regulated industries have requirements that maintenance can only be performed by individuals with specific certifications or qualifications. To track certifications and ensure maintenance is done by qualified individuals, you can associate a maintenance location record with a capability.

### About this task

After the status of a capability is changed to INACTIVE, that capability can no longer be added to the list of capabilities on a maintenance location record. However, maintenance location records that have already been associated with that capability are unaffected by this change in capability status.

For some capabilities, specific class and category are required. Only those maintenance location records that possess the required crafts and skill levels can be associated with such capabilities. If no specific craft and skill levels are required, the capability can be associated with any maintenance location record.

### Procedure

1. In the Capability (CM) application, select the capability record and click the **Associated Maintenance Locations** tab.
2. In the Maintenance Locations table, add a new row and specify the maintenance location.
3. Specify the first year that the company acquired competence in that capability.
4. Optional: Specify the following information about a certification:
  - a. Specify a certificate number.
  - b. Specify the effective date of the certificate.
  - c. Specify a validation date for the certificate.
  - d. Optional: Specify the individual who validated the certificate requirements and the organization that issued the certificate.
5. Save the capability.

### Extending or renewing capabilities

If a location renews its certification, you can extend or renew the existing capability associated with a maintenance location record.

### Procedure

1. In the Capability (CM) application, select the record and click the **Associated Maintenance Locations** tab.
2. In the **Maintenance Locations** table window, view the details for the maintenance location code for the capability that you want to extend or renew.
3. Click **Extend/Renew Capability**.
4. Specify the dates when the certificate was validated.
5. Specify the date when the extension or renewal becomes effective.
6. Click **OK**.

### Adding capabilities to purchase transactions

Capabilities refer to the approvals, certificates, and other formal records that a company holds. These records define the ability of the organization to provide goods and services as detailed in the capability records. Certain industries maintain assets that are subject to regulatory control, and require traceability for items and services relating to maintaining these assets.

### Procedure

1. In the Purchase Requisitions (CM), Purchase Orders (CM), or Request for Quotations (CM) application, select a record and open the **PR Lines**, **PO Lines**, or **RFQ Lines** tab.
2. Select a CM item.
3. In the **Capability** field, specify one of the following options:
  - If no capability is defined for terms and conditions, leave this field blank.
  - If capability is defined for terms and conditions but is not valid, specify N. For example, specify N if the specified vendor does not hold the capability or the capability is expired.
  - If capability is defined for terms and conditions and is valid, specify Y. For example, specify Y if the specified vendor holds the capability and the capability is not expired.
4. On the **PR**, **PO**, or **RFQ** tab, if the vendor holds valid capability, select the **CM Capability** check box in the Vendor table.
5. On the **Terms and Conditions** tab, specify a sequence, capability, and line item.
6. Save the purchase record.

---

## Creating maintenance location records

A maintenance location record contains information about companies that are approved to perform maintenance work. The information includes contact names and addresses, and the capabilities associated with the location.

### About this task

If a company has multiple locations, you can create separate records for each location and associate the records with a parent company record. Company information must be entered in the Companies application first so that other applications, such as Inventory and Purchasing, can access the information.

### Procedure

1. In the Maintenance Locations (CM) application, click the **New Maintenance Location** icon and specify the maintenance location.
2. If the maintenance location has a parent, specify the parent.

3. Specify a description for your maintenance location.
4. Specify the type of company.
5. Specify the currency that the maintenance location uses.
6. Specify the capabilities associated with this maintenance location.
7. Optional: Specify details about the purchasing, payment, and e-commerce.
8. Save the record.

## Identifying maintenance locations at company master level

You can identify maintenance location records at company master level to support your auditing processes. You can identify the maintenance location records when they are created or by editing the company type of existing records.

### Creating company master records

Company master records maintain detailed information about companies that belong to a particular company set. Company master records contain information such as contact information for the company, the purchasing details, e-commerce details, and payment details.

#### Procedure

1. From the toolbar of the Company Master (CM) application, click **New Company Master**. If the **Company** field is empty, specify a value.
2. Specify a description for the company.
3. Specify the calendar period and shift this company master record will be available for allocation.
4. Specify the type of company. You can specify this company master record to be of a maintenance location (ML) type.
5. Optional: If you did not specify this company master record to be of ML type, deselect the maintenance location checkbox.
6. Specify the currency that the company uses.
7. Optional: In the **Customer #** field, specify a number to be used by outside companies to uniquely identify your company.
8. Specify the contact information, such as phone, fax, and e-mail.
9. Specify the contact address information and remit-to-company address information.
10. Save the record.

#### What to do next

After you have created a company master record, you need to add the record to one or more organizations.

### Adding company master records to organizations

After you have created a company master record, you must add the record to one or more organizations. You cannot delete a company master record that is already associated with an organization.

#### Procedure

1. From the Company Master (CM) application, display the record to which you want to add to an organization.

2. From the **Select Action** menu, select **Add Company Master to Organization**. After a company master record has been added to an organization, only those organizations that use the same company set and do not have that master record added to them are displayed.
3. Select the check box for each organization to which you want to add the record.
4. Click **OK**.

## Associating label codes with maintenance location capabilities

For tracking purposes, you can associate label codes with maintenance location capabilities to identify the component codes related to the capabilities.

### Procedure

1. In the Maintenance Locations (CM) application, select the **Capability** tab.
2. In the Labels table window, add a new.
3. Specify a capability label code.
4. Save the maintenance location record.

## Specifying the capabilities of maintenance locations

You associate capabilities with maintenance location records to identify the qualifications for the selected maintenance locations. You can associate multiple capabilities with a maintenance location record. Each maintenance location capability must have a unique value within the associated organization.

### Procedure

1. In the Maintenance Locations (CM) application, on the **List** tab, select the maintenance location to which you want to associate a capability.
2. On the **Capability** tab, in the Approvals table, click **New Row**.
3. Specify the capability you want to associate with the maintenance location.
4. If the selected capability requires a certificate, specify the information in the required fields.
5. Save the maintenance location record.

## Specifying limitations of maintenance locations

You can associate limitations with maintenance location records to indicate the maintenance locations that do repairs only on certain asset types. After you associate a capability with a maintenance location, you can associate a limitation with the capability.

### Procedure

1. In the Maintenance Locations (CM) application, click the **Capability** tab.
2. In the Limitations table, add a new row.
3. Specify a capability limitation.
4. Save the maintenance location record.

## Specifying ratings for maintenance location capabilities

For tracking purposes, you can associate ratings with maintenance location capabilities to define the type of capabilities that are available at the selected maintenance locations.

## Procedure

1. In the Maintenance Locations (CM) application, click the **Capability** tab.
2. In the Ratings table, add a new row.
3. Specify a capability rating.
4. Save the maintenance location record.

---

## Issues and transfers

You use the Issues and Transfers (CM) application to issue configuration-managed (CM) items or tools directly to a work order, to a location, to an asset, or against a general ledger account either within a site or across sites within an organization. You can also return an item or a tool to a storeroom within a site.

You can transfer items or tools from one storeroom to another within a site, across sites within an organization, or across organizations. In addition, you can use a courier and determine when an item is currently in transit.

Consider the following when transferring or returning items or tools:

- You cannot return items or tools across sites or across organizations.
- You can define the CM item, model, and variant associated with an asset to be issued.
- When you transfer items or tools from one storeroom to another between sites and organizations, the balance is adjusted accordingly.
- If you are transferring an item or a tool between storerooms within a site or across sites within one organization, you can do so with or without an internal purchase order.
- If you are transferring an item or a tool across organizations, you must have an internal purchase order and the organizations must share the same item set.





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## Chapter 11. Glossary

This glossary provides terms and definitions for the Maximo Asset Configuration Manager software and products.

The following cross-references are used in this glossary:

- *See* refers you from a nonpreferred term to the preferred term or from an abbreviation to the spelled-out form.
- *See also* refers you to a related or contrasting term.

For other terms and definitions, see the IBM Terminology website (opens in new window).

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### A

#### **ad hoc report**

A report that is created for one-off business needs so that report developers are not required to create and maintain large numbers of unique reports.

**asset** A manageable object that is either deployed or intended to be deployed in an operational environment.

#### **asset template**

A record that specifies asset information that is shared by multiple asset records. An asset template can be applied to existing asset records or it can be used to generate multiple new asset records for similar assets, such as a fleet of vehicles.

#### **assignment**

A labor requirement on a work order record that has been matched to an appropriate laborer.

---

### B

**BIRT** See Business Intelligence and Reporting Tools.

#### **build item**

A component in the model, such as a subassembly or system.

#### **Business Intelligence and Reporting Tools (BIRT)**

An Eclipse-based open source reporting system for web applications.

---

### C

#### **CM item**

See configuration-managed item.

#### **compliance**

The state of being in accordance with regulated standards.

**configuration-managed item (CM item)**

A specialized item type that represents a part number that is under configuration management control as part of the reference engineering data.

**configuration management**

The process of planning for, identifying, controlling, and verifying the configuration items within a service, recording and reporting their status and, in support of change management, assessing the potential impact of changing those items.

**craft** A work activity performed by a labor or worker, for example, plumbing.

---

**D**

**dynamic segmentation**

The ability to analyze a linear asset multiple ways without affecting its underlying geometry.

---

**F**

**failure class**

The highest level of a failure hierarchy.

**failure hierarchy**

A tree structure that shows relationships between identified problems, causes, and remedies for asset and operating location failures. Failure hierarchies are built from the top level, the failure class, down.

---

**G**

**general ledger account (GL account)**

An account that is used to track expenses for various entities within a company, such as assets, locations, or tools.

**geographic information system (GIS)**

A complex of objects, data, and applications that is used to create and analyze spatial information about geographic features.

**GIS** See geographic information system.

**GL account**

See general ledger account.

---

**I**

**item** A component or part of an asset.

---

**J**

**job plan**

A detailed description of work to be performed for a work order. A job plan typically includes required tasks and lists of estimated labor, materials, services, and tools needed to complete the work.

---

## K

### **key performance indicator (KPI)**

A measurable quantity against which specific performance criteria can be set when a service level agreement is written.

**KPI** See key performance indicator.

---

## L

### **labor record**

A document that contains information about a labor or worker, such as craft, skill level, hours worked, and certifications. A labor record cannot exist without a corresponding person record.

### **linear asset**

An asset that is maintained in segments, such as a road, pipeline, or railroad track. Measurements are made along the linear asset to specify work, monitoring, metering, or placement of signs. See also point asset.

### **linear referencing**

Defining the location of a point along a linear asset.

### **linear referencing method (LRM)**

A method of determining a position on a linear asset by using a known start point, a measure, a direction, and offset values.

### **linear segment**

The span of a linear asset that is defined by a start and an end measure. The span can be the entire length of the linear asset or any continuous part of it.

### **location**

A place where assets are operated, stored, or repaired.

**LRM** See linear referencing method.

---

## M

### **maintenance location record**

A record that contains detailed information about vendors, manufacturers, and other maintenance locations

### **master preventive maintenance record**

A template that creates a schedule to generate work orders for required maintenance.

### **measurement point**

A record that defines the acceptable upper and lower conditions and performance limits for a point or place on a piece of equipment.

### **method of compliance (MOC)**

A process that is used to implement a technical record, such as an airworthiness directive or a service bulletin.

**MOC** See method of compliance.

**model** The allowable configuration of an asset that is used to validate the asset.

---

## N

### **national requirement**

A maintenance task that is required by a national airworthiness authority. See also vendor requirement.

---

## O

**offset** The number of measuring units from an arbitrary starting point to some other point.

### **operating location**

A location type that indicates the presence of operating assets (as opposed to a storage or repair facility).

### **organization**

A record that identifies a unique legal entity. The data set for an organization includes information that companies or other distinct legal entities might share, such as calendars, vendors, and financial information. An organization can contain one or more sites. See also site.

---

## P

**PM** See preventive maintenance record.

### **PM alert**

A message that indicates that a preventive maintenance work order is about to become due for an asset or location. See also preventive maintenance record.

### **point asset**

An asset whose length or measure is not integral to its maintenance, such as an airplane or a train car. See also linear asset.

### **portlet**

A reusable component that is part of a web application that provides specific information or services to be presented in the context of a portal.

### **preventive maintenance record (PM)**

A template for scheduled preventive maintenance work. PMs can contain job plan and corresponding safety plan information that the system copies to work orders. See also PM alert.

---

## R

### **reference point**

A feature instance that can be used as a start or end point for a linear segment.

### **reference point offset**

A distance along the length of the asset measured from a previously defined reference point. For example, a speed sign is .2 miles from milepost 10.

### **rotating asset**

A non-perishable asset that is tracked in inventory through its association with a specific rotating item.

**rotating item**

An inventory item for which each instance of the item is also tracked by its own asset number. Rotating items are typically repaired or refurbished, not discarded.

**rotating tool**

A tool for which each instance of the tool is also tracked by its own asset number.

---

**S****segment**

A defined section of a linear asset.

**service level agreement (SLA)**

A contract between a customer and a service provider that specifies the expectations for the level of service with respect to availability, performance, and other measurable objectives.

**service request**

A request from a user for help, information, advice, or access to an IT service.

**site** A work location, such as a plant or facility. See also organization.

**SLA** See service level agreement.

**slot** A location that represents a maintenance area, such as an aircraft hangar, and a period of time in which maintenance activities are performed.

**subassembly**

An assembled unit that is incorporated with other units into a complete assembly.

---

**T****technical record**

A record that maintains information that is related to an externally published directive or bulletin, such as an airworthiness directive or a customer service notification. Technical records are used in highly regulated industries to ensure that all regulations are properly implemented.

**ticket** A record, such as a service request, incident, or problem report, that can be routed and assigned a status.

---

**V****variant configuration**

A high-level specification that is used by the manufacturer to describe the design and functional capabilities of an aircraft and that can be divided into subvariants to describe additional differences in tracked positions, allowable part numbers, and maintenance policy.

**vendor requirement**

A maintenance task that is recommended by the vendor or by the original equipment manufacturer (OEM) of the aircraft or piece of equipment. See also national requirement.

---

## W

### **warranty**

Terms of a contract that outline standards for potential claims for an asset.

**WO** See work order.

### **work order (WO)**

A record that contains information about work that must be performed.

### **work plan**

A list of the operations, labor, materials, and tools that are required to complete a work order.

---

## Y

### **Y-offset**

A distance perpendicular to the direction of the linear asset. For example, a speed limit sign is located 10 feet from the right edge of the road. "Right" is positive and "left" is negative. Therefore, the Y-offset is 10.

---

## Z

### **Z-offset**

A distance above or below a linear asset. For example, an exit sign is located 18 feet above the surface of the road, and a culvert is 4 feet below the surface of the road. The Z-offset for the sign is 18, and the Z-offset for the culvert is -4.

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## Chapter 12. Release notes for Maximo Asset Configuration Manager 7.6.6

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Use the following links to search the Support knowledge base for technotes for your product. If no information is available, the searches return no results.

- [Technotes documenting installation issues.](#)
- [Technotes documenting product issues.](#)





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