



**Critical**  
manufacturing  
an ASM PT company

# Container Maintenance Events

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### DOCUMENT ACCESS

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# Container Maintenance Events

## Overview

In manufacturing, containers and carriers used to store and transport products can degrade over time, potentially leading to quality issues, reduced yield, and increased operational costs.

Implementing regular preventive maintenance, including routine inspections, cleaning, and refurbishment, helps significantly extend container lifespans and ensures consistent performance. Without proper maintenance, containers may deteriorate, requiring costly replacements and causing disruptions to manufacturing processes.

Critical Manufacturing [MES](#) helps manage container maintenance proactively. When creating or managing a Resource in the [MES](#), activating the **Enable Container Maintenance Events** option allows the system to automatically track container usage through predefined maintenance counters. These counters increment each time one of the following operations occurs:

Operation	Event
<a href="#">Add Container to Container</a>	Associate First
<a href="#">Add Material to Container</a>	Associate First
<a href="#">Dock Container</a>	Dock
<a href="#">Empty Container</a>	Disassociate Last
<a href="#">Manage Container Positions</a>	Associate First & Disassociate Last
<a href="#">Remove Container from Container</a>	Disassociate Last
<a href="#">Remove Material from Container</a>	Disassociate Last
<a href="#">Track-In Material</a>	Track In
<a href="#">Transfer Container Between Containers</a>	Associate First & Disassociate Last
<a href="#">Transfer Material Between Containers</a>	Associate First & Disassociate Last
<a href="#">Undock Container</a>	Undock
<a href="#">Ship Material</a>	Ship

Table: Events that can be associated to each Container-related operation.

## Real Use Case

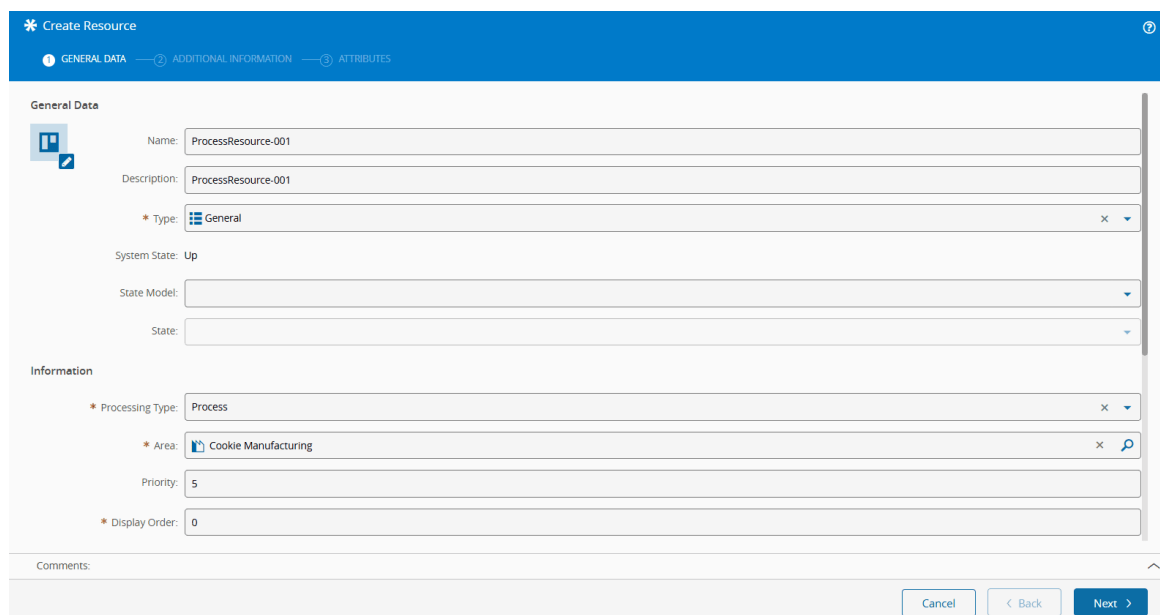
Follow the steps below to understand how to use the Enable Container Maintenance Events feature using Critical Manufacturing MES.

## Creating a Resource

To start managing Container maintenance events, you first need to create and configure a Resource. Navigate to the **Resource** entity within the **Business Data** menu and select **New** from the button ribbon. Provide the following details in the General Data step of the **Create Resource** wizard:

- Name - add a name for the Resource (for example, `ProcessResource-001`).
- Type - choose a value from the [ResourceType](#) Lookup Table (for example, `General`).
- Processing Type - select either `Process` or `Line` from the dropdown (for example, `Process`).
- Area - choose the desired Area (for example, `Cookie Manufacturing`).

Select **Next** to continue.



The screenshot shows the 'Create Resource' wizard in the 'GENERAL DATA' step. The form contains the following fields and values:

- Name: ProcessResource-001
- Description: ProcessResource-001
- Type: General
- System State: Up
- State Model: (empty dropdown)
- State: (empty dropdown)
- Processing Type: Process
- Area: Cookie Manufacturing
- Priority: 5
- Display Order: 0

At the bottom right, there are three buttons: 'Cancel', '< Back', and 'Next >'. The 'Next >' button is highlighted in blue.

Once in the Additional Information step, add the following information:

- Position Unit Type - choose `Material` as the Resource position unit type.
- Enable Container Maintenance Events - activate this toggle to enable container tracking.

**Create Resource**

GENERAL DATA — ADDITIONAL INFORMATION — ATTRIBUTES

**Material Logistics**

Enable Automatic Replenishment:

**Setup**

Setup Mode: Not Required x

Setup Begin And Complete Mode: Manual Begin and Complete x

**Positions**

\* Position Unit Type: Material x

Track Positions:

Auto Generate Positions:

Total Positions: 10,000

**Locations**

Has Resource Locations:

Comments:

Cancel < Back Next >

### Other Information

**Create Resource**

GENERAL DATA — ADDITIONAL INFORMATION — ATTRIBUTES

**Other Information**

Enable Container Maintenance Events:

Enable Request MAO on State Change:

Resource Group:

Propagate Up:

Validate Down:

**Automation**

\* Mode: None x

Address:

Job Management:

Recipe Download:

Recipe Upload:

Comments:

Cancel < Back Next >

**Note**

Additional configurations can be set when creating a Resource, but for simplicity, only key configurations relevant to this scenario are shown. For detailed information, see [Create Resource](#) and [How to: Create a Resource](#).

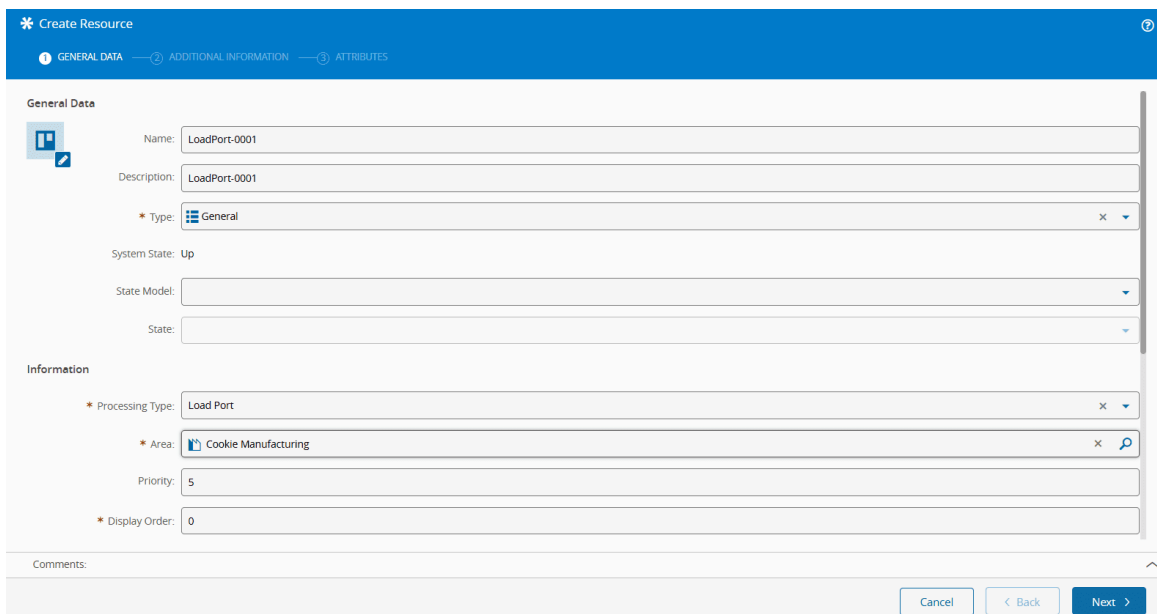
Select **Next** to proceed to the Attributes step. For more information, see [Attributes](#). If no attributes are defined, select **Create** to complete the operation.

### Creating a Sub-Resource

Now, create a Sub-Resource for your `ProcessResource-001`. Follow similar steps as above and enter the following information:

- Name - add a name for the Resource (for example, `LoadPort-0001`).
- Type - choose a value from the [ResourceType](#) Lookup Table (for example, `General`).
- Processing Type - choose the `Load Port` processing type.
- Area - choose the same Area as chosen for the `ProcessResource-001` (in this example, `Cookie Manufacturing`).

Select **Next** to continue.



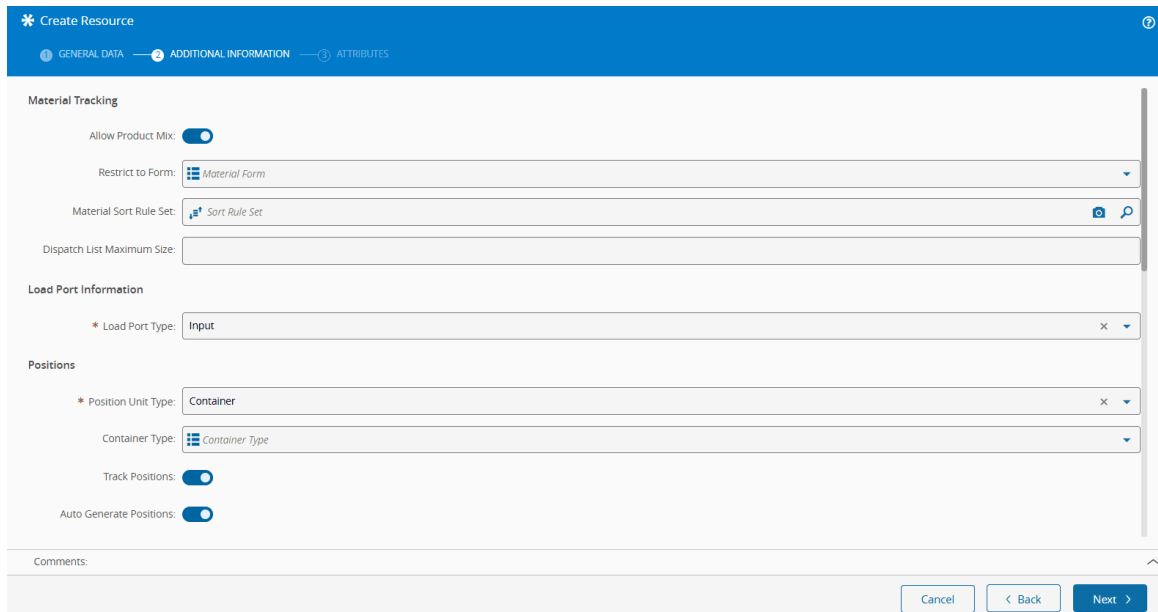
The screenshot shows the 'Create Resource' form with the following fields:

- General Data:**
  - Name: `LoadPort-0001`
  - Description: `LoadPort-0001`
  - \* Type: `General`
  - System State: `Up`
  - State Model: (empty)
  - State: (empty)
- Information:**
  - \* Processing Type: `Load Port`
  - \* Area: `Cookie Manufacturing`
  - Priority: `5`
  - \* Display Order: `0`

At the bottom, there is a 'Comments' field and navigation buttons: 'Cancel', '< Back', and 'Next >'.

Once in the Additional Information step, add the following information:

- Load Port Type - choose the load port type from the dropdown (for example, `Input`).
- Position Unit Type - choose `Container` as the Resource position unit type.



**Create Resource**

GENERAL DATA — **ADDITIONAL INFORMATION** — ATTRIBUTES

**Material Tracking**

Allow Product Mix:

Restrict to Form:

Material Sort Rule Set:

Dispatch List Maximum Size:

**Load Port Information**

\* Load Port Type:

**Positions**

\* Position Unit Type:

Container Type:

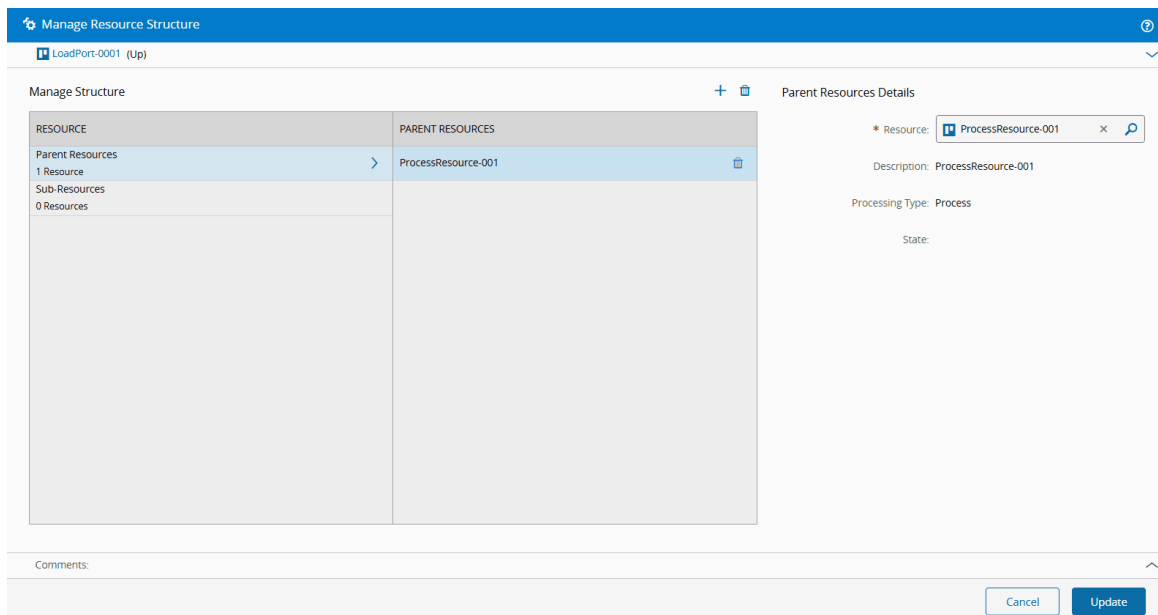
Track Positions:

Auto Generate Positions:

Comments:

Cancel < Back Next >

After creating the Sub-Resource, in the Structure section of the Details view, choose the **Manage** button. This will open the **Manage Resource Structure** wizard. Add `ProcessResource-001` as Parent Resource to `LoadPort-0001` and select **Update** to complete the operation, as shown in the image below. For more information, see [How to: Manage Resource Structure](#).



**Manage Resource Structure**

LoadPort-0001 (Up)

RESOURCE	PARENT RESOURCES
Parent Resources 1 Resource	ProcessResource-001
Sub-Resources 0 Resources	

**Parent Resources Details**

\* Resource:

Description: ProcessResource-001

Processing Type: Process

State:

Comments:

Cancel Update

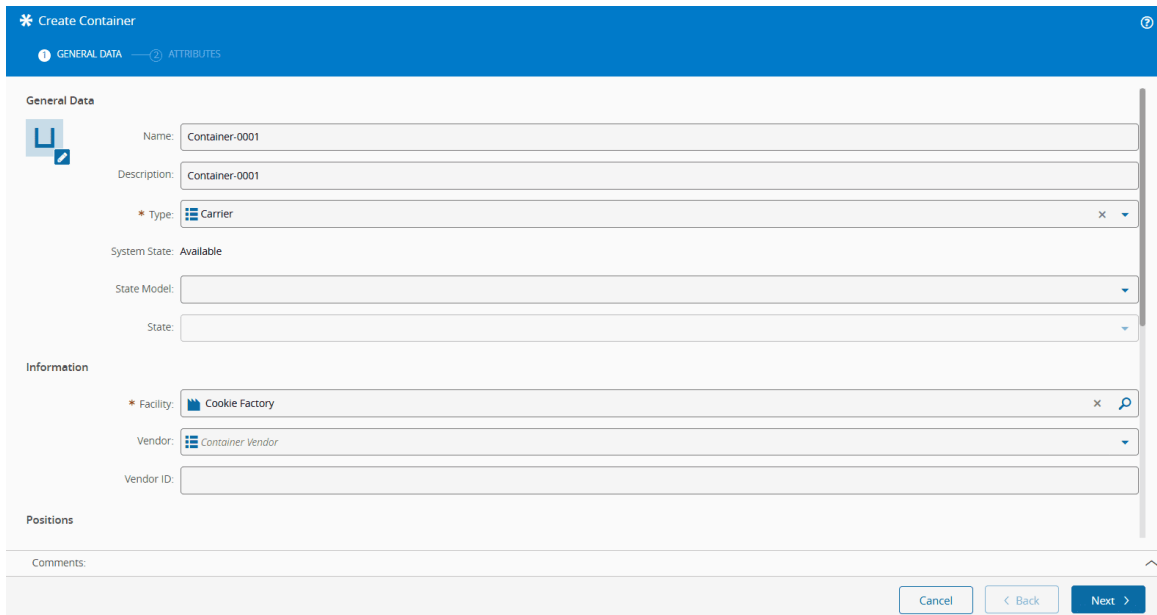
## Creating a Container

After creating the Resource and Sub-Resource, create a Container. So, navigate to the **Container** entity within the **Business Data** menu and select **New** from the top ribbon. Provide the following details in the General Data step of the **Create Container** wizard:

- Name - add a name for the Container (for example, `Container-0001`).
- Type - choose a value from the `ContainerType` Lookup Table (for example, `Carrier`).
- Facility - choose a Facility that contains the Area previously defined for the Resource and Sub-Resource (in this example, `Cookie Factory`).
- Position Unit Type - choose the `Resource` position unit type.

- Total Positions - define the total number of positions for the Container (for example, 10).

### General Data & Information



**Create Container**

GENERAL DATA ATTRIBUTES

**General Data**

Name: Container-0001

Description: Container-0001

\* Type: Carrier

System State: Available

State Model:

State:

**Information**

\* Facility: Cookie Factory

Vendor: Container Vendor

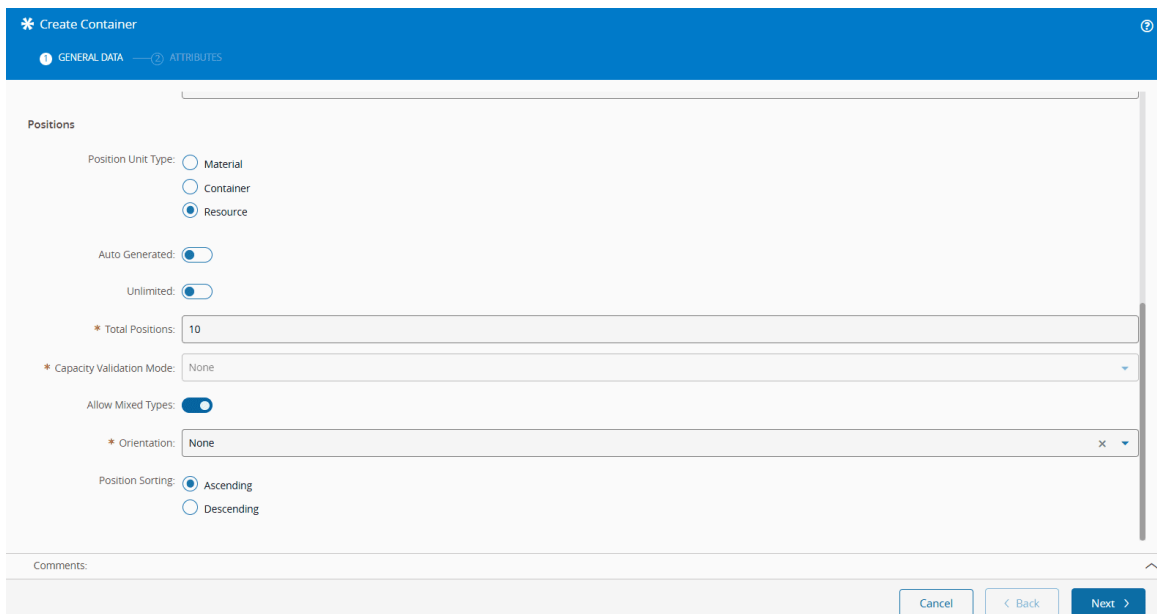
Vendor ID:

**Positions**

Comments:

Cancel < Back Next >

### Positions



**Create Container**

GENERAL DATA ATTRIBUTES

**Positions**

Position Unit Type:  Material  Container  Resource

Auto Generated:

Unlimited:

\* Total Positions: 10

\* Capacity Validation Mode: None

Allow Mixed Types:

\* Orientation: None

Position Sorting:  Ascending  Descending

Comments:

Cancel < Back Next >

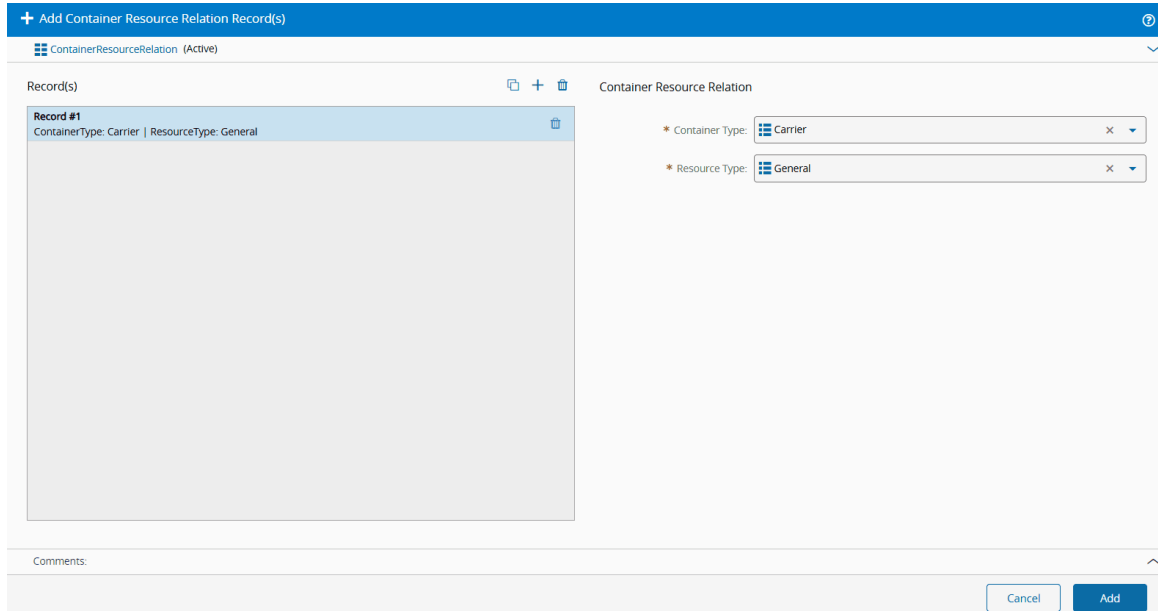
### Note

Additional configurations can be set when creating a Container, but for simplicity, only key configurations relevant to this scenario are shown. For detailed information, see [Create Container](#) and [How to: Create a Container](#).

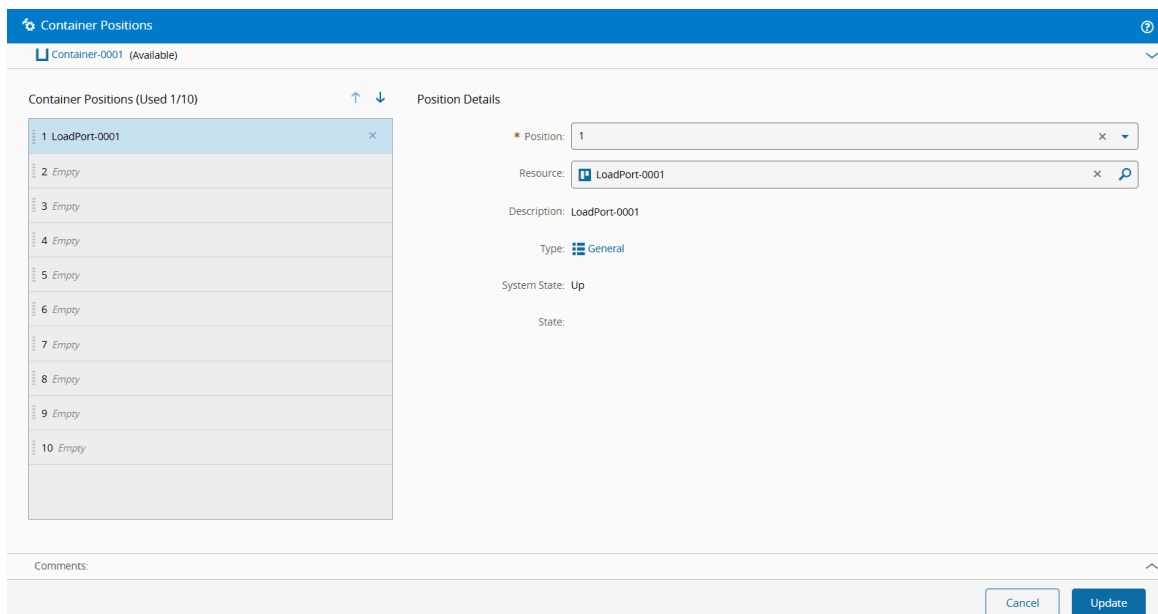
Select **Next** to proceed to the Attributes step. For more information, see [Attributes](#). If no attributes are defined, select **Create** to complete the operation.

## Adding a Container to a Resource

Afterwards, add the Container you created to the Sub-Resource `LoadPort-0001`. First, add a new entry to the `ContainerResourceRelation` Generic Table, specifying the chosen Container Type (in this example, `Carrier`) and the matching Resource Type (in this example, `Carrier`). Confirm by selecting **Add** to complete this association.



Next, navigate to the `Container-0001` page and select the **Manage Positions** button from the top ribbon. Since the **Container** was previously configured with a `Resource` position unit type, you will now be able to add **Resources** in the **Container Positions** wizard. Add the `LoadPort-0001` Resource to the first position of `Container-0001`. Select **Update** to finalize the operation.

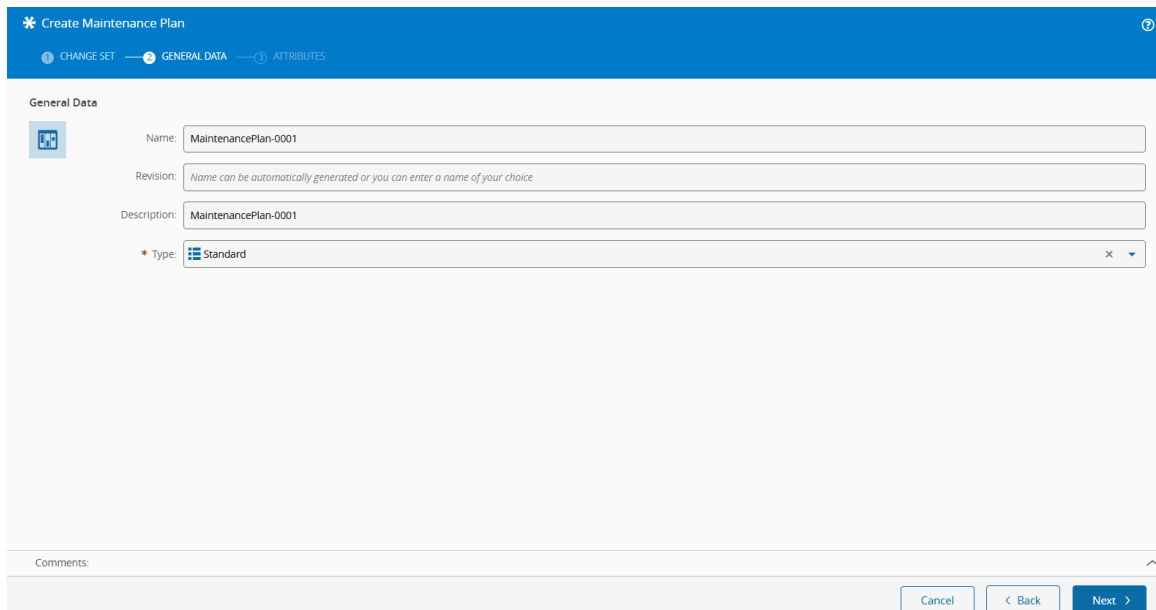


## Creating a Maintenance Plan

To create a Maintenance Plan, first [create a Change Set](#) or select an existing one. For more information, see [Change Set](#).

After choosing the Change Set, add the following details to the General Data of the **Create Maintenance Plan** wizard:

- Name - enter a name for the Maintenance Plan (for example, `MaintenancePlan-0001`).
- Type - choose a value from the `MaintenancePlanType` Lookup Table (for example, `Standard`).



The screenshot shows the 'Create Maintenance Plan' wizard in the 'GENERAL DATA' step. The 'Name' field contains 'MaintenancePlan-0001'. The 'Revision' field has a placeholder text: 'Name can be automatically generated or you can enter a name of your choice'. The 'Description' field also contains 'MaintenancePlan-0001'. The '\* Type' dropdown menu is set to 'Standard'. At the bottom right, there are three buttons: 'Cancel', '< Back', and 'Next >'.

Select **Next** to proceed to the Attributes step. For more information, see [Attributes](#). If no attributes are defined, select **Create** to complete the operation.

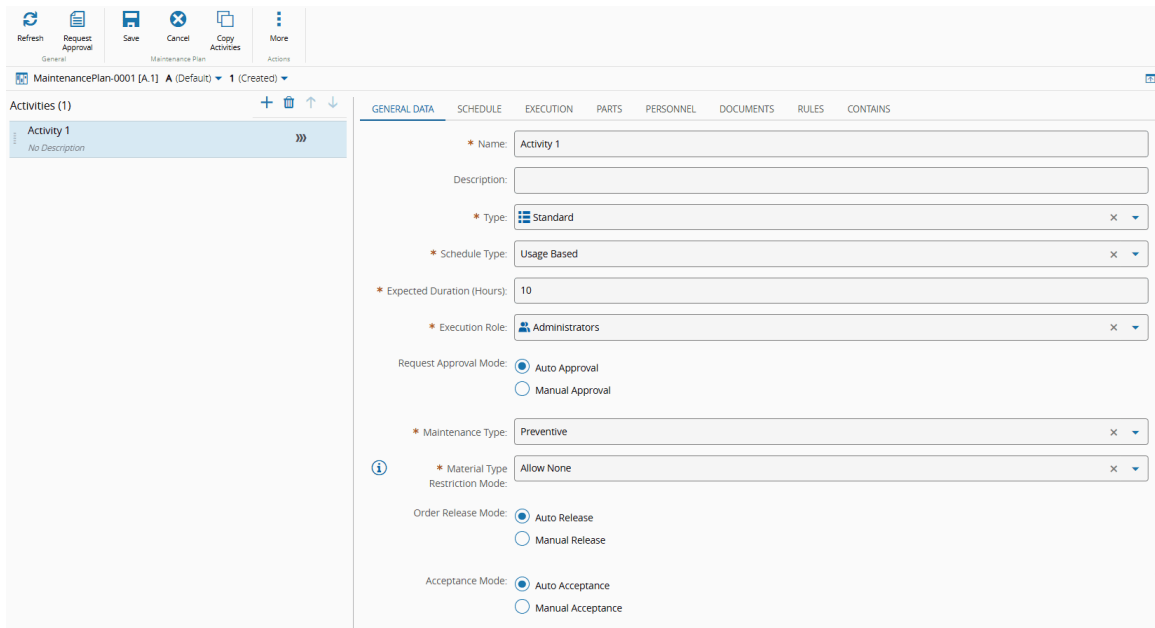
## Adding Maintenance Activities

Add two Maintenance Activities to the Maintenance Plan you just created by selecting the **Edit** button from the top ribbon, followed by the **+** icon on the left panel. Use the configurations described below.

### Activity 1

General Data tab:

- Name - enter a name for the Maintenance Activity (for example, `Activity 1`).
- Type - choose a value from the `MaintenanceActivityType` Lookup Table (for example, `Standard`).
- Schedule Type - choose `Usage Based` as the schedule type.
- Expected Duration - define the estimated time to complete the Maintenance Activity (for example, `10` hours).
- Execution Role - specify the user role responsible for executing the activity (for example, `Administrators`).
- Maintenance Type - choose the Maintenance type from the dropdown (for example, `Preventive`).
- Material Type Restriction Mode - specify if there are restrictions for the Material type (in this example, `Allow None`).

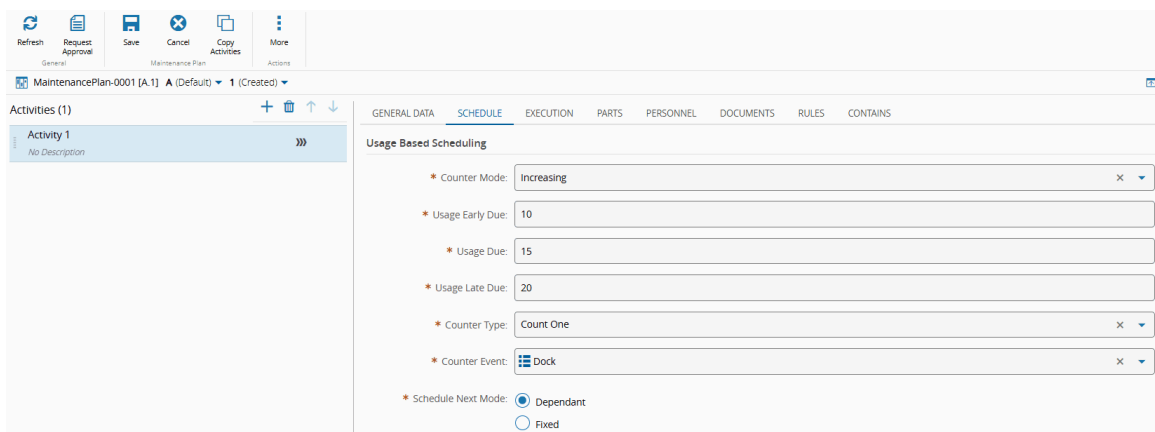


**GENERAL DATA**

- \* Name: Activity 1
- Description:
- \* Type: Standard
- \* Schedule Type: Usage Based
- \* Expected Duration (Hours): 10
- \* Execution Role: Administrators
- Request Approval Mode:
  - Auto Approval
  - Manual Approval
- \* Maintenance Type: Preventive
- \* Material Type: Allow None
- Order Release Mode:
  - Auto Release
  - Manual Release
- Acceptance Mode:
  - Auto Acceptance
  - Manual Acceptance

### Schedule tab:

- Counter Mode - indicate the counter behavior (in this example, **Increasing**).
- Usage Early Due - define the threshold at which maintenance is recommended to start earlier than scheduled (for example, **10**).
- Usage Due - define the exact event count at which maintenance becomes due (for example, **15**).
- Usage Late Due - define the threshold at which maintenance is considered overdue (for example, **20**).
- Counter Type - specify how the events are counted towards maintenance scheduling (in this example, **Count One**).
- Counter Event - specify the event triggering the counter increment from **MaintenanceManagementEvent** Lookup Table (for example, **Dock**).
- Schedule Next Mode - indicate if the subsequent Maintenance Activities depend on completing the current activity (in this example, **Dependant**).



**Usage Based Scheduling**

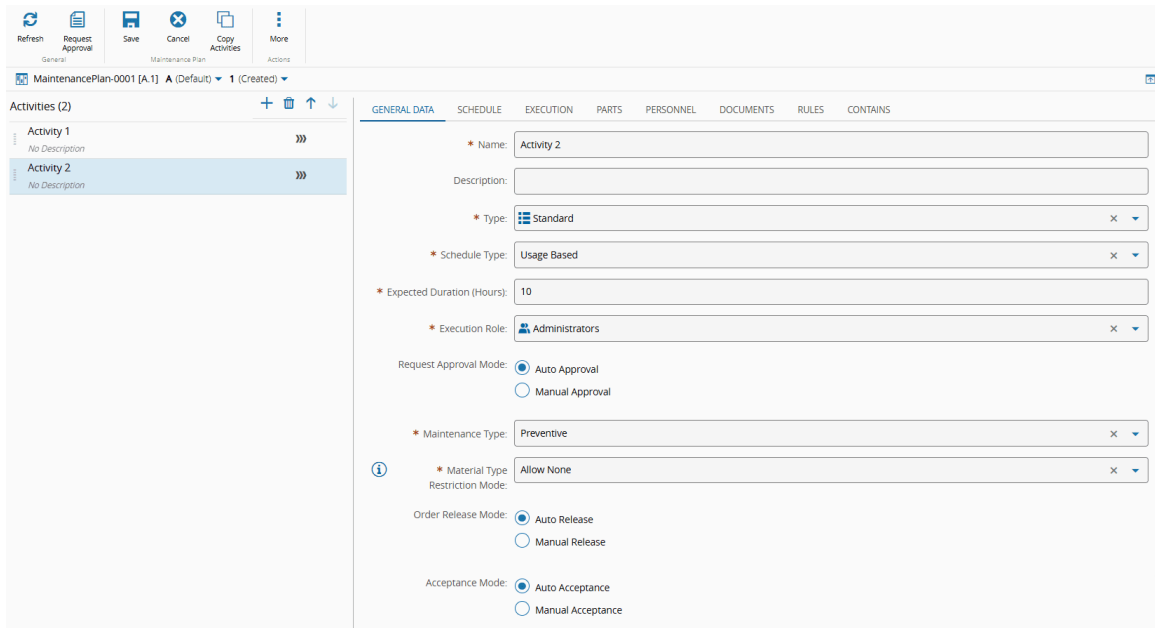
- \* Counter Mode: Increasing
- \* Usage Early Due: 10
- \* Usage Due: 15
- \* Usage Late Due: 20
- \* Counter Type: Count One
- \* Counter Event: Dock
- \* Schedule Next Mode:
  - Dependant
  - Fixed

### Activity 2

#### General Data tab:

- Name - enter a name for the Maintenance Activity (for example, **Activity 2**).

- Type - choose a value from the [MaintenanceActivityType](#) Lookup Table (for example, `Standard`).
- Schedule Type - choose `Usage Based` as the schedule type.
- Expected Duration - define the estimated time to complete the Maintenance Activity (for example, `10` hours).
- Execution Role - specify the user role responsible for executing the activity (for example, `Administrators`).
- Maintenance Type - choose the Maintenance type from the dropdown (for example, `Preventive`).
- Material Type Restriction Mode - specify if there are restrictions for the Material type (in this example, `Allow None`).

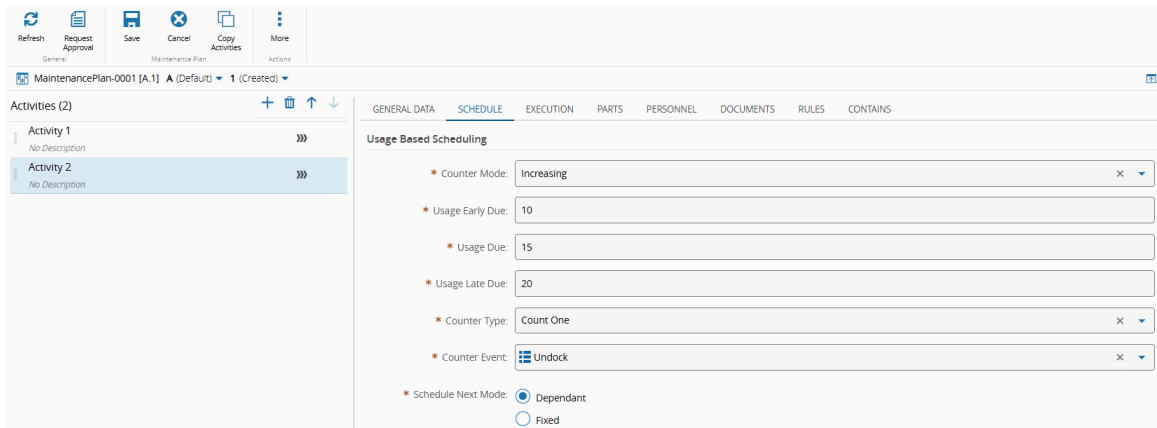


The screenshot shows the 'GENERAL DATA' tab of a software interface for configuring a maintenance activity. The interface includes a toolbar with icons for Refresh, Request Approval, Save, Cancel, Copy Activities, and More. Below the toolbar, there is a breadcrumb trail: MaintenancePlan-0001 [A-1] (Default) > 1 (Created). The main area is divided into a left sidebar and a right main panel. The sidebar shows a list of activities: Activity 1 (No Description) and Activity 2 (No Description). The main panel displays the configuration for Activity 2. The fields are as follows:

- Name: Activity 2
- Description: (empty)
- Type: Standard
- Schedule Type: Usage Based
- Expected Duration (Hours): 10
- Execution Role: Administrators
- Request Approval Mode:  Auto Approval,  Manual Approval
- Maintenance Type: Preventive
- Material Type Restriction Mode: Allow None
- Order Release Mode:  Auto Release,  Manual Release
- Acceptance Mode:  Auto Acceptance,  Manual Acceptance

#### Schedule tab:

- Counter Mode - indicate the counter behavior (in this example, `Increasing`).
- Usage Early Due - define the threshold at which maintenance is recommended to start earlier than scheduled (for example, `10`).
- Usage Due - define the exact event count at which maintenance becomes due (for example, `15`).
- Usage Late Due - define the threshold at which maintenance is considered overdue (for example, `20`).
- Counter Type - specify how the events are counted towards maintenance scheduling (in this example, `Count One`).
- Counter Event - specify the event triggering the counter increment from [MaintenanceManagementEvent](#) Lookup Table (for example, `UndoCK`).
- Schedule Next Mode - indicate if the subsequent Maintenance Activities depend on completing the current activity (in this example, `Dependant`).



The screenshot shows the 'Usage Based Scheduling' configuration for a maintenance plan. The 'Schedule Next Mode' is set to 'Dependant'.

Field	Value
Counter Mode	Increasing
Usage Early Due	10
Usage Due	15
Usage Late Due	20
Counter Type	Count One
Counter Event	Undock
Schedule Next Mode	Dependant (Selected)

**Note**

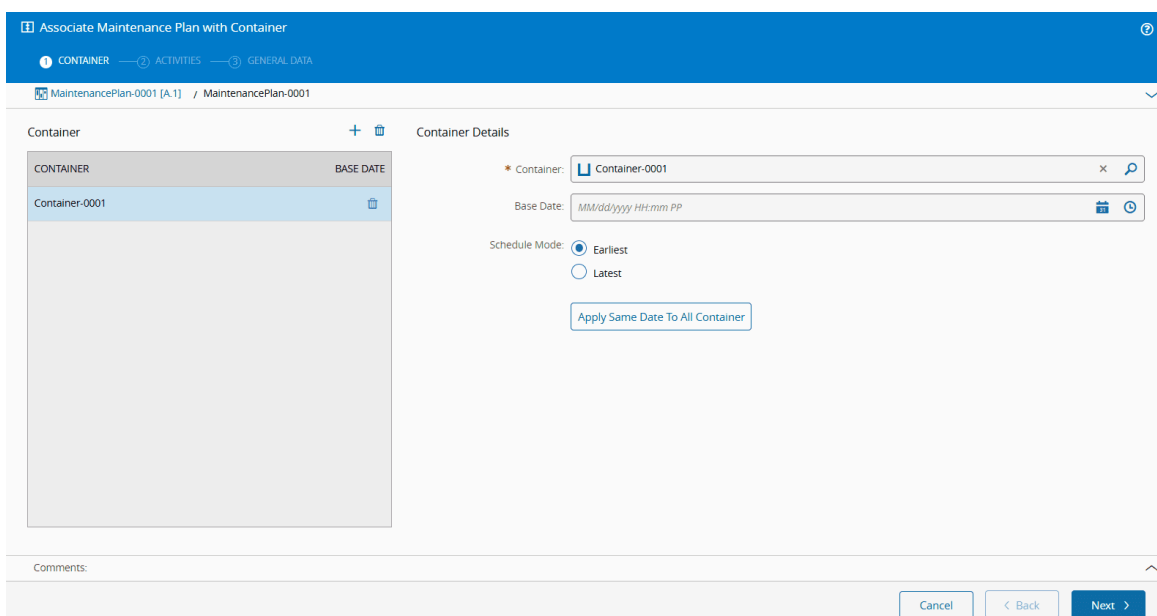
Additional configurations can be set when adding Maintenance Activities, but for simplicity, only key configurations relevant to this scenario are shown. For detailed information, see [Create Maintenance Plan, How to Create a Maintenance Plan](#), and [How to Add Maintenance Activities](#).

Finally, set the Maintenance Plan you created Effective.

### Associate a Maintenance Plan with a Container

Next, associate the MaintenancePlan-0001 with Container-0001 by selecting the **Associate With** button from the top ribbon and choose **Container**. Add the Maintenance Activities associated to the Maintenance Plan you have created and choose the Owner Role (in this example, Administrators). For more information, see [How to Associate an MP with an Entity](#).

#### Container



The dialog box 'Associate Maintenance Plan with Container' shows the configuration for associating MaintenancePlan-0001 with Container-0001. The 'Schedule Mode' is set to 'Earliest'.

Field	Value
Container	Container-0001
Base Date	MM/dd/yyyy HH:mm PP
Schedule Mode	Earliest (Selected)

#### Activities

Associate Maintenance Plan with Container

CONTAINER — ACTIVITIES — GENERAL DATA

MaintenancePlan-0001 [A.1] / MaintenancePlan-0001

Activities

CONTAINER	ACTIVITY	BASE DATE/COUNTER
Container-0001	Activity 1 Usage Based	0
	Activity 2 Usage Based	0

Usage Based Scheduling

Usage Counter:

Counter Type: Count One

Counter Event:  Undock

Activity Details

Activity: Activity 2

Description:

Schedule Type: Usage Based

Comments:

Cancel < Back Next >

## General Data

Associate Maintenance Plan with Container

CONTAINER — ACTIVITIES — GENERAL DATA

MaintenancePlan-0001 [A.1] / MaintenancePlan-0001

General Data

\* Owner Role:

Distribution List:

Comments:

Cancel < Back Associate

## Tracking Container Usage

Once you've completed the previous steps, you can begin tracking the Container usage. First, open the Maintenance Plan instance associated with your Container (in this example, `MaintenancePlan-0001-Container-0001-0001`).

Navigate to the Maintenance Schedule view and open the Maintenance Activities you've defined (such as `Activity 1` and `Activity 2`). Within each activity page, locate the Scheduling section under the Details view. Here, you'll see the associated events configured for each activity. Initially, before any Container operations occur, the Usage field will display a value of zero. For example, `Activity 1` will show the Usage as `CountOne at Dock: 0`, and `Activity 2` will show `CountOne at Undock: 0`.

To verify the tracking mechanism, navigate to `Container-0001` page and perform the operations you associated with the Maintenance Activities. Selecting **Dock** from the top ribbon will increment the Usage in `Activity 1 to CountOne at Dock: 1`. Similarly, selecting **Undock** from the top ribbon will increment the Usage in `Activity 2 to CountOne at Undock: 1`.

Watch the video below to see how to use this feature.



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