TEAMCENTER

Capital Asset Lifecycle Management — Usage

Teamcenter 2412

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1. CALM Overview

What is Capital Asset Lifecycle Management?

Teamcenter Capital Asset Lifecycle Management (CALM) allows you to manage plant process data created in a plant process application such as Siemens COMOS. You can also visualize related 2D interactive diagrams such as process and instrumentation diagrams (P&ID), single line diagrams (SLD), and process flows. You can further leverage this plant data in downstream processes such as engineering, procurement, construction, and commissioning.

The following graphic shows the integrated CALM features in the PLM system.

Where do I go from here?

> Note:
>
> This help content assumes you are familiar with PLM terminology and also with the program planning and execution of business process for capital projects.

Administrator	Refer to the Capital Asset Lifecycle Management — Deployment
Business User	
Get started with the basics of using Active Workspace.	Refer to Active Workspace Fundamentals.
Get familiar with the Active Workspace page layout.	See the section describing the page layouts.
Use the CALM solution.	Start with aggregating and managing plant data.

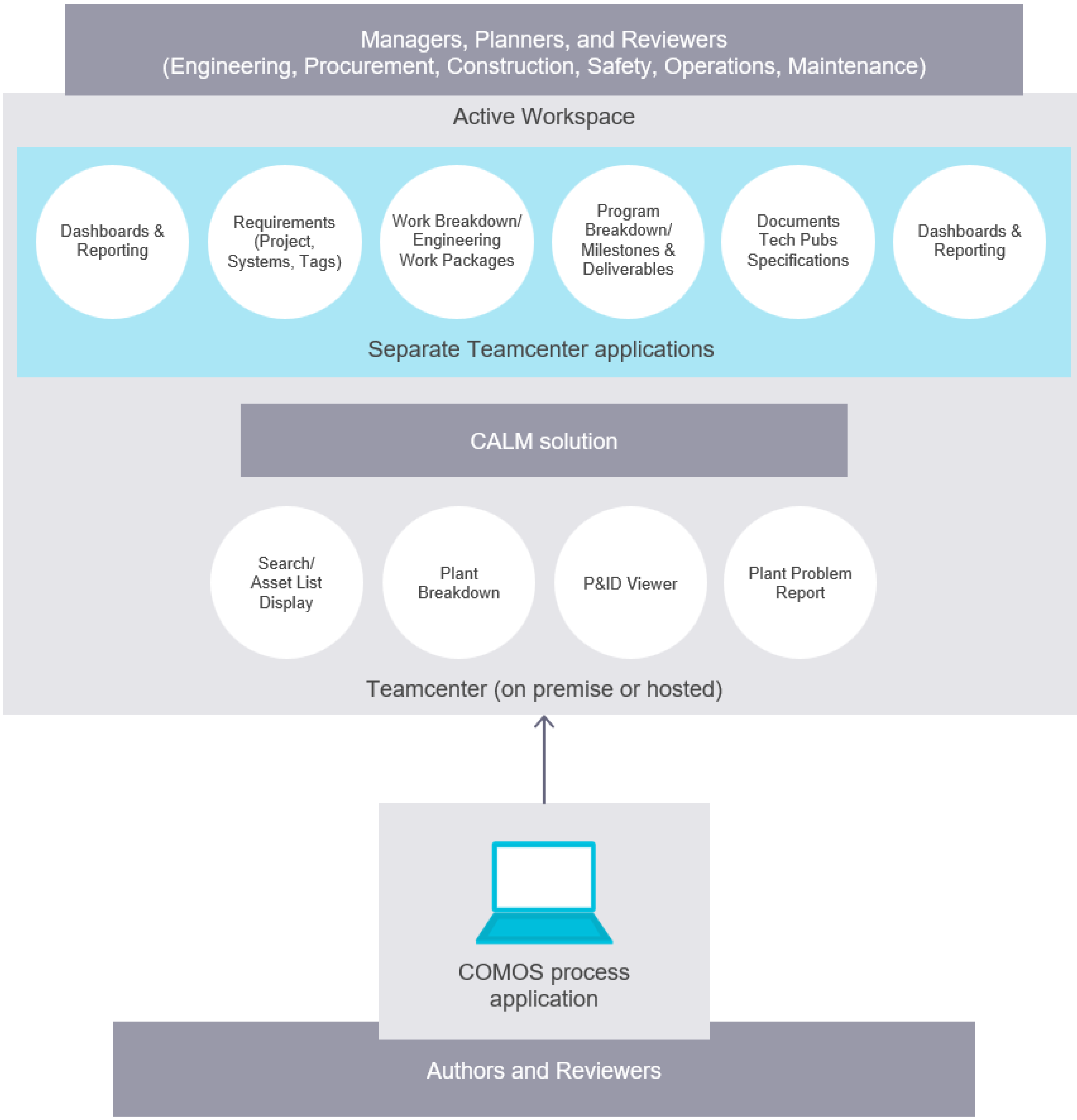
Collaborating on enterprise projects

All projects begin with a design phase, which requires an integrated project team. The CALM solution allows each participant to work securely and collaboratively with other project participants on version-controlled documents. You can share drawings, models, and files with authorized recipients inside and outside your organization. The solution streamlines document reviews and approvals by alerting participants when their attention is required.

Once the project moves into the construction phase, new participants join the project and additional workflows support construction managers, contractors, and subcontractors. This allows the new participants to efficiently collaborate with the design participants.

Overview of components

Principal components of the CALM solution



2. Using the CALM Solution

Aggregate and manage plant data

The CALM solution aggregates plant data authored in the COMOS design tool into Teamcenter. This integration removes the boundary between plant and enterprise data, allowing you to leverage the enterprise data management and business processes provided by Teamcenter.

Plant engineering and execution may involve multiple stakeholders from different groups, organizations, and geographic locations. These stakeholders work in parallel on component design and systems engineering of the same plant, using various process authoring tools to generate plant logical information such as process flow diagrams, 2D piping and instrumentation diagrams (P&ID), equipment data sheets, and various design documents and drawings.

Using the CALM solution, you can bring process plant information into Teamcenter, enabling enterprise users to leverage this front-end engineering information for downstream engineering, plant operation, and maintenance.

Data from the COMOS authoring tool is incrementally imported and managed in Teamcenter with revision and change history. Enterprise users can search for tags and tag properties, view 2D process diagrams, and initiate change requests.

Search plant data

About searching plant data

You can enter a name, type, or tag ID to search for plant objects and their related requirements, drawings, documents, and P&ID diagrams. Configurable filter options allow you to narrow down the search result. A wild card search option on the home screen permits quick searches for plant objects, data, and documents with multiple filter options. You can:

- Search globally across all plant data from your home page for plant objects and related documents by object name or tag ID.
- Use an in-context search to search for plant objects or partitions with various filter options, including name, object type, owner, proximity, and release status.
- Configure search filters to your individual preference.
- Save search queries for future use.
- Visualize items from the search results in the viewer panel.

Search globally by plant object tag or name

You can quickly search for a plant object using its name or tag. This allows engineers to locate their assigned plant objects to review the associated data and issues.

1. In the global search box, enter a full or partial name or tag, for example, **Horizontal Separator** or **V-101**, and then click **Search**. If the same or a similar search has been run before, the system displays suggestions as you type.

   You can refine the search by selecting a particular owner or category. For example, you can use the **Equipment Type** category when searching for tag ot elements. You can also click **Advanced Search** to display more filters for refining the search on the left-hand panel.

   All the possible matches are displayed in the results panel. The following example shows search results arranged by category.

   If you enter a partial (incomplete) name or tag, it displays all possible matches.

2. (Optional) Use the property filters in the left-hand column to refine the relevance of matches.

3. (Optional) Open the plant object in the search results by selecting it and then clicking . You can then examine its properties, related information, and image.

Search in-context

You can make an *in-context* search for an individual plant object, document, or other data at any level in the hierarchy. The context of the search is a partition containing logical or physical plant elements.

1. Navigate to the required object and then click **Filter**.

2. In the **Filter** panel, use one or more of the following options:

   - **Partition scheme** (**Physical**, **Functional**, **Commissioning**, **Corrosion Loop**, or **Maintenance Unit**)

     Shows a list of all available partitions in the plant. You can select one or more partitions in any of the available partition schemes.

   - **Name**

     You can find a plant object by entering its name. The object found is displayed in the 1D, and 2D views.

   The object is found and displayed in the center panel. You can also open an object in a new page.

3. Continue to apply filters as appropriate to further refine your search results.

4. Click **Delete** ⊗ to clear each subset filter.

Validate plant data

About validating data and viewing dashboard reports

You can initiate data validation to check imported data for several discrepancies, such as duplicate asset tags, null asset tags, and inconsistent asset tag format. The resulting reports provide visual indicators showing validated, consistent, and inconsistent data. This information helps you to understand the overall maturity of the plant data. It also helps you to know when to raise problem reports to resolve identified validation issues. With this feature, you can:

- Initiate one or more of the following validation processes:
  - Asset Tag Format Validator
  - Null Asset Tag Validator
  - Same Asset Tag Validator
- View reports identifying data inconsistencies.

Validate plant data

You can validate all of the plant data coming from COMOS, including partitions, logical design elements, or tag, once it is loaded.

1. Search for a Capital Asset Product Root, and open it.
2. Click **More Commands** ••• > **New** ⊕ → **Initiate Data Validation**.
3. In the **Initiate Data Validation** panel, select one or more of the following validation processes to run:

Validator Name	Description
Asset Tag Format Validator	Identifies design elements that do not follow the defined naming convention.
Null Asset Tag Validator	Identifies design elements with no tag ID.
Same Asset Tag Validator	Identifies design elements with tag IDs that are not unique within a plant (CD).

4. Click **Initiate Data Validation**.

   The data validation is initiated for the selected validation process types.

When the validation is complete, a notification shows in the left global navigation toolbar under **Alerts**.

5. Click **Reports** in the global navigation toolbar to access the validation reports.

   The reports dashboard displays reports based on the selections you made in the **Initiate Data Validation** panel.

6. If this is your first time accessing the **Reports** page to view CALM reports, you must add them to your dashboard by performing the following steps:

   a. Click the **Templates** tab in the header.

   b. Enter **CALM*** in the search box and click .

   c. Select the CALM reports one by one and click **Add to Dashboard** .

7. From the **Reports** page, click the **My Dashboard** tab and open the **CALM: Asset Tag Validation** report by clicking the title link.

   The initial report page opens in the context of all CA Roots in the system. The **BY CA ROOT** pie chart shows the number of design elements in each plant in the system.

8. In the **BY CA ROOT** pie chart, click the segment representing the CA roots of interest.

   The results are now in context of the single selected CD.

   The **BY STATUS** bar graph shows the number of design elements that have consistent, same, invalid tag format, or null (missing) tag IDs.

Navigate and visualize a plant

About navigating and visualizing plants

CALM provides plant navigation and visualization capabilities that allow you to quickly navigate to and visualize plant objects. When navigating, you can select a tree view, table view, or list view of plant data, with or without a summary. You can then view the 2D P&ID in the viewer plane. You can:

- Manage plant milestone information in 1D, 2D
- Manage physical and functional breakdown hierarchy.
- Navigate plant hierarchy.
- View complete 2D P&IDs models of the plant.

- View 2D smart P&IDs associated with the plant.
- Cross probe between 1D and 2D P&IDs in a single screen. Selecting an object in one plane highlights it in the other planes.
- Select an object in the search results and see it highlighted in the 2D P&ID view.

Navigate a plant

Plant data can be imported from COMOS and is presented as a breakdown structure that you can navigate to find objects of interest.

1. Open the plant design of interest from your desktop, **Home** folder, or any other location. If you typically work on a single project, your administrator may create a shortcut tile to it on your desktop.

   The plant hierarchy is displayed.

2. Ensure the revision rule is set to **Latest**.

3. Select the required partition scheme from the **Organization** list in the title bar, which may be **Physical**, **Functional**, **Commissioning**, **Corrosion Loop**, or **Maintenance Unit**.

   Using these schemes, you can organize the plant data and visualize based on its usage.

   > Note:
   >
   > By default, the plant hierarchy opens with the same partition scheme you selected in the previous session.

   The hierarchy display is reformatted to reflect the selected partition scheme.

4. Select the required revision from the **Revision** list in the title bar. Revisions track the content of the plant design for a particular milestone.

   The hierarchy display is reformatted to reflect the selected revision.

5. With a design element, logical element, or partition selected, click the **Overview** tab.

6. From the **ELEMENT ATTRIBUTES** section, expand the categories in the table to view the selected element's properties and values.

> Note:
>
> Your administrator uses a preference to control whether or not attributes with empty values are displayed in this table.

7. Click **Subset**.

   The **Filter** panel is displayed, which has a list of filter criteria that you can apply to refine the search results.

8. Select one or more filter criteria.

   The hierarchy display is refreshed and shows only those objects that match the entered criteria.

> Tip:
>
> The selected filter criteria are listed at the top of the **Subset** panel. Click **Delete** next to any of the criteria to delete it.

Visualize a plant (2D)

You can visualize plant data using the 2D viewers. You can cross probe the data between 1d and 2d views.

1. Navigate to the structure object of interest and then select the tree with summary view format.

2. Select the **Overview** tab.

   The basic properties of the object and a thumbnail image are displayed.

3. Select the **Viewer** tab.

   P&ID diagrams are shown in the 2D viewer pane. If several P&ID diagrams are available, the first one is shown initially, and you can select additional diagrams from the selection list or you can select partition or element in the structure. It will bring up the respective P&ID in 2d viewer pan. If no diagrams are available, a `No P&ID at this time` message is displayed and the viewer is blank.

4. Click **Full Screen** in the 2D viewer pane to maximize the view.

5. In the **Viewer** toolbar, click **Single Select** to select an element in the model.

6. Use the following commands in the **Viewer** toolbar to examine the model in different views:

	Use this option	To do this	By clicking the command and then
	Settings	Open the settings panel.	
	Zoom In	Zoom in on the required section.	Click the command or hover the cursor over the required section of the document and scroll forward.
	Zoom Out	Zoom out of the required section.	Click the command or hover the cursor over the required section of the document and scroll backward.
	Reset	Reset to default zoom.	
	Pan	Move the model in the plane of the viewing window.	Clicking and dragging in any direction.
	Select	Select an object or a markup.	Clicking and selecting objects.
	Bird View	To view sections within the 2d P&ID document.	To view the required section of the document, move the colored area in the miniature view while keeping the left mouse button pressed.

7. Use the following toggles and buttons in the **Viewer** toolbar for described purposes:

Use this option	To do this
Dark Mode	To view the document in dark mode.
Grid	To view the grid points of the report.
Quadrant ruler	To view quadrants if they are present in the report.
Print	Print the document.
Language	Choose different language.
Ruler	To view horizontal and vertical bars with length information.

8. To get basic information about any element, hover over the element and view the information in the resulting window. For more detailed information, click **Information** ⓘ in the primary toolbar on the right.

9. Click **Exit Full Screen** to return to the default layout showing the 1D, and 2D views.

Cross probe between 1D and 2D data

Cross probing allows you to locate the same object in different (1D, and 2D) views of the plant. It enables you to more easily identify the impact of changes or other necessary work.

1. Navigate to or search for the plant object of interest, and then select it in the hierarchy.

2. Select the **Viewer** tab, and then select the object in the 2D view on the left-hand navigation panel.

   The selected object is highlighted in each of the views and in the left-hand navigation panel.

   If you filter or configure the displayed data in the navigation panel, the views are updated accordingly.

View COMOS 'released' engineering documents

COMOS documents such as interactive sheets (P&IDs, SLDs, and PFDs) and evaluation reports (datasheets) are imported into Teamcenter from the COMOS plant engineering application as part of the plant hierarchy, where they can then be viewed and managed.

To view the imported documents, do as follows:

1. Expand the plant hierarchy and locate a plant document.

2. Select the plant document in the primary work area and select the **Attachments** tab.

   All released revisions of the plant document are shown in the **DOCUMENTS** section. As new revisions of the document are created and subsequently released in COMOS, they are brought into Teamcenter during incremental imports and added to this section.

3. Click one of the revisions in the **DOCUMENTS** section to open it.

   From the **Overview** tab, the associated file is shown in the **FILES** section, and its contents are displayed in the **Viewer** pane.

Create a plant document

Creating a Plant Document allows you to categorize the documents by plant discipline, discipline document type, and set the engineering status as well.

1. Search for or browse to the plant object or partition to which you would like to add a new plant document.

2. Select the plant object or partition in the primary work area and select the **Attachments** tab.

3. In the **DOCUMENTS** section, click **Add to** ⊕ from the work area toolbar above the table.

4. In the **Add** panel, from the **New** tab, type **Plant Document** in the box to filter the list of document types. Select **Plant Document**.

5. Type a name for the plant document in the **Name** box. Enter additional information as necessary.

6. Use the list to choose a value for **Plant Discipline**. Based on this selection, the available values in the **Discipline Document Type** list update.

7. Select a value for **Discipline Document Type**. Again, based on this selection, the available values in the **Engineering Status** list update.

8. Finally, choose a value for **Engineering Status**.

> Note:
>
> The values in these three lists follow Capital Facility Information Handover Specification (CFIHOS) standards.

9. Click **Add**.

   The plant document is created and listed in the **DOCUMENTS** table.

Associate a BVR assembly to a tag or a logical element

You can associate plant process objects with the relevant physical assembly elements.

1. Search for and copy the appropriate BVR assembly node.

2. Search for or browse to the design or logical element to which you would like to associate the copied BVR assembly.

3. Select the element and click the **Overview** tab.

4. In the **DESIGNS** section, click **Add to** ⊕ from the work area toolbar.

5. In the **Add** panel, click the **Palette** tab.

6. In the **CLIPBOARD** section, select the BVR object you copied and click **Add**.

7. Click **Add** again.

   The BVR assembly is associated to the element and is listed in the **DESIGNS** section.

Relate plant objects to requirements with trace links

A trace link establishes a directional relationship between two objects. In this relationship, one object defines a condition with which the other object must comply, that is, it must partially or completely fulfill.

You can relate a plant object, such as a system, sub-system, or area (plant partition), to its original design requirement or specification by creating a *trace link* between them. Once linked, you can view the latest requirements associated to the various plant objects.

1. Search for or browse to the plant object.

2. Select the plant object in the primary work area, right click, and choose **Create Trace Link**.

3. In the **Create Track Link** panel, click **Add** ⊕ next to the **End** box.

   The **Add End** panel opens.

4. From the **Search** tab, search for the relevant requirement. Click **Add** and then, **Create**.

5. Select the plant object in the primary work area once again, right click, and choose **Existing Trace Link**.

   The **Existing Trace Link** panel opens, showing the requirement that was just added.

6. Select the requirement and click **Open** to open it.

7. From the **Attachments** tab, review the requirement details as necessary.

Managing requirements and associating them with plant breakdown structure

This solution allows you to link and easily visualize plant requirements associated with plant systems, sub-systems, and plant objects. You can:

- Review requirements specifications associated with plant objects.
- Review and analyze 1D and 2D plant data with plant requirements specifications.
- Identify gaps and plant problem items.
- Associate requirements by creating trace links.
- Create trace links with plant tags.
- Create trace links with systems, sub-systems, and areas (plant partitions).
- Link one or many requirements objects or specifications with plant objects.
- Navigate to linked requirements from plant objects.

Relate a plant design to an equipment design

About relating a plant design to an equipment design

A Unified BOM design element (DE) object is a generic object that only represents a position in the plant. There is no detailed structure. The equipment design item contains the actual design detail of the equipment. With this feature, you can:

- Relate a plant design element to its BOM assembly structure.
- Navigate from the plant design to the equipment BOM (assembly).

Relate a plant design to an equipment design

In the current plant design world, a Unified BOM design element object is a generic object that only has position information in the plant; it does not have detailed structure information such as sub-assemblies and serviceable components. This information is provided by the equipment structure. In Teamcenter, you can relate a Unified BOM design object to an existing equipment object. This allows you to easily navigate from a plant design object to an equipment design object and examine the details of the equipment design.

1. Open a plant design and click **Subset**.

2. In the **Subset** panel, in the **Name** box, type the name of an equipment element and click **Filter**. Close the **Subset** panel.

3. Select **None** from the **Organization** list in the title bar.

4. Select the design element in the primary work area and select the **Overview** tab.

5. Scroll down to the **Designs** section and click **Add to**.

6. From the **Palette** tab, choose the PDR previously copied from the program, project, or event to the clipboard and click **Add**.

   Alternatively, from the **Search** tab, search for the relevant deliverable. Select the deliverable and click **Add**.

7. In the **Add** panel, from the **Palette** tab, choose the assembly structure previously copied to the clipboard and click **Add**.

   Alternatively, from the **Search** tab, search for the relevant assembly structure. Select the assembly structure and click **Add**.

   The assembly structure is now related to the design element.

Open the assembly structure object from the **Designs** section by clicking **Open** next to the object's name.

The assembly opens. You can navigate the structure in the primary work area, view the design using the 2D viewer, and find out where the equipment is being used from the **Where Used** tab.

Manage changes

About managing changes

This solution enables you to select individual plant objects or partitions and create associated change requests. You can:

1. Select the required object from the imported COMOS structure.

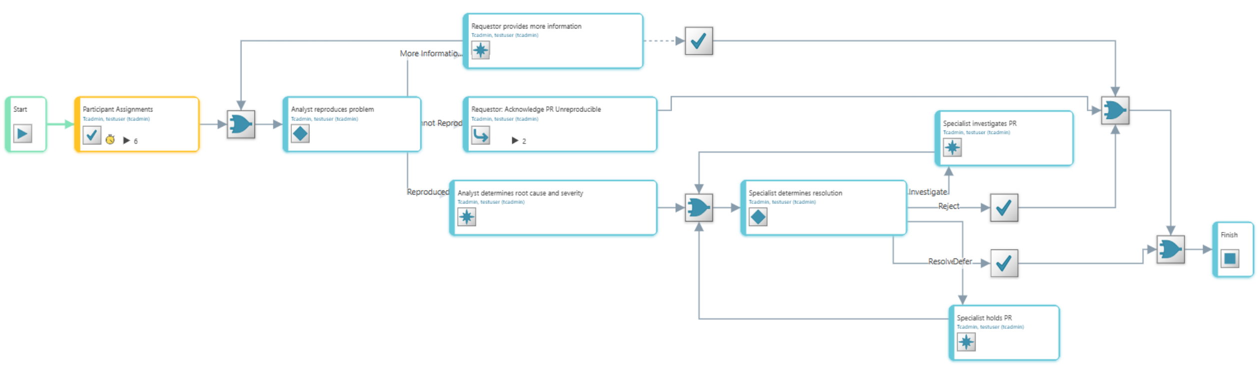
2. Click **More commands** ••• > **New** > **Problem Report** ⊕.

3. In the **Create Change** panel, accept the default values for **PR Number** and **Revision**, and specify the **Synopsis** and other details.

4. Click **Create and Submit**.

5. In the **Changes** tab, under **Changes** section, open the created problem report.

6. In the problem report click the **Workflow** tab and complete the workflow review process.

   After the completion of problem report workflow review process, the necessary changes are made to the object on COMOS server.

7. Import the updated data from COMOS server by running the below command.

```
calm_utility.bat "--operation=start_comos_inc_import" "-u=TC-admin-user" "-
p=password" "--comosprj=U:2:A3YFNPO8AR:"
        "--comosdb=db1" "--comosroot=U:8:A8BTYN2KJR:U" "--comosuser=PLM\comosuser"
"--comospwd=password@1234#"
```

The problem report changes to the object gets imported in to the Teamcenter.

8. Validate the changes and close the problem report.