Manufacturing Asset Management

Powered by Autodesk™ PLM 360

The tools manufacturers need to collect and analyze data related to assets

Manufacturing Asset Management Powered by Autodesk PLM 360 delivers the tools manufacturers need to collect and analyze data related to assets. Assets can easily be upgraded to Equipment. Equipment enables you to add the essential information about maintenance, repair, inspection or calibration required to keep it available and in shape for proper usage. To properly manage the tasks around “Asset & Equipment” the application delivers the proper history for the Maintenance, Repair or Calibration applied to it.

Features and Benefits

- Easy-to-use web based asset definition
- Easy to use web based Equipment definition with a proper Service Record
- Automatically attached history of service records
- Display of upcoming maintenance and calibration
- Display technical availability by status network
- Link supplier to asset or equipment
- Add responsible technician to the maintenance request
- Enter maintenance data and update the maintenance request
- Track the maintenance status on-line
- Reduce unscheduled maintenance by identifying issues before they become failures

Asset Management App Components

The Asset Management App powered by Autodesk PLM 360 consists of three primary workspaces.

1. Equipment Library
2. Equipment
3. Equipment Service Request

The **Equipment Library** and **Equipment** workspaces gather data depend on each other. Where **Equipment Library** only contains the raw equipment without any location information, the **Equipment** workspace adds the information of the exact instance of the asset and its maintenance schedule. The **Equipment Service Request** workspace enables the equipment to go through its planned maintenance and includes the ability to add comments and notify individuals on a case-by-case basis. Both **Equipment** and **Equipment Service Request** are driven by an implemented workflow.

See Workflow Actions to learn more about lifecycle states in Autodesk PLM 360.

Asset Management Groups, Roles, & Permissions

The Asset Management App powered by Autodesk PLM 360 is delivered out-of-the-cloud with groups, roles, and permissions already defined for users in order to use the Asset Management App. The only requirement from the System Administrator is to create a user and assign the user the group named **Operations**. See Adding Users WikiHelp for more information on adding users and assigning groups.

The following matrix illustrates the roles assigned to the Operations Group (Workspaces marked with an * are workspaces associated to the Asset Management App):

Workspace	Role	Permission
Equipment* (new)	**Equipment [R/W]** **Equipment [WF]**	**Read / Write**
Equipment Library* (new)	**Equipment Library [R/W]** **Equipment Library [WF]**	**Read / Write**
Equipment Service Request* (Extended)	**Equipment Service Request [R/W]** (Extend Original Role by adding + Ownership & Change summary + Change Ownership) **Equipment Service Request [WF]**	**Read / Write**
Items or Assets*	**None needed for the interaction items or Assets can be selected via pick-list**	**Optional Read**
Additional Workspace Permissions given to the Operations Group		
Accident Reports	Accident Reports [R/W]	Read / Write
Approval Lists	Approval Lists [R/W]	Read / Write
Customers	Customers [R]	Read Only

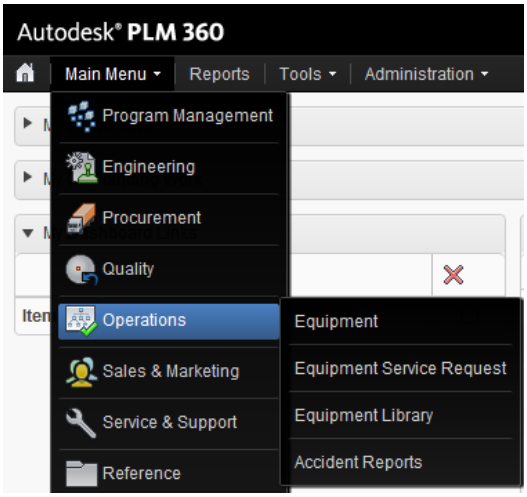
Project Management	Project Management [R]	Read Only
Suppliers	Suppliers [R]	Read Only
Tasks	Tasks [R/W]	Read / Write

Equipment Library Workspace

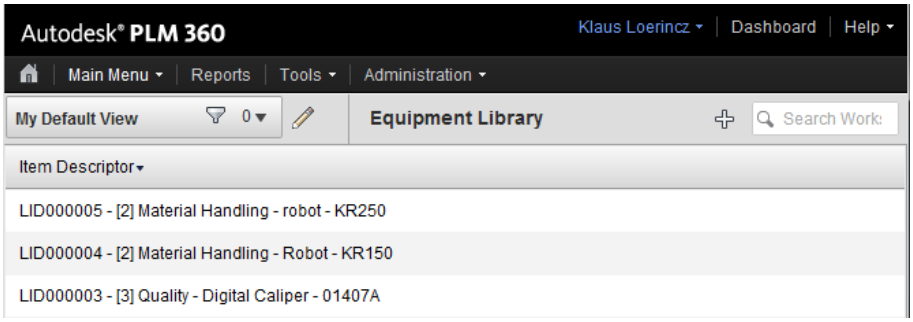
The **Equipment Library** workspace is where the relevant equipment base data is collected. The workspace identifies the category, sub-category, supplier and service-schedule information. The Procurement Information about the source should be filled. The Library is also the hub for all instances to be mentioned as a link and count.

How to Create an Equipment Library (Item or Asset)

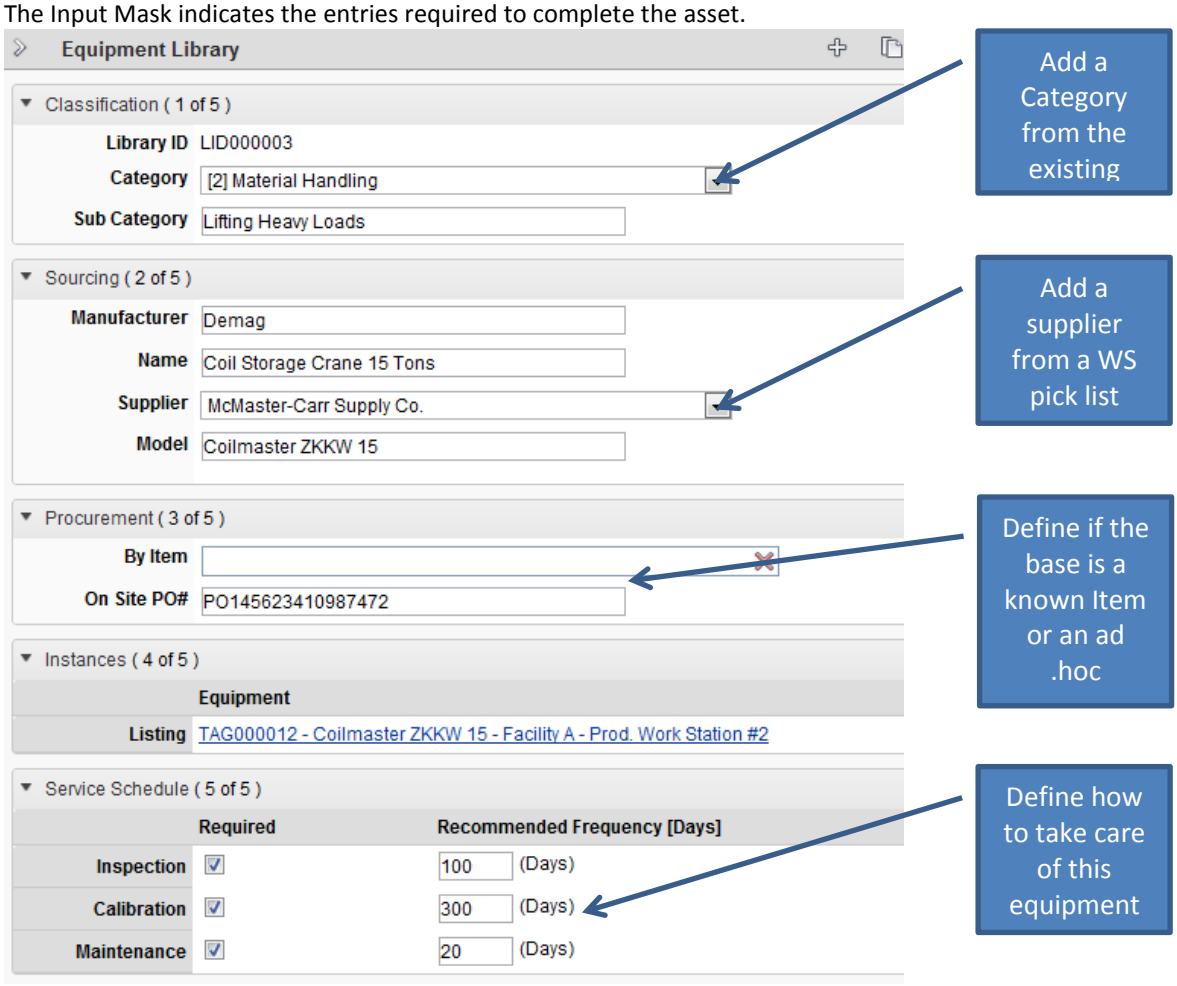
1. Log into Autodesk PLM 360 with a user that has permissions to create a new Equipment Library (Item/Asset). See Adding Users WikiHelp for more information on adding users and assigning groups.
2. Select Main Menu > Operations > **Equipment Library.**



3. Click **New** to add a new Item/Asset.



4. The Input Mask indicates the entries required to complete the asset.



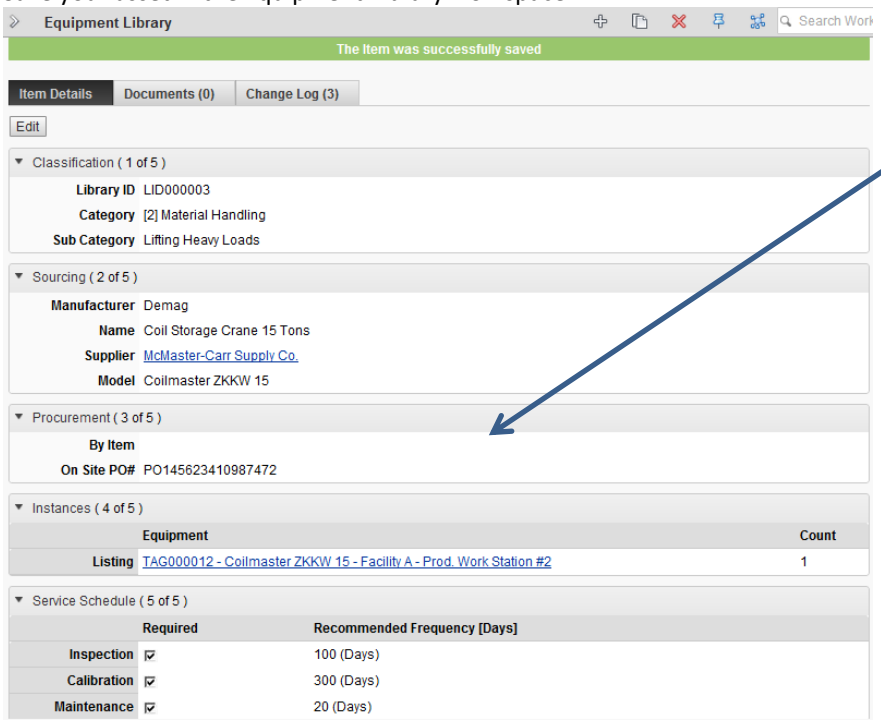
The Category is a pre-defined pick-list which can be extended or changed according to your needs. See How to edit a Pick List for more information. The Sub-Category text field is a label used to make finding of the asset easier.

The Sourcing section needs to be filled in according to the purchasing requirements. **Manufacturer Name** and **Model** are reused in the Equipment workspace.

All derived instances are listed in the matrix: Instances. The creation of the Equipment instance fills in the fields automatically.

Enter the base requirements for the Service-Schedule. This information is reused in the Equipment workspace

5. Save your asset in the Equipment Library workspace.



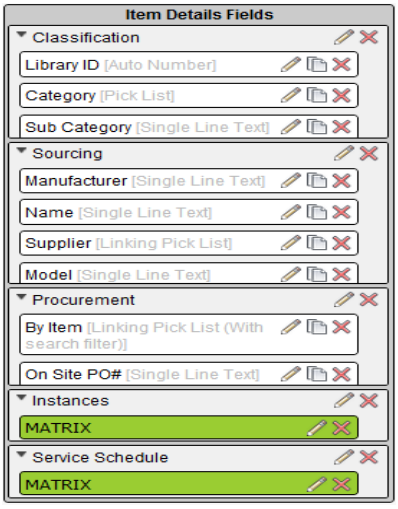
Result after pressing the save button

HTML links can be followed in the browser to visit the associated information

6. Only members of the **Operations** group can edit the form.

Workspace 1 Configuration / Additional Security / Scripting

Within the Equipment Library, there is only configuration used to achieve the appearance and data input capabilities.



Configuration used:

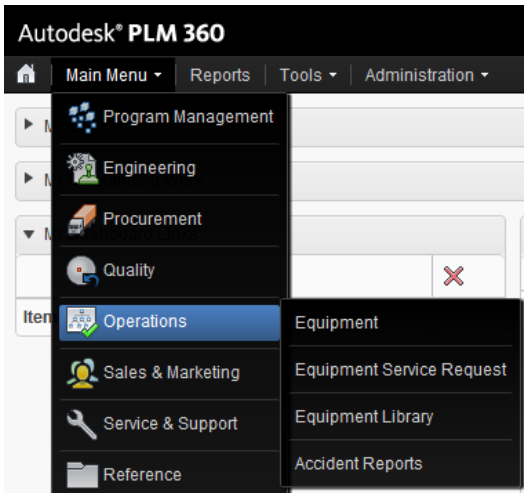
1. Auto Number
2. Single Line of Text (Free Text or computed Field & Display Length)
3. Picklist (from the Picklist-Manager)
4. Linking Picklist (HTML link to a Workspace & Item)
5. MATRIX (Table Style Field arrangement)
6. Check-Box (Field to Check On/Off)
7. Integer (Number between 0 and 9999)

Workspace 2 Description

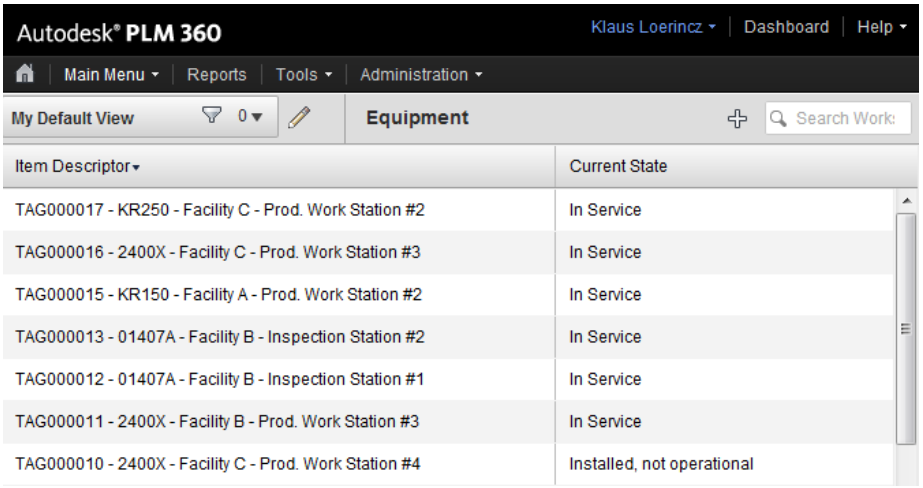
The Equipment workspace is where the specific equipment data is collected for each location. The aim here is to identify the Location, Service Point, and the details of the Service Record. As each individual record will be labeled with a BAR-Code the Item Details will hold the BAR-Code and the option to print the BAR-Code.

How to create an Equipment (from an Item/Asset)

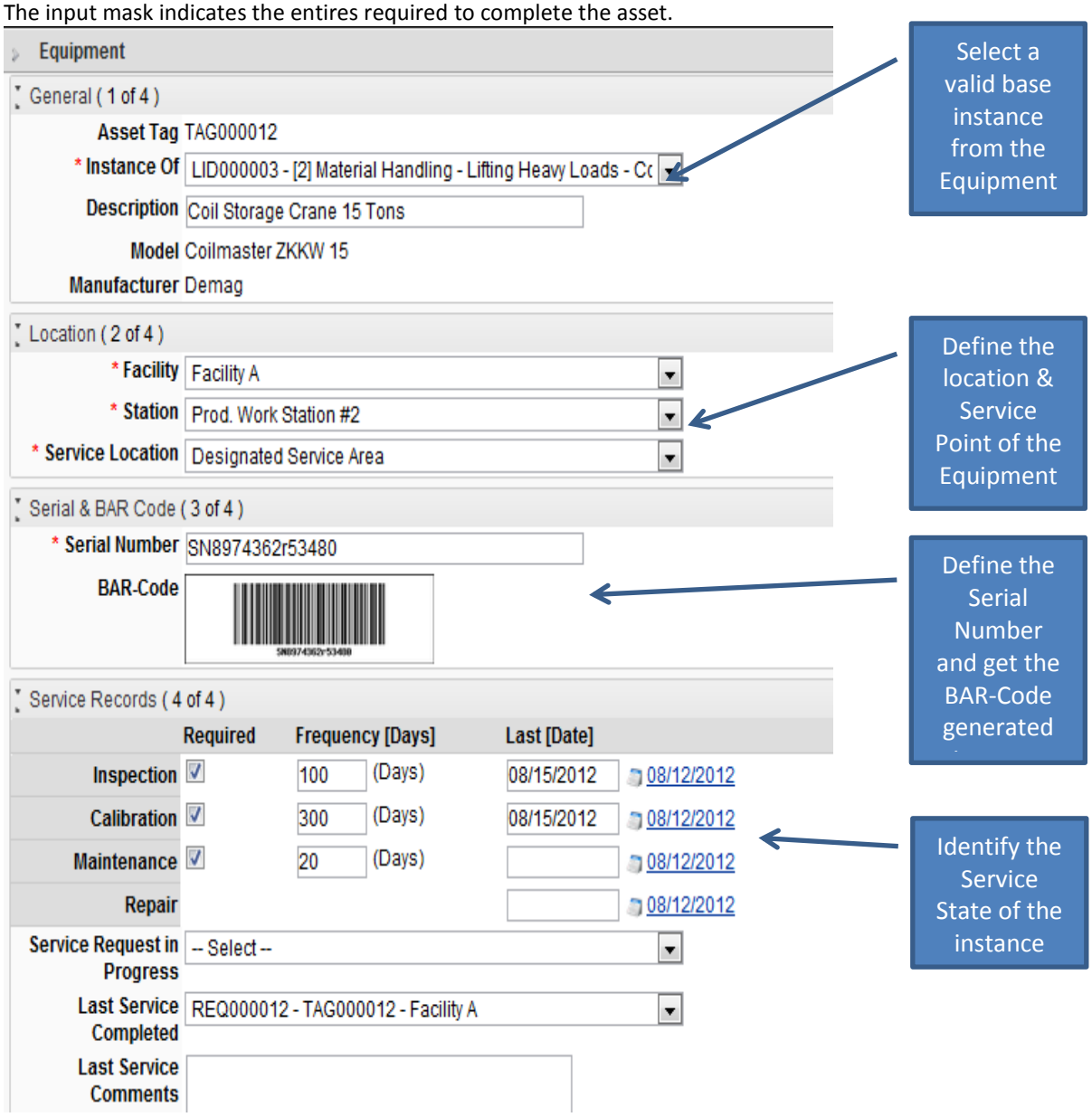
1. Log into Autodesk PLM 360 with a user that has permissions to create a new Equipment. See Adding Users WikiHelp for more information on adding users and assigning groups.
2. Select **Main Menu** > **Operations** > **Equipment.**



3. Click **New** to add equipment.

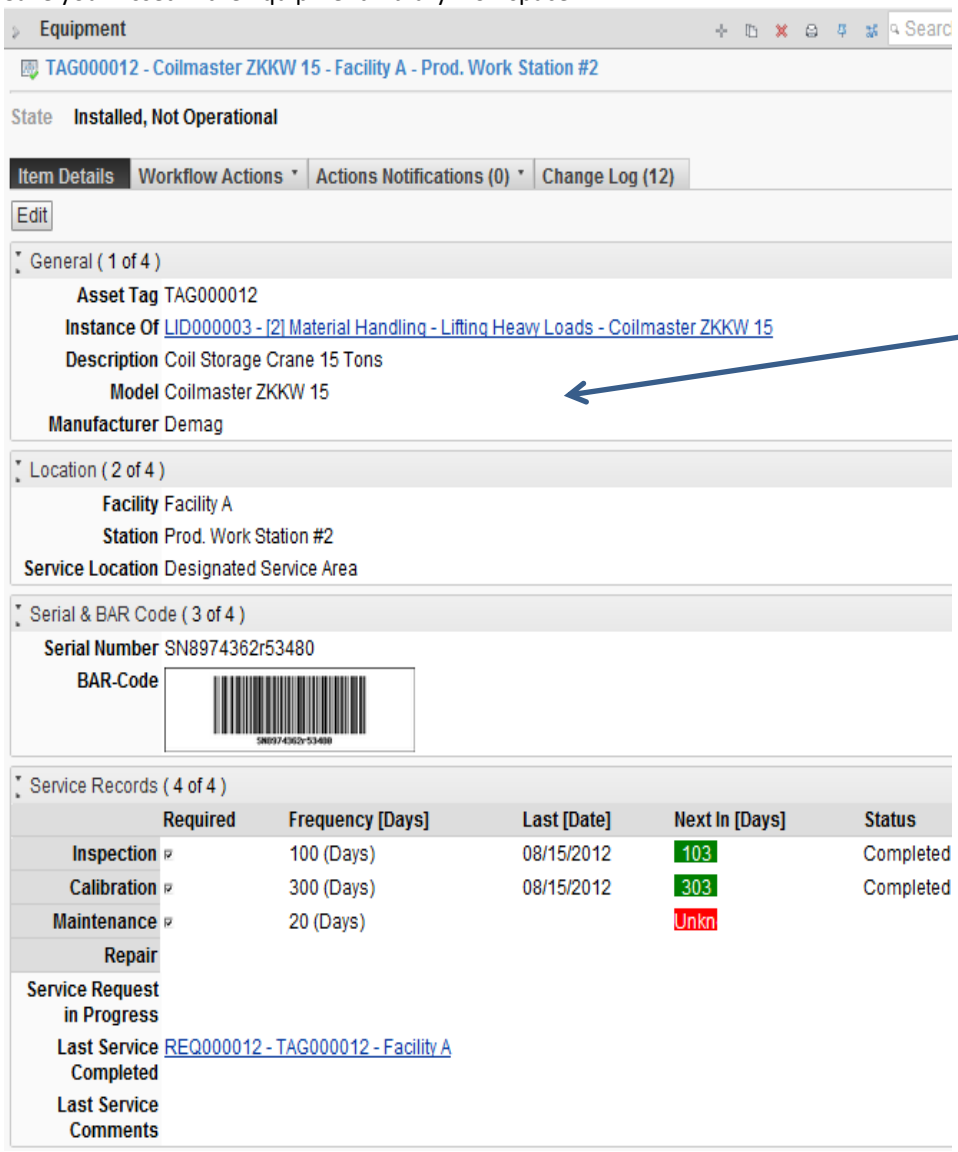


4. The input mask indicates the entires required to complete the asset.



Instance of lets you pick an Equipment-Library Asset from the Equipment Library workspace.
Serial Number is a free text field to enter the location specific Serial-Number.
Description is a free text to help you identify the Instance of the Equipment.
Location help you with pre-defined lists to identify where to find this Equipment.
The last step is to identify the dates for the **Last** column. Use the current date for new stuff or whenever the last action was performed on the existing Equipment. The **Required** and **Frequency** fields are imported from the linked Equipment-Library Asset.

5. Save your Asset in the Equipment Library workspace.



Fields from the assigned Asset Instance imported due to the rules assigned in the configuration (Behavior = NewEquipment)

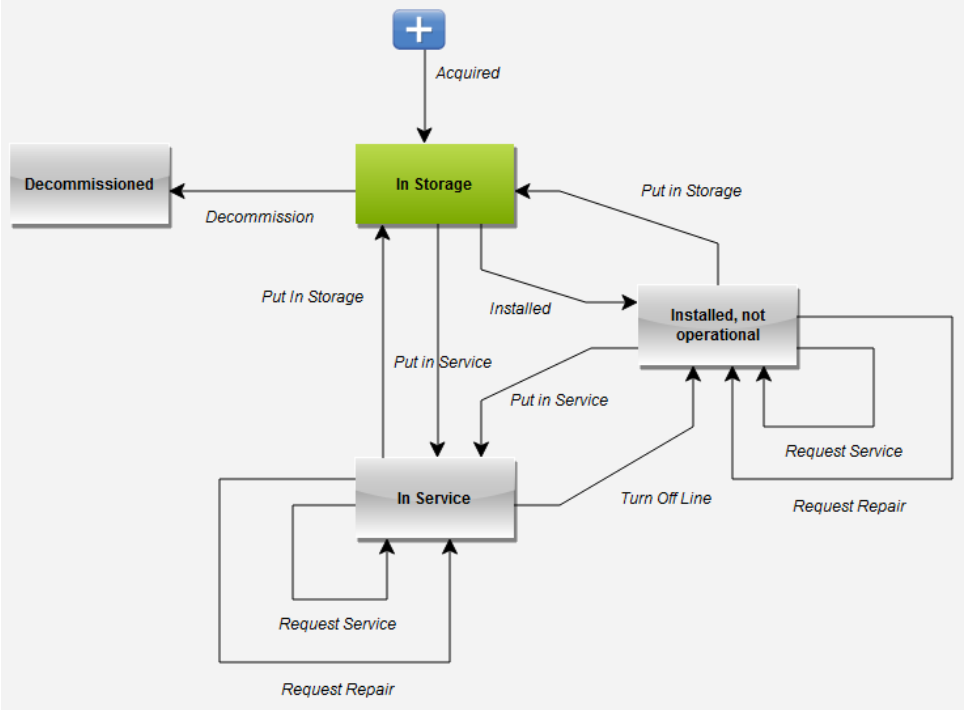
Note that the Frequency values were imported from the Equipment Library Asset which you created in step one. The open days to the next actions are calculated after saving the asset as well. The values are updated each time you open the equipment.

The behavior after "Create" is registered to the workspace at present. This behavior is "EquipmentNew"- This will copy the defined values from the Library component as well as register the instance at the linked Equipment Library.

6. Only members of the **Operations** group can edit the form.

7. This object has a workflow attached to it. The workflow describes the following equipment phases:

In Storage	Company Owned but not in Use
In Service	Company Owned and in operation/use
Installed, not operational	Unexpected Offline
Decommissioned	Retirement of the Equipment



The State Change Network for the Equipment comes with a single role: [WF] All.

There are three groups driving the above workflow within the company (ideation):

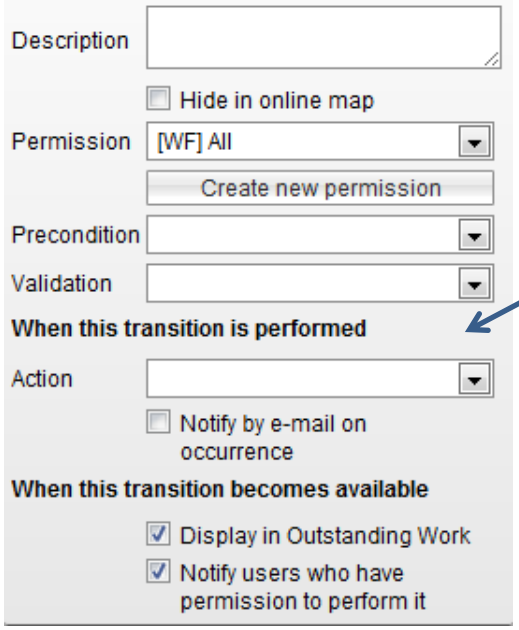
Procurement: Will set up the equipment record
Will be able to decommission the equipment
Will always be notified when the equipment goes back to in storage
Will be able to view Equipment Library and Equipment workspaces

Service: Will be notified when an equipment service request is raised with either "Request Service/Repair" or with the original Install.
Will be able to view the Equipment & Equipment Service Requests.

Engineering: Will be able to see the Equipment and can schedule a Service Request
Will be able to use the Equipment in Projects

There are three state change transition configurations in the out-of-the-cloud delivered app.

This configuration is used for the Acquired, Put In Storage, Decommission, and Turn Off Line transitions:

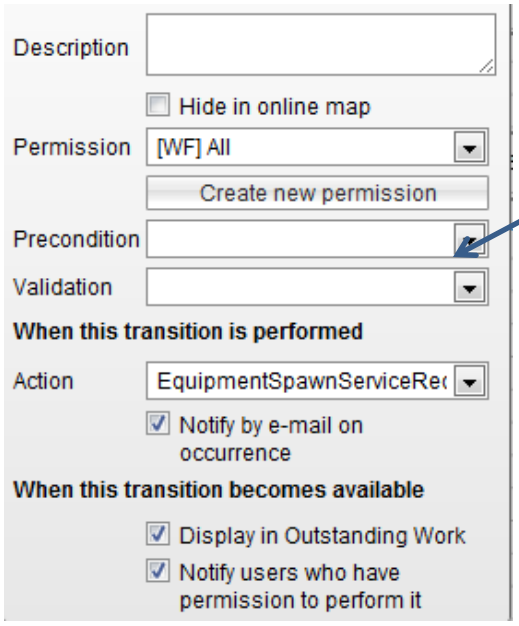


Precondition:
You must be Owner or Co-Owner

Validation:
Validation is on the fields

Action:
None

This configuration is used for the Put In Service, Request Service, Request Repair transitions:

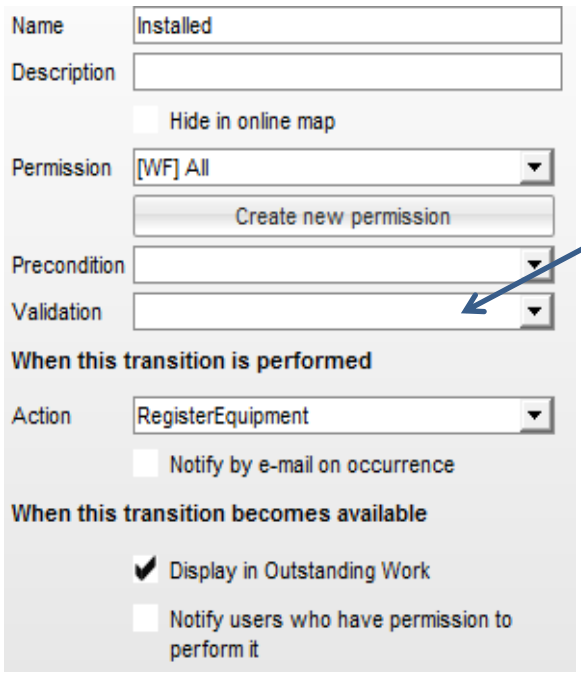


Precondition:
You must be Owner or Co-Owner

Validation:
Validation is on the fields

Action:
EquipmentSpawnServiceRecord

This configuration is used for the Installed transition:



Precondition:
You must be Owner or Co-Owner

Validation:
Validation is on the fields

Action:
RegisterEquipment

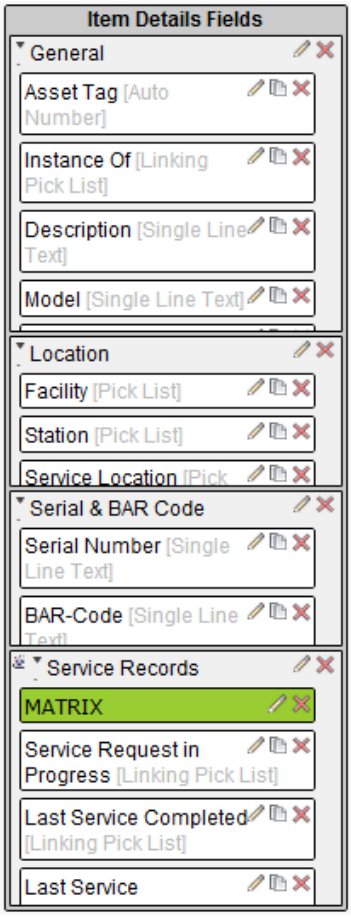
Workspace 2 Configuration / Additional Security / Scripting

In the Equipment workspace, scripts are used to automatically fill in fields. The script *EquipmentNew* is run after creating a new equipment entry in the equipment workspace. The script *EquipmentSpawnServiceRequest* is run after the actions "Create New Equipment Service Request" or "Add to an existing Equipment Service Request" are triggered within the workflow.

Fields which are consumed from other workspaces should be set to Edit = False. In this configuration, only the script is able to write into fields which are locked. Scripts have always higher permissions than the users triggering them.

Configuration used:

1. Auto Number
2. Single Line of Text (Free Text or computed Field & Display Length)
3. Picklist (from the Picklist-Manager)
4. Linking Picklist (HTML link to a Workspace & Item)
5. MATRIX (Table Style Field arrangement)
6. Check-Box (Field to Check On/Off)
7. Integer (Number between 0 and 9999)

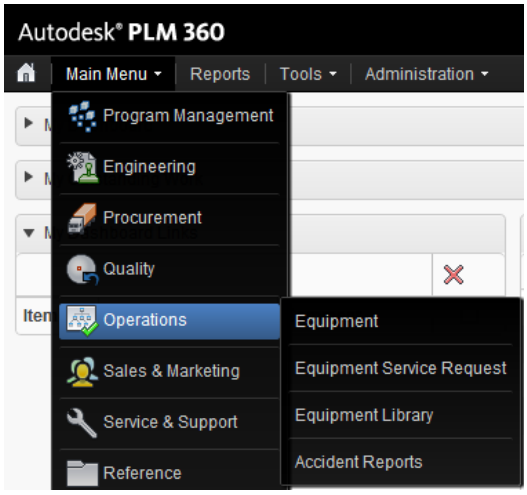


The Equipment Service Request Workspace

The Equipment Service Request Workspace is where the specific equipment is scheduled for inspection, calibration, maintenance or a repair. The Equipment Maintenance will be created when the equipment changes states.

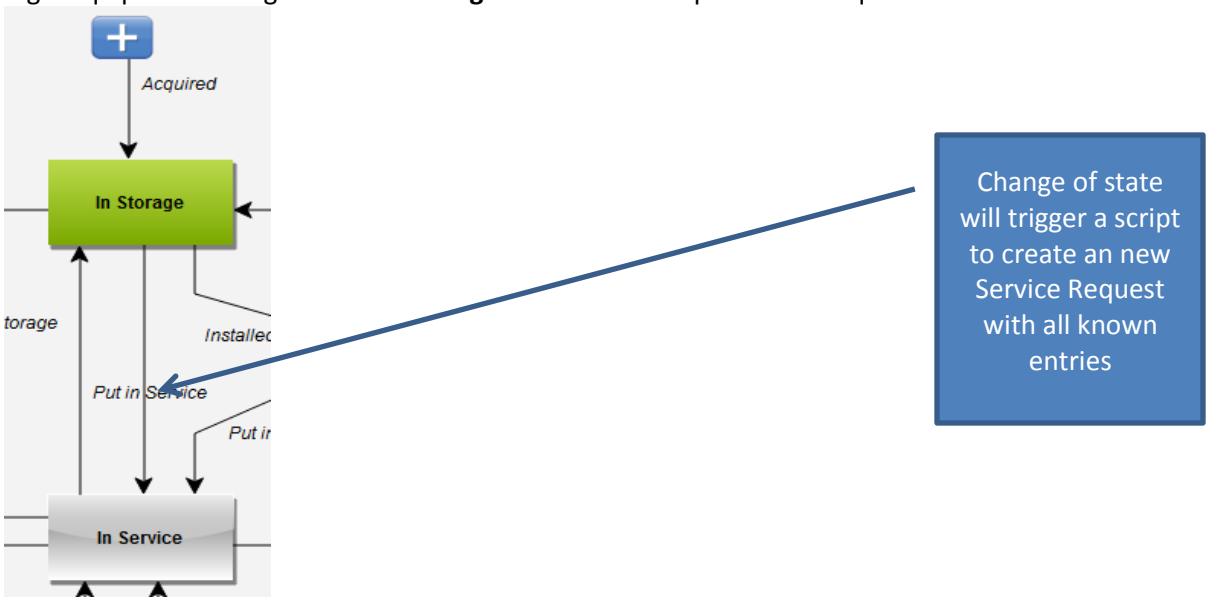
How to create an Equipment Service Request (from an Item/Asset)

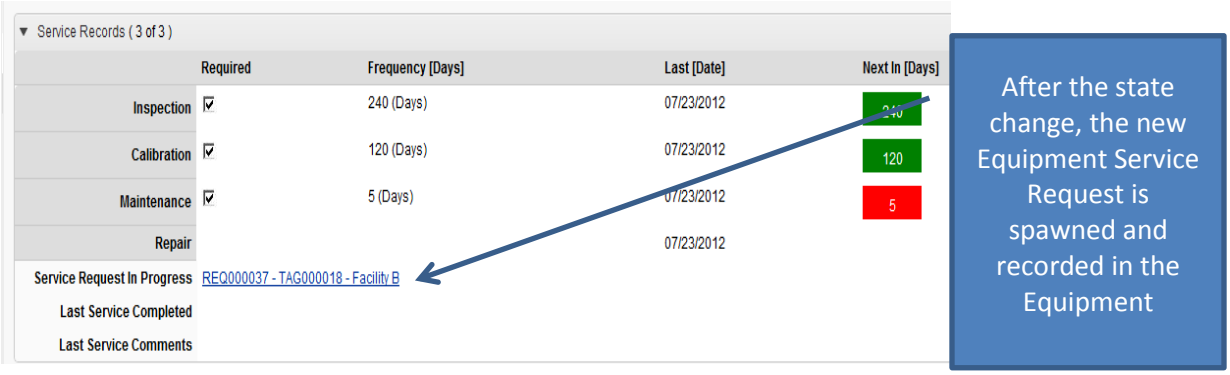
1. Log into Autodesk PLM 360 with a user that has permissions to create a new Equipment. See Adding Users WikiHelp for more information on adding users and assigning groups. Perform the state change in the Equipment which will trigger the creation of a new Equipment Service Request. Check within the Equipment if the new request has been generated and you will be able to follow the link within the Equipment to visit the new spawned Equipment Service Request.
2. Select **Main Menu** > **Operations** > **Equipment Service Request**.



3. You should not create a new Equipment Service Request with the “Add New” button. New Service requests are created by the Workflow change of the Equipment which needs to be lined up for the new maintenance to happen. Only the Administrator should have the ability to create entries for test purposes. This can be restricted by changing the R/W role as well.

e.g. : Equipment changes from **In Storage** to **In Service** or perform a Request Service.

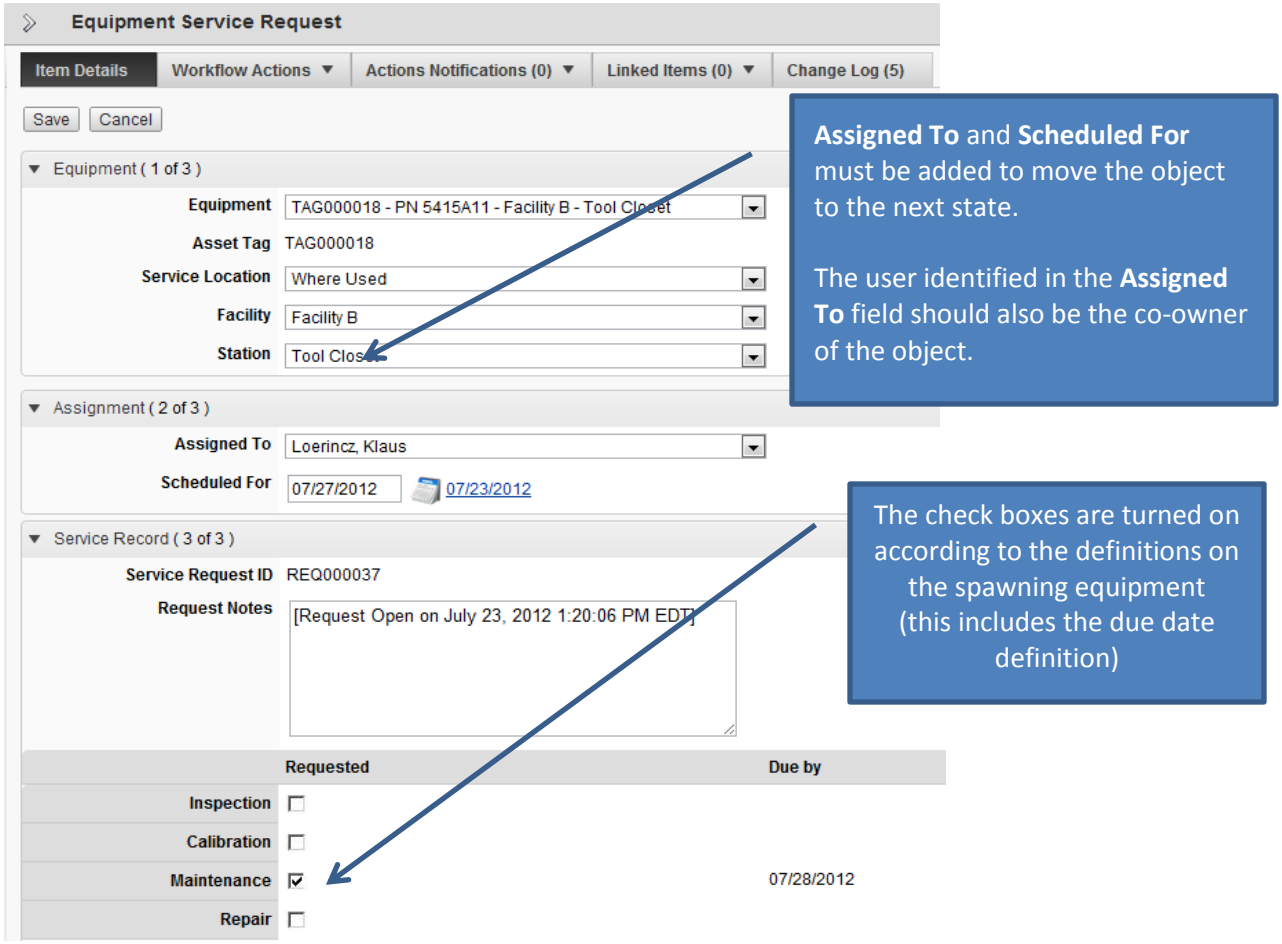




After the Equipment Service Request is created, it is also added to the equipment from which it was spawned. This closes the information loop.

4. Edit the Equipment Service Request to add the Additional Information needed to process the request.

   The **Assigned To** and **Scheduled For** fields must be completed on the Service Request. Add the same user in the **Assigned To** and the **Additional Owners**. This enables the user to see and edit the new object. Milestones help to flag the object urgency in the assignee's priority list. Milestones can be set with the scheduled date in mind.



   The Service Request ID is generated automatically. The Request Notes are added by the script, but further details can be added by the user who prepares the service requests for the assigned resource. After all fields of the Request Phase are filled in, you can move the workflow to **Accepted**. You need to be the owner of the object.

5. Add Information to the workspace as needed during the Processing Phase. At the end of the Processing Phase, the information about Performed, Completed By, Completed On and Service Comments need to be filled out.

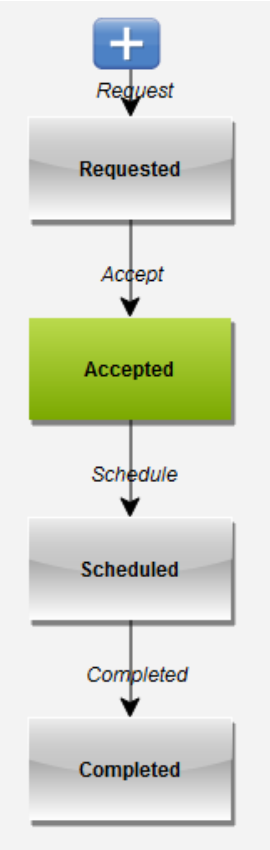
	Requested	Due By	Performed	Competed By	Completed On
Inspection	☑	08/30/2012	☑	in the Field, Klaus	08/15/2012
Calibration	☑	08/30/2012	☑	Operator, Klaus	08/23/2012
Maintenance	☐		☐		
Repair	☐		☐		
Service Comments					

Performed, **Completed By**, **Completed On**, need to be filled in for all requested actions to move to the Completed state

The application verifies that this information is present. If any data is missing, you cannot move the service request to Completed.

6. Only a member of the **Service** group can edit the request. View will be granted to **Engineering**, **Procurement** and **Operations**,

This object has a Workflow attached to it. The workflow describes the following phases:
Requested = Request created
Accepted = Request is ready to be scheduled
Scheduled = Date was found to process the request
Completed = Equipment was properly pushed through Service



The Requested:
Automatic by Engineering

The rest of the actions need to be completed by the Service Department.

The Engineering and Operations groups are notified when the Complete state is reached.

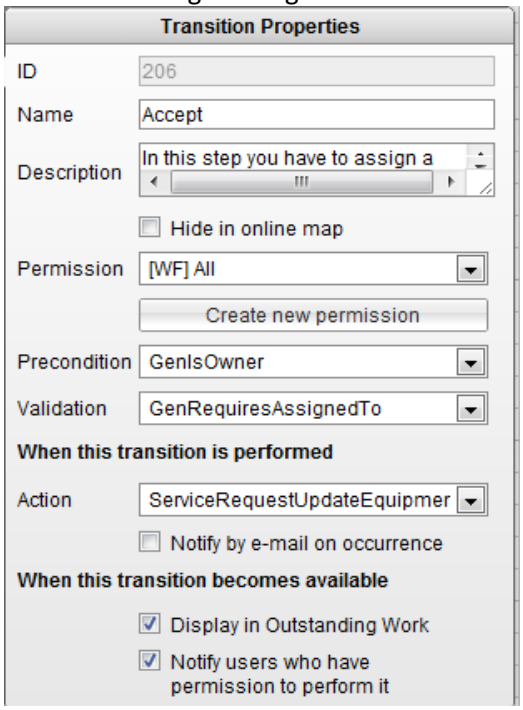
The State Change Network for the Equipment comes with a single role:[WF] All
The following Preconditions are applied to the Accepted transition:
“GenIsOwner”

The following Preconditions are applied to all other transition:
“GenAssignedTo”
The following Validations will be applied to the Accepted transition:
“GenRequireAssignedTo”

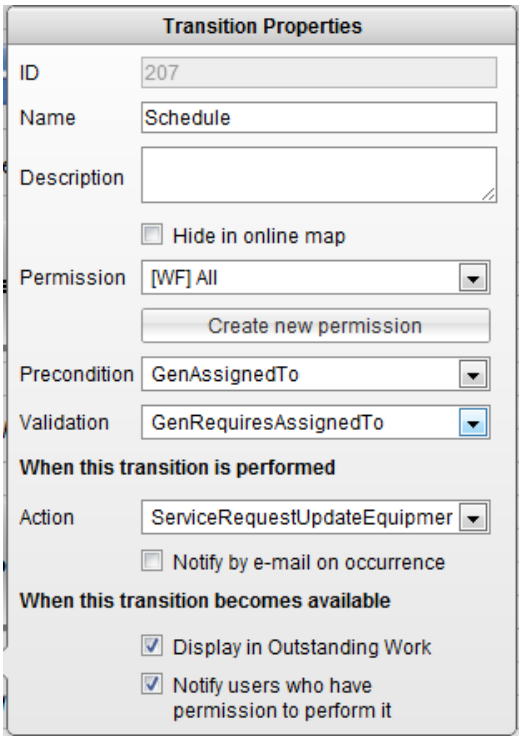
The following Validations are applied to the Completed transition:
“ESR_All_Actions_Complete”
The following Actions are applied at all transitions:
“ServiceRequestUpdateEquipment”

There are three different State Change Transition Configurations in the out-of-the-cloud delivered app.

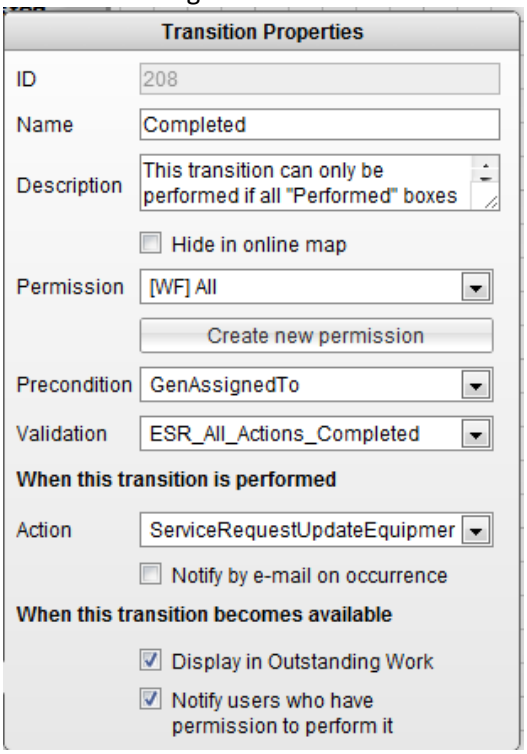
This State Change Configuration is used for the Accepted state.



This State Change configuration is used for the Scheduled state.



This State Change definition is used with the Completed state.



The action script updates the defined Information in the Equipment to align it with the current Service condition. This happens at all 3 transitions. These fields are “Completed” and “Last Service Date” which will define the possible next service schedule event of the Equipment object of either “Service”, “Maintenance” or “Calibration” but will not change an entry in the Equipment schedule dates for a “Repair”.

In all State Changes the “Outstanding Work” will be updated and the users which are part of Owner and Co-Owners will be notified that there is some work to be done. This also applies to the “Requested” transition which will be performed without any user interaction – Spawning Script Execution to create a new Object within the PLM360.

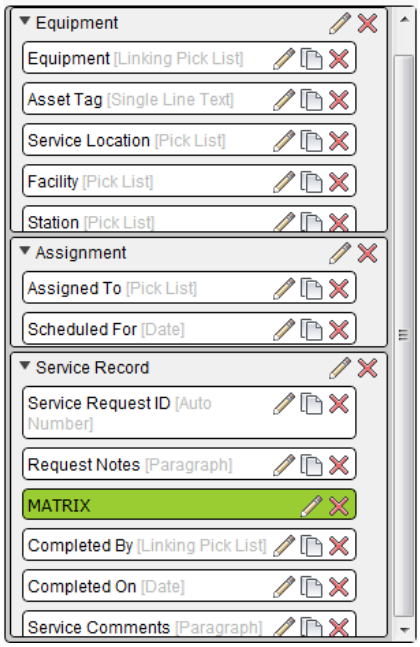
Add Security and Scripting to the Equipment Service Request Workspace

In the Equipment Service Request workspace, scripts are used to automatically fill in fields. The scripts are triggered when the equipment goes through certain state changes. The script *ServiceRequestUpdateEquipment* is triggered with each state change of the service request to update the Equipment workspace.
Related actions are the update of a set of fields in the Equipment WS which can only be defined by the ESR Workspace.

Fields which are consumed from other workspaces should be set to Edit = False. In this configuration, only the script is able to write into fields which are locked. Scripts have always higher permissions than the users triggering them.

Configuration used:

1. Auto Number
2. Single Line of Text (Free Text or computed Field & Display Length)
3. Picklist (from the Picklist-Manager)
4. Linking Picklist (HTML link to a Workspace & Item)
5. MATRIX (Table Style Field arrangement)
6. Check-Box (Field to Check On/Off)
7. Integer (Number between 0 and 9999)



Related Scripts

Preconditions			
Script Name	***Purpose***	***Short Description***	***Status***
GenIsOwner	*This script essentially locks the workflow transition to a single user, the record owner*	*Associate a Transition to the Record Owner*	***Reuse***
GenAssignedTo	*Only allows transitions to selected user*	*Only the User in the "Assigned To" filed will be able to change the state in the workflow*	***Reuse***
Validations			
Script Name	***Purpose***	***Short Description***	***Status***
GenRequires AssignedTo	*Transition will fail if user is not set*	*The Field "Assigned To" will need to have a valid user entry to proceed to the next state in the workflow*	***Reuse***
ESR_All_Completed	*Ensure that ALL requested actions are performed within the request*	*In the Equipment Service Request all Requested actions should be completed in front of moving to the Completed state*	***Add New***
Actions			
Script Name	***Purpose***	***Short Description***	***Status***
EquipmentSpawn ServiceRecord	*Create a new Service Record*	*The new service request will be created by a state change of the Equipment.*	***Add New***
EquipmentNew	*Clones basic information about the Equipment from the respective Equipment Library item*	*In addition in the Equipment Library Item an indicator of the existing Instances will be created*	***Add New***
ServiceRequestUpdate Equipment	*Update Equipment record each time a transition is executed on the associated service request*	*Update Equipment record on the change of state transitions of the Service Request*	***Add New***
RegisterEquipment	*Register the current Equipment to the root of its Equipment*	*Action script calling the Library function*	***Add New***

	Library component	*"submitEquipment()" from "EquipmentFunctions"*	
Library			
Script Name	***Purpose***	***Short Description***	***Status***
SpawnNewRecord	*Create a new PLM360Object*	*Basic handling of a new record creation with options of additional milestone creation, property population and others..*	***Reuse***
EquipmentFunctions	*Execute the registration of Equipment to Equipment Library as a Library Script*	*Basic Handling of the "add to Custom Object (Multi List)" with checking if this object is already existing. In addition the "length" of the list will be recorded in the property Count*	***Add New***

HOW TO USE THE APPLICATION

Guide to Application:

Equipment Library			
Workflow	***Purpose***	***Short Description***	***Status***
Create	*Create a new Equipment Library record to generate a base for further actions within the App. The Library component will be the base for creating instances.*	*The base for the Equipment Library can be an existing Item or an on demand item ordered via PO on site. The basic information hosted in the Library will then be reused in the Equipment. The instances of the Library will be listed for traceability & statistics during reporting.* *All Users which have access to the Equipment Library will be able to see the*	

		Library components. Only the ones granted access to create and edit will be able to do so. *To enable this the Owner and Co-Owner section on the record needs to be filled accordingly.*	
Edit / Change	*This can be done at any time to the Library component It is only access controlled and does not have a workflow attached to it*	*The Changes should be transported to the existing Instances. This should be handled without user interaction*	***Not implemented as of today → Will be done with reflections more properly and without scripting. This will be available with PLM360 V7.10***
Equipment			
Workflow	***Purpose***	***Short Description***	***Status***
Create	*Create a full Qualified Instance with:* *Facility Location* *Service Location* *Service & Repair Information* *Single Level Service History*	*During the Creation of new Equipment all existing information from the Library assigned will be imported and reused. At the end of the Process the created instance will be added to the equipment as a reference.* *Now the Equipment will be handled within its own workflow with the Help of Equipment Service Requests* *All Co-Owners and the correct Owner shall be identified.* *It is mandatory that the*	***Note: Register the Equipment to the Equipment Library at Create can be enabled with the release of PLM360 V7.10***

		User in the "Assigned To:" field is to be added as a Co-Owner. This will help to control the users being able to see the equipment instance and also which users are able to edit the Equipment instance or move it within the workflow with the appropriate permissions.	
Edit/Change	*With the appropriate permissions the Equipment can be manipulated to a certain extend*	*The Library component properties derived from the Equipment Library cannot be changed after create.* *The Service Table can only be edited when the user is in certain groups: Admin, Engineering & Quality.* *The "Serial Number" will not be editable after creating the Equipment.* *PS: The "Serial Number" could be automatically generated. This should be only changed when an appropriate formula is agreed on.*	
Print	*A print definition for the Serial Number is preset.*	*This Print setting can be changed to the appropriate needs from the Administrator*	
In Storage	*Initial Sate after creating the Equipment*	*From this point you can control the Equipment to either:* *"**Decommission**" - remove it* *"**In Service**" - activate it* *"**Installed, Not Operational**"*	

		- archive it	
Decommission	*You want to retire the Equipment instance you are working on*	*Can only be done form the "**In Storage**" state. Other states will not offer this ability* *No Action is triggered by WF.*	
In Service	*If you move the Equipment Instance to "**In Service**" form either location it is possible an "Equipment Service Request" will be spawned.*	*Now you are actively using the instance of the Equipment and you need to take care of "Service & Repair" to executed and tracked.* *The tracking of the actual & actual -1 history is on the item details page in a matrix.* *This matrix is also used to show you the current state of the Equipment Service Request it is attached to.* *Further Requests can be triggered on demand checking the Service & Repair matrix on the item Details* *Moving to this state from others will check if the issue of a Service request is required.* *If "YES" it will be executed automatically from the workflow. You will find the appropriate information on the Equipment Item Details page*	
Installed, Not Operational	*If you move to this state from either "**In Service**" or "**In Storage**"* *you can display that the instance of the Equipment will not be used in any operations.*	*The instance of the Equipment will not be used "Actively" but will still be on premise and ready to use if needed. Therefore you still want to be able to take care about the*	

		equipment. You can still schedule "Equipment Service Requests" as needed. *Moving from "**In Storage**" to this state will check if the Equipment is already registered to the Equipment Library. If this is not the case it will be added by the Workflow action.*	
Equipment Service Request			
Workflow	***Purpose***	***Short Description***	***Status***
Create	*A new service Request will always be spawned by the Workflow of the instances of the Equipment.*	*If not too many fields will need to be populated manually in both records. This is to ease the work for the creator of the requests. In addition the users of the equipment will receive the appropriate information within the instance of the equipment they are using (alternatively the mail notification could be switched on within the workflow)* *All Co-Owners have to be specified to see and being able to work on the Equipment service request*	
Edit / Change	*Will be available for all users listed* *in the Owner or Co-Owner's and will be given appropriate permissions*	*The users can update certain Fields and will be able to drive the Workflow which will update the corresponding equipment as we move it forward.*	
Requested	*Condition after the Equipment Service Record was spawned*	*Update certain Fields like* *Assigned To:* *Scheduled for:*	

		To be able to move to the next state. = "Accepted" *Only the Owner of the record can do that*	
Accepted	*State for the Assigned To user to acknowledge that this can be done*	*The appropriate user should also set the final date when the service will be started* *Only the "Assigned To" user will be able to do that.*	
Scheduled	*Step where the actual requested work will be performed.*	*All remaining Information in the Service Record will have to be filled out in order to be able to move the Workflow to the "Completed" state.* *Hence all "Requested" check marked fields will have to have the Performed, Completed On and Completed By filled out. (Precondition Check)* *Only the Assigned To user will be able to perform it.*	
Completed	*Final state of the Equipment Service Request*	*Associated Equipment will be updated to show the next Service dates and that the current Service Record will be moved to the completed one.*	