dynaway

White Paper

Enterprise Asset Management

for

Microsoft Dynamics® 365 for Finance and Operations, Enterprise Edition

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1 Introduction

Enterprise Asset Management (EAM) is an advanced module for managing assets and maintenance jobs in Microsoft Dynamics® 365 for Operations. Enterprise Asset Management is developed by Dynaway A/S and integrates seamlessly with several modules in Microsoft Dynamics® 365 for Operations.

In Figure 1 you will see a graphic illustration of the interfaces to other modules in Dynamics 365 for Finance and Operations.

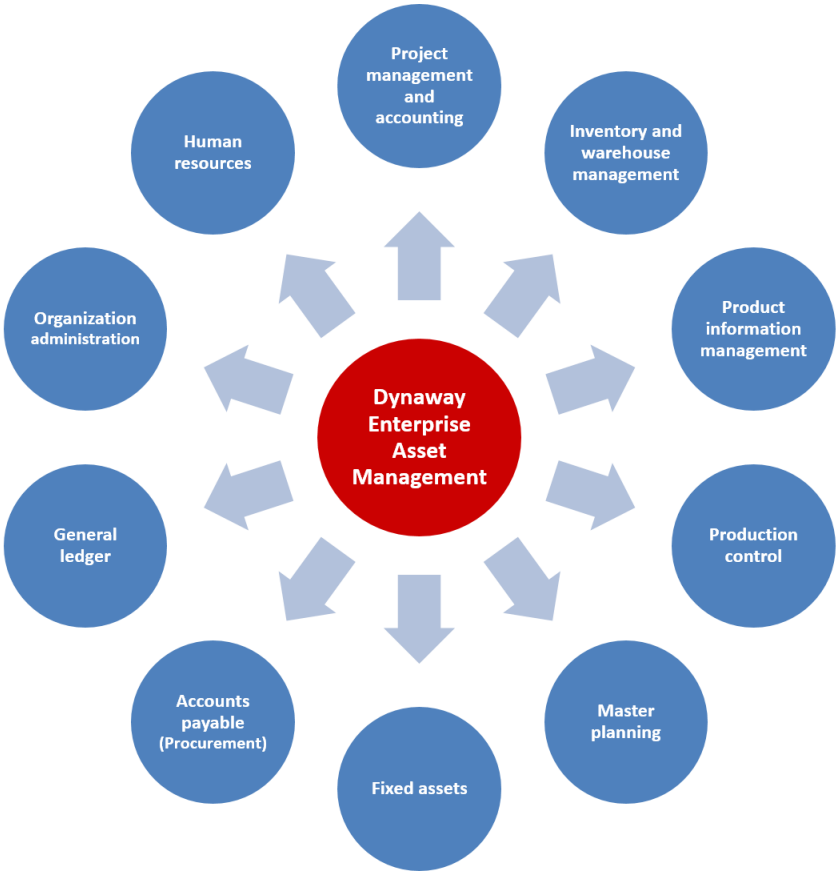

Figure 1

Enterprise Asset Management allows you to efficiently manage and carry out all tasks related to managing and servicing many types of equipment in your company, for example, machines, production equipment, and vehicles. Enterprise Asset Management can also be set up for Asset Service Management (ASM) with the main focus of servicing customer equipment.

Figure 2 shows an overview of the key functionality covered by Dynaway Enterprise Asset Management.

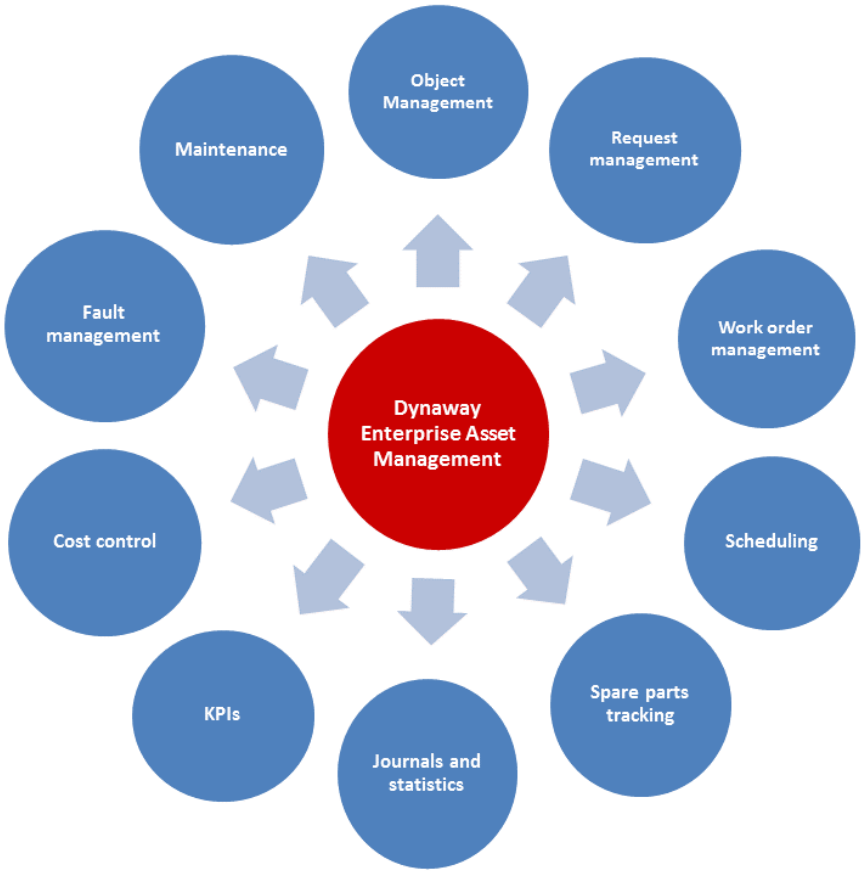

Figure 2

2 Enterprise Asset Management

Dynaway Enterprise Asset Management (EAM) comprises many features that enable your company to keep your machinery running continuously without unnecessary interruptions or breakdowns. In the following sections, we will introduce you to some of the core functionality in our asset management solution.

2.1 Objects and Work Orders

The central parts of Dynaway Enterprise Asset Management (EAM) are objects and work orders. An object is a machine or a piece of equipment that requires continuous maintenance and service. Objects can be created in a hierarchical structure. Maintenance jobs can be planned at all levels in the object structure. Various product information data can be set up on an object or a work order.

Here is a list of some of the data that can be created on an object or a work order:

- Jobs
- Product/Model relations
- Location
- Spare parts
- Check lists
- Measuring points
- Condition assessment
- Fault symptom, cause, and remedy
- Maintenance sequences (based on time or counters)
- Production stop
- Technical specifications
- Consumption (items, hours, costs)
- Notes

Objects and related sub objects can be created in a hierarchical structure to display relations and dependencies of objects. Maintenance jobs can be related to all levels in the hierarchical structure.

Job Types, Variants, and Trades

An object has an object type attached to it. The object type defines which job types, meaning which maintenance or service jobs, can be carried out on an object. When you create a work order, selecting a job type is mandatory. Job variants can be set up on a job type. Job variants define variations of a job type, for example, size (small, medium, large), periods (weekly, bi-weekly, 1 month, 3 months), and configurations (low standard, flexible, high performance). Job trades are information regarding professional trade, for example, mechanical, electrical, and hydraulic.

Copy and Move Objects

In the **All Objects** list view, objects are shown in hierarchical order in the **Object** column. Parent objects are displayed in the **Parent** column. The object hierarchy for a selected object is also shown in a tree view in the **Object tree** FactBox. It is possible to copy an entire object hierarchy. This is useful if your company has several object hierarchies with similar object structures, and you want to quickly create a number of similar object hierarchies.

You can also move objects and related sub objects in an object hierarchy. This is useful if, for example, your company wants to handle

- moving an object permanently because it has a new location
- moving an object temporarily from an object hierarchy for refurbishment and then re-inserting the refurbished object in the object hierarchy

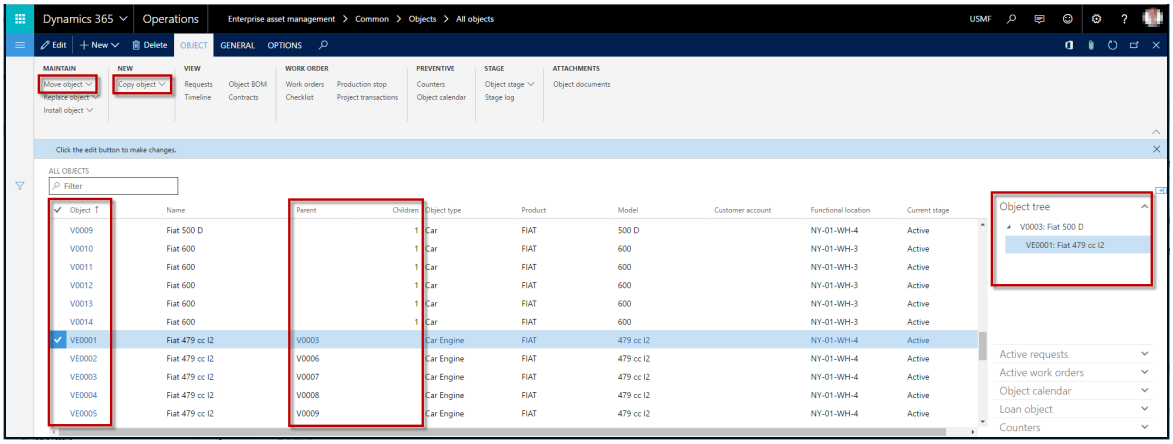

Figure 3

In order to manage maintenance jobs carried out on objects, you create work orders. A work order consists of one or more work order lines. Each work order line contains an object that requires maintenance, and a related job type, for example, 10,000 km, 50,000 km, 1-year overhaul, or safety inspection. In the figure below you will see an overview of the work flow connected to a work order.

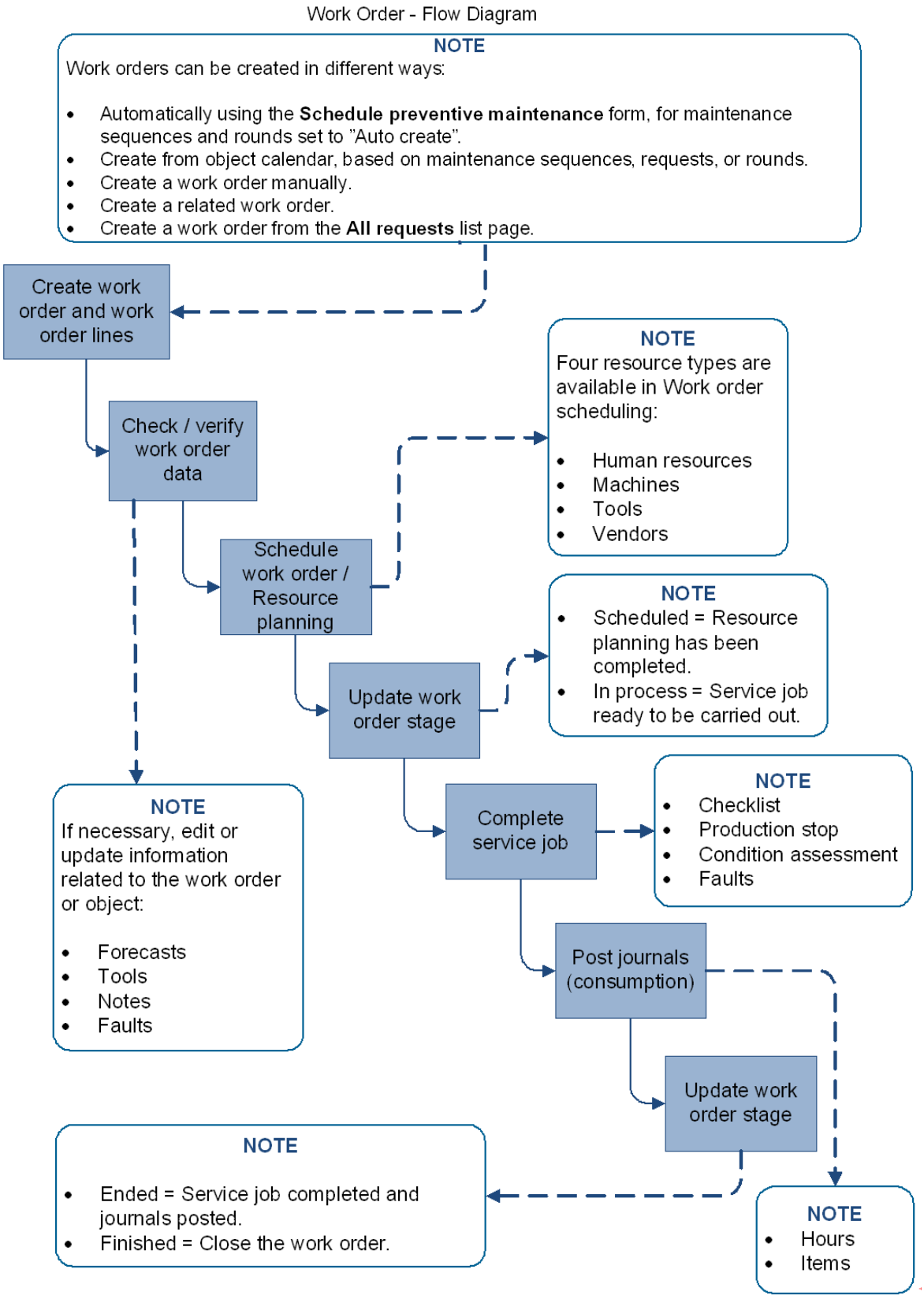

Figure 4

Procurement

In Enterprise Asset Management, you can get an overview of purchase requisitions and purchase orders related to work orders. It is also possible to create a purchase order or a purchase requisition from a work order.

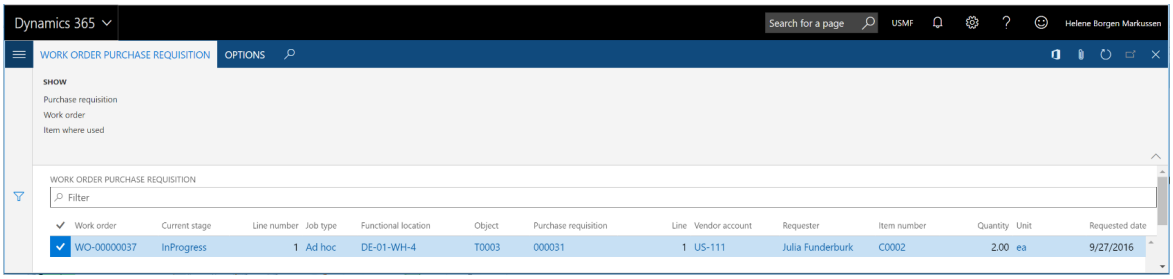

Figure 5

2.2 Functional Locations

Functional locations are used to manage objects on locations, including track object costs on functional locations. Functional locations are structured hierarchically, and locations can have sub locations. The functional location structure is static; locations cannot change place. Objects can be installed on functional locations and, if required, the objects can later be installed on another functional location.

Functional locations are elements of a technical structure, for example, functional units within a system. Here are examples of how you can use functional locations:

- Functional (user-oriented, manage objects with similar behavior)
- Process-related (work flow-oriented)
- Spatial (geographical locations, sites)

Object costs always follow the location of the object meaning that if you install an object on a new functional location, the object automatically uses the financial dimensions related to the functional location. Therefore, object costs are always related to the functional location to which the object was related at any given time. This automatic handling of financial dimensions ensures complete traceability of costs when your company performs project controlling and reporting on functional locations.

How you build your functional location hierarchy is based on your company's requirements for maintaining internal equipment or servicing customer equipment. The two figures below show examples of functional locations - based on geographical locations and customers.

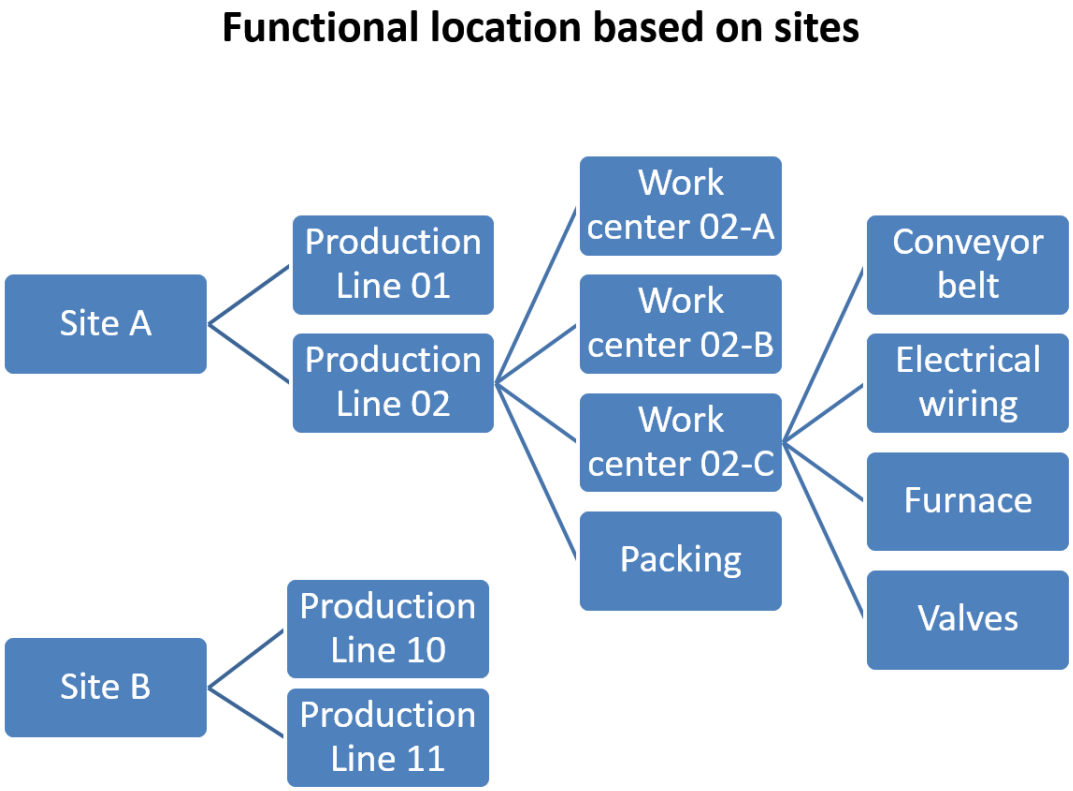

Figure 6

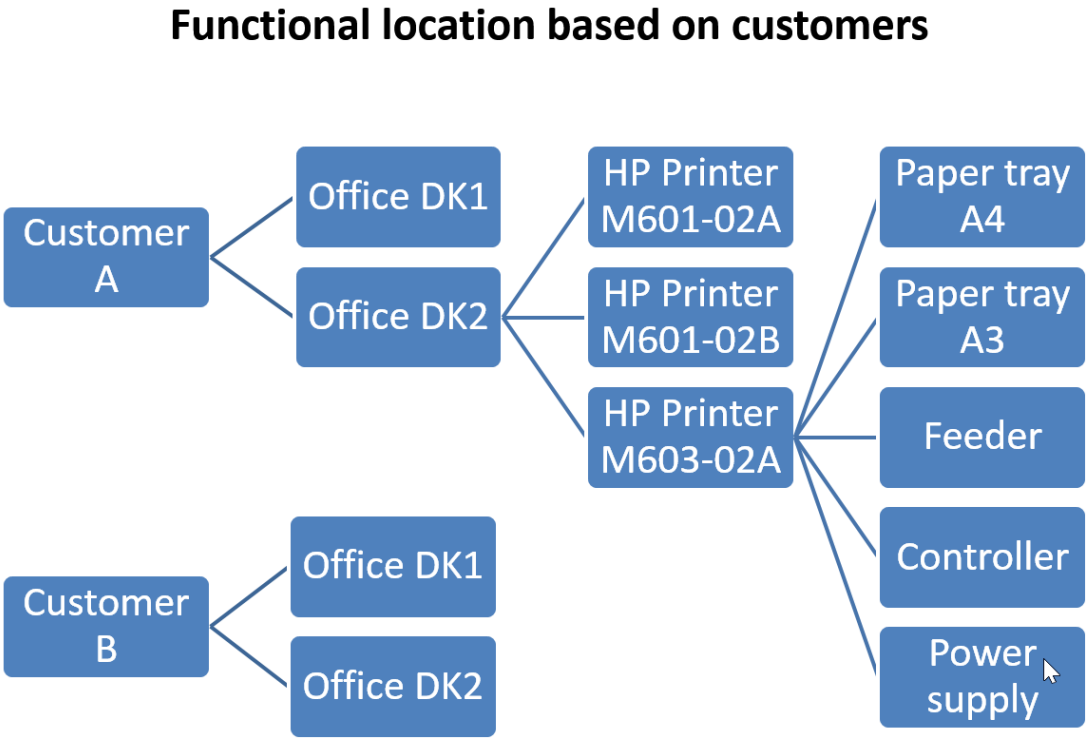

Figure 7

Functional locations provide traceability of objects in relation to requests, work orders, fault registrations, condition assessments, production stop registrations, and object counter registrations.

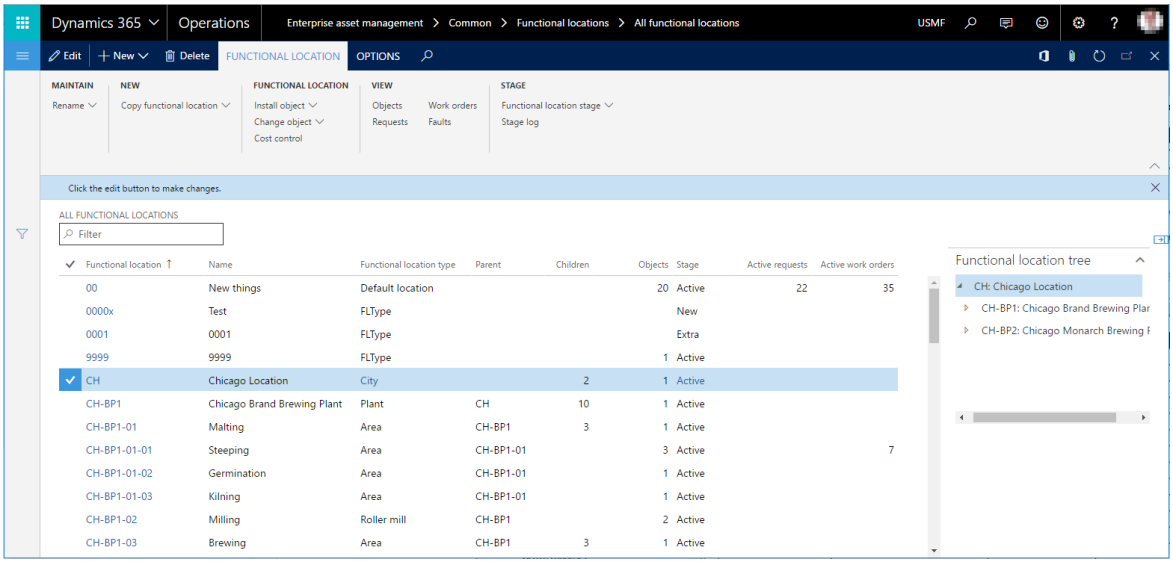

Figure 8

2.3 Spare Parts

Spare parts are managed in the **Product information management** module in Dynamics 365 for Finance and Operations. Spare part consumption is registered on work orders. Replenishment of stock, including the spare parts ordering process, is done using standard Dynamics 365 for Finance and Operations functionality.

Spare parts are set up on object types, which are related to objects. A spare part list can contain a list of approved spare parts as well as spare part alternatives to be used in case approved spare parts are not available.

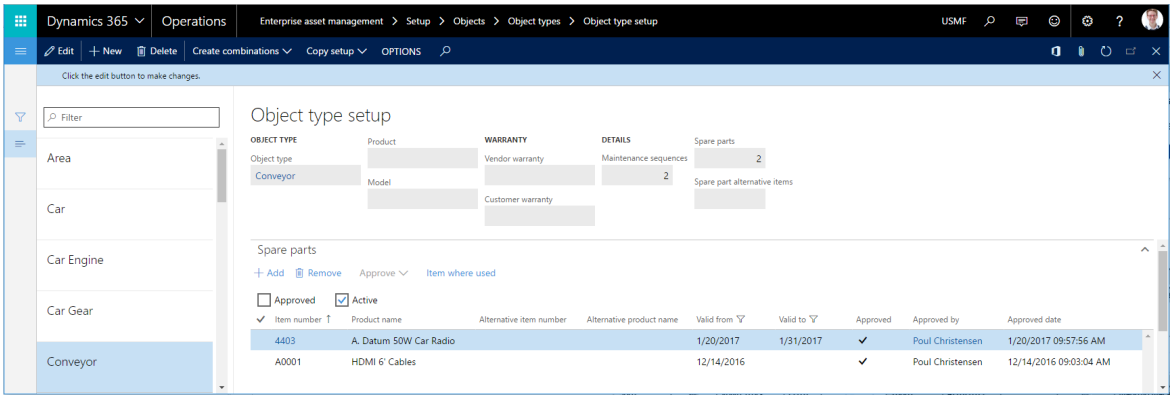

Figure 9

When you have created a work order, it is possible to add approved spare parts to the work order, if required.

After you have completed a maintenance job, and item consumption has been registered on a work order, you will be able to track consumption of spare parts and other items used on the object. This functionality allows you to keep a complete item consumption record on all your objects. For example, you can use the record to monitor if a specific spare part is often replaced, or keep track of which spare parts or other items are currently used on an object.

2.4 Checklists

Checklists and measuring points can be created to ensure that maintenance jobs are carried out correctly. For example, you want to ensure that safety precautions or special procedures relating to a particular machine type are observed.

Checklists are set up on job types. When you create a new work order line and select an object, the checklist related to the object is automatically transferred to the work order line. It is possible to define that a worker must attach his or her worker identification to each item in a checklist. This means that a job cannot be completed until the worker has signed off on all checklist items. If required, workers can also create additional checklists and measurements.

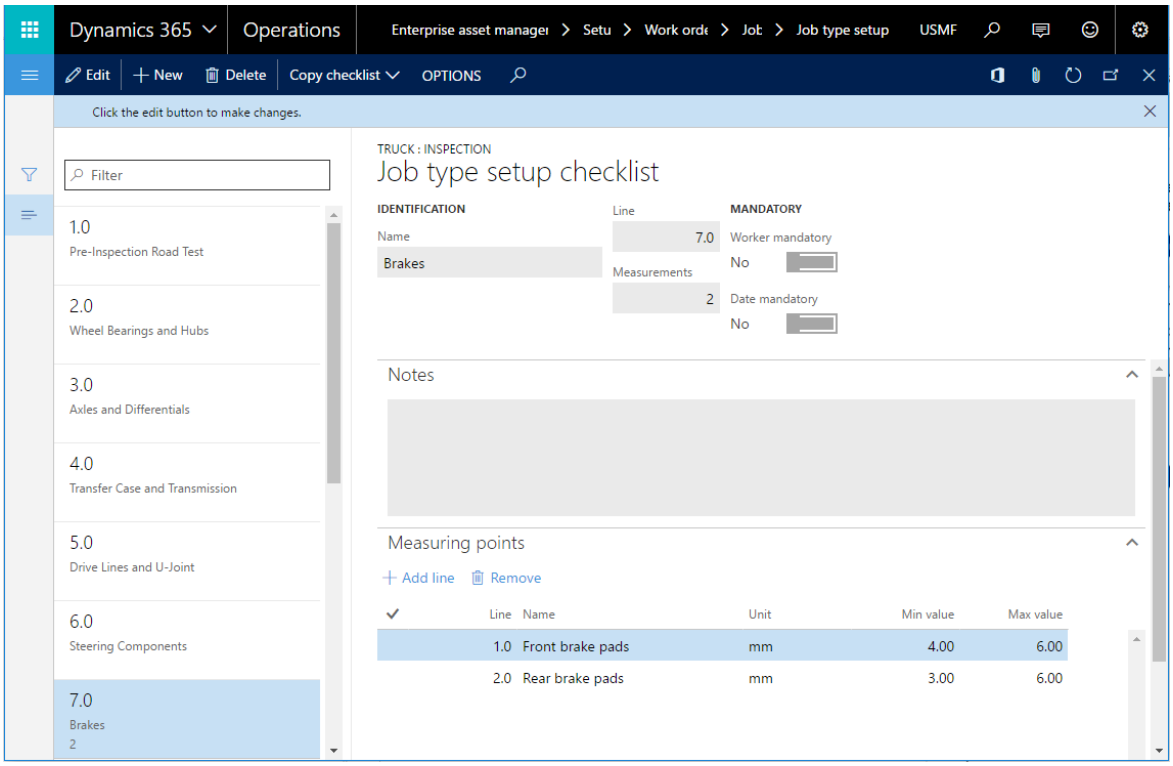

Figure 10

2.5 Consumption

When a maintenance job has been completed on a work order, the next step is to make consumption registrations and post journals. You can make registrations on the following consumption types: Hours and items. The different consumption types are registered and posted in the **Journal** form. The journal setup is used for creating and posting separate journals for hours and items, which is handled in the **Project management and accounting** module.

2.6 Mobile Client

Workers can work with objects and work orders on the Mobile Client. Regarding objects, the following information and functionality are included:

- A list of objects related to the work orders assigned to the worker who is logged in on the Mobile Client
- Search options, using either a search field or the smart filter bar

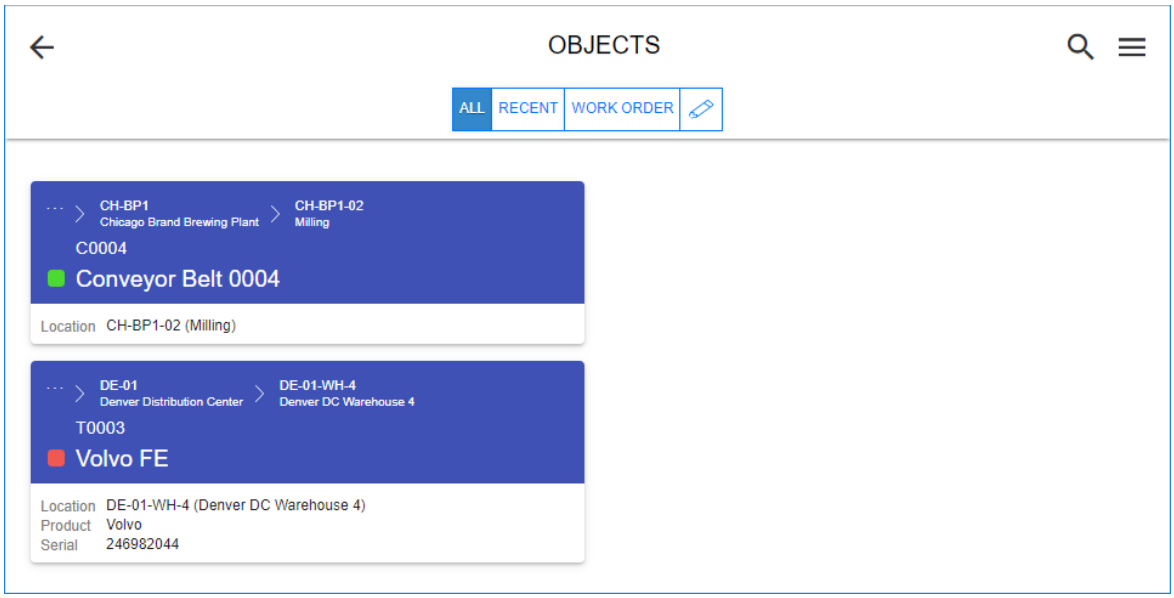

Figure 11

- Overview of object-related information
  - Fault registrations
  - Production stop registrations
  - Requests
  - Work orders
  - Counter registrations
  - Spare parts
  - Object specifications
  - Object documents
  - Bill of Materials
  - Attachments

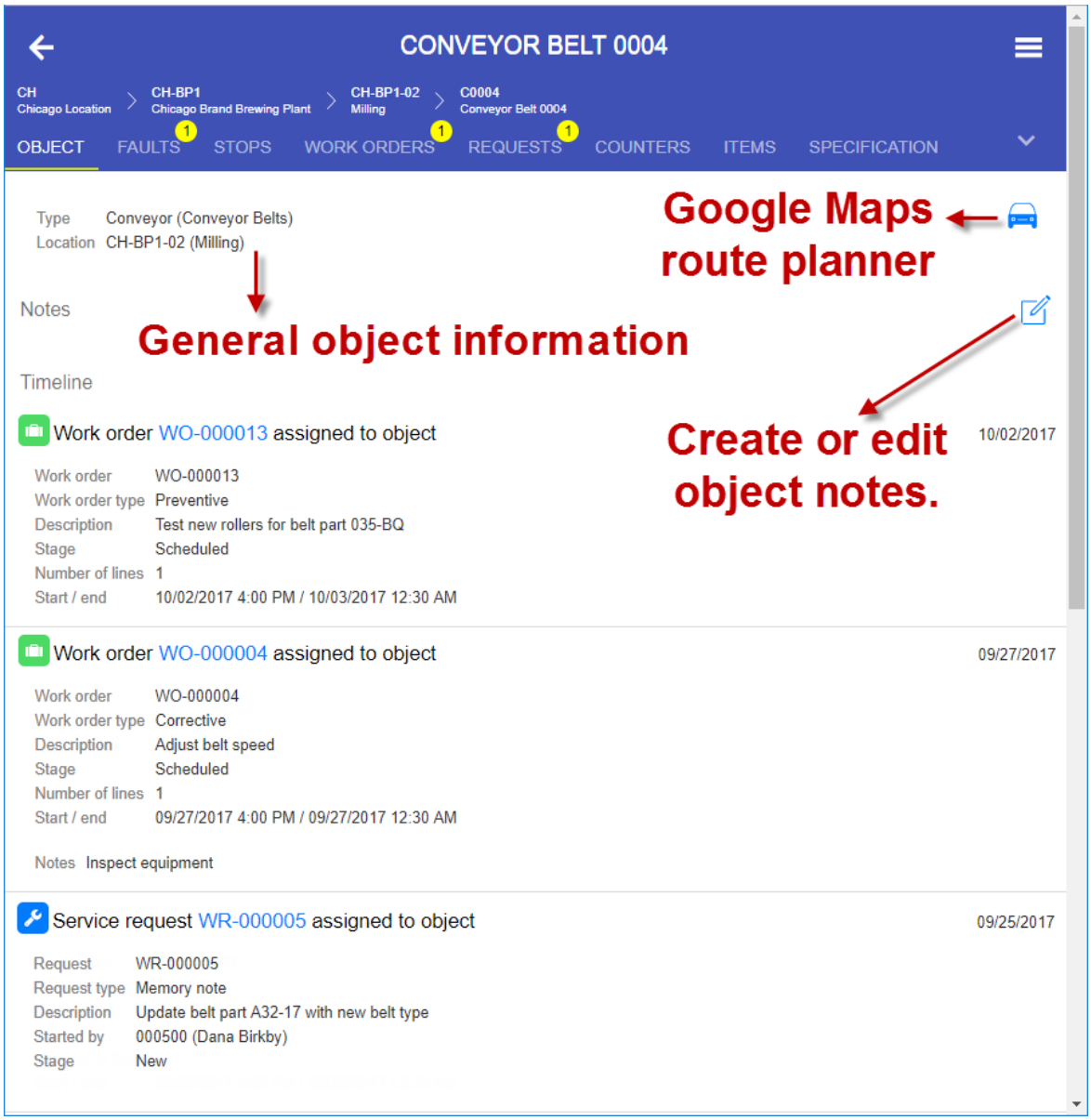

Figure 12

Work Orders

The work calendar shows a list of work orders scheduled for the worker who is logged in on the Mobile Client.

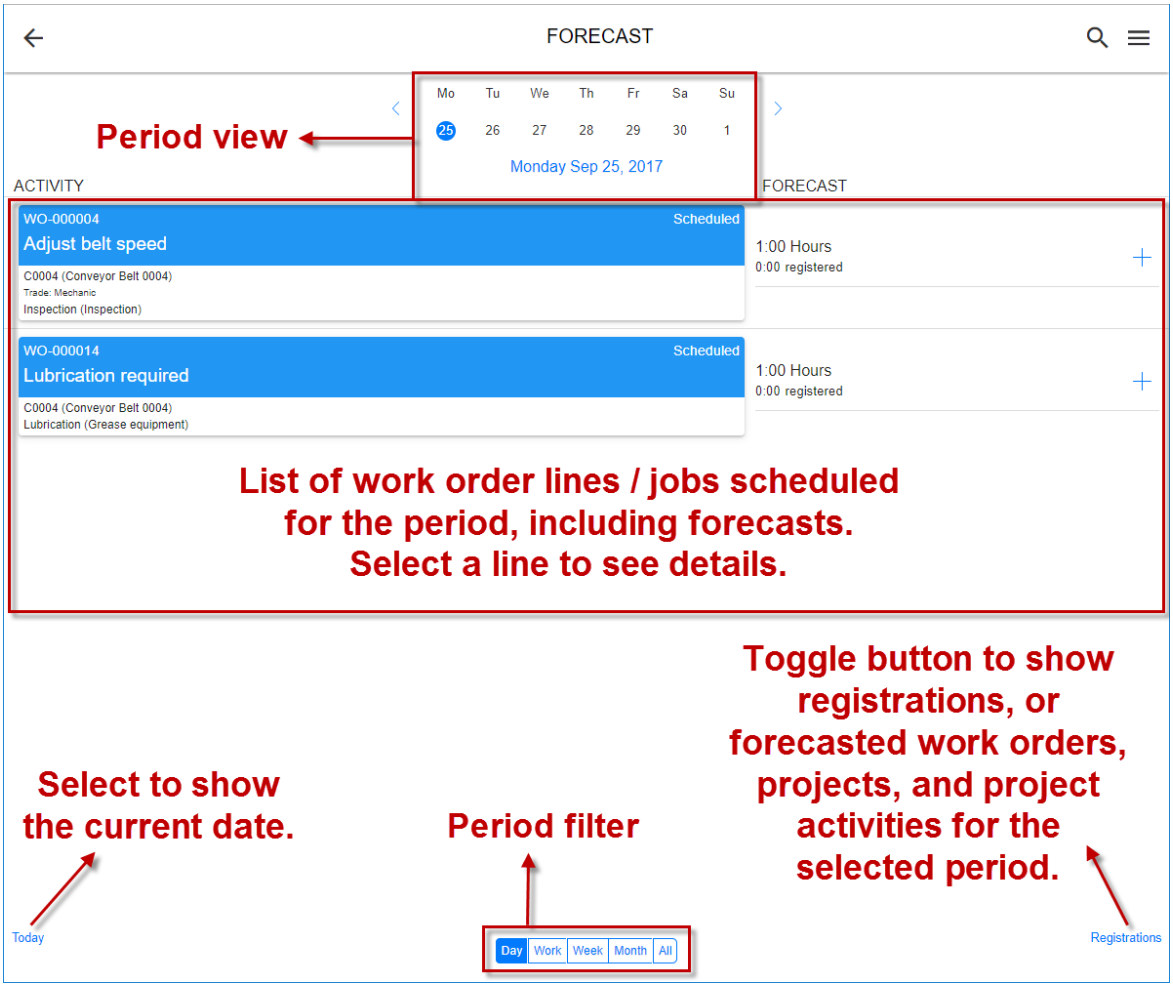

Figure 13

You can see and work with the following data on a work order and related work order lines:

- Checklists
- Fault registrations
- Production stop registrations
- Attachments
- Consumption (hours, items, expenses)
- Related purchase orders
- Work order stage
- Sign-off report

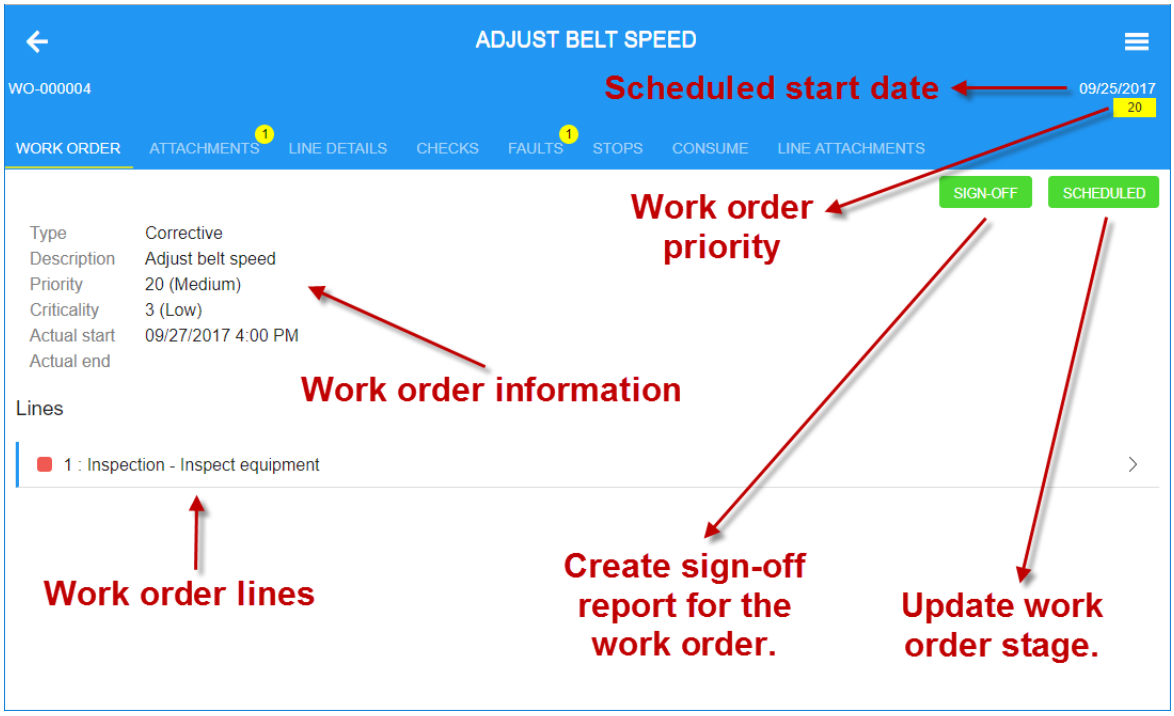

Figure 14

3 Preventive and Reactive Maintenance

Preventive maintenance is a discipline involving planned maintenance jobs, for example, regular service, calibration, and inspections. You can create maintenance sequences and set them up on objects or functional locations. Also, you can read counter registrations (production hours or quantity produced) on your equipment and subsequently create counter registration records on the objects. The counter registrations are used in preventive and reactive maintenance scheduling.

Maintenance sequences can be set up on objects or functional locations. Instead of setting up maintenance sequences on objects, you can create rounds that include multiple objects on which you need to perform related types of maintenance jobs in the same work routine. Maintenance sequences are used for preventive and reactive maintenance on individual objects. Rounds are used for preventive maintenance on a group or a set of objects.

A maintenance sequence defines when a pre-planned preventive maintenance job is to be carried out on an object. Maintenance sequences can be related to objects, object types, functional locations, or functional location types. There are two types of maintenance sequences:

- Counter
- Time

Examples of preventive maintenance sequences of type "Time" are "Repeated from start date", "Repeated from last work order", and "Linked from last work order" (repeated after every completed work order).

Examples of reactive maintenance sequences of type "Counter" are "Once reached above" (validating against an upper limit) and "Once reached below" (validating against a lower limit).

The figure below provides an overview of the work flow from creating maintenance sequences to creating work orders for objects based on those sequences.

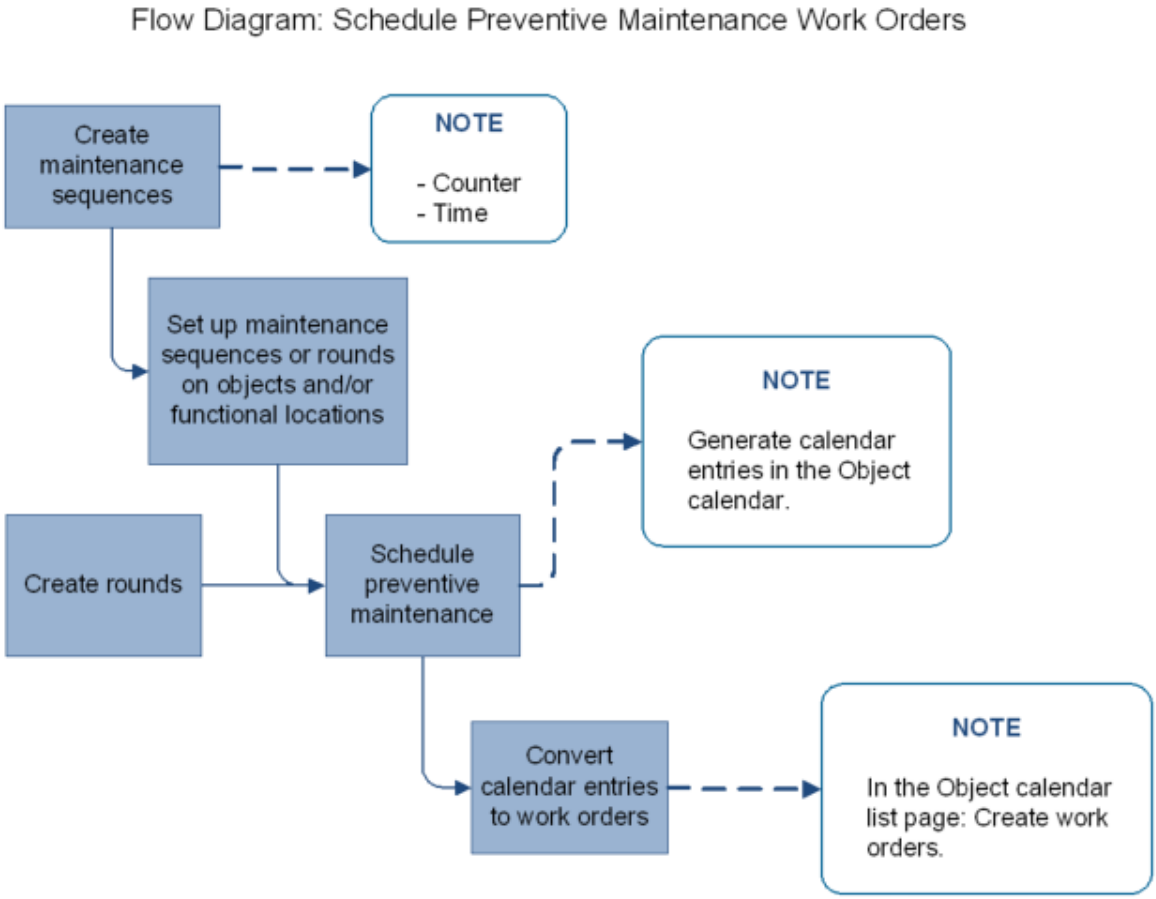

Figure 15

Requests and Notes

Workers can create requests and notes in the system, for example, if they discover the need for further maintenance or repair when they are performing a preventive maintenance job. When working with requests you can

- create a request on a customer
- create a request on a functional location
- start a production stop registration on a request
- verify the object selected on a request

You can create a request based on a customer or a functional location without having to select an object. The object selection is optional, in case you don't know the exact object ID when you create the request. The object can later be selected and verified in the **All requests** detail view. If required, you can also make a production stop registration in the **All Requests** detail view.

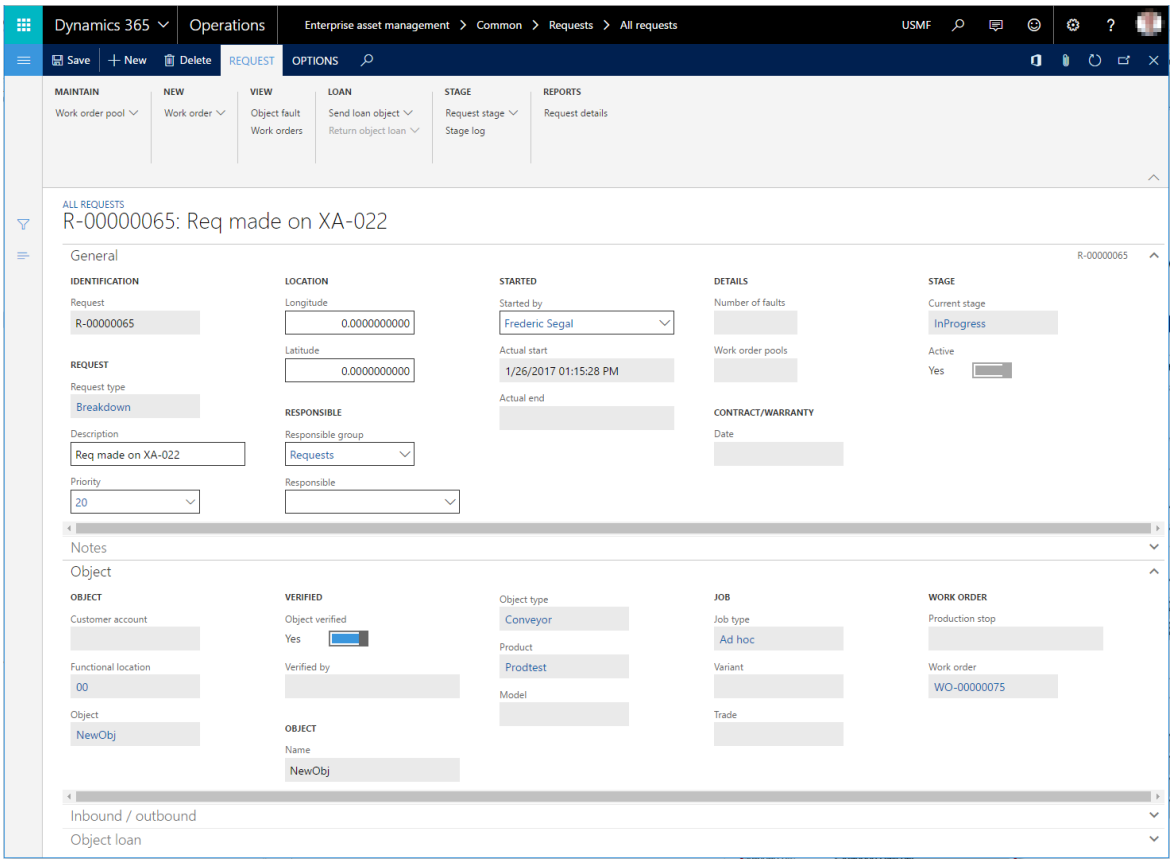

Figure 16

Service Portal on the Mobile Client

The **Service portal** module on the Mobile Client allows you to quickly and easily create requests on objects, for example, when a worker detects an error, a faulty setup, or a need for inspection on a machine / work center. This module is intended for shop floor workers who operate machines or other types of equipment, which regularly require maintenance or service. The **Service portal** ensures that a worker can quickly report faults and errors in your production facility. A maintenance manager or maintenance clerk decides what needs to be done to follow up on the request.

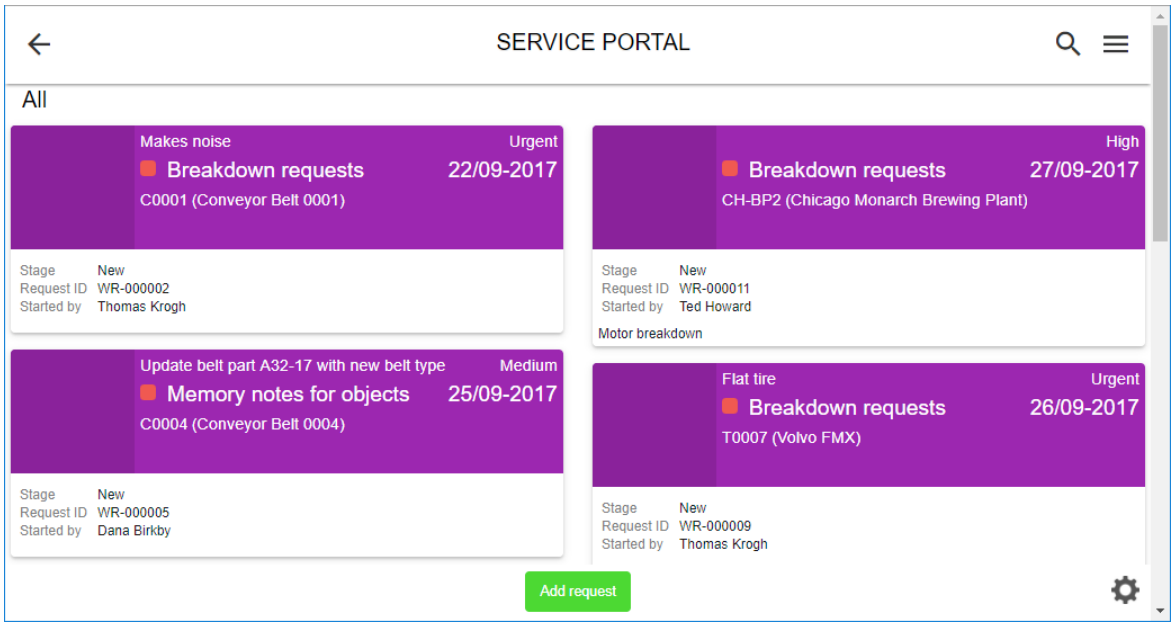

Figure 17

Note

The **Service portal** requires a separate license. In order to use the **Service portal** module, licenses for Enterprise Asset Management must have been purchased and installed in advance.

Object Calendar

The object calendar is used for scheduling all the expected preventive maintenance jobs to be carried out. The object calendar provides an overview of the following job types: Preventive maintenance jobs, rounds, and requests. When the calendar entries have been converted to work orders, you will be able to see the work order ID related to each job.

Maintenance Budget

Maintenance budgets are used to get an overview of expected costs for preventive maintenance. Budget lines are calculated based on object calendar lines with an expected start date in the budget period.

Maintenance budgets are based on the cost types used in Enterprise Asset Management: Preventive, Corrective, and Investment. Investment budget costs are included for active objects that have a replacement date in the budget period, and a related replacement value. Budget costs for corrective maintenance are included if a past corrective date is included in the budget calculation. In that case, corrective costs from an earlier period will be calculated for the same future period for which you calculate the maintenance budget.

Different tasks can be carried out when working with maintenance budgets:

Task	Description
Create maintenance budget	Create a new maintenance budget
Recalculate maintenance budget	Recalculate an existing maintenance budget. This means that you delete existing budget lines and make a new calculation.
Adjust budget lines	Instead of recalculating the entire budget, you can select some budget lines and adjust them either by adding an amount to the selected lines, or by selecting a multiply value to be used on the lines.
Update actual costs	When the dates on the budget lines have passed, and actual costs have been posted, you can update actual costs on the maintenance budget.
Add budget lines manually	Add a new budget line manually and make selections on the budget line.

The option of manually adding budget lines may be useful if, for example:

- You know that refurbishment on some objects is currently in the planning phase, but related jobs have not yet been created, and you want budget costs for those jobs to be included in the maintenance budget.
- New objects or object types have been created since you made the maintenance budget, but maintenance sequences used for preventive maintenance have not yet been set up on those objects or object types, and you want budget costs for those object types to be included in the maintenance budget.

Note

The maintenance budget calculates budget costs based on object calendar lines. If you want to calculate actual costs for the same period, make that calculation in the Object cost control form.

4 Work Order Scheduling

When a work order has been created and planned, the next step is to allocate the required resources to complete the maintenance job. Resources are used in work order scheduling to make capacity reservations. Three resource types are available:

- Human resources
- Machines
- Tools

Work order scheduling can be carried out on two levels - advanced work order scheduling or exclusive work order scheduling - depending on your requirements for resources for the maintenance job. The "Schedule exclusively" option is useful if, for example, a worker has called in sick, and you need to quickly reschedule jobs from one worker to another. The scheduling process in the **Enterprise Asset Management** module is done by including different factors in the scheduling calculation:

- Calculating scores for work orders and workers. The scores are set up in the **Enterprise asset management parameters** form.
- Checking for matching competencies, meaning skills and certificates, required to perform the job. Skills and certificates are set up on workers in the **Human resources** module in Dynamics 365 for Finance and Operations.

Work Order Calendar

The work order calendar is used to get an overview of the work orders allocated to a resource. Work orders using resource types "Human resources", "Tools", and "Machines" are displayed in the list. The list can be used to get an overview of work orders allocated to a specific resource. You can also use it to find a work order allocated to a worker who, for example, called in sick this morning, and then quickly allocate another worker to the job.

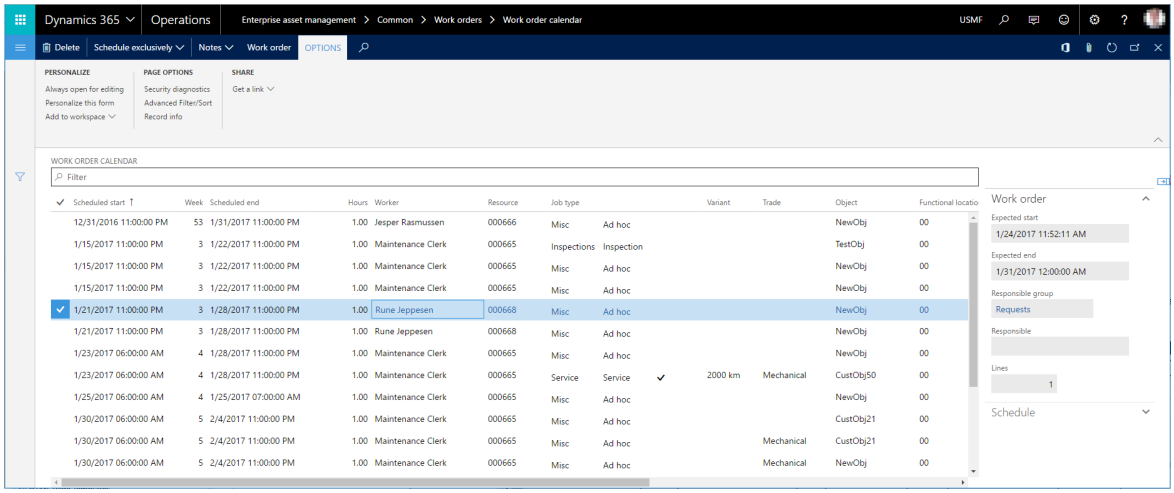

Figure 18

Scheduled Execution

Work order priorities can be used to set up scheduled execution. You can use scheduled execution to provide flexibility in work planning for the maintenance worker or service worker by setting up more detailed or less detailed requirements as to the interval during which a work order should be completed. For example, if a worker has completed a job faster than expected at a customer site, the worker may be able to complete a job nearby, not necessarily planned for the current day, but for the current week. This approach provides the possibility of optimizing worker planning and job completion.

Scheduled execution can be set up for various levels related to a work order. It can be generic, based on date, time, week, month, or it can be more specific and relate to a work order type, object type, product, model, job group, job type, job variant, job trade, priority, or a combination.

Capacity Planning

In Enterprise Asset Management it is possible to calculate capacity load and item forecasts. You can make capacity load and item forecast calculations on

- Object calendar lines
- Work orders that have not yet been scheduled
- Scheduled work orders

This is useful if you want to get an overview of expected capacity load or expected item consumption (spare parts and other items required for completing work orders) for a specific period. Calculation of capacity load and item forecast can be done on all objects or selected objects. You can also make a calculation on a maintenance stop, or on a work order pool.

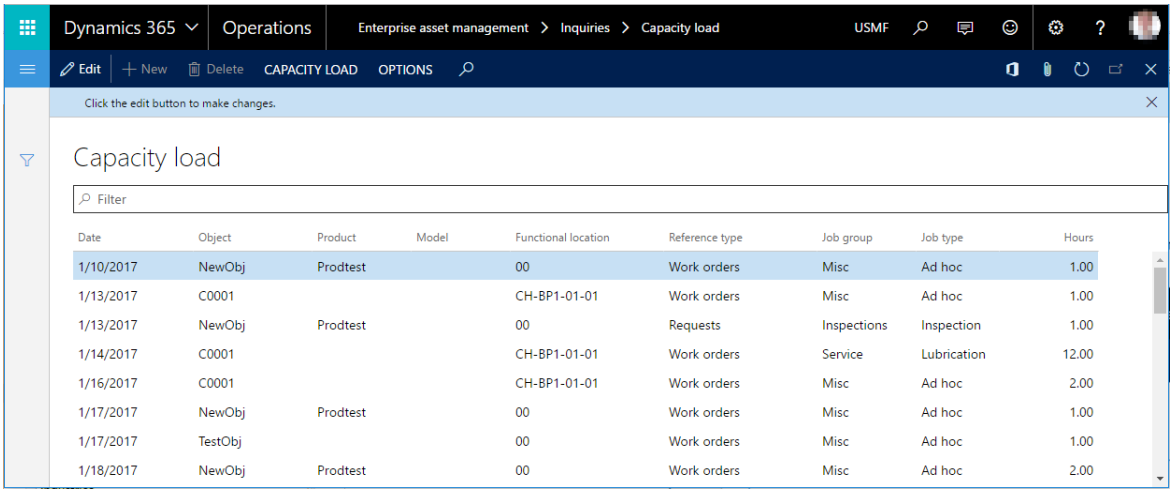

Figure 19

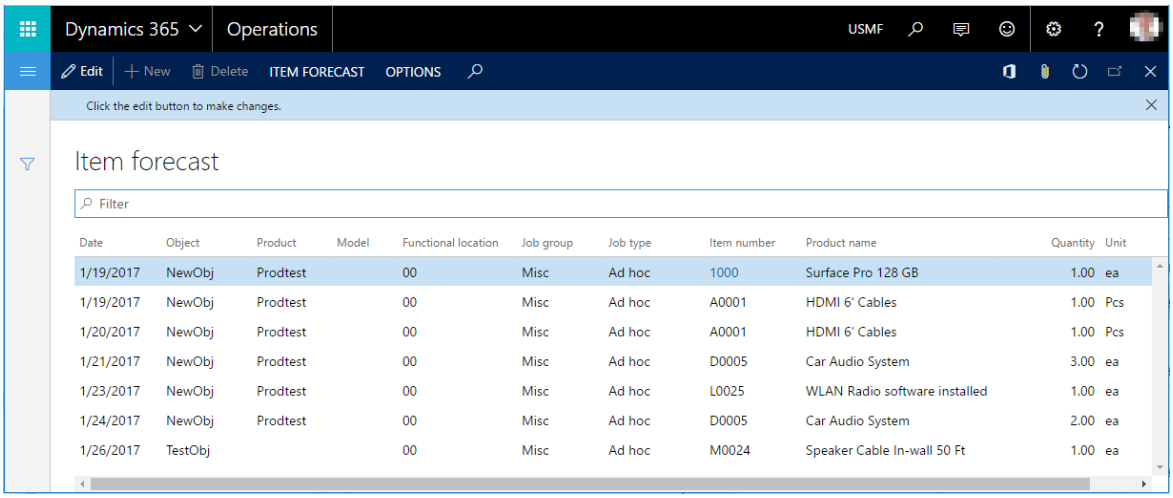

Figure 20

Scheduling on the Mobile Client

The Kanban board is used for handling and completing work orders within teams on the Mobile Client. For example, your company may set up teams of workers with different skills to work on specific work orders, or you may have groups of professionals such as electricians, mechanics, or plumbers, which work on the same types of jobs / work orders, or groups may be divided geographically on a site if you have multiple production facilities on one company address.

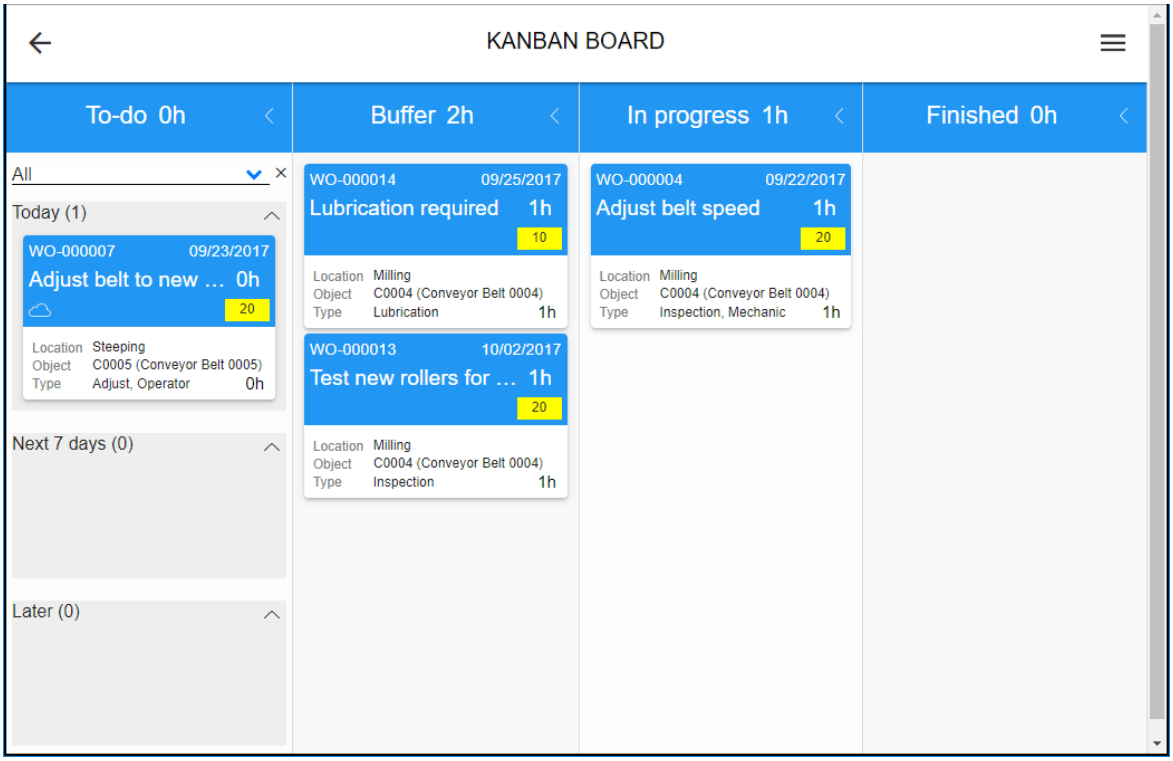

Figure 21

The Planning board is used for planning unscheduled work order lines on individual workers. Planners, supervisors, and managers can schedule and reschedule work order lines on the Mobile Client. Scheduling is updated in real time. The planning board is meant to be used for tasks or jobs

that require only one worker per work order line and no additional tools or other capacity reservations to complete the job.

Note

The **Planning board** requires a separate license. In order to use the **Planning board** module, licenses for Enterprise Asset Management must have been purchased and installed in advance.

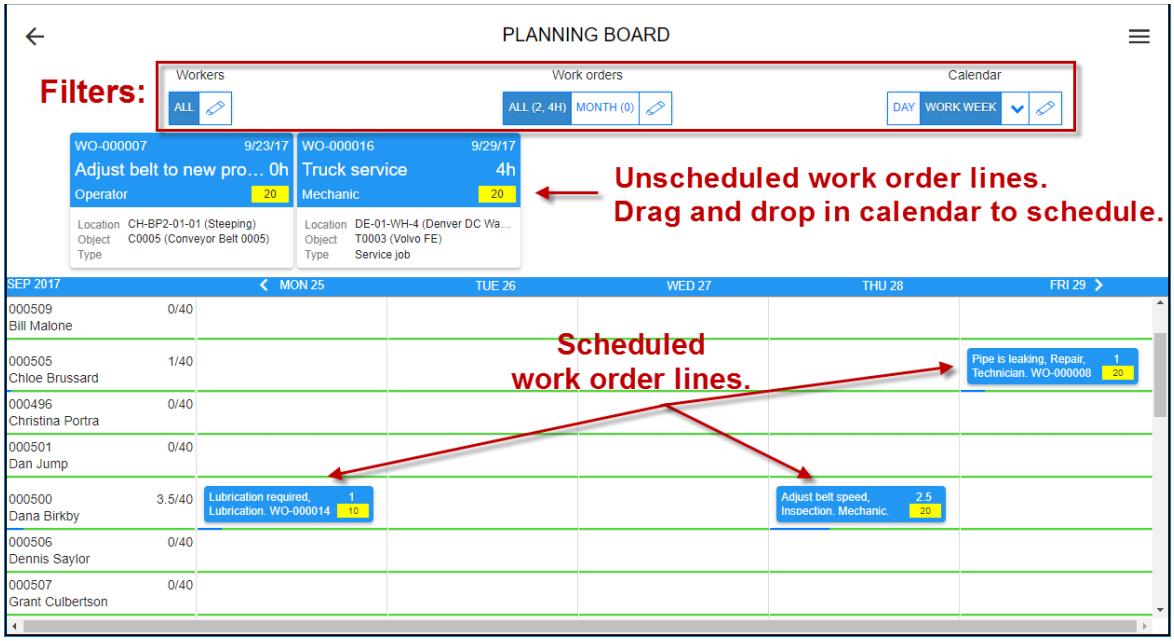

Figure 22

5 Workspaces

A workspace is an area in Dynamics 365 for Finance and Operations in which you can perform tasks and get overview of work in progress and completed tasks, which are related to the same work area or business process. The workspaces in Enterprise Asset Management are intended for planners, supervisors, or managers who work with managing requests and work orders in your company.

A workspace may contain various parts, for example buttons, tiles, and statistics (charts).

Request Management

The **Request management** workspace is intended for users who work with and manage requests on a daily basis. Below you see an extract of the **Request management** workspace.

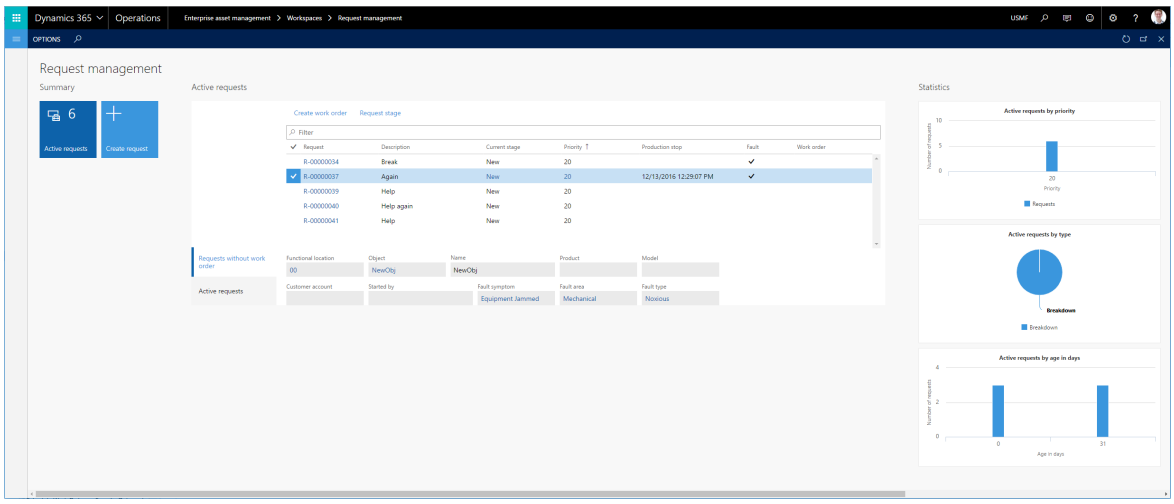

Figure 23

If required, you can add Power BI tiles to your request management workspace, for example:

- Average closing age, showing average age of requests when they are no longer active, meaning they have been rejected or closed, or the related work order has been completed.
- Number of new, active, and closed requests per day, displayed in three colors. This view does not inform you how many new or active requests have been closed. This view provides historical data from the latest 2-week period.

Work Order Management

The **Work order management** workspace is intended for users who work with and manage work orders on a daily basis.

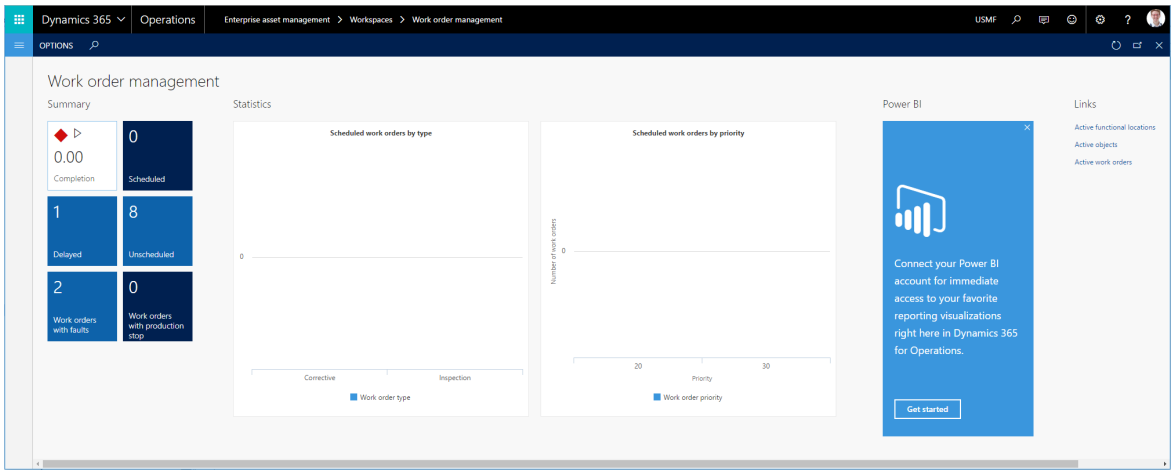

Figure 24

The standard tiles shown in this work space include:

- **Scheduled** - work orders scheduled for today
- **Delayed** - work orders for which scheduled start date and time is in the past and not yet completed
- **Unscheduled** - active, but not yet scheduled work orders
- **Work orders with faults** - active work orders containing fault registrations
- **Work orders with production stop** - active work orders containing production stop registrations
- **Completion** (KPI) - shows percentage of work orders completed of the work orders scheduled for today. Click on the tile to see detailed information. You can edit a KPI, for example, you can change the color used when displaying threshold. KPI data are automatically updated every 10 minutes.

6 Cost Control

In Enterprise Asset Management, you can calculate costs to get a complete overview of actual costs compared to budget costs on

- Objects
- Functional locations
- Work orders
- Fault registrations

Actual costs are based on posted transactions. The date is the transaction date when the registration was recorded.

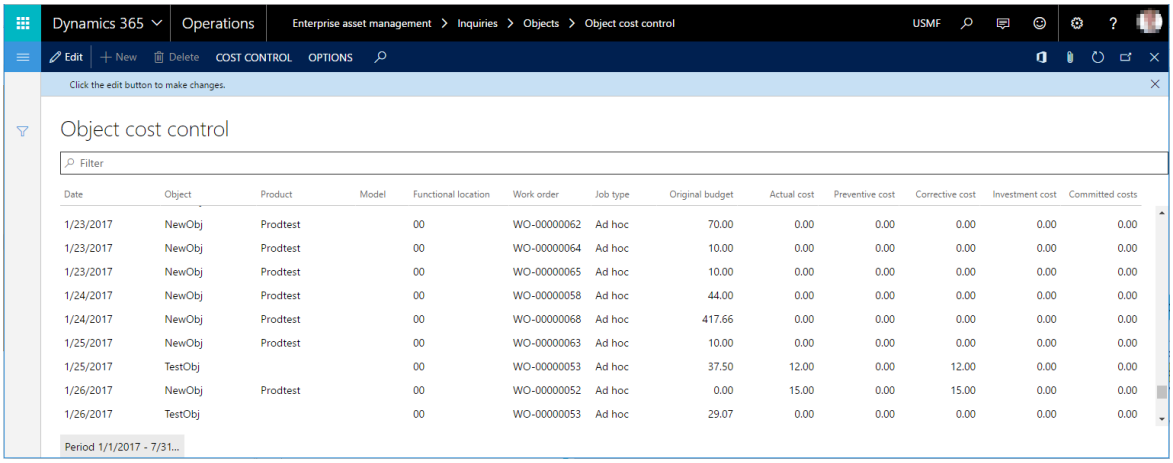

Figure 25

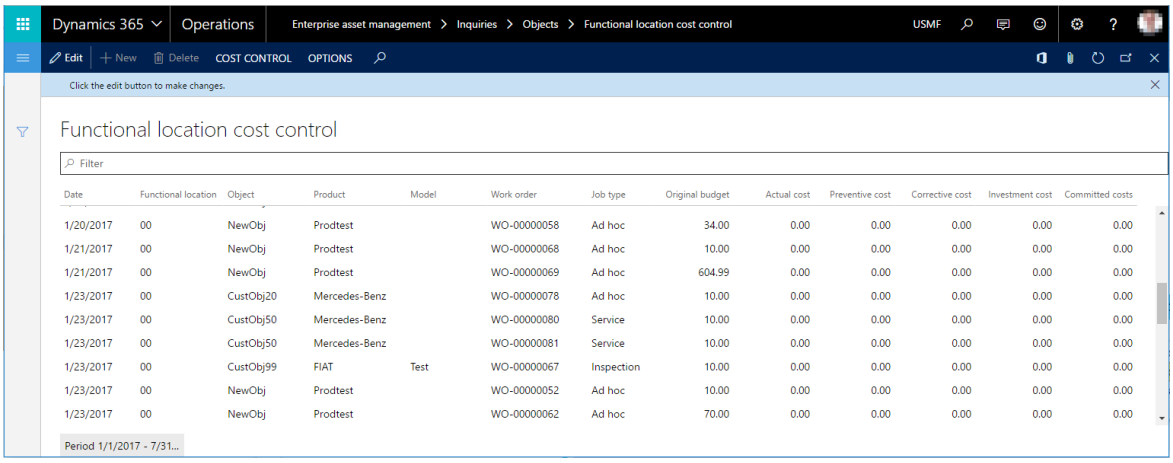

Figure 26

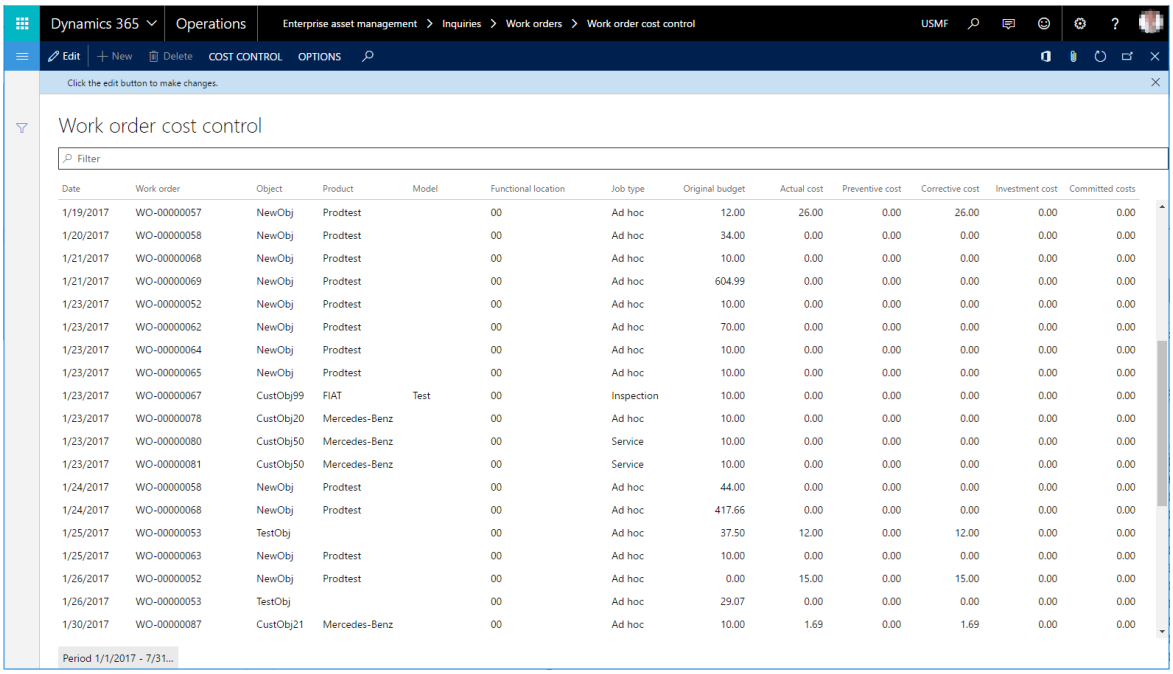

Figure 27

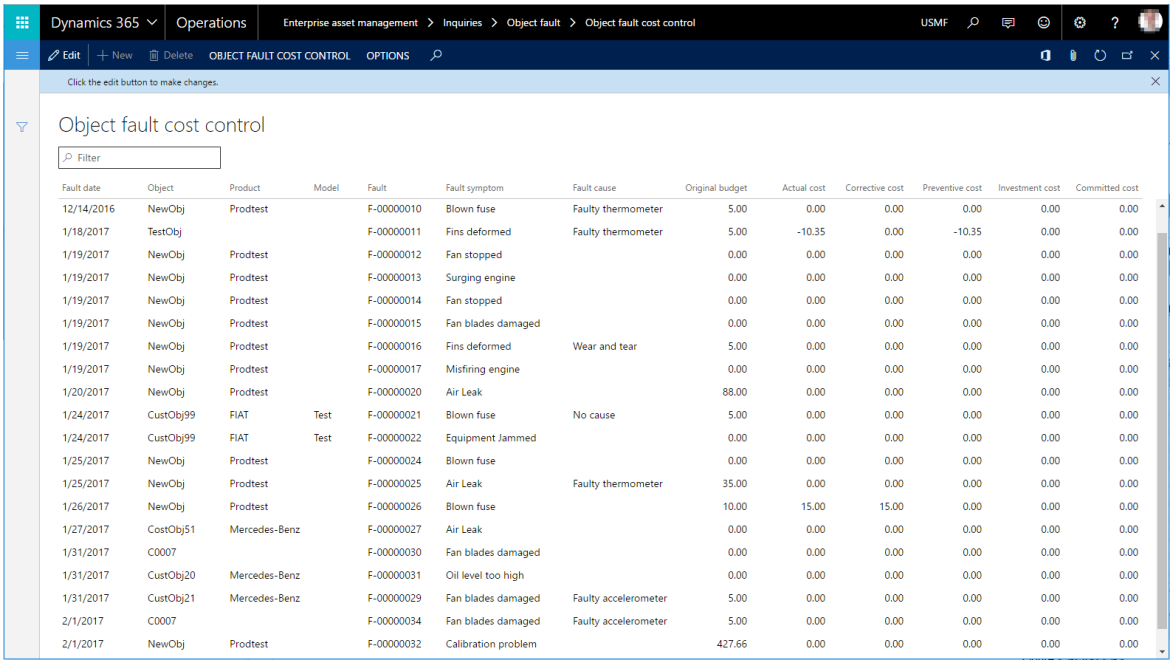

Figure 28

Note

The **Original budget** field shows budget costs from the work order forecast. The **Actual cost** field shows posted costs on work orders. The **Committed cost** field shows costs that your company is committed to in relation to work orders, but these costs have not yet been posted.

In Enterprise Asset Management, you can also get an overview of actual work hours compared to budget hours on objects, functional locations, or work orders.

7 KPIs

In Enterprise Asset Management, you can calculate various Key Performance Indicators (KPIs) for objects and object types. KPIs are used to get an overview of performance on objects in relation to, for example

- Uptime
- Downtime
- Repair time
- Mean Time Between Failure (MTBF)
- Mean Time Between Stops (MTBS)
- Mean Repair Time (MRT)

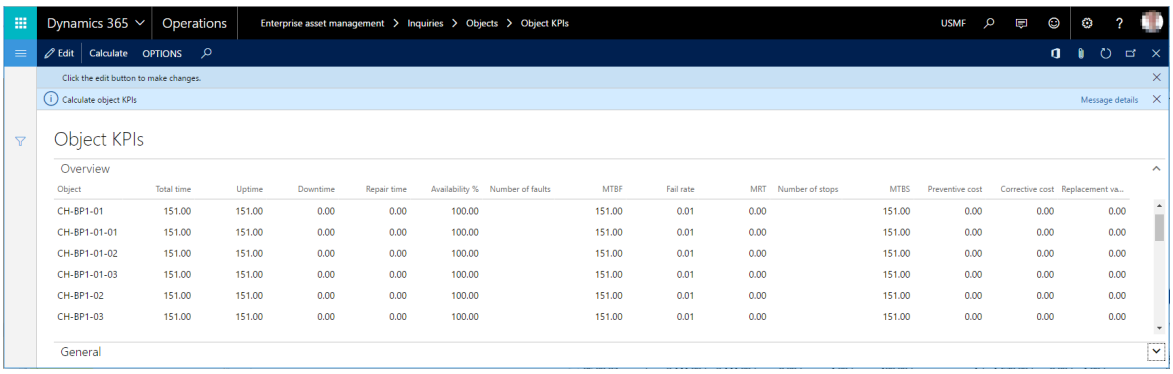

Figure 29

8 Security Roles

In Dynamics 365 for Finance and Operations, security roles are used to grant access rights to a user, allowing the user to access certain menu items and perform specific tasks. Security roles relate to Client Access Licenses (CAL) in Dynamics 365 for Finance and Operations.

Below, you will see the roles and related tasks defined for Dynaway Enterprise Asset Management.

Enterprise Asset Management

Role	Related tasks	CAL level in Dynamics 365 for Finance and Operations
Maintenance Manager	Maintain base data and perform all maintenance-related tasks. Able to access and work with all menu items in Enterprise Asset Management.	Enterprise
Maintenance Clerk	Schedule work orders, register consumption, post journals, maintain work orders, create purchase orders. Able to work with all menu items in Enterprise Asset Management except items located in the **Setup** area, which are read only.	Enterprise
Maintenance Worker	Print work order report, register consumption.	Activity

9 Industries

Dynaway Enterprise Asset Management (EAM) is designed for maintenance management across various industries. Companies in the manufacturing, distributing, and servicing sectors will benefit from our EAM solution through powerful asset data management. Dynaway EAM helps maximize the reliability and availability of your assets.

The Dynaway EAM solution is a strong partner whether your primary focus is maintenance of buildings, machines, vehicles, facilities, or any other object that requires regular inspection or overhaul.

Here are a few examples of industries that currently profit from the Dynaway Enterprise Asset Management solution:

- Discrete manufacturing
- Process manufacturing
- Project manufacturing
- Chemical processing
- Metal processing
- Pharmaceuticals
- Food / Beverage
- Energy supply
- Bio diesel
- Mining

For more information, take a look at our case stories on www.dynaway.com.

10 About Dynaway

Dynaway A/S is a privately held independent software vendor with an exclusive focus on providing valuable solutions for the Microsoft Dynamics platforms.

Dynaway A/S was founded in 2001 as a spin-off from one of the largest Microsoft Dynamics AX Value Added Resellers (VAR) in Denmark. The intention of the spin-off was to create a software development powerhouse, capable of absorbing trends, ideas and partial solutions from the mother company and its end customers, and transform these into fully-fledged, high-quality software packages for the entire Microsoft Dynamics AX partner channel. Today, Dynaway A/S is owned by the EG group, a Microsoft Gold Certified Partner.

Dynaway designed and developed the Shop Floor Control module for Microsoft Dynamics AX, which has been divided into two separate modules, Manufacturing execution and Time and attendance, in Microsoft Dynamics AX 2012 and Dynamics 365 for Finance and Operations. Those modules are now owned by Microsoft. Production management has been a core focus area for Dynaway for more than 15 years.

Today, the main focus area for Dynaway is Enterprise Asset Management (EAM). Our EAM solution sets the de facto standard for maintenance, service, and contract management in Microsoft Dynamics AX 2012 and Dynamics 365 for Finance and Operations. The Enterprise Asset Management solution is sold through Microsoft Dynamics partners world-wide, and the solution is Certified for Microsoft Dynamics (CfMD).

Dynaway has also developed mobile solutions to provide optimum flexibility for mobile workers to handle various kinds of job registrations. The mobile solutions are based on HTML5 technology and integrate seamlessly with several modules in Microsoft Dynamics AX 2012 and Dynamics 365 for Finance and Operations. The Mobile EAM Client is customized for maintenance workers and service technicians to provide quick and easy access to information and registrations related to objects and work orders.

For more information on Dynaway and our products, visit our website on www.dynaway.com, or email to info@dynaway.com.

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