CHAPTER 6: MANUFACTURING AND SCHEDULING

Objectives

The objectives are:

- Discuss how to set up resources.
- Describe how resource requirements are defined on routes.
- Discuss how to perform resource scheduling and describe the basic resource allocation principles.
- Describe the concept of using a period template to define schedules.

Introduction

Microsoft Dynamics® AX 2012 introduces resources which are assigned to jobs and operations. Resources can be of many types, such as tools, workers, and machines. The scheduling engine aligns with the new resource model and can schedule resources based on their capabilities.

Resources and capabilities replace work centers and task groups to provide for more flexibility in setup and maintenance. Therefore, work centers and task groups are obsolete in Microsoft Dynamics AX 2012.

Operations Resource Model

In Microsoft Dynamics AX 2009, task groups were used for specifying alternative work centers, but only in job scheduling. In Microsoft Dynamics AX 2012, resources can be allocated to jobs and operations by matching the capabilities of the resources with the requirements of the operation.

Alternative resources with the same capabilities are considered, unless there are requirements for a specific resource or resource group. This applies whether you select to run job scheduling or operations scheduling. The selection process consists of matching the requirements of the operation with the capabilities of the resources. Other requirements, such as location, resource working time, and resource type are also considered when planning the production.

Microsoft Dynamics AX 2012 has changed the following to the Operations Resource Model:

- Separated the way resources are grouped for managing capacity from the way resource requirements are specified for activities.
- Enabled resources to be used at multiple locations, just not at the same time.
- Eliminated the need for defining resources multiple times.
- Added the functionality to view available capacity by capability and simplifying manual scheduling and exception handling.

Setting up Resources

Operation resources are used throughout the production or project processes. They can be machines, tools, people, or vendors that contribute to the production of an item. They are considered as one unit for managing the planning of capacity requirements and detailed scheduling. After an operations resource is created, you can assign it to a resource group and specific productions.

You can reassign resources to different resource groups. However a resource can only be assigned to one resource group at a time. The **Effective** and **Expiration** date fields on the **Resource groups** tab represent when the resource in question can be used for production.

This setup lets you share a resource across many sites. When a resource becomes a member of the resource group, it represents the physical move from one site to another.

To set up a resource open: **Organization administration > Common > Resources > Resources**
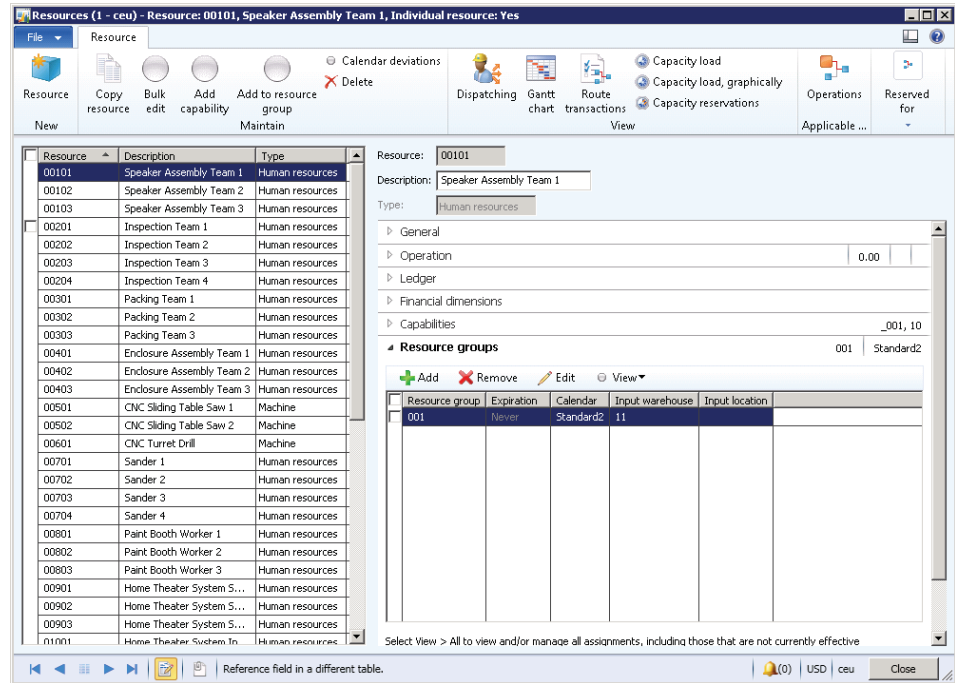

FIGURE 6.1 RECOURCES FORM

There are five types of resources that are available:

- **Vendor**: Select this type when the group consists of external operations resources, for example with a subcontractor. This type lets you generate purchases for subcontractors based on bill of material (BOM) lines or production lines.

- **Human resources**: Select this type when the operations resource group consists of one worker. Only select this value if you want to schedule individual workers. For both the operation and the operations resource, you can specify several operators as standard, and you can follow the operations resource consumption for the operator time in the operator profile. Typically, you schedule human resources type if the personnel capacity is limited.

- **Machine**: Select this type if the resource is considered a production machine.

- **Tool**: Select this type if the resource is considered a tool. If you want to schedule for tools, machines, or personnel at the same time, select a primary operations resource that determines the capacity available.

- **Location**: Select this type if the resource is considered a location.

Capabilities

A capability is the ability of a resource to perform a given activity relevant to production. To set up capabilities open: **Organization administration > Common > Resources > Resource capabilities**.

Capabilities are assigned to an operations resource. A resource can have more than one capability assigned to it, and a capability may be assigned to more than one resource. Capabilities can also be assigned to resources on a temporary basis by defining a start date and expiration date on the capability assignment. Capabilities that have expired on a resource will prevent the resource being scheduled for production if the production requires that capability. A capability that has expired can be later renewed. Also a capability can be assigned to any type of resource

Skills

In the **Skills** form, you can create and manage competencies that you will specify for employees or jobs. An operation may require a resource with a specific skill. The scheduling engine can find resources with specific skills by searching for the skill information on the worker to which the resource is linked. This is only applicable for job scheduling, not operation scheduling. To set up skills open: **Human resources > Setup > Employee > Skills**.

Course

Courses can be created and maintained. This lets you track what courses your employees have attended. An operation may require a resource with a specific course. The scheduling engine is able to find resources with specific courses by searching for the course information on the worker to which the resource is linked. This is only applicable for job scheduling.

Certificate

Certificates can be added to user in human resourcing, which lets you track what certificate your employees have. An operation may require a resource with a specific certificate. The scheduling engine can find resources with specific certificates by searching for the certificate information on the worker to which the resource is linked. This is only applicable for job scheduling.

Title

The title an employee has can also be a requirement for a job. An operation may require a resource with a specific title. The scheduling engine can find resources with specific titles by searching for the title information on the worker to which the resource is linked. This is only applicable for job scheduling.

Scenario: Creating New Resources

Contoso has hired five new employees to work in the assembly workshop. After the workers are created, Lars, the Production Supervisor, must create the resource records and add the capabilities to each resource. Next, he will assign the new resources to a resource group for operations and job scheduling.

Procedure: Setting up a Resource for Manufacturing and Scheduling

To set up a resource for manufacturing and scheduling, follow these steps:

1. Open **Organization administration > Common > Resources > Resources**.
2. Click **Resource** from the **New** group of the action pane.
3. Type resource ID in the **Resource** field.
4. Type a brief description in the **Description** field.
5. Select the resource **Type** field.
6. Type necessary information for resource Type.
7. If you select Vendor as the **Resource type**, in the **Vendor** field on the **General** tab, select the vendor this resource represents. If not, leave this field blank.
8. If you are using the Human Resources module, and you want to select Human resources as the **Resource type**, you can select the worker in the Send list of products field on the **General** tab.
9. Close the **Resources** form.

Procedure: Adding Capability to a Resource

To add a capability to a resource, follow these steps:

1. Open **Organization administration > Common > Resources > Resources**.
2. Highlight the previously created resource.
3. Click **Add** from the action pane.
4. Select **Capability** from the drop-down list. Type the **Effective** and **Expiration** dates.
5. Type **Priority** and **Level** for the capability.
6. Click **OK.**
7. Close the **Resources** form.

*NOTE: This can also be done from the **Capability** form.*

Procedure: Adding a Resources to a Resource Group

To add a resources to a resource group, follow these steps:

1. Open **Organization administration > Common > Resources > Resources**.
2. Select the previously created **resource** in the grid.
3. Open the **Resource groups** fast tab.
4. Click **View > All** from the action pane strip.
5. Click **Add** from the action pane strip.
6. Select resource group in the **Resource group** field. Type the **Effective** and **Expiration** dates.
7. Select the calendar in the **Calendar** field.
8. Select a warehouse or use the default for the **Input warehouse**.
9. Select a location or use the default for the **Input location**.
10. **Close** the **Resources** form.

Procedure: Checking Skills and Capability for a Resources

To check skills and capability for a resource, follow these steps:

1. Open **Organization administration > Common > Resources > Resources groups**.
2. Select the **Resource group** in the grid.
3. Click **Capability map** from the action pane.
4. Press the **Arrow button** to browse to date.
5. Notice what resources are available for the group.
6. Click the **Certificates** tab.
7. Notice how the resource either has or does not have certificates.
8. **Close** the **Capability map** form.
9. **Close** the **Resource groups** form.

Defining Resource Requirements on Routes

Operations represent the work that is required to produce items in your production.

You must know the following, to set up operations:

- What work or activity will be completed.
- The order of the operation process and operation priorities.

An operation network is a series of operations linked in sequence. The network is the route the item must take through the manufacturing process to emerge as a finished product.

The major changes in defining a resource for a route in Microsoft Dynamics AX 2012 are as follows:

- Routes can be independent of specific resources.
- Routes are more descriptive.
- Resource selection is deferred to scheduling, unless requirements for specific resources.
- Different requirements may be used for operations scheduling and job scheduling.
- Estimation for a route can be based on a specific costing resource.
- Resource selection may be done based on competency information from human resources.

An operation's requirements for a resource are defined on the **Resource requirements** tab. The resource requirement can be one of the following:

- Resource type
- Resources
- Resource group
- Capabilities
- Skills

- Courses
- Certificates
- Titles

FIGURE 6.2 RESOURCE REQUIREMENTS TAB ON ROUTE FORM

Resources which match the requirements of an operation, for a particular date, are considered applicable resources. The resource must satisfy all the resource requirements for the operation in order to be applicable.

For a specific route version, you can use the **Check feasibility** form for validating whether there are resources that are available that match the resource requirements of all operations in the route.

To check the feasibility of a route, open: **Production Control > Common > Routes > Route Details > Versions > Check feasibility**.
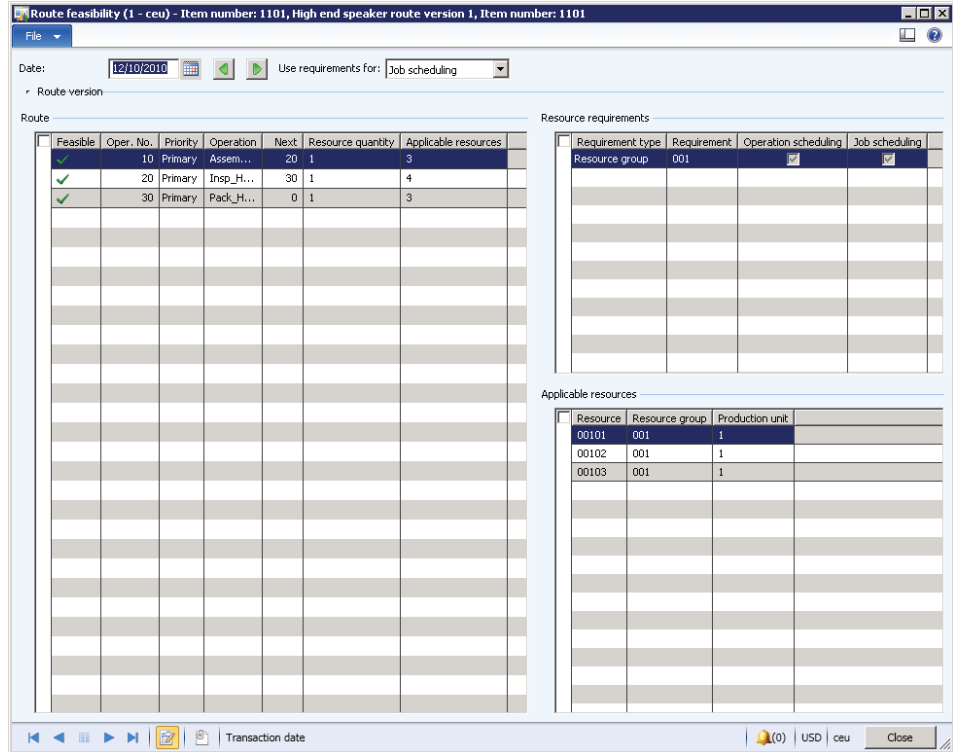

FIGURE 6.3 ROUTE FEASIBILITY

Scenario: Resource Requirements on a Route

Contoso is expanding its warehouse to add another production line. Tony, the Production Manager, is in charge of determining which requirements are needed for each route on the production line. Many processes will be using new equipment and all workers must take the suitable courses before they can work on the new equipment. Using the Resource requirement on the route Tony can make sure only the correct workers are assigned to the tasks.

Procedure: Set up and Define Resource Requirements for a Route

To set up and define a resource requirement for a route, follow these steps:

1. Open **Production control > Setup > Routes > Operations** and select an **Operation**. Click **Relations** in the action pane.
2. On the **Resource requirements** tab, click **New** to create a new resource requirement.
3. In the field, select a **Requirement type**. The requirement type selected affects the options available in the fields that follow.