Oracle Real-Time Scheduler

Server Application User Guide

Release 2.2.0.0

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Contents

Chapter 1

Getting Started

This section provides an overview of Oracle Real-Time Scheduler.

About Oracle Real-Time Scheduler

Oracle Real-Time Scheduler simplifies and optimizes the scheduling, dispatching, and tracking of field activities and mobile service crews.

The application includes the following major functional components:

- **Resource planning and scheduling:** Supports resource planners and service managers in managing resources, planning shifts, and scheduling work. This component is comprised of the following user functions:

  - Resource management: Setting up mobile workers, vehicles, crews, shift procedures, gathering timesheet information, etc.

  - Service management: Interfacing activities, setting up service areas, service classes, generating exception alerts, etc.

  - Transfer of Goods management: Setting up depots, handling cutoffs, etc.

  - Scheduler: Automatic scheduling of activities to shifts

  - Contractor management: Managing external (contracted) work resources

- **Common dispatching functionality:** Supports dispatchers as they handle exceptions throughout the day, and enables context-based decision making at the dispatcher level. The system can be configured to automatically dispatch all activities or limit auto-dispatching to certain activity types or shifts. The system maintains real-time communication with mobile resources, tracks the location of crews and vehicles, and allows dispatchers to monitor and manage activities, crews, alerts, and key performance indicators. Common dispatching functionality is provided through the Common Dispatching Interface (CDI) portal.

- **Mobile communications platform:** Supports mobile crews as they perform service work, facilitating communication with the dispatcher, providing GPS-based mapping services, and processing activity status updates and work completion details. Mobile communications platform functionality is provided through the Oracle Real-Time Scheduler mobile application.

Starting the Application

Use this procedure to start Oracle Real-Time Scheduler.

1. Click the **Desktop** icon or **Program** menu option to start the server application.

2. Log in using your user ID and password.

3. If prompted, select a language.

4. Use the toolbar or menu bar (on the left edge of the screen) to select the function you want to perform.

Understanding the User Interface

For information about the application's main toolbar, menu system, user setup and security, and user interface standards, see the System Wide Standards topic in the Framework Business Processes help.

Menus and Navigation

This topic describes the Oracle Real-Time Scheduler menus and general rules for navigating the system.

The menu displays on the left-hand side of the application screen. The menu is configurable, so the options that appear may vary based on your user profile and your system's configuration.

Main Menu and Admin Menu

By default, the system provides two menus: the **Admin** menu and the **Main** menu. The **Admin** menu provides access to functions used for setup and administration. Only users who have administrative privileges will be able to see this menu. The **Main** menu provides access to all other functions. The options displayed on each menu are based on the settings defined in your user profile. Your user profile also controls your access to different portals and dashboard zones.

The **Main** Menu is displayed by default. Click the **Menu** icon in the main toolbar to display a list of available menus, then select the menu you want to use. The selected menu appears on the left-side of the screen.

Functional and Alphabetical Menus

The system supports two different menu styles: alphabetical and functional.
The functional menu groups menu options by the function, such as Service Management, Device Management, and Resource Management. Thus, to add a new crew, you would first click the **Resource Management** submenu, and then select the Crew option.

The **Alphabetical** menu groups menu options by the first letter of the option name. Thus, to add a new crew, you would first click the C submenu, and then select the Crew option.

> **Note:** Switching the way that the menus are sorted is a change that affects all users through Admin Installation Options.

The procedures in this documentation assume that you are using the functional menus. If you are using alphabetical menus instead, simply replace the functional submenu with the **Alphabetical** submenu. For example, if the procedure instructs you to select:

Main Menu > **Resource Management** > **Crew**

then you would instead select:

Main Menu > **C** > **Crew**

Access to Different Applications

The menu system provides access to both Oracle Utilities Application Framework functions and Oracle Real-Time Scheduler functions. If you have additional Oracle applications installed, the menu system will provide access to functions for that application as well. Framework functions are described in the Framework online help; Framework help topics are listed under the appropriate Framework heading in the help contents panel. Likewise, topics related to the base application are listed in the help contents panel under the appropriate heading.

Base Menu Functions

The following table lists base menu functions. Online documentation for all functions listed below is provided under the Oracle Real-Time Scheduler option on the online help contents panel.

> **Note:** An implementation can add or remove any of these functions from the menu system, change the menu option name or the submenus under which they appear, or restrict access to the options for some or all users.

Navigating to Portals in Add or Edit Mode

Most menu options display a + sign after the option name. If you click the plus sign, rather than the option name, you will go directly to a screen that lets you add a new record. For example, if you click **Crew** + the system navigates to the Crew add/edit screen so you can begin creating a new crew. This is referred to as 'navigating to the **Crew** portal in add mode.'

If you click the option name, rather than the + sign, the system navigates to a search portal, where you can select the entity you want to view or edit. (For admin-level data maintenance, the system navigates to a screen that lists the entities and lets you select one from the list.) This is referred to as 'navigating to the **Crew** portal in edit mode.' Once you have found the entity you want to work with, the system displays a maintenance portal listing all the actions you can take on that entity. The valid options will vary depending on the entity, your user privileges, and your system's configuration. Standard actions include Edit, Duplicate, and Delete. Valid actions also typically include changes to the entity's status. Thus, if you are viewing the maintenance portal for an activity, the available actions might include Dispatch, Allocate, or Complete.

Menu Options

The following table lists base menu functions. Online documentation for all functions listed below is provided under the Oracle Real-Time Scheduler option on the online help contents panel.

> **Note:** An implementation can add or remove any of these functions from the menu system, change the menu option name or the submenus under which they appear, or restrict access to the options for some or all users.

Admin Menu Options

Functional Menu	Menu Option
BI Configuration	BI Configuration
Device Management	Deployment Part
	Deployment Type
	Deployment
	MDT Type
	MDT
Mail Management	Mail Template

Functional Menu	Menu Option
	Mailing List
Resource Management	Capacity Type
	Crew Hierarchy
	Crew Type
	Depot
	Dispatcher Type
	Equipment
	Location
	Mobile Worker Type
	Period of Unavailability Type
	Procedure Type
	Resource Group Type
	Shift Cost Profile
	Shift Type
	Skill
	Timesheet Type
	Vehicle Type
Service Management	Alert Type
	Appointment Booking Group
	Dispatch Area
	Geographic Area
	Key Performance Indicator
	Priority Profile
	Remark Type
	Service Area
	Service Area Hierarchy
	Service Class
	Task Type
	Work Profile

Main Menu Options

Functional Menu	Menu Option
Service Management	Activity
	Alert
	Alert Area
	CDI
	Contractor Work Management
	Override Time Window

Functional Menu	Menu Option
	Remote Message
Resource Management	Capacity
	Capacity Weekly Template
	Contractor Eligibility
	Crew
	Crew Shift
	Dispatcher
	Dispatcher Shift
	Mobile Worker
	My Calendar
	Period of Unavailability
	Procedure
	Resource Group
	Resource Route Replay
	Shift Weekly Template
	Timesheet
	Vehicle
Batch	Batch Control Global View
My Mail	

About Time Zones

To support businesses spanning across multiple time zones, the system stores all date and time information in a single common time zone known as the base time zone or system clock.

A user's preferred time zone can be managed in user preferences. The system manages the conversion back and forth between how time zones appear on screen, how they are entered, and how they are stored in the database.

Entities associated with a geographic location such as activities, crew shifts and meetings, are entered and displayed in the specific time zone where they occur, the entity time zone. The rest of the application uses the user's preferred time zone to display date and time information.

The **CDI** portal displays data according to the user time zone, however, users have the ability to toggle time zones as needed.

Crews using the mobile application (MCP) work their schedule using their local device time zone and the system handles the conversion of the data to and from the server time zone.

The system handles daylight saving time by displaying and allowing entry in "legal time" or the time affected by daylight saving time. All date/time information is *stored* throughout the system in base time zone standard time, with no user preferences or daylight saving time settings applied.

Please refer to the configuration guide for more detailed information on how daylight saving time is handled and how system and user time zone preferences affect the system.

Chapter 2

User Documentation

This section describes the application functions that support day-to-day operations. These functions are available from the Oracle Real-Time Scheduler application **Main** Menu.

Resource Management

This section describes concepts and procedures related to managing mobile workers, vehicles, crews and crew shifts, dispatchers and dispatcher shifts, shift weekly templates and crew shift templates, break, non productive tasks, periods of unavailability, location based services, and resource route replay.

Understanding Resource Management

This section describes concepts related to resource management.

About Mobile Workers

A mobile worker is an individual workforce resource that performs work as part of a crew.

A mobile worker is associated with a mobile worker type that defines attributes of the mobile worker's job description. For example, a mobile worker type can define the assumed skills of all mobile workers of that type. You can override these settings if an individual mobile worker possesses more or fewer skills. If a mobile worker lacks assumed skills, the system lists them as missing skills on the **Mobile Worker** maintenance portal. If you attempt to allocate an activity to a crew's shift, the system warns you if a mobile worker currently allocated to that shift lacks the required skills and/or skill level. Some skills have effective periods. For example, a skill might require a license that must be renewed every year. If a skill has an effective period, you will be required to enter an effective date and an expiration date when you assign that skill to a mobile worker. Skills can also be associated with activity types, indicating that the skill is required to perform this type of activity.

Mobile workers are assigned to crew shifts. When scheduling work, the system matches the requirements of each activity to the capabilities of available crew shifts. The scheduler considers the skills and equipment of all mobile workers and vehicles allocated to a crew shift to determine which activities the crew can work on a particular shift.

A mobile worker may be associated with one or more base service areas within which they typically work. A mobile worker may be part of only one crew shift at any time.

Planned Leave for Mobile Workers

If a period of unavailability (POU), such as vacation time, has been entered for a mobile worker, the system also takes into account whether or not the leave period overlaps with any planned shift and factors this in when determining whether the mobile worker is available to be scheduled for a shift. If the leave overlaps with the shift for any amount of time, the mobile worker is considered unavailable, even if the overlap is only for a very short duration of time.

Leave time periods are displayed on the resource calendar so that it is easy for the resource planner to determine the availability of all resources.

My Calendar Portal

The **My Calendar** portal can be used by any user that is defined as mobile worker , company or contractor users. This allows them to easily access their shifts and to review their activities to enter completion information. This can also be set as the home page for such users.

Navigating to the Mobile Worker Portal

You can access the **Mobile Worker** portal in any of the following ways

- Select **Main Menu** > **Service Management** > **Mobile Worker** to display the **Mobile Worker** Query portal, then search for and select the mobile worker you want to allocate.

- From the **Crew Shift** and **Crew Shift Template** portals, click the **Mobile Worker** link displayed in the **Current Crew Allocation** section.

About Vehicles

A vehicle is a workforce resource used by a crew to perform work.

A vehicle is associated with a vehicle type that defines attributes common to all vehicles of that type. For example, it can define the assumed equipment of all vehicles of that type. You can override these settings if a specific vehicle possesses more or fewer pieces of equipment. If a vehicle lacks assumed equipment, the system lists it as missing equipment on the **vehicle** maintenance portal.

Vehicle equipment can be associated with activity types, indicating that the equipment is required to perform this type of activity.

Like mobile workers, vehicles are assigned to crew shifts. When scheduling work, the system matches the requirements of each activity to the capabilities of the available crew shifts. The scheduler considers the capabilities of all mobile workers and vehicles assigned to a crew shift to determine which activities the crew can work on a particular shift. If you attempt to allocate an activity to a crew's shift, the system warns you if a vehicle currently allocated to that shift lacks the required equipment.

A vehicle can only be part of one crew shift at any time.

Planned Unavailability for Vehicles

If a period of unavailability, such as for maintenance, has been entered for a vehicle, the system also takes into account whether or not the leave period overlaps with any planned shift and factors this in when determining whether the vehicle is available to be scheduled for a shift. If the leave overlaps with the shift for any amount of time, the vehicle is considered unavailable, even if the overlap is only for a very short duration of time.

Leave time periods are displayed on the resource calendar so that it is easy for the resource planner to determine the availability of all resources.

Navigating to the Vehicle Portal

You can access the **Vehicle** portal in any of the following ways:

• Select **Main Menu** > **Service Management** > **Vehicle** to display the **Vehicle** Query portal, then search for and select the vehicle you want to allocate.

• From the **Crew Shift** and **Crew Shift Template** portals, click the **Vehicle** link displayed in the **Current Crew Allocation** section.

About Crews and Crew Shifts

This section describes details about crews and crew shifts.

Crews

A crew is a uniquely named group of mobile workers and vehicles that perform work in shifts. The specific mobile workers and vehicles that make a crew may be typically constant, like single person crews, or they can vary by day of week from shift to shift. A crew might also perform different types of work and cover different service areas on different shifts. Therefore, crew allocation is defined for crew shifts, not for crews. Likewise, activities are scheduled to crew shifts, not to crews.

Crew Shifts

A crew shift is a planned period of time in which a crew (one or more mobile workers and vehicles) is scheduled to perform work. For example, a crew shift might be defined as Crew A, consisting of Jack and his van, working on a specific date from 9 am – 5 pm.

A crew shift is associated with a shift type, that defines attributes common to all crew shifts of that type, including the shift start time and duration of the shift. For example, night shifts would have a different start time and duration than morning shifts, so they would have different shift types.

Other attributes that may be defined for a shift include the primary service class of work to be performed, service areas to be covered, breaks to be taken during the shift, logon and logoff locations, shift-based cost factors, and auto-dispatch settings.

Typically, crew shifts are automatically generated from crew shift templates that define the basic characteristics of the shifts. Shifts can also be manually created to address special situations on particular days.

Logon / Logoff Locations

A crew shift must either reference a service center location record for their logon / logoff location or indicate it is the mobile worker's home. The latter is only applicable when the shift is for a single worker. Other than the home option the shift cannot reference an address and has to reference a common location record for the address.

You may specify a maximum travel time the crew is expected to spend traveling from/to the logon/logoff location on their own time. You can also reserve time at the beginning and/or end of the shift for performing review and preparation work.

This information is used by the scheduler to properly plan the schedule or tasks assigned to the crew on that specific shift.

Covered Areas

The **Covered Areas** section displays a listing of the service areas where the shift is allowed to perform work. Preferred service areas are areas in which the crew is allowed to perform work and which are given priority during scheduling. A shift must be associated with at least one service area, either allowed or preferred.

Controlling the Type of Work Assigned to the Shift

A crew shift may be associated with one service class of work that is defined as the primary function of the crew on that shift. This is considered the preferred service class. The scheduler is encouraged to assign work of the preferred type over non-preferred work to a crew shift.

A crew shift may also be associated with one or more services classes it is not allowed to perform. This association is used to discourage the scheduler from assigning certain classes of work to the shift; however, a dispatcher can allocate any class of work to any crew. A crew shift can designate one service class for which a percentage of its capacity is reserved.

Advance Dispatching

Dispatching is an action that locks a task's sequence in the shift schedule so no further optimization takes place and marks it as ready to be sent to the crew.

Once a crew starts their shift, you can configure the scheduler to automatically dispatch to the crew none, all or a subset of their work without requiring dispatcher intervention. The number of tasks to dispatch at any point in time, referred to as the drip horizon, may be controlled on the crew shift.

Regardless of the automatic dispatching setting, you can also configure the system to dispatch a number of tasks in advance of the shift start. This would ensure the schedule of these tasks is locked for various business needs. For example, it allows the crew to preview the first few tasks of their schedule before starting their shift. The amount of time prior to start that the shift is locked is set by the value in the Advanced Dispatch **Offset** field. You can also indicate that at that time the shift should be closed and all the tasks should be dispatched using the **Advance Dispatch Mode** field.

Standby Shifts

Standby shifts can be planned as potential shifts that can be activated only when needed. For example, a crew may be planned to have a stand by shift on Sundays to handle emergencies. Stand by shifts are not considered as available capacity, and are therefore scheduled until the crew actually starts the shift or the dispatcher changes its status to "open". If the crew is indeed called on that Sunday and starts that shift, it becomes an active shift as usual and gets sent to the scheduler. A shift is typically marked as "stand by" when created, but it can also be changed to standby while this shift is still in pending state.

Variable Shifts

When crews work on appointments, there may be a lot of idle time between the time they start their shift and their first appointment. To help with more efficient scheduling, in these cases, shifts can be set as "variable shifts" to provide the crew with some flexibility on when they can start and end work. If the **Variable Shift** field on a shift is set to **Yes** you must then enter a **Shift Duration** to establish the total amount of time allotted for the shift. The scheduler sets the start work time as the start time of the first task scheduled to the shift, minus any travel time. The estimated start time is rounded down based on the setting of the **Round Start Time** option. The start time is locked at some point prior to the earliest start time so that the schedule does not change without giving the crew enough time to know about the change. Once the estimated start time is locked, the shift is sent to the scheduler as a fixed shift. The amount of time prior to start that the shift is locked is set by the value in the **Advanced Dispatch Offset** field.

For example, a variable shift with a range of 8:00 AM to 8:00 PM and a duration of 9 hours can start anytime between 8:00 AM to 11:00 AM (the start window is defined as the earliest shift start time to the latest end time, minus the duration - a three hour offset in this example). Depending on the shift start time, the shift will end 9 hours later for an end time between 5:00PM and 8:00PM. If the first activity is scheduled after the latest shift start time, the shift will start at 11:00AM to ensure that the requirement for a 9 hour duration is met.

Closed Shifts

Closing a shift locks its current schedule and does not allow the scheduler to add more tasks to it.

Shifts can be closed in the following ways:

• If the crew goes offline, then all scheduled tasks are dispatched to the crew and the shift is closed.

- A dispatcher can close a shift so as to finalize its schedule. When this is done, the crew cannot receive more work. The dispatcher can re-open the shift at any time.

- A custom process might also be configured in implementation to close a shift prior to the start of the shift so that all of the activities are allocated to the crew. In this case, the crew has the opportunity to review the shift before its start. This is useful for non-MDT crews.

Planned Unavailability for Crews

The following circumstances may mean that a crew has a planned unavailability:

- Crews are entitled to take planned breaks after working for some time on their shift. Refer to *About Breaks* for more information.

- Crews may need to restock their vehicles or perform other administrative tasks at the beginning of their shift or sometime after. Refer to *About Non-Productive Tasks* for more information.

- Crews may need to attend work related events such as training sessions, meetings etc also known as periods of unavailability (POUs). If a period of unavailability has been entered for a crew, the system also takes into account whether or not the unavailability period overlaps with any of their planned shift and factors this in the event as part of the shift route. For example, the crew can be out for work in the field, attend their meeting and then resume work in the field afterwards. Refer to *About Periods of Unavailability (POUs) and POU Templates* for more information.

Crew Hierarchy

Depending on your business practices, crews might be organized within a reporting hierarchy. Using crew hierarchy can help with reporting and also allows for advanced searching and/or filtering crews in the Gantt and from related records.

Refer to *About Crew Hierarchies* for more information.

Crew Calendar

Shifts and periods of unavailability are displayed on the resource calendar so that it is easy for the resource planner to determine the availability of all resources.

Shift Time Zones

The time zone on a shift indicates the time zone in which the crew is planned to be working. All date and time information on the **Shift** portal, including set up of breaks and non productive tasks for the shift, is entered and displayed in that time zone.

Procedures

Crews performing a certain primary function may be required to complete a set of procedures before they are allowed to start their shift or change their primary function mid shift. These procedures may be defined on the service class used for primary function purposes.

Crews utilizing certain types of vehicles may be required to complete a set of procedures before they are allowed to use the vehicle. These procedures may be defined on such vehicle types.

Crews performing certain types of work may be required to complete a set of procedures on site before they are allowed to start the work. These procedures may be defined on such activity types.

Before the shift starts the shift portal lists a preview of all the procedures planned for the crew to complete. Once started the zone lists all the actual procedures performed.

Refer to *About Procedures* for more information.

Shift Timekeeping

Refer to *About Timesheets* if your organization uses timekeeping functionality.

Route Replay

You can use the **Route** tab on the **Crew Shift** portal to view a geographic map which shows the planned route for the crew on the specific shift. Once the shift is started, the route is based on the sequence of task locations the crew has visited whether they completed the task or not. If GPS reports are available for the crew during this shift, an additional actual route is displayed. The display shows the crew's current location if the shift is in progress.

The actual route is shown in one color and the planned route in a different color. Hover over icons to reveal additional information about the shift or task. For example, if the task was postponed or worked out of sequence etc.

An **Action** link displays on the main record allows users to toggle the display of planned and actual routes. The user can also request detailed directions for the route of a planned shift.

Depot Restrictions

If depot restrictions are indicated on a crew, the crew's schedule is restricted to the specific depots indicated. If no depots are specified, the crew can travel to any depot as part of their schedule. A shift can be scheduled to work at any depots that are allowed on the crew. Either all depots, or only the depots that are indicated under Depot Restrictions. Note that the depot restriction section on the shift is an override for exception handling. If for some reason a crew on a specific shift should not be allowed to visit a depot then this can be manually overridden on the shift. A depot section is only displays on shifts if there are any such overrides.

Refer to *About Depots and Depot Runs* for more information.

Navigating to the Crew Shift Portal

You can access the **Crew Shift** portal in any of the following ways:

- Select **Main Menu** > **Resource Management** > **Crew Shift,** then search for and select the crew shift.
- Click the **Crew Shift** link from the **Scheduling Gantt** on the **CDI** portal.
- Click the **Crew Shift** link on the **Scheduling** tab of the **Activity** portal (if the activity has been scheduled to a shift).
- Click the **Allocated Shift** link from the **Activity** portal (if the activity has been allocated to a crew shift).
- Click the **Crew Shift** link from the **Calendar** zone on the **Crew** portal, **Mobile Worker** portal, or **Vehicle** portal.
- From the Alert Queue, click on a crew shift associated with the alert (shift-related alerts only).
- From the **Alert** Search portal for a shift-related alert, click the **Shift** link.

About Breaks

A break is a planned period of time during which a crew is entitled to take a break during their shift.

Shift breaks allow you to plan for nonworking time within a shift. For example, a shift might include two 15-minute breaks, one in the morning and one in the afternoon. The morning break could be taken anytime from 9:00 am to 11:00 am, and the afternoon break could be taken anytime from 1:00 pm to 4:00 pm.

Each break is associated with a break type, which defines the duration of the break and the duration of the break window (the period of time during which the break can be taken). When you create a crew shift or crew shift template, you can add one or more break types to the shift. When the shifts are generated, the system automatically creates break tasks and incorporates them into the crew shift's schedule.

Breaks are planned to be performed during a time window starting at an offset relative to shift start time. If the crew starts their shift earlier or later than planned the break's schedule is adjusted accordingly. For example, if the offset is 2 hours and the shift starts at 8am, the break cannot start before 10am. If the shift starts at 9am with the same 2 hour offset, then the task can start as early as 11am. Alternatively, you may specify the offset using an actual window start date and time. Here, the system calculates the offset of that time from the shift start.

Activity types and activities include an **Allow Breaks** indicator which specifies whether or not the activity can include break time. This is used automatically on complex activities.

Breaks are displayed at the end of a crew shift's schedule until they have been scheduled.

Breaks created for a variable shift must specify an offset.

Navigate to a Break Tasks

- Navigate to the **Break Task** maintenance portal in any of the following ways:
  - From the **Scheduling Gantt** in the **CDI** portal, right-click the break and select **View Details** from the pop-up menu.
  - • From the **Breaks / Non Productive Tasks** zone on the shift maintenance portal
- Click the appropriate button in the **Actions** zone.

Action Button	Description
Start	Indicates that the crew is starting the break.
Complete	Indicates that the crew has completed the break and is ready for the next assignment.
Cancel	Indicates the crew is not going to take the break. This action cancels the break task and removes it from the crew shift schedule.

About Non-Productive Tasks (NPTs)

A non productive task (NPT) is a period of time during which a crew must perform a task other than regular work as part of their shift, such as replenishing stock. Such tasks are built into a crew's schedule and are always associated to a location where the task is performed.

Non-productive tasks allow schedulers to plan for non-working time during a shift. For example, a shift might start with a task to replenish supplies on the truck in the morning, and to check tire pressure in the afternoon. The morning task might take place anytime from 6:00am to 9:00 am, and the afternoon task might take place any time between 1:00pm and 3:00pm.

Unlike a meeting the non-productive task is not planned to start on a specific fixed time but rather is planned to be performed during a time window starting at an offset relative to shift start time. If the crew starts their shift earlier or later than planned the task's schedule is adjusted accordingly. For example, if the offset is 2 hours and the shift starts at 8am, the task cannot start before 10am. If the shift starts at 9am with the same 2 hour offset, then the task can start as early as 11am. Alternatively, you may specify the offset using an actual window start date and time. Here, the system calculates the offset of that time from the shift start.

Each non-productive task is associated with a task type which defines the duration of the task, and the duration of the task window. When you create a crew shift or crew shift template, you can add one or more non productive task types to the shift. When the shifts are generated, the system automatically creates non productive task tasks and incorporates them into the crew shift's schedule.

The location of an NPT may be a reference to a common location or a specific address. A crew may be affiliated with a specific NPT location defined on the crew record. When creating an NPT if its location is not explicitly specified, the system defaults it from the shift's crew record if any is defined.

NPTs are displayed at the end of a crew shift's schedule until they have been scheduled.

Non productive tasks cannot be created on variable shifts.

About Periods of Unavailability (POUs) and POU Templates

A period of unavailability (POU) is a specific period of time during which one or more resources are not available to perform work. For example, mobile workers or dispatchers may be unavailable due to vacation, personal appointments, meetings or training sessions etc. Vehicles may be unavailable for maintenance reasons. Crews may need to attending meetings or participating in training sessions and hence not available to perform work during these events.

Leave POUs

An individual resource POU is used to capture an individual's leave time such as vacation time or a vehicle's unavailability due to maintenance. Such POUs reference a single resource only and do not specify a location.

If a leave POU has been entered for a mobile worker or a vehicle the system also takes into account whether or not the leave period overlaps with any of their planned shifts and factors this in when determining whether the resource is available to be scheduled for a shift. If the leave overlaps with the shift for any amount of time the resource is considered unavailable, even if the overlap is only for a very short duration of time.

Crew POUs

A crew POU represents a meeting or an event to which one or more crews are invited. In addition to the event time, duration, location and the list of invited crews it may also specify one or more service areas. This instructs the scheduler to incorporate the POU in the invited crews' shift only if they are planned to work in the specified service areas. (This is used to discourage the incorporation of the POU event into a crew's shift schedule if the crew happens to work too far from the event that day.) If no service areas are specified, the POU will apply to all service areas. A crew POU is always associated with a location so that travel time to and from the POU location is taken into account when optimizing the crew shift's route.

POUs can be managed for multiple crews at one time using the **Invited Crews** and **Crew Search** zones. The **Invited Crews** zone displays a list of crews that are currently allocated to the POU. You can also remove invited crews from this zone. Use the **Crew Search** zone to search for and select crews to add.

Crew POU Tasks

A POU task is a tool for tracking crew attendance of a POU event. The system automatically creates a POU task for every crew associated with a crew POU, and then incorporates it into the crew's shift schedule. A POU task is dispatched to a crew, just like an activity, and its status is updated and tracked in the same way.

- Navigate to the **Period of Unavailability Task** maintenance portal in any of the following ways:

  - From the **Scheduling Gantt** in the **CDI** portal, right-click the POU and select **View Details** from the pop-up menu.

  - Navigate to the **Crew Shift** portal and search for the crew shift to which the POU is scheduled. On the **Crew Shift** portal, click the **Schedule** tab and then click the **POU** link in the **Scheduled Tasks** zone. You can also click the POU in the Crew Shift Scheduling Gantt and then select **View Details** from the pop-up menu.

- Use the buttons in the **Actions** zone of the **Period of Unavailability Task** maintenance portal to perform valid actions on POUs.

The actions that are valid at any time depend on the current status of the POU and your system's configuration. The table below describes a set of standard actions.

Action Button	Description
Edit	Allows you to enter comments and add standard completion remarks.
En Route	Indicates that the crew is currently on its way to the POU.
On Site	Indicates that the crew has arrived at the POU location.
Complete	Indicates that the crew has completed the POU and is ready for the next task.

Action Button	Description
Cancel	Indicates the crew is not going to attend the event. This action cancels the POU task and removes it from the crew shift schedule.

POU Templates

POUs are either recurring or non-recurring. For recurring POUs, you define a template POU from which the actual POUs are generated. For example, if you create a template POU for a regular weekly staff meeting, the system will automatically generate individual POUs for each meeting.

To indicate that the POU template should repeat, check the **Recurring** box when creating the template. You also specify the number of occurrences and the expiration date.

POU templates support the following recurrence patterns:

• **Daily**: the POU can recur every x days.

• **Weekly**: the POU can recur on a specific day every x weeks. If you want the POU to occur on Tuesday and Thursday every week, create two POU templates; one that occurs on Tuesday every week and one that occurs on Thursday every week.

• **Monthly**: the POU can recur every x months on an exact date or a relative date (a day in a specific week). For example, the POU can occur on the 21st of every month or the last Friday every three months.

• **Yearly**: the POU can recur every x years on an exact date or a relative date (a day in a specific week in a specific month). For example, the POU can occur the 4th of July every year or the first Monday of January every two years.

In a situation where POU details differ from their template on a particular date, you can generate the POU initially from the template and then manually adjust it to override the template settings. For example, circumstances might require that a weekly staff meeting, typically held on a Monday morning, be held on Friday during one particular week. In this situation, POUs for every meeting would be generated automatically from the template, and then you would manually modify the POU for the special meeting. Modified POUs are called **overridden POUs**, as they no longer match the template from which they were generated. The **Overridden POUs** zone on the **Period of Unavailability** portal displays a list of overridden POUs linked to the current template.

A generated POU maintains a reference to the template that generated it, so any changes made to a template are automatically applied to all future POUs generated from that template. If you modify a POU template after POUs have been generated from it, the system notifies you that all previously generated POUs will be deleted and regenerated, and that any manual overrides will be lost.

When a POU Template is activated, the system automatically generates the POUs based on the effective date and your system's planning horizon.

Holidays and POU Creation

Work calendars define holidays within a period of time. They are optional for POU templates, however if the start date/ time for a POU falls on a non-workday or a holiday as defined by the calendar, the POU will not be generated. If a POU Template is defined as daily, then a POU will be created for every day of the week, Monday through Friday, excluding any holidays.

The number of occurrences defined on a POU Template only counts the actual POUs that are generated. For example, if a POU Template is defined as the first Monday of every month for 10 occurrences, presumably January through October, but two of those Mondays are holidays, the POUs will be created from February through November, skipping the two holiday days.

Time Zones

If a POU is associated with a geographic location, like a meeting, all date and time information on the **Period of Unavailability** portal is entered and displayed in that location's time zone.

About Shift Templates and Shift Weekly Templates

Templates provide a tool for quickly generating large numbers of shifts based on pre-defined parameters.

A shift weekly template defines a cyclical weekly pattern made up of crew shift templates. Shift weekly templates are either:

- effective for a specified number of weeks starting from their effective date, or
- perpetual, which means they have an effective date but no end date. The global planning horizon parameter (defined in the master configuration) controls the number of day's worth of shifts to generate for perpetual templates.

Each shift template defines the attributes for the corresponding recurring shift. For example, a weekly shift template might use a different crew shift template on Fridays than the one used on other days. Attributes on a shift template include the shift's planned start date and time, covered service areas, breaks, etc. The system generates actual crew shifts automatically from the crew shift templates. Shift weekly templates may be:

- Crew specific - These templates are defined for a single crew and are fully defined with everything that the shift generator needs to generate the shift. They reference the crew that they are defined for and how the resources are allocated on the shift.
- Common - These templates can be shared across multiple crews via subscription. As such they cannot define crew specific details such as the crew itself or its resource allocation. These details are therefore defined on the crew entity itself. Shift generation combines crew details on top of template details to generate shifts. Any crew that is subscribed to a common template must have these types of details defined.

In a situation where crew shift details should differ from their template on a particular date, generate the shift initially from the template and then you can manually adjust it to override the template settings. These modified shifts are called overridden shifts, as they no longer match the template from which they were generated. The **Overridden Shifts** zone on the **Shift Weekly Template** portal displays a list of overridden shifts linked to the current template.

A generated crew shift maintains a reference to the template that generated it, so any changes made to a template are automatically applied to all future shifts that were generated from that template. If you modify a shift weekly template after crew shifts have been generated from it, all previously generated crew shifts will be regenerated, and any manual overrides will be lost.

Common Weekly Templates

Resource planners can set up common weekly templates which can be shared across multiple crews. This is helpful for the efficient generation of shifts in organizations where there are sometimes hundreds or possibly even thousands of crews that follow the same weekly shift pattern. The resource planner can subscribe crews to the common template, then shifts generated from the common template are exactly the same and follow the same timing in the rotation except for crew specific details such as allocated resources.

Subscription to a common template is effective dated so that resources can subscribe to follow a common template as of a given date and this relationship can expire. Each resource can subscribe at different times but their shifts are generated in the same rotation timing as all other subscribed resources, regardless of when they subscribed.

The planner can also unsubscribe a crew from the common template at any time or change effective dates to affect the creation of future shifts for those crews.

Changes made to the common template affect future shifts of all subscribed crews. Since a common template may involve a large number of subscriptions, such changes are NOT applied right away to all these shifts but rather they take effect the next time the shift generation batch process runs. If you want to apply the recent changes to a specific crew without waiting for the next scheduled batch run you can select the **Process Now** button next to the crew on the subscription list.

Similarly subscriptions and requests to unsubscribe may involve multiple crews. Therefore these requests are applied the next time the shift generation batch runs or by clicking the **Process Now** button for a specific crew.

In a typical workflow, the resource planner would create a common weekly template then subscribe multiple crews to the template bearing the following in mind:

- Subscriptions require an effective date and allow an expiry date

- A crew's subscriptions and specific templates cannot overlap

About Working with Draft and Original Templates

If you attempt to modify a template from which shifts have already been generated, the system automatically creates a draft copy of the template. This allows you to make your changes to the draft, then preview the shifts that would be generated if you applied the draft.

You can also see if any manual edits were made to previously generated shifts. (Such manual overrides will be lost when the draft is applied and shifts are regenerated). When you have reviewed this information and are sure you want to make the proposed changes, you can apply the draft and be confident that you understand the impact of your action.

It is helpful to understand the following rules that apply when working with draft and original templates:

Initial Creation

- When you create a new shift weekly template, its status is pending.

- When you apply the pending template, its status changes to "Applied". The system will generate future shifts automatically from the template's effective date through the earliest of the planning horizon or the expiration date (if any). A background process manages the generation of shifts going forward.

Making Changes to an Applied Template

- If you attempt to update an applied template, the system will automatically create a draft template. The updates will be stored in the draft and the original template will remain unchanged.

- If you attempt to update an original template for which a draft already exists, the system will notify you that you must enter your changes in the existing draft.

- If you apply a draft (for which an original template exists), the system notifies you that any future shifts generated from the original template will be deleted and regenerated. At this point, you can continue or cancel the operation. If you continue, the following occurs:

  - The draft template's status changes to applied.

  - The original template is updated to match the draft.

  - All future shifts generated from the original template are either updated (if those shifts' templates also exist in the draft) or deleted (if those shifts' templates were deleted from the draft). New shifts are generated for any shift templates that were added to the draft.

  - Any additional changes made to this template will result in a new draft.

Setting an Applied Template Back to Pending Status

- If you attempt to set an applied template back to pending status, the system notifies you that any future shifts generated from the template will be deleted. If you confirm the action, the following occurs:

  - The original template's status changes to pending (no draft exists).

  - All future shifts that were previously generated from the original template are deleted.

  - If a draft template exists, it is deleted.

About MDT, SMS, and Non-MDT Crews

The application supports dispatching directly to mobile data terminals (MDTs) and cellular phones.

Mobile data terminals (MDTs) may be laptops, tablets and other mobile devices interfacing with the system via the mobile application. The mobile application may be running locally on the device in a disconnected mode or accessed on the server through a browser in a connected mode.

Communication with cellular phones is done using SMS (short messaging system).

MDT Crews

MDT crews use the mobile application to log on and receive their assigned tasks. A crew must be connected (either wirelessly or over a wired network) to log on to their shift and receive dispatched activities. Once activities have been dispatched, the crew can work disconnected if wireless communication is not available. As they work each task, they enter status updates (en route, started, etc.) and completion details on the mobile device. They can also receive new tasks and updates to existing tasks throughout their shift. The system regularly checks the connection to the mobile device, and displays the connection status to the dispatcher on the **CDI Dispatcher** portal.

Offline MDT Crews

Crews may operate in areas with poor or no connectivity coverage. In this situation the entire work schedule for the day needs to be dispatched to the crew at shift start time as they cannot get additional work during their shift.

Moreover, since the crew cannot provide status updates the scheduler does not have a way to validate whether or not the crew is on schedule and therefore incorrectly pushes the schedule back.

To prevent scheduling discrepancies the crew must notify the scheduler that they are offline by selecting the option on their mobile device. When the crew goes offline, the shift is also closed and their entire schedule is dispatched to them notifying the crew when the process is complete. Once the MDT crew's activities have been dispatched, the crew can work offline if wireless communication is not available. The crew can also request to be online again, as needed.

SMS Crews

SMS crews communicate via text messages sent from their cell phone. For example, a text message of "Logon" logs the crew shift on and tells the server to send the first task. The system responds by sending a message with the details of the first assignment. Details include the activity type, arrival time, customer name and address.

As the crew works the assignment, they send simple messages to communicate their progress: a crew message of "1" indicates that the crew is traveling (en route) to the task; "2" indicates arrival at the task location; "3" indicates that work is done and the crew is ready for a new task.

The system also sends non productive tasks, POUs and breaks to the crew in the same way that it sends activities. At the end of a shift, the crew sends a "Logoff" message. Typically, an SMS crew enters completion details at the end of their shift when they return to their office.

Logic to interpret and process SMS messages is handled by a plug-in. Refer to the configuration guide for information about customizing this plug-in.

Non-MDT Crews

If a crew does not have either an MDT or SMS device, the dispatcher can start the crew shift from the **Crew Shift** maintenance portal on the server and communicate details of each task directly to crew. The dispatcher can also update the status of a task (using the task's maintenance portal) and enter activity completion details when the crew has completed work. Typically, the shifts of non-MDT crews are closed some time before their shift is planned to start. If a non-MDT crew's shift is closed then it is also set to offline. Non-MDT crews can also call in the dispatcher, and request them to decline the activity on their behalf, so crew does not get the activity again.

SMS Message Reference

This topic describes the messages that an SMS user can send to the server application.

Messages from the Crew to the Server

The following SMS messages are supported from crew members in the field.

Message	Description
Logon	Finds the next shift for the user associated with the mobile phone and starts it. Starting a shift causes the first task to be sent to the crew. The system validates the phone number and uses it to retrieve the mobile worker's current shift and send the first task. The cell phone number must be associated with an active SMS-enabled mobile worker record on the server.
1	If the current task is associated with a geographic location, this indicates that the crew is traveling to the task location. If the current task is a break, this starts the break.
2	If the current task is associated with a geographic location, this indicates arrival at the task location. This is invalid for breaks.
3	If the current task is associated with a geographic location, this completes the task. If the current task is a break, this completes the break. Once the current task is completed, the next task (if any) is sent to the crew.
9	Postpones the current task for a specified duration of time (in minutes) or until the end of shift.
0	Toggles the state of the current shift from In Service to Out of Service, and vice versa.
Return	Sent in response to an SMS recall. This indicates that the crew accepts the recall. The system then updates the assignment status to Returned.
Logoff	This message ends the current shift and returns any unfinalized activities.

Sample Messages from the Server to the Crew

The following table provides examples of the messages sent to crews when tasks are dispatched.

Message	Example
Activity Details	MREAD at 12.00.00 for Swetha Paspuleti at 6284 dressler Road NW, North Canton
POU Details	STATUS MEETING at 6284 dressler Road NW,North Canton from 14.00.00 to 14.30.00
Break Details	COFFEE from 13.00.00 to 13.30.00

About Location Based Services

Location Based Services (LBS) refers to crew location and tracking services that utilize Global Positioning System (GPS) data obtained from a mobile resource. GPS data is used to display the location of resources on the map and to track crews and routes on the map.

LBS allows dispatchers and the scheduler know the precise whereabouts of crews and vehicles in relation to:

- Activities being performed in the field

- Log on and log off locations

- Other crews and vehicles

- The underlying map geography (street names, landmarks, etc.)

- Hazard or other alert areas

LBS services can only be provided if GPS data is obtained for a mobile resource. Data may be captured via the crew's mobile device (MDT) or independent of it via an external GSP system embedded in the vehicle.

Sending of GPS data from the mobile device can be enabled or disabled at the shift level using the **GPS Data Enabled** attribute.

Vehicles equipped with an external GPS system can be configured to transmit GPS data independently. If the shift is not configured to send GPS data, the system uses GPS sent from the vehicle if any.

If GPS data is not available or is too old (as defined in your system's global configuration), then the system estimates the crew's current location based on its last known location.

About Procedures

Procedures represent steps or tasks that crews may need to complete prior to starting a business activity such as starting their shift, using a vehicle or starting work on an activity. Usually procedures relate to safety precautions or regulatory requirements. For example, the mobile worker may need to complete a vehicle inspection at the beginning of a shift, or review safety instructions for a hazardous task. A procedure associated to the activity or vehicle type would guide the completion of the inspection or safety check.

Procedures functionality is only available to MDT crews.

Typically, procedures consist of simple questionnaires with predetermined expected answers (yes/no, text, a number, etc). The base product is shipped with business objects to supports this type of procedure but you may customize your procedure business object you meet you business needs.

If the person entering the answers enters one incorrect answer, the entire procedure fails. The procedure may or may not be set to allow the crew to override a failed procedure as passed. If override is disabled, the next business activity is prevented from starting with a failed procedure. Your business practices will determine how the crew should proceed in cases where the procedure fails and there is no override allowed. You may also specify for each procedure whether or not attendance is taken of all crew members who were present during completion of the procedure . These details as well as the specific procedure steps are defined by the procedure type.

Procedures can be shift based or activity based:

- Shift based procedures must be completed based on a shift event such as the start of the shift, change of primary function, change of vehicle, and so on. In this case, whenever a shift event occurs, the crew is notified on their mobile device that they are required to complete a procedure. These procedures are determined by the service class or vehicle type associated with the shift. Shift based procedures can be viewed on the **Shift Actions** menu on the mobile device.

- Activity based procedures must be completed on site before the crew starts the activity. These procedures are determined on the activity type and are sent to the crew's mobile device when the activity is dispatched. Activity based procedures can be viewed on the **Activity Actions** menu on the mobile device.

As procedures are created, processed and completed, the system creates a **Procedure** record to track the information, attendance (if applicable), and results. Procedures cannot be manually created in this portal. Procedure records indicate whether or not the procedure was passed successfully, and the crew shift details related to the procedure.

Before the shift starts the list of planned procedures is displayed on the shift portal. Once the shift has started, actual procedure records are displayed.

About Resource Route Replay

Resource Route Replay shows a replay of a crew's actual route during a specific period of time based on GPS coordinate history. This feature can be used to analyze route patterns and for auditing purposes.

A crew's mobile device may be configured to transmit GPS location data throughout the day. A vehicle's GPS data may be interfaced to the system from an external system. You can review resource routes for crews and/or vehicles, viewing them one at a time or adding multiple routes (up to 12) to the map at once. Multiple routes are displayed by representing each route in a different color.

When successive routes are displayed, route points are marked with a sequence number so that it is clear in which order the points were visited. Hover the mouse pointer over any route point to display the GPS details for that route point.

Click the **Clear All** button to remove all resources from the map and start again.

You can use the **Route** tab on **Crew Shifts** to view a geographic map which shows the planned route for a crew on a specific shift. Refer to the *About Crews and Crew Shifts* for more information.

About Dispatchers and Dispatcher Shifts

A dispatcher is a person within your organization responsible for monitoring crews and crew shifts within certain dispatch areas.

A dispatcher record defines the dispatch areas and key performance indicators (KPIs) that the dispatcher is allowed to monitor. (Dispatch areas identify a set of service areas and service classes.) The dispatcher record also specifies the default date range for activities to be monitored and indicates whether the dispatcher will be allowed to modify that date range when they log on to their shift.

A dispatcher shift record controls the scope of data to be monitored by the dispatcher for a particular shift. When a dispatcher logs on to start their shift, the system creates the dispatcher shift record at that time. The dispatcher can select which dispatch areas (of those specified in the dispatcher record) they want to monitor for the shift. They can also change the date range of activities to monitor for the shift, if allowed (based on settings defined in the dispatcher record).

A dispatcher can log off and log on again at any time. Whenever a dispatcher logs off a shift, the system finalizes that dispatcher shift record. Whenever a dispatcher logs on to a shift, the system creates a new dispatcher shift record. From business perspective, a dispatcher's shift may be an 8-hour period from 9:00 to 5:00, but from a system standpoint, the shift lasts from logon to logoff.

> **Note:** For a dispatcher to be "logged on," the dispatcher shift itself must be logged on. This is not just logging in to the application.

About Timesheets

Timesheets allow your organization to more easily use the time information which is collected within the application as shifts are completed. This information can be exported to external timekeeping systems as needed.

This functionality also allows mobile workers to review, accept, and sometimes change their reported time for work, travel, or non-work events (such as breaks, non-productive tasks and periods of unavailability) for their shifts. Timesheet functionality is optional. Global master configuration parameters must be specified to enable this functionality.

Timesheets are created automatically at the end of the related shift for each period of time the resource was part of the shift. The summary of time is presented to the crew or resource for acceptance and completion as part of shift completion processing. Time is grouped in into usage "time buckets" providing a breakdown of total durations for the different types of time utilization categories, or buckets, such as travel, work, etc.

Time spent traveling to and working various types of tasks can be configured to be grouped into custom time "buckets" as pat of the task type definition.

Time "buckets" are calculated automatically by the system, but might be adjusted by the crew or resource depending on your business practices and settings. Use the master global configuration option to allow or not allow crews to adjust the system calculated times.

MDT crews may complete their timesheet verification on the mobile device. If the mobile worker does not agree with their timesheet report or cannot correct the data, they can choose not to mark it reviewed on the device and complete it later in office.

Non MDT crews can complete timesheets "in office" as part of their general shift completion workflow using the timesheet zone on the shift portal. The mobile worker may click on the Process Crew Timesheets Now button to generate the timesheet record for each individual resource that worked this shift or wait for the next timesheet batch process to do so.

Timesheets cannot be manually created, but can be maintained or duplicated for correction purposes in the **Timesheet** portal.

Review and Corrections

Actions in the **Record Actions** section allow for further processing of the timesheet based on your business requirements.

The **New** button is used to correct a timesheet for the overall time period. A timesheet is created for each period of time a resource is known to the system to work as part of a shift, and these calculated time frames are strictly based on recorded system events. If for some reason the system times do not accurately reflect actual events, users can create a new timesheet. For example, if a mobile worker joined the shift at noon but the crew leader recorded the crew allocation change at 1 PM, then the system generated timesheet would show that the worker joined at 1 PM. Whether it is reviewed on the mobile device or in the application, users can only correct the amount of time in each time bucket or add new time buckets. The only way to adjust the time frame, as in the example, is to create a new, duplicate timesheet within the application. In this example, the mobile worker or crew leader would have to make the correction after returning from the field. When a new timesheet is created, the timesheet is overwritten.

Additional actions allow users to confirm that the timesheet has been reviewed and the mobile worker agrees to the reported time, or rejects the time. This can also be completed from the mobile device. Your organization may or may not allow mobile workers to correct the reported time as configured on the master global configuration option.

Working with Mobile Workers

This section describes common tasks related to working with mobile workers.

Creating Mobile Workers

Use this procedure to create a new mobile worker.

Prerequisites: You must define the mobile worker type, skills, and service areas before you can associate them to a mobile worker. The mobile worker must have a valid system user ID.

1. Select **Main Menu** > **Resource Management** > **Mobile Worker+** .

2. Select the mobile worker type and click **OK**.

3. Enter the mobile worker's system user ID or click the search icon to search the user list.

4. Enter contact information for the mobile worker.

5. Review the list of assumed skills. Remove any skills this worker does not have, and add any skills the worker has that are not listed.

   If skill has an effective period, you must enter the effective and expiration dates.

6. Select the service areas in which this mobile worker typically works.

7. Click **Save**.

Mobile Worker Search

Use this procedure to search for a mobile worker on the **Mobile Worker Query** portal.

1. Select **Main Menu** > **Resource Management** > **Mobile Worker** .

2. Select one of the following query options in the **Mobile Worker Query** zone.

3. Click **Refresh**.

4. In the search results list, click the link for the mobile worker you want to view or edit.

Maintaining Mobile Workers

Use this procedure to maintain an existing mobile worker.

1. Navigate to the **Mobile Worker** portal in edit mode.

2. Click a button in the **Actions** zone to edit, delete, duplicate, or activate/deactivate the mobile worker.

3. Click **Save**.

If you add or remove skills from a mobile worker, all non-finalized shifts to which the mobile worker is currently allocated are resent to the scheduler. The scheduler then reevaluates the shift schedules accordingly, and may add or remove tasks as a result. If a task has already been dispatched or marked for dispatch, it remains on the shift; it is the responsibility of the crew to suspend an activity if they cannot perform the work. If a task is still being scheduled, it is rescheduled to another qualified crew.

Viewing Missing or Expired Skills for a Mobile Worker

Use this procedure to view missing or expired skills for a mobile worker:

1. Navigate to the **Mobile Worker** portal in edit mode.

   If the mobile worker is missing any of the assumed skills defined for its mobile worker type, those skills are listed in the **Skills** section. If any of the mobile worker's skills are expired, the expiration date is displayed in red next to the skill.

2. To add a missing skill:

   - Click the **Add** button next to the missing skill.

   - If the skill has an effective period (as defined in the skill type), enter the effective and expiration date for the skill.

   - Click **Save**.

3. To change the expiration date for a skill, click the **Edit** button, then enter the new expiration date and click **Save**.

Viewing the Mobile Worker Calendar

Use this procedure to view events and other items occupying time on the mobile worker's schedule for the current month.

1. Navigate to the **Mobile Worker** portal.

2. In the **Mobile Worker Calendar** zone, do any of the following:

   - Use the toolbar buttons to change the view (Day, Week, Month, or List) and to display the calendar for the previous or next viewing period.

   - Click an object in the calendar to navigate to its maintenance portal.

Viewing My Calendar

Use this procedure to view events and other items in a user's scope of data.

1. Navigate to the **My Calendar** portal.

2. In the **Calendar** zone, do any of the following:

   - Use the zone's toolbar buttons to change the view (Day, Week, Month, and List) and to display the calendar for the previous or next viewing period.

   - Click an object in the calendar to navigate to its maintenance portal.

Working with Vehicles

This section describes common tasks related to working with vehicles.

Creating Vehicles

Use this procedure to create a new vehicle.

Prerequisites: You must define equipment before you can associate it to a vehicle.

1. Select **Main Menu** > **Resource Management** > **Vehicle+** .

2. Select the vehicle type and click **OK**.

3. Enter a tag or license plate number to identify the vehicle and complete all other required fields.

4. Review the list of assumed equipment. Remove any equipment this vehicle does not have, and add any equipment the vehicle has that are not listed.

   If equipment has an effective period, enter the effective and expiration dates.

5. Click **Save**.

Vehicle Search

Use this procedure to filter and search for vehicles.

1. Select **Main Menu** > **Resource Management** > **Vehicle** .

2. Enter your search criteria.

   You can search by any combination of vehicle type, vehicle tag, and license plate. You can also exclude all inactive vehicles from the search results.

3. Click **Refresh**.

4. In the search results list, click the link for the vehicle you want to view or edit.

Maintaining Vehicles

Use this procedure to maintain an existing vehicle.

If you add or remove equipment from a vehicle, all non-finalized shifts to which the vehicle is allocated are resent to the scheduler. The scheduler then reevaluates the shift schedules accordingly, and may add or remove tasks as a result. If a task has already been dispatched or marked for dispatch, it remains on the shift; it is the responsibility of the crew to suspend an activity if they cannot perform the work. If a task is still being scheduled, it is rescheduled to another qualified crew.

1. Navigate to the **Vehicle** portal in edit mode.

2. Click a button in the **Actions** zone to edit, delete, duplicate, or activate/deactivate the vehicle.

3. Click **Save**.

Viewing Missing Equipment for a Vehicle

Use this procedure to view missing or expired equipment for a vehicle.

1. Navigate to the **Vehicle** portal in edit mode.

   If the vehicle is missing any of the assumed equipment defined for its vehicle type, those items will be listed in the **Equipment** section. If any of the vehicle's equipment is expired, the expiration date is displayed in red next to the equipment.

2. To add a missing piece of equipment:

   • Click the **Add** button next to the missing equipment.

   • If the equipment has an effective period, enter the effective and expiration date.

   • Click **Save**.

3. To change the expiration date for a piece of equipment, click the **Edit** button, then enter the new expiration date and click **Save**.

Working with Crews

This section describes common tasks related to working with crews.

Creating Crews

Use this procedure to create a new crew.

Prerequisites: You must define the crew type before you can create crews of that type.

1. Select **Main Menu** > **Resource Management** > **Crew+** .

2. Select the crew type and click **OK**.

3. Enter a unique crew name and fill in the remaining fields according to your business requirements.

4. Click **Save**.

You can now create crew shifts for this crew.

Maintaining Crews

Use this procedure to maintain an existing crew.

1. Navigate to the **Crew** portal in edit mode.

2. Click a button in the **Actions** zone to edit, delete, duplicate, or activate/deactivate the crew.

3. Click **Save**.

Viewing Shift Weekly Templates for a Crew

Use this procedure to view the shift weekly templates associated with a particular crew.

1. Navigate to the **Crew** portal in edit mode.

    If one or more shift weekly templates have been defined for this crew, they are displayed in the **Shift Weekly Templates** zone. By default, only non-expired templates are displayed. To include expired templates, click the **Filter** icon in the zone title bar, then check the **Include History** checkbox and click **Refresh**.

2. Click on a template to navigate to the template's maintenance portal.

Working with Crew Shifts

This section describes common tasks related to working with crew shifts.

Creating Crew Shifts

Use this procedure to create a new crew shift. Typically, crew shifts are generated automatically by the system from crew shift templates. However, you can create individual crew shifts to meet special situations.

Prerequisites: Crew, shift type, service classes, break types, non productive tasks, mobile workers, vehicles, service areas, and logon/off locations must have been previously defined.

1. Select **Main Menu** > **Resource Management** > **Crew Shift+.**

2. Select the crew shift type and click **OK**.

3. Complete the fields in the **Main** section.

   Note that the shift can be created as fixed or variable. A variable shift will allow the scheduler more flexibility in determining when the shift can be worked.

4. Add each mobile worker and vehicle that will be working this crew shift. (Optionally, you can save the crew shift without selecting any resources, and then use the **Maintain Crew Allocation** feature, which recommends a list of appropriate crews.)

5. Add each service area that the shift will cover, then select either **Allowed** or **Preferred**.

6. Specify any service classes of work that are not allowed on this shift.

7. Enter logon and logoff information.

8. Click **Save**.

   The **Crew Shift** maintenance portal is displayed. Note that the crew shift status is pending. Review the shift details at this time and make any final updates:

   • To add breaks or non productive tasks to the shift, click the **Add** link in the **Breaks/Non Productive Tasks** zone title, then select each break or non productive tasks you want added to the shift.

   • If you want the system to recommend appropriate resources, click the **Maintain Crew Allocation** link.

   • If you want the system to recommend an appropriate shift cost profile (by matching the service area and service class combination defined in existing profiles to this crew shift's service areas and service classes), click the **Recommend Change** link next to the **Shift Cost Profile** field.

9. When you ready for the system to begin scheduling tasks to this shift, click the **Plan** button in the **Actions** zone.

   The shift is sent to the scheduler for planning.

Crew Shift Search

Use this procedure to filter and search for crew shifts.

1. Select **Main Menu** > **Resource Management** > **Crew Shift.**

2. From the **Crew Shift Search** zone, select the Query Option to use.

3. Click **Refresh**.

4. Click a shift in the search results to navigate to the **Crew Shift** portal.

Maintaining Existing Crew Shifts

Use this procedure to maintain existing shifts. You can change crew shift details, such as the primary function or shift cost profile. You can also update the crew shift's status and log a crew shift off the system.

Once a crew shift is started by an MDT or SMS crew, the crew should be in full control of the shift's status; changing the status of such a shift independently on the server may cause crew status updates to fail. A dispatcher should only update crew shifts for non-MDT crews.

If you change shift details for a logged on shift, the shift details are resent to the scheduler. If any tasks previously scheduled to the shift are no longer appropriate for it, they are rescheduled automatically, unless they have already been dispatched. If a task has already been dispatched to a crew, it will remain on the shift; the crew or dispatcher will be required to resolve the situation manually.

1. Access the **Crew Shift** portal in edit mode.

2. Use the buttons in the **Actions** zone to maintain the crew shift.

   In addition to the standard **Edit**, **Duplicate**, and **Delete** buttons, the **Actions** zone displays buttons you can use to change the status of the crew shift. The buttons that are displayed at any time vary depending on the crew shift's current status and your system's configuration. Action buttons supported in the base system are described below.

Button	Description
Plan	Tells the system to begin scheduling tasks to this shift (when the shift start date falls within the planning horizon).
Cancel	Cancels the crew shift. If any tasks are currently scheduled to the shift, they will be rescheduled to another shift.
Start	Starts a crew shift. This applies only to crew shifts that are in a planned status. This effectively logs the crew shift on to the system so that scheduled tasks can be dispatched and worked.
In Service	Indicates that the crew is currently working (traveling to an activity location, working an activity, idle between activities, etc.).
Out of Service	Indicates that the crew is not currently working or available for work. The crew may be attending a meeting or may have experienced a vehicle breakdown, for example. You will be prompted to provide a reason for going out of service and an estimated duration.
Force Logoff	Forcibly logs the crew shift off. This may be required if a logged-on crew's MDT is not working and they need to receive data on a new device. This is not the same as logoff at end of shift. Force logoff is used to disconnect a crew shift from a device. Force logoff does not disassociate the crew shift from its crew leader. For security purposes, the system maintains a link between the crew shift and the last user who logged on to the crew shift. Only that user can log back on to the shift on the new device and retrieve the shift details.
Allocate All	Allocates all of the activities scheduled to the selected shift that have not yet been dispatched . Allocating all does not close the shift.
Open	Opens the shift's schedule allowing the scheduler to scheduler more activities to the shift as needed. If the shift was a stand by shift it becomes fully available for scheduling.
Close	Closes the shift and allocates all scheduled activities to the shift. The scheduler is prevented from removing any of the allocated activities or adding more activities to the current shift. The shift planner is also provided with the opportunity to dispatch the allocated activities also as part of closing the shift.
Complete	Indicates that the crew is done working. This is also referred to as End of Shift.

The system validates the action and displays an error message if the validation failed. Otherwise, the updated status is displayed.

Changing the Shift Cost Profile for a Crew Shift

Use this procedure to view a list of recommended shift cost profiles for the current shift. The system finds appropriate shift cost profiles by matching the service area and service class combination defined in the profile to the current crew shift's service areas and service classes. You can select one of the recommended profiles or specify any profile you wish.

1. Navigate to the **Crew Shift** portal in edit mode.

2. Click the **Recommend Change** link next to the **Shift Cost Profile** field.

   The **Recommend Change** link is only displayed for crew shifts that are in pending or planned state.

3. Click the **Search** icon in the pop-up window to display the profile list.

4. Review and select a profile from the list (or cancel if you do not wish to select one).

5. Click **Save**.

Changing the Resource Allocation for a Crew Shift

Use this procedure to view a list of recommended resources from which you can choose when updating resource allocation for a crew shift.

1. Navigate to the **Crew Shift** portal in edit mode.

2. In the **Current Crew Allocation** section, click the **Maintain Crew Allocation** link.

   The **Recommended Crew Allocation** portal is displayed. The **Recommended Mobile Worker** zone displays a list of mobile workers that have been identified as appropriate for this crew shift, based on the shift's attributes. The **Recommended Vehicle** zone displays a list of vehicles identified as appropriate for the shift.

3. To add a recommended mobile worker or vehicle, click the **Add** button displayed next to the resource.

4. To remove a resource that is currently allocated, click the **Remove** button.

5. To filter or search for additional resources, enter your search criteria and click **Refresh**.

Viewing a Crew Shift Schedule

Use the **Schedule** tab on the **Crew Shift** portal to view the tasks currently assigned to a crew shift.

1. Navigate to the **Crew Shift** portal in edit mode.

2. Click the **Schedule** tab.

   The **Crew Shift Schedule Gantt** zone displays the schedule in a graphical time line. The crew shift is listed on the left, and all tasks scheduled to it are displayed in the task area to right. The **Scheduled Tasks** zone displays a list of all scheduled tasks in work order sequence.

3. To take action on a scheduled task, right-click the activity in the **Schedule Gantt** zone and choose an option from the pop-up menu. Options may vary depending on your system's configuration. Standard options allow you to allocate, dispatch, defer, and unassign a task from the Gantt.

4. To view summary details for a scheduled task, right-click the task in the **Schedule Gantt** zone. Details are displayed at the top of the pop-up menu.

To navigate to the task's maintenance portal, right-click the task and then select **View Details** from the pop-up menu. You can also click the link for the task in the **Scheduled Tasks** zone.

Viewing Crew Shift Capabilities

Use the **Capabilities** tab on the **Crew Shift** portal to view a list of all capabilities currently allocated to this shift. This includes all distinct skills for allocated mobile workers and all distinct equipment for allocated vehicles.

1. Navigate to the **Crew Shift** portal in edit mode.

2. Click the **Capabilities** tab.

You cannot change any information on this tab. To change crew allocation, click the **Maintain Crew Allocation** link on the **Main** tab of the **Crew Shift** portal.

Working with Shift Weekly Templates and Crew Shift Templates

This section describes common tasks related to working with shift weekly templates and the crew shift templates associated with them.

Creating Shift Weekly Templates and Crew Shift Templates

Use this procedure to create a shift weekly template and a set of crew shift templates that make up the weekly template.

Prerequisites: Crew, shift type, service classes, break types, mobile workers, vehicles, service areas, and logon/off locations must have been previously defined.

1. Select **Main Menu** > **Resource Management** > **Shift Weekly Template+.**

2. Select the shift weekly template type and click **OK**.

Types of templates you might create include: common shift template, a shift template for a specific crew, and a crew's subscription to a common template.

3. Complete the fields in the **Main** section.

4. Click **Save**.

The **Shift Weekly Template** portal is displayed. The status of the new shift weekly template is pending.

5. Click the **Add Shift Template** link in the **Shift Weekly Template Calendar** zone title bar to add the first crew shift template.

The **Crew Shift Template** add/edit screen is displayed.

6. Complete the fields as appropriate.

7. Click **Save**.

The system returns you to the **Shift Weekly Template** portal.

8. Repeat the steps for each shift template you want to add.

Alternatively, you can select the crew shift template you just created and click the **Duplicate** icon in the **Shift Weekly Template Calendar** toolbar. Modify the copy and save.)

9. Click the **Review** tab to display a month's worth of potential shifts that would be generated if you applied the template.

   Use the scroll buttons to view the previous or next month. Click the **Broadcast** icon next to a shift to display its details in the **Crew Shift Preview** zone.

10. When you are satisfied with the shift weekly template, click the **Apply** button in the **Actions** zone of the **Shift Weekly Template** portal.

The status of the template is set to Applied. The system will generate future shifts immediately for the period beginning with the shift's effective date through the earliest of either the global planning horizon or the shift's expiration date, if specified. A shift weekly template monitor background process is responsible for generating shifts going forward.

Shift Weekly Template Search

Use this procedure to filter and search for shift weekly templates.

1. Select **Main Menu** > **Resource Management** > **Shift Weekly Template.**

2. Enter your search criteria on the **Shift Weekly Template Search** zone.

   You can search by crew ID and/or effective date. The system will find all templates effective on or after the date you enter.

3. Click on a template in the search results to navigate to the **Shift Weekly Template** portal.

   You can also click in the **Crew** column for any template listed to navigate to the **Crew** portal.

Maintaining Shift Weekly Templates and Crew Shift Templates

Use this procedure to view, edit, duplicate, or delete an existing shift weekly template and also to add and maintain the crew shift templates that make up the weekly template. To maintain a shift template, you must first access the shift weekly template from which it was created.

1. Select **Main Menu** > **Resource Management** > **Shift Weekly Template.**

2. Search for and select the shift weekly template you want to maintain.

   If the shift weekly template has an existing draft, the system automatically displays the draft, rather than the original. To get to the original, you must click on the original template link from the draft.

3. Note the status of the template.

   • If the status is Applied and the **Pending Draft Exists** link appears next to the status, you must enter your changes in the existing draft. Click the link to open the existing draft for editing. Use the **Show Differences** button to see the differences between the draft and the applied versions. You can also set the status back to Pending, which deletes the draft.

   • If the status is Applied and no draft exists, the system will automatically create a new draft template to store any new changes you make.

   • If the status is Pending, your changes will be made to the current pending template.

4. To edit shift weekly template details, click the **Edit** button in the **Actions** zone, then make your changes and save.

   To add and maintain shift templates, continue with the next step.

5. Review the **Shift Weekly Template Calendar** zone.

This zone displays a calendar that covers the weekly template period. Any crew shift templates already defined for this weekly template are displayed as colored bars spanning one or more days (the period of time covered by the shift template).

6. Click on the colored bar for the shift template you want to maintain.

    When you click a shift template, a set of toolbar icons is displayed above the calendar. (Hover the mouse over an icon to view a brief description.)

7. Click the icon for the action you want to take:

Edit	Navigates to the Crew Shift Template add/edit screen for the selected crew shift template. Make any desired changes and click **Save**. The system returns you to the **Shift Weekly Template** portal. To associate a break type with this template, click the **Add** link in the Break zone title. (When the template is applied and shifts are generated, the system creates breaks for the break types associated with the template.)
Duplicate	Makes a copy of the selected crew shift template. and then navigates to the add/edit screen for the copy. Make any desired changes to the copy and click **Save**. The system returns you to the **Shift Weekly Template** portal.
Delete	Deletes the selected crew shift template. You will be prompted to confirm the deletion.
Go To	Navigates to the **Crew Shift Template** portal. From there you can view the template details or use the buttons in the **Actions** zone to edit, duplicate, or delete the template. When you are done, return to the **Shift Weekly Template** portal.

8. Repeat steps 5-7 to maintain another crew shift template, or click the **Add Shift Template** link in the zone title bar to create a new one.

9. When you have made all necessary changes, click the **Review** tab to preview the shifts that would be generated if you applied your changes.

10. Check the **Overridden Shifts** zone to see if any shifts generated from this template have been modified manually and no longer match the template from which they were generated. These manual overrides will be lost if you apply this template.

11. If you are updating a draft shift weekly template, use the **Show Difference** button in the **Actions** zone to view a list of the differences between the applied and draft version of this template before you apply the template.

12. To apply your changes, click the **Apply** button in the **Actions** zone of the draft template's **Shift Weekly Template** portal.

Viewing Overridden Shifts

An overridden shift is one has been modified manually and no longer matches the template from which it was generated. The **Overridden Shifts** zone on the **Shift Weekly Template** portal displays a list of all overridden shifts for this template. If you apply the template, these shifts will be regenerated and any manual overrides will be lost.

To view details for an overridden shift, click the **Shift** link in the **Overridden Shifts** zone on the **Shift Weekly Template** portal.

Displaying Differences Between Draft and Original Templates

When you make changes to a template that has already been applied, the system automatically creates a new draft version of the template. It puts your changes in the draft version and leaves the original applied version unchanged until you manually apply the draft. Before you apply a draft template, you should view the differences between the draft and the original to make sure you want all changes applied.

To view differences, click the **Show Differences** button in the **Actions** zone of the Shift Weekly Template portal. The system displays a pop-up window listing each template that has been changed and the type of change (Deleted, Updated, or New). You may also want to preview the shifts that will be generated if the draft is applied. Use the **Review** tab on the **Shift Weekly Template** portal to preview shifts.

Navigating Between Original and Draft Templates

When the shift weekly template you are working with has an original version and a pending draft, you can navigate between them as follows:

- When viewing a draft template, click the **Original Template ID** link to navigate to the original template's maintenance portal.

- When viewing an original template, click the **Pending Draft Exists** link to navigate to the draft's maintenance portal.

Viewing the Capabilities for a Crew Shift Template

Use the **Capabilities** tab on the **Crew Shift Template** portal to view a list of all capabilities currently allocated to this shift. This includes all skills for allocated mobile workers and all equipment for allocated vehicles.

You cannot change any information on this tab. To change crew allocation, click the **Maintain Crew Allocation** link on the **Main** tab of the **Crew Shift** portal.

Reviewing Shifts to Be Generated

Use the **Review** tab on the **Shift Weekly Template** portal to review the shifts that would be generated if the current template is applied.

The **Shift Weekly Template Preview Calendar** zone displays the shift weekly template calendar for the current month based on the changes you have made but not yet applied.

- Use the scroll buttons to view the previous or next month's calendar.

- Click the **Broadcast** button next to a shift to displays its shift details in the **Crew Shift Preview** zone.

You cannot make changes from this tab. To make any changes, return to the **Main** tab.

Working with Common Weekly Templates

This section describes common tasks related to working with common weekly templates.

Subscribing Crews to a Common Shift Weekly Template

Use this procedure to subscribe crews to a common shift weekly template.

Prerequisites: Common shift weekly template, crew, shift type, service classes, break types, mobile workers, vehicles, service areas, and logon/off locations must have been previously defined.

1. 1. Select **Main Menu** > **Resource Management** > **Shift Weekly Template** .

   Alternately, you can select **Shift Weekly Template**+ and create a new **Subscription Shift Weekly Template** to subscribe one crew at a time.

2. Search for and select the appropriate common weekly template.

3. In the **New Subscriptions** zone, select a crew or multiple crews.

4. Click **Subscribe**.

5. Enter the **Effective Date** and **Expiration Date** for the subscription.

6. Click **OK**.

   The system lists the crew shift in the **Subscriptions** zone with options to process the subscription now, unsubscribe, or change the dates of the subscription.

7. Click **Process Now** next to each crew for which you want to immediately generate shifts for this crew.

   If you do not click Process Now, the crew shifts are automatically generated next time the shift generation batch processing is scheduled to run.

Unsubscribing Crews from a Common Shift Template

Use this procedure to remove crews from a common shift weekly template.

1. Select **Main Menu** > **Resource Management** > **Shift Weekly Template** .

2. Search for and select the appropriate Common Weekly Template.

3. In the **Subscriptions** zone, select a crew or multiple crews.

4. Click **Unsubscribe**.

   The selected crews are removed from the **Subscribed** list.

5. Click **Process Now** next to each crew for which you want to immediately delete all future shifts that may have been generated by the subscription.

   If you do not click **Process Now**, the crew shifts are automatically deleted next time the shift generation batch processing is scheduled to run.

Changing Subscription Effective Period

Use this procedure to change the effective period on crew subscriptions to common templates.

Prerequisites: Common template must be created.

1. Select **Main Menu** > **Resource Management** > **Shift Weekly Template** .

2. Search for and select the appropriate common weekly template.

3. Select the subscription you want to change in the **Subscriptions** zone.

4. Click **Change Dates**.

5. Enter the new **Effective Date** and **Expiration Date** for the subscription.

6. Click **OK**.

   The system lists the crew shift in the **Subscriptions** zone with options to process the subscription now, unsubscribe, or change the dates of the subscription.

7. Click **Process Now** next to each crew for which you want to immediately generate shifts for this crew.

   If you do not click **Process Now**, the dates are automatically updated the next time the shift generation batch processing is scheduled to run.

Working with Breaks

This section describes common tasks related to working with breaks.

Adding Breaks to Crew Shifts

You can add breaks to existing crew shifts.

Prerequisites: The crew shift must have been previously defined. (If you are creating a new crew shift, you must save the crew shift and then add breaks.) The break type must have been previously defined.

1. Navigate to the **Crew Shift** portal in edit mode.

2. Click the **Add** link in the **Breaks/Non Productive Tasks** zone title.

3. Select the break type and click **OK**.

4. Enter the start time for the break.

5. Click **Save**.

Viewing and Editing Break Tasks for a Specific Crew Shift

Use this procedure to view break tasks associated with a particular crew shift and edit the window start date and time for a break. (This is the only field you can edit.)

1. Navigate to the crew shift for which you want to view or edit breaks.

   All breaks defined for this crew shift are listed in the **Breaks** zone. You can also view scheduled breaks on the **Schedule** tab and on the **Scheduling Gantt** zone in the **CDI** portal.

2. Click the break in the **Breaks** zone.

3. Click **Edit**.

4. Enter the desired start date and time for the break window and click **Save**.

Working with Non Productive Tasks

This section describes common tasks related to working with non productive tasks.

Adding NPTs to Crew Shifts

You can add non productive tasks to existing crew shifts.

Prerequisites: The crew shift must have been previously defined. (If you are creating a new crew shift, you must save the crew shift and then add non productive tasks.) The non productive task type must have been previously defined.

1. Navigate to the **Crew Shift** portal in edit mode.

2. Click the **Add** link in the **Breaks/Non Productive Tasks** zone title.

3. Select a non productive task type and click **OK**

4. Enter the offset or window start time.

   These values determine the earliest time that the non-productive task can be scheduled to start after the start of the shift.

5. Select the location or specify address as applicable where the non productive task will occur. If not specified location is defaulted from the shift's crew if any.

6. Click **Save**.

Viewing and Editing NPT Tasks for a Specific Crew Shift

Use this procedure to view non productive task tasks associated with a particular crew shift and edit the window start date and time for a non productive task. (This is the only field you can edit.)

1. Navigate to the crew shift for which you want to view or edit non productive tasks. All non productive tasks defined for this crew shift are listed in the **Breaks/Non Productive Tasks** zone. You can also view scheduled non productive tasks on the **Schedule** tab and on the **Scheduling Gantt** zone in the **CDI** portal.

   Note: Since they represent a type of period of unavailability, NPTs are displayed on the map using the same generic POU icon. A POU is resource oriented and fixed in time whereas NPT is shift related and is offset based. However they both mark time not available to perform work and therefore use same icon.

2. Click the non productive task in the **Breaks/Non Productive Tasks** zone.

3. Click **Edit**.

4. Enter the desired offset or start date and time and location for the non productive task window. Adjust the address details as needed.

5. Click **Save**.

Non Productive Task Tasks

Use this procedure to start, complete or cancel a scheduled non productive task.

Prerequisites: To start a non productive task, it must have been dispatched to the crew and the previous task must have been finalized. To complete a non productive task, it must have been started.

1. Navigate to the **Non Productive Task** maintenance portal in any of the following ways

   - From the **Scheduling Gantt** in the **CDI** portal, right-click the non productive task and select **View Details** from the pop-up menu

   - Select **Main Menu** > **Resource Management** > **Crew Shift** and search for the crew shift to which the NPT is scheduled.

   - On the **Crew Shift** portal, click the **Schedule** tab and then click the **non productive task** link in the **Scheduled Tasks** zone. You can also click the non productive task in the **Crew Shift Schedule Gantt** and then select **View Details** from the pop-up menu.

2. Click the appropriate button in the **Actions** zone.

Action Button	Description
Start	Indicates that the crew is starting the NPT.
Complete	Indicates that the crew has completed the NPT and is ready for the next assignment.
Cancel	Indicates the crew is not going to take the NPT. This action cancels the NPT task and removes it from the crew shift schedule.

Working with Periods of Unavailability

This section describes common tasks related to working with periods of unavailability (POUs).

Creating Periods of Unavailability (POUs)

Use this procedure to create a recurring or non-recurring period of unavailability.

Prerequisites: The POU type must have been previously defined.

1. Select **Main Menu** > **Resource Management** > **Period of Unavailability+** .

   If your system supports more than one period of unavailability type, the system prompts you to select a type before continuing.

2. If the selected POU type supports recurring POUs, indicate whether or not this POU is recurring and click **OK**.

   For example, if you are creating a POU for a regular weekly meeting, check the **Recurring** check box. If you are creating a POU for a one-time event, leave the box unchecked.
   If you select Recurring, the system displays the **Period of Unavailability Template** screen; otherwise, the system displays the **Period of Unavailability** screen.

3. Complete the fields in the **Main** and **Address** sections.

   For template POUs, specify how often the POU occurs (every so many weeks) or the total number of occurrences of the POU within the effective period. (You cannot specify both.) For non-recurring POUs, these fields are not displayed.

4. Add the resources to which this POU applies.

The POU type defines which class of resource can be associated with this POU.

5. Add all service areas to which this POU applies.

   This is applicable to crew POUs only (that is, POUs for which the resource class is defined as Crew). Service areas selections are used to discourage the inclusion of this POU into a crew's shift schedule if the crew is working too far from the event that day. If you specify service areas, the scheduler will include the POU only in the schedule of crews covering these areas at the time of the event. If you do not specify any service areas, the POU applies to all service areas.

6. Click **Save**.

Period of Unavailability (POU) Search

Use this procedure to filter and search for an activity POU.

1. Select **Main Menu** > **Resource Management** > **Period of Unavailability** .

2. From the **Period of Unavailability Query** zone, enter your search criteria and click **Refresh**.

   You can search by any combination of scheduled by POU type, start date/time, resource class or ID, or POU location. If you enter multiple criteria, the system will search for POUs that match all search criteria.

3. In the search results list, click a POU to display the **Period of Unavailability** portal.

Maintaining POUs and POU Templates

Use this procedure to view or edit POUs and POU templates.

1. Select **Main Menu** > **Resource Management** > **Period of Unavailability** .

2. Search for and select the POU you want to maintain.

   To maintain a POU, click the link in the **Period of Unavailability** column. To maintain a POU template, click the link in the **Generated by Template** column.

3. Use the buttons in the **Actions** zone to update the object. The buttons that appear may vary depending on the POU's current status and your system's configuration. Standard action buttons are described below:

Action	Description
Cancel	Applies only to POUs (not POU templates). This action cancels the POU and any associated non-cancelled POU tasks generated from this POU. You cannot cancel a POU if any of its corresponding POU tasks are completed.
Delete	Deletes the POU or POU template. If you delete a POU template, the system deletes all POUs generated from it. If you delete a POU, the system deletes all its POU tasks, if any.
Expire	Only applies to POU templates. This action sets the expiration date for a POU template to the current date and sets the status to expired. POUs will no longer be generated from this template. All future POUs that were generated from this template after the expiration date will be deleted.
Activate	Only applies to POU templates. This action sets the status for an expired POU template to Active and sets the effective date to the current date. Once the POU is activated, the system will generate POUs from the template automatically, based on its effective date and your system's planning horizon.

4. Click **Save**.

   The system validates the action and displays an error if validation fails.

Viewing Overridden POUs

An overridden POU is one has been modified manually and no longer matches the template from which it was generated. The **Overridden POUs** zone on the **Period of Unavailability Template** portal displays a list of all overridden POUs for the current template. If you apply the template, these POUs will be deleted and regenerated, and any manual overrides will be lost.

To view details for an overridden POU, click the shift link in the **Overridden POUs** zone.

Working with Resource Route Replay

This section describes common tasks related to working with resource route replay.

Using Resource Route Replay

Follow these steps to use Resource Route Replay to monitor crew shift routes.

1. Select **Main Menu** > **Resource Management** > **Resource Route Replay** .

2. Search for and broadcast the appropriate crews and/or vehicles.

   If you want to see routes for multiple resources, select the **Broadcast** button for all of the resources you want to see. You can select up to 12 crews/vehicles.

3. Fill in **Date** fields and click the **Show on Map** button.

   The route of the resource you selected is shown on the map for the selected date range. If you selected multiple resources, each is shown in a different color on the map.

Working with Dispatchers

This section describes common tasks related to working with dispatcher records.

Creating Dispatchers

Use this procedure to create a dispatcher record.

Prerequisites: Dispatcher type, dispatch areas, key performance indicators must have been previously defined.

1. Select **Main Menu** > **Resource Management** > **Dispatcher+** .

2. Select the dispatcher type and click **OK**.

3. Complete the fields in the **Main**.

4. Add all dispatch areas. This dispatcher is allowed to monitor during their dispatcher shifts. (The dispatcher can select from this list when they log on to a shift.)

5. Add all key performance indicators this dispatcher can monitor during their dispatcher shifts.

6. Click **Save**.

Dispatcher Search

Use this procedure to filter and search for dispatcher records.

1. Select **Main Menu** > **Resource Management** > **Dispatcher.**

2. From the **Dispatcher Query** zone, enter your search criteria and click **Refresh**.

   You can search by first name and/or last name.

3. Click a dispatcher in the search results to navigate to the **Dispatcher** portal.

Maintaining Dispatchers

Use this procedure to edit, delete, duplicate or activate/deactivate an existing dispatcher record.

1. Select **Main Menu** > **Resource Management** > **Dispatcher** .

2. Search for and select the dispatcher record you want to maintain.

3. Use the buttons in the **Actions** zone to perform the desired action.

4. Click **Save**.

Working with Dispatcher Shifts

This section describes common tasks related to working with dispatcher shifts.

Logging on to Start a Dispatcher Shift

Use this procedure to log on to start a dispatcher shift.

You do not need to create a dispatcher shift in advance. The system creates a new dispatcher shift automatically when an authorized dispatcher logs on to the system from the **CDI** portal.

1. Select **Main Menu** > **Resource Management** > **CDI** .

   If you are already logged on to a dispatcher shift, the **CDI** portal is displayed and is populated with data you are responsible for monitoring during the current shift. Otherwise, the **Logon** button is displayed.

2. Click the **Logon** button.

3. Specify the settings to use for this shift, such as the date range for monitoring activities. The available settings may vary depending on your dispatcher profile.

4. Select which dispatch areas you want to monitor.

   The list of dispatch areas from which you can choose is predefined; you can only select dispatch areas you are authorized to monitor, based on your dispatcher profile. For each shift you work, you can select one, some, or all of these dispatch areas.

5. Click **Save**.

The system logs you on to the shift and displays the **CDI** tab for the current shift. You can now begin monitoring and managing tasks and crew shifts.

Dispatcher Shift Search

Use this procedure to filter and search for dispatcher shifts.

1. Select **Main Menu** > **Resource Management** > **Dispatcher Shift** .

2. If prompted, select the dispatcher shift business object and click **OK**.

3. Enter your search criteria.

   You can search by dispatcher and/or logged on date.

4. Click **Refresh**.

5. In the search results list, click the link for the dispatcher shift you want to view or edit.

Maintaining Dispatcher Shifts

Dispatchers can manage their current dispatcher shift directly from the **CDI** portal. Other authorized users can view and manage dispatcher shifts starting from the main menu.

If a dispatcher shift's status is Logged On, you can edit the shift details or change the status to Logged Off. If the status is Logged Off, you cannot modify the shift or its status.

1. To access the **Dispatch Shift** portal, do one of the following:

   - Select **Main Menu** > **Resource Management** > **Dispatcher Shift** , then search for and select the dispatcher shift you want to maintain.

   - From the **CDI** portal, click the **Shift** tab.

2. Use the buttons in the **Actions** zone to modify the shift:

   - Click **Edit** to edit the shift details, including the dispatcher areas to monitor during this shift. Enter your changes and click **Save**.

   - Click **Log Off** to change the status of this shift to logged off.

Service Management

This section describes concepts and procedures related to viewing and maintaining activities, tasks, alerts, override time windows, and remote messages.

Understanding Service Management

This section describes concepts related to service management.

About Activities

An activity is a task performed at a particular geographic location. Activities can be received from a host system or created in the base application. Each activity is defined by an activity type that identifies the skills and equipment required to work activities of that type and specifies how the activities should be dispatched, prioritized, scheduled and more.

Activity Details

An activity must specify the site address, which is the address of the actual entrance to the site of service. This may be different than the service address, where the work is performed. The scheduler uses the site address to optimize schedules and routes, and attempts to assign activities at the same site to the same crew. Depending on your system's configuration, valid geo-coordinates may be required for the site address.

An activity must specify at least one time window during which the activity should be scheduled. If the activity is an appointment, it specifies the time during which the appointment should be scheduled. When applicable a work profile associated with the activity type may also affect the time frame in which the activity is allowed to be worked. Refer to *About Work Profiles* for more information.

An activity must also provide customer contact information. Other requirements may exist, depending on your system's configuration.

Activity Work Flow

When an activity is received from the host (or created on the server), it is validated by the system. If critical errors are found, the activity is rejected or, if created locally, the activity will not be saved until the errors are corrected. If errors are found that can be corrected within Oracle Real-Time Scheduler, the activity is saved in an Issues Detected state. Once the issues are corrected, the activity will be available for scheduling.

Activities are typically assigned automatically to crew shifts by the scheduler. However, a dispatcher or other authorized user can override virtually any scheduling decisions made by the system, as long as it permitted by your system's configuration.

The scheduler carefully matches the location, required skills, and scheduling time window of each activity to the location, capabilities, and availability of crews. Some activities have appointments, indicating that the activity must be scheduled within an agreed-upon appointment period.

Until it is time to dispatch an activity, the scheduler may change the assigned crew several times to find a more optimal assignment. However, some types of work require that the crew assignment is stabilized some time before the shift starts. In these cases the activity type is configured so that these activities are allocated to the crew at some time before the start of the shift.

A dispatcher or other authorized user can override virtually any scheduling decisions made by the system, as long as the change is allowed according to configuration settings.

Before a crew starts their shift, they may preview their first few tasks for the day on their mobile device. The maximum number of tasks to preview is defined on their shift. Previewed tasks may be viewed, but no modifications are allowed.

When a crew starts their shift, they receive one or more of their scheduled tasks as per their shift drip mode configuration.

As the crew works each assignment, they update its status (from en route to on site, for example). The crew can also adjust the scheduled duration of an activity, from the field, if the activity takes much more or much less time than what was estimated. This type of update is sent back to the server so that the scheduler can adjust the crew's schedule accordingly.

If the crew captures digital content while in the field, it is sent to the server as an attachment of the activity which can be viewed in the **Attachment** zone of the **Activity** portal.

When the crew is finished working and they enter completion details, they update the status to "completed". The crew may also provide interim completion details and send them right away to the server even before fully completing the assignment.

Completion details are then sent back to the requesting host system.

Crew Procedures Before Starting Work

The activity type may specify procedure types that must be completed before a crew shift can start work on an activity. If this is the case, the crew will have to complete a form or questionnaire on their mobile device prior to starting the activity. Refer to *About Procedures* for more information.

Taking a Break While On Site

By default, breaks are never planned to be taken while the crew is on site performing work. However, some type of work may be too long to be performed straight without a break. If the activity type is set up to allow breaks to be planned while on site the scheduler plans such breaks accordingly. The crew is provided with a visual cue on the mobile device **Task List** as to whether an activity is scheduled with some break time while on site.

Activity Time Tracking

The system tracks important events related to an activity on the activity and assignment logs. This information can be used to summarize how much time was spent by the crew on travel, actual work, taking breaks on site and whether there was any wait time on site. You can configure the activity type to summarize that information and present it to the crew at activity completion time so they can review and adjust them as needed. Note that this feature is independent from timesheet functionality however if the crew has made adjustments to reported times they are included in the timesheet total adjusted times summary.

This feature is automatically enabled for *complex activities* as they tend to be long tasks during which a crew may have taken breaks on site and it is very important to keep track of an accurately reported work time to be subtracted from the overall complex activity.

Creating Activities in the Field

Crews have the ability to create new activities which may or may not be related to any existing activity on their schedule. This is useful when the crew is out in the field and come across an issue. The crew can choose to work the activity or send it in to the server to have it assigned to a crew.

Emergency Activities

Emergency activities must be scheduled as soon as possible, as such they must be sent to the scheduler as mandatory. Typically, such activities would be of an emergency activity type properly referencing a mandatory priority profile. If a situation arises where an activity's state is changed to become an emergency, the system ignores the parameters set on the activity type and sends the activity to the scheduler as mandatory emergency. The scheduler then allocates crew shift resources for the emergency activity irrespective of cost.

Activity Priority

The scheduler prioritizes activities based on their scheduling priority. The **Scheduling Priority** field provides a numerical value from 0.01 to 10 that establishes the importance of the activity type relative to other activities. 10 is the highest priority. Activities with a higher priority are scheduled vs. not scheduled, scheduled to an earlier shift, or scheduled earlier in the shift.

For example, if there are two connect activities, one at a hospital with a high higher priority and one at an seldom used warehouse with a lower priority, and multiple shifts, the higher priority hospital activity will get scheduled today and earlier in the day (whereas the lower priority one may not get scheduled on that day at all).

Typically an activity's scheduling priority is determined and posted onto the activity by the application but it may be sent in along with the activity if known to the host system. If not provided the system uses the activity's type configuration as well as a **Business Priority Number** if provided on the activity to determine the activity scheduling priority. Refer to *Determine Activity Priority* for more information.

When requests to add or update activities are sent from the host system, the business priority and scheduling priority can be included as part of the request. This also applies for appointment booking requests. If both values are included, the scheduling priority overrides the business priority number.

The scheduler applies a factor onto the activity's scheduling priority to calculate its priority over time. This factor is defined by a Priority Profile as a function over the activity's broad time window. The activity's type references the appropriate Priority Profile. Refer to *About Priority Profiles* for more information.

In the **CDI** portal, activities are sorted by their priority then by sort order. Emergency activities are still prioritized over all other activities, regardless of priority.

Sequence Locking

When the crew's shift uses **Drip Mode** set to **Standard** activities are worked on a route in sequence and once the activity is dispatched, the sequence is locked. The scheduler would not dispatch next activities before an activity that is already dispatched.

In situations where a user would want to allow a new task to be dispatched before tasks that have already been dispatched the **Ignore Sequence Locking** field can be set to "Yes". This allows the scheduler if needed to dispatch the activity before any other activities that are already dispatched. This is defaulted from the activity type when the activity is created but may be overridden on the activity as needed.

Expired Activities

Typically, if an activity has not been worked by the time its last effective time window expires, the scheduler stops attempting to schedule it. Depending on your configuration and business practices, activities of certain types may be configured to handle the situation as follows:

- Incorporate built in automatic extensions so that the scheduler will continue to try and schedule expired activities beyond the original effective time window by a set number of days or hours.

- If automatic extension is not allowed or exhausted the activity could be automatically canceled

- If automatic extension is not allowed or exhausted create a To Do for a user to make the necessary changes. Business rules handling expired activities reside in a plug-in associated with the activity's business object and is therefore customizable.

Handling Keys

If a key or card is needed to gain access to a work site or facility, the crew cannot start an assigned activity without it. These types of activities need to specify a **Key Identifier** and **Key Location Depot** in order to provide information about where the crew can pick up keys to gain access to the work site. Key pick up and drop off are handled using depots so that the system can incorporate into activities these additional tasks and travel. Handling keys using depots also allows the system to present crews with a list of keys or access cards to pick up before they start traveling to a work location. Once the crew has the key or card, the activity should not be assigned to another crew or resource. If a dispatcher attempts to change the assigned crew, he or she receives a warning.

The system creates a depot task to pick up the key as part of scheduling such activity. If the same crew has multiple activities that require them to pick up keys at the same location, the system is designed to create one task to pick up all of those keys when possible.

Activities that require keys are restricted to shifts that have the same logoff location as the location where keys are picked up. This is assumed to occur as part of the shift practices. The system does not validate whether or not a key was actually dropped off.

Activities already associated with depot to pickup or drop goods cannot use keys since an activity can only be in a single depot run. This means that there cannot be depot activities that require "goods" to be picked up from depot A and "keys" picked up from depot B. Then the activity would have to be in two depot runs to pickup both goods and keys. Refer to *About Depots and Depot Runs* for more information.

Time Zones

The activity's time zone is the time zone of its geographic location, i.e. where work needs to be performed. All date and time information on the activity and its assignment portals is entered and displayed in that time zone.

Navigating to the Activity Portal

You can access the **Activity** portal in any of the following ways:

- Select **Main Menu** > **Service Management** > **Activity** to display the **Activity Query** portal, then search for and select the activity you want to allocate.

- From the **CDI** portal, search for and select an activity in the **Activity** List.

- From the **CDI** portal, right-click on an activity displayed in the **Scheduling Gantt** and select **View Details** from the pop-up menu.

- From the To Do List, click in the **Message** column for a To Do entry associated with an activity.

- From the **Schedule** tab on the **Crew Shift** portal, do one of the following:

  - Right-click an activity in the **Crew Shift Schedule Gantt** and select **View Details** from the pop-up menu.

  - Click on an activity link in the **Scheduled Tasks** zone or **Rogue Assignments** zone.

- From the **Alert Queue**, click on an activity associated with the alert (activity-related alerts only).

- From the **Alert** Search portal for an activity-related alert, click the **Activity** link.

About Capabilities

A capability is a skill, equipment, or other attribute of a crew which makes the crew qualified to perform work. Typically, activities specify a list of capabilities that are required of any crew that will be scheduled to work the activity. The scheduler uses required capabilities along with location, and the scheduling time window of each activity to the current location, and availability of crews to determine which crew shift can perform the work.

An activity's required capabilities are typically defined on the activity type. In some instances it is necessary to specify the list of required skills and equipment on the activity. Specifying the capabilities on the activity overrides those specified on the activity type. For example, if a business is installing thousands of products, yet the skills and equipment needed to install product A is different from the skill needed to install product B. Rather than having to separate these products into different installation activity types, it would be efficient to simply define a generic "Install Product" activity type and specify the capabilities needed to install the specific product on the individual activity.

The **Crew Shift** and **Crew Shift Template** portals include a **Capabilities** tab which lists all capabilities currently allocated to a shift via its resources. This includes all distinct skills for allocated mobile workers and all distinct equipment for allocated vehicles.

About Resource Restrictions

By default activities are assigned to any available compatible resource. The following describes various options affecting the resources the scheduler considers for an activity.

- **Allowed Crews.** An activity can be restricted so that it can only be scheduled to a specific list of crews. This list might be sent from the host system or entered in the maintenance view of the activity. If there are no crews listed, all compatible crews are considered by the scheduler as usual. When specified, the scheduler selects only from this list, still considering all the usual service area and skill restrictions, when determining candidates to work the activity.

- **Fix to Crew.** Click the **Fix to Crew** button to restrict the activity to a specific crew. This overrides the allowed crew, if any. This would be used, for example, if a crew does not finish an activity but they want to retain the activity for future shifts. If, for instance, the activity is suspended and the crew has the parts or keys to complete the job, they can request to keep the activity with them so that they can work on it the next day or during a future shift. The crew can make this request when postponing, suspending or declining an assignment. At the end of their shift, each crew receives a reminder to review and mark activities they want to keep with them.
Dispatchers can also use the **Fix to Crew** action on the maintenance screen of the activity for the same purpose.

  Activities that are fixed to a crew are also highlighted in the CDI. The CDI also warns the dispatcher if he or she attempts to allocate to another crew an activity that has been retained. Note that this functionality is not applicable to emergency activities or complex activities.

If one activity in a job is fixed to a crew, all other activities are also fixed to same crew. In a partially completed job, only remaining non-worked activities remain in the job so that they can be rescheduled. The Job Activities zone displays all of the activities that were part of the original job.

- **Excluded Shifts and Contractor Capacities.** Shows the list of crew shifts and contractor capacities that not allowed to be assigned this activity. Shifts are excluded from performing the activity either when the crew declines it or a dispatcher decides to unassign the work from the crew or the contractor capacity.

    - Base package reason codes include:

        - Crew cannot reach the activity today.

        - Crew does not have the capability to work the activity. The crew would also be required to enter free-form comments to explain the capability mismatch. A to do is created for an administrative user to update the resource's capabilities to reflect actual capabilities. This ensures that future activities of this type are not assigned to the crew.

- **Excluded Contractors** lists any contractors that have declined the activity or are no longer allowed to perform the activity because they have failed to approve their commitment on time or were manually excluded by a user. Refer to *Understanding Contractor Management* for more information.

About Bound Work

A group of activities that have dependencies is referred to as "bound work". This includes jobs, chains, and assist activities. This section describes the various types of bound work and the dependencies created when activities are tied to each other.

Jobs

A job is a group of activities that need to be performed by a single crew during a single shift. Because of that functions performed on any activity that belongs to a job that may cause it to be rescheduled from its currently assigned shift affect the entire job. Examples include:

- Allocation to a shift

- unassigning from current shift

- deferring the schedule

- locking to depot

- booking

- rebooking

Similarly, If there is any scheduling issue for one activity on a job, all of the activities are disabled from scheduling until the issue is resolved. After resolution, all of the activities are rescheduled automatically by the scheduler.

The order in which the activities in a job should be performed is established as usual by their time windows. A scheduling order number may be specified to achieve a more explicit order. Notice that ordering should not contradict the time windows ordering.

The CDI provides a visual cue to indicate that an activity is part of a job and therefore has dependencies. This helps the dispatcher to be able to easily see how each activity is related.

In the **Activity** portal, if the activity belongs to a job, the **Job** zone lists all activities in the job in the order they should be performed, highlighting the current activity in that list.

The base product supports the interface of jobs from the host system. It does not provide means to compose such jobs in the application itself.

Chains

A chain represents linked activities where each activity is dependent upon the start or completion of another activity with dependency defined in terms of timing and assigned resource. Chains differ from jobs in that the activities and are not

bound to a specific shift, they are bound in time and can span multiple shifts. They are set up so that each activity depends upon the completion of the prior activity before it can start. In some cases the activity must be done within a certain amount of time after the completion of the prior activity and/or within a specified time window. For example, if there is a project to dig a trench, lay pipes, and fill the trench, chain might be set up as follows:

- A surveyor is scheduled to lay out the plan before the start of work

- Only after the surveyor is finished can the digging begin

- The pipes cannot be laid out until the trench is complete

- The trench cannot be filled until the pipe is laid

- and so on

A dependent activity can start within an offset range relative to the start or finish time of the parent activity. An activity can also be restricted so that it can only be worked by a crew other than its immediate parent activity or by a crew other than any of those assigned to activities in the entire chain.

The CDI provides a visual cue to indicate that an activity is part of a chain and therefore has dependencies. The user can then navigate to the special **Activity Dependency** portal for an overview of the entire project to which the current activity belongs. The portal provides a schematic view of the dependency hierarchy as well as a Gantt view of the scheduled activity in the chain supporting the main activity related dispatcher functions enabled on the main **CDI** portal.

If an activity belongs to a chain you can also navigate to the **Activity Dependency** portal from the **Dependencies** section of the **Activity** portal.

The following considerations apply for chains:

- An activity can only be immediately dependent on one other activity.

- A circular dependency is not supported, i.e. the activity cannot be dependent on itself even indirectly . (Example: A->B->C->A)

- Appointment booking, conditional booking and chooser requests can only be used for an activity in a chain if the activity does not have any other activities dependent on it.

- The time windows for a dependent activity must be wide enough to support its timing dependency constraints, including offsets, with its parent activity. This has to take into account potential early or later start of the parent activity. For example, assume activity B is scheduled to start an hour after activity A starts. Since activity A may start earlier than planned by more than one hour, activity B should be defined with time windows wide enough to accommodate a reasonable early start of activity A. In other words that applying an offset towards the actual start of activity A would still be within the time window for activity B.

If the scheduler finds conflicts because these considerations have not been followed, the whole chain (non-started part of it) is disabled and not scheduled.

The base product supports the interface of chain dependencies from the host system. It does not provide a means to manually compose such chains in the application itself, with the exception of assist activities.

Assist Activities

When a crew is unable to complete an activity and requires additional help from another crew, the dispatcher can create an assist activity and have it dispatched to another crew. The assist activity must be scheduled at the same time as the original activity so that both crews are on site at the same time. In addition it must be scheduled to a crew other than the original activity's crew. The original and assist activities are an example of a small chain dependency.

The scheduler will attempt to assign the assist activity to a suitable crew. However the dispatcher can also manually allocate it to any specific crew as needed. To do that the dispatcher could take advantage of the shift chooser query option which consults the scheduler for a cost based recommended list of shifts to choose from.

It is recommended to set up the assist activity to require manual acknowledgment by the assisting crew. This serves as notification that they are aware of the fact that they have been assigned to assist another crew.

Only specific activity types, as determined by configuration settings, can be created as assist activities.

About Complex Activities

Activities that require multiple shifts to complete are referred to as "complex activities" or "multi shift tasks" and are typical of, but not limited to, construction work.

The scheduler handles complex activities in the following ways:

- The activity is split into several crew visits to the site and progress is tracked per visit. Each visit is assigned to a shift. Work can be limited to the same crew, or multiple crews may be allowed. If the **Same Crew** value is set to "Yes" one crew should work the job from start to finish. This means that all visits for the complex activity would be planned to be performed by one crew.

- Visits are scheduled sequentially, one visit per shift, unless a user manually allocates them differently. Visits can overlap for a certain percentage of the time (for example to allow time for one crew to pass on or debrief another crew that is taking over the activity). All crew visit assignments as well as a list of all remaining visits are listed on the complex activity portal.

- The type of complex activity sets the average and minimum site time per visit. The scheduler splits the long task into visits of average length when possible but no less than the minimum requirement which may be used, for example, to allow the crew some time for setup and tear down.

- When a crew completes a visit, the crew or dispatcher can indicate whether the work is complete or adjust the remaining time if it is not complete. As a result, the scheduler re-optimizes the whole complex activity, and may add or subtract future visits and/or adjust their length. If more time is needed to complete the activity, the scheduler simply creates another visit or appends to an existing visit.

- Future planned visits are adjusted based on the remaining time indicated.

- Once the activity is complete, remaining visits are removed from the schedule and the activity cannot be extended.

- The host system is updated upon each visit and when the entire project is complete.

- Complex activities are considered mandatory work.

As an example, a complex activity might be set up that is 20 hours in length to be scheduled over 4 work days with the minimum visit time set as 2 hours. The scheduler would split the activity into 4 visits (visit 1 is 6 hours, visit 2 is 6 hours, visit 3 is 4 hours, and visit 4 is 4 hours).

The **CDI** portal provides a visual indicator for complex activity site visits.

> **Note:** Transfer of goods, appointment booking, conditional booking and site delay cannot be used with complex activities. They can also not be used for emergency work and are not eligible for capacity contracting.
> Also, a complex activity cannot be dependent on any other activity. They cannot be part of a chain dependency or part of a job dependency. Refer to *About Bound Work* for more information.

Complex Activity Time Tracking

Complex activities always allow the crew to review and adjust time spent on each visit. They also allow breaks to be taken while on site. Refer to *Taking a Break While On Site* and *Activity Time Tracking* in About Activities for more information.

About Activity Time Windows

This section describes the different time windows related to activities.

- **Effective Time Window (ETW)**: The time period within which an activity can be scheduled. This is typically sent from the host.

- **Preferred Time Window (PTW)**: The time period within which it is ideal to schedule an activity. This is typically sent from the host.

- **Arrival Time Window (ATW)**: A period of time within an activity's effective time window during which the activity is allowed to be scheduled, based on applicable rules, restrictions, or conditions.

- **Service Time Window (STW)**: A period of time within an activity's arrival time window during which it is preferable to schedule the activity.

- **Override Time Window (OTW)**: A period of time during which the default arrival time window for activities of a particular type is overridden.

The system uses time windows in the scheduling process in the following ways:

- Typically, an activity's effective time windows and preferred time windows are sent from the host and establish the broadest scheduling window. The activity type may allow effective time windows to be extended as per your business rules. Refer to *Expired Activities* for more information.

- Since some types of work may be restricted to certain times, each activity's effective time window is further broken down to one or more arrival time windows, representing a time period when the activity is allowed to be scheduled based on applicable restrictions.
  Override time windows, work profiles and public holidays can be used to define such restrictions. Refer to *About Work Profiles* for more information.

  Work Profiles define weekdays and times during which a specific type of work is allowed to be performed. Work calendar defines public holidays preventing work of a certain type. Both work profile and work calendar are specified on the activity type.

  In addition to these predefined restrictions, if at least one of an activity's effective time windows overlaps with an override time window defined for the activity type and activity service area, then the scheduling restrictions defined in the override time window are applied to the activity. Refer to *About Override Time Windows* for more information.

  > **Note:** The logic to calculate an activity's arrival and service time windows is defined in the activity business object's Update Time Windows plug-in, and is therefore customizable.

- The scheduler will honor an override as long as the activity has not been dispatched yet. If dispatching has not occurred, it will not schedule the activity to start or complete within an override time window. The activity may be scheduled late, but only as far as it does not overlap with an override time window.

- Dispatched activities that overlap with an override require manual intervention. The system provides a KPI algorithm to report these so that a dispatcher can recall them as needed.

- The arrival time windows are further broken down to one or more service time windows, representing the overlap between an arrival time window and a preferred time window.

The scheduler only considers an activity's arrival time window and service time window.

About Override Time Windows

An Override Time Window defines a period of time during which activities of a particular type are allowed or not allowed to be scheduled, overriding the default arrival time window for the activity itself. The override may be further restricted to activities within specific service areas.

For example, you might prohibit disconnects to be performed during certain periods of time.

When you define an override time window, you specify the time period during which the override applies, the service areas to which it applies (if you do not specify any, then it applies to all), and whether the activity type is allowed or not allowed during the override period.

The override is applied to all activities for which at least one their effective time windows overlaps with this override time window. Consider this example:

- Due to a backlog in repair and installation work, you want to limit the number of routine inspections performed for the next week.

- You create an override window that disallows inspection activities in all service areas between Monday at 8 am and Wednesday at 5 pm of the following week.

- An activity is received from the host for an inspection. Its effective time windows are Monday through Friday between 9 am and 2 pm on each day. The arrival time window is Monday through Friday between 9 am and 2 pm.

- When the override is applied, the activity is eligible to be scheduled only on Thursday or Friday between 9 am and 2 pm.

You can also use override time windows to allow an activity type to be scheduled during a holiday when it would otherwise not be allowed.

About Assignments

An assignment is a copy of an activity created by the system to track the assigned crew's progress in accomplishing the work. When the crew's shift has started, assignments are created by the system on the server and sent to the mobile device. An assignment is only created on the mobile device when the crew's shift has already started. Assignments are sent to the crew as a copy of the activity. The crew works on the copy and any updates made by them are updated on the activity.

If the crew uses an MDT, the assignment is also sent to the crew when the activity is dispatched and appears on the crew's task list.

As the crew works each task, they update the assignment's status. When they are finished working, they enter completions details and update the status to completed. When the assignment is completed by the crew, the associated activity is automatically completed on the server, unless concurrent assignments exist.

Typically, an activity is completed by the assigned crew. However, if the assigned crew does not complete the activity by the end of their shift, the assignment is automatically returned and the activity is rescheduled.

A dispatcher can update a crew's assignment if the crew is out of range or is not using an MDT.

The dispatcher or crew can also decline an assignment if the crew is unable to complete it for some reason. If an activity is declined because there is a capability mismatch or a missing capability, To-Do is created and assigned to the dispatcher. A declined activity cannot be rescheduled to the crew's current shift.

If your organization works with external capacity contractors, the system establishes an assignment record for the contractor company, in lieu of a specific crew, to represent the company's commitment of this activity to the contractor. Refer to *Understanding Contractor Management* for more information.

About Forced Recall

If a dispatcher attempts to take certain actions on an activity that is already dispatched to a crew, the system allows the user to proceed with the action and forcibly recall the activity from the crew. Forced recall applies to actions such as defer, allocate, and unassign.

For example, if a dispatcher allocates an already dispatched activity to another crew, the system warns that this action would result in a forced recall. If the dispatcher confirms the action, the system sends a recall message to the current crew and proceeds with allocating the activity to the other crew.

When the recall message is received on a crew's MDT device, the system determines whether the assignment is in a state that allows it to be recalled.

- If recall is possible, the assignment is returned on the device, removed from the crew's task list, and then returned on the server.

- If the recall is not possible because, for example, the assignment is already completed, then the assignment is not returned on the device and remains completed. This also means that the assignment is not returned on the server, so concurrent assignments now exist for the activity.

To avoid this situation, the dispatcher will typically contact the crew by phone or radio to make sure they do not perform the work. However, it is possible that both assignments could be completed. (For example, the first crew might arrive at the location, see that the work was already done, and then complete their assignment with no work details).

When an SMS crew receives a recall, they can either ignore it (if it's too late to recall, for example) or confirm the recall by sending a recall confirmation message back to the server. The recall message causes the assignment to be returned.

For a non-MDT crew, there is no method of confirming a recall. The system assumes that the dispatcher has contacted the crew and confirmed the recall verbally. The system does not wait for confirmation to return the assignment of a non-MDT crew.

Concurrent Assignments

If multiple assignments exist for the same activity, they are referred to as concurrent assignments.

Typically, only one crew is assigned to work an activity at any point in time. However, it is possible that multiple assignments could be created for the same activity if, for example, an activity has already been dispatched to a crew and the dispatcher needs to assign it to a different crew.

When the dispatcher allocates an already dispatched activity to another crew, the system warns the dispatcher that this action would result in a forced recall. If the dispatcher confirms the action, the system sends a recall message to the current crew and proceeds with allocating the activity to the other crew. If recall succeeds, the assignment is returned and no concurrent assignments exist. If the recall is not possible because, for example, the assignment is already completed, then the assignment is not returned on the device and concurrent assignments now exist.

Although the dispatcher will typically contact the crew by phone or radio to make sure they do not perform work for a recalled assignment, it is possible that both assignments could be completed. For example, the first crew might arrive at the location, see that the work was already done, and then complete their assignment with no work details.

If the system receives two finalized assignments for the same activity, the status of the activity changes to **Collision Detected** and a **To Do** entry is raised. The dispatcher (or who ever is assigned to resolve such issues) must review the assignments and choose which one to use to complete the activity.

About Field-Referenced Activities (FRAs)

If the system is unable to dispatch an assignment to a crew (typically due to poor connectivity), the dispatcher can contact the crew and verbally communicate the key details of the activity. The crew can create a field-referenced activity (FRA) on their MDT. The crew uses the FRA to record status updates and completion details.

The procedure works as follows:

1. The dispatcher receives an alert when the synchronization of an assignment to the crew's mobile device takes too long or fails.

2. The dispatcher clicks the **Voice** button on the Alert Queue. The system updates the status of the assignment to Dispatched and sets the status reason to Voiced. This action also cancels any further attempts to send the assignment to the crew, so the assignment won't exist twice on the device once the FRA is created.

3. The system navigates to the **Activity** portal and displays a message instructing the dispatcher to voice-dispatch the activity to the specified crew. To simplify the voice-dispatch, the system generates a relatively short alternate ID for the crew to use when creating the FRA.

4. The dispatcher communicates the information to the crew (typically via phone), and the crew creates a field-referenced activity (FRA) on the MDT using the alternate ID.

5. The crew works the FRA, updating its status as work progresses through completion, just like any other assignment.

6. When the crew's connectivity is reestablished, the system automatically matches the FRA to the corresponding activity using the alternate ID.

About Activity Attachments

Attachments provide additional information to support records within the system.

An attachment can be any file, such as a photo, a document with instructions or specifications, a spreadsheet, or any other supporting documentation. Several standard attachment file types are supported such as PDF, Word, Excel, or other document types.

Attachments might be linked to activity types for the purpose of providing supporting information and guidelines to crews when performing the type of work. A common use for attachments to activity types would be a set of instructions on how to perform the work or safety guidelines. Attachments that are created in the Attachments portal and attached to one or more activity types are referred to as "common attachments."

Links to these attachments are sent to the crew's mobile device along with a dispatched activity of this type so they can download their content on demand provided they are connected (to save bandwidth, time and storage space, etc.). Common attachments your organization prefers to always be available on the device can be explicitly added to the mobile application deployment as a designated deployment part that includes attachments. This way the crew does not need to manually download them each time.

A dispatcher can use the **Attachments** zone on the activity portal to attach files that are specific to an activity for the purpose of making it available to the assigned crew of for any other purpose. If an attachment is added to an activity that has already been dispatched, the system sends that attachment to the mobile device when the attachment is saved.

Crews using the mobile application can capture content or attach documents related to a specific activity in the field. These attachments are later on synchronized and uploaded to the server.

The **Attachments** zone on activities lists all attachments specific for the activity including those captured by crews in the field. If it is a complex activity, then attachments related to all its visit assignments are displayed.

The **Send to Crew** indicator allows you to determine whether or not the attachment is presented to the crew on the mobile device with the activity. For example, an attachment can not be required for work or of any interest to the crew in the field.

Links to all activity specific attachments, regardless of whether they were created in office or by a crew in the field, are made available to crews when the activity is dispatched so they can download their content on demand.

Activity Attachments on Mobile Devices

In the field, mobile users can upload and download attachments as needed to support their work. Assignments with attachments show a paperclip icon next to their entry in the mobile device **Task List** to indicate that an attachment is present.

Upload functionality is only available for laptops. For Windows Mobile and Android mobile devices, pictures or audio files (considered "captures") can still be attached and viewed, but not other types of files. Files that are uploaded in support of activities are included in the **Attachments** zone for the activity.

All attachments can be downloaded on all devices, however if the file type is not supported on the device, it cannot be opened or viewed.

The **Attachments** zone on **Activities** lists all attachments for the activity including those captured by crews in the field. If it is a complex activity, then attachments related to all its visit assignments are displayed. When created in the field, attachments are added to the **Attachments** zone after the attachment is uploaded back to the server.

If an attachment is added in the **Activity** portal to an activity that has already been dispatched, the system sends that attachment to the mobile device when the attachment is saved.

The **Send to Crew** indicator allows you to determine whether or not the attachment is presented to the crew on the mobile device with the activity. For example, an attachment might not be required for work or of any interest to the crew in the field.

About Alerts

An alert is a situation in which predefined condition(s) have been met that require user intervention. An alert is always related to either an activity or a shift that caused the condition.

The alert type defines the attributes and behavior associated with all alerts of that type, including:

- how the alert is raised

- how the system determines if the underlying issue has been resolved and the alert can be closed

- the threshold which causes the alert to trigger, such as the number of minutes the crew has to acknowledge an emergency alert before the alert triggers.

- how long before the alert expires (closes automatically after a period of time) or is recycled (is directed to another dispatcher if not acknowledged after a period of time)

- whether or not it can be closed manually

- whether the snooze feature is enabled for the alert and, if enabled, the length of the snooze period (snoozing removes an alert from the queue for a period of time and then re-issues it when the snooze period expires)
  You can also indicate whether the dispatcher can adjust the snooze time when assigned an alert of this type.

- e-mail address to be notified when alerts of this type cannot be assigned to a dispatcher

- whether or not the alert makes a sound when appears on the dispatcher's alert queue to help get the attention of the dispatcher (note: when the alert is displayed elsewhere, such as on the **Alert** portal, it does not make a sound, only on the alert queue)

When an alert is raised, it appears on the Alert Queue of the dispatcher assigned to the alert. (If no logged on dispatcher is found, an email is sent to the address defined on the alert type.) From the Alert Queue, users can take action on the alert (acknowledge or close it, for example) and can also navigate to the maintenance portal of the related shift or activity.

You can also manage alerts directly from the **Alert** maintenance portal.

Below are some examples of typical alerts:

- **Missed appointment alerts** are generated when an appointment has been missed.

- **Unacknowledged emergency alerts** are generated when a crew does not acknowledge an emergency alert within a specified period of time.

- **Crew Idle Alerts** are generated when the crew shift is idle for a specified period of time of time.

- **Synchronization Alerts** are generated when the crew does not receive a dispatched activity's assignment from the server within a specified period of time. The dispatcher can choose to cancel the synchronization process and voice the assignment details to the crew.

- **Cancel Activity Alert** is generated on an attempt, typically initiated by the host system, to cancel an activity that has been dispatched to the crew. This alert supports a special Force Cancel action that cancels the activity and closes the alert

- **Crew On Site For Too Long Alerts** are generated when the crew has been on site for "x" minutes since the estimated completion time.

- **Panic Alerts** are generated when a crew in distress presses the **Panic** button on their mobile device. These alerts are immediately assigned to an available dispatcher and should be given attention right away. If the mobile device has the capability, the alert is sent with the GPS location of the crew at the time that the panic alert was issued to better locate the crew on the map.

- **Timed Event** alerts are generated when a crew has created an event with an expiration date to indicate that the dispatcher should check on them if the event expires. This is used if the crew feels they may be in a dangerous or hazardous situation and would like higher visibility from the dispatcher. The alert only becomes in effect and shows up on a

dispatcher's alert queue once expired. If the crew manages to close the event before it has expired the alert is closed and does not appear on any dispatcher's alert queue.

How Alerts are Generated

An alert is associated with an alert type, which defines the behavior of alerts of that type. Each alert type represents a unique business condition to be checked and establishes a threshold used to generate alerts of this type.

For example, your system might generate an alert if an emergency activity is not acknowledged by a crew within 5 minutes.

Most alerts are generated when a monitoring process determines that the conditions for the alert have been met. For critical conditions, such as gas leaks or downed power lines, alerts can be generated in advance and set to become effective some number of minutes in the future.

An alert reports a problem related to an activity, a crew shift or a resource at a specific location.

How Alerts are Distributed

Alerts are distributed to users based on a set of business rules.

> **Note:** This topic describes the alert distribution rules configured for the base system. These rules can be customized during implementation to meet your organization's business requirements.

The system directs each alert to the most appropriate user currently available based on the following priority order:

1. A logged-on dispatcher who is currently monitoring a dispatch area covering the shift or activity related to the alert*

2. A logged-on dispatcher who is eligible to monitor a dispatch area covering the alert related entity

3. Any logged-on dispatcher*

4. If no logged-on dispatcher is found, an alert is issued to a supervisor, typically via email (using the email address specified in the alert type)

* If multiple dispatchers are eligible to receive the alert, the one with the least number of open alerts is preferred.

Alert Actions

The available actions for an alert vary depending on the alert type and its current state.

Common alert actions include the following:

- **Acknowledge**: Indicates that you have viewed the alert. If the **Minutes to Snooze** value for the alert type is greater than zero, the system removes the alert from the alert queue for this number of minutes and then reissues it.
  If an alert is not acknowledged within the time specified in the alert type, the system recycles it.

- **Close**: Closes the alert and removes it from the queue. This is only supported if the alert type supports manual close.

- **Voice**: For synchronization alerts only, this indicates that you want to voice-dispatch the activity. The system updates the activity status and then navigates to the **Activity** portal and displays a message instructing you how to voice-dispatch the activity.

- **Force Cancel**: Cancels the associated activity and removes the alert from the queue. This is only supported for cancel activity alerts.

About Alert Areas

Alert areas set up geographic areas that can be displayed on a map and that trigger an alert when resources enter or leave designated areas.

Such alerts are sent to the dispatcher monitoring the resource or closest service area to the alert location.

Select the **Map** tab to draw an area on the map to define the map boundaries of the alert area. Set alert areas to active or inactive as needed throughout the course of business by clicking the related action buttons in the **Record Actions** section. Active hazard areas appear as a layer on the **CDI** map.

Hazard Areas

Hazard areas establish a boundary or zone that, if entered, triggers an alert. If the most recent actual location of a crew or vehicle shows that they have entered the area, the system generates an alert. The hazard area supports an optional list of crew primary functions allowing you to limit the alert to crews performing certain types of work, as necessary.

An alert is generated when crews currently working these listed functions, if any, or any vehicles that are *not* part of any started shift enter the area. For example supervisors or other company workers might drive around, but are not identified in the system associated to a shift. These would trigger an alert if they enter a hazard area. If no restrictions are indicated, any crew that enters the area will cause the system to generate an alert.

Vehicle Leave Areas

Vehicle leave areas establish a boundary or zone where vehicles are prohibited from leaving. This type of alert area supports an optional list of vehicle types, or vehicle primary functions, allowing you to limit the alert to vehicles of a certain type only, as necessary.

An alert is generated when a vehicle of the listed types, if any, leave this area. This is typically used to track stolen vehicles or to make sure that crews are not using vehicles outside of designated work areas. If no specific vehicle types are defined, the alert applies for vehicles of any type.

Excluded Resources

The **Excluded Resources** zone lists all resources that have been manually excluded from alert processing for the specific alert area. Once presented an alert for a resource entering or exiting an alert area, a dispatcher may decide that the resource is allowed to be where it is and hence manually close that alert. Manually closing an alert adds the resource to this list which excludes the resource from getting additional alerts for that area. However, if for some reason alerts should be created again for that resource, click the **Remove** button to take that resource off of the exclusion list.

About Remote Messages

Remote messages are used to transmit data from the crew in the field to the main application on the server. This data includes shift and task completion details as well as shift and task status updates.

Remote message processing ensures against data loss by saving or 'persisting' all data sent from the device so nothing is lost when the application closes or another user logs on to a new shift. This is important because devices may be shared by multiple mobile workers -- one crew may send data and then leave for the day, and another crew may use the same device on a subsequent shift.

Messages from the crew are received continually throughout the day. If message processing fails at any time, a To Do entry is created for a user to review and resolve the problem. You can view the XML content of any message, try to reprocess the message as is, or edit the message content and then reprocess.

Note: Some errors may arise due to a concurrent attempt to update the same entity by another process and may resolve on their own when the system tries to process the message again. It is important to schedule the remote message monitor batch process to retry failed messages periodically. For example every 10 minutes or so.

Working with Activities

This section describes concepts and common tasks related to working with activities.

Creating Assist Activities

Use this procedure to create an activity for an alternate crew to provide assistance on an existing activity.

1. Open the **Activity** portal to the appropriate activity.

2. Click the **Assist** button.

3. Select an Activity Type for the assist activity and click **OK**.

   The system creates the assist activity and navigates to the **Activity** portal so that you can add a note to the crew if needed.

   You can either allow the scheduler to it to an available crew or you can manually allocate the activity to a specific crew.

   If the original activity has already started, which is typical in assist situations, the scheduler would attempt to dispatch it right away. You may also manually dispatch the activity as needed.

Viewing Activity Dependencies

Activities that have been created as part of bound work such as assist activities, jobs or chains, are dependent upon other activities. In the same way, a complex activity schedule is made of multiple visit tasks. There are different ways in which you can find out how an activity fits into a bound work structure or which other activities it is related to. Use the following methods to review activity dependencies.

1. Look for visual cues in the **CDI** for job or chain dependencies.

2. If an activity belongs to a job, you can view the entire job on the **Activity** portal.

3. If an activity belongs to a chain you can view the entire chain on the **Activity Dependency** portal which you can navigate to from **CDI** or **Activity** portal

4. View the entire complex activity schedule on the **Schedule** tab of the **Complex Activity** portal

Activity Search

Use this procedure to filter and search for an existing activity.

1. Select **Main Menu** > **Service Management** > **Activity** .

2. From the **Activity Search** zone, select the Query Option to use.

3. Enter your search criteria and click **Refresh**.

4. In the search results list, click in the **Activity** column of the activity you want to work with. To view an assignment associated with this activity, click an assignment in the **Assignments History** zone.

Editing Activities

Use this procedure to edit the details of an existing activity.

Some fields may not be editable, based on the activity's current status and your system's configuration.

1. Navigate to the **Activity** portal and display the activity you want to edit.

2. Click the **Edit** button in the **Actions** zone.

3. Enter your changes and click **Save**.

   If you change the address, the system recalculates the geocode coordinates.

If any errors are encountered while saving, the system displays the error messages at the top of the screen. You must resolve these errors before the changes can be saved.

If the activity is saved but issues are detected, the **Activity** portal is displayed and these issues are listed at the top of the **Activity** zone. You must resolve these issues in order for the activity. To resolve the issues, edit the activity to provide the necessary information, then click the **Validate** button.

Validating Activities

If an activity has issues that prevent it from being scheduled, you must correct them and then validate the activity.

You can only validate an activity if the system has detected issues.

1. Navigate to the **Activity** portal and display the activity you want to validate.

2. If you have not already corrected the condition causing the issues, do so now. (Click the **Edit** button in the **Actions** zone, then edit the activity details and save. Upon successful save, you are returned to the Activity portal.)

3. Click the **Validate** button in the **Actions** zone.

   The system will attempt to validate the activity. If validation succeeds, its status is updated and the activity is ready for scheduling. If the system still detects issues with the activity, the issues are displayed for your review. Repeat this process to resolve the issues and then revalidate.

Viewing Captured Content on an Activity

Use this procedure to review digital content that was captured or attached to the activity on an MDT and synchronized to the server.

Prerequisites: Content must have already been captured on the device and synchronized to the server.

1. Select **Main** > **Service Management** > **Activity**

2. Search for and select the appropriate activity.

3. Select the attachment you want to open from the Attachment zone.

   The attachment opens in the viewer needed to view the content. For example, if you are opening an image file, an image file viewer opens on your computer.

Adding an Attachment to an Activity

Use this procedure to add an attachment to an activity. Attachments that are added to activities can be sent to the crew whether or not the shift has already started.

You must have created the attachment and know its file location.

1. Navigate to the appropriate **Activity** record.

2. Click the **Add** link in the **Attachments** zone.

3. Choose the attachment format by selecting from the **Attachment Business Object** field and click **Ok**.

   This allows you to indicate whether the attachment is a spreadsheet, an image, video or audio, a text document, or any other file type available.

4. Enter the file name and description.

5. Indicate whether or not the attachment should be sent to the crew by setting the **Send to Crew** indicator.

6. Click **Save**.

7. Select the file to upload.

   Make sure that you select a file with the appropriate file type.

8. Click **Ok** .

Viewing or Opening Attachments

Use this procedure to view an attachment that has been added to an individual activity or in the **Attachments** portal.

1. Navigate to the record where the attachment was added.

   This could be the **Attachments** portal or an individual activity.

2. Click the **Open** button next to the attachment to directly open the file, or you can click the link for the attachment to open the **Attachment** record.

   If you open the **Attachment** record using the link you can edit, delete, view, or upload a new version of the attachment.

Editing Attachments

Use this procedure to edit an attachment that has been added to an individual activity or in the **Attachments** portal. When you edit an attachment you can only change the file name, description, and whether or not it is sent to the crew on an activity. If you need to replace the attachment file select the **Upload** button and browse to select a different file.

1. Navigate to the record where the attachment was added.

   This could be the **Attachments** portal or an individual activity.

2. Click the link for the attachment.

3. Click the **Edit** button.

4. Modify the attachment file name and description as needed.

   You can also change the **Send to Crew** indicator.

Replacing an Attachment File

Use this procedure to replace an attachment file that has been added to an individual activity or in the **Attachments** portal. If you need to edit the attachment file name select the **Edit** button.

1. Navigate to the record where the attachment was added.

   This could be the **Attachments** portal or an individual activity or activity type.

2. Click the link for the attachment.

3. Click the **Upload** button.

4. Browse to and select the new file then click **Upload**.

   The new file is updated anywhere the attachment is referenced.

Deleting Attachments

Use this procedure to delete an attachment that has been added to an individual activity or in the **Attachments** portal.

1. Navigate to the record where the attachment was added.

   This could be the **Attachments** portal or an individual record such as an activity or activity type.

2. Click the link to the **Attachment** record or click the delete icon.

   If you are accessing the Attachments portal, you have to navigate to the **Attachment** record to delete. Click the **Delete** button on this screen.

3. Confirm that you want to delete the attachment.

Activity Actions

This section describes the actions you can take to update an activity's status.

The actions available at any time depend on the activity's status, your user privileges, and your system's configuration. All valid actions can be performed from the **Activity** maintenance portal. Some actions, such as Chooser, Allocate, Dispatch, Defer, and Unassign can also be performed directly from the **CDI** portal. The following topics provide instructions for performing all standard activity actions.

Allocating Activities

Use this procedure to lock an activity to a particular crew's shift. Once an activity has been allocated, the scheduler can continue to optimize its scheduled time, but cannot assign the activity to another crew shift.

You can only allocate an activity if its current status supports it.

You can allocate an activity in several different ways, as described below.

Starting from:	You can:
CDI Scheduling Gantt zone or the **Scheduling Gantt** on the **Crew Shift** portal's **Schedule** tab	Do one of the following: • Right-click the activity in the task area and select **Allocate** from the pop-up menu. When prompted, specify the crew shift to which you want the activity allocated.

Starting from:	You can:
	• Click on an activity that is currently scheduled to one crew shift and drag it to another crew shift. This is not available if you are viewing a single shift (such as from the **Crew Shift** portal).
	• Select a shift then select **Allocate All** to allocate to the shift all activities that have been scheduled but not yet dispatched. This action does not close the shift.
CDI Activity Search zone	Do one of the following:
	• Click the check box to the left of one or more activities you want to allocate, then click the **Allocate** button. When prompted, specify the crew shift to which you want the selected activities allocated. (If you selected multiple activities, they will all be allocated to the same crew shift.)
	• Click the checkbox for one or more activities, then right-click a crew shift in the **Scheduling Gantt** zone and select the **Allocate** option. All checked activities will be allocated to the same crew shift.
Activity maintenance portal	Click the **Allocate** button in the **Actions** zone, then specify the crew shift to which you want the activity allocated.

The system validates the action and displays an error message if validation fails. You must resolve errors before the activity can be allocated.

Some validation checks result in warning messages. For example, a warning is displayed if the shift lacks a required skill; however, the system may still permit you to allocate the activity (based on your configuration).

If the activity has already been dispatched to a crew, a warning message notifies you that the activity will need to be recalled. You can continue the action or cancel.

If you confirm the action, the system completes the requested allocation and does the following:

- If the crew is using an MDT, the system attempts to recall the activity.

- If the crew is using an SMS device (cell phone), the system sends the crew an SMS message notifying them of the recall. It is the crew's responsibility to return the assignment.

- If the crew is not using any device (non-MDT), its assignment is automatically returned.

Allocating an Activity Using the Chooser

Use this procedure to view a list of recommended shifts for the activity and manually select the best shift to complete the work. The list is sorted by scheduling cost from lowest to highest, but you can click on any column to sort by as needed. You can also choose to relax some of the scheduling restrictions so that more shifts are considered by the scheduler. For example, removing skill compatibility allows the scheduler to return shifts that do not possess the skills that were indicated as required to perform the activity. You can also set the maximum number of shifts to return to prevent the scheduler from showing an unmanageable number of results.

You can use the chooser from several different locations, as described below:

Starting from:	You can:
CDI Scheduling Gantt or the **Scheduling Gantt** on the **Crew Shift** portal **Schedule** tab	Right-click on the activity in the task area, then select **Chooser** from the pop-up menu.
CDI Activity Search zone	Click the check box to the left of one or more activities you want to allocate, then click the **Chooser** button.
Activity maintenance portal	Click the **Chooser** button in the **Actions** zone.

Fix and Activity to a Crew

This action locks an activity to a specific crew.

Refer to *Resource Restrictions* for more information.

Cancelling Activities

Use this procedure to cancel an activity that has not been finalized.

You can only cancel an activity if its current status supports it.

1. Navigate to the **Activity** portal and display the activity you want to cancel.

2. Click the **Cancel** button in the Actions zone.

The system validates the action and displays an error message if the action cannot be completed. The activity is removed from consideration for scheduling and, if already assigned to a crew shift, will be removed from the crew shift's schedule.

Completing Activities with Concurrent Assignments

If multiple completed assignments are received for the same activity, the system will not automatically complete the associated activity. The dispatcher must decide which assignment to accept, and then complete the activity from that assignment's maintenance portal.

Prerequisites: Before you begin this procedure, make sure you have reviewed all assignments and have determined the correct one to use to complete the associated activity.

To complete an activity from an assignment, follow these steps:

1. Navigate to the **Activity** portal and display the activity you want to complete.

2. In the **Concurrent Assignments** section, click on the assignment you want to use to complete this activity.

3. Click the **Complete Activity** button in the **Actions** zone of the Assignment portal.

The system validates the action and displays an error if it cannot complete the activity.

Declining Activities

Use this procedure to decline an activity's current assignment on the server on behalf of a non MDT crew.

This procedure is only applicable for non-MDT crews. The dispatcher must act on behalf of the crew.

Starting from the ...	You can ...
Select the **Current Assignment** link on the activity.	Click the check box to the left of one or more activities you want to remove, then click the **Decline** button. The system opens the Decline Assignment pop-up window where you enter a decline reason and provide comments as needed.

A copy of the activity is sent to crew in the form of an assignment, so the crew works on the copy and any updates made by them are updated on the activity.

Deferring Activities

Use this procedure to put off the scheduling of an activity to a later date. When you defer an action, you change its original effective time window. This differs from the hold action, which puts an activity on hold and removes it from consideration for scheduling until you manually remove the hold.

You can only defer an activity if its current status supports it.

You can defer an activity in several different ways, as described below.

Starting from the ...	You can ...
CDI Scheduling Gantt zone	Click the **Defer** button in the **Actions** zone. When prompted, enter the deferment
CDI Activity Search zone	Right-click on the activity in the task area, then select **Defer** from the pop-up menu.
Activity's maintenance portal	Click the checkbox to the left of one or more activities you want to defer, then click the **Defer** button.

When prompted, enter the date to which you want the activity deferred, the reason for the deferment, and any other relevant remarks, then click **OK**. The system validates the action and displays an error message if the action cannot be completed.

If the activity is successfully deferred, its status is updated, indicating that the activity is ready for scheduling based on its adjusted arrival time window.

If the activity has already been dispatched to a crew, a warning message notifies you that the activity will need to be recalled. You can continue the action or cancel it.

If you confirm the action, the system completes the requested allocation and does the following:

- If the crew is using an MDT, the system attempts to recall the activity.

- If the crew is using an SMS device (cell phone), the system sends the crew an SMS message notifying them of the recall. It is the crew's responsibility to return the assignment.

- If the crew is not using any device (non-MDT), its assignment is automatically returned.

Dispatching Activities

Use this procedure to lock an activity's sequence in the shift schedule and mark it as ready to be sent to the crew.

You can only dispatch an activity if its current status supports it.

You can dispatch an activity in several different ways, as described below.

Starting from the ...	You can ...
CDI Scheduling Gantt zone or the **Scheduling Gantt** on the **Crew Shift** maintenance portal's **Schedule** tab	Right-click on the activity in the task area, then select **Dispatch** from the pop-up menu.
CDI Activity Search zone	Click the checkbox to the left of one or more activities you want to dispatch, then click the **Dispatch** button.
Activity's maintenance portal	Click the **Dispatch** button in the **Actions** zone.

The system validates the action and displays an error message if the action cannot be completed. If the action is successfully completed, the activity will be queued for dispatch to the crew's mobile device.

Please also note the following regarding dispatching activities:

- Activities are not actually dispatched until the assigned crew's shift has started. Until then, the activity is considered queued for dispatch.

- For an MDT crew, an activity is considered dispatched only upon receipt of acknowledgement from the crew's MDT.

- For SMS crews, an activity is considered dispatched once it is sent. For a non-MDT crew, queued activities are considered dispatched when the crew shift starts.

Putting Activities on Hold

Use this procedure to place an activity on hold if something needs to be done before work can be started. Putting a hold on an activity removes it from consideration for scheduling until you manually remove the hold.

You can only put an activity on hold if its current status supports it.

1. Navigate to the **Activity** portal and display the activity you want to put on hold.

2. Click the **Hold** button in the Actions zone.

3. Enter a reason for the hold and click **OK**.

   The system validates the action and displays an error message if the action cannot be completed.

When you are ready to remove the hold on this activity, navigate back to the **Activity** portal and click the **Schedule** button in the **Actions** zone.

Rescheduling Activities

Use this procedure to reschedule an activity that is currently queued for dispatch. This action effectively reverses a dispatch action taken on an activity, and indicates to the scheduler that the activity is no longer locked to its current location in the schedule.

If the activity was manually allocated, the scheduler cannot schedule the activity to a different crew shift but can still optimize its location in the schedule. If the activity was not manually allocated, the activity can now be scheduled to any crew.
You can only reschedule an activity if its current status supports it.

1. Navigate to the **Activity** portal and display the activity you want to reschedule.

2. Click the **Reschedule** button in the **Actions** zone.

The system validates the action and displays an error if it cannot complete the action. If the status is successfully updated, it is sent to the scheduler to be rescheduled.

Unassigning Activities

Use this procedure if you want to unassign an activity and send it back to the scheduling pool. If the activity is currently manually allocated, it becomes available for scheduling to any crew. If it is currently dispatched to a crew, then the system attempts to recall it from that crew. Once an activity is unassigned from its current crew's shift, the activity is never given back to the same shift. In addition to excluding the shift, unassigning also removes manual allocation to the shift.

You can only unassign an activity if its current status supports it.

You can unassign an activity in several different ways, as described below.

Starting from the ...	You can ...
CDI Scheduling Gantt zone or the **Scheduling Gantt** on the **Schedule** tab of the **Crew Shift** portal	Right-click on the activity in the task area, then select **Unassign** from the pop-up menu.

Starting from the ...	You can ...
CDI Activity Search zone	Click the checkbox to the left of one more activities you want to unassign, then click the **Unassign** button.
Maintenance portal for the activity	Click the **Unassign** button in the **Actions** zone.

The system validates the action and displays an error message if the action cannot be completed. If the activity is successfully unassigned, it will be available for rescheduling. You can manually allocate the activity to another crew shift or let the scheduler assign it.

If the activity has already been dispatched to a crew, a warning message notifies you that the activity will need to be recalled. You can continue the action or cancel.

If you confirm the action, the system completes the requested action and does the following:

- If the crew is using an MDT, the system attempts to recall the activity.

- If the crew is using an SMS device (cell phone), the system sends the crew an SMS message notifying them of the recall. It is the crew's responsibility to return the assignment.

- If the crew is not using any device (non-MDT), its assignment is automatically returned.

Removing Allocation

Select the **Remove Allocation** button to make sure that the activity is no longer allocated to any shift. Notice that unlike the unassign action, this action does not impact an already dispatched activity and therefore does not issue any recall. If the activity is already dispatched then this would only affect its schedule if the crew has not performed the work and it is later on returned and rescheduled.

Excluding Contractor

This action excludes the currently assigned contractor group from working the activity.

Refer to *Resource Restrictions* for more information.

Reverting to Company

This action marks an activity as allowed to be performed only by company resources. This action may be used when an activity is eligible for contracting but for some reason the dispatcher needs to revert it back to company only crews.

Requesting an Assisting Crew

This action requests an assisting crew to help with the work of an activity. A new activity is created for the assisting crew of a specific activity type. The current activity and the assisting crew's activity are bound as a chain so that the scheduler plans their arrival accordingly.

Refer to *About Bound Work* for more information on activity dependency.

The list of activity types to use for the assisting activity shows only activity types marked as allowed to be used as such.

Viewing Activity Schedule Information

Use the **Schedule** tab on the **Activity** portal to view current scheduling details for an activity.

These values cannot be changed.

When scheduled, the **Schedule** tab displays the crew shift to which this activity is currently scheduled, as well as the sequence in which this activity is expected to be worked with respect to other tasks currently assigned to the scheduled shift. Additional schedule details include the calculated travel time and distance from the previous task on the shift schedule, and the calculated or actual arrival, start, and completion times. If there are any scheduling warnings or errors associated with this activity, they are also displayed.

If the activity should be scheduled but is not the system displays the reason.

Viewing and Updating Assignments for an Activity

Use this procedure to view and update assignments associated with an activity.

1. Navigate to the **Activity** portal and display the activity you want to work with.

   The current assignment is displayed in the **Main** section of the **Activity** portal. The **Activity Display** zone also displays the following:

   • A link to the assignment used to complete the activity, if applicable

   • Any concurrent assignments, if applicable

   • A list of completed assignments, if the activity's status is collision detected

   All assignments associated with this activity are also listed in the **Assignments History** zone.

2. Click the assignment you want to view or edit.

3. Use the buttons in the **Actions** zone of the **Assignment** maintenance portal to perform valid actions on an assignment.

   The buttons that are displayed at any time depend on the current status of the assignment and your system's configuration. The table below describes a set of standard action buttons.
   These actions apply when the assignment is for a crew shift:

Button	Description
En Route	Indicates that the crew is currently on its way to the activity.
Arrived	Indicates that the crew has arrived at the activity address but has not yet started work. This can be used if there is some delay for the crew in starting.
Started	Indicates that the crew has started work.
Postpone	Indicates that the crew has not yet arrived on site to the location and must postpone work on the assignment. After you click **Postpone,** you will be prompted to enter the reason for postponing and the date and time to which the work will be postponed. The activity remains assigned to the crew, allowing them to return to it later on. . At this time the system provides you with the option to also keep the activity with you for a future shift if you are not able to complete it during your current shift.
Suspend	Indicates that the crew arrived on site and started work, but was unable to complete it. After you click **Suspend**, you will be prompted to enter the reason for suspending and the date and time to which the work will be postponed. You must also indicate how much time is still required to complete the work. The activity remains assigned to the crew, allowing them to return to it later on. At this time the system provides you with the

Button	Description
	option to also keep the activity with you for a future shift if you are not able to complete it during your current shift.
Work Done	Indicates that the crew completed work, but completion details have not been entered yet. (This is typically used by an SMS crew or by a dispatcher on behalf of a non-MDT crew.) When completion details are available, you can enter them and then complete the activity.
Complete	Indicates that the crew has completed work and all completion details have been entered. Enter completion details before clicking the **Complete** button. If there is no collision with another assignment, the activity is also completed.
Complete Activity	Use this action to complete an activity using the completion information contained in this assignment. This action is only available if an activity has more than one completed assignment. The dispatcher must first choose which assignment to accept and then click the **Complete Activity** button from that assignment's maintenance portal.
Decline	Use this action to return this assignment so it can be rescheduled. During rescheduling the system provides you with the option to also keep the activity with you for a future shift if you are not able to complete it during your current shift.

These actions apply when the assignment is for a contractor capacity:

Button	Description
Approve	Indicates that the contractor has agreed to take on this activity.
Complete	Indicates that the contractor has completed work and all completion details have been entered. Enter completion details before clicking the Complete button. If there is no collision with another assignment, the activity is also completed.
Decline	Indicates that the contractor has either declined taking on the activity committed to them or failed to approve their commitment is a timely manner.

Viewing and Processing Alerts

You can manage alerts using the Dashboard Alert Queue or the **Alert** maintenance portal.

Alert Search

Use this procedure to filter and search for a particular alert.

The **Alert** Portal is used only on an as-needed basis for investigating a particular alert or for audit purposes. The Alert Queue is the primary tool for viewing and managing alerts.

1. Select **Main Menu** > **Service Management** > **Alert** .

2. Enter your search criteria in the **Alert Query** zone.

   You can enter any combination of alert type, creation date, dispatcher, activity, or shift. You can also limit the search to include or exclude finalized alerts.

3. Click **Refresh**.

4. From the search results, do one of the following:

   • Click the **Alert** link to navigate to the **Alert** maintenance portal.

   • Click on the related entity column to navigate to the corresponding portal.

Defining Alert Areas

Use this procedure to define an area that can be represented on a map.

1. Navigate to the **Main Menu** > **Service Management** > **Alert Area+** .

   You can also navigate to the portal and click the **Add** link.

   If your organization has configured any custom skill business objects, you may need to select one.

2. Select the appropriate value for the **Alert Area Business Object** field and click **OK**.

   For example, you may select whether this is a hazard area or a vehicle leave area.

3. Enter a unique descriptive name and a description.

4. Complete the remaining fields according to your business processes.

5. Click **Save**.

   Next you can select the **Map** tab to draw an area on the map to define the map boundaries of the alert area. Refer to *Defining Map Areas on Alert Areas* for more information.

   Note you must also create a corresponding alert type for the alert area.

Defining Map Areas on Alert Areas

Use this procedure to draw, on a map, the area represented by the defined alert area.

1. Navigate to the appropriate alert area.

2. Click the **Map** tab.

3. Draw a shape on the map to define the geographic boundaries of the area.

   Click the **Draw** button and select a shape to begin drawing.

   Click the **Edit Text** button to modify the geocoded coordinates, as needed. You can also zoom in and out on the map or pan around the map using the tools on the left.

4. Click **Save**.

Working with Override Time Windows

This section describes common tasks related to working with override time windows.

Creating Override Time Windows

Use this procedure to create an override time window.

Prerequisites: The activity type and service areas must have been previously defined.

1. Select **Main Menu** > **Service Management** > **Override Time Window+** .

2. Select the type of activity to which the override applies.

3. Enter the start and end time for the time window.

4. Indicate whether activities of this type should be allowed or not allowed during this time period. (Use the Allowed option if you want activities of a particular type to be scheduled on a holiday, when they would otherwise not be allowed.)

5. Select one or more service areas to which the override applies.

   If you do not select any, the override applies to all service areas.

6. Click **Save**.

The system checks to see if any existing activities would be affected by this override time window. (The override affects all activities for which at least one of their effective time windows overlaps with the override time window.) If any such activities exist, the system notifies you how many activities would be affected and asks if you want to continue. If you confirm the action, the system saves the override time window, recalculates the time windows for all affected activities, and resends the activities to the scheduler if necessary. If you cancel the action, the override time window is not saved.

Override Time Window Search

Use this procedure to filter and search for existing override time windows.

1. Select **Main Menu** > **Service Management** > **Override Time Window** .

2. Enter your search criteria in the Override Time Window Query zone.

   You can enter any combination of activity type, start date/time, end date/time or service area.

3. Click **Refresh**.

4. Click the override time window you want to work with from the search results.

Maintaining Existing Override Time Windows

Use the buttons in the **Actions** zone of the **Override Time Window** portal to maintain existing override time windows.

1. Select **Main Menu** > **Service Management** > **Override Time Window** .

2. Search for and select the override time window you want to maintain.

3. Use standard actions to edit, delete, and cancel the time window.

Working with Remote Messages

This section describes tasks related to working with remote messages used to transmit data from the crew in the field to the main application on the server.

Remote Message Search

Use this procedure to filter and search for crew messages.

1. Select **Main Menu** > **Service Management** > **Remote Message** .

2. Enter your search criteria and click **Refresh**.

   You must enter a processing date and time for the search. The system will search for all messages processed on or after that date. You can also search by the user or MDT associated with the message.

3. Click on a message in the search results to navigate to the **Remote Message** maintenance portal.

Viewing, Editing, and Retrying Remote Messages

Use this procedure to view remote messages from crews. If an error occurred while processing the message, you can retry the message. You can also edit the XML content before resending. You cannot create a new remote message.

1. Select **Main Menu** > **Service Management** > **Remote Message** .

2. Search for and select a message.

   The **Remote Message** portal displays the message content is in XML format.

3. Click the **Edit** button in the **Actions** zone to modify the XML content of the message.

   Be sure to maintain the integrity of the message structure and conform to the message's schema.

4. Click the **Retry** button to reprocess the message.

   The system will attempt to reprocess the message. If the action is successful, the message's status changes to Processed and the **Retry** button is removed from the screen; otherwise, the status Error status remains unchanged and the **Retry** button is displayed again.

Dispatcher Functions (CDI)

This section describes concepts and procedures related to the dispatching functionality. Most dispatcher functions are performed from the **Common Dispatching Interface (CDI)** portal, which provides a single point of interaction for monitoring and managing tasks, crew shifts, and KPIs. You can also view and manage alerts and To Do entries from dashboard zones without ever leaving the **CDI** portal.

Understanding Dispatcher Functions

This section describes concepts related to dispatcher functions.

About the CDI Portal

The **CDI** portal helps dispatchers effectively manage day-to-day operations and facilitates communication with crews in the field. The CDI supports context-based decision making for handling exceptions that arise during the day. Although the system automatically schedules and dispatches tasks to available and qualified crews (based on your system's business rules), a dispatcher can override virtually any decision made by the system to handle special situations.

The system provides two versions of the **CDI** portal:

- The main **CDI** portal that is displayed after you log into your dispatcher shift.

- The KPI-Specific **CDI** portal that is displayed when you click on an actionable KPI from the **KPI Summary** zone on the main **CDI** portal.

Both **CDI** portals contain the same zones and look similar, but the data represented in each portal is different.

About the Scope of Data

The scope of data refers to the crew shifts and tasks for which data is displayed in the **CDI** portal.

When a dispatcher logs on to a shift, they select which dispatch areas to monitor and, depending on their user privileges, they may also be able to set the range of dates to monitor. These settings determine which tasks and crew shifts will be displayed on the **CDI** portal and also which alerts will be directed to the dispatcher for situations requiring attention or manual intervention. If the dispatcher changes these shift settings during a shift, the scope of data changes.

Crew Shift Data Scope

A crew shift is considered within the dispatcher's data scope when its service areas and service classes are covered by at least one of the dispatch areas currently being monitored and one of the following is true:

- The crew shift is currently logged on
- The crew shift's status is planned and its planned time window falls within the dispatcher shift's monitoring period

Contractor Capacity Data Scope

This is only relevant if your organization uses the contractor management functionality. A non canceled contractor capacity is considered within the dispatcher's data scope when its service areas and service classes are covered by at least one of the dispatch areas currently being monitored and it overlaps with the dispatcher shift's monitoring period. Refer to *Understanding Contractor Management* for more information.

Activity Data Scope

An activity is considered within the dispatcher's data scope if its service area and service classes are covered by at least one of the dispatch areas currently being monitored and at least one of its arrival time windows is within the monitoring date range for the dispatcher shift. In addition, any activity scheduled to a shift or a contractor capacity in the dispatcher's data scope, regardless of dispatch area eligibility, is also considered in scope.

KPI-Specific CDI Data Scope

The dispatcher can further limit the scope of data by clicking a KPI link in the **KPI Summary** zone. The system displays the KPI-Specific CDI, which shows crew shifts and tasks related to the selected KPI. For example, if you were to click on an Appointments in Jeopardy KPI, the KPI-Specific CDI might display all appointment tasks that were in danger of being missed. (The logic used to narrow down tasks and shifts for a KPI is defined in the KPI's calculation algorithm KPI and can be customized.)

Map Data Scope

The map's scope of data is the same as the scope of data for the portal from which it was launched (either the main CDI or the KPI-Specific CDI).

Time Zones

On the CDI date/time information of all shifts and tasks is displayed in the user's time zone, by default. The user can toggle to display in other time zones as needed.

About the KPI Summary

The **KPI Summary** zone on the **CDI** portal displays a summary of key performance indicators (KPIs) that the dispatcher is responsible for monitoring.

Key performance indicators (KPIs) are quantifiable measurements that support dispatcher decision making and in-day exception handling. KPIs are associated with either activities or crew shifts. For example, an activity-related KPI might

indicate the number of appointments in jeopardy of being missed. A shift-related KPI might indicate the number of out-of-service crews.

If action is required to resolve a KPI, you can navigate to the KPI-specific **CDI** portal, which displays only tasks and crew shifts related to the KPI. The KPI-specific **CDI** portal displays the **Scheduling Gantt** and **Activity Search** zones as on the main CDI, but with a potentially narrower scope of data. From the KPI-Specific portal, you can take action on specific tasks and crews to resolve the underlying problem.

For example, if you clicked on a Crews Out of Service KPI in the KPI Summary, a KPI-Specific **CDI** portal would show a list of out-of-service crew shifts. You could then view and change the shift status or reallocate activities as needed.

The KPI Summary uses colors and icons to help dispatchers easily identify KPIs that need their attention. Color coding is fully customizable. Typically, green indicates normal KPI values; red is used for values that fall outside a pre-defined range and require immediate attention; yellow is used for warnings and to indicate a potential problem.

About the Scheduling Gantt

The **Scheduling Gantt** zone on the **CDI** portal displays a graphical representation of the crew shift schedules you are monitoring, and allows you to take action on scheduled tasks.

This zone displays monitored crews and activities in a time line. Crew shifts appear on the left. Their schedule of tasks appears in the **Gantt** view on the right. A vertical line down the **Gantt** indicates the current date and time.

In the basic / non-customized display, the crew and shift date and time are indicated on the left, and the schedule of tasks appears on the right. You can add information to view on the left panel by selecting **Customize Columns** in the toolbar. You can also filter the crew and shifts that you see by selecting **Filter**. On the shift schedule, icons, colors, symbols, and other graphical elements provide visual cues to information available regarding the crew's shifts and activities.

View and manipulate the information that you see in the Gantt display using the following:

Column Sort

Click column headings to sort by multiple columns and reorder the columns as necessary.

Right-Click Options

Right click on any element within the **Gantt** display to reveal actions and options such as **Show on Map**, **View Details**, **Allocate**, and so on. Right click options change depending on the element that you click.

The Toolbar

Use the toolbar to perform functions such as zooming in and out on the scheduler, jumping to a date or time, opening the CDI map, customizing columns, or changing the time zone. These tools are described in detail below:

- **Time Zone**: When applicable, you can change the time zone by selecting from the drop down next to the Customize Columns icon.

- **Zoom In/Zoom Out**: Adjusts the task area to show a narrower/broader time frame.

- **Go To Date Time**: Scrolls the Gantt view to a selected date and time.

- **Go to Now**: Scrolls the Gantt view to the current date and time.

- **Show Map**: Launches the CDI Map (or switches focus to it). Symbols displayed on the map provide information about the type of task or crew. The definitions of the icons are described on the map legend.

- **Filter**: Refines the crew and shifts that are displayed in the schedule view according to any criteria such as; by activity information, by capability, by coverage, by resource, by emergencies, or by custom filters that you save. You can test a filter before applying it into your Gantt. These filters can be saved to a list that you can easily select to toggle the display based on different filters and preferences that you have defined. Select **Save Current** to store your filter to your

list of filters which you can refer back to later. Filters cannot be saved as your default view since it is a best practice to review all the information in your scope of data before applying filters.

Note that filtering does not affect the underlying scope of data the dispatcher monitors, and as such does not affect the data displayed on **CDI** map, only the **Gantt** display.

- **Customize Columns**: Change the look and organization of your Gantt view by selecting **Customize Columns** then **Change Display**. Select which columns you want to see on the left hand panel or sort and filter by field resources, crews and shifts. After the display is changed, you can use the other **Customize Columns** options to save the display for easy access later (**Save Display**) or make that display the default view that opens whenever you open the CDI portal (**Set as Default**). Access your listing of saved displays by selecting **My Displays**. Note that saved columns and saved filters work independently. Filters that are applied when you save a column layout will not be saved with that column layout.

Contractor Crew Symbol

The ⬤ symbol next to the crew name indicates that this is a contractor crew.

Shift States, Tasks Types and Activity Information

Information such as whether a task is scheduled or clustered, representation of administrative tasks, breaks or depot visits, and activity dependencies are represented with icons on the schedule.

- Scheduled task: Uses a preceding travel time line from previous task.

- Task fixed to a crew

- Activity allocated to current shift contractor capacity

- Activity dependent on another activity

- Depot visit

- Break

- Administrative tasks

- Clustered tasks: Tasks of the same class and state with minimal or no idle time in between. Activities requiring special attention are never clustered. You cannot perform actions on clustered tasks; expand them first using the + icon in the **Shift** column.

General notes about the task bar:

- A fixed shift that has not yet started is displayed using a frame in the planned color.

- If the shift is variable and has not yet become fixed, the variable broad shift duration is displayed as an underlay to the planned duration in the variable time color.

- The planned start/end of a shift is displayed as an underlay on started shifts in the same color as the planned shift.

- If the shift enters overtime, the remainder of the shift is drawn using the configured overtime color.

- The length of the task bar represents the task's duration.

- The line preceding a task represents the travel time for the crew to get to the task.

- The color of the task indicates its status.

- If you right-click a task, detailed information about the task is displayed at the top of the pop-up menu, followed by a list of available options. Options may vary depending on the class and status of the selected task and your system's configuration. Clustered tasks do not have a popup menu.

- To select multiple contiguous tasks, hold down the shift key and select the tasks. Refer to *About the Task Schedule Area* to see standard options.

Colors and Frame Borders

Task bars are colored based on the state of the task. The underlying shift time period is also colored based on the shift state.

An activity may be enclosed in a frame that conveys additional information:

Emergency: An emergency activity.

Regular: A non-emergency activity.

Appointment: An appointment activity.

Scheduled: The task is considered scheduled when the scheduler places it in a specific work sequence on a crew shift schedule. Scheduled tasks may be clustered.

Non-Scheduled: The task is allocated to the crew, but has not been incorporated by the scheduler into the crew's schedule. When a user manually allocates an activity to another crew, the scheduler must find a place on the new crew's schedule. During the time it takes to do that, the task is stacked at the end of the new crew's schedule, with no travel time from the previous task (since it is not yet sequenced in the route and the previous task is not know yet). Likewise, if a break is added to a crew shift but has not yet been incorporated into the schedule yet, the break is stacked at the end of the schedule.

Deferred: This indicates that the activity was deferred to a future time, and the scheduler has not yet processed the deferment and provided a new schedule for the task.

About the Scheduling Gantt Left Pane

In the default view, the left hand pane on the **Scheduling Gantt** zone displays the crew name and the associated shift start date and time. It also displays an icon indicating whether the crew is using a mobile device or SMS to work their shift and the current state of the crew, i.e. whether they are out of range, enroute to an activity, working on site out of service, etc.). If any of the tasks for a shift are clustered, an **Expand Shift** button is also displayed.

This pane supports the following actions:

- Alter the display to filter by field resources, crew, shift and so on. Click the *Customize Columns* icon to alter the pane.

- Click on a crew shift to navigate to its maintenance portal.

- Click the **Expand Shift** (+) button to expand all clustered tasks for this crew shift.

- Right-click a crew shift to display detailed information about the crew shift, such as its primary function and crew allocation. This information is displayed at the top of the pop-up menu, followed by a list of available options. The available options may vary depending on the selected shift and your system's configuration. Standard options include:

Crew Menu Option	Description
Allocate	Allocates the activities currently selected in the **Activity Search** zone to this crew shift.

Crew Menu Option	Description
	Allocating an activity locks it to a particular crew shift. Once an activity has been allocated, the scheduler can continue to optimize its scheduled time, but cannot assign the activity to another crew shift.
Allocate All	Allocates all of the activities scheduled to the selected shift that have not yet been dispatched . Allocating all does not close the shift.
Chooser	Allows you to access the **Chooser** directly to view a list of recommended shifts for the selected activity.
Close	Closing a shift allocates to the shift all activities that have been scheduled to it but not yet dispatched. Once the shift is closed the scheduler cannot add any more work nor remove any allocated work from the shift. The dispatcher is also provided with the opportunity to dispatch the entire schedule of the shift also as part of closing the shift.
Open	Opening the crew shift allows the scheduler to add more work to the shift again. However, it does not remove the existing allocations.
Send Mail	Sends a message to the selected crew using the internal messaging system.
Expand Shift	Expands (unclusters) all clustered tasks for this crew shift, and re-clusters any previously expanded shift. Only displays if the shift contains clustered tasks.
Show Crew on Map	Displays the location of this crew in the open map window. (The map window must have already been launched. This action switches to the map window and focuses on the selected crew.) The crew's location is determined by the latest GPS data or its last known or estimated location.
Show Route on Map	Draws the route for this crew shift in the map window. (The map window must have already been launched.)
Hide Route on Map	Removes the route for this crew shift from the map. (The map window must have already been launched.)
View Details	Navigates to the maintenance portal for this crew shift.

About the Task Schedule Area

The task schedule area of the **Scheduling Gantt** zone displays all scheduled tasks for each crew shift listed in the **Crew** pane. Tasks appear across a time line. A red vertical line indicates the current date/time.

Each task bar uses visual cues to convey information about the task.

> **Note:** The colors, shapes, borders, and icons used to convey information are customizable. You can refer to the embedded help for the **Scheduling Gantt** zone for a list and descriptions of the actual cues used in your system if your implementation has updated the embedded help to reflect how these elements were configured. For options delivered in the base package, refer to *About the Scheduling Gantt* .

To select multiple contiguous tasks, hold down the shift key and select the tasks.

Standard options include:

Task Menu Option	Description
Dispatch	Marks all selected tasks as ready for dispatched. If the shift is not started, the tasks will remain queued for dispatch. If the shift has started, the system attempts to dispatch the selected tasks to the crew.

Task Menu Option	Description
Allocate	Prompts you for the crew shift to which you want the selected activities allocated, then allocates them. Allocating an activity locks it to a particular crew shift. Once an activity has been allocated, the scheduler can continue to optimize its scheduled time, but cannot assign the activity to another crew shift.
Chooser	Allows you to access the **Chooser** directly to view a list of recommended shifts for the selected activity.
Defer	Prompts you for the reason for the deferment, the date to which the selected activities should be deferred, and any relevant comments. Deferring an activity modifies its arrival time window to a future date.
Unassign	Unassigns the activity and sends it back to the scheduling pool. If the activity is currently manually allocated, it becomes available for scheduling to any crew. If it is currently dispatched to a crew, then the system attempts to recall it from that crew.
Show on Map	Displays the selected task on the map. (The map window must have already been launched. This action switches to the map window and focuses on the selected task.)
View Details	Navigates to the maintenance portal for the selected task.

About Clustered Tasks

If a crew shift contains multiple tasks of the same class and status, and those tasks have a short period of idle between them so they can be viewed as "back to back," then the system collapses the individual tasks into one clustered task in the **Scheduling Gantt** task area.

> **Note:** Other business rules apply that may prevent a task from being clustered. For example, an emergency activity is never clustered, nor is an activity in the KPI-Specific CDI that contributes to a KPI. Clustering rules are customizable.

You cannot perform actions on clustered tasks; you must expand them first using the Expand (+) icon in the **Shift** column on the **crew** pane or right-click the shift and select **Expand Shift**. When you expand clustered tasks for one shift, the system unclusters all tasks for that shift and clusters tasks for all other shifts (where applicable).

About the Activity Search Zone

The **Activity Search** zone on the **CDI** portal displays a list of activities within the current scope of data, and allows you to search, sort, and filter the list. You can perform standard dispatching functions on one or more selected activities displayed in the list or navigate to the maintenance portal of any activity listed.

Click one of the displayed results to highlight that item in the **Scheduling Gantt** zone.

When the **CDI** portal is initially displayed (after logon), the **Activity Search** zone displays a list of activities that are within the dispatcher's data scope and that require attention. This list includes all non-finalized emergencies and all unassigned activities that are due on or before today's date. Activities are displayed in the following order:

1. Emergencies
2. Priority Profile Sort Sequence
3. Creation Date/Time

Other tools in the **Activity Search** zone include:

- **Filtering**: You can filter by information such as general activity information including hierarchy levels for the involved crews or service areas, activity type, service area, etc; activity due date; activity scheduled date; other activity identifiers and so on.

  Note: Note that the filters in the **Activity Search** do not affect the filters or display in the **Scheduling Gantt** view.

- **Highlight Scheduled Activity**: Use the binoculars icon to highlight an activity in the Gantt if it is scheduled to a crew.

- **Actions**: Once you have a listing of the appropriate activities according to your search, you can use the buttons to perform actions on one or more selected activities such as Allocate, use the Chooser, Defer, Dispatch, Unassign, or Remove Allocation.

- **Navigation**: Click on an activity in the list to navigate to that specific activity.

- **Map**: Use the map icon to show an activity on the map.

About the KPI-Specific CDI

Key performance indicators (KPIs) are quantifiable measurements that support dispatcher decision making and exception handling. KPIs are associated with either activities or crew shifts.

The KPI-Specific **CDI** portal is similar in appearance to the general **CDI** portal, but only displays data related to a particular KPI. This is useful for troubleshooting the underlying conditions that contribute to the KPI. This portal is displayed when you click on an actionable KPI. (Actionable KPIs display as hyperlinks in the **KPI Summary** zone.)

From the KPI-Specific **CDI** portal, you can view and manage crew shifts and activities just as you would from the general **CDI** portal.

About the CDI Map

The CDI Map allows you to view the location of activities, meetings and non productive tasks, crews, and vehicles on a map. You can also view the route a crew will travel during its shift, based on the shift's currently scheduled tasks.

The location of a vehicle is determined based on its last known GPS location if any. The location of a crew is determined by its last known or estimated location Each task uses it own specified location for display on the map.

For consistency, the CDI map shows the same route as used by the scheduler when creating the schedule. This allows the dispatcher to see an accurate depiction of the crew's actual work route.

The map is started from the **Show Map** toolbar button in the **CDI** portal. A box in the upper right hand corner of the map window displays a set of checkboxes, representing the different types of objects that can be displayed on the map. Each type is referred to as a map layer. You can display or hide layers by checking or unchecking these boxes. For example, if you check the administrative box, the map displays all meetings and other non productive tasks within the current data scope. (The map's scope of data is the same as the scope of data for the portal from which it was launched (either the main CDI or the KPI Specific CDI). Some layers are initially checked, and thus displayed, by default. The layers that are displayed initially by default vary depending on where the map was launched from, i.e main Gantt display or KPI Gantt. All CDI map layers are defined using **CDI Map Layer** extendable lookup which also includes a customizable indication as to whether the layer is displayed by default when applicable.

- The **Clear All** button clears all route lines, if any are displayed, and also clears the latest marker of a crew or task shown on map

- The **Refresh** button updates the map with the latest available data.

- The **Legend** icon in the lower right-hand corner of the map window can be expanded to show the icons used to represent different objects on the map.

The map interface works similar to other common mapping programs. You can pan and zoom using the icons in the upper left-hand corner of the map window. You can also click and drag any point on the map to move its position within the map window.

When you hover over a point on the map that is related to a shift or task, the system displays detailed information about the object in a context window.

About the CDI Shift Tab

Use the **Shift** tab on the **CDI** portal to log on or off a dispatcher shift and select which dispatcher areas to monitor for the shift. Depending on how your system in configured, you may also be able to select the dates of tasks to monitor.

Occasionally, as part of the shift, a dispatcher might be responsible for backing up another dispatcher by monitoring that dispatcher's alerts. Any dispatcher shift can be configured with a list of user IDs that the current dispatcher is backing up when these users are away. Alerts assigned to these dispatchers also appear on the current dispatcher's backup alert queue.

About the Contractor Capacity Tab

This tab is displays activities by contractor and according to status such as committed, completed, and remaining capacity.

Capacities represent an external contracting company's agreement to take on a certain amount of work of a certain type in specific service areas for a period of time. The tab is only accessible if your company uses contractor functionality and the dispatcher's data scope includes contractor capacities. Refer to *Understanding Contractor Management* for more information.

About Managing Exceptions

When an alert is raised, it appears on the Alert Queue of the logged on dispatcher assigned to handle the alert.

The **Alert Queue** appears on the dashboard area when at least one alert is assigned to the current user. As a dashboard zone it is guaranteed to always be present regardless of where a user has navigated in the system. Refer to *About Alerts* for more information.

In the same way, the **Backup Alert Queue** appears in the dashboard area when at least one alert exists for another user the current logged on dispatcher is backing up. Refer to *About the CDI Shift Tab* for more information.

Also on the dashboard area is the **To Do In Scope** zone that summarizes open To Do entries related to entities in the dispatcher's data scope by To Do Type. Users can drill-down to the **Dispatcher To Do List** portal to review issues of a specific type.

Managing your Dispatcher Shift

This section describes common tasks related to managing your dispatcher shift.

Logging On to Start a Dispatcher Shift

You can log on to start a dispatcher shift directly from the **CDI** portal.

You do not need to create a dispatcher shift in advance. The system creates a new dispatcher shift automatically when an authorized dispatcher logs on to the system from the **CDI** portal.

1. Select **Main Menu** > **Service Management** > **CDI** .

    If you are already logged on to a dispatcher shift, the **CDI** portal is displayed and is populated with data you are responsible for monitoring during the current shift. Otherwise, the **Logon** button is displayed.

2. Click the **Logon** button.

3. Specify the settings to use for this shift, such as the date range for monitoring activities. The available settings may vary depending on your dispatcher profile.

4. Select which dispatch areas you want to monitor.

   The list of dispatch areas from which you can choose is predefined; you can only select dispatch areas you are authorized to monitor, based on your dispatcher profile. For each shift you work, you can select one, some, or all of these dispatch areas.

5. Click **Save**.

The system logs you on to the shift and displays the **CDI** tab for the current shift. You can now begin monitoring and managing tasks and crew shifts.

Changing the Date Range for Dispatch Monitoring

Use the **Shift** tab on the **CDI** portal to view and change the initial date and the date range of activities and crew shifts to monitor during your current dispatcher shift.

> **Note:** One or more fields on this tab may be set to read-only, indicating that you are not allowed to change these settings.

When you change any date settings, the system automatically updates the scope of data for the **CDI** portal and all its zones.

Changing the Dispatch Areas to Monitor

Use the **Shift** tab on the **CDI** portal to add or remove dispatch areas to monitor during the current shift.

> **Note:** The list of dispatch areas from which you can choose is predefined; you can only select dispatch areas you are authorized to monitor, based on your dispatcher profile. For each shift you work, you can select to monitor one, some, or all of these dispatch areas.

When you change the dispatch area selections, the system automatically updates the scope of data for the **CDI** portal based on your selections. These selections also determine which alerts and To Do entries you will receive during your shift.

Backing Up Another Dispatcher

Use the **Shift** tab on the **CDI** portal to back up another dispatcher.

1. From the **CDI** portal, click the **Shift** tab.

2. Click **Edit**.

3. Search for or enter the User ID of each dispatcher you will back up during your shift.

4. Click **Save**.

Alerts assigned to these dispatchers will also appear on your backup alert queue.

Logging Off a Dispatcher Shift

Use the **Shift** tab on the **CDI** portal to log off a dispatcher shift.

1. From the **CDI** portal, click the **Shift** tab.

Although dispatchers access their current shift directly from the **CDI** portal, other authorized users can access a dispatcher shift by selecting **Main Menu** > **Resource Management** > **Dispatcher Shift** , then searching for and selecting the logged-on dispatcher shift they want to maintain.

2. Click **Logoff**.

The system logs off the shift and redistributes any open alerts to another eligible dispatcher.

Managing Tasks and Crews using the CDI

This topic describes procedures related to managing tasks and crews using the CDI.

Using the Scheduling Gantt

This section describes tasks related to using the **Scheduling Gantt** zone on the **CDI** portal.

Viewing Task Details from the Scheduling Gantt

To view summary details about a task, right-click the task in the task schedule area. Detailed information displays for the selected task(s) at the top of the pop-up menu. To navigate to the task's maintenance portal, right-click the task and then select **View Details** from the pop-up menu.

Viewing the Crew Shift Details from the Scheduling Gantt

To view summary details about a shift, right-click the shift in the **Crew** pane. Detailed information displays for the selected shifts(s) at the top of the pop-up menu. To navigate to the crew shift's maintenance portal, click the **Shift** link. You can also right-click the shift in the **Crew** pane and then select **View Details** from the pop-up menu.

Customizing Columns in the Scheduling Gantt

Change the look and organization of your Gantt view by selecting **Customize Columns** then **Change Display**. Select which columns you want to see on the left hand panel or sort and filter by field resources, crews and shifts. After the display is changed, you can use the other **Customize Columns** options to save the display for easy access later (**Save Display**) or make that display the default view that opens whenever you open the CDI portal (**Set as Default**). Access your listing of saved displays by selecting **My Displays**. Note that saved columns and saved filters work independently. Filters that are applied when you save a column layout will not be saved with that column layout.

Filtering the Scheduling Gantt

Click the **Filter** icon to refine the list of crews and shifts that are displayed in the schedule view according to any criteria such as; by activity information, by capability, by coverage, by resource, by emergencies, or by custom filters that you save. Select **Save Current** to store your filter to your list of filters which you can refer back to later. Filters cannot be saved as your default view since it is a best practice to review all the information in your scope of data before applying filters.

Filtering the Scheduling Gantt by KPI

To see only those crew shifts and tasks that are related to a KPI, click the link for the KPI in the **KPI Summary** zone on the **CDI** portal. The KPI-Specific **CDI** portal is displayed, and its **Scheduling Gantt** zone is filtered by the selected KPI.

Setting the Display Date for the Scheduling Gantt View

You can jump directly to any date (within the period of time you are monitoring) and display crew shifts and tasks beginning with that date. To scroll the **Scheduling Gantt** view to a specific date and time, click the **Go to Date Time** toolbar icon, then enter the desired date.

To scroll to the current date, click the **Go to Now** toolbar icon.

Zooming In and Out in the Scheduling Gantt View

Use the **Zoom In** and **Zoom Out** buttons on the **Scheduling Gantt** toolbar to adjust the time frame.

Zoom In: Adjusts the task area to show a narrower time frame (for example, from 12 hours to 6 hours), thus expanding the task bars.
Zoom Out: Adjusts the task area to show a wider time frame (for example, from 3 hours to 6 hours), thus compressing the task bars.

Using the Activity List

The **Activity Search** zone on the **CDI** portal allows you to search for activities and take action on them.

From the **Activity Search** zone, you can:

- Find the activities you want to work with.

- Use the action buttons to update the status of selected activities. (Check the box to the left of each activity you want to update before you click the action button.) The available actions may vary depending on your system's configuration.

- Click the **Activity** link to navigate to the activity's maintenance portal.

- Click the **Show on Map** icon to display the selected activity on the **CDI Map**. (You must have already launched the map using the **Show Map** button. **Show on Map** switches to the map window and focuses on the selected activity.)

Activity Search

Use this procedure to filter and search for activities in the **CDI** portal.

1. Access the **CDI** portal for a logged on dispatcher shift.

2. From the **Activity Search** zone, select the Query Option to use.

   You can only search for activities within the current scope of data.

3. Enter your search criteria and click **Refresh**.

Filtering the Activity List by KPI

To see only activities related to a particular KPI, select the link for the KPI in the **KPI Summary** zone on the **CDI** portal. The KPI-Specific **CDI** portal is displayed, and its Activity list is filtered by the selected KPI.

Using the CDI Map

This section describes common tasks related to using the **CDI Map** .

Launching the CDI Map

The **CDI Map** can only be launched from the **Scheduling Gantt** zone. Click the **Show Map** toolbar icon on the **Scheduling Gantt** zone to start the map.

The map opens in a separate window. When initially loaded, the scope of data displayed in the map is the full scope of data you are monitoring in the **CDI** portal. Use the check boxes in the upper right-hand corner of the map window to include or exclude specific layers (types of objects) from the map display.

> **Note:** You must launch the map before you can use the **Show on Map** options to display specific crews, activities, or routes on the map. After launching the map, leave the map window open and return to the **CDI** portal to use these options.

The map's scope of data is the same as the scope of data for the portal from which it was launched, either the main CDI or the KPI-Specific CDI.

Displaying Activities on the Map

You can display all activities within the current scope of data on the map, or choose a particular activity to display. You can also display only activities related to a particular KPI.

1. If the map window is not already open, click the **Show Map** toolbar icon on the **CDI** portal to launch the map.

   By default, the map shows all activities for the dispatch areas and dates you are monitoring.

2. To focus the map on a particular activity:

   • Leave the map window open and then return to the **CDI** portal.

   • Right-click on an activity in the **Scheduling Gantt** task area, then select **Show on Map**.

3. To display only activities related to a particular KPI:

   • Click the **KPI** link in the **KPI Summary** zone to display the KPI-Specific CDI.

   • Click the **Show Map** button on the **Scheduling Gantt** toolbar (in the KPI-Specific **CDI** portal, not the general **CDI** portal). The map window is displayed with data filtered by the selected KPI.

4. To display detailed information about the object in a context window

When you hover over a point on the map that is related to a task (or a crew shift), the system displays detailed information about the object in a context window.

Displaying Routes on the Map

Use this procedure to display the route for a crew shift on the map.

1. If the map window is not already open, click the **Show Map** toolbar icon on the **CDI** portal to launch the map.

2. To focus the map on the route for a particular crew shift:

   - Leave the map window open and then return to the **CDI** portal.
   - Right-click on a crew in the **Scheduling Gantt** crew pane, then select **Show Route on Map**.

3. Use the **Clear All Routes** button in the map window to remove the route display.

Displaying Crews on the Map

You can display all crews within the current scope of data on the map, or choose a particular crew to display. You can also display only crew shifts related to a particular KPI.

1. If the map window is not already open, click the **Show Map** toolbar icon on the **CDI** portal to launch the map.

2. Check the **Crews** box. The map displays all crews within the current scope of data.

3. To focus the map on a particular crew:

   - Leave the map window open and return to the **CDI** portal.
   - Right-click on a crew in the **Crew** pane, then select **Show Crew on Map**.
   - Select **Show on Map**. The map window is displayed showing the location of the crew or the activity related to the alert.

4. To display only crews related to a particular KPI:

   - Click the **KPI** link in the **KPI Summary** zone to display the KPI-Specific CDI.
   - Click the **Show Map** button on the Scheduling Gantt toolbar (in the KPI-Specific **CDI** portal, not the general **CDI** portal). The map window is displayed, and the data is filtered by the selected KPI.

When you hover over a point on the map that is related to a crew shift (or a task), the system displays detailed information about the object in a context window.

Clearing All Routes

Use the **Clear all Routes** button on the **CDI Map** page to clear all route lines from the map. This button is displayed only if route lines are currently drawn on the map.

Monitoring KPIs

Use the **KPI Summary** on the **CDI** portal to view and manage the KPIs you are responsible for monitoring.

1. Review the KPIs listed in the **KPI Summary** zone.

2. Click a KPI link to view the KPI-Specific **CDI** portal, which displays only tasks and crew shifts related to the selected KPI.

3. Review the information and take action as needed.

- Right-click a task in the **Scheduling Gantt** task area, then select the desired option from the pop-up menu. To navigate to the task's maintenance portal, select **View Details** from the pop-up menu or click the activity link in the **Activity** zone.

- Right-click a crew in the **Scheduling Gantt** crew pane area, then select the desired option from the pop-up menu. To navigate to the crew shift's maintenance portal, select **View Details** from the pop-up menu or click the shift link in the **Crew** pane.

Mail Management

This section describes concepts and procedures related to managing mail messages.

About Mail Management

The main purpose of the mail management system is to allow dispatchers to communicate with crews without leaving the application. Crews can respond to and communicate with dispatchers from their mobile device.

Messaging is context driven, providing dispatchers control over communication with crews based on their shift, availability, and whether or not they are logged on. For example, dispatchers can send one mail to all of the crews that he or she monitors.

Mail messaging also provides control over message behavior. For example, an emergency message sent to a crew's mobile device, pops up over the mobile device screen to grab the user's attention. Messages can also be tracked to show whether or not they have been acknowledged.

Users receive notifications of new messages via the **Mail Summary** zone on their dashboard. They can also review all of the messages that they have sent or received using the **My Mail** portal.

Message Creation

Users have the option of selecting from a mail template to send preset mail content for specific situations, or they can create unique messages from scratch.

Mailing lists are also available so that a predefined list of users can be selected quickly and easily.

Dispatchers can choose to send messages as normal delivery, as emergency mail, or with other special handling such as setting the message to require manual acknowledgement or setting the message to expire after a certain amount of time without being acknowledged.

Dispatchers can send mail to:

- Their monitored crews
- All crews
- Another user, typically a mobile user
- A list of predefined users in a mailing list

Crews can send mail to:

- All logged on dispatchers monitoring them
- All logged on dispatchers
- Another user, typically their supervisor(s)

About the My Mail Portal

The **My Mail** portal provides access to view mail you have received or sent.

Any user with a valid login can use this portal to see their messages. This is also useful for non-MDT or SMS crew members who do not have access to mail from a portable device.

You can create new mail, reply, acknowledge mail you received and archive your mail using this portal.

Users can also receive notifications of new messages via the **Mail Summary** zone on their dashboard.

Archive your messages to remove them from your sent or received folder for a clean work space, but to still have access to them.

Some mail messages include a **Voiced** button which allows dispatchers a way to manually relay messages to crews. This only applies when an alert is sent to the dispatcher because the system has failed to dispatch an activity to the crew in a timely manner. The dispatcher can respond to the alert situation by reassigning the work to another crew or by contacting the current crew by radio. When communicating the message by radio, the message is relayed by "voice" rather than by dispatch. The dispatcher can click the **Voiced** button and the system navigates to the activity portal so they can read the details to the crew.

Mail Summary

You can also manage your mail using the **Mail Summary Dashboard** zone. The zone includes the following features:

- Refer to the zone for notifications whenever you receive a new message.

- Select the **Mail** link on the toolbar to open the **My Mail** portal directly from the dashboard.

- Click the **New** button to start a new mail message directly from the dashboard.

Working with Mail

This section describes common tasks related to working with mail messages.

Creating a New Mail Message from a Mail Template

Use this procedure to create a new mail message from a mail template.

Prerequisites: Mailing Template must be configured.

You can start a new message in one of several ways:

- Dispatchers can right-click on a shift to send mail to the entire crew from the **CDI** portal.

- General users and dispatchers can also click the **New** button on the **Mail Summary Dashboard** zone or click the **Mail** link on the same zone to navigate to the **My Mail** portal. They can also access the **My Mail** portal directly by selecting **Main Menu** > **My Mail+**

After navigating to where you can create a new message, the general message creation steps are the same:

1. Click the **Use Template** button.

2. Select the appropriate template.

3. Verify that all of the message details are as you would like them to apply for the message. Make changes as appropriate.

4. Click **Send**.

Creating a New Free Form Mail Message

Use this procedure to create a new mail message.

Prerequisites: None.

You can start a new message in one of several ways:

- Dispatchers can right-click on a shift to send mail to the entire crew from the **CDI** portal.
- General users and dispatchers can also click the **New** button on the **Mail Summary Dashboard** zone or click the **Mail** link on the same zone to navigate to the **My Mail** portal. They can also access the **My Mail** portal directly by selecting **Main Menu** > **My Mail+**

After navigating to where you can create a new message, the general message creation steps are the same:

1. Enter a subject and message body in the appropriate fields.

2. Select additional message options, as applicable.

3. Select a message group, user or mailing list for where the message will be sent, as appropriate.

4. Click **Send**.

Archiving Messages

Use this procedure to archive your sent or received messages.

Prerequisites: You must have existing received or sent messages.

1. Access the **My Mail** portal.

   Click the **Mail** link on the **Mail Summary Dashboard** zone to navigate to the **My Mail** portal. You can also access the **My Mail** portal directly by selecting **Main Menu** > **My Mail+**

2. Search for and open the appropriate message.

3. Click the **Archive** button.

   Archiving a message removes it from your received or sent box, but allows you to search for it in the Archived folder.

Reviewing Mail Messages

Use this procedure to filter and search for mail messages.

Prerequisites: None.

1. Access the **My Mail** portal.

   Click the **Mail** link on the **Mail Summary dashboard** zone to navigate to the **My Mail** portal. You can also access the **My Mail** portal directly by selecting **Main Menu** > **My Mail+**

2. Enter search criteria.

   To see the messages that have been sent to you, select Received as the Query option. Additionally, you can search by messages that you sent or that you archived. You can also enter additional criteria to filter the list of messages further.

3. Click **Refresh**.

   In the search results list, click the link for the message you want to view or edit.

Transfer of Goods

This section describes concepts and procedures related to the transfer of goods.

Understanding Transfer of Goods

This section describes concepts related to the transfer of goods.

About the Transfer of Goods

Transfer of goods involves the process of transporting goods from one location to another. Not all organizations use this business practice, however, if they do, the system provides a way to manage goods, restrictions and vehicle load limits related to the transfer of goods.

Transfer of goods functionality creates activities and vehicle types that answer the questions: What are the goods? What can and cannot be shipped with these goods? and What are the vehicle capacities for these goods?

When this functionality is in use, the goods being transferred are specified on activities. All goods being delivered must be both picked up and dropped off so that at the end of the day the net pickups and deliveries are balanced. For example, you might have a job with 2 activities in it - one to pick up 1 item from location A and one to deliver 1 item to location B. The total goods being transferred must be 0 at the end of the job, 1 picked up – 1 delivered = 0 on board at the end of that job.

Businesses might also take managing transfer of goods one step further and also manage locations where the goods are picked up and dropped off by incorporating the use of depots.

About the Goods Being Handled

Activities that handle goods specify information about the transferred goods such as load capacities (weight, volume, size, etc) and restrictions relative to other goods on board. For example, an activity would indicate if hazardous load combinations should be avoided.

About Vehicle Maximum Capacity

For some types of goods being transported it is important to know how much of a load the transport vehicle can handle such as maximum weight, maximum volume, maximum size or any other measurement as needed.

Maximum capacity of vehicles is defined on the vehicle type, not the crew shift. Any shift that references the vehicle type is bound by those capacity restrictions. However this can be overridden on a specific shift to handle exceptions. For example if a dispatcher is aware that a truck has low tire pressure, he might override the maximum capacity to indicate that the truck cannot carry such a heavy load.

> **Note:** The types of vehicle capacity limits to consider such as weight, volume, size etc. must be configured before vehicle limits functionality can be used. Refer to the configuration guide for more information.

About Depots and Depot Runs

If transferred goods are loaded or unloaded at a particular centralized location, your organization can set up depots to capture the information related to these locations. Details such as whether the depot is a pick up or drop off location, what types of goods the depot can handle, the physical address and the days and times that it is open are all specified.

Two types of depot operations are supported:

- **Distribution** - a depot where crews pick up goods for delivery.

- **Collection** - a depot where crews drop off goods picked up from customers.

Crews can be scheduled to drop off and pick up goods at depots based on time windows, crew availability, and depot details. Crews can be configured to be affiliated with one or many specific depots, or they might be allowed to visit any depots as needed. The crew's depot affiliation is defined on the crew record. As with any task they perform, crews can provide status updates related to each depot visit. Likewise, dispatchers have visibility into the location of depots via the CDI map. Dispatchers can also indicate restrictions to limit which depots a shift can visit.

> **Note:** The depot layer on the map is only available when there are depots defined in the system.

Activities, Tasks and Runs

A crew's interaction with a depot is managed in terms of activities, tasks and runs:

- Depot based activities involve either picking up goods from a customer location and returning them to a depot center, or loading/collecting goods at a depot center and delivering them to a customer location.

- Depot tasks represent a scheduled visit to a depot, with a task duration for loading or off-loading the goods. The scheduler automatically creates these depot tasks to handle activities as needed.

- Depot runs represent the entire trip or travel to visit a depot, including the depot task and one or more depot activities. A single run never mixes distribution and collection operations, so a run would only consist of the activity to pickup goods at a distribution depot and a second run would consist of the activity to drop off goods at a collection depot.

Depot Breaks

The system can also be configured to designate breaks which can only be taken at a depot. If a shift is not scheduled for depot work, the break is scheduled as a standard break.

Depot Time Windows

Depot time windows define when the depot is open. They are used by the scheduler to determine when depot tasks to visit a specific depot should be scheduled.

The access time window defines the time frame that the depot is open. Each access time window also has an associated window cost and late cost. The window cost indicates the cost of using the time window, whereas the late cost indicates the cost of being late and arriving at the depot outside of the allotted time frame.

The service time window defines the *preferred* time windows within the normal operational hours. Lower cost is associated with scheduling work during preferred service time.

Access times and service times cannot overlap, so if there is a preferred service time defined, the general access times should be defined during time frames outside of the defined service times.

Multiple depots can share this information by referring to a depot profile which also has these values defined. If there are no times specified, there is no restriction on when the depot is available.

Maximum capacities might also be specified for a time window to indicate limits such as maximum weight, maximum volume, or any other measurement as configured by your implementation applicable during that time window.

> **Note:** The types of maximum capacity limits to consider such as weight, volume, size etc. must be configured before limits can be specified for a depot time window. Refer to the configuration guide for more information.

Depot Time Window Overrides

An override time window is used to redefine a depot's access or service time window as originally defined on the depot. For example, if the dispatcher knows that the depot will be open later than usual on a particular day, he can override the default time window and adjust for the later time. The override will apply to a specific day and time for the depot rather than the generalized weekly schedule defined by the default time windows.

An override can also be used to completely remove a specific time window or to adjust the maximum capacities defined on the time window such as the maximum size or weight of distribution that the depot can handle.

Crews Can Be Restricted To Specific Depots

Since crews typically logon and logoff from their base depots in depot based operations, crews can be configured so that they are restricted to specific depots. This may be necessary, for example, if the crew's vehicle is too large to visit some depots. In these cases, the scheduler is limited to only scheduling the crews to visit depots where the crew is allowed. If a crew is not limited to specific depots, it is assumed that they are allowed at any depot. Moreover, a dispatcher can override the list of depots a crew is restricted to on a specific shift.

About Depot Cutoff

A depot cutoff event closes all distribution depot runs that are planned to depart from the depot before a specified cutoff time, and instructs the scheduler to build new runs for the depot to depart after that cutoff time. The depot cutoff automatically locks all such runs from the distribution depot.

The cutoff events are initiated by the host system. However, a user can also initiate a depot cutoff manually. This only applies for distribution depots and cannot be set in advance to be triggered in the future.

As an example, think of depot cutoff functionality applied for grocery delivery. All deliveries for a given day must be on the truck and ready to go by 10 am to make the "early run". With depot cutoff, the scheduler enforces that orders must be processed before a certain trigger date and time, say 5pm, on the previous day. The runs would be locked after 5 pm and any orders processed after that time would be pushed to later runs.

The **Cutoff History** zone in the **Depot** portal shows a history of cutoff requests that have been processed for the depot. You can select a cutoff request and navigate to the **Depot Cutoff** portal. The **Closed Depot Runs** zone lists the depot tasks closed by the cutoff event. Navigate to one of these depot tasks to see the current state.

Working with Depots

This section describes common tasks related to working with depots.

> **Note:** Depot activities are not delivered with the base package and must be configured by your implementation team before you have access to these functions.

Viewing Depot Runs

Use this procedure to view the entire run that a depot activity belongs to.

Prerequisites: None.

1. Navigate to the **Activity** portal in edit mode.

   Alternately, dispatchers can review the run on the **CDI** portal by clicking on **Show Run** on the run's corresponding depot task.

2. Search for and select the appropriate activity.

   Look in the **Activities In Depot Run** zone to see all of the activities in the run and where the current activity falls in sequence with the others.

Closing a Depot Run

Use this procedure to close a depot run. You would close a depot run to prevent the scheduler from making further changes to the set of activities in the run.

You can also complete this process from the **Depot Task** portal.

1. Navigate to the **CDI** portal.

2. Locate the depot task related to the run.

3. Right click and select **Close**.

Opening a Depot Run

Use this procedure to open a depot run. You would open a depot run to allow the scheduler to further optimize the run and make changes to the set of activities in it.

You can also complete this process from the **Depot Task** portal.

1. Navigate to the **CDI** portal.

2. Locate the depot task related to the run.

3. Right click and select **Open**.

Overriding Depot Time Windows

Use this procedure to change or remove the time windows on a depot.

1. Navigate to the **Depot** portal in edit mode.

2. Search for and select the appropriate **Depot** record.

3. Click the **Add** link in the **Override Time Windows** zone.

4. Follow the prompts to add a new override.

Initiating a Depot Cutoff Event Manually

Use this procedure to manually execute a depot cutoff event.

1. Navigate to **Admin – Depot**.

2. Select a distribution depot.

3. Click the **Cutoff** button.

4. Enter the cutoff date and time.

 The cutoff date/time on the depot is set to the new cutoff time. The scheduler automatically closes all depot runs to this depot planned to depart on or before the date and time mentioned.

Contractor Management

This section describes concepts and procedures related to contractor management.

Understanding Contractor Management

Some companies use third-party contractor companies to help them to complete their work. If your organization uses contractors, or non-company resources, to work activities, you might use contractor management functionality to assign, schedule and complete this work.

This section describes concepts related to contractor management functionality.

About Contracting Models

Contractor management functionality incorporates two models for contractor resources: A shift based model and a capacity based model. You might use both models since each contractor is set up and managed on an individual basis.

Shift Based Model

In the shift based model, contractor mobile resources, i.e. mobile workers, vehicles, crews and their shifts, are set up, configured, and scheduled as if they are internal employees. The contractor company is defined as a resource group then the resource group is referenced on all associated resources. For example, all contractor mobile workers, vehicles and crews must reference their company's resource group. Aside from these resources, all other user roles such as dispatchers, resource planners, etc. are assumed to be company employees.

Capacity Model

In the capacity model, external contractor companies are assigned work based on an agreed upon capacity. Contractor companies are defined as resource groups within the system while individual resources are fully managed and scheduled outside of your system. The contractor companies receive work from your organization then manage all activities on their own until they provide completion information.

Instead of working shifts, contractor companies agree to provide a certain capacity of work to your company. Capacities are expressed in terms of number of hours or a number of activities over a period of time. Each **Capacity** record specifies a period of time during which the contractor company agrees to take on work of a certain type in specific areas. Similar to the notion of crew shifts, **Capacity** records may be generated based on templates or created manually as needed to reflect agreements between your company and the contractor company. Refer to *About Capacities* for more information.

The contractor company may need to be notified in advance of work your company commits to them so they can plan accordingly. A **Notification Horizon** specifies the amount of lead time prior to the beginning of the contractor's capacity period, that the contractor must be notified of activities committed to them for the specific capacity. Once the notification horizon begins, no additional activities can be added to the specific contractor's capacity. For example, if the capacity period begins on Thursday at 8:00 am, and the notification horizon is set to 72 hours, the capacity is closed on Monday at 8:00 am and the contractor is notified of all committed work booked to the capacity. Notification horizon is specified on the contractor's **Resource Group** record but may be overridden on the **Capacity** record.

Once activities are committed and sent to the contractor, they have to approve or reject each activity within a specified amount of time. The required amount of approval time is also specified on the contractor's **Resource Group** record. If the contractor has not responded by the close of this time window, the activity is returned to your organization and considered declined.

If the contracting company is integrated with your company system via web services then approval and rejection is automatically handled by message exchanges between the systems. The system sends messages to the external system referenced on the resource group definition for the contracting company.

Smaller contracting companies that do not use an integrated system, can access the **Contractor Work Management** portal within your company's application to manage their work. Refer to *About the Contractor Work Management Portal* for more information.

Aside from contractor users managing their committed work via the **Contractor Work Management** portal, all other user roles such as dispatchers, resource planners, etc are assumed to be company employees.

About Resource Groups

Resource groups define information about the contractor companies doing work for your organization. This information includes name, contact information and the base service area where they work.

Your organization must also be defined as a resource group of class "company" if you need to establish scheduling preference ranks between contractor companies and your own company using contractor eligibility rules. Refer to *About Contractor Eligibility Rules* for more information.

The contracting model as well as whether this is your own company is defined on the resource group type. Only one resource group can be defined as your company.

The following also apply for defining resource groups:

- Contractor companies may be associated with a list of service areas that they are eligible to work in.

- If the capacity contractor company's system is integrated with your company's system, their external system definition has to be referenced on their resource group definition.

- If the contracting model is shift based then all contractor mobile workers, vehicles and crews must reference their company's resource group.

  Note: Regardless of the contracting model used, any individual who will need to access the system as a contractor needs to be set up as a user within the system. This user <u>must</u> reference the resource group defined for the contracting company they work for. The **User** record includes a field to note the contractor company associated with a user.

About Capacity

Capacities represent an external contracting company's agreement to take on work of a certain type in specific service areas for a period of time.

The capacity type defines whether the capacity is expressed as a number of activities or number of hours. If specified as a number of hours then the capacity must be defined for a specific activity type. If it is expressed as number of activities, then it can be for an activity type or a broader service class. A capacity has to be offered in one or more service areas eligible of the contracting company. The capacity also states the amount of time the contractor company needs for advance notice for work booked to the capacity.

The scheduler considers capacities as well as internal crew shifts when scheduling a particular activity based on the whether or not the activity is allowed to be worked by a contractor and other preference options.

The scheduler may assign or unassign work to and from a capacity as part of the optimization process up to when the notification time specified on the capacity has been reached. Notification time is defaulted from the contractor company's resource group but may be overridden on the capacity. Contractor companies receive activities for approval or rejection when the end of the notification horizon. At this time, the capacity is considered closed and all work currently assigned to the capacity is allocated and committed to the contractor. If the contractor company does not accept the activities by the specified acceptance horizon, then the activities revert back to your company. Activites can also be reverted manually as necessary. The company can always pull back activities and allocate them elsewhere (with the risk that the

contractor has already done the work). Standard alerts are used for activities that are in jeopardy or missed, regardless of whether they are assigned to internal resources or a contractor company.

An activity can also be manually allocated to a capacity by using the chooser action. This can be used to request that the scheduler recommend capacities where the activity can be allocated.

Capacities are assumed to be set up by your company based on agreements made with the contractor company using capacity templates and/or creating them adhoc as needed.

Refer to *Committing Work to Contractors* for more information.

About Capacity Templates

Capacity templates provide a tool for quickly generating large numbers of shifts based on pre-defined parameters.

A capacity weekly template defines a recurring weekly pattern for generating capacities for a specific external capacity contractor. The capacity template defines the information to be used when creating capacities based on this template. The capacity establishes the time period that the contractor company is available to work, it does not establish any time limits for completing assigned work.

Capacity weekly templates are either:

• effective for a specified period of time

• perpetual with an effective date but no end date
  The global planning horizon parameter (defined in master configuration) controls the number of day's worth of capacities to generate for perpetual templates.

A weekly template may reference a work calendar to state public holidays for which capacities should not be generated. Each contracting company may be associated with multiple effective dated capacity weekly templates representing their agreements with your company over time.

In a situation where capacity details should differ from their template on a particular date, generate the capacity initially from the template and then manually adjust the capacity to override the template settings. These modified capacities are called "overridden capacities", as they no longer match the template from which they were generated. The **Overridden Capacities** zone on the **Capacity Weekly Template** portal displays a list of overridden capacities linked to thetemplate.

A generated capacity maintains a reference to the template that generated it, so any changes made to a template are automatically applied to all future capacities that were generated from that template. If you modify a capacity weekly template after capacities have been generated from it, all previously generated capacities will be regenerated, and any manual overrides will be lost.

Allowing Contractors to Work Activities

Settings on activities indicate whether or not the activity is eligible to be worked by a contractor. This is defaulted from the activity type, but can be overwritten on the activity itself.

The **Eligible For Contracting** field indicates whether the activity should be worked by a company resource only, any internal crew (company or contractor), or any resource. If this is not specified, the activity is not eligible for contracting. Activities that are eligible for contracting can be re-set as not eligible for contracting using the **Revert To Company** action.

About Contractor Eligibility Rules

Contractor eligibility rules define scheduling prioritization between your company and contractor companies. This determines how your organization wants to schedule work for a particular service area and service class.

Defining contractor eligibility rules is optional, so if not specified the scheduler automatically gives preference to internal crews, company and shift based contractors, over external contractor capacities

Eligibility rules specify an overall preference between company and shift based contractors, vs. external capacity contractors. The eligibility rule can also provide a ranked list of resource groups, company and contractors, to be assigned work in the specified order of preference. If multiple groups are assigned the same rank then they are equally preferred. If a resource group is not listed it is assumed to be least preferred.

These preferences are stamped onto activities that are eligible to be worked by contractors when the activity is created or rescheduled. If the system detects a change to the eligibility rules while the activity is still being scheduled it stamps the preferences to reflect the change.

Eligibility preferences are used by the scheduler when scheduling the activity. Scheduling cost is associated with not honoring this preference option. For example, if your preference is capacity then it would be less expensive to use a capacity over an internal resource.

Committing Work to Contractors

Contractors, irrespective of their contracting model, can only view and act upon work committed to them. Once committed to a contractor the scheduler cannot change the activity's assignment. This means that the activity is locked to that contractor. Company users can view and act upon any activity committed or not.

If an activity is scheduled to a capacity contractor, it is committed to the capacity contractor company when the notification time specified on the capacity is reached. An activity is also automatically committed to a capacity contractor when it is allocated to any of the contractor's capacities.

Once committed to a capacity contractor, the activity appears on the contractor's work management portal. If the contractor's system is integrated with your system then for each committed activity an outbound message is sent to contractor with the activity details.

The capacity contractor company has to approve or reject work committed to them by the agreed upon approval time specified on the contractor resource group record. If they explicitly reject the work or do not approve in a timely manner the activity is no longer committed to them, the contractor company is excluded from performing the specific activity and the activity is rescheduled. A contractor user may use the contractor work management portal to approve and reject work. Alternatively, if the contractor's system is integrated with your system this may be achieved via web services.

If the activity is scheduled to a crew shift, for either a company crew or a shift based contractor crew, it is committed to the associated contractor company at either allocation or dispatch time. No approval or rejection is needed. When committed the contractor's resource group is stamped on the activity and is key to ensuring contractors access their committed work only.

About the Contractor Work Management Portal

Contractor companies that do not have a system integration with Oracle Real-Time Scheduler use the **Contractor Work Management Portal** to manually manage committed work.

> **Note:** If your company does have a system integration with Oracle Real-Time Scheduler it is not necessary to use this portal as work management is completed directly in your system.

Committed work must reviewed and either approved or declined in a timely manner. Failing to respond to work causes the system to automatically remove that work from your backlog, handling it as if it has been declined.

Search for capacities based on the various criteria and click the **Refresh** button to display results.

Once results are displayed, click the broadcast icon next to the capacity for the appropriate date range to display the work details in the **Committed Work** zone. This zone lists all activities that are currently committed to a capacity. Clicking the **Approve** or **Decline** button to accept or reject work committed to your company. Failing to do so in a timely manner would result in the system automatically removing that work from your company and handling it as if it has been declined.

You can also download the list of committed activities and their key information to an excel spreadsheet by clicking the **Explorer Zone Menu** icon in the toolbar.

When using this portal, a contractor can only see their work; they cannot see other contractor's information or the source company's information.

> **Note:** Any individual who will need to access the **Contractor Management** portal or requires other access to the system as a contractor needs to be set up as a user within the system. The **User** record includes a field to note the **Contractor ID** defined in the **Resource Group** portal.

About the CDI and Contractor Capacities

Contractor crews are highlighted on the **Scheduling Gantt**, and activity search supports filtering by contracting related criteria. The **Contractor Capacity** tab provides a summary of contractor capacities monitored by the dispatcher.

Working With Contractor Work Management

This section describes common tasks related to working with contractor work management.

Defining Resource Groups

Use this procedure to define a contractor or your company resource group.

1. Navigate to the **Main Menu** > **Resource Management** > **Resource Group** + .

   You can also navigate to the portal and click the **Add** link.

2. Select the appropriate value for the **Resource Group Type** field and click **OK**.

   If you are creating the one company resource group for your organization, make sure to select the **Company** resource group type that was created to indicate that this is the designated resource group type for your organization.

3. Enter a unique descriptive name and a description.

4. Complete the remaining fields according to your business processes.

5. Click **Save**.

Defining Capacity Weekly Templates

Use this procedure to create a capacity weekly template.

Prerequisites: You must have configured contractors in the **Resource Group** portal.

1. Navigate to the **Main Menu** > **Resource Management** > **Capacity Weekly Template** + .

   You can also navigate to the portal and click the **Add** link.

2. Complete the fields according to your business processes.

3. Click **Save**.

4. Click the **Add Capacity Template** link in the **Capacity Templates** section.

5. Select a **Capacity Type** and click **OK**.

6. Complete the fields according to your business processes.

7. Click **Save**.

Defining Capacity Templates

Use this procedure to create a capacity template. Capacity templates define a set of parameters to create capacities.

1. Navigate to the appropriate **Capacity Weekly Template**.

2. Click the **Add Capacity Template** link in the **Capacity Templates** section.

3. Select a **Capacity Type** and click **OK**.

4. Complete the fields according to your business processes.

5. Click **Save**.

Entering Capacity

Use this procedure to enter parameters used to determine what type of work contractors can perform and when. Capacities are typically generated using templates, however this procedure can be used to manually enter them.

1. Select **Main Menu** > **Resource Management** > **Capacity+** .

2. Select a capacity type.

   Capacity types determine whether the capacity is defined by number of hours or number of activities.

3. Complete the fields according to your business processes.

4. Click **Save**.

Defining Contractor Eligibility

Use this procedure to define scheduling prioritization between your company and contractors.

1. Select **Main Menu** > **Resource Management** > **Contractor Eligibility+** .

2. Complete the fields according to your business processes.

3. Click **Save**.

Viewing Contractor Work

Use this procedure to view work committed to a capacity contractor. If you are a contractor user, the portal is restricted to your company only. If you are a company user, navigate to this portal from the contractor's resource group to review their committed work.

1. Select **Main Menu** > **Service Management** > **Contractor Work Management** .

2. Search for and select the contractor capacity and click **Refresh**.

3. Click the link for the appropriate contractor work/capacity.

Chapter 3

System Administration

This section provides conceptual information and instructions for performing various setup and administration tasks.

Resource Management Administration

This section describes concepts and common tasks related to resource management administration.

Understanding Resource Management Setup and Administration

This section describes entities used to support the management of resources and shifts.

About Locations

You can predefine a set of common locations, such as service centers or business offices that can be selected and referenced later. For example, predefined locations can be used as logon and logoff locations for crew shifts or as meeting locations for periods of unavailability.

About Skills

Skills define an ability or talent needed to perform certain types of work.

An activity may require the assigned mobile worker to posses certain skills to complete the activity. Required skills are typically defined on the activity type but may also be overridden on the activity.

Mobile worker types define a list of skills assumed to be possessed by all mobile workers in that job description, and each mobile worker record lists the individual mobile worker's skills.

When the system schedules work it matches the requirements of each activity to the capabilities of available crew shifts. The scheduler validates the skills and equipment of all mobile workers and vehicles allocated to a crew shift to determine which activities the crew can work on a particular shift.

Some skills have effective periods. For example, a skill might require a license that must be renewed every year. If a skill has an effective period, as defined in the **Limited Time** attribute for the skill, users will be required to enter an effective date and an expiration date when they assign that skill to a mobile worker.

Skill Levels

A skill set defines relationships between similar skills of different skill levels, where each skill within the set represents a specific level of expertise.

In the following example, the listed skills represent levels of expertise within a skill set. They are grouped together by referencing the same set number:

- Novice Inspector = Level 1

- Standard Inspector = Level 2

- Expert Inspector = Level 3

Skill levels are used to make sure that skilled resources are being used as efficiently as possible. Schedules can assign crew members to an activity based on their level of skill so as not to waste more experienced resources on simple task, or to be sure to have a worker with a high level of skill where needed. If an activity requires a Novice Inspector skill the scheduler would first look for novice inspector crews before considering standard or expert inspectors. This can be left blank if the skill does not require levels.

> **Note:** Adding a new skill level to an existing skill set is achieved by duplicating an existing skill level of the skill set. Please refer to *Defining Skills and Skill Levels* for more information.

About Vehicle Equipment

Equipment is any device or apparatus used to perform certain types of work.

An activity may require the crew to posses certain equipment. The list of required equipment is typically defined on the activity type but may also be overridden on the activity.

Each vehicle record lists the equipment that the vehicle is equipped with. Vehicle type may define a list of equipment assumed to be on all vehicles of this type.

Like mobile workers, vehicles can be assigned to crew shifts. When scheduling work, the system matches the requirements of each activity to the capabilities of available crew shifts. The scheduler considers the skills and equipment of all mobile workers and vehicles allocated to a crew shift to determine which activities the crew can work on a particular shift.

About Mobile Worker Types

A mobile worker is an individual workforce resource that performs work as part of a crew. Mobile worker types define the attributes for a mobile worker of a particular type.

A mobile worker is associated with a mobile worker type that defines attributes of the mobile worker's job description. For example, a mobile worker type can define the assumed skills of all mobile workers of that type. You can override these settings if an individual mobile worker possesses more or fewer skills. If a mobile worker lacks assumed skills, the system lists them as missing skills on the **Mobile Worker** maintenance portal.

About Vehicle Types

A vehicle is a workforce resource used by a crew to perform work.

A vehicle is associated with a vehicle type that defines attributes common to all vehicles of that type. For example, it can define the assumed equipment of all vehicles of that type. You can override these settings if a specific vehicle possesses more or fewer pieces of equipment. If a vehicle lacks assumed equipment, the system lists it as missing equipment on the **vehicle** maintenance portal.

If your organization transfers goods and vehicle capacity limits should be considered refer to *About Vehicle Maximum Capacity*under Transfer of Goods for more information.

Vehicle Utilization Procedures

The vehicle type may specify procedures that the crew must perform each time they utilize a vehicle of that type. The crew is not allowed to start their shift or change their vehicle mid shift until these procedures are passed. Depending on your business practices, the procedure type may or may not be configured to allow the crew to override or bypass a failed procedure as necessary. Refer to *About Procedure Types* for more information.

The completion and status of procedures is tracked in the **Procedures** zone of the **Crew Shift** as well as in the **Procedure** portal.

About Crew Type

A crew is a uniquely named group of mobile workers and vehicles that perform work in shifts. The actual resources allocated to the crew on a specific shift may be fixed or vary daily depending on your business practices.

Crew type defines attributes common to all crews of this type. For example it defines the business object that controls the structure and business rules of crews created by this type.

Refer to *About Crews and Crew Shifts* in the Resource Management section for details about crews and crew shifts.

About Crew Shift Type

A crew is a uniquely named group of mobile workers and vehicles that perform work in shifts.

Crew shifts are typically generated by shift templates but may also created online as needed. A shift type defines attributes common to all crew shifts and shift templates of this type, for example their typical start and end times, duration etc.

Refer to *About Crews and Crew Shifts* in the Resource Management section for details about crews and crew shifts.

If your organization transfers goods and vehicle capacity limits should be considered refer to *About Vehicle Maximum Capacity*under Transfer of Goods for more information.

About Crew Hierarchies

Crew hierarchies organize crews into logical structures of up to three levels that represent their position in relationship to other crew.

For example, your business practices may require crew hierarchy levels of **Business Unit**, **Department**, and **Office** with different crews belonging to each level.

The portal defines the name, description, and level of the selected hierarchy. Fields also indicate the parent hierarchy level, or the level that this level reports to. The meaning and usage of hierarchy levels is entirely dependent upon your business

practices, however hierarchies can facilitate easier searching and/or filtering in related records such as crew, crew shift, period of unavailability search for crews, common weekly templates, override time window search and in the CDI.

You can download and upload hierarchies to and from a spreadsheet. Download a hierarchy from the info zone using standard **Export** functionality, make changes, then upload it back into the system.

Load a hierarchy into the application by clicking the **Upload Hierarchy** link in the toolbar and uploading a properly formatted spreadsheet file. During the upload, records are created in the order that they are listed in the spreadsheet. This means that if a crew is referenced as a higher level than another crew, the higher level should be listed first in the sheet.

> **Note:**
> All hierarchy nodes must be unique across the system, regardless of their hierarchy and level.

About Shift Cost Profiles

Shift cost profiles define shift-based scheduling cost factors that are used as multipliers against global scheduling costs.

For example, a shift-based overtime cost of 3 means that overtime for all crew shifts associated with this profile is three times more than the overtime cost defined globally. Note that small changes to shift-based factors may result in significant schedule changes.

Global and shift-based costs are used by the scheduler to evaluate and compare possible schedule solutions. A less costly schedule is preferred over a most costly one.

When you define a shift cost profile, you can associate it to specific service classes and/or service areas. For example, you might set up a shift cost profile to discourage the scheduler from utilizing overtime for shifts covering certain areas or performing certain types of work. The service classes and service areas associated with a shift cost profile do not restrict the use of the shift cost profile in any way; you can associate any shift cost profile to any shift. Rather, the system uses these service class and service area associations to recommend appropriate shift cost profiles when you are defining crew shifts. (If you click the **Recommend Change** link next to the shift cost profile field on the **Crew Shift** portal, the system displays a list of shift cost profiles that match the current shift's service area and service class combination.)

You can assign a shift cost profile to one or more shift templates or to individual shifts. Each shift is associated with a single shift cost profile.

About POU Types

A period of unavailability (POU) is a specific period of time during which one or more resources are not available to perform work, for example, meetings or training sessions crews attend as part of their shift, a mobile worker's vacation leave, a vehicle's planned maintenance time, etc.

A POU type defines basic characteristics of all POUs of a particular type. For example, a POU type specifies whether or not POUs of that type can be recurring. Recurring POU types are used for events such as regular weekly staff meetings. If a POU type supports recurring POUs, it also specifies the POU template business object used to create recurring POUs of that type.

POU type also identifies the class of resource (crew, mobile worker, vehicle, etc.) that can be associated with POUs of that type. .

POU Tasks and POU Task Types

Crew POUs are events to which multiple crews may be invited. A POU task is automatically created by the system for each invited crew in order to incorporate the POU event into each crew's shift schedule at the appropriate time and track each crew's attendance individually. It is therefore only relevant to crew-related POUs (POUs for which the resource class is Crew).

A POU task does not bear specific event details; these are defined on the POU itself. The system uses a single type of POU task, which is defined on the master configuration, to generate all POU tasks.

A POU task is dispatched to a crew, just like an activity, and its status is updated and tracked in the same way. If a POU is modified, the system automatically adds, updates, or deletes any related POU tasks, based on the type of change and the POU task's status.

About Dispatcher Types

A dispatcher record identifies a user as a dispatcher. Dispatcher type defines attributes common to all dispatchers of this type. Typically there should be one dispatcher type to be used for all your dispatcher records.

About Procedure Types

Procedure types define the details associated with procedures of a particular type. This includes whether the procedure of that type is for an activity type, a vehicle type or a primary function, effective dates, and other requirements of completing the procedure.

Procedures represent steps or tasks that a crew may need to complete before starting their shift, utilizing a vehicle or starting an activity. Usually they relate to safety precautions or regulatory requirements.

Note: Procedure functionality is embedded into the mobile application and as such is only enforced for crews using the mobile application.

- Service class procedures: Procedure types entered on service classes determine the procedures required when a shift takes on a certain primary function role defined by this service class. This may be at shift start or when there is a change in primary function mid shift.

- Vehicle procedures: Procedure types entered on vehicle types determine the procedures required when a vehicle of this type is used or changed on a shift.

- Activity procedures: Procedure types entered on activity types determine that procedures required before the crew can start work on the activity. If the crew has previously suspended the activity and resumes work, they are required to fill out these procedures again.

Procedure types also establish the following for procedures of that type:

- Whether or not crews are required to take attendance of who was present during completion of the procedure.

- Whether or not the procedure can be overridden.
  The system does not allow the business activity to commence until all required procedures are passed. If procedure override is allowed, the crew is can bypass a failed procedure so it is considered as passed.

- Whether or not the procedure is effective dated (meaning they are only required at certain periods).

Disable the procedure type by selecting the **Deactivate** button in the **Record Actions** section.

Procedure Steps

The procedure type defines the procedure business object to be used to create and manage procedures of that type. This can be a base business object or a custom business object implemented to address specific business requirements. The base product's procedure type and procedure business objects implement a simple questionnaire form.

If your organization is using the base procedure business object the **Procedure Steps** section defines the specific questions or steps that need to be followed to complete the procedure. These can be in the form of yes or no questions, text or numerical values that must be entered, valid ranges, etc.

Message categories are used for the text messages for all steps in the procedure. It is recommended that you designate one or more message categories for procedure related messages. For example, you may have a message category for vehicle

inspection or activity safety checklist. The **Sequence** field indicates the order in which the steps s are presented to the crew and must be completed. This can be used if the steps need to be re-ordered or if any steps need to be inserted in between existing steps. The procedure steps also include values to determine whether or not the step is required to pass the procedure, as well as the expected pass value and answer types.

These steps are created on the procedure type for the procedure and cannot be altered on the procedure record.

> **Note:** Procedure message categories need to be included as part of your deployment type configuration. When adding or changing step messages you need to create a new mobile application deployment to reflect your recent changes.

About Timesheet Types

Timesheet types define attributes common to timesheet records of the same type. For example, you can designate whether the timesheet is for a mobile worker or a crew.

A timesheet summarizes the time a mobile worker spent on various types of tasks and other work related activities while working a shift. This functionality is optional. When enabled, the system automatically creates timesheet records for each mobile worker that worked a shift at shift completion time. If the crew uses the mobile application, then timesheets are calculated on the server and sent to the mobile device for each mobile worker to review and approve their timesheet. If the crew uses the main application in the office to complete their shift they have an option to request timesheets to be calculated on demand or wait for the next timesheet monitor to calculate the timesheets.

Timesheet Time Types

Timesheet types define attributes common to timesheet records of the same type. For example, you can designate whether the timesheet created by this type is for a mobile worker or a process managing the creation of timesheet records for all mobile workers that were part of the shift's crew.

Timesheet type for a mobile worker can specify a **percent deviation** value which defines the maximum percentage allowed for corrections of a timesheet to deviate from the actual time calculated by the system. This is the difference between the total actual shift time and the total shift time as entered by the user as the corrected shift time. If the total corrections exceed the percentage entered here, the user can override the validation by checking the **Override** box, and continue with the corrections.

Timesheet Configuration

To enable timesheet functionality, set up a timesheet type for the crew process and a timesheet type for the mobile worker and reference them in the **Resource Management** section on **Master Configuration** under **Global Configuration**.

> **Note:** If these **Global Configuration** values are not filled in, timesheet functionality is not enabled for your organization.

The **Timesheet Correction** field sets whether or not the timesheet time calculations that are automatically created can be adjusted by the mobile worker. If this is allowed, the system presents the worker with the option to change values such as their travel time, work time, break times etc. when they verify and accept the timesheet. System values are kept for audit purposes.

Mobile workers complete timesheet verification on their mobile device while non-mobile workers can complete timesheets "in office" as part of their general shift completion workflow. Include the timesheet process type and the mobile worker timesheet type to your deployment. This sends the timekeeping settings to the mobile devices including what is needed to start generating timesheets. Also ensure that the **M1-TIMSHT** batch control is running periodically such as every few hours. The batch is mainly needed mainly to handle situations where timesheet calculation is waiting for some task completion information errors to be resolved.

Defining Locations

Use this procedure to define physical locations, such as service centers.

Prerequisites: None

To maintain existing locations, select **Admin Menu** > **Resource Management** > **Location** , then use *standard actions* to edit, duplicate, or delete a location.

To define a new location:

1. Select **Admin Menu** > **Resource Management** > **Location+** .

   If your system supports more than one location type business object, you will be prompted to select a business object for this location.

2. Enter the location name and a meaningful description.

3. Provide the address of the location.

   The system will attempt to find the geocode coordinates from the address you provide. If it cannot, you may be required to enter the geocode coordinates, depending on your system configuration.

4. Click **Save**.

You can now select this location as a shift logon or logoff location on the **Crew Shift** maintenance portal or select it as a POU location on the **POU** maintenance portal.

Defining Equipment

Use this procedure to define equipment needed to perform certain types of work.

Prerequisites: None

To maintain existing equipment, select **Admin Menu** > **Resource Management** > **Equipment** , then use *standard actions* to edit, duplicate, or delete the equipment.

To define a new equipment record:

1. Select **Admin Menu** > **Resource Management** > **Equipment+** .

   If your system supports more than one equipment type business object, you will be prompted to select a business object for this equipment.

2. Enter a name and a meaningful description for the equipment.

3. Click **Save**.

You can now associate this equipment with an activity type, indicating that the equipment is required to work this type of activity. You can also associate it with a vehicle or a vehicle type (as assumed equipment).

Defining Skills

Use this procedure to define a human ability or talent needed to perform certain types of work.

1. Navigate to the **Admin Menu** > **Resource Management** > **Skill** + .

   You can also navigate to the portal and click the **Add** link.

If your organization has configured any custom skill business objects, you may need to select one.

2. Enter a unique descriptive name and a description.

3. Complete the remaining fields according to your business processes.

4. Click **Save**.

Defining Mobile Worker Types

Use this procedure to define a classification of mobile worker and identify the skills typically associated with mobile workers of that type.

Prerequisites: You must define skills before you can associate them with a mobile worker type.

To maintain existing mobile worker types, select **Admin Menu** > **Resource Management** > **Mobile Worker Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new mobile worker type:

1. Select **Admin Menu** > **Resource Management** > **Mobile Worker Type+** .

   If your system supports more than one mobile worker type business object, you will be prompted to select a business object for this mobile worker type.

2. Enter a name and meaningful description.

3. Select the business object to use when creating mobile workers of this type.

4. To add or remove skills for this mobile worker type, click the + or – sign in the **Assumed Skills** section and select a skill from the drop-down.

   Assumed skills can be overridden for an individual mobile worker.

5. Click **Save**.

You can now create new mobile workers of this type.

Defining Vehicle Types

Use this procedure to define a classification of vehicles and identify the equipment typically associated with vehicles of that type.

Prerequisites: You must define equipment before you can associate it with a vehicle type.

To maintain existing vehicle types, select **Admin Menu** > **Resource Management** > **Vehicle Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new vehicle type:

1. Select **Admin Menu** > **Resource Management** > **Vehicle Type+** .

   If your system supports more than one vehicle type business object, you will be prompted to select a business object for this vehicle type.

2. Enter a name and meaningful description.

3. Select the business object to use when creating vehicles of this type.

4. To add or remove equipment for this vehicle type, click the + or – sign in the **Assumed Equipment** section and select the equipment from the drop-down.

Assumed equipment can be overridden for an individual vehicle.

5. As applicable, enter any procedure types that should apply for vehicles of this type.

   The procedure type will determine what procedures must be completed before crew shifts can use vehicles of this type.

6. Click **Save**.

You can now create vehicles of this type.

Defining Crew Types

Use this procedure to define a classification of crew.

Prerequisites: None

To maintain existing crew types, select **Admin Menu** > **Resource Management** > **Crew Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new crew type:

1. Select **Admin Menu** > **Resource Management** > **Crew Type+** .

   If your system supports more than one crew type business object, you will be prompted to select a business object for this crew type.

2. Enter a name and meaningful description.

3. Select the business object to use when creating crews of this type.

4. Click **Save**.

You can now create crews of this type.

Creating Crew Hierarchies

Use this procedure to define a level in your organization's hierarchical structure for crews.

Prerequisites: Your organization must have established hierarchy levels according to the guidelines in the configuration guide.

1. Select **Admin Menu** > **Resource Management** > **Crew Hierarchy** + .

   You can also navigate to the portal and click the **Add** link.

2. Select the appropriate value for the **Crew Hierarchy Business Object** field and click **OK**.

   If your organization has not configured any custom crew hierarchy business objects, this step is skipped.

3. Select the appropriate level for the hierarchy and indicate the parent node, if applicable.

   If you are defining the top level of the hierarchy, there will not be a parent.

4. Complete additional fields according to your business processes.

   Note: All hierarchy nodes must be unique across the system, regardless of their hierarchy and level.

5. Click **Save**.

   Once the hierarchy level is created, navigate to the appropriate crews to associate them with the level as needed.

   You can also upload your full hierarchy structure using a spreadsheet.

Uploading a Crew Hierarchy Using a Spreadsheet

Use this procedure to define a full crew hierarchy.

1. Select **Admin Menu** > **Resource Management** > **Crew Hierarchy** .

2. Click the **Upload Hierarchy** link.

3. If your system supports more than one crew hierarchy business object, you will be prompted to select a business object to define the base attributes for the hierarchy.

4. Verify that the spreadsheet you want to upload includes the columns indicated in the upload dialog box.

   Note: All hierarchy nodes must be unique across the system, regardless of their hierarchy and level.

5. Click the **CSV File to Upload** button.

6. Browse to the appropriate file and click the **Submit** button.

   During the upload, records are created in the order that they are listed in the spreadsheet. This means that if an entity is referenced as a higher level to another entity, the higher level should be listed first in the sheet.

Once the hierarchy is created, navigate to the appropriate crews to associate them with the lowest level as needed.

Adding Crews to Hierarchies

Use this procedure to add a crew to a hierarchy.

The hierarchy levels must be defined.

1. Navigate to the **Crew** portal.

2. Search for and select the appropriate **Crew**.

3. Populate the **Reporting Hierarchy** field with the lowest level of the hierarchy that it belongs to.

4. Click **Save**.

Defining Period of Unavailability Types

Use the **Period of Unavailability Type** portal to define a type of period of unavailability (POU), such as a meeting or training session for crews, maintenance for vehicles, or leave time for mobile workers.

Prerequisites: None

To maintain existing period of unavailability types, select **Admin Menu** > **Resource Management** > **Period of Unavailability Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new period of unavailability type:

1. Select **Admin Menu** > **Resource Management** > **Period of Unavailability Type** + .

   If your system supports more than one period of unavailability type business object, you will be prompted to select a business object for this POU type.

2. Enter the POU type name and a meaningful description.

3. Select the resource class associated with this POU.

The resource class selection determines which resources can be associated with POUs of this type. For example, if you select Mobile Worker as the resource class, then you will be able to associate one or more mobile workers with POUs of this type and the system will automatically incorporate POU tasks into the schedules of those mobile workers at the appropriate time.

4. Select the business object to use when creating POUs of this type.

5. Select the business object to use when creating POU templates of this type.

   POU templates are used to create recurring POUs.

6. Click **Save**.

You can now create periods of unavailability based on this type.

Defining Shift Cost Profiles

Use this procedure to define shift-based scheduling cost factors that serve as multipliers against global costs.

Prerequisites: You must define service areas and service classes before you can associate them to a shift cost profile.

To maintain existing shift cost profiles, select **Admin Menu** > **Resource Management** > **Shift Cost Profile** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new shift cost profiles:

1. Select **Admin Menu** > **Resource Management** > **Shift Cost Profile+** .

2. Enter a name and meaningful description.

3. Specify the shift-based cost factors that will be used as multipliers against global costs.

4. Select the service areas to which the profile applies.

   If you do not select any, the profile will apply to all service areas.

5. Select the service classes to which the profile applies.

   If you do not select any, the profile will apply to all service classes.

6. Click **Save**.

You can now associate this shift cost profile with a crew shift template, so that it will be applied to all crew shifts generated from the template.

Defining Shift Types

Use this procedure to define basic attributes associated with a type of crew shift, such as its start time and duration.

Prerequisites: None

To maintain existing shift types, select **Admin Menu** > **Resource Management** > **Shift Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new shift type:

1. Select **Admin Menu** > **Resource Management** > **Shift Type** +.

   If your system supports more than one shift type business object, you will be prompted to select a business object for this shift type.

2. Enter a name and meaningful description.

3. Enter the start date and duration for all shifts of this type.

4. Select the business object to use when creating shifts of this type.

5. Select the business object to use when creating shift templates of this type.

6. Click **Save**.

You can now create crew shifts and crew shift templates based on this type.

Defining Dispatcher Types

Use this procedure to define a type of dispatcher resource.

Prerequisites: None

To maintain existing dispatcher types, select **Admin Menu** > **Resource Management** > **Dispatcher Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new dispatcher type:

1. Select **Admin Menu** > **Resource Management** > **Dispatcher Type+** .

   If your system supports more than one dispatcher type business object, you will be prompted to select a business object for this dispatcher type.

2. Select the business object to use when creating dispatcher records of this type.

3. Click **Save**.

You can now create new dispatchers of this type.

Defining Procedure Types

Use this procedure to define the attributes associated with a particular type of procedure.

1. Navigate to the **Admin Menu** > **Resource Management** > **Procedure Type** + .

   You can also navigate to the portal and click the **Add** link.

2. Select the appropriate value for the **Procedure Type Business Object** field and click **OK**.

   If your organization has not configured any custom procedure type business objects, this step is skipped.

3. Enter a unique descriptive name and a description.

4. Complete the remaining fields according to your business processes.

5. Click **Save**.

   Once you define the procedure type, you will need to add the procedure steps that are required for procedures of that type by clicking the **Edit** button and filling in the steps.

You can now add this procedure type to service classes, activity types and vehicle types to establish procedure requirements.

Defining Timesheet Types

Use this procedure to define attributes common to timesheet records of the same type. For example, you can designate whether the timesheet is for a mobile worker or a crew.

1. Navigate to the **Admin Menu** > **Resource Management** > **Timesheet Type +** .

   You can also navigate to the portal and click the **Add** link.

2. Select the appropriate value for the **Timesheet Type Business Object** field and click **OK**.

   In the base package, you are determining whether timesheets of this type are for crew processes or resources such as mobile workers.

3. Enter a unique descriptive name and a description.

4. Complete the remaining fields according to your business processes.

5. Click **Save**.

Service Management Administration

This section describes concepts and common tasks related to service management administration.

Understanding Service Management Setup and Administration

This section describes the entities used to support service management and dispatcher functions.

About Task Types

A task type defines default attributes for all tasks of a particular type. A task is any activity, period of unavailability (POU), or break that occupies time on a crew shift's schedule.

Task Types

The following sections describe the various classes of task types supported by the product:

Activity Type

An activity is a task to be performed at a specific location. The activity's type controls how such activities should be dispatched, prioritized, scheduled and more. Refer to *About Activity Types* for more information.

Break Type

Break type specifies the duration of the break and duration of the break window (period of time during which the break can be taken).

If your organization uses depots the system can also be configured to designate breaks which can only be taken at a depot. Refer to *About Breaks at Depots* under Transfer of Goods for more information.

Non Productive Task Type

Specifies the duration of the non productive task and duration of the task window (period of time during which the task should be scheduled)

Depot Task Type

Depot task is a tool for tracking the crew's travel, arrival and completion of the depot visit. Refer to *About Depot Related Activity Types* for more information.

Timesheet Time Types

Timesheets are generated at end of shift to summarize how much time the crew spent on various work related tasks and effort. By default travel and work time is summarized across all task types. If your business requires that travel and work are summarized separately for specific types of work you may introduce new timesheet time types and reference them on the corresponding task types. Refer to *About Timesheets* for more information on timesheets.

About Activity Types

This section describes various features controlled by activity type configuration.

If activities are used to transfer goods from and to depots refer to *About Depot Related Activity Types* for more information.

General Work Description

The activity type describes the requested work.

It references the host system requesting such work. Depending on integration configuration it may also reference the identifier of this activity type in the host system.

It specifies how long it takes on average to perform such activity, what skill, equipment and crew size are required to perform the work. These are default requirements and a specific activity may override this information. Sometimes a dispatcher may need to call in a crew to assist another crew with their work. For example, clearing out a tree from the site location. In this situation the dispatcher creates an assisting activity related to another activity. Not all types of work may be used for that purpose. Based on your business practice you can limit the list of activity types that are allowed to be created for the purpose of assisting another crew.

When Can Work Be Performed

Certain types of work may only be performed on specific days and business hours. You may specify a work profile on the activity type that describes the business hours during which this type of work is allowed to be performed. In addition you may specify a work calendar that lists applicable public holidays during which work should not be performed.

When the host system sends in an activity without a due date the system can default it if such option is configured on the activity type. The activity type may state a number of days or hours within which the activity should completed. Days and hours may refer to calendar or <u>business</u> days and hours respectively.

You must specify a work profile if choosing to default due date by business days or business hours. This is because the system relies on the work profile definition of business days and hours for this type of work. For example, a work profile is created specifying that work can be performed between 9AM and 4 PM Monday - Thursday and 9 AM and 1 PM on Friday.

The activity type references this work profile and also indicates that work must be performed within 24 business hours. If an activity of this type comes in from the host with a time window that starts on a Thursday at 3 PM with no end time window, the default due date and time is set to the following Wednesday at 2 PM (1 hour on Thursday, 4 hours on Friday, 7 hours on Monday and Tuesday, and 5 hours on Wednesday).

Regardless of whether due date is defaulted or provided by the host the system generates time windows based on the work profile if specified.

If the activity is an appointment then the activity type defines the appropriate appointment booking group to use when offering appointment time windows. You may specify an appointment group as well as a work profile. In this situation the scheduler would offer appointment times available by the both the work profile and the appointment booking group. Refer to *About Work Profiles* for more information.

Determine Activity Priority

The activity type states whether such activity is an emergency or not. This may also be overridden on the activity level.

For non emergency work the activity type defines the scheduling priority for this type of work relative to other types. This may be a single value or it may be determined based on stepped ranges of a business priority number provided on the activity itself. Using stepped ranges allows you to set same type of work activities with different scheduling priorities based on business needs.

For example, collection activities can be prioritized highest overdue amount first. The host system would include a business priority number equal to the amount overdue. Given this, the activity type logic would derive the scheduling priority based on ranges of amounts overdue:

- Up to business priority of $100 might convert to a scheduling Priority of 1
- Up to business priority of $1000 might convert to a scheduling priority of 5
- Up to business priority of $999,999,999 might convert to a scheduling priority of 10
- (with other ranges in between)

Another example is for the host to include a business priority number equal to the number of customers impacted so that the activity that impacts the most customers is prioritized higher. The activity type logic would convert the number of customers impacted into a scheduling priority of 1 to 10. Note that when determining priority, the system attempts to use the ranges first, based on information from the activity, however if the priority cannot be determined from the range, the value in the **Scheduling Priority** field is used.

Activities with a higher priority are scheduled vs. not scheduled, scheduled to an earlier shift, or scheduled earlier in the shift. For example, if there are two connect activities, one at a hospital with a high higher priority and one at an seldom used warehouse with a lower priority, and multiple shifts, the higher priority hospital activity will get scheduled today and earlier in the day (whereas the lower priority one may not get scheduled on that day at all).

Note that the scheduler only acts upon activity scheduling priority. When an activity is created, the priority is defaulted from the activity type unless it is specified by the host. However, the priority on the activity itself is what the scheduler ultimately considers.

> **Note:** If your organization needs to maintain the concept of priority based on activity type but allow activities of same type to prioritize differently then it is important to keep scheduling priority ranges allocated to specific types of work and let the stepped list be a further list of ranges within the range designated for the activity type. This way the scheduling priority will represent the preference between one type of work to other types as well as the preference within activities of one type of work.

The scheduler applies a factor onto the activity's scheduling priority to calculate its priority over time. This factor is defined by a Priority Profile as a function over the activity's broad time window. The activity's type references the appropriate Priority Profile. Refer to *About Priority Profiles* for more information.

Concurrent Breaks

By default, breaks are planned to be taken in between activities. However, some activities may require the crew to remain on site for a long time. In this situation the crew may be entitled to a planned break on site. The activity type indicates whether breaks may be scheduled to be taken while the crew is on site.

Contracting Work

By default, work can only be performed by company resources. However, certain types of work can be allowed to be performed by contractors. The activity type indicates whether activities are allowed to be performed by contractors.

Likewise, work can be restricted to be worked only by company or shift based contractor crews managed by your organization (internal resources). This information can be overridden on the activity.

Advance Allocation

Certain types of work might need to be locked to their currently assigned crew at some time before the planned start time of the shift. When allocation is done in advance, dispatchers and planners can know in advance which crew is slated to perform the work. This information can be useful for planning purposes as per your business needs.

Dispatching and Acknowledgement

By default an activity is automatically dispatched by the scheduler. Certain types of work may require a user to approve their dispatch to a crew. You can achieve that by not allowing automatic dispatch on this type of activity.

A dispatched an activity is automatically acknowledged when received on the mobile device. Certain types of work, typically emergency work, require that a crew member manually acknowledge take it on. You can require manual acknowledgment on the activity type.

When the crew's shift uses **Drip Mode** set to **Standard**, activities are worked on a route in sequence and once the activity is dispatched, the sequence is locked. The scheduler would not dispatch next activities before an activity that is already dispatched. You may want to allow certain types of work to break that order and get dispatched before already dispatched activities. You do that by setting the **Ignore Sequence Locking** field to "Yes". This is defaulted onto the activity when it is created and allows the scheduler to dispatch such activity before any other activities that are already dispatched if needed.

Activity Completion

When completing an activity the crew can provide additional information in the form of standard remarks defined as valid for this type of work.

The activity type may indicate whether a summary of the time the crew spent traveling and working the activity should be calculated and presented to the crew for review at completion time. If this option is used the summary including original calculated times and any corrections made by the crew are sent back to the host system as part of the activity completion information.

Service Class

Each activity type must belong to at least one service class. The scheduler uses this classification when scheduling work to shifts based on their primary function and the type of work they are allowed to perform. Dispatchers also use this classification when they choose to monitor work by their service class association. An activity type can belong to multiple service classes. Refer to *About Service Classes* for more information.

Service Type

If your company provides multiple service types and divides your service territory into different service areas for the different service types you should state the service type associated with each activity type.

For the same reason, your service areas should also be associated with the corresponding service type. This information is used by the system when determining the service area an activity belongs to. Since service areas for different service types can overlap for a specific location, the system considers the activity type's service type to determine the appropriate service area. Refer to *About Service Areas* for more information.

Reporting Options

Activities extracted to the Business Intelligence (BI) data warehouse are associated with the Reporting Service Category as well as the Response time SLA specified on the activity type for filtering and reporting purposes.

Procedures

Certain types of work require the to follow and successfully complete business procedures on site prior to performing work. The activity type can be configured to list the procedure types a crew has to perform each time they are about to start work.

Work cannot start until these procedures are passed. If the **Procedure Clearance Required** option is set to **Yes**, then the crew cannot start working on activities of that type that they have created in field without them being verified for required procedures. This means that the crew has to be connected to work on these activities

Attachments

The crew might need supplemental documentation related to some times of work. You can attach this type of documentation to the activity type using the **Attachments** zone. The crew can download these attachments as needed when working such activities using the mobile application. The crew must be connected to download attachments. If you want specific attachments to be available to the crew even when they are not connected, consider adding them directly to the deployment. This option increases the total size of the mobile application deployment so it should be used sparingly.

Exception Handling

The system creates a To Do entry for errors that requires user intervention. The activity type defines the To Do type and role to use for the following exceptions:

• Reporting various data issues related to the activity.

• Reporting collision situation where more than one crew completed the activity.

• Requesting a user to review and handle an expired activity.

Complex Activity Types

A complex activity is an activity that is too long to be performed during a single crew's shift. Its activity type configuration is similar to a regular activity type with the following exceptions:

• In addition to the average duration of the overall activity it also define the minimal and average amount of time the system should use to split the long activity into smaller parts known as crew visits.

• The activity type indicates whether the same crew should be scheduled to perform the entire work.

• Complex activities are never emergencies.

• Complex activities can not be scheduled to external contractor capacities.

• Complex activities always allow breaks to be planned on site.

• Complex activities require the crew to be able to correct how much time they spent working on the activity as it impacts the calculation of remaining time left to schedule. Hence the crew is always presented with time usage summary.

About Priority Profiles

Priority profiles define factors used to prioritize the scheduling of activities. Activity type defines the priority profile to use for all activities of that type.

The priority profile defines the following attributes:

• The sequence in which activities will be displayed in application screens.

• Whether or not work is mandatory or optional. If mandatory the activity will be scheduled by its due date regardless of cost. If optional, scheduling the activity is considered optional and is driven by costs. Note that emergencies are always considered mandatory.

• The scheduling priority profile section defines the function that the scheduler uses to calculate a factor applied to the activity's scheduling priority over time to make it stronger, weaker or unchanged as needed. For example, short-cycle, SLA-oriented work is critical at the beginning of the window and diminishes after that. Long-cycle work, such as meter inspections, is low priority in the beginning of the window and becomes critical toward the end.

About Work Profiles

Work profiles define operational time windows and other time restrictions regarding when certain types of work can be performed.

Typically work profiles represent a regulatory restriction that does not allow an activity to be scheduled outside of these windows. With a work profile properly defined for the activity type, the system ensures that the activity is not scheduled outside of the established time window.

One work profile can be referenced on multiple activity types.

On the work profile you designate a **Minimum Business Day** value to establish the minimum duration, in minutes, that can be considered as a business day when defaulting an activity's due date using the **Business Days** option on the activity type. This ensures that only time windows that are long enough are considered. For example, if this is set at 5 hours and the activity must be completed within 3 business days on the activity type, but one of the days is a 4 hour day, that day will not be considered a full business day for the purpose of defaulting the activity due date. This is only used if the activity type is configured to default the due date by business days and the due date is not sent from the host.

You can also define a **Minimum Late Time** to establish the maximum duration, in minutes, that the activity can be started late. Setting this to zero indicates that no lateness is allowed. If this value is not specified, lateness is not restricted.

The values entered in the **Time Windows** section establish the operational days and times during which work may be performed. For example, if this work profile is establishing a restriction for work that can only be completed during a graveyard shift or during the weekend between Friday and Monday, the time window should be set between Friday 9:00pm to Monday 4:00am. You can create multiple time windows to establish non-consecutive blocks of time.

> **Note:** Changes to work profiles after they have been established and added to activity types, do not impact existing activities, only activities created after the change.

About Appointment Booking Groups

Some activities require an appointment to be made with the customer to ensure that the crew will have proper access to the service location. Appointment booking groups define valid time windows for appointment booking.

When the system receives an appointment booking request from the host, it uses the appointment booking group specified on the request to identify the actual time windows during which appointments are allowed to be scheduled. If no appointment booking group is supplied by the host, the system uses the activity type's default appointment booking group.

The host system uses the Appointment Booking XAI inbound service to request a list of available appointments for an activity prior to interfacing it.

About Auto-Dispatching

This topic describes the auto-dispatch process.

Dispatching is an action that locks a task's sequence in the shift schedule so no further optimization takes place and marks it as ready to be sent to the crew. Dispatching can be either manual (initiated by a dispatcher) or automatic (performed by the system without user initiation).

Note the following regarding auto-dispatching:

- Automatic dispatching applies only to a started shift. Until the crew starts their shift, the system does not automatically mark any task as ready to be dispatched.

- Manual dispatching apples to activities only. Breaks and POU tasks are always automatically dispatched.

- A dispatcher may manually request to dispatch an activity at any time. If a crew's shift has not started yet, then the activity remains queued for dispatch until the crew starts the shift.

You can enable or disable automatic dispatching of activities globally or for specific crew shifts or activity types.

Setting Auto Dispatch Globally

To enable or disable auto dispatching globally, set the **Enable Auto Dispatch** scheduler parameter to True or False in the scheduler configuration. (This is listed under Real Time parameters on the Scheduler Configuration portal.) If set to True (checked), auto dispatching of activities is enabled globally, but can be disabled at the activity or shift level. If False (unchecked), auto dispatching is disabled and cannot be enabled at the shift or activity level.

Setting Auto Dispatch for Crew Shifts

To enable or disable auto dispatching at the crew shift level, set the following attributes for a particular crew shift or crew shift template:

- **Drip Mode:** Indicates how the system should handle dispatching of activities to the crew shift. Valid options are:
    None: Automatic dispatching is disabled. All scheduled activities must be manually dispatched to the crew by the dispatcher or by another system-invoked process.
    All: All scheduled activities are automatically dispatched to the crew and any additional activities scheduled throughout the shift are also auto-dispatched. This excludes any activities where the **Auto Dispatch** attribute is set to No on their Activity Type.
    Standard: Only a fixed number of scheduled activities are automatically dispatched to the crew at any given point of time. The fixed number is specified in the Drip Horizon. Note that if an activity's type does not allow automatic dispatching, the activity will not be assigned to shifts that are set to Standard drip mode.
- **Drip Horizon:** Number of activities that can be dispatched to a crew at any time. Valid only if Drip Mode is set to Standard.

Setting Auto Dispatch for Activity Types

To enable or disable auto dispatching for a particular activity type, set the **Auto-Dispatch** attribute at the activity type level. If set to Yes, activities of this type will be automatically dispatched to the assigned crew. If set to No, activities of this type will not be automatically dispatched, overriding the global or shift-based auto-dispatch settings.

> **Note:** Preventing certain types of activities from being automatically dispatched is applicable only if auto-dispatch is enabled globally and the Drip Mode of the crew shift is set to All. Manual dispatching is not allowed if a shift is being drip fed tasks (Drip Mode of Standard).

Scheduler Configuration Settings

The scheduler configuration defines additional scheduler parameters affecting auto dispatching. These are typically defined at implementation and should not need to be changed. These additional parameters are listed below (and described in the Configuration Guide and in the embedded help available from the **Scheduler Configuration** maintenance portal):

- Break Dispatch Mode
- POU Dispatch Mode
- Auto Dispatch Stability Period
- Auto Dispatch Interval
- Auto Dispatch On Completion
- Auto Dispatch Time Horizon
- Emergency Dispatch Mode

About Service Classes

A service class is a broad categorization of activity types. A shift may be associated with one or more service classes to limit the scheduler in assigning certain types of activities to be performed by the crew. Activity types can belong to more than one service class.

Service classes are associated with the following objects:

- **Crew Shifts**:

  A crew shift may be associated with one service class of work that is defined as the primary function of the crew on that shift. This is considered the preferred service class. The scheduler is encouraged to assign work of the preferred type over non-preferred work to a crew shift.

  A crew shift may also be associated with one or more services classes it is not allowed to perform. This association is used to discourage the scheduler from assigning certain classes of work to the shift; however, a dispatcher can allocate any class of work to any crew.

  For example, the system sends a shift to the scheduler specifying class A as the preferred service class and classes C and D as not allowed. Activities belonging to service class A, B, or E are all allowed on the shift, but an activity belonging to class A is preferred.

  A crew shift can designate one service class for which a percentage of its capacity is reserved.

- **Contractor Capacities**: A contractor capacity specified a service class to limit the type of work to be assigned to the contractor by the scheduler.

- **Shift Cost Profiles**: A shift cost profile can be associated to specific service classes and/or service areas. These associations do not restrict the use of the shift cost profile in any way; you can associate any shift cost profile to any shift. Rather, the system uses these associations to recommend appropriate shift cost profiles when you are defining crew shifts.

- **Dispatch Areas**: A dispatch area is a predefined set of service areas and service classes that determine which activities and crew shifts a dispatcher is responsible for monitoring.

- **Procedure Types**: When a service class represents a primary function, it may reference a list of the **Procedure Types** a crew has to perform when they start a shift assigned that primary function or change their primary function mid shift.Refer to *About Procedure Types* for more information.

About Service Areas

A service area is a logical boundary of an organization's territory that may or may not be based on geography.

Service areas are associated with the following objects:

- **Activities**: Each activity is associated with a single service area.

- **Mobile Workers**: Mobile workers may typically work in specific service areas, which comprise their base service areas.

- **Crews**: Each crew shift is defined with a list of service areas in which its crew is allowed to work and service areas in which it is preferred to work. Lower costs are typically associated with preferred service areas.

- **Shift Cost Profiles**: A shift cost profile can be associated to specific service classes and/or service areas. These associations do not restrict the use of the shift cost profile in any way; you can associate any shift cost profile to any shift. Rather, the system uses these associations to recommend appropriate shift cost profiles when you are defining crew shifts.

- **Periods of Unavailability (POUs)**: If a crew-related POU is associated with a service area, the scheduler will include a task for that POU in the schedules of associated crews that are covering any of these areas at the time of the POU event.

- **Dispatch Areas**: A dispatch area is a predefined set of service areas and service classes that determine which activities and crew shifts a dispatcher is responsible for monitoring.

- **Scheduler Areas**: A scheduler area is a predefined set of service areas, or subsets of them, covered by a particular scheduler.

- **Override Time Windows**: An override time window applies to a specific activity type and may be further restricted to specific service areas.

If your company provides multiple types of services, such as gas, electric etc, and divides the service territory differently for each type of service, you should indicate the **Service Type** associated with each service area. For the same reason your activity types should also be associated with the corresponding service type. This information is used by the system when determining the service area for an activity. Since service areas for different service types may overlap for a specific location, the system considers the activity type's service type to determine the appropriate service area. Service areas of the same service type cannot overlap.

Associate service areas with the territory hierarchy structure, as defined by your organization, by populating the **Service Area Hierarchy** field with the immediate hierarchy unit belonging to each service area. You must use the **Service Area Hierarchy** portal to define the hierarchy before you can associate service areas with it. Using hierarchies can help with reporting and also allows for advanced searching and/or filtering in the **Gantt** and from related records. Refer to *About Service Area Hierarchies* for more information.

Select the **Map** tab to upload and view the geographic boundaries of the service area. Geographic boundaries must be drawn in an external Geographic Information System (GIS) tool. The resulting ordinates can then be copied and pasted by clicking on the **Edit Text** button and entering them as the **Polygon Definition**. Ordinates must be entered as comma delimited in longitude, latitude order.

If you have uploaded the geographic boundaries of your service areas the **CDI** map can show the dispatcher's service areas and service territories when those layers are selected.

The portal may also include a **Covering Schedulers** zone which indicates the list of schedulers that cover the service area.

About Service Area Hierarchies

Service Area hierarchies organize service areas into logical structures of up to three levels that represent their position in relationship to other service areas.

For example, your business practices may require service area hierarchy levels of **Division**, **District**, and **County**.

The portal defines the name, description, and level of the selected hierarchy. They also indicate the parent hierarchy level, or the level that this level reports up to. The meaning and usage of hierarchy levels is entirely dependent upon your business practices, however hierarchies can facilitate easier searching and/or filtering in related records.

You can download and upload hierarchies to and from a spreadsheet. Download a hierarchy from the info zone using standard **Export** functionality, make changes, then upload it back into the system.

Load a hierarchy into the application by clicking the **Upload Hierarchy** link in the toolbar and uploading a properly formatted spreadsheet file. During the upload, records are created in the order that they are listed in the spreadsheet. This means that if a service area is referenced as a higher level than another service area, the higher level should be listed first in the sheet.

Note:
All hierarchy nodes must be unique across the system, regardless of their hierarchy and level.

About Dispatch Areas

A dispatch area is a predefined set of service areas and service classes that can be monitored by one or more dispatchers.

Dispatch areas are associated to dispatcher records, indicating which areas the dispatchers are allowed to monitor. When dispatchers log on to start their shift, they can select which of the authorized dispatch areas they will monitor during that shift.

The system determines which activities and crews the dispatcher is responsible for monitoring during their shift based on the selected dispatch areas:

- A crew's shift matches a dispatch area if at least one of the shift's service areas and at least one of its allowed service classes are included in the dispatch area definition.

- An activity matches a dispatch area if its service area and at least one of its service classes are included in the dispatch area definition.

- It is enough for an activity or shift to match one of the monitored dispatcher areas to be monitored by the dispatcher.

- A single dispatch area may be monitored by multiple dispatchers.

Dispatch areas are also used when forwarding alerts, to ensure that alerts are sent to the proper dispatchers.

About Alert Types

Alert types define common attributes and behavior associated with conditions that require human attention, or alerts.

The alert type can specify a creation algorithm that monitors system data and raises an alert if needed. A creation algorithm is not required if there is another mechanism that raises alerts of this type.

> **Note:** The alert creation algorithm is called by the alert type batch monitor process. This process should be scheduled to run frequently to ensure that alerts are raised in a timely manner.

The alert type can also specify an evaluation algorithm that checks to see whether the underlying condition for an alert of this type has been resolved so the alert can be automatically closed.

> **Note:** The alert evaluation algorithm is called by the alert batch monitor, which should be scheduled frequently enough to ensure that alerts are evaluated and recycled in a timely manner.

The alert type can also be defined with the following:

- A priority level for an alert type, which controls the order in which the alerts of this type are displayed in the alert queue.

- A creation threshold time, in minutes. For example, a crew idle alert is raised if a crew is idle more than the amount of time specified in the creation threshold.

- The length of time before the alert automatically expires or is recycled to another dispatcher. If the currently assigned dispatcher does not respond to the alert within this number of minutes, the system reassigns the alert to another dispatcher.

- A snooze feature, similar to the snooze on an alarm clock. You can set the length of time to snooze (stop issuing alerts) before redisplaying alerts of this type in the alert queue. You can also indicate whether the dispatcher may choose a snooze time in the alert queue. Snoozing is not available for some alerts, such as those for missed appointments or other events that happened in the past.

- Enable or disable the manual close option for an alert type. If manual close is not enabled, then the condition that raised the alert must be cleared in order for the alert to be closed.

- Whether or not a sound is played when the alert appears in the dispatcher's queue to better attract the dispatcher's attention. A sound is only played if a sound file and parameters are set up on the master configuration.

- An e-mail address where messages will be sent if an alert is raised and no available dispatcher can be found to address it.

- A restricted list of activity types for which this type of alert would be raised. If no activity types are specified alerts of this type are raised for any type of activity.

About Key Performance Indicators (KPIs)

Key performance indicators (KPIs) are quantifiable measurements used to monitor and evaluate performance.

KPIs are displayed on the **KPI Summary** zone on the **CDI** portal and support dispatcher decision making and in-day exception handling. A KPI is either crew shift-oriented (for example, the number of idle crews) or activity-oriented (the number of appointments in jeopardy). The user can click a KPI to narrow the scope of data to better address those shifts or activities contributing to the KPI. Clicking a shift-oriented KPI typically impacts only the data displayed in the **Scheduling Gantt** zone, while clicking an activity-oriented KPI impacts both the **Scheduling Gantt** and the **Activity Search**.

If a KPI is actionable, the KPI will appear as a link on the **KPI Summary** zone. This allows the dispatcher to drill in to a KPI specific CDI portal where actions can be taken to address the underlying condition. If a KPI is not actionable, the KPI appears as plain text for information purposes only.

Each KPI has an associated plug-in (algorithm) that defines how the KPI is calculated. The plug-in also identifies which shifts to include in the **Scheduling Gantt** and which activities to include in the **Activity Search** when the user drills in to the KPI specific CDI portal.

Alert Based KPIs

When you define a KPI, you must specify the algorithm used to calculate the KPI and indicate whether or not the KPI is alert-related. If a KPI is alert-related, you must also specify the corresponding alert type. (If the KPI is alert-related, an alert condition is associated with the same underlying conditions as the KPI.) The KPI record also defines the normal, warning and severe thresholds values for the KPI. If the KPI value is less than the normal threshold, the KPI will not be presented to the dispatcher, even if it is actionable.

KPIs and Dispatchers

KPIs are associated to dispatcher records, indicating which KPIs will be monitored during the dispatcher shifts. A dispatcher is not allowed to choose which KPIs to monitor when they start their shift. Instead the list of KPIs that they are assigned to monitor is defined on the dispatcher record.

Alert based KPIs count the number of related alerts for activities/shifts that the dispatcher actively monitors regardless of whether or not they are assigned to that dispatcher in the alert queue. For example, if there are multiple dispatchers covering the same dispatch area the KPI counts would appear for all of these dispatchers even though the alerts would not necessarily be assigned to all of them.

About Geographic Areas

Geographic areas define areas that can be represented on a map.

These areas can be configured to appear as custom layers in the **CDI** similar to alert areas. For example, you may want to represent the entire company territory, certain dense population areas and so on. Associate your geographic area with a specific custom usage to represent its category or the broad purpose you use it for. Next you can select the **Map** tab to draw an area on the map to define the map boundaries of the geographic area. Draw a shape on the map to define the geographic boundaries of the area. Click the **Draw** button and select a shape to begin drawing. Click the **Edit Text** button to modify the geocoded coordinates or upload them from an external system, as needed. You can also zoom in and out on the map or pan around the map using the tools on the left.

Defining Task Types

A task type defines the attributes of a particular type of activity, period of unavailability, break or non-productive task. The following sections provide information on defining these various task types.

Defining Activity Types

Use this procedure to define activity type attributes.

To maintain existing activity types, select **Admin Menu** > **Service Management** > **Task Type** , then use *standard actions* to edit, duplicate, or delete an activity type record.

To define a new activity type:

1. Select **Admin Menu** > **Service Management** > **Task Type+** .

   If your system supports more than one activity type business object, you will be prompted to select a business object for this activity type.

2. Complete the fields and sections according to your business practices.

3. Click **Save**.

You can now create new activities of this type. You can also associate this activity type with one or more shift cost profiles, dispatch areas, or crew shifts.

Defining a Period of Unavailability Task Type

Use this procedure to define a type of POU task used for tracking crew attendance of a POU event.

The system uses a single POU task type, specified in the master configuration, to create all POU tasks. This POU task type is typically defined during implementation and should not need to be changed. The POU task type does not contain any specific attributes; the attributes of the POU are defined in the POU record.

Prerequisites: None

To maintain existing POU types, select **Admin Menu** > **Service Management** > **Task Type** , then use *standard actions* to edit, duplicate, or delete a POU task type record.

To define a new POU task type:

1. Select **Admin Menu** > **Service Management** > **Task Type +** .

   If your system supports more than one POU task type business object, you will be prompted to select a business object for this task type.

2. Enter the task type name and a meaningful description.

3. Select the business object to use when creating POU tasks of this type.

4. Click **Save**.

Defining Break Types

Use this procedure to define types of breaks that can be added to crew shift schedules.

Prerequisites: None

To maintain existing break types, select **Admin Menu** > **Service Management** > **Task Type** , then use *standard actions* to edit, duplicate, or delete a break type record.

To define a new break type, follow these steps:

1. Select **Admin Menu** > **Service Management** > **Task Type** +.

    If your system supports more than one break business object, you will be prompted to select a business object before continuing.

2. Enter a name and meaningful description for the break type.

3. Enter the break window duration and the break duration.

4. Select the business object to use when creating breaks of this type.

5. Click **Save**.

You can now add breaks of this type to crew shifts.

Defining Non Productive Task Types

Use this procedure to define types of non productive tasks that can be added to crew shift schedules.

Prerequisites: None

To maintain existing non productive task types, select **Admin Menu** > **Service Management** > **Task Type** , then use *standard actions* to edit, duplicate, or delete a non productive task type record.

To define a new non productive task type:

1. Select **Admin Menu** > **Service Management** > **Task Type** +.

2. Select a business object for the non productive task type.

3. Enter a name and meaningful description for the non productive task type.

4. Enter the scheduling window duration and the duration of the non productive task

5. Select the business object to use when creating non productive tasks of this type.

6. Click **Save**.

You can now add non productive tasks of this type to crew shifts.

Adding an Attachment to an Activity Type

Use this procedure to add an attachment to an activity type. Attachments that are added to activity types are included with all activities of that type.

You must already have created the attachment in the **Attachments** portal. You cannot add attachments to activity types "on the fly".

1. Navigate to the appropriate **Activity Type** record.

2. Click the **Attach** link in the **Attachments** zone.

3. Enter or search for the appropriate **Attachment ID** and click **OK**.

Defining Priority Profiles

Use this procedure to define a set of allocation factors used by the scheduler to prioritize the scheduling of an activity relative to other activities.

Prerequisites: None

To maintain existing priority profiles, select **Admin Menu** > **Service Management** > **Priority Profile** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new profile, follow these steps:

1. Select **Admin Menu** > **Service Management** > **Priority Profile+** .

    If your system supports more than one priority profile business object, you will be prompted to select a business object for this priority profile.

2. Complete the fields according to your business practices.

3. Click **Save**.

You can now associate this priority profile with one or more activity types.

Defining Work Profiles

Use this procedure to establish date and time restrictions that can be associated to activity types.

1. Navigate to the **Admin Menu** > **Service Management** > **Work Profile+** .

    You can also navigate to the portal and click the **Add** link.

2. Select the appropriate value for the **Work Profile Business Object** field and click **OK**.

    If your organization has not configured any custom work profile business objects, this step is skipped.

3. Enter a unique descriptive name and a description.

4. Complete the remaining fields according to your business processes.

5. In the **Time Windows** section, use the + and – signs to add and remove time windows. Enter the beginning and ending day and time for each time window that is valid for this appointment booking group.

6. Click **Save**.

    Once you define the work profiles, you can associate them to activity types as appropriate.

Defining Appointment Booking Groups

Use this procedure to define a set of valid time windows for scheduling appointments.

Prerequisites: None

To maintain existing appointment booking groups, select **Admin Menu** > **Service Management** > **Appointment Booking Groups** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new appointment booking group:

1. Select **Admin Menu** > **Service Management** > **Appointment Booking Group+** .

2. Select the business object that provides the best base definition for the appointment booking group that you need to create.

3. Create a unique appointment booking group name and enter a description.

4. Complete the additional fields, if any, according to your business practices.

5. In the **Time Windows** section, use the + and – signs to add and remove time windows. Enter the beginning and ending day and time for each time window that is valid for this appointment booking group.

6. Click **Save**.

You can now associate this appointment booking group to one or more activity types as appropriate.

Defining Service Classes

Use this procedure to define a broad categorization of activity types that can be used to restrict a crew shift to performing certain types of work.

Prerequisites: You must define activity types before you can associate them with a service class.

To maintain existing service classes, select **Admin Menu** > **Service Management** > **Service Class** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new service class:

1. Select **Admin Menu** > **Service Management** > **Service Class** +.

   If your system supports more than one service class business object, you will be prompted to select a business object for this service class.

2. Enter a name and meaningful description for the service class.

3. Select one or more activity types that belong to this service class.

4. If this service class is used as a primary function, enter any procedure types that should be completed by the crew when assigned this primary function.

5. Click **Save**.

You can now associate this service class with one or more shift cost profiles, dispatch areas, or crew shifts.

Defining Service Areas

Use this procedure to define a logical boundary of an organization's territory that may or may not be based on geography.

Prerequisites: None

To maintain existing service areas, select **Admin Menu** > **Service Management** > **Service Area** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new service area:

1. Select **Admin Menu** > **Service Management** > **Service Area**+ .

   If your system supports more than one service area business object, you will be prompted to select a business object for this service area.

2. Enter the service area name and a meaningful description.

3. Click **Save**.

You can now associate this service area with one or more mobile workers, dispatch areas, shift cost profiles, scheduler areas, or crew shifts.

Creating Service Area Hierarchies

Use this procedure to define a level in your organization's hierarchical structure for service areas.

Prerequisites: Your organization must have established hierarchy levels according to the guidelines in the configuration guide.

1. Select **Admin Menu** > **Resource Management** > **Service Area Hierarchy +** .

   You can also navigate to the portal and click the **Add** link.

2. Select the appropriate value for the **Service Area Hierarchy Business Object** field and click **OK**.

   If your organization has not configured any custom service area hierarchy business objects, this step is skipped.

3. Complete the fields according to your business processes.

   Note: All hierarchy nodes must be unique across the system, regardless of their hierarchy and level.

4. Click **Save**.

   Once the hierarchy level is created, navigate to the appropriate service areas to associate them with the level as needed.

Uploading a Service Area Hierarchy Using a Spreadsheet

Use this procedure to define a full service area hierarchy.

1. Select **Admin Menu** > **Service Management** > **Service Area Hierarchy** .

2. Click the **Upload Hierarchy** link.

3. If your system supports more than one crew hierarchy business object, you will be prompted to select a business object to define the base attributes for the hierarchy.

4. Verify that the spreadsheet you want to upload includes the columns indicated in the upload dialog box.

   Note: All hierarchy nodes must be unique across the system, regardless of their hierarchy and level.

5. Click the **CSV File to Upload** button.

6. Browse to the appropriate file and click the **Submit** button.

   During the upload, records are created in the order that they are listed in the spreadsheet. This means that if an entity is referenced as a higher level to another entity, the higher level should be listed first in the sheet.

Once the hierarchy is created, navigate to the appropriate service areas to associate them with the lowest level as needed.

Adding Service Areas to Hierarchies

Use this procedure to add a service area to a hierarchy.

The hierarchy levels must be defined.

1. Navigate to the **Service Area** portal.

2. Search for and select the appropriate **Service Area**.

3. Populate the **Service Area Hierarchy** field with the lowest level of the hierarchy that it belongs to.

4. Click **Save**.

Once the hierarchy is created, navigate to the appropriate service areas to associate them with the lowest level as needed.

Defining Dispatch Areas

Use this procedure to define a set of service areas and service classes that determine which activities and crews a dispatcher is responsible for monitoring.

Prerequisites: You must define service areas and service classes before you can associate them to a dispatch area.

To maintain existing dispatch areas, select **Admin Menu** > **Service Management** > **Dispatch Area** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new dispatch area, follow these steps:

1. Select **Admin Menu** > **Service Management** > **Dispatch Area** +.

    If your system supports more than one dispatch area business object, you will be prompted to select a business object for this dispatch area.

2. Enter a name and meaningful description.

3. Select the service areas to be monitored by this dispatch area.

    If you do not select any, the dispatch area will cover all service areas.

4. Select the service classes of work to be monitored by this dispatch area.

    If you do not select any, the dispatch area will cover all service classes.

5. Click **Save**.

You can now associate this dispatch area with one or more dispatcher records.

Defining Alert Types

Use this procedure to define common attributes and behavior associated with alerts of a given type.

Prerequisites: None

To maintain existing alert types, select **Admin Menu** > **Service Management** > **Alert Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new alert type:

1. Select **Admin Menu** > **Service Management** > **Alert Type+** .

    If your system supports more than one alert type business object, you will be prompted to select a business object for this alert type.

2. Complete the fields in the **Main** section.

3. Click **Save.**

You can now create alerts of this type. You can also associate this alert type to key performance indicators (KPIs).

Defining Key Performance Indicators (KPIs)

Use this procedure to define a quantifiable measurement that supports dispatcher decision making and in-day exception handling.

Prerequisites: If a KPI is alert-related, you must define alert types before you can associate them to KPIs. Each KPI is associated to a plug-in that determines how the KPI is calculated. The plug-in and the calculation algorithm must have been previously defined.

To maintain existing KPIs, select **Admin Menu** > **Service Management** > **KPI** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new KPI, follow these steps:

1. Select **Admin Menu** > **Service Management** > **>KPI** +.

   If your system supports more than one KPI business object, you will be prompted to select a business object for this KPI.

2. Complete the fields in the **Main** section.

3. Click **Save**.

You can now associate this KPI with dispatchers, so they will be able to monitor the KPI during their shifts.

Defining Remark Types

Use this procedure to define a particular type of comment that can be entered when an activity is completed.

Prerequisites: None

To maintain existing remark types, select **Admin Menu** > **Service Management** > **Remark Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new remark type:

1. Select **Admin Menu** > **Service Management** > **Remark Type+** .

   If your system supports more than one remark type business object, you will be prompted to select a business object for this re mark type.

2. Enter a name and meaningful description for the remark type.

3. Click **Save**.

You can now associate this remark type with an activity type, indicating that remarks of this type can be entered by a crew when the activity is completed.

Defining Geographic Areas

Use this procedure to define an area that can be represented on a map. Geographic areas appear in the CDI similar to alert areas, and can be configured to represent any map area.

1. Navigate to the **Admin Menu** > **Service Management** > **Geographic Area+** .

   You can also navigate to the portal and click the **Add** link.

   If your organization has configured any custom skill business objects, you may need to select one.

2. Select the appropriate value for the **Geographic Area Business Object** field and click **OK**.

    If your organization has not configured any custom geographic area business objects, this step is skipped.

3. Enter a unique descriptive name and a description.

4. Complete the remaining fields according to your business processes.

5. Click **Save**.

    Next you can select the **Map** tab to draw an area on the map to define the map boundaries of the geographic area.

Defining Map Areas on Geographic Areas

Use this procedure to draw, on a map, the area represented by the defined geographic area.

1. Navigate to the appropriate geographic area.

2. Click the **Map** tab.

3. Draw a shape on the map to define the geographic boundaries of the area.

    Click the **Draw** button and select a shape to begin drawing.

    Click the **Edit Text** button to modify the geocoded coordinates, as needed. You can also zoom in and out on the map or pan around the map using the tools on the left.

4. Click **Save**.

Mail Management Administration

This section describes concepts and common tasks related to mail management administration.

Understanding Mail Management

This section describes entities used to support the management of mail messages.

About Mailing Lists

Mailing lists define a list of users for mail distribution purposes. When mail is sent to the list, each user receives a copy.

Mailing lists have a status of active or inactive. Mail cannot be sent to inactive lists.

About Mail Templates

Mail message templates establish standard settings for the fast creation of mail messages. Users can then select the template when creating new mail and the pre-defined subject, message and other settings are automatically copied to the new message from the template.

The following options can be included on the mail template:

* **Queue**: The queue setting specifies how the message should be delivered: emergency or normal. If set as Emergency, the system delivers the mail on the emergency queue which is faster than the normal queue.

- **Acknowledgement Required**: The acknowledgement required value determines whether or not the message recipient is required to respond to the message. The system notifies the sender if the acknowledgement is not returned within a specified time limit.

- **Deliver Now**: The deliver now setting tells the system whether or not to send the message immediately. If this is set to Yes but the recipient cannot be contacted, the message sending fails. This could occur if the crew does not have a device or if they have not started their shift yet. If this is set to No, the system attempts to send the message immediately but if send is not possible, the system attempts to send the message later. For example, it waits until the crew starts their shift.

- **Time Limit**: The time limit establishes the amount of time the system waits before stopping delivery attempts. If the mail requires acknowledgement, then the system only alerts the sender of unacknowledged mail while in this time limit. For example, if the dispatcher has sent a message that is only relevant for today, he or she can set the time on the message to expire at the end of the day. If the crew connects for the first time after the expiration time, the expired mail is not sent to their device. If this value is not specified the system assumes there is no time limit and continues to try and send the message indefinitely.

- **Group, User, Mailing List**: Distribution options for the mail including sending it to a mailing group, a predefined list of users (mailing list) or a single user.
Mailing Lists differ from Groups in that a group is dynamic. For example, a mailing group changes based on the logged on or logged off status of members of the group.

Defining Mailing Lists

Use this procedure to create a new mailing list.

Prerequisites: None.

1. Select **Admin Menu** > **Mail Management** > **Mailing List**+ .

2. Enter a descriptive mailing list name and a description of the list.

3. Click **Save**.

Adding Users to a Mailing List

Use this procedure to add users to a mailing list.

Prerequisites: Mailing List must be configured.

1. Select **Admin Menu** > **Mail Management** > **Mailing List** .

2. Click the **Broadcast** icon for the appropriate mailing list.

3. In the **Add User's** Zone, enter selection criteria and click **Refresh**.

4. Click the **Add** button next to the name of the person to add.

Removing Users from a Mailing List

Use this procedure to remove users from a mailing list.

Prerequisites: Mailing List must be configured with users added.

1. Select **Admin Menu** > **Mail Management** > **Mailing List** .

2. Click the **Broadcast** icon for the appropriate mailing list.

3. Click the **Remove** button next to the name of the person to remove in the **Mailing List Users** zone.

Defining Mail Templates

Use this procedure to create a new mail template.

Prerequisites: None.

1. Select **Admin Menu** > **Mail Management** > **Mail Template+** .

2. Enter a descriptive template name and a description.

3. Enter template body text as appropriate.

4. Enter details appropriate to defining the mail template.

5. Click **Save**.

Transfer of Goods Administration

This section describes concepts and common tasks related to transfer of goods administration.

Understanding Transfer of Goods Management

Transfer of goods management refers to the creation of depots and all aspects of depot functions such as; depot profiles, depot task types, depot time windows and depot override time windows.

About Depots

A depot is a central location where goods are loaded for delivery or collected goods are unloaded. Depot functionality enables the scheduling of drop-off or pick-up activities tied to specific depot locations.

Two types of depot operations are supported:

- **Distribution** - a depot where crews pick up goods for delivery.
- **Collection** - a depot where crews drop off goods picked up from customers.

  Note: If a Depot location can function as both a distribution and a collection depot, one depot of each type should be created to refer to the same location.

The **Depot Class** indicates whether the depot is for distribution or collection. A depot can only perform one of these functions, not both. The **Task Type** indicates the type of task the system should use when creating tasks to visit this depot. Only depot task types can be selected. For example, you might have a task type to pick up keys, to pick up hazardous goods, or to drop off goods. Using a designated task type allows the description of the depot task everywhere in the system it is displayed to more clearly convey the purpose of the visit to the depot. **Depot Site Delay** indicates a fixed delay time involved in transferring goods in this depot. For example the amount of time needed to access the depot center on each visit regardless of specific goods being transferred.

A depot may refer to a **Depot Profile** for shared settings of certain details. Refer to *About Depot Profiles* for more information.

About Depot Profiles

Depot profiles can be set up to establish common settings for site delay, access time windows and service time windows across multiple depots. All other details are defined on each individual depot.

If a depot refers to a profile, the settings established by the profile cannot be overwritten. However, anything that is changed on the depot profile is also changed on any depot that references the profile.

The access time windows define time slots during which the depot is accessible for work. They also establish capacity limits which represent metrics such as maximum weight, maximum volume, or any other measurement.

The service time windows define preferred time windows within the normal operational hours. Lower cost is associated with scheduling work during preferred service time. Multiple depots can share this information by referring to a depot profile which also has these values defined.

About Depot Related Activity Types

Depot based activities involve either picking up goods from a customer location and returning them to a depot center, or loading/collecting goods at a depot center and delivering them to a customer location.

Whether the activity is picking up goods or dropping them off is defined on the activity's type. These activity type records need to be defined using the depot related activity type business object.

Any task type record defines which business object to use when the system creates a task of this type. Depot related activity types should reference the depot related activity business object to leverage depot functionality.

About Depot Task Types

Depot task is used to track the crew's travel, arrival and completion of the depot visit. The system generates depot tasks as needed when planning depot runs to and from depot centers.

The system uses the depot task type specified on the depot or depot profile level and, if not specified, it uses the depot task type defined on the master configuration, to generate the depot tasks. A depot task is dispatched to a crew, just like an activity, and its status is updated and tracked in the same way.

About Vehicle Maximum Capacity

For some types of goods as they are being transported, it is important to know how much of a load the transport vehicle can handle such as maximum weight, maximum volume, maximum size or any other measurement as needed.

Maximum capacity of vehicles is defined on the vehicle type, not the crew shift. To specify these limits on a vehicle type you need to use the vehicle type business object that supports vehicle capacities.

Any shift that references the vehicle type is bound by those capacity restrictions. However this can be overridden on a specific shift to handle exceptions. For example if a dispatcher is aware that a truck has low tire pressure, he might override the maximum capacity to indicate that the truck cannot carry such a heavy load. Here too you need to use the base shift business object that supports override vehicle capacities to enable this functionality.

> **Note:** The types of vehicle capacity limits to consider such as weight, volume, size etc has to be configured before vehicle limits functionality may be used. Refer to the configuration guide for more information.

About Breaks at Depots

The system can also be configured to designate breaks which can only be taken at a depot. If a shift is not scheduled for depot work, the break is scheduled as a standard break. To do that you need to associate the break type with the appropriate business object.

Defining Depot Profiles

Use this procedure to define depot profiles that will be used to establish common settings for site delay, access time windows and service time windows across multiple depots.

To maintain existing depot profiles, select **Admin Menu** > **Resource Management** > **Depot** , then use standard actions. To define a new depot profile:

1. Select **Admin Menu** > **Resource Management** > **Depot+** .

   You will be prompted to select a depot profile business object before continuing.

2. Enter a name and meaningful description for the depot profile.

3. Select the depot class to determine whether this is a profile for a distribution deport or a collection depot.

4. Enter a numerical value to indicate the site delay.

   Site delay is a fixed delay involved in transferring goods in the depot. For example the amount of time needed to access the depot center on each visit regardless of specific goods being transferred.

5. Enter start and end dates and time to determine the Access Time Windows and Service Time Windows.

6. Select the business object to use when creating depots of this type.

7. Click **Save**.

Defining Depots

Use this procedure to define depots that will indicate distribution or collection locations for crew shifts.

Prerequisites: The depot location is specified by referencing a common location

To maintain existing depots, select **Admin Menu** > **Resource Management** > **Depot** , then use *standard actions*.

To define a new depot, follow these steps:

1. Select **Admin Menu** > **Resource Management** > **Depot+**

   You will be prompted to select a depot business object before continuing.

2. Enter a name and meaningful description for the depot.

3. Select the depot class to determine whether this is a profile for a distribution deport or a collection depot.

4. Select a depot profile if you want the depot to use predefined values for the site delay and time windows depot configuration.

5. Enter an expiration date, if applicable.

   The expiration date indicates if the depot will not be available after a certain date.

6. If you have not references a depot profile, Enter or modify date and time values for the time windows.

Defining Depot Task Types

Use this procedure to define the type of depot task the scheduler would use to create depot tasks. There should only be one such task type and it needs to be referenced on master configuration.

Prerequisites: None

To maintain existing depots, select **Admin Menu** > **Service Management** > **Task Type** , then use *standard actions* .

To define a new depot:

1. Select **Admin Menu** > **Service Management** > **Task Type+**

    If your system supports more than one depot business object, you will be prompted to select a business object before continuing.

2. Enter a name and meaningful description for the depot type.

3. Enter the depot window duration and the depot duration.

4. Select the business object to use when creating depots of this type.

5. Click **Save**.

    You can now add depot tasks of this type to crew shifts.

Contractor Management Administration

This section describes concepts and common tasks related to contractor management administration.

Understanding Contractor Management Administration

This section describes concepts related to contractor management administration. This is only applicable if your company utilizes the contractors functionality.

Contractor management administration involves defining resource group types and capacity types.

Any contractors that require access to the application must be set up as users in the **User** portal and their record must reference the resource group of the company they work with. These users must only be allowed access to the certified application components for contractor users to ensure they have access to data related to their company only. Refer to the configuration guide for more information.

Refer to *Understanding Contractor Management* for more information.

About Resource Group Types

Resource group types define classifications for various types of contractor companies doing work with your organization.

The group class indicates the nature of the contracting relationship with contractors of the type; whether they are shift based or capacity based. When a contractor is shift based, their work is managed within the system like any other worker , vehicle or crew. When a contractor is capacity based, their work and resources are managed outside of the system and the contractor only interacts with the system to approve, decline or complete work they have committed to take. Refer to *About Resource Groups* for more information.

Note:

Your organization must define a resource group with the "company" class if there is a requirement to prioritize work between your company and contractors. Prioritization is defined using **Contractor Eligibility**.

Only one company resource group type and one company resource group can be created for your company. Refer to *Defining Resource Group Types* for more information.

About Capacity Types

Capacities represent an external contracting company's agreement to take on a certain amount of work of a certain type in specific service areas for a period of time.

Capacity types define the capacities of a certain type. For example whether the committed amount of work specified in the capacity is defined as number of hours or as number of activities. When capacities are defined, the capacity type determines whether there is an **Hours** field or a **Number of Activities** field to establish the parameters of the capacity.

Contractors commit to capacities over time and work is booked based on those commitments.

Defining Resource Group Types

Use this procedure to define a classification for a resource, usually a contractor.

1. Navigate to the **Admin Menu** > **Resource Management** > **Resource Group Type +** .

   You can also navigate to the portal and click the **Add** link.

2. Select the appropriate value for the **Resource Group Type Business Object** field and click **OK**.

   If your organization has not configured any custom resource group type business objects, this step is skipped.

3. Enter a unique descriptive name and a description.

4. Complete the remaining fields according to your business processes.

   If you are creating the one company resource group type for your organization, make sure to select the **Company** business object to indicate that this is the designated resource group type for your organization.

5. Click **Save**.

Defining Capacity Types

Use this procedure to define capacity types.

Prerequisites: None.

1. Navigate to the **Admin Menu** > **Resource Management** > **Capacity Type +** .

   You can also navigate to the portal and click the **Add** link.

2. Select the appropriate value for the **Capacity Type Business Object** field and click **OK**.

   If your organization has not configured any custom capacity type business objects, this step is skipped.

3. Enter a unique descriptive name and a description.

4. Complete the remaining fields according to your business processes.

5. Click **Save**.

Device Management Administration

This section describes concepts and common tasks related to device management administration.

Understanding Device Management

Device management refers to the packaging and delivery of mobile application components to a mobile device terminal (MDT).

About MDTs and MDT Types

Mobile data terminals (MDTs) such as laptops, cellular phones, tablets and other mobile devices may be used to interface with the system via the mobile application.

An MDT Type defines attributes common to MDTs of a certain type. For example, it specifies the Mobile Communication Platform compatible with devices of the type. Many features and settings depend on the supported platform.

Mobile Communication Platform

The mobile application can be used in a disconnected or connected mode:

- **Disconnected** mode: In disconnected mode, the mobile application and data reside locally on the mobile device allowing the crew to work offline as needed. Message updates to and from the device are staged and exchanged the next time a connection is available. The actual device used has to be registered in the system as an MDT and has to be an officially supported type of device. The device must be compatible with the disconnected mode mobile communication platform specified on the MDT Type: Android, Windows Mobile and Laptop. Refer to *About Disconnected Mode* for more information.

- **Connected** mode: In connected mode neither data nor mobile application resides locally on the mobile device. They reside on the server and the user must be connected to the server at all times using their browser to access the mobile application. In this mode the actual physical device used to access the mobile application is irrelevant and therefore registering the specific device in the system is not needed. The system still utilizes the notion of an MDT but it generates virtual MDTs as needed using an MDT Type set with connected mobile communication platform. Refer to *About Connected Mode* for more information.

Capabilities

The capabilities section on the MDT Type allows you to define the various features or functions supported by mobile devices of this type, such as capturing photo or sound, attaching supporting documents or launching a geographic map.

Each capability is performed or carried out on the device using algorithms that are executed in the sequence indicated. When enabled, MDT users can capture digital content such as pictures and voice recordings related to an activity they work which are then sent to the server as an attachment linked to the activity.

In the same way, when enabled MDT users can attach supporting documents that exist on their local device and are related to the activity they work. Content sent from the device, whether captured or simply attached, may be viewed on the device as well as the Activity portal when synchronized to the server.

The ability to view attachments also applies to attachments sent to the crew along with the activity from the server.

> **Note:** If a capability is not explicitly enabled on the MDT Type, the corresponding function is not available on the device. Also, enabled function has to represent true device capabilities.

Attachments

The MDT Type also controls the types of attachments that can be opened on a device, and sets a limit for the attachment size. The **Attachment Storage Size** (MB) field indicates the document size limit, in megabytes, for attachments on MDTs of the type. When a user attempts to download an attachment, the system validates that the total size of the download plus what is already on the MDT will not exceed the maximum for the MDT.

If you want the MDT Type to be able to open attachments, each attachment file type must be included in the **Capabilities** section as a capability of that MDT type.

About Disconnected Mode

The mobile application can be used in a disconnected or connected mode. In disconnected mode the mobile application and data reside locally on the mobile device allowing the crew to work offline as needed. This means the physical device has to be compatible with the mobile application requirements it runs locally.

You must create an MDT record for each physical device that will communicate with the main server application. The MDT's type has to be of a compatible mobile communication platform.

Mobile application users log on to a particular MDT from the mobile application. The first time a mobile user runs the mobile application, they will be required to register their MDT. The system will ask for the Device Tag (assigned when the MDT record is created on the server) and the URL of the server application. As part of the registration process, the system creates a unique registration ID and saves it in the MDT record. Once the device is registered, the mobile user will be able to log on to the application from that device without further prompting.

About Connected Mode

The mobile application can be used in a disconnected or connected mode. In connected mode neither data nor the mobile application reside locally on the accessing mobile device. Instead the data and mobile application reside on the server and the user must be connected to the server at all times using their standard browser to access the mobile application.

> **Note:** This should not be confused with the server application. This is the mobile application presented in a regular internet browser.

The actual physical device used to access the mobile application in a connected mode is irrelevant since the application is not run locally and therefore registering the specific device in the system is not needed. The system still needs an MDT record for the mobile application to work properly, but it is not related to the physical accessing device.

To access the mobile application in connected mode the user needs to reference your organization's mobility server URL in a browser, as they would any website, and enter their username and password. After the user is authenticated the system allocates an MDT record of a connected platform MDT Type from a pool of available records to the user. If all connected MDTs are already in use by other users the system duplicates an existing connected MDT record to create a new MDT record and allocates it to the user.

> **Note:** In connected mode, the system ignores the display option value configured on the MDT Type for the MCP and instead dynamically changes the display option based on the available screen resolution (once per login). This means that for iPads and newer Android devices, which typically use 1024x768, the system recognizes them as XVGA (laptop). This is important when you are selecting a deployment, for these devices they should select a laptop deployment.

Once allocated to a user, the MDT is stamped with that user and is not available to another user. The system generates new MDT records upon request but it requires at least one to be defined manually. To speed up MDT allocation process it is recommended to define a pool of connected MDT records in advance for as many crews that access in that mode daily.

Regardless of the connection mode, when a mobile worker starts a shift from the mobile application the MDT they have used is stamped on the started shift. If connected mode was used and the user closes the browser and logs in again the system assigns back the same MDT stamped on the started shift to which the user belongs. Moreover, any user that is part of that started shift and use connected mode to access the mobile application would be assigned the same MDT so they can all share data associated with working their shift.

When the shift is completed and all messages are processed transactional data is cleared from the connected MDT data store on the server and the MDT it is made available to all.

Note: As with all MDT specific data, log files are also stored on the server and uniquely identified by MDT.

The following functionality is not supported when accessing the mobile application in connected mode: GPS data is not captured or sent to the server, attachments, capture picture and capture sound functionality.

About Deployments, Deployment Types and Deployment Parts

A deployment refers to a specific cut or build of a mobile application of a specific deployment type configuration and for a specific language. It is a packaged set of application components needed to carry out mobile application functions using a mobile data terminal (MDT).

Creating A Deployment

Developing mobile application components, such as business objects, UI maps, and service scripts, is done using the same development tools used for the main application. Once the mobile application components have been developed and tested, they must be gathered together and packaged for delivery. This is referred to as creating a deployment.

Each deployment is created based on a configuration defined by a deployment type which includes the authorized user groups (user groups associated with a deployment type have access to all modules and functions in that deployment type), supported MDT types, messages used, and application objects included. The deployment type specifies which application objects by referencing one or more deployment parts.

A **deployment part** is a collection of application components, such as business objects, UI maps, service scripts, etc. Deployment parts provide a way to create reusable groups of application components. To create a deployment part, you must first gather the application components together into a bundle and then upload the bundle entities to the deployment part.

A deployment can only be created using the **Create Deployment** batch process. Use the **New Deployment** link on the deployment type zone to submit the batch process for the current deployment type. Once the batch job runs and the deployment has been created, it has to be manually activated before it can be deployed to any devices. Use the **Deployment** portal to view existing deployments and change the status (activate or inactivate).

Deployment Selection on the Mobile Device

Once a deployment has been activated, it is available for download to MDTs. When the mobile user logs on, the system looks for the most recent version of all active, qualified deployments based on the user's user group, language, and MDT type.

- If no deployments are found, the system displays an authorization error message and prevents the user from continuing.

- If only one deployment is found and it is newer than the one currently deployed or there is none currently deployed, then the deployment is downloaded to the MDT.

- If only one deployment is found and it is the same as the one currently deployed, then the deployment is not downloaded.

- If more than one deployment is found, the user can select the one they want to download. Once the application components defined in the deployment are downloaded to the MDT, the user can begin using the system.

Note: The new deployment will not be downloaded if unprocessed data from a previous shift still exist on the device. If the user is authorized to use the deployment currently on the device, it will be used; otherwise, an authorization error will be displayed.

Out of Date Deployments

Deployments become out of date when a new MCP version is released, the deployment type configuration changes, or any underlying application component that is part of the configuration changes.

The **Deployment Evaluation and Purge** batch process evaluates existing deployment records and marks those that are out of date and purges out of date deployments that are older than a specified number of days. The number of days is specified on the batch control.

As a general part of accepting a new product release, new deployments are required. When the release is applied, all existing deployments are marked as out of date so that it is clear which deployments need to be recreated.

When the system marks an active deployment as out of date it also creates a To Do entry in order for a user to create a new deployment as needed. Creating a new deployment for the same deployment type and language automatically closes any remaining ToDos for out of date deployments.

The **Deployment** portal displays an indicator message when the deployment is out of date while the **Out of Date Items** zone list the out of date information. Mobile users are warned at login to their mobile device when they are use an out of date deployment. The user is allowed to continue but is advised to contact their administrator to synchronize their deployment.

MCP Versioning

The mobile communications platform (MCP) communication architecture involves both client side and server side elements. These must be compatible or else errors will occur. To enforce compatibility, the system validates the MCP version as follows:

- When the MDT attempts to connect to the server, the system versioning check validates whether or not the MCP Version on the MDT is compatible with the MCP version on the server. If the versions are not compatible, the device is not allowed to work online and no communication is sent to/from the server. In this situation, the MDT must be upgraded to the correct version before it can work online again. If there was data on the MDT, the user can continue offline and manually collect any data they need before the MDT is upgraded. If a user tries to log on with an incompatible MCP on their device, they receive a message.

- When a deployment is created on the server, it is marked with the version number of the server side MCP Components that created it. Then when a MDT logs on to download a deployment, only deployments with compatible MCP Version can be downloaded. This prevents the incompatible version situation described above.

Before the server is upgraded, all MDT's should end shift and be allowed to logoff. This will prevent the need for manual data copying. Also, with each new product version existing deployments stamped with the older version are marked as out of date.

The About screen on the MDT shows the MCP version number. This version is also marked on the MDT record on the online MDT screen. Deployments show the MCP Version as well on the online user interface.

About Data Encryption

You have the option of enabling or disabling data encryption by altering the master configuration setting, Data Encryption, to either On or Off.

Each **MDT Type** also has a **Data Encryption** setting which you can set to "Default," "On," or "Off." If this is set to "Default" the MCP uses the setting from master configuration. Otherwise the MDT Type takes the localized setting of on or off.

Encryption is not applicable when accessing the mobile application in connected mode.

Defining Deployment Types

Use this procedure to define attributes of an application to be deployed, including all deployment parts, authorized user groups, supported MDT types, and associated message categories.

Prerequisites: You must define all deployment parts, user groups, MDT types, and message categories before you can associate them to a deployment type.

To maintain existing deployment types, select **Admin Menu** > **Device Management** > **Deployment Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a deployment type, follow these steps:

1. Select **Admin Menu** > **Device Management** > **Deployment Type+** .

2. If prompted, select the deployment type business object and click **OK**.

3. Enter a unique name for the deployment type and provide meaningful descriptions.

4. Select the service script to be executed when application starts.

5. Add all deployment parts, MDT types, message categories, and user groups associated with this deployment type.

6. Click **Save**.

You can now create deployments of this type by clicking the **New Deployment** link. This submits the create deployment batch process to create the deployment.

Defining Deployment Parts

Use this procedure to define a collection of deployment items, such as maintenance objects, business objects, UI maps, service scripts, business object schemas, algorithms, etc. A deployment type is made of deployment parts.

Prerequisites: You must define the export bundle containing the items that comprise this deployment part before you can upload them to the deployment part.

To maintain existing deployment parts, select **Admin Menu** > **Device Management** > **Deployment Part** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new deployment part, follow these steps:

1. Select **Admin Menu** > **Device Management** > **Deployment Part+** .

2. If prompted, select the deployment part business object and click **OK**.

3. Enter a name and meaningful description.

4. Select the bundle containing the items that comprise this deployment part.

5. Click **Upload** to upload the items in the bundle.

   The bundle items are displayed in the **Entities** list. When you upload bundle entities, the system replaces all existing entities with the uploaded entities from the bundle.

6. If you want to remove an entity from this **Deployment Part** list, click the - sign to the left of the object in the **Entities** list.

7. Click **Save**.

   You can now add this deployment part to a deployment.

Defining MDT Types

Use this procedure to define the attributes associated with a particular type of MDT, such as the display type and GPS settings.

Prerequisites: None

To maintain existing MDT types, select **Admin Menu** > **Device Management** > **MDT Type** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new MDT Type:

1. Select **Admin Menu** > **Device Management** > **MDT Type+** .

2. If prompted, select the MDT type business object and click **OK**.

3. Enter a unique name for the MDT type and provide meaningful descriptions.

4. Select the display type and GPS settings, then enter interval and timeout values.

5. Select the business object to use when creating MDTs of this type.

6. Click **Save**.

You can now create MDTs of this type.

Defining MDTs

Use this procedure to define mobile data terminals that will communicate with the base application to send and receive work order information.

Prerequisites: You must define the MDT Type before you can create MDTs of that type.

To maintain existing MDTs, select **Admin Menu** > **Device Management** > **MDT** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new MDT:

1. Select **Admin Menu** > **Device Management** > **MDT+** .

2. If prompted, select the MDT type and click **OK**.

3. Enter a unique ID for the device in the **Device Tag** field.

4. Enter the serial number of the device.

5. Enter values for logging and update intervals.

6. Click **Save**.

Make note of the Device Tag value. The first time a user logs onto the mobile application from this device, the system will prompt for this value. The Device Tag is required to register the mobile application to the MDT.

Changing the MDT Log Level

To change the logging level for a device, click the **Set Current Log Level** button on the **MDT** portal and then select the desired logging level (such as INFO or ERROR). An asynchronous request is sent to the device to update its logging level. Once the MDT is updated, it will send a response back to the server to update the Current Log Level for the device on the server.

Activating and Deactivating MDTs

When an MDT record is created, its status is set to Active. Use the **Inactivate** action button on the **MDT** portal to set the status to Inactive. The system will not allow users to log on to the mobile application from an inactive device. Use the **Activate** button on the **MDT** portal to set the status from Inactive to Active.

Getting the MDT Log Files

Log files are not sent to the server automatically; they are only sent on demand, usually for debugging or tracing purposes.

To send log files for a device to the server, click the **Get MDT Log Files** button on the **MDT** portal. This initiates a request to the device to send the active log files to the server. Refer to the configuration guide for more information about MDT logging.
Use the **Log Files** tab to view the contents of the log files.

Reviewing Log Files from an MDT

Use the **Log Files** tab on the **MDT** portal to view log files that were sent from the MDT to the server.

Prerequisites: The log files must have been previously sent to the server using the **Get MDT Log Files** button on the **MDT** portal.

To view log files for an MDT:

1. Select **Admin Menu** > **Device Management** > **MDT** .

2. Click the **Log Files** tab.

3. Enter the dates for which you want to see log files and click **Refresh**.

4. Click a log file in the search results to view the log contents.

Creating Deployments

Use this procedure to create a new deployment using the batch deployment process.

Prerequisites: You must have already created the deployment type and any deployment parts, MDT types, message categories, service scripts, and user groups associated with the deployment type.
Note, the deployment can also be created more simply by clicking the **New Deployment** link from the **Deployment Type**.

1. Select **Main Menu** > **Batch** > **Batch Job Submission+** .

2. Do not enter a value in the **Batch Job ID** field. This will be assigned automatically by the system.

3. In the **Batch Code** field, select the batch control ID of the deployment creation batch control. (The base system provides batch control M1-DPLOY for this purpose.)

4. Enter batch control settings as desired.

   The Desired Execution Date/Time defaults to the current date and time. If you want the batch job to run immediately, accept the default. If you want the job to execute at a future date, enter the date and time you want the job to start.

5. In the Deployment Type Parameter Value, enter the Deployment Type ID for this deployment. The deployment type determines which application components will be included in the deployment.

6. Click **Save**.

   The batch job will run automatically at the Desired Execution Date/Time.

7. To check the progress or view the results of the batch job, select **Main Menu** > **Batch** > **Batch Run Tree** .

8. Search for the batch control ID (M1-DPLOY), then select it in the search results list.

   Note the time at which the job ran, the status, and any processing details.

The status of the new deployment is Created. You must manually activate the deployment before it can be deployed to any MDTs.

Activating and Inactivating Deployments

Use this procedure to activate a deployment so that it can be downloaded to MDTs. You can also inactivate a deployment so that it can no longer be deployed.

Prerequisites: The deployment must have been created using the batch deployment creation process.

1. Select **Admin Menu** > **Device Management** > **Deployment** .

2. Use the **Deployment Search** zone to find the deployment you want to activate.

3. On the **Deployment** Portal, click the **Activate** or **Inactive** button in the **Actions** zone.

Once a deployment has been activated, it is available for download to MDTs that logon on from the mobile application. When the mobile user logs on, the system looks for all qualified deployments and downloads the appropriate one. If more than one eligible deployment exists, the system prompts the user to select one. If the user's current shift is not complete, no downloads are performed.
Once a deployment has been inactivated, it is no longer available for download to MDTs.

Verifying Whether a Deployment is Current

Use this procedure to verify whether or not a deployment is up to date.

Deployments become out of date when there is a change to any of the data that supports the deployment. If the service detects a mismatch between what has been deployed and the most current deployment data, a flag is displayed to indicate that the MCP version is out of date.

1. Select **Admin Menu** > **Device Management** > **Deployment** .

2. Search for and select the deployment you want to verify.

3. If it is not already marked as out of date by another process, expand the **Out of Date Items** zone to request the system to evaluate the deployment now.

   If determined as out of date the deployment is marked as such and the zone lists the out of date information.

Scheduler Administration

This section describes concepts and common tasks related to scheduler administration.

Understanding Scheduler Setup and Administration

This section describes concepts related to scheduler setup and administration.

About the Scheduling Process

The scheduling process automatically assigns tasks to crew shifts, matching field work requirements to crew capabilities and optimizing the routes traveled by crews. The goal of the scheduling process is to produce the most cost-effective schedule. The scheduling process considers a large number of configurable factors to arrive at the optimum schedule.

The scheduling process has the following basic inputs:

- **Tasks:** Tasks represent the types of "things" the crew might have to do during their shift. They can be any one of the following, all of which are incorporated into the schedule as needed.

  - Activities indicate the type of work, required skills, task duration, service location, time windows, and task-based cost factors.

  - Periods of Unavailability tasks (POUs) indicate a fixed period of time as well as a location where the crew must to attend to some task unrelated to shift work, such as a meeting.

  - Non productive tasks (NPTs) indicate a window of time as well as location where the crew must attend to some task unrelated to shift work. The start time for a NPT is defined as an offset period so that it must start within a certain amount of time after the start of a shift, but is not scheduled for a particular time.

  - Breaks indicate a broad window during which the crew may take their break, as well as the allowed break duration.

- **Crew Shifts:** Shift data includes crew capabilities, covered service areas and service classes, logon and logoff location, and shift-based cost factors.

- **Map Data:** All locations within the service territory are represented in the map data.

- **Static Control Data:** This includes global cost controls and appointment booking groups.

The scheduling process assigns each task a scheduled date/time on a particular shift of a crew. As part of the optimization process, a task may be assigned, unassigned, and reassigned any number of times until its current scheduled shift starts. This happens when a crew logs on to the shift and the task is dispatched.

Dispatchers can manually override virtually all scheduling decisions made by the system.

About the Appointment Booking Process

Appointment booking refers to how the host system (such as a customer relationship management or customer information system) handles requests from the host for appointments and how it responds with available appointment windows. The appointment booking process receives appointment requests from the host that specify the time periods for which the scheduler should return a list of available appointment windows. The process generates a set of possible appointment windows from which customers can choose.

If the activity being booked is part of a job, the request must include all of the activities in the job. The possible time windows returned reflects available times for the target activity as well as all of the other activities in the job. Refer to *About Time Windows* for more information.

Appointment booking, conditional booking and chooser requests cannot be used for activities that have dependent activities.

Conditional Booking

When an appointment is booked from an outside application, the host requests a list of available appointment windows from the scheduler. By the time the user makes a selection for a specific appointment window there is a chance that the selected window may no longer be available. Therefore the booking is sent as "conditional" pending the availability of the selected appointment window. If the activity is still available, it is created as per usual. However, if it is no longer available, then the activity is not created.

If the activity being booked is part of a job, the request must include all of the activities in the job.

Conditional booking cannot be used for activities that have dependent activities.

Re-Booking

The system allows users to change an existing appointment in the host application. When the user requests a change to the appointment, similar to requesting an appointment for the first time, the host system reconciles with the base application to present the user with a new set of available appointment windows to match the new booking details. Typically the request to rebook an existing appointment is sent from the host as conditional upon the ability to accommodate the new booking instead of the original booking. As such, if the new booking is no longer available or the old booking can no longer be canceled, the rebooking attempt fails and the user is notified of the situation. Once rebooking is confirmed, the system cancels the original booking and schedules the new one instead.

If the original booking is already dispatched to a crew, the system cannot guarantee its successful recall from the crew as this requires human intervention. If the rebooking request states that it must be fully guaranteed then the rebooking attempt fails and the user is notified of the reason. If however the rebooking request can tolerate it not being guaranteed, then the system alerts a dispatcher to follow up with the crew on the cancellation of the original appointment but at the same time also schedules the new booking. If the dispatcher manages to cancel the original appointment in time then it is canceled. If it is not canceled in time then both the original and the new booking are scheduled temporarily until the dispatcher cancels the new one.

If the activity was manually allocated to a specific shift or locked to its depot run by a dispatcher then a subsequent rebooking change frees the activity from these allowing it to be fully rescheduled.

When rebooking activities that are part of a job, the new job composition must fully replace the old job composition so that any activity that used to be in the old job and is no longer part of the new one is canceled.

About Schedulers

The term scheduler refers to the system component that manages a single scheduling process. An implementation typically runs at least two schedulers to provide for backup, but may run additional sets of schedulers if required for scalability.

Each uniquely named scheduler is configured to manage a single scheduling process. Scheduling process responsibilities include:

- Holding
- Request Handler Only
- Optimization
- Optimization and Request

A holding scheduler does not schedule shifts or tasks. It is designed to capture tasks and shifts that cannot be assigned to any online scheduler. One and only one holding scheduler should exist. Any task or shift attached to a holding scheduler is evidence of a scheduling error.

A scheduler that handles requests can handle the following request types:

- **chooser** – returns a list of recommended shifts for an activity

- **appointment booking** - returns a list of valid possible appointments for an activity. Refer to *About Short Term and Long Term Booking* for more information.

- **conditional booking** - confirms the schedule of an activity

- **crew route and directions** – returns the street level route as well as driving directions for a list of tasks in a crew shift's schedule

Each scheduler is associated with a scheduler configuration that defines the scheduling parameters to be used by that scheduler during the scheduling process. These parameters include cost controls, performance and optimization settings, and settings to control logging, auto-dispatching, and other scheduler functions. Refer to *About Scheduler Configurations* for more information.

Each scheduler is also configured to cover a specific geographic area called a scheduling area. Multiple schedulers may be used to handle high task loads. Refer to *About Scheduler Areas* for more information.

Since schedulers are processes intended to continuously run without interruption it is important to always be able to know if a scheduler is running or not (without requiring that users look at the server logs). Refer to *About Monitoring Schedulers* for more information.

About Monitoring Schedulers

Since schedulers are processes intended to continuously run without interruption, it is important to always be able to know whether or not a scheduler is running without having to review server logs.

Each scheduler record must be associated with a unique batch control that runs continuously without interruption. This batch control manages and handles the execution of the scheduler. At run time the batch process determines the scheduler record associated with its batch control and handles operations requested on behalf of the scheduler. If marked online then the batch process starts the corresponding scheduler and if requested to be offline it instructs the scheduler to properly terminate.

As standard batch processes, scheduler batch processes may be visible by an enterprise management console as well as started and monitored by an enterprise batch scheduler.

> **Note:** Your implementation must configure a dedicated batch control for each scheduler as described in the Configuration Guide for schedulers to work properly.

If necessary, a scheduler can be brought on or offline by using the **Boot** or **Shut Down** buttons, respectively.

> **Note:**
> This does not cancel or start the scheduler's batch process but rather guides the batch process to start or terminate its associated scheduler process. If you no longer need to use a certain scheduler you need to shut it down and contact your system administrator to terminate the corresponding batch process and ensure it is not automatically started again.

The **Scheduler Runtime Details** section in the **Scheduler** portal provides information about the status of the scheduler, including the following:

- **Running** – The scheduler is online and running

- **Requested Offline** - The scheduler status was manually set to Offline

- **Not Running** – The scheduler is meant to be online but is not running. Typically a system administrator should investigate when this status is present.

- **Unknown** - The scheduler is not associated with a dedicated batch control so status monitoring is not possible. This is an invalid configuration as all schedulers must be associated with their own unique batch control.

The scheduler also periodically reports various statistical measurements related to its current operation such as total number of activities and shifts it manages, average cycle time, etc. If enabled on the scheduler's batch control, the system uses this information to evaluate how well the scheduler currently works and rate its level of service accordingly. You can reference

the **Level of Service** algorithm defined on the scheduler's batch control for more information on how scheduler level of service is determined.

Access the **Batch Control** portal to review information about the control, or you can find even more information about the running state and level of service of all your schedulers by accessing the *Batch Control Global View* portal.

The **Service Area** portal may also include a **Covering Schedulers** zone which indicates the list of schedulers that cover the service area. Service areas are added for scheduler coverage as an option on the scheduler itself.

In addition, the **Schedule** tab on activities shows a scheduling status message as to why an activity is not scheduled. For example, there is no running scheduler covering the activity location, there is no shift with the appropriate skills, the activity is out of the scheduling horizon, there are activity data errors, etc.

About Scheduler Areas

A scheduler area is a predefined set of service areas or geographic subsets of service areas, referred to as optimization areas, covered by this scheduler. Each scheduler has one scheduler area.

A scheduler is limited to scheduling tasks within its scheduler area. A scheduler area may comprise one or more service areas. If a scheduler area has too many tasks for a single scheduler, it may be broken down into smaller segments called optimization areas. Optimization areas are defined by a geocode pairs.

The **Optimization Area** field indicates whether coverage is specified in optimization areas or in entire service areas. When the scheduling load for a service area is more than a single scheduler can manage, optimization may be further limited to smaller subsets of that area. If enabled, these areas are defined in the **Optimization Sets** section.

The **Service Area** section indicates the service areas that make up the scheduler area, and the **Service Area Tree** zone displays a hierarchical representation of the scheduler area and the service areas that comprise the scheduler area.

Access the **Scheduler Area Map** tab to review the geographic boundaries of the scheduler area.

Oracle provides guidelines for planning and designing scheduler areas and optimization areas. Refer to the configuration guide for more information.

About Scheduler Configurations

A scheduler configuration is a predefined set of parameters and settings that control scheduler behavior.

This includes a defining the number of days in the future for which data should be for scheduling as well as long term booking requests. Refer to *About Short Term and Long Term Booking* for more information.

All schedulers that have a scheduler area associated with the same service area must use the same scheduler configuration.

Cost profiles are a type of scheduler configuration that define your organization's scheduling cost preferences. Each scheduler configuration record references a cost profile to define its scheduling cost parameters. Cost control parameters may be shared by multiple scheduler configurations. Refer to *About Cost Profiles* for more information.

For a complete list and description of all scheduling parameters, see the Configuration Guide. (The system provides a description of each scheduler parameter in the embedded help available from the **Scheduler Configuration** portal. Descriptions are also displayed on the **Parameter Definition** portal.)

About Short Term and Long Term Booking

The scheduler uses a scheduling horizon to determine the number of days into the future to consider when scheduling crew shifts and activities.

Appointments that would be set outside of the scheduling horizon are considered by the scheduler as "long term" appointments. A scheduler configured to handle requests may be restricted to handle short term requests only (i.e. those set within the scheduling horizon), long term requests only or both.

The scheduler uses a long term horizon to determine the number of days into the future to consider for long term requests. The long term horizon must be same or larger than the scheduling horizon. Both horizons are defined on the scheduler configuration record.

About Cost Profiles

A cost profile is a type of scheduler configuration that establishes a pre-defined set of cost controls which can be referenced on multiple scheduler configurations.

Cost profiles can be defined to handle different situations then users can actively switch between cost profiles without shutting down the scheduler. This is done by changing the cost profile on the scheduler configuration. When the cost profile is changed, the scheduler responds immediately by optimizing work according to the changed cost profile.

Example situations which may cause you to switch cost profiles include:

- Time of year - winter work, summer work, etc.

- Strong thunderstorms - where different types of work may be preferred

- Sudden drop in temperature - where regulations prohibit turning off power to customers for non-pay

- Sudden high temperatures - where regulations prohibit turning off water to customers for non-pay

- A large backlog of certain types of work, where it has been determined it is ok to work more overtime

- and so on.

Defining cost profiles in the system involves creating the cost profile as a type of scheduler configuration. It is then referenced on the general scheduler configurations that are then applied to schedulers.

When you change a cost profile that is currently used by online schedulers, the schedulers are notified and acquire the new cost profile values automatically. The same applies to changing the cost profile reference on a scheduler configuration used by online schedulers. There is no need to restart the schedulers to reflect cost control changes.

Refer to *About Scheduler Configurations* for more information.

About Scheduler Parameters

Scheduler parameters control how a particular scheduler will schedule tasks, optimize routes, and dispatch activities to crews.

Parameters are typically defined as part of the implementation process. The **Parameter Definition** portal allows admin users to set the minimum, maximum, and default values for each scheduler parameter. This portal also displays detailed descriptions of all parameters.

Most scheduler parameters are associated with a scheduler configuration and their values are maintained on the **Scheduler Configuration** portal. Entity parameters are associated with other objects in the system, such as shifts or activity types, and are maintained on the maintenance portals for those objects.

For a complete list and description of all scheduling parameters, see the Configuration Guide.

Parameter Types

This topic describes the different types of scheduler parameters.

You can view scheduler parameter definitions and their default values on the **Parameter Definition** portal. You can also filter by parameter type.

Parameter Type	Description
appointment generation	Controls how appointment booking requests from the host are processed.
connection	Controls how the scheduler sends and receives data to/from client applications.
cost control	Defines how to calculate and apply costs used to build the most cost-effective schedule.
entity	Defines shift-based and task-based parameters that are applied against global parameters.
general administration	Defines system-wide scheduling parameters.
logging	Controls how and where the scheduler creates log files.
map configuration	Defines mapping parameters used to build and optimize routes.
optimization behavior	Defines parameters that affect optimization of the scheduler.
optimization performance	Defines parameters that affect system performance.
real time	Controls the scheduler's real-time functionality.
reference time	Controls how and when reference time is updated. (Reference time is the time used by the scheduler as input to cost-calculations that are sensitive to the current time.)
site	Defines the default (UTC) Coordinated Universal Time and the error translation file used to translate error messages at initialization.
scheduler manager	Defines defaults and settings for the scheduler manager process.

Understanding Cost Parameters

The system uses cost control parameters to encourage or discourage particular actions within the system. Applying cost controls allows the system to produce the most cost-effective schedule while adhering to your business rules and processes.

Cost Parameters are of two types:

- **Relative:** Cost factors that work as multipliers against global costs. For example, consider that an organization has full-time crews and contractors that may be called on to handle excess work. In order to encourage the system to schedule work to contractors only when no full-time crew is available, you could apply a relative cost of ten to contractor shifts, indicating that these shifts would cost ten times as much to use in the schedule as a full-time crew shift. Examples of relative cost parameters are Relative Shift Cost, Relative Late Cost. Relative costs factors default to a value of 1.0.

- **Global:** Costs that are applied globally at a base level within the schedule. Examples of global cost settings are Late Cost, Shift Cost, Travel Time Cost, and Travel Distance Cost.

Global costs can be of various types:

- **Flat:** Costs that are applied once, when the object is activated, and removed when the object is no longer being used. The cost for using this object does not go up over time but stays at a standard or flat cost. For example, the global Shift Cost is the flat of utilizing a shift. The Relative Shift Cost parameter can be used as a multiplier against the flat cost.

- **Variable:** Costs that are applied per use or per unit. These are also referred to as running costs. Travel Time Cost and Travel Distance Cost parameters fall into this category.

- **Complex:** Costs that increase exponentially and are nonlinear in nature. Complex costs are determined by mathematical functions controlled by a group of three cost control parameters:

    Cost Value a represents the initial slope for x>=0 (at x=0).

    Cost Value b represents the doubling rate (the slope of the function doubles every x_B).

    Cost Value c represents a flat additional cost, creating an initial step.

    For more information about complex costs, see the Configuration Guide.

- **Time-Dependent:** Factors that adjust shift-based costs based on when a shift begins. Six independent variables (TDC Values A-F) are used to define time-depending costs:

  - **TDC Value A:** Initial value for the time-dependent cost factor. This value must be greater than or equal to zero.

  - **TDC Value B:** Controls how long the initial TDC Value A applies, in hours.

  - **TDC Value C:** Controls the shape of the curve between the initial value and the final slope, referred to as the transition curve. The valid range is 0.1 to 10.

  - **TDC Value D:** Number of hours after which the function changes from curved to linear. This value must be greater than TDC Value B.

  - **TDC Value E:** Factor at the point at which the function changes from curved to linear. (This the final factor for the transition curve and the initial factor for the final curve.) This value must be greater than or equal to zero.

  - **TDC Value F:** Controls the gradient of the final slope (units/hour).

  For more information and examples of time-depending costs, see the Configuration Guide.

About the Scheduler Registry

The scheduler registry contains a record for each task, shift, appointment booking group, and scheduler configuration that is used by a scheduler.

Registry Objects

All objects associated with the scheduling process register themselves to the scheduler registry.

- An activity is registered with all schedulers that host its geographic location or at least its service area. (If a scheduler's scheduler area is defined using optimization areas, then the activity registers itself to that scheduler only if the scheduler covers the activity location's geocode. If a scheduler is defined using service areas only, then the activity registers itself to that scheduler if it covers its service area.)

- A shift is registered with all schedulers that host any of its service areas.

- A break is registered with all schedulers that host its shift.

- A POU task is registered with all schedulers that have a shift for the POU resource and covers any of the POU services areas, if any.

- Every appointment booking group is registered with all schedulers.

- A scheduler configuration and its cost profile are registered with all schedulers linked to that configuration.

Online scheduler monitoring processes update the scheduler registry automatically to remove shifts and tasks that no longer belong to any of the scheduler's optimization areas (if used) or service areas (if no optimization areas are used), and to

add tasks and shifts that belong to one of the scheduler's service areas/optimization areas but are not already linked to the scheduler. This could happen if a scheduler's service areas/optimization areas are altered while the scheduler is running .

Posting Actions

The system notifies scheduler managers about a change that was made to an entity by posting a change action onto each scheduler's registry record for the entity. Each scheduler manager then communicates this information to its scheduler process. Posting actions in the registry include:

Send: An entity has changed and the entire entity needs to be sent to the scheduler.

Send Status: An entity's state has changed and state-related details for the entity, rather than the entire entity, need to be sent to the scheduler.

Send Schedule: Another scheduler manager has made a schedule change to an entity and schedule-related details need to be sent to the scheduler.

Processed: The registry record has been processed by the scheduler. For example, an object that needed to be sent to the scheduler process was delivered.

Remove: The system has deleted or cancelled an entity (or changed it so that it is no longer relevant to the scheduler) and the entity needs to be removed from the scheduling process (that is, it should no longer be considered for scheduling). After removing the object, the scheduler deletes the registry entry.

Errors

If any errors or warnings resulted from the posting action, they appear in the registry record. Depending on your configuration, To Do entries may also be generated for scheduler registry errors. Verify that the **M1-SCHED Scheduler Monitor** batch process runs periodically to generate and manage these to do entries.

Read Plug-Ins

Read plug-ins are used to read registered objects and package them for transfer between the scheduler manager and the scheduling process. Read plug-ins are enabled for tasks, shifts, appointment booking groups, and scheduler configurations. For more information, see the Configuration Guide.

Defining Scheduler Parameters

Use this procedure to view scheduler parameter definitions and edit the minimum, maximum, and default values that can be entered by the user for each parameter. Scheduling parameters are typically defined during system implementation.

Prerequisites: None

> **Note:** Most scheduling parameters are associated with scheduler configurations and control how the scheduler processes tasks and shifts to arrive at the most cost-effective schedule. Use the **Scheduler Configuration** portal to specify the parameter values for a particular scheduler.
> Some scheduling parameters are associated with crew shifts, activity types, or resources. Use the appropriate maintenance portal to set these parameter values.
>
> To view descriptions of all scheduler parameters and determine where each parameter value is set, see the Scheduler Parameter table in the Reference Topics. Descriptions are also displayed on the **Parameter Definition** portal.

To maintain scheduling parameter definitions:

1. Select **Admin Menu** > **Scheduler** > **Parameter Definition** .

2. Select the parameter you want to maintain and click the **Edit** icon.

3. In the **Value** section, edit the default and, if appropriate, minimum and maximum values for this parameter.

4. Click **Save**.

Defining Schedulers

Use this procedure to add or maintain an individual scheduler. Scheduler attributes include the application server (node), scheduler configuration, scheduler area, and process type.

Prerequisites: You must define the scheduler configuration and scheduler area before you can associate them to a scheduler.

To maintain existing schedulers, select **Admin Menu** > **Scheduler** > **Scheduler** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new scheduler, follow these steps:

1. Select **Admin Menu** > **Scheduler** > **Scheduler+** .

   If your system supports more than one scheduler business object, you will be prompted to select a business object for this scheduler.

2. Complete all fields in the **Main** section.

3. Click **Save**.

When you create a new scheduler, its status is set to Offline. Use the **Boot** action to bring an offline scheduler online.

Starting or Shutting Down Schedulers

Use this start a scheduler that is currently offline or shut down a scheduler that is currently online.

1. Select **Admin Menu** > **Scheduler** > **Scheduler** .

2. Select and broadcast the desired scheduler.

3. Click **Boot** to bring an offline scheduler online; click **Shut Down** to take an online scheduler offline.

   Note: This does not cancel or start the scheduler's batch process but rather guides the batch process to start or terminate its associated scheduler process. If you no longer need to use a certain scheduler you need to shut it down and contact your system administrator to terminate the corresponding batch process and ensure it is not automatically started again.

Defining Scheduler Areas

Use this procedure to define geographic areas to be scheduled by one or more cooperating schedulers.

Prerequisites: Before you create a scheduler area, identify its service areas and count the number of tasks expected to be scheduled within the service areas. If the count exceeds the threshold for a single scheduler, then you should plan and design optimization areas within the service areas.

To maintain existing scheduler areas, select **Admin Menu** > **Scheduler** > **Scheduler Area** , then use *standard actions* to edit, duplicate, or delete a record.

To define a new scheduler area, follow these steps:

1. Select **Admin Menu** > **Scheduler** > **Scheduler Area+** .

   If your system supports more than one scheduler area business object, you will be prompted to select a business object for this scheduler area.

2. Enter a name and meaningful descriptions.

3. If you want to define optimization areas for this scheduler, select **Enabled** from the Optimization Area drop-down.

4. Select one or more service areas to be managed by this scheduler.

5. If you enabled optimization areas in step 4, continue with the next step; if you will not be defining optimization areas for this scheduler, click **Save** and exit this procedure.

6. Provide a name and meaningful descriptions for the first optimization set.

7. Enter the NW and SE longitude and latitude boundaries for this optimization set.

8. Enter the NW and SE longitude and latitude boundaries for the first optimization area within this optimization set.

9. Click the + sign next to the optimization area and repeat step 8 for each optimization area you want to define.

10. Click the + sign next to the optimization set and repeat steps 6- 9 for each optimization set you want to define.

11. Click **Save**.

   Use the Map tab to review your optimization sets and area on a geographic map.

You can now assign this scheduler area to one or more schedulers.

Defining Scheduler Configurations

Use this procedure to configure a set of parameters that can be used by one or more schedulers.

Prerequisites: All parameters used by a scheduler configuration must have been previously defined. Parameters are typically defined as part of the implementation process.

To maintain existing scheduler configurations, select **Admin Menu** > **Scheduler** > **Scheduler Configuration**, then use *standard actions* to edit, duplicate, or delete a record. (Refer to the **Scheduler Configuration Actions** below for information about additional actions.)

To define a new scheduler configuration:

1. Select **Admin Menu** > **Scheduler** > **Scheduler Configuration+** .

2. If prompted, select the scheduler configuration business object.

   Based on the business object that is selected, you either create a cost profile or a scheduler configuration. You should always create cost profiles first so that they can be referenced on scheduler configurations.

3. Complete the fields in the **Main** section and click **Save**.

   You can now set the parameter values for the configuration and perform other actions, as described below.

Scheduler Configuration Actions

The following table describes the additional actions you can perform from the **Scheduler Configuration** maintenance portal.

To...	Do this...
View parameters of a particular type	Expand the parameter type section.
Edit the value of a parameter	Expand the parameter type section and then click the **Edit** button to the right of the parameter name. Enter the values on the **Scheduler Configuration Parameter** screen and click **Save**.
Complete a scheduler configuration that is in a Pending state	Click the **Complete** button in the **Actions** zone to indicate that the scheduler configuration is complete.

To...	Do this...
	Only complete configurations can be associated with online schedulers. When a scheduler configuration is in the Complete state, you cannot change any of its parameter values.
	To change a completed scheduler configuration, you must set the status back to Pending first.
	If you need to change a scheduler configuration that is being used by one or more online schedulers, you will need to duplicate it first, then edit the copy and change its status to Complete. You can publish the configuration as described below.
Changing a complete scheduler configuration	When a scheduler configuration is in the Complete state, you cannot change any of its parameter values, except its reference to a cost profile. The referenced cost profile can be changed at any time as described below.
	For all other changes to a completed scheduler configuration, you must set the status back to Pending first. If the scheduler configuration is being used by one or more online schedulers, you will need to duplicate it first, then edit the copy and change its status to Complete. You can publish the configuration as described below.
Publish a configuration	The publishing action replaces an existing configuration with an updated one. This has the advantage of keeping the previous configuration intact. Refer to *Publishing Scheduler Configurations* for instructions.
Change the cost profile	If you need to switch any scheduler to use a different cost profile, change the scheduler configuration to reference the new cost profile. You can complete this action at any time, including when the scheduler configuration is being used by online schedulers.
	The change takes effect automatically without the need to stop and restart the scheduler.
	If you want to adjust a cost control parameter on an existing cost profile edit the profile and save.
	All schedulers using the profile reflect the change automatically, also without the need to stop and restart the scheduler.
Assign a scheduler configuration to a scheduler	Navigate to the **Scheduler** maintenance portal in add or edit mode. In the **Scheduler Configuration** field, select the configuration you want to assign to this scheduler and click **Save**.

Publishing a Scheduler Configuration

Use this process to publish a scheduler configuration.

1. Identify the existing scheduler configuration you want to replace, and navigate to its maintenance portal.

2. Make a copy of this configuration using the Duplicate action. When prompted, enter a name for the new configuration.

3. Enter your changes to the configuration and save, then click **Complete**.

4. Navigate back to the original configuration (the one you are replacing).

The **Scheduler List** zone on the **Scheduler Configuration** shows the status of all schedulers linked to this configuration. The publish action will only update offline schedulers.
If any of the listed schedulers are currently online, you must take them offline. Navigate to the **Scheduler** portal, locate each scheduler, and click **Shut Down**.

5. Navigate to the new configuration, and click **Publish**. When prompted, select the original configuration you want to replace.

The new configuration will now be linked to every scheduler the old configuration was previously linked to. You can put the schedulers back online from the **Scheduler** portal.

Viewing the Scheduler Registry

Use this procedure to view the scheduler registry, which contains a record for each object (task, shift, appointment booking group, or scheduler configuration) that is currently owned by a scheduler.

Prerequisites: None

1. Select **Admin Menu** > **Scheduler** > **Scheduler Registry** .

2. Use the **Scheduler Registry Search** zone to find the registry record.

3. Click an entry in the Scheduler Registry search results to view the registry record.

The information displayed in the **Scheduler Read** section describes the details that would be sent to the scheduler. This information varies depending on the type of registry object.

Registry records are view only.

Batch Control Global View

This section describes concepts and common tasks related to using the **Batch Control Global View** portal.

About the Batch Control Global View

The **Batch Control Global View** portal provides an "at a glance" view of the current running state of any batch process. The portal is mainly useful to assess the level of service of your schedulers as well as to monitor batch processes.

Use the portal to find out if a batch process currently runs and how well it runs. This information is only provided if thebatch control is associated with a level of service algorithm.

The portal provides a **Level of Service** column which indicates the health of the batch process. Users can refer to the level of service on the batch control to better understand the business rules applied to assess the batch process. The portal also provides more detailed information about the batch control in the **Current State** zone.

Working With the Batch Control Global View

This section describes common tasks related to working with the batch control global view.

Viewing Scheduler Status in the Batch Control Global View

Use this procedure to monitor a scheduler using the **Batch Control Global View**.

Prerequisites: Your organization must have the necessary batch controls configured to use this feature.

1. Navigate to the **Main Menu** > **Batch** > **Batch Control Global View** .

2. Set the **Query Option** to "Schedulers" and fill in any other search fields as applicable.

3. Click **Refresh**.

4. **Broadcast** the appropriate scheduler.

    The view provides runtime details and other information about the state of the scheduler.

Monitoring Batch Jobs in the Batch Control Global View

Use this procedure to monitor any batch job using the **Batch Control Global View**.

Prerequisites: Your organization must have the necessary batch controls configured to use this feature.

1. Navigate to the **Main Menu** > **Batch** > **Batch Control Global View** .

2. Set the **Query Option** to "All Batch Controls" and fill in any other search fields as applicable.

3. Click **Refresh**.

4. **Broadcast** the appropriate batch control.

    The view provides runtime details and other information about the state of the scheduler.

BI Configuration Administration

BI configuration administration involves creating, maintaining and working with Oracle Utilities Analytics configurations.

About BI Configuration

The **BI Configuration** portal holds information about the configuration tasks related to Oracle Utilities Analytics.

This is a display-only portal that provides a bird's eye view of the configuration for Oracle Utilities Analytics. The portal also provides links and guidelines for the areas that need configuration to successfully run the extract transfer and load processes from Oracle Utilities Analytics.

Users can leverage the reporting capabilities of Oracle Utilities Analytics to monitor and measure the crew optimization, and also measure the activity response time and route effectiveness etc.

Chapter 4

Reference Topics

This section provides reference information to support tasks.

Glossary

This glossary provides definitions of commonly used terms.

Acknowledgement Required	Indicates that the crew is required to manually confirm receipt of activities of this type.
activity time window	The time period during which an activity can be scheduled. See also effective time window (ETW), preferred time window (PTW), arrival time window (ATW), and service time window (STW)
activity type	Defines the nature of the task to be performed at a specific location.
alert	A situation in which predefined condition(s) have been met that require user attention or intervention.
algorithm	A set of rules for solving a problem in a finite number of steps.
allocate	A user-initiated action that locks an activity to a particular crew shift. See also assign and unassign.
allocation priority profile	See priority profile
Allow Crew Time	Some activity types include an **Allow Crew Time** field that indicates whether the crew is allowed to review and correct time usage reports for activities of that type. If this value is set to Yes, the mobile worker is presented, at activity completion, with an **Activity Completion Times** screen which displays a list of times spent on the activity such as travel, wait time, work, and breaks. The mobile worker can then

review and adjust the times, as necessary, to align the reported time with actual time spent on each "time bucket". Also, If the value is set to Yes, this feature is active whether or not your organization uses the full timekeeping functionality.

This feature is automatically used for *complex activities* so that mobile users always see the **Activity Completion Times** verification screen at activity completion time. Since it is always used, the **Allow Crew Time** field is not shown on complex activities or complex activity types.

alternate ID	A different way of uniquely identifying an activity, in addition to its system-generated primary key. A short and simple alternate ID is typically used if an activity is dispatched to a crew by voice and the activity's system-generated key is too long to communicate verbally.
application service	Defines the actions (access modes) supported by a securable function in the system. An application service exists for every transaction and zone in the system, and every business object must reference an application service. Application security is defined by granting or denying user groups access to specific application services.
appointment	An activity for which an arrival time window has been set in advance.
Appointment Booking Group	Defines valid time windows for appointment booking.
arrival time window	A period of time within an activity's effective time window (ETW) during which the activity is allowed to be scheduled, based on applicable restrictions or conditions. See also effective time window (ETW), preferred time window (PTW), and service time window (STW)
arrived	A task status indicating that the crew is at the service site or event location site but has not yet started work.
assign	An action, performed by the scheduler, that links an activity to a particular crew shift. Assigning is done only by the system. A user can unassign an activity, which unlinks it from its current crew shift and makes it available for rescheduling to any other crew shift, and then the user can allocate it to a different shift; however, a user cannot assign activities.
assignment	A crew's copy of an activity. It is used by the crew to record status changes and completion information. If the crew uses a mobile data terminal (MDT) to work their schedule, a copy of the assignment is dispatched to the crew's mobile device.
assignment in progress	An activity status indicating that a copy of the activity, referred to as an assignment, has been created. The activity remains in this status until the crew completes the assignment or returns it.
assist activity	An activity created to address a situation where a crew needs assistance with an activity.
assumed equipment	Equipment (capabilities) typically associated with vehicles of a particular type.
assumed skills	Skills (capabilities) typically associated with mobile workers of a particular type.
auto dispatch	A system feature that provides automatic dispatching of activities to crews once they are logged on. Also refers to an **Activity Type** attribute that enables or disables auto dispatch for specific activity types. The **Drip Mode** attribute defines auto dispatch settings at the crew shift level.

base service areas	Service areas within which a mobile worker typically works.
base time	The **Time** zone defined on installation options, which is typically the **Server Time** zone.
being scheduled	An activity status indicating that the activity has been sent to the scheduler and is in the process of being scheduled. An activity also transitions back to this status if its current assignment to a crew has been recalled or returned.
BPA	Business Process Assistant. See BPA script.
BPA script	A set of commands that run on the client's browser and guide a user through a business process.
break	A planned time period within a crew shift during which the crew is eligible for taking a break. During a break, the crew may not carry out work or travel.
break duration	Duration of the break.
break window duration	Duration of the period of time during which the actual break can be taken. For example, a 15-minute morning break might have a 60 minute window during which the break can be taken.
calculated	Computed; arrived at or determined by mathematical calculation.
cancel	An action that typically terminates the lifecycle of a business entity. For example, canceling an activity stops the effort of scheduling and performing it.
cancelled (status)	The status resulting from a cancel action. This is typically a final state. For activities, a cancelled status indicates that the host system or the dispatcher has cancelled the activity and it is no longer being considered for scheduling. For crew shifts, a cancelled status indicates that the shift was manually cancelled.
capability	An ability associated with a resource that qualifies the resource for a certain type of work.
capability type	A type of ability that qualifies a resource for a certain type of work. Capability types may define human skills or equipment.
chain	A number of activities that are dependent upon each other.
chooser	A scheduler tool that returns a list of recommended shifts for an activity and allows you to manually select the best shift to complete the work.
class	A broad grouping or categorization.
clustered tasks	If a crew shift contains multiple tasks of the same class and status that are back-to-back (with only a short period of idle between), then the system collapses the individual tasks into one clustered task in the **Scheduling Gantt** task area. You cannot take action on clustered tasks; you must first expand the shift to uncluster the tasks.
collision	A clash; a conflict; a meeting of objects that causes an adverse impact. See collision detected.
collision detected	An activity status that occurs when more than one completed assignment is received by the server for the same activity.
Common Dispatching Functionality	A component of the application that provides functionality for dispatchers to effectively monitor and manage workforces and activities.

Common Dispatching Interface	The primary point of user interaction for the Common Dispatching Functionality (CDF).
complete	An action that finalizes the processing of a business entity and ends its lifecycle.
complete (activity status)	An activity status indicating that the requested work has been done and completion details are available to be sent back to the requesting host system. A completed assignment has been received (one and only one) for an activity and all other assignments for that activity are finalized. The activity remains on the mobile device until logoff. If an activity was in a Collision Detected status and the dispatcher has identified which completed assignment to use, the activity transitions to the Completed status.
complete (shift status)	A crew shift status indicating that the crew is done working. This is also known as the End Of Shift. A shift cannot be completed if any of its tasks are not completed or returned.
completion remarks	Comments typically entered by a crew when an activity is completed.
crew	A uniquely named group of resources (mobile workers and vehicles) scheduled to perform work.
crew allocation	The specific mobile worker(s) and vehicle(s) assigned to a crew on a particular shift.
crew shift	A planned period of time in which a crew is available to work.
crew shift template	A tool for quickly generating crew shifts based on pre-defined parameters.
crew size	The minimum number of mobile workers needed to perform activities of a particular type.

dashboard	A portal that always appears on the desktop. Its zones contain tools and data used to complete common tasks.
deadreckoning	A method of estimating the current position of a moving vehicle where GPS is not available or updates are received infrequently.
dependent activity	An activity that depends on another activity either by time or resource. The dependent activity may also have other activities dependent on it to form a chain. Such dependency may span resources and shifts.
deployment	Refers to the set of application components (maintenance objects, business objects, UI maps, service scripts, etc.) that are delivered to mobile device terminals to define the function of the mobile application on the mobile device.
deployment part	A collection of deployment items, such as maintenance objects, business objects, UI maps, etc.
deployment type	Defines attributes of an application to be deployed, including authorized user groups, supported MDT types, messages used, and objects included.
depot	A central location where goods are loaded for delivery, or collected goods are unloaded.
depot run	When a crew makes a trip to a depot.
detected	Discovered; found.

disable	To make unavailable or inactive.
dispatch	An action, either system- or user-initiated, that locks an activity's sequence in the shift schedule and marks it as ready to be sent to the crew. See dispatched status.
dispatched (status)	An assignment status indicating that the assignment has been synchronized to the crew and the activity is now locked to its assigned crew shift and sequence. If required, manual acknowledgement has been given.
dispatch area	A predefined set of service areas and service classes monitored by one or more dispatchers.
dispatcher	An individual responsible for monitoring and managing day-to-day field operations.
drip mode	A **Crew Shift** attribute that indicates how the system should handle dispatching of activities to that crew shift. Valid options are: **None:** Automatic dispatching is disabled. All scheduled activities must be manually dispatched to the crew's shift by the dispatcher or by another system-invoked process. **Auto All:** All scheduled activities are automatically dispatched to a shift once it has started. This applies to any additional activities being scheduled throughout the duration of that shift. This excludes any activities where the **Auto Dispatch** attribute is set to No for the Activity Type. **Standard (Drip Mode):** Only a fixed number of scheduled activities are dispatched to the crew at any given point of time. The fixed number is specified as the Drip Horizon.
drip horizon	The number of activities to dispatch when drip mode is set to Standard or Hybrid.
effective date	The date on which a characteristic, parameter value, or other element becomes effective. See also arrival time window (ATW), preferred time window (PTW), and service time window (STW)
effective time window	The time period within which an activity should be scheduled, based on values sent from the host.
emergency task	A task of highest priority, indicating that its scheduling takes precedence over all non-emergency tasks.
en route	An assignment or POU status indicating that the crew is on its way to the service address or meeting address.
enable	To make available or active.
end odometer	The final odometer reading (total distance traveled by the vehicle) recorded at shift logoff.
equipment	Device or equipment used to perform certain types of work. In ORS, equipment is a capability that can be associated with one or more vehicles (resources).
estimated duration	The approximate length of time it should take to complete an activity.
field referenced activity	An activity created by a crew when connectivity problems prevent the crew from receiving an activity and require the dispatcher to voice dispatch it. The FRA references the original activity and, when connectivity is re-established, the FRA is synchronized with that activity on the server.

finalized	Indicates that an object's current status represents the end of its defined lifecycle. For example, in the base system an activity is finalized if it is in a canceled or completed state.
foreign key	A referential constraint between two tables. The foreign key identifies a column or a set of columns in one (referencing) table that refers to a column or set of columns in another (referenced) table.
foreign key reference	Defines the program used to construct a maintenance object's info string. It may also define the transaction used to display, add, and update instances of the maintenance object.
Gantt	A tool that allows dispatchers to view shifts in a timeline and perform actions on activities for those shifts.
Geocode	The longitude and latitude associated with an address, which is used for optimizing routes and displaying crews and activities on a map.
Global Positioning System	A navigation system based on a network of satellites that send out radio signals to pinpoint an entity's location.
holding scheduler	A holding scheduler is not associated with a schedule manager and therefore does not schedule shifts or tasks. It is designed to capture tasks and shifts that cannot be assigned to any online scheduler. One and only one holding scheduler should exist. Any task or shift attached to a holding scheduler is evidence of a scheduling error.
host external system	A computer system external to the base application that sends work orders (activities) to and receives updated information from the server.
idle time cost	A scheduling factor that indicates whether or not crew idle time cost should be considered by the scheduler.
Ignore Sequence Locking	In most situations activities are worked on a route in sequence and once the activity is dispatched, the sequence is locked. If another activity comes in and is dispatched, it would typically not be dispatched before an activity that is already dispatched. In situations where a user would want to allow a new task to be dispatched before tasks that have already been dispatched this value can be set to "Yes". This allows the scheduler to dispatch the activity before any other activities that are already dispatched. This is only relevant for shifts where the **Drip Mode** is set to **Standard**.
in service	A crew shift status indicating that the crew is considered to be performing work. The crew may be traveling to an activity location, working an activity, or idle between activities. The crew status transitions to In Service automatically when an activity is started or a POU or break is ended. The user can manually transition to this status.
issue	A situation, problem, or potential problem requiring attention or resolution.
issues detected	An activity status indicating that the activity is not valid and processing cannot proceed. Manual dispatcher intervention is required to resolve the issue. Once the problem has been fixed, the status of the activity can transition to Being Scheduled.
job	Multiple activities that must be all performed by the same crew on a single shift.

key performance indicators	Quantifiable measurements that support dispatcher decision making and in-day exception handling. A KPI may apply to activities and crew shifts that dispatchers are responsible for in their current shift.
late cost	A scheduling factor that defines a cost associated with late arrival to an activity. It is used to discourage scheduling of the activity outside its time window.
lead time	Number of minutes before a shift is planned to start that the reserved capacity is released.
limited time	Indicates an entity or capability that has an effective and expiration date.
location	A predefined physical location, such as a service center.
logoff delay	Number of minutes before the end of the shift that the scheduler should stop scheduling work. This is used to reserve time at the end of the shift for any end-of-shift work.
logon delay	Number of minutes after start of the shift that the scheduler should begin scheduling tasks to the shift. This is used to reserve some time at the beginning of the shift for performing review and preparation work.
location based services	Crew location and tracking services that utilize GPS data obtained from a mobile resource.
maintenance object	A group of tables maintained together within the system.
manual	Occurring as a result of a user action, rather than automatically by the system.
manual acknowledgement	See acknowledgement required.
MapViewer	A tool, based on Oracle Application Server MapViewer, that provides a visual representation of monitored activities, crews, and routes on a map in the Common Dispatch Interface.
MCP	Mobile communications platform. Essentially this refers to the mobile application.
MDT	Mobile data terminal
message category	A set of application messages.
metadata	Data about data. Metadata may define formatting, validation, possible values, data type, etc.
missing equipment	Equipment typically associated with the vehicle type but missing from this vehicle.
missing skills	Skills that a mobile worker of the specific job type is assumed to have, but this mobile worker does not have.
mobile data terminal	A computerized device typically used to communicate with a central dispatch office.
mobile worker	Refers to any individual, crew member, field resource, field technician, contract resource or any other person or resource completing activities, tasks, or other work.
odometer	An instrument that indicates distance traveled by a vehicle.
non-productive task	Non-work related activities that are planned as part of a shift. For example, replenish stock on a vehicle for 1 hour at the beginning of a shift.

on hold	An activity status indicating that the activity was placed on hold, either by the dispatcher or by the system based on a business rule. An activity may be placed on hold because something needs to be done before the order can be worked (e.g., parts, permit, etc.). An activity cannot be put on hold once an assignment has been created (unless the assignments are returned). The activity will remain in this status until a user removes the hold manually or a condition occurs that prompts the system to remove the hold, at which time it will return to its previous status.
optimization area/set	An optimization area is a geographic sub-region within a scheduler area. An optimization set is the group of sub-regions in one scheduler area. When the scheduling load for a service area is more than a single scheduler can manage, such as too many tasks, optimization may be further limited to these smaller subsets of that service area. Optimization sets are configured on the scheduler area using longitude and latitude coordinates to define the boundaries.
out of service	A crew shift status indicating that the crew is not performing work. The crew may be attending a meeting, taking a break or having a vehicle breakdown, etc. When a crew goes out of service, they provide a reason and an estimated duration. At logon, a shift is Out of Service until a task is started and then it switches to In Service. Starting a POU or break automatically sets the crew status to Out of Service. The user may manually transition to this status.
overridden POU	A POU that has been modified manually and no longer matches the POU template from which it was generated.
overridden shift	A crew shift that has been modified manually and no longer matches the template from which it was generated.
overtime cost	A scheduling factor that defines the cost of exceeding the planned shift duration.

pending (shift status)	A shift's initial status when it is first created, before it is considered planned and ready to be started.
pending dispatch	An assignment status indicating that the assignment has not yet been synchronized to the crew's mobile device or has not been manually acknowledged by the crew, if the activity requires manual acknowledgement.
period of unavailability	A period of time in which a crew is planned not to perform work, such as while attending a meeting.
planning horizon	The number of days into the future to plan for crew shifts and periods of unavailability. For example, if the planning horizon is set to 60, the system generates crew shifts and periods of unavailability (POU) sixty days into the future. Generation occurs in a sliding window in that each day generates data for the last day incrementally. At any given time, the number of days of planned shifts and periods of unavailability is equal to this value. Planning horizon should be equal to or greater than the scheduling horizon.
portal	A page in an application that contains one or more zones.

posting action	A posting action is associated with every scheduler registry entry. It identifies the type of change made to an entity that impacts scheduling, and is used to communicate this information to the scheduler manager.
postpone	An user-initiated action that occurs when a crew has not yet started work on an activity but must postpone the scheduled work.
postponed	An activity status resulting from the postpone action.
preferred time window	The time period within which it is ideal to schedule an activity, based on values sent from the host. See also effective time window (ETW), arrival time window (ATW), and service time window (STW)
preview calendar	Calendar based on the changes that have been entered but not yet applied.
primary key	A single column or set of columns in a table that uniquely identifies each row in the table.
priority profile	A predefined set of allocation factors used by the scheduler to prioritize the scheduling of an activity relative to other activities.
queue	A list of items, such as activities, that are awaiting processing.
queued for dispatch	An activity status indicating that the activity has been successfully scheduled to a particular crew shift and is no longer eligible for rescheduling during optimization, but has not yet been synchronized to the crew's mobile device.
rebooking	A request to reschedule an activity because the activity details, typically requested time, have changed.
recall	An action, typically initiated by a dispatcher, that requests the return of an assignment from its assigned crew.
recommended allocation	One or more mobile workers and/or vehicles identified as appropriate or desirable for a crew shift.
recycle (alert)	An action that reassigns an alert to another dispatcher if the currently assigned dispatcher does not respond to it within a configurable amount of time.
reference time)	Time used by the scheduler as input to cost-calculations that are sensitive to the current time. Applies only to time-dependent costs.
relative efficiency	Scheduling factor that defines a mobile worker's efficiency as a percentage of the expected efficiency for mobile workers of this type.
relative speed	Scheduling factor that defines a vehicle's speed as a percentage of the expected speed for vehicles of this type.
reserve capacity	A scheduling concept allowing shifts to reserve a portion of their time for a specific service class of work.
reserve capacity percentage	Percentage of shift time to be reserved for work associated with the reserve capacity service class.
reserve capacity type	Service class for which a percentage of the crew shift's capacity is reserved.
resource	A workforce resource, such as a crew, vehicle, mobile worker, or dispatcher.
resource class	A broad classification of resource. Resource classes include mobile worker, vehicle, crew, and dispatcher, and may include additional user-defined classes.

resource planner	An individual responsible for allocating workforce resources to perform work across multiple shifts.
Resource Planning and Scheduling	A component of Oracle Real-Time Scheduler system that handles resource planning, resource management, service management, and scheduling.
returned	An assignment status indicating that the crew has returned the assignment or the assignment was recalled. This is the end of the assignment's lifecycle; the activity will be rescheduled.

scheduler	A component of the Oracle Real-Time Scheduler system that assigns tasks to crew shifts in such a way as to optimize the use of resources and reduce overall costs. An implementation typically runs multiples schedulers in parallel for performance and backup.
scheduler area	A predefined set of service areas that are designated to be scheduled by a particular scheduler or a number of cooperating schedulers. Scheduler areas can be further segmented by optimization sets. These sub-regions in the scheduler area are used when the scheduler area has too many tasks for a single scheduler to manage.
scheduler configuration	Defines parameters used to control the scheduler.
scheduler registry	Contains a record for each object currently owned by a scheduler.
scheduling horizon	The number of days into the future the scheduler will consider when scheduling crew shifts and activities. Only shifts that have already started or are planned to start within that time frame, as well as activities that may be scheduled during that time, are considered. For example, if the scheduling horizon is set to 21, the scheduler considers shifts and activities for the next 21 days. Oracle recommends that the scheduling horizon be kept as short as is practical while still meeting customer business requirements. The optimum value for scheduling horizon strikes a balance between long term planning and short term flexibility.
service area	A logical boundary of an organization's territory that may or may not be based on geography.
service class	A broad categorization of activity types, such as Meter Work or Emergency Work.
service level agreement	A part of a service contract where the level of service is formally defined.
service time window	A period of time within an activity's arrival time window (ATW) during which it is preferable to schedule the activity. See also effective time window (ETW), preferred time window (PTW), and arrival time window (ATW).
shift	Short version of crew shift.
shift cost	A scheduling factor that defines the cost of utilizing a shift.
shift cost profile	A preconfigured set of shift cost-based factors that affect scheduling decisions.
shift promotion cost	A scheduling factor that specifies the multiplier by which the shift promotion cost for an activity type is increased or decreased. This is used to discourage creation of additional shifts.

shift weekly template	A tool used to define a cyclical weekly pattern made up of crew shift templates.
site address	The address of the actual entrance to the site of service, which may be different than the service address.
site delay	The delay involved in arriving at this site.
Short Messaging Service	A service that allows the interchange of short text messages between mobile telephone devices.
shuffler	A shuffler changes the current solution (schedule). The scheduler operates by repeatedly calling a shuffler to change the current solution and calculating the new solution cost to determine whether the change was beneficial or not. The scheduler employs many shufflers, each with its own specialization.
skill	A capability that indicates the ability to perform certain types of work. Mobile workers have skills; mobile worker types have assumed skills; activity types require skills.
SLA	Service level agreement.
SLA Flexibility	A scheduling factor that defines the period of time within which an activity must be scheduled to avoid incurring the SLA Priority cost.
SLA	service level agreement
SLA Priority	A scheduling factor that defines the fixed cost that will be applied for working an activity outside its service time window's SLA Flexibility period.
snooze (alert)	To stop (sleep) for a certain amount of time before reissuing the alert.
solution	The scheduler (activity-to-shift assignments) generated by the scheduler.
solution cost	The value calculated by the objective function for a schedule. This value is indicative of how well the schedule attains its cost goals. The lower the value, the better.
sort sequence	The order in which items appear in a list.
start odometer	The initial odometer reading (total distance traveled by the vehicle) recorded at shift logon.
started	A task status indicating that the crew is at the service site or event location site and has started work.
status reason	The reason why an entity transitioned to its current state.
suspend	A user-initiated action that occurs when a crew has started work on an activity but cannot complete the work due to time, material or other resource constraints. When the crew suspends an order, they must provide an estimate of the time required to complete the work.
suspended	An assignment status resulting from the suspend action. The assignment's life cycle is not terminated and remains on a crew shift until the assignment is completed, a dispatcher re-assigns the activity to another shift (a new assignment is created), or the crew logs off the shift and the assignment is returned. When a crew is ready to resume work on a suspended activity, it transitions to En Route status.
synchronize	To communicate data between the server and the MDT so that both have the same up-to-date information.

task	Any activity, POU, or break that occupies time on a crew shift's schedule.
task class	A classification of task. Task classes include activity, POU, and break. Within each task class, there can be any number of task types.
task type	Defines the attributes of a particular type of activity task, POU task, or break. Examples of activity tasks are Meter Read or Equipment Installation.
template	A pre-defined model or example used as a guide to make other objects. POU templates are used to generate actual POUs. Crew shift templates are used to generate crew shifts.
travel time cost	A scheduling factor that defines a cost associated with crew travel time.
UI map	An entity that contains predefined HTML for building a map zone. Its schema defines the fields whose values are inserted into the map at run time.
unassign	A user-initiated action that unlinks an activity from the crew shift to which it has been assigned by the scheduler.
user-defined	Configured or set by a user rather than being assigned by the system.

vehicle	A non-human mobile resource used by a crew.
window cost	A scheduling factor that defines the preference of an activity's time window relative to other time windows.
work calendar	Defines work holidays within a specified time frame.
work done	An assignment status indicating that the crew completed the work but has not entered the completion details yet. The crew may enter the details later in the day. This is typical to crews using SMS to work their schedule. This is the end of the assignment's lifecycle. The activity remains in the Assignment in Progress status while waiting for the completion details to be entered.
work profile	Work profiles establish a date and time restriction that can be associated to an activity type. With a work profile properly defined for the activity type, the system ensures that the activity is not scheduled outside of the established time window.
work sequence	The task's sequence within the crew shift.
zone	A section of a portal. Examples of zones include **Query** zones, **List** zones, and **Actions** zones.

Standard Actions for Admin-Level Data Maintenance

A standard set of maintenance portals are used to define objects that are maintained from the **Admin** menu. These portals use a common interface and support a set of standard actions for creating and maintaining objects. The following quick reference table provides the basic steps for performing any of the standard actions.

Action	Steps
Add	Click the **Add** link in the list or search zone title bar. Provide all necessary information and click **Save**.
Edit	Select the object you want to edit from the **List** zone, then click the **Edit** icon. Enter your changes and click **Save**.
Delete	Select the object you want to delete from the **List** zone, then click the **Delete** icon. Confirm the deletion.
Duplicate	Select the object you want to duplicate from the **List** zone, then click the **Duplicate** icon. Key fields will be cleared in the new record. Complete all required fields and click **Save**.
Broadcast	Select the object you want to broadcast from the **List** zone, then click the **Broadcast** icon. The details and available actions for the selected object are displayed in the appropriate zones.
Activate or Deactivate	Select the object you want to activate or deactivate from the **List** zone, then click the **Broadcast** icon. Click **Activate** or **Deactivate** in the **Actions** zone. **Note:** These actions only apply to objects that support an Active and Inactive status, such as resource types, task types, and alert types. When such an object is deactivated, no new objects of this type can be created.
Sort	Click a column header in the **List** zone to resort by the values in that column. Click again to reverse the order (from ascending to descending or descending to ascending).
Filter	If a list zone supports filtering, a Filter icon is displayed in the **List** zone title bar (on the far right). Click the **Filter** icon, then select the field by which you want to filter and click **Refresh**.
View or add log entries	Click the **Log** tab to view log entries. To add an entry, click the **Add** link in the **List** zone title bar and provide the requested information.

Standard Actions for Data Maintenance

This topic provides the basic steps for performing standard actions on data maintained from the **Main** Menu.

> **Note:** The system displays buttons for all valid actions, based on the object's current status, your user privileges, and your system's configuration. The following table provide instructions for performing all standard actions.

Action	Steps
Edit	From the **Main** Menu: 1. Select the option for the object you want to maintain. A query portal is displayed.

Action	Steps
	2. Enter search criteria to locate the object. The maintenance portal is displayed.
	3. Click the **Edit** button in the **Actions** zone.
	4. Enter your changes. Click ⑦ to display field descriptions.
	5. Click **Save**.
Cancel	From the **Main** Menu:
	1. Select the option for the object you want to cancel. A query portal is displayed.
	2. Enter search criteria to locate the object. The maintenance portal is displayed.
	3. Click the **Cancel** button in the **Actions** zone. The object's status changes to Cancelled and the available actions change to reflect the new status.
Duplicate	From the **Main** Menu:
	1. Select the option for the object you want to duplicate. A query portal is displayed.
	2. Enter search criteria to locate the object. The maintenance portal is displayed.
	3. Click the **Duplicate** button in the **Actions** zone. A new record is created and the Add/Edit screen is displayed. Key fields will be cleared in the new record.
	4. Complete all required fields. Click ⑦ to display field descriptions.
	5. Click **Save**.
Activate/ Deactivate	These actions are valid only for resources, such as mobile workers and vehicles. If a resource is currently in Active status, deactivating it makes it ineligible to perform work. If the resource is currently inactive, deactivating it will allow it to scheduled for work again. From the **Main** Menu:
	1. Select the option for the object you want to duplicate. A query portal is displayed.
	2. Enter search criteria to locate the object. The maintenance portal is displayed.
	3. Click the **Duplicate** button in the **Actions** zone. A new record is created and the Add/Edit screen is displayed. Key fields will be cleared in the new record.
	4. Complete all required fields. Click ⑦ to display field descriptions.
	5. Click **Save**.
View or add log entries	From the **Main** Menu:
	1. Select the option for the object you want to manage log entries for. A query portal is displayed.
	2. Enter search criteria to locate the object. The maintenance portal is displayed.

Action	Steps
	3. Click the **Log** tab.
	4. To add a log entry, click the **Add** link in the **Log** zone title bar.
	5. Type the log detail and click **Save**.

Viewing and Adding Log Entries

Use the **Log** tab to view or add log entries for the current object.

The log displays a list of user and system actions associated with an object, such as when it was created, last updated, or transitioned to different status. For each log entry, the system displays the date and time the action occurred, the user/system that initiated the action, the type of action, and related object, if any.

To create a new log entry, click the **Add Log Entry** link in the zone title, then enter log entry details and click **Save**. Your user ID is saved with the log entry.

Chapter 5

FAQs

This section provides answers to commonly asked questions.

How do I ... ?

This topic answers questions about how to perform day-to-day functions.

Q. How do I reassign all work assigned to a mobile worker if he calls in sick?

A. You can do this in two ways:

- If you want to allocate all of the tasks to a specific crew shift, use the drag-and-drop allocate feature from the **Scheduling Gantt** zone in the CDI portal. Click and drag the tasks from the current crew and drop them on the new crew.

  You can also accomplish this by checking the box to the left of each task in **CDI Activity Search** zone. Then, in the **Scheduling Gantt** zone, right-click the crew shift to which you want the tasks allocated and select **Allocate** from the pop-up menu. (You can also use the **Allocate** button in the **Activity** Search zone and then specify the crew shift.)

- If you want to send the tasks back to the scheduler to be rescheduled, use the Unassign action. From the **CDI Activity** Search, click the check box to the left of each task, then click the **Unassign** button.

Q. How do I determine whether all mobile workers have logged on to their shift on time?

A. The **Crew** pane on the **Scheduling Gantt** zone in the **CDI** portal displays the current status of each crew shift within the scope of data. If the crew has started their shift, the crew state is displayed as In Service and the shift start time is displayed.

Q. How do I determine if a mobile resource is out of range?

A. The system monitors the connection between the server and the mobile devices, and displays a connection status icon to the left of each crew on the **Crew** pane of the **Scheduling Gantt** zone on the **CDI** portal.

Q. How do I change the snooze time for alerts?

A. The snooze time for an alert, as well as the recycle and expire time, are controlled by the settings in the alert type record. If you have appropriate administrative privileges, you can change this value on the **Alert Type** maintenance portal. The

alert type associated with an alert is displayed on the alert's maintenance portal. Note that if you change the setting for alert type, it will affect all alerts of this type.

Q. How do I disable Auto Dispatching for a particular shift?

A. If automatic dispatching is enabled globally for your system (on the scheduler configuration), you can disable it at the shift level by changing the Drip Mode setting on the **Crew Shift** or **Crew Shift Template** maintenance portal to None.

Q. How does reserve capacity work?

A. Reserve capacity is a scheduling concept that allows you to reserve a portion of a crew shift's time for a specific service class of work. For example, consider that your business is entering a seasonal busy cycle, and you want to reserve more time for emergency work during this period. You can also disallow certain types of work during the same period, if you like. Reserve capacity settings are defined on the **Crew Shift** and **Crew Shift Template** portals. Select the reserved class of work in the **Reserve Capacity Type** field. Then specify the percentage of time you want reserved for this type of work in the **Reserve Capacity** field, and enter the amount of lead time before the shift starts that unused reserved time is released and made available to any class of work. Note that you can only specify one reserve capacity class per crew shift.

Q. How do I change the dispatch areas, KPIs, and dates of activities I can monitor in the CDI?

A. The scope of data for the CDI is controlled by the dispatcher shift settings. The dispatcher initially sets the scope at logon, and can change it at any time during a shift using the **Shift** tab on the **CDI** portal. The list of dispatch areas a dispatcher is allowed to monitor is predefined on the dispatcher record. For any particular shift, a dispatcher can choose to monitor one, some, or all of these authorized dispatch areas. The KPIs that appear in the **KPI Summary** are also defined in the dispatcher record, and these cannot be changed for an individual shift. The dispatcher record also determines the default date range for monitoring and specifies whether or not the dispatcher can change the date range for an individual shift.

Q. When is an activity actually dispatched to a crew shift?

A. If auto-dispatch is enabled, an assigned activity will be dispatched to the mobile device when the crew is logged on and the activity is within the crew shift's drip horizon. Here's an overview of how the process works:

- An activity is sent to the scheduler to be considered for scheduling.

- The scheduler assigns the activity to a crew shift or, alternatively, a dispatcher allocates the activity to a crew shift.

- The scheduler continues to optimize a crew shift's schedule up until the time the crew shift starts.

- Based on auto-dispatch drip-feed settings or following a manual dispatch action performed by the dispatcher, the activity is queued for dispatch. This means that the activity is no longer eligible for rescheduling, but has not yet been synchronized to the crew's mobile device.

- Once the crew starts their shift, the dispatch process differs depending on the type of device (if any) the crew is using:

  - For an MDT crew, all Queued for Dispatch tasks are sent to the crew's mobile data terminal (MDT). An activity is considered dispatched only upon receipt of acknowledgement from the crew's MDT.

  - For an SMS crew, the system sends one task at a time via SMS and that task is considered dispatched once it is sent.

  - For non-MDT crew, queued activities are immediately set to dispatched.

Q. How does the system decide which activities to schedule to a crew shift?

A. The scheduler matches the requirements and location of each activity to the capabilities and availability of scheduled resources. It considers a large number of configurable parameters to produce the most cost-effective schedule possible. These include cost factors, which can be set globally as well as at the shift or activity type level. Global parameters are typically established when the system is implemented, and should not need to be changed. Shift-based cost factors are defined in shift cost profiles and then assigned to crew shifts and crew shift templates. Task-based cost factors are defined for an activity type, and apply to all activities of that type. For more information, see the following topics:

- *About the Scheduling Process*
- *About Scheduling Parameters*

- *Understanding Cost Parameters*
- *About Shift Cost Profiles*

Q. If an MDT crew has back-to-back shifts, do they need to log out after the first shift and then log in again for the next one?

A. Yes. If a crew has a 1:00 - 4:00 PM shift and then a 4:00 - 6:00 PM shift directly following it, the system will log the crew off the application at end of shift. The crew will need to log on again to start the second shift.

Q. What happens if a mobile worker's device breaks or is lost during a shift?

A. If an MDT device breaks or is lost during a shift, the dispatcher can forcibly log the crew leader (the last user to log on to the shift) off the shift. The crew leader can then log in from another device and request shift details from the server.

The system provides security measures to ensure that only one device at a time can have the shift data. When a crew logs on to a shift, the system links both the MDT and the user to the crew shift. The system will allow any member of the crew to log on to the shift from this MDT, but will only allow the crew leader to log on from a different device. The force logoff action can be used to unlink the MDT from the crew shift (so the crew leader can log on using a different device), but it does not unlink the user from the shift.

If a device dies and the crew leader is unavailable to log back on, then a user with administrative privileges must revoke the crew leader's password and create a new one, then communicate the new password to another crew member so they can log in from a different device.

Q. How do I know if a deployment is current?

A. Batch processing monitors deployments to determine when they become out of date. Refer to the topic *About Deployments, Deployment Types and Deployment Parts* for more information.

Q. How do I generate a POU from a POU Template?

A. When you activate a POU Template, the system automatically generates the POUs based on the effective date and your system's planning horizon.

Q. How can I tell if a scheduler is running or find other scheduler diagnostics?

A. Refer to the *Monitoring Schedulers* for information on viewing scheduler diagnostics.

What's the Difference Between ... ?

This topic describes the difference between terms and concepts that are closely related.

Q. What's the difference between an activity and an assignment?

A. An **activity** is a task that must be performed at a particular geographical location. Activities can be received from a host system, or created within the application or initiated by crews in the field.

An **assignment** is a copy of an activity created by the system to track the assigned crew's progress in accomplishing the work. An assignment is only created when the crew's shift has already started. If the crew uses an MDT, the assignment is also sent to the crew when the activity is dispatched and appears on the crew's task list.

The crew enters status updates and completion details for the assignment on their MDT, and the system communicates this information back to the server, where the original activity is updated. A dispatcher can create multiple assignments for the same activity if, for example, the original crew has gone out of range and an attempt to recall the original activity has failed. For more information, see:

Concurrent Assignments

Q. What's the difference between a task and an activity?

A. A **task** is any activity, period of unavailability (POU), or break that occupies time on a crew shift schedule. An **activity** is a task that must be performed at a particular geographic location.

Q. What's the difference between allocating and assigning an activity?

A. **Allocate** is an action performed by a user that manually locks an activity to a particular crew shift. Once allocated, the scheduler can optimize the activity's scheduled time, but cannot assign it to another crew shift.

Assign is an action performed by the scheduler that assigns an activity to a particular crew shift. Assigning is done only by the system. A user can unassign an activity, which unlinks it from its current crew shift and makes it available for rescheduling, and then the user can allocate it to a different shift; however, a user cannot assign an activity.

Q. What's the difference between Postpone, Suspend, Defer, and Hold?

A. Hold and Defer are dispatcher actions, whereas Postpone and Suspend are crew actions that can be performed by the dispatcher on behalf of a non-MDT crew. Here's a brief description of each term and how they differ:

Use the **Suspend** action if a crew has arrived on site to an activity and cannot complete it. The system will prompt for a reason for the postponement, the time to which the activity should be postponed (within the current crew shift), and the estimated length of time that will be required to finish the work once it is resumed. This causes the scheduler to re-optimize the position of that activity within the crew's route on that shift based on the estimated postponed time.

Use the **Postpone** action if a crew has not yet arrived to an activity location and wants to postpone the start of work until a later time. The system will prompt for a reason for the postponement and the time to which the activity should be postponed, which should be within the current crew shift. This causes the scheduler to re-optimize the position of that activity within the crew's route on that shift based on the estimated postponed time.

Use the **Hold** action if an activity has not yet been dispatched to a crew (or if it has been dispatched and returned) and you want to hold the activity from being scheduled. This is useful if something needs to be done before the order can be worked, like acquiring parts or permits. When you are ready for the activity to be worked, you can update its status accordingly (to allocate or dispatch, for example).

Use the **Defer** action to modify an activity's arrival time window to a future date. Unlike the Hold action, which applies an indefinite hold, the Defer action causes the activity to be automatically rescheduled based on its new arrival time window.

Q. What's the difference between a POU and a POU task?

A. A **POU** is a period of time during which a crew is planned not to perform work, for example, while attending meetings or training. A **POU task** is a way of tracking a specific crew's attendance of a POU event.

To define the attributes of a POU, you create either a Template POU (for recurring POUs) or a Real POU (for non-recurring POUs). You can specify the resources (crews, mobile workers, vehicles, dispatchers, etc.) that will be attending the POU event, and also specify one or more service areas.

If the resource type is set to crew for the POU type, the system will automatically generate POU tasks for all crews associated with the POU event. Tasks for crews that happen to be working in the specified service areas at the time of the POU event are incorporated into the crew's shift schedule.

Q. What's the difference between unassigning and rescheduling an activity?

A. Both actions cause the activity to be rescheduled. The Unassign action tells the schedule to deallocate an activity if it was manually allocated to a crew shift. The Reschedule action retains the manual allocation if one exists.

Can I ... ?

This topic answers questions about whether certain actions are permitted.

Q. Can I change the capabilities of a resource if that resource is currently logged on to an active shift?

A. Yes. Whenever you update a resource to add or remove capabilities, all non-finalized shifts to which that resource is allocated are resent to the scheduler. The scheduler then reevaluates the shift schedule accordingly, and may add or remove tasks as a result. If an activity has already been dispatched or marked for dispatch, it remains there; it is the responsibility of the crew to suspend the activity if they cannot perform the work and cannot contact the dispatcher. If an activity is still being scheduled when required capabilities are removed, the task is rescheduled to another qualified crew.

Q. Can I change shift details (crew allocation, covered areas, service classes) for a logged on shift?

A. Yes. Any activities that are still being scheduled are rescheduled accordingly. If a task is already dispatched to the shift, it remains there; it is the responsibility of the crew or the dispatcher to resolve the issue manually.

Q. Can I manually dispatch activities if auto dispatching is enabled?

A. Yes. A dispatcher can manually override virtually any scheduler decision. If the scheduler has already assigned an activity to a crew shift, the dispatcher can reallocate it and mark it for dispatch to a different crew shift.

What happens if...?

Q. What happens if a crew doesn't take a scheduled break?

If the crew does not intend to take the break they should cancel it. This allows the scheduler to release the reserved time for the break and better optimize the remainder of the shift schedule. Otherwise, the mobile worker could take the break at any time within its defined window.

Q. What happens if a mobile worker's device breaks or is lost during a shift?

A. If an MDT device breaks or is lost during a shift, the dispatcher can forcibly log the crew leader (the last user to log on to the shift) off the shift. The crew leader can then log in from another device and request shift details from the server.

The system provides security measures to ensure that only one device at a time can have the shift data. When a crew logs on to a shift, the system links both the MDT and the user to the crew shift. The system will allow any member of the crew to log on to the shift from this MDT, but will only allow the crew leader to log on from a different device. The force logoff action can be used to unlink the MDT from the crew shift (so the crew leader can log on using a different device), but it does not unlink the user from the shift.

If a device dies and the crew leader is unavailable to log back on, then a user with administrative privileges must revoke the crew leader's password and create a new one, then communicate the new password to another crew member so they can log in from a different device.

Q. What happens if a crew doesn't attend a POU event?

A. If the crew did not attend a POU and the event has already ended, the crew would need to cancel it before starting their next task. This allows the scheduler to release the reserved time for the event and better optimize the remaining of the shift schedule.

What happens if a crew shift does not finish all assigned tasks by the end of the shift?

When the crew completes it shift, the system automatically returns any unfinalized activities so they can be rescheduled.