

## Student Exercises

# IBM Workload Scheduler 9.4 Operations and Scheduling

Course code TX319 ERC 1.0



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# About these exercises

IBM Workload Scheduler is part of the IBM Workload Automation suite of products. With IBM Workload Scheduler, you can automate and control your entire enterprise production workload. IBM Workload Scheduler is a middleware product that is commonly known as a batch job scheduler, or job scheduler. Job schedulers automatically drive work in mainframe and non-mainframe environments.

Workload Scheduler maintains a database of production scheduling objects such as workstations, jobs, resources, and calendars, and assembles them into a plan. The plan contains the list of the workload to complete within the planned production period. When all conditions and prerequisites are satisfied, the agent runs the workload components and reports the outcome.

In the lab exercises, you learn how to schedule batch jobs in IBM Workload Scheduler. You use the Dynamic Workload Console to create job definitions, scheduling object definitions, and job stream definitions. You submit job streams that you created and monitor their outcomes.

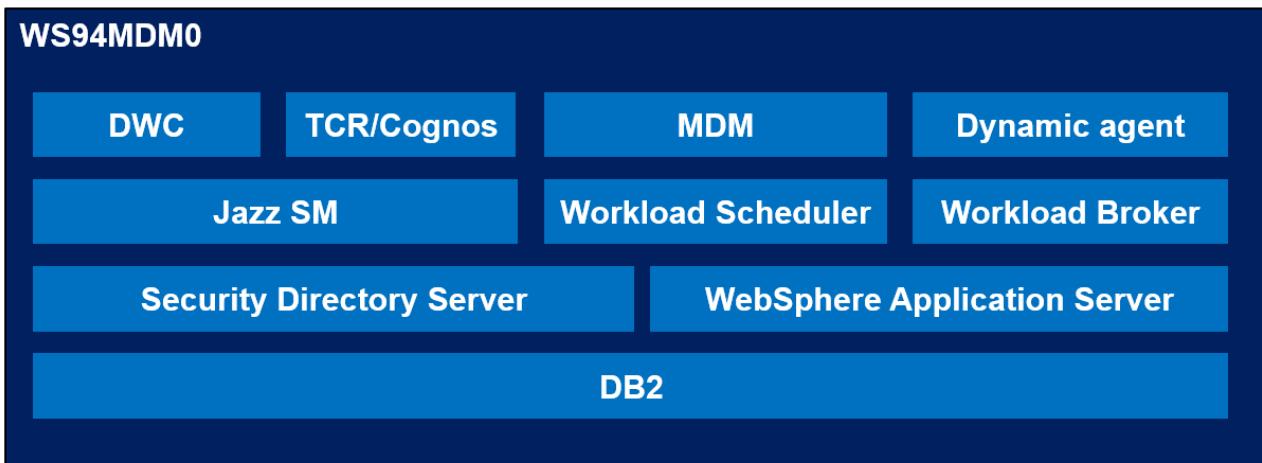
# The Workload Scheduler network in your lab

In the exercises for this class, you log in to the system by using the parameters listed in the following table.

**Table 1 IBM Workload Scheduler learning environment**

Parameter	Default value
Master workstation	MDM0
Host name	ws94mdm0
User IDs	wsuser, wauser, db2inst1, root
Password	object00
Dynamic Workload Console URL	<a href="https://ws94mdm0:16311/ibm/console">https://ws94mdm0:16311/ibm/console</a>

Your learning station contains a virtual computer that runs on a virtual network. The computer contains Workload Scheduler components, as shown. A Master Domain Manager controls a network of dynamic agents. The dynamic agents are collected into pool and dynamic pool workstations.



Docker containers provide additional dynamic agents that you use to learn about monitoring and creating dynamic pool workstations.

Login names that you use during the exercises in this class are **wsuser**, and other names in the LDAP directory. The password for each user is **object00**. The URL for the IBM Dynamic Workload Console is <http://localhost:16311/ibm/console>.

Login names from the directory server that you use during the exercises in this class are listed in [Table 2](#). The password for each user is **object00**.

**Table 2 User names in the directory**

User name	UID	tws Administrators	tws Operators	tws Schedulers	tws Analysts	tip users
Adeline Durling	adurling	Y	Y	Y	Y	Y
Ariana Braman	abraman			Y		Y
Bart Winebarger	bwinebarger		Y	Y	Y	Y
Dick Selan	dselan		Y		Y	Y
Earline Ange	eange	Y	Y	Y		Y
Else Zegarelli	ezegarelli				Y	Y
Emelda Lotempio	elotempio		Y			Y
Gerald Baillio	gbaillio		Y	Y		Y
Houston Dold	hdold	Y	Y	Y	Y	Y
Jaime Vasso	jvasso		Y			Y
Jasper Guglielmo	jguglielmo					Y
Jorge Mulberry	jmulberry	Y	Y		Y	Y
Karine Kingsolver	kkingsolver				Y	Y
Keesha Holzheimer	kholzheimer		Y	Y	Y	Y
Kory Sweetland	ksweetland		Y			Y
Maxima Lamendola	mlamendola	Y	Y	Y	Y	Y
Melvin Harthorne	mharthorne		Y			Y
Thanh Engbretson	tengbretson	Y	Y			Y
Tinisha Fowble	tfowble		Y	Y		Y
Zackary Iverslie	ziverslie		Y	Y		Y
tipuser1	tipuser1		Y	Y	Y	Y
tipuser2	tipuser2		Y	Y	Y	Y
tcruser1	tcruser1				Y	
tcruser2	tcruser2					Y
Administrator	Administrator					



---

# **Unit 1 Introduction to IBM Workload Automation exercises**

In the exercises for this unit, you review the enhancements that are available in Workload Scheduler V9.4, and prepare your environment for the exercises in the next unit. You start the Dynamic Workload Console and use the `conman` and `composer` commands.

## **About IBM Workload Scheduler V9.4**

IBM Workload Scheduler V9.4 automates running batch and near real-time work loads and activities that support business services. It helps provide the reliable and Service Level Agreement (SLA) compliant delivery of these business services. Workload Scheduler extends automation capabilities to heterogeneous systems, and manages work flows that integrate mainframe applications with distributed applications, Enterprise Resource Planning (ERP), and business intelligence applications.

Workload Scheduler offers mechanisms for resource virtualization and uses cloud technologies, which helps to minimize fixed costs. Workload Scheduler includes a modern web-based interface, called the Dynamic Workload Console, for operations, monitoring, scheduling, administrative tasks, and reporting. It offers self-service catalog for mobile devices to show scheduling services to business users in a natural way.

IBM Workload Automation V9.4 integrates with existing data center systems and cloud resources and applications. It delivers improved productivity for the daily operations of IT administrators and schedulers.

# Exercise 1 Logging on and preparing the system

Follow these steps to log on to the computer and prepare the system for your exercise. The exact steps to start the environment are different depending on the classroom that is hosting the training.

1. Open the provided link in your browser. You might have to allow provisioning of plug-ins to your browser.
2. Start the booting of the lab environment by clicking **Power On** for the virtual machine. Booting can take several minutes.
3. When the computer starts, the **wsuser** is automatically logged in, and the browser is automatically started.

If any services are not running, you see red icons. Do not continue until you see that all of the services are running. The web page automatically refreshes, but you can refresh the web page by pressing F5.

The screenshot shows the 'IBM Workload Scheduler Education - Mozilla Firefox' window. The URL in the address bar is <http://ws94mdm0>. The page title is 'IBM Workload Automation'. The left sidebar has a 'Overview' section with links to 'IBM resources', 'Workload Scheduler training', 'Workload Automation offerings', 'Knowledge Center', 'REST API (Swagger)', 'API documentation', 'Forum', and 'Wiki'. Below that is an 'Other resources' section with links to 'Yahoo! maestro.I' and 'ASAP University'. The main content area is titled 'IBM Workload Automation' and contains several sections: 'Workload Console', 'Application Lab', 'Self-service Console', 'Mobile dashboard', 'WS Websphere Console', 'DASH Websphere Console', 'Workload Scheduler log files', and 'RedHat Cockpit'. Each section includes a small screenshot and a brief description. At the bottom, there's a 'Users and groups' section and a 'New SELinux security alert AVC denial, click icon to view' message. The status bar at the bottom right shows '1 / 4'.

**Note:** If the screen saver locks the desktop, in the **Password** field, enter **object00** to unlock the desktop.

4. Refresh the web page after a few minutes by pressing F5.

5. Click the link that has the label **Workload Console**. A new tab opens with the IBM Workload Scheduler page.
6. Log on to the console with user ID **eange** and password **object00**. When you log in to the Dynamic Workload Console, you see a start page that shows links to commonly used tasks in the three web-based Workload Scheduler interfaces.
7. In Dynamic Workload Console section, click **GO**.

# Exercise 2 Using the Welcome Page

In this lesson, you learn how to use the Welcome page.

The screenshot shows the 'WELCOME TO DWC' page of the 'WORKLOAD DASHBOARD'. At the top, there's a navigation bar with links for Default, Administration, Planning, Reporting, System Configuration, System Status and Health, and Troubleshooting and Support. Below the navigation bar, the title 'Hello eange, welcome to the Dynamic Workload Console' is displayed. On the left, there's a 'Take the tour' section with a 'Welcome' link and a brief introduction. To the right, there's a 'Quick start' section with links for Set your preferences, Manage settings, Connect your engines, Define your workstations, Design your workload, and Monitor your workload. A video player window titled 'Monitor your workload' is open, showing a play button and a progress bar. At the bottom, there are links for Help, Follow us, and Mobile it, along with a Start button.

The Welcome page is first page that you see when you log on to the Dynamic Workload Console. The Welcome page contains the following elements.

- A welcome message, with your login name
- An introduction to a built-in tour of the Dynamic Workload Console
- A Quick start section that contains links to commonly used tasks and video demonstrations of those tasks
- Links to extra help, social media sites that are focused on IBM Workload Automation, and links to Workload Scheduler interfaces designed for mobile devices

The **Quick start** section provides links to commonly used tasks, and video demonstrations about how to use them. From the Quick start, you can start common tasks, depending on the roles assigned to your account.

The screenshot shows the 'Quick start' section of the IBM Workload Automation Dynamic Workload Console. On the left, a vertical list of tasks includes: Set your preferences (highlighted in green), Manage settings, Connect your engines, Define your workstations, Design your workload, and Monitor your workload. To the right of this list is a video player window. The video title is 'How to set user preferences'. The video player interface includes a play button, a progress bar showing 0:00 to 3:13, and volume controls. At the bottom right of the video player are 'Maximize' and 'Go' buttons. Above the video player, there is descriptive text: 'View or edit your preferences. You can set the number of lines per page to display in your results, the date and time display options and your timezone'.

- Select a task from the list to the left, and click **Play** to show the video. You can also click **Maximize** to enlarge the video window.
- Select a task from the list, and click **Go** to open the task without using the menus.

To set your user preferences by using the Welcome page, perform the following steps.

1. Hover the mouse over **Set your preferences** in the Quick start section.
2. Click **Go**. You see the Set User Preferences page.

The screenshot shows the 'SET USER PREFERENCES' page. At the top, there are two tabs: 'WELCOME' and 'SET USER PREFERENCES'. The 'SET USER PREFERENCES' tab is active. Below the tabs, the page title is 'Set User Preferences'.  
**Task Options**: Lines per page: 25  
**Date/Time Display Options**: Date format: Short + Time Zone, Timezone: America/Chicago - Central Standard Time (GMT-6:00)  
**Dashboard Options (Legacy only)**: Refresh Rate (seconds, 0=automatic)  Edit... Restore beacon defaults

3. Click **Edit** to use the preferences page to change your Dynamic Workload Console preferences.

4. In the **Task Options** section, select **All** from the **Lines per page** menu. Optionally, change the other settings, such as date format and time zone, to your preferences.

The screenshot shows the 'Set User Preferences' tab selected in the top navigation bar. The main content area is titled 'Preferences'. Under 'Task Options', the 'Lines per page' dropdown is set to 'All' and is highlighted with a red box. Below it, under 'Date/Time Display Options', there are several configuration options: 'Display dates in:' with 'Short format' selected (radio button is blue), 'Long format' unselected (radio button is grey), 'Append time zone name' checked (checkbox has a blue checkmark), and 'Append current GMT offset' unselected (checkbox is grey). Under 'Convert dates to:', 'Default time zone' is unselected (radio button is grey) and 'Selected time zone' is selected (radio button is blue), with 'America/Chicago - Central Standard Time (GMT-6:00)' displayed in a text input field. At the bottom, the 'Dashboard Options (Legacy only)' section includes a 'Refresh Rate' dropdown set to 'Automatic' (radio button is blue) with a value of '30' in a text input field, and two buttons: 'Save changes' (highlighted with a red box) and 'Discard changes'.

5. Click **Save changes** to store the preferences for user **eange**.
6. Click the X on the **Set User Preferences** tab to close the preferences page.

# Exercise 3 Creating and managing engines and configuration settings

To create a connection configuration between the Dynamic Workload Console and Workload Scheduler, complete the following steps.

1. Click **System Configuration > Manage Engines** to open the **Manage Engines** task.
2. On the Manage Engines page, click **New**. You see the Engine Connection Properties page that contains the fields that you complete to create an engine connection.

**Engine Connection Properties**

**Information**

\*Engine Name

**Connection Data**

Engine Type  \*Host Name  \*Port Number   
Remote Server Name

**Connection Credentials**

User ID  Password   Share credentials

**Plan**

Default Plan

**Database Configuration for Reporting**

Enable Reporting  
Database User ID  Password

**Dashboard**

Show in dashboard

3. On the Engine Connection Properties page, click the question mark in the upper-left corner. You see help for the engine connection properties in a new browser window.
4. After reading the help page, close the Engine Connection Properties - Mozilla Firefox browser window that contains the help text.
5. Complete the Engine Connections Properties page with the data that is listed in [Table 1](#).

**Table 1 Engine connection properties**

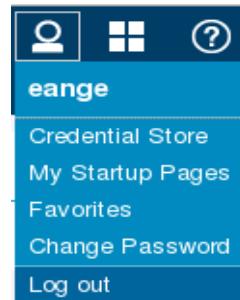
Field	Data
<b>Engine Name</b>	TX319
<b>Engine type</b>	Distributed
<b>Host name</b>	localhost
<b>Port Number</b>	31117
<b>User ID</b>	<i>cleared</i>
<b>Password</b>	<i>cleared</i>
<b>Share credentials</b>	<i>cleared</i>
<b>Enable reporting</b>	<i>selected</i>
<b>Database User ID</b>	db2inst1
<b>Password</b>	object00
<b>Show in dashboard</b>	<i>cleared</i>

6. Click **OK**. You see the message, AWSUI1310I Engine connection created successfully. Click **OK**.
7. In the **Manage Engines** task, select the **TX319** check box and click **Test Connection**. You see the message AWSUI0765I Test connection to [TX319] : successful.
8. Click **OK** to close the Manage Engines page.
9. Click **X** on the **Manage Engines** tab to close the Manage Engines task page.

# Exercise 4 Logging out of the Dynamic Workload Console

To log out of the Dynamic Workload Console, perform the following steps.

1. Select **User > Log out**.



2. Close the browser tab that contains the IBM Workload Scheduler login page.

# Exercise 5 Using the command-line interfaces

In this exercise, you prepare a shell environment and run command-line `conman` and `composer` interfaces from a login shell.

## Setting up the command-line environment

To use the command-line interfaces, perform the following steps.

1. To open a terminal window, minimize the browser and click the **Terminal** icon. Optionally, select **Applications > Utilities > Terminal**.
2. Resize the window to match your preference.
3. Source the Workload Scheduler environment by running the following command.  
    `. /opt/IBM/TWA/TWS/tws_env.sh`

## Starting to use the console manager

To use the console manager program, `conman`, perform the following steps.

1. In the terminal window, at the shell prompt, enter `conman status`. You see text similar to the following example.

```
[wsuser@ws94mdm0 ~]$ conman status
IBM Workload Scheduler(UNIX) /CONMAN 9.4.0.01 (20170626)
Licensed Materials - Property of IBM* and HCL**
5698-WSH
(C) Copyright IBM Corp. 1998, 2016 All rights reserved.
(C) Copyright HCL Technologies Ltd. 2016, 2017 All rights reserved.
* Trademark of International Business Machines
** Trademark of HCL Technologies Limited
Installed for user "wsuser".
Locale LANG set to the following: "en"
Scheduled for (Exp) 09/17/17 (#101) on MDM0. Batchman LIVES. Limit: 11, Fence: 0, Audit Level: 1
IBM Workload Scheduler(UNIX) /CONMAN 9.4.0.01 (20170626)
Scheduled for (Exp) 09/17/17 (#101) on MDM0. Batchman LIVES. Limit: 11, Fence: 0, Audit Level: 1
[wsuser@ws94mdm0 ~]$
```

Notice that the `status` command displays the Workload Scheduler status, and returns to the shell prompt.

2. Start the conman program interactively by entering `conman` at the shell prompt. The prompt changes to the percent sign.
3. At the percent prompt (%), display a list of console manager commands by entering `help commands`. Press the space bar to advance through the next pages. Press q to exit the help command.
4. Exit the conman program by typing `exit` at the percent prompt (%).

## Starting to use the composer program

To use the composer command, complete the following steps.

1. Enter the program interface by running `composer`.
2. At the dash (-) prompt, display a list of available commands by entering `help commands`. Press the space bar to advance through the next pages. Press q to exit the help command.
3. Exit the composer program by typing `exit` at the dash prompt (-).

---

# **Unit 2 Using the Application Lab interface exercises**

In these exercises, you create applications, jobs, and job streams in IBM Workload Scheduler by using the *Application Lab* interface.

# Exercise 1 Using the Application Lab interface

Go to the Mozilla Firefox browser and click the **IBM Workload Scheduler Education** tab.

The screenshot shows the 'IBM Workload Automation' section of the IBM Workload Scheduler Education interface. On the left, there's a sidebar with links like 'Overview', 'IBM resources', 'Workload Scheduler training', etc. The main area has tabs for 'AppServer', 'JazzSM', 'Batchman', 'JobManager', and 'Planorchestrating'. A red box highlights the 'Application Lab' link under the 'Workload Console' section. Other sections shown include 'Self-service Console', 'Mobile dashboard', 'WS Websphere Console', 'DASH Websphere Console', 'Workload Scheduler log files', and 'RedHat Cockpit'. At the bottom, there's a message about a SELinux security alert and a page navigation bar.

1. Click the **Application Lab** link. Optionally, go to the following link to access the **Application Lab** interface

<https://localhost:16311/ibm/TWSWebUI/Simple/index.jsp?engineName=WS93d&engineOwner=smadmin&tenantId=TX&skipTutorial=true>

2. If prompted, log on with user name **ziverslie** and password **object00**.

In this exercise, you use the Application Lab interface and optionally follow the built-in tutorial.

The screenshot shows the IBM Workload Automation Application Lab interface. The left pane displays the 'PROCESS LIBRARY' with categories like 'Critical work', 'Daily tuna', 'Weekly martin', 'As needed grouper', and 'My processes'. The 'Daily tuna' category is selected, showing a table with rows for 'Catch' and 'Release'. The 'AGENTS' list on the left shows four agents: AGENT0, AGENT1, AGENT2, and ECHO, all running on Unix. The right pane is the 'Status' pane, which is currently set to 'PROCESS LIBRARY'. It shows a table of processes with columns for Name, Status, Triggers, Last Run Result, Last Run Date, and Creation Date. A specific process named 'Catch' is selected, showing its details in the bottom half of the pane. The details include steps like 'Start a program', 'Move a file', 'Start a program', and 'Start a program', along with their corresponding scripts and agent assignments. A message box at the bottom right indicates that 'Process Catch enabled successfully' on Aug 31, 2015, at 2:08:18 PM.

*Application Lab layout*

The **Application Lab** presents, on one page, all of the information you need to create simple scheduled work flows in Workload Scheduler. In this exercise, you open the Application Lab interface and use the overview page.

When you log in to the IBM Workload Automation Application Lab, you see the information that you need to create and monitor simple workload processes. The interface has four panes.

- The *process library* pane shows a folder-based structure where the process definitions are stored.
- The *agents list* shows the Workload Scheduler agents that are available to use in the Application Lab.
- The *status* pane has two modes.
  - a. When **Process Status Overview** is selected, the status pane shows the overall status of all the processes run in the Application Lab.
  - b. When **Process Library** is selected, the status pane shows a list of processes in the selected library.
- The *details* pane shows more information about a process you select in the status pane.

## Optionally, following the built-in tutorial

The first time that you use the Application Lab, you can follow a built-in tutorial that guides you through the steps to create your process. As you complete each step, a tooltip guides you to the next step with instructions about which data is needed for that step.



If the tutorial is not running, you can start one by clicking the question mark at the upper-right corner and clicking **Start the tutorial**. You can suppress the tutorial by including the `skipTutorial=true` keyword in the URL that you use to start the Application Lab interface.

# Exercise 2 Managing processes

In this exercise, you use the *processes status overview* page to monitor the progress of all the processes at a high level. From the overview page, you see these items:

- The process library, where process definitions are organized into folders
- A list of available agents, from which you can choose to run process steps
- The processes status overview

From the processes status overview page, you see all of the enabled processes that are planned for the day. You filter the list of processes according to their age by moving the **View last hours** slider. Moving the selection to the right increases how many processes you see in the overview.

The list is not automatically refreshed. Click **Refresh** to update the overview with the most current information.

## Using the process library

By using process libraries, you can organize processes into folders and subfolders for easier access. All users who log in with the same tenant ID share the process libraries.



You create a process library in one of the following ways:

- Click **New** in the process library header.
- Right-click the process library area, and click **New main library**.
- Right-click an existing process library, and click **New sublibrary**. You can create as many sublibraries as you need.

Similarly, you delete a process library by clicking **Delete** in the process library header, or right-clicking the library and clicking **Delete** from the menu. Before you can delete a library or sublibrary, you must remove all the processes from the library. When you delete a library, you also delete all of its sublibraries.

You can move a sublibrary to any other main library or sublibrary. Drag the folder to the new library to move it. As you drag the folder, you see its color change from red to green when you reach a valid destination for the folder.

## Creating a process library

To create a process library, complete the following steps.

1. Click **New** in the **Process Library** pane.
2. In the New Process Library window, enter **My process library** in the **Process library name** field, and click **OK**.

## Creating a process

To create a process, complete the following steps.

1. Select **My process library** to contain the process.
2. Click **New** in the status pane.
3. Define the process properties and conditions by completing the **General**, **Triggers**, **Variables**, and **Steps** tabs in the details pane. The details of each tab are explained in the next section.

## Applying general properties

In the details pane, the **General** tab is selected. Complete the following fields on the **General** tab.

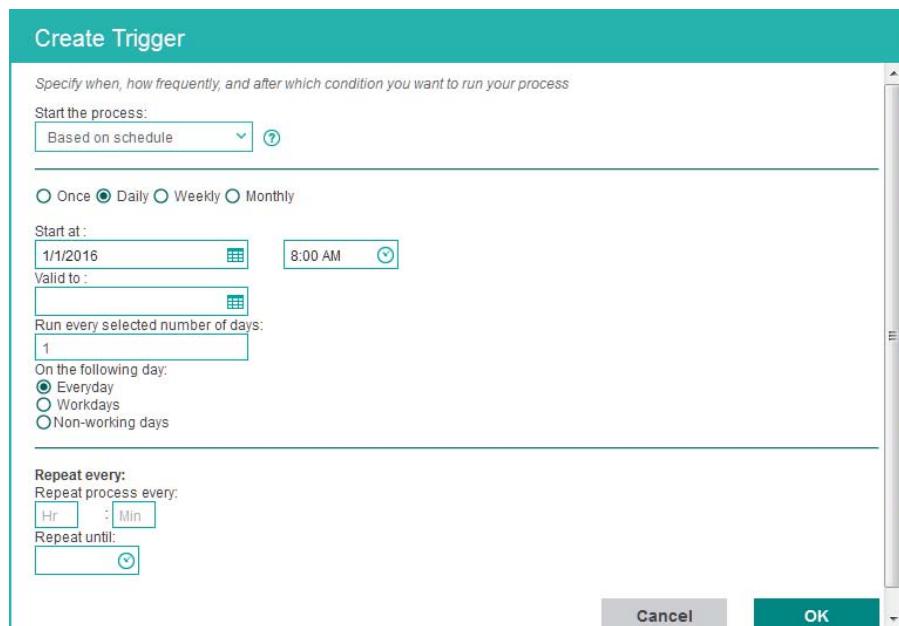
1. Enter **My process** the **Name** field to name the process. This field is required.
2. Complete the **Description** field to add a description.
3. The **Valid from** field is cleared. When you enter a date in the **Valid from** field, the process cannot run before the date you select, either by using triggers or manually requesting it.

- The **Valid to** field is cleared. When you enter a date in the **Valid to** field, the process cannot run after the date you select.

## Adding triggers to your process

You use triggers to specify when Workload Scheduler should automatically run the processes that you define. You create as many triggers as needed for each process. Triggers are schedule-based or event-based. You use schedule-based triggers to start the process on a regular interval based on the date, day of week, or day of the month, and the time of day. You use event-based triggers to start the process when a file is created, modified, or deleted on a computer that runs a Workload Scheduler agent.

- On the **Triggers** tab, click **New** to add a trigger.
- Schedule-based triggers define how frequently to run the process. In the Create Trigger window, select **Based on schedule** from the **Start the process** menu. When you select a frequency, other selection criteria on the Create Trigger window change.
- Select **Daily**.
- From the **Start at** calendar menu, choose **July 1, 2017**.
- From the time menu, select **8:00 AM**.



- Click **OK** to store the trigger definition.



**Hint:** Event-based triggers define how to run the process when a change in the agent's file system occurs.

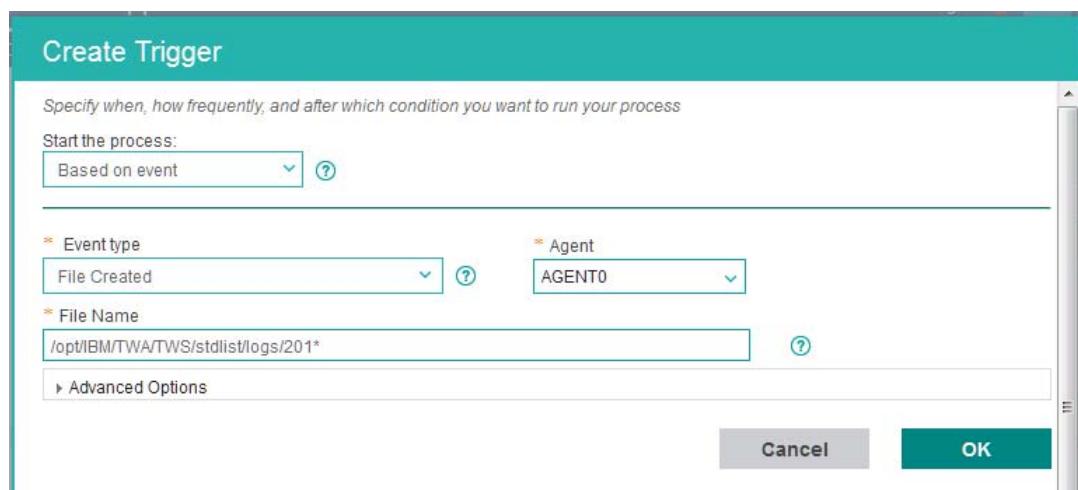
7. Click **New** to add another trigger to your process.
8. In the Create Trigger window, select **Based on event** from the **Start the process** menu. When you use an event-based trigger, complete the fields that are on the following list.
  - a. Choose **File created** from the **Event type** menu so that the trigger starts when a file exists on the agent's file system that did not exist before.
  - b. Select **AGENT0** from the **Agent** menu, where the file is monitored.
  - c. Enter the full path and file name of the monitored file from the **File Name** menu. Enter the following path name:

/opt/IBM/TWA/TWS/stdlist/logs/201\*



**Hint:** You can use wildcards as part of the file name for **File Created** and **File Deleted** event types.

9. Click **OK** to store the trigger definition.



## Defining variables

You can use variables either on the Steps page or in the Self-Service Catalog. Variables are useful when you want to reuse the same definition in different steps. You use the name to reference the variable in the steps you create. The type that you select defines what a user of the Self-Service Catalog sees when they select this process. No variables are defined for this process.

## Defining steps

You use **steps** to specify the tasks Workload Scheduler agents should run on the computers where agents are installed. You create as many steps as needed for each process. Steps are started on

the agent computers in the order you define them, when the triggers you define start. Each step in your process starts as soon as the previous step in the list completes successfully.

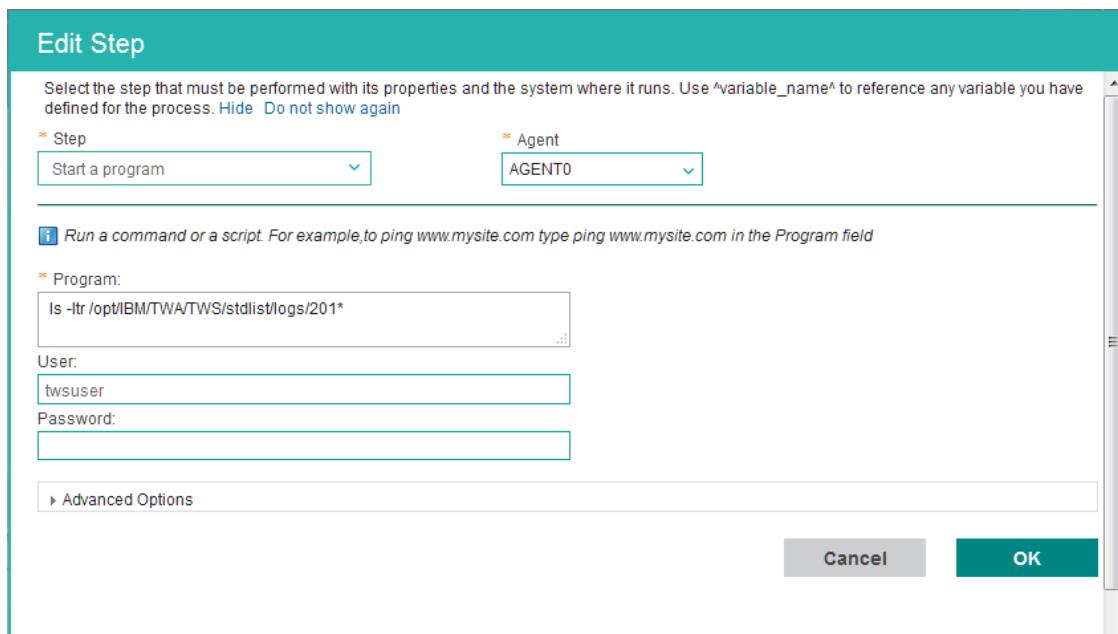
To create a step, you select the type of task to run, select which agent should run the task, and define the properties of the task. Depending on the task type, each task type has different properties, which can be defined. The Create step window changes according to which type of task you select for the step. The list of task types changes according to the job plug-ins that are installed on the Workload Scheduler server. In this lesson, you learn how to create program tasks.

To create a step that starts a program, complete the following list.

1. To add a step, on the **Steps** tab, click **New**.
2. Select **Start a program** from the **Step** menu in the “Create step” window.
3. Select **AGENT0** to run the step from the **Agent** menu.
4. Type the path to the script or command you want the step to run in the **Program** field. You can instead paste or type an entire shell script into the **Program** field. Enter the following text:  

```
ls -ltr /opt/IBM/TWA/TWS/stdlist/logs/201*
```

The **User** field contains the account name of the user that runs the program on the agent. The **Password** field contains the password of the account you entered in the **User** field. For programs that run on UNIX and Linux computers, these fields are optional.
5. Enter **wsuser** in the **User** field. The **Password** field remains cleared.



6. Click **OK** to save your step definition.

You can use the variables that you created on the **Variables** tab in any part of a step's task definition. To use a variable in your step definition, enter the name of the variable, and enclose it in caret (^) symbols. For example, if you created a variable that is named **StartDay** that contains a

date, enter `\StartDay` in the step definition. If you use an event-based trigger to run the process, a variable that is named `FileName` is automatically created. The value of the variable is the path of the file that caused the trigger to start.

Steps are started on the agent computers in the order that you define them. As you create steps, they are assigned a sequence number that shows the order that the steps run. You can change the order of the steps by moving steps up or down.

To move a step, on the **Steps** tab, highlight the step, and click **Up** or **Down**, depending on which direction you want to move the step.

# Running and monitoring a process

After you create a process, you must enable the process to run. When a process is enabled, you can start the process at any time, in addition to any instances that triggers started. While a process is enabled, you can view its properties, but it cannot be deleted or edited. To edit a process, it must be disabled.

- A process must be enabled before it can run.
- A process must be disabled before you can edit it.

To deactivate a process and disable it from running, select the process in the process library, and click **Disable**.

To activate a process and enable it to run, select the process in the process library, and click **Enable**.

To run a process, while it is enabled, click **Run now**. The process is immediately submitted to run.

After a process is submitted to run (either manually or by a trigger), you can review its history. To view the history of a process, select the process in the process library, and click the **History** tab in the process details. On the **History** tab, you see the instances of the process that were submitted. Each instance has a status. You see one of the following statuses.

- **Queued:** The process was submitted, and is ready to run.
- **Running:** The process started. One of the steps in the process is running.
- **Error:** One of the steps in the process ended in an error.
- **Completed:** All of the steps in the process completed successfully.

To enable and run your process, complete the following steps.

1. Highlight your process in the process library, and click **Enable**. You see a message in the lower-right corner that your process is enabled successfully.
2. Click **Run now** to start running your process. You see a message that your process is submitted to run.

- Click **History** to see the status of your process. If the status is not **Completed**, click **Refresh**.

Name	Operating System
AGENT0	Unix
AGENT1	Unix
AGENT2	Unix
ECHO	Unix

- When the process is complete, highlight the first row that is labeled **Completed**, and click **Details**.

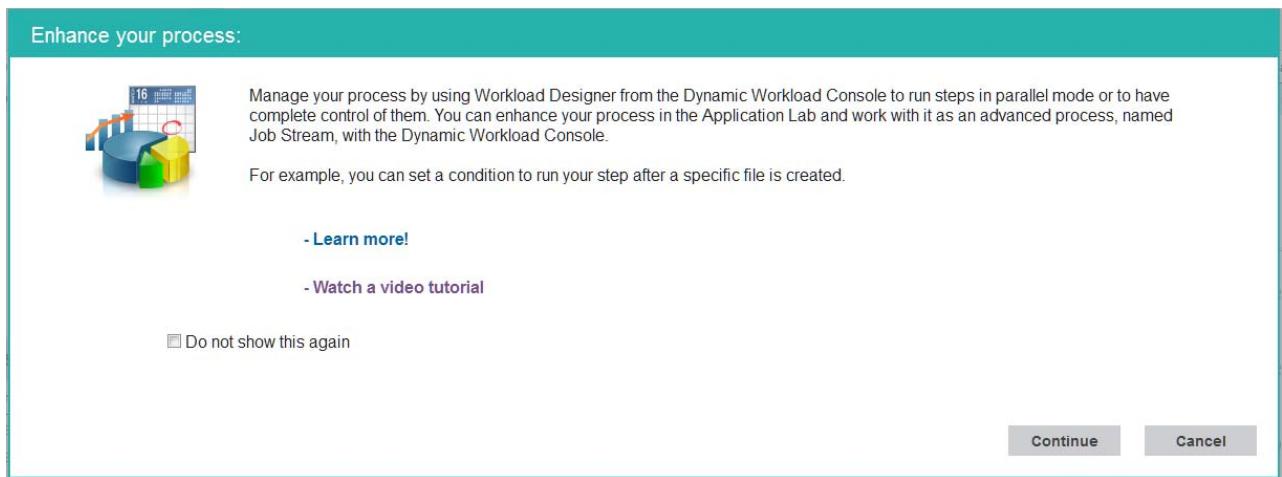
- Click **View Log** in the Step Status window. A new tab opens, where you can see the output of the program that ran in your step.
- After viewing the log file, close the browser tab that contains it.
- Click **Close** to close the Step Status window.

# Exercise 3 Using other Application Lab functions

In this exercise, you use Application Lab features to enhance the process you created, and view the results.

To enhance the process, complete the following steps.

1. Disable your process by highlighting **My Process** on the process list, and clicking **Disable**. The process is disabled.
2. Right-click the process, and click **Enhance** from the menu. Click **Continue** to proceed.



3. Complete the following fields in the “Enhance your process” window:
  - a. Enter **S1STDL** in the **Job stream name** field.
  - b. Enter **J2LSLONG** in the **Job definition name** field. The **job name** field contains the same name.
  - c. Enter **STDLIST\_WATCH** in the **Event rule name** field.

4. Click **Enhance**.

Enhance your process: My process

Specify the name of Dynamic Workload Console objects

Note:

- Job stream name is equivalent to your process name, but with a maximum length of 16 characters
- The job definition contains all the information of your job that can be re-used across different flows
- The job name is the name that identifies the step within the job stream
- The variable table is the table associated to the job stream containing variables and their values that can be re-used across different flows
- For event-based triggers, an event rule is created to submit the job stream when a condition is satisfied

Job stream name:  
S1STDL

Step	Job definition name	Job name
1	J2LSLONG	J2LSLONG

Trigger	Event rule name
File Created	TX STDLIST_WATCH

**Enhance** ? **Create a copy** ? **Cancel**

The **Workload Designer** opens in a new window, and you can edit the process that you enhanced as job stream and job definitions.

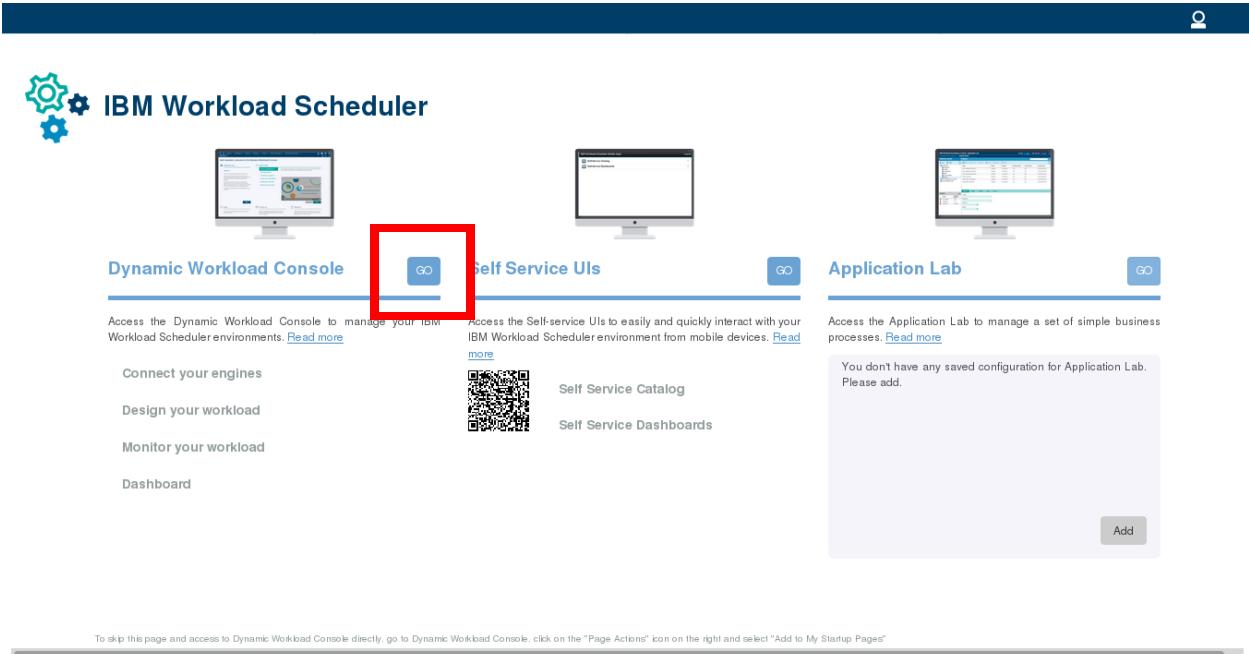
5. Close the job stream definition by clicking **Close** (  ).
6. Close the Workload Designer (if it is open) by closing the browser window that contains it.
7. Log out of the Workload Console by selecting **Log Out** from the user (  ) menu.
8. Close the browser.

# Unit 3 Monitoring Workload Scheduler production exercises

In the exercises for this unit, you create and customize tasks in the Dynamic Workload Console. You monitor production plan objects by using Dynamic Workload Console and command-line interfaces.

To open the Dynamic Workload Console, if it is not open, complete the following steps:

1. Open the Firefox Web Browser.
2. Open the first tab in the browser, and click **Workload Console**. A new tab opens. Optionally, open a new browser tab and enter the following URL in the address bar.  
<https://ws94mdm0.tivoli.edu:16311/ibm/console>
3. If prompted to do so, log on with user name **adurling** and password **object00**.
4. On the IBM Workload Scheduler page, click **GO** in the **Dynamic Workload Console** section.



The screenshot shows the IBM Workload Scheduler landing page. It features three main sections: "Dynamic Workload Console", "Self Service UIs", and "Application Lab".  
  
The "Dynamic Workload Console" section contains:

- A "GO" button with a red square box drawn around it.
- Text: "Access the Dynamic Workload Console to manage your IBM Workload Scheduler environments. [Read more](#)"
- Links: "Connect your engines", "Design your workload", "Monitor your workload", and "Dashboard".
- QR code labeled "Self Service Catalog".
- Link labeled "Self Service Dashboards".

  
The "Self Service UIs" section contains:

- A "GO" button.
- Text: "Access the Self-service UIs to easily and quickly interact with your IBM Workload Scheduler environment from mobile devices. [Read more](#)"

  
The "Application Lab" section contains:

- A "GO" button.
- Text: "Access the Application Lab to manage a set of simple business processes. [Read more](#)"
- Text: "You don't have any saved configuration for Application Lab. Please add."
- A "Add" button.

  
At the bottom of the page, there is a note: "To skip this page and access to Dynamic Workload Console directly, go to Dynamic Workload Console, click on the "Page Actions" icon on the right and select "Add to My Startup Pages".

# Exercise 1 Using the Direct Query feature in Dynamic Workload Console

In this exercise, you monitor jobs by using the direct query feature. You also learn how to edit and save your direct queries for persistent use.

1. From the **System Status and Health** menu, choose **Monitor Workload**.
2. On the Monitor Workload page, complete the following fields.

---

**Engine:** Select **WS94d**, and clear all other options

---

**Object Type:** Job

---

**List Plan** current-plan

---

**Query:** @#SM2@. @

---



The screenshot shows the 'Monitor Workload' page. At the top, there are dropdown menus for 'Engine' (set to 'WS94d [smadmin]'), 'Object Type' (set to 'Job'), and 'List Plans' (set to 'current-plan'). Below these is a 'Query' input field containing the value '@#SM2@. @'. At the bottom right of the form, there are three buttons: 'Run', 'Edit', and 'View As Report'.

3. Click **Run** to see a list of all jobs within job streams on any workstation that have names that start in *SM2*. In the resulting page, you see these features:
- A toolbar that contains specific job-related actions and task-related actions, and column headers that you can use to sort the table
  - A field that you can use to further filter the query result
  - The table that contains items that match the query request
  - The table footer, from which you can see other pages of results

Monitor Workload (Owner: adurling; Engine: WS94d,Distributed)

Plan Name: Current Plan

#@#SM2@.@

<a href="#">Job Log...</a> <a href="#">Dependencies...</a> <a href="#">Release Dependencies</a> <a href="#">Rerun...</a> <a href="#">What-if</a> <a href="#">Job Stream View</a> <a href="#">More Actions ▾</a>      										
Status	Internal Status	Job	^ Job Type	^ Workstation (Job)	^ Job Stream	^ Workstation (Job Stream)	^ Scheduled Time			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	SUCC	J2MCO_ASTIP_33395	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/17/17 12:00 AM	 0	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	SUCC	J2MCO_ASTIP_33395	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/18/17 12:00 AM	 0	
<input type="checkbox"/>		Waiting	HOLD	J2MCO_ASTIP_33395	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/19/17 12:00 AM	 0
<input type="checkbox"/>	<input checked="" type="checkbox"/>	SUCC	J2MCO_BINGE_33332	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/17/17 12:00 AM	 0	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	SUCC	J2MCO_BINGE_33332	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/18/17 12:00 AM	 0	
<input type="checkbox"/>		Waiting	HOLD	J2MCO_BINGE_33332	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/19/17 12:00 AM	 1
<input type="checkbox"/>	<input checked="" type="checkbox"/>	SUCC	J2MCO_CHAOS_33327	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/17/17 12:00 AM	 0	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	SUCC	J2MCO_CHAOS_33327	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/18/17 12:00 AM	 0	
<input type="checkbox"/>		Waiting	HOLD	J2MCO_CHAOS_33327	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/19/17 12:00 AM	 1
<input type="checkbox"/>	<input checked="" type="checkbox"/>	SUCC	J2MCO_DEMON_33672	Executable	CHARLIE	SM2MCO_KBC	CHARLIE	9/17/17 12:00 AM	 0	

4. Scroll the table to the right to see the other columns that are available on this page. Notice that the first column remains fixed to the left of the table.
5. Click the **Next Page** carats (**>>**) to view the next pages.
6. To view all the data in one page, select **All** from the **Lines per page** menu. Scroll vertically to see other items in the table.
7. To sort the table by the time that the jobs started, click the **Sort** icon (^) in the **Actual Start** column.

8. To see only jobs that ran on workstation CHARLIE, enter CHARLIE in the filter field. Choose **Workstation (Job Stream)** from the filter menu, and click **Filter**. The filter field is not case-sensitive.

The screenshot shows a filter dialog box with the query field containing "charlie". The filter menu is open, listing items such as Any column, Status, Internal Status, Job, Job Type, Workstation (Job), Job Stream, Workstation (Job Stream) (which is selected and highlighted in blue), Scheduled Time, Not Satisfied Dependencies, Priority, Job Number, Earliest Start, Actual Start, and Deadline. To the right of the filter menu, there is a table with several rows, each showing a scheduled time of 5 12:00.

You see only jobs that matched the query and ran on workstation CHARLIE.

9. Enter **Waiting** in the filter field, and select **Status** from the filter menu. Click **filter**. You see jobs that are waiting to run. Notice that the workstation filter no longer applies.
10. Clear the filter by clicking **Clear filter**.
11. To change the direct query to include only jobs that are waiting, enter the following text into the query field, and click **Run**.  

```
@#SM2@. @+State=#Waiting
```

You see that only jobs with *Waiting* status are displayed in the result.
12. Click **Edit**. You see the other filter criteria that you can apply to the direct query filter. As you select other items to filter, the query field changes to reflect your selections and show you the syntax for a direct query.
13. Close the Monitor Jobs page by clicking **X** in the tab at the top of the page.

## ***Creating a customized task***

Next, you create a direct query to save as a permanent task. To create a monitoring task, complete the following steps.

1. In the **Query** field on the Monitor Workload page, enter the following query string, and click **Edit** to create a new query task:  

```
@#SM2@. @+State=#Waiting
```
2. Expand the **Columns Definition** section at the bottom of the page to see the list of columns you can configure for the type of query you edit.
3. Click **<< Remove All** to clear the list of **Selected Columns** for the query task. You cannot remove the job name from the selected columns.

4. Add these columns to the **Selected Columns**.

- Workstation (Job)
- Job Stream
- Internal Status
- Scheduled Time
- Earliest Start
- Not Satisfied Dependencies
- Priority
- Deadline



**Note:** To add columns to your query, choose the columns from the **Available Columns** list, and click **Add** to move the column names to the **Selected Columns** list. You can select more than one column at a time by holding the Shift key to select neighboring columns or by holding the Ctrl key to select noncontiguous columns.

5. Change the order of the columns if necessary.

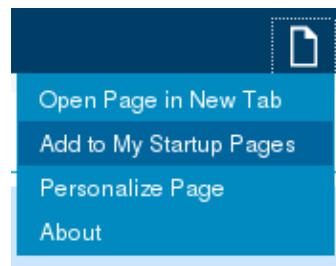


**Note:** You can order the columns by clearing the list of selected columns and adding columns in the order of your preference. Or, you can add columns in any order, and use **Move Up** and **Move Down** to change the order of the columns.

- In the **Task Name** field, enter **SM2 jobs waiting**, and click **Save**.

The screenshot shows the 'Monitor Workload' tab in the Dynamic Workload Console. At the top, there are fields for 'Engine' (WS94d [smadmin]), 'Object Type' (Job), and 'List Plans' (current-plan). Below these are 'Query' (@#SM2@.#+State=>Waiting) and 'Task Name' (SM2 jobs waiting) fields. Buttons for 'Run', 'Edit', and 'View As Report' are at the top right. Below the main area, there are sections for 'Time Data Filter', 'Dependencies Filter', and 'Columns Definition'. The 'Columns Definition' section has two panes: 'Available Columns' (Status, Job Type, Workstation (Job Stream), Job Number, Return Code, Latest Start, Actual Start, Estimated Duration, Actual Duration, Run Options) and 'Selected Columns' (Job, Workstation (Job), Job Stream, Internal Status, Scheduled Time, Earliest Start, Not Satisfied Dependencies, Priority, Deadline). Buttons for 'Add >', 'Add All >>', 'Remove <', 'Remove All <<', 'Move Up', and 'Move Down' are visible between the panes.

- Choose **All Configured Tasks** from the **System Status and Health** menu. You see **SM2 jobs waiting** on the list of monitoring tasks.
- Click **SM2 jobs waiting** to run the monitor jobs task. You see the result of the query you created.
- After you review the list of jobs, close the **All configured tasks** tab by clicking its **X**.
- On the **Monitor Workload** tab, click the **Page Actions** icon near the upper-left corner of the page. Select **Add to My Startup Pages** from the menu to add your monitor task.



- On the "Add Page to My Startup Pages" page, click **Add**.
- Close the **Monitor Workload** tab by clicking its **X**.

# Exercise 2 Using the Workload Dashboard

In the Workload Dashboard, you see a consolidated view for monitoring workload status across one or more IBM Workload Scheduler networks. In this lesson, you learn how to use the Workload Dashboard.

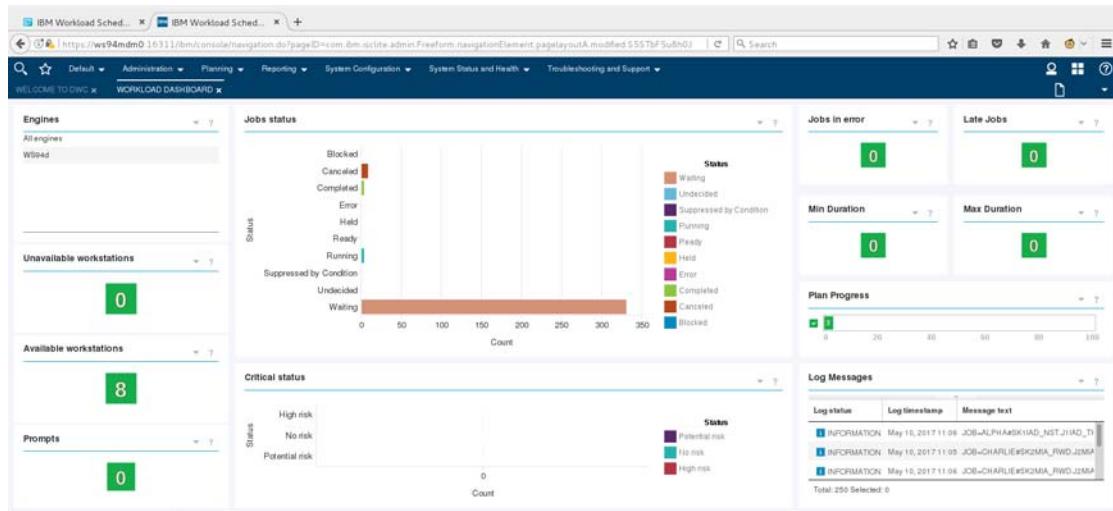
IBM builds the Workload Dashboard by using features in the IBM Dashboard Application Services Hub and data sets that IBM Workload Scheduler provides. In addition to the provided Workload Dashboard, you can create your own customized dashboard by using predefined or customized widgets.

To open the workload dashboard, follow these steps.

1. Select **Workload Dashboard** from the **System Status and Health** menu.

The workload dashboard contains widgets that show the results of the most commonly used queries. Each widget links to a monitoring task that contains information that relates to the widget's topic.

The widgets link to a table of results. When **All engines** is selected from the **Engines** widget, the widgets accumulate the values of the queries of all the engines that are defined in the Dynamic Workload Console, and open Multiple Engine monitoring tasks when you click them.



You can enhance the view of a widget in the following ways.

2. Expand the **Jobs status** widget to the full size of the Workload Console, by clicking the menu next to the question mark in the upper-left corner of the widget. Select **Maximize**. You can expand any widget.
3. Restore the widget to its original size, by clicking the menu and selecting **Restore**.

4. Update the data that is displayed in the **Jobs status** widget, by clicking the menu, and clicking **Refresh**.

To read helpful information about the widget, click the question mark (?).

The **Engines** widget shows the engines that are defined in the Dynamic Workload Console.

5. Select an engine for the monitoring widgets to reflect, or **All engines**. Right-click an engine on the list to view properties for that engine.

The following section describes the widgets that you see on the workload dashboard by default.

When you click an icon that is presented in the widget, a related monitoring task opens.

- The **Unavailable workstations** widget shows the number of workstations that are not available.
- The **Available workstations** widget shows the number of workstations that are available.
- The **Prompts** widget shows the number of asked prompts for the selected engine. A prompt is asked when an operator reply is requested.
- View the **Job status** widget to see how many jobs for the selected engine are in each status.  
The bars in the job status chart link to a **Monitor Jobs** task that contains list of jobs that match the status.
- View the **Critical status widget** to see how many jobs are at each risk level. The bars in the critical status chart link to a **Monitor Critical Jobs** task that contains a list of jobs that match the risk level. You can run this query on a single engine; it is not supported for multiple engines.

Other job-related widgets show how many jobs meet the following criteria. You can click a job status widget to view a Monitor Jobs task that shows the jobs in plan that met the widget's query condition.

- The **Jobs in error** widget shows how many jobs ended with an error condition.
- The **Late jobs** widget shows how many jobs completed after their designated deadline.
- The **Min Duration** widget shows how many jobs completed before reaching their defined minimum duration.
- The **Max Duration** widget shows how many jobs completed after running longer than their defined maximum durations.
- The **Plan Progress** widget shows the overall progress of the production plan.
- The **Log Messages** widget shows operator log messages for the selected engine. You can double-click a message to see details about the message.

# Exercise 3 Monitoring workstations

In this exercise, you monitor workstations and further refine how monitoring tasks are configured. To open a workstation monitoring task and customize its settings, perform the following steps.

1. From the **System Status and Health** menu, choose **All Configured Tasks**.
2. On the All Configured Tasks page, notice the **All Workstations in plan (Distributed)** task and its properties. The **Engine Name** is **Ask when needed**.

The screenshot shows the 'All Configured Tasks' page with the following details:

**Header:** All Configured Tasks

**Toolbar:** New, Task Properties, Duplicate, Delete, Share, Unshare, Run, View As Report, camera icon, search icon.

**Table Headers:** Task Name, Task Type, Engine Name, Engine Type, Plan, Task Owner, Shared.

**Table Data:**

Task Name	Task Type	Engine Name	Engine Type	Plan	Task Owner	Shared
All Job Streams in plan in Error or	Monitor Job Stream	Ask when needed	z/OS		adurling	None
All Jobs in plan (Distributed)	Monitor Jobs	Ask when needed	Distributed		adurling	None
All Jobs in plan (zOS)	Monitor Jobs	Ask when needed	z/OS		adurling	None
All Jobs in plan in Error or Waiting	Monitor Jobs	Ask when needed	Distributed		adurling	None
All Jobs in plan in Error or Waiting	Monitor Jobs	Ask when needed	z/OS		adurling	None
All Operator Messages	Monitor Operator M	Ask when needed	Distributed		adurling	None
All Prompts in plan	Monitor Prompts	Ask when needed	Distributed		adurling	None
All Resources in plan (Distributed)	Monitor Resources	Ask when needed	Distributed		adurling	None
All Resources in plan (zOS)	Monitor Resources	Ask when needed	z/OS		adurling	None
All Triggered Actions	Monitor Triggered A	Ask when needed	Distributed		adurling	None
All Workstations in plan (Distributed)	Monitor Workstation	Ask when needed	Distributed		adurling	None
All Workstations in plan (zOS)	Monitor Workstation	Ask when needed	z/OS		adurling	None
SM2 jobs waiting	Monitor Jobs	Ask when needed	Distributed		adurling	None

**Pagination:** Lines per page: 25, Page: 1 << 1 >> 1

3. Click **All Workstations in plan (Distributed)**. You see a new window where you can choose an engine connection.

**Choose Engine**

Please enter the engine connection data for this task: **All Workstations in plan (Distributed)**

Use selected engine and/or plan:

**Select an Engine**

Engine name: **WS94d [smadmin] (Distributed)**

Remember for current session

Specify connection properties:

**Connection Data**

\*Host Name: **localhost** \*Port Number: **31116**

\*Remote Server Name: **[redacted]**

**Connection Credentials**

User ID: **[redacted]** Password: **[redacted]**

**Plan**

Plan: **Current Plan**

**DataBase Configuration for Reporting**

4. Select **WS94d** from the **Engine name** menu.
5. Click **OK**. You see the **All Workstations in plan** task that shows the workstations.
6. Scroll to the right to see any columns in the task.

**7. Close the All Workstations in plan task by clicking Close.**

All Workstations in plan (Distributed) (Owner: adurling; Engine: WS94d,Distributed)

Plan Name: Current Plan

Close

Link Status	Workstation	Agent Running	Writer Running	Start Time	Run Number	Limit	Domain	Type
LINKED	AGENT0	Yes		9/17/17 11:41 PM 101	11		MASTERDM	Agent
LINKED	ALPHA	Yes		9/17/17 11:41 PM 101	11		MASTERDM	Dynamic Pool
LINKED	BRAVO	Yes		9/17/17 11:41 PM 101	11		MASTERDM	Dynamic Pool
LINKED	BROKER0	Yes	Yes	9/17/17 11:41 PM 101	11		MASTERDM	Workload Bro
LINKED	CHARLIE	Yes		9/17/17 11:41 PM 101	11		MASTERDM	Dynamic Pool
LINKED	ECHO	Yes		9/17/17 11:41 PM 101	11		MASTERDM	Dynamic Pool
LINKED	MASTERAGENTS	Yes		9/17/17 11:41 PM 101	11		MASTERDM	Pool
LINKED	MDMO	Yes		9/17/17 11:41 PM 101	11		MASTERDM	MASTER

**8. Edit the All Workstations in plan task definition by selecting the row. Click Task Properties.**

All Configured Tasks

All Configured Tasks

New Task Properties Duplicate Delete Share Unshare Run View As Report

All Workstations in plan (Distributed)

Task Name	Task Type	Engine Name	Engine Type	Plan	Task Owner	Shared
All Job Streams in plan in Error or	Monitor Job Stream	Ask when needed	z/OS		adurling	None
All Jobs in plan (Distributed)	Monitor Jobs	Ask when needed	Distributed		adurling	None
All Jobs in plan (zOS)	Monitor Jobs	Ask when needed	z/OS		adurling	None
All Jobs in plan in Error or Waiting	Monitor Jobs	Ask when needed	Distributed		adurling	None
All Jobs in plan in Error or Waiting	Monitor Jobs	Ask when needed	z/OS		adurling	None
All Operator Messages	Monitor Operator M	Ask when needed	Distributed		adurling	None
All Prompts in plan	Monitor Prompts	Ask when needed	Distributed		adurling	None
All Resources in plan (Distributed)	Monitor Resources	Ask when needed	Distributed		adurling	None
All Resources in plan (zOS)	Monitor Resources	Ask when needed	z/OS		adurling	None
All Triggered Actions	Monitor Triggered A	Ask when needed	Distributed		adurling	None
All Workstations in plan (Distribut	Monitor Workstatiot	Ask when needed	Distributed		adurling	None
All Workstations in plan (zOS)	Monitor Workstatiot	Ask when needed	z/OS		adurling	None
SM2 jobs waiting	Monitor Jobs	Ask when needed	Distributed		adurling	None

**9. On the Monitor Workstations Task page, change the following fields on the Enter Task Information pane.**

- Change **Task name** to **All Workstations**.
- Change **Engine** to **WS94d [smadmin] (Distributed)**.

10. Click **Columns Definition** to change the page.
11. On the Columns Definition page, click **Add All** to add all of the available columns to the Selected Columns list.
12. In the Selected Columns list, choose **Link Status**. Click **Move Down**.
13. In the Selected Columns list, choose **Method**. Click **Remove**.
14. In the Selected Columns list, choose **Event Processor Running**. Click **Remove**.

#### Monitor Workstations Task (Distributed): All Workstations

Customize the columns selection for the main table and any drill down tables generated by running this task.

Select the columns for the main table listing:

**Workstations**

**Available Columns**

- Method
- Event Processor Running

**Selected Columns**

- Workstation
- Link Status
- Agent Running
- Writer Running
- Start Time
- Run Number
- Limit
- Domain
- Type
- Version

Add >

Add All >>

< Remove

<< Remove All

15. Click **Save**. You see the **Monitoring Workstations** task list.
16. Click **All Workstations**. You see the **All Workstations** monitoring task.



**Hint:** You were not prompted to select an engine connection because you configured the task to use WS94d.

17. Scroll to the right. Notice that the Workstation column remains visible as you view other columns.
18. Click **AGENT0** to see the properties of the workstation. Click **Close View**.



**Hint:** From the properties page, you can change the workstation limit and fence settings by clicking **Limit** or **Fence**.

19. Click **Close** to return to the **Monitor Workstations** task list.

# Exercise 4 Monitoring Workload Broker Computers

In this exercise, you monitor workstations and further refine how monitoring tasks are configured. To open a workstation monitoring task and customize its settings, perform the following steps.

1. From the **System Status and Health** menu, choose **Monitor Computers on Broker**.
2. On the Computer Search Criteria page, click **Search**. You see the Computer Search Results page.

The screenshot shows a software interface titled "Computer Search Results". At the top, there are buttons for "Actions" (Set as online, Go, Refresh), a search bar, and a tab labeled "MONITOR COMPUTERS ON BROKER". Below this is a table with the following data:

Select	Display Name	Status	Availability	Operating System	Active Jobs	Processors	CPU Usage
<input type="checkbox"/>	AGENT0	Online	Available	OpenStack	0	1	20%

At the bottom left is a "Cancel" button.

3. On the Computer Search Results page, click **AGENT0**. You see the details for the computer that runs the workstation AGENT0.  
In the **Computer Details** section, you can determine information about the computer that runs AGENT0, such as its operating system, CPU usage, and free memory.
4. Scroll down to the **Job Instance Search Results** section. In heading of Job Instance Search Results table, click **Edit Sort**.

The screenshot shows a "Job Instance Search Results" dialog box. It has a toolbar with icons for search, refresh, and other actions, followed by a "Select" button and a "Name" dropdown. Below this is a "First Sort" section with "Submit Time" and "Descending" options. There are also "Second Sort" and "Third Sort" sections with similar controls. At the bottom are "OK" and "Cancel" buttons.

5. Select **Submit Time**, and **Descending** for the **First Sort**. Click **OK**. You see a list of jobs that completed on the computer that runs AGENT0, with the most recently submitted job at the top.

6. Click **File Systems** to see which file systems are available on the computer.
7. Click **Network Systems** to see which network addresses are available on the computer.
8. Close the **Monitor Computers on Broker** tab by clicking its **X**.

# Exercise 5 Monitoring workstations by using the command-line interface

In this exercise, you monitor workstations and scheduling objects by using the conman interface. To use the conman program, perform the following steps.

1. To open a terminal window, select **Applications > Utilities > Terminal** from the desktop menu. You can instead restore a terminal window that you previously opened.
2. Resize the terminal window so that you see at least 132 columns and 25 rows.
3. Source the Workload Scheduler environment by running the following command.  
    . /opt/IBM/TWA/TWS/tws\_env.sh
4. Start the conman program.



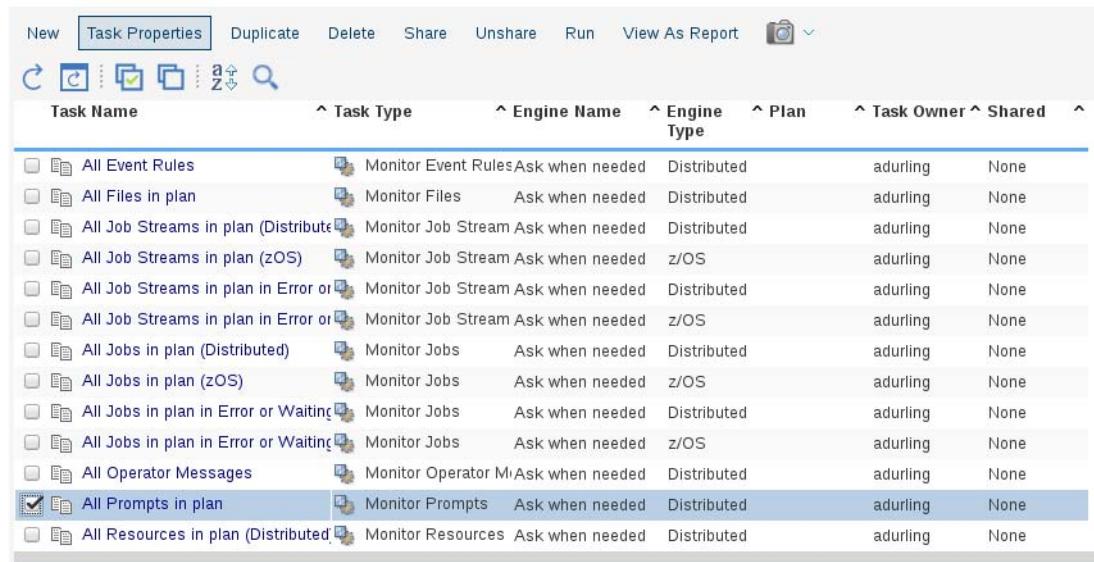
**Hint:** For the next exercises, you use the conman command-line interface. You see a percent prompt (%) instead of the shell prompt. The percent sign (%) that you see in the exercise instructions signify that the command you run is a conman command.

5. Display the list of workstations in the plan with their status.  
    % showcpus
6. Display the linking information about the workstations.  
    % sc;link
7. Display the version, time zone, and operating system information about the workstations.  
    % sc;info
8. Exit the conman program.  
    % exit

# Exercise 6 Monitor scheduling objects

In this exercise, you monitor scheduling objects. To open a monitoring task and view its results, perform the following steps.

1. From the **System Status and Health** menu, choose **All configured tasks**.
2. On the All Configured Tasks page, notice the **All Prompts in plan** task and its properties. The **Engine Name** is **Ask when needed**.
3. Edit the **All Prompts in plan** task definition by selecting the row. Click **Task Properties**.



New	Task Properties	Duplicate	Delete	Share	Unshare	Run	View As Report	
Task Name	Task Type	Engine Name	Engine Type	Plan	Task Owner	Shared		
All Event Rules	Monitor Event Rules	Ask when needed	Distributed	adurling	None			
All Files in plan	Monitor Files	Ask when needed	Distributed	adurling	None			
All Job Streams in plan (Distributed)	Monitor Job Stream	Ask when needed	Distributed	adurling	None			
All Job Streams in plan (zOS)	Monitor Job Stream	Ask when needed	z/OS	adurling	None			
All Job Streams in plan in Error or Waiting	Monitor Job Stream	Ask when needed	Distributed	adurling	None			
All Job Streams in plan in Error or Waiting	Monitor Job Stream	Ask when needed	z/OS	adurling	None			
All Jobs in plan (Distributed)	Monitor Jobs	Ask when needed	Distributed	adurling	None			
All Jobs in plan (zOS)	Monitor Jobs	Ask when needed	z/OS	adurling	None			
All Jobs in plan in Error or Waiting	Monitor Jobs	Ask when needed	Distributed	adurling	None			
All Jobs in plan in Error or Waiting	Monitor Jobs	Ask when needed	z/OS	adurling	None			
All Operator Messages	Monitor Operator M	Ask when needed	Distributed	adurling	None			
All Prompts in plan	Monitor Prompts	Ask when needed	Distributed	adurling	None			
All Resources in plan (Distributed)	Monitor Resources	Ask when needed	Distributed	adurling	None			

4. On the Monitor Prompts Task page, change the following fields on the **Enter Task Information** pane.
  - a. Change **Task name** to **Unanswered Prompts**.
  - b. Change **Engine** to **WS94d (Distributed)**.

5. On the General Filter pane, select **Asked** and **Not Asked**.

#### Monitor Prompts Task (Distributed): All Prompts

The screenshot shows the 'Monitor Prompts Task (Distributed): All Prompts' configuration page. The 'General Filter' tab is selected. In the 'Periodic Refresh Options' section, the 'Enable Periodic Refresh' checkbox is checked with a value of 30 seconds. In the 'Filter Criteria' section, the 'Prompt Name' field is empty. In the 'Status' section, both 'Asked' and 'Not Asked' checkboxes are checked. At the bottom, there are 'Save' and 'Cancel' buttons.

6. Click **Save**.
7. On the All Configured Tasks page, click **Unanswered Prompts**. You see a query result with prompts that are not answered.
8. Select the prompt that is named **PROMPT1**. Click **Job Streams**. You see a secondary query that contains a list of job streams that have the prompt as a dependency.
9. In the **Not Satisfied Dependencies** column, click **2**.  
You see a page that shows all of the dependencies for the related job stream. From the page, you see the dependencies for the selected job stream. You can click the link for each type of dependency to review unsatisfied dependencies, or add new ones.
10. Click **Close View** to return to the Job Stream monitor page.
11. Click **Close View** to return to the Unanswered Prompts page.
12. Click **Close** to return to the All Configured Tasks page.

# Exercise 7 Monitoring by using the command-line interface

In this exercise, you monitor workstations and scheduling objects by using the conman interface. To use the conman program, perform the following steps.

1. To open a terminal window, double-click the **Terminal** icon on the desktop, or select **Applications > System Tools > Terminal**. You can instead restore a terminal window that you previously opened.
2. Resize the terminal window so that you see at least 132 columns and 25 rows.
3. Source the Workload Scheduler environment by running the following command.  
`. /opt/IBM/TWA/TWS/tws_env.sh`
4. Start the conman program.

```
$ conman
```



**Hint:** For the next exercises, you use the conman command-line interface. You see a percent prompt (%) instead of the shell prompt. The percent sign (%) that you see in the exercise instructions signify that the command you run is a conman command.

5. Display the list of prompts in the plan.

```
% sp
```

6. Display the list of resources in the plan.

```
% sr @#@
```

7. Display the list of job streams on workstation CHARLIE

```
% ss charlie#@
```

8. Display the list of jobs that are waiting to run and are in job streams with names that start with SM.

```
% sj @#SM2@. @+STATE=HOLD,READY,WAIT
```

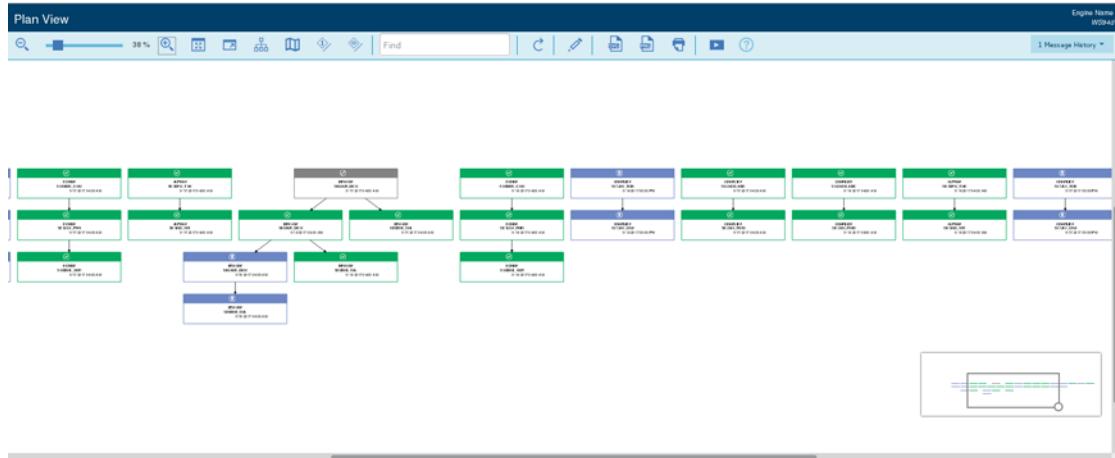
9. Exit the conman program.

```
% exit
```

# Exercise 8 Monitoring the plan graphically by using the Plan View

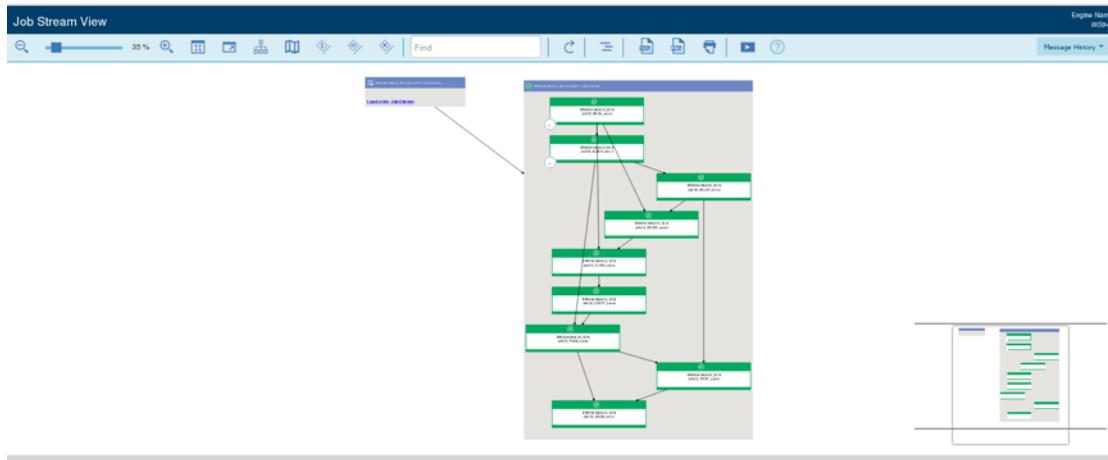
In this exercise, you monitor the plan graphically by using the Dynamic Workload Console Plan View. To start the Plan View, perform the following steps.

1. Switch to the browser window, or open an Internet web browser.
2. Log in as `adurling` with password `object00` if required.
3. From the **System Status and Health** menu, choose **Show Plan View**.
4. On the Show Plan View page select **WS94d (Distributed)** from the **Engine name** menu, and click **GO**. A new browser tab opens with the plan view.



5. Choose the **Zoom** tool, and select an area around a job stream that is running. Job streams that are running are colored orange.

6. Right-click a job stream that is running, and choose **Open > Job Stream View**. You see a new window that shows the job stream you selected, with its jobs.



7. In the Job Stream View, click a job. You see a tooltip that contains information about the job you selected.
8. Close the Job Stream View window.
9. In the Plan View window, click **Zoom to fit** (  ).
10. In the **Search** field, type **SM2** and press Enter. You see that a job stream that contains the text is highlighted and displayed near the center of the window.
11. Press Enter again. Each time you press Enter, a different job stream that matches the search criteria is highlighted.

12. Click **View and update filter criteria** (  ). In the **Job Stream** field, enter **SM2\***. Select **Include predecessors**. Click **Apply**. You see the Plan View window that shows only job streams with names that start in SM2 and job streams that are their predecessors.



13. Click **Auto layout graph** (  ) to view the selected job streams.

14. Close the Plan View window.

15. Close the **Show Plan View** tab.

*Exercise 8 Monitoring the plan graphically by using the Plan View*

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# **Unit 4 Managing Workload Scheduler production exercises**

In the exercises for this unit, you manage objects in the Workload Scheduler production plan. You change objects in the plan by using Dynamic Workload Console and command-line interfaces.

# Exercise 1 Managing workstations in the plan

In this exercise, you change workstation properties by using the workstation monitoring tasks. You also check agent properties by viewing them from the monitoring pages.

1. From the **System Status and Health** menu, choose **Monitor Workload**.
2. On the Monitor Workload page, complete the following fields.

**Engine:** Select **WS94d**, and clear all other options

**Object Type:** Workstation

**List Plan** current-plan

**Query:** @

3. Click **Run**. You see the **Monitor Workstations** task in a new tab.

All Workstations in plan (Distributed) (Owner: adurling; Engine: WS94d,Distributed)

All Configured Tasks > Active Tasks (1) > All Workstations in plan (Distributed...)

Link Status	Workstation	Agent Running	Writer Running	Start Time	Run Number	Limit	Domain	Type
<input type="checkbox"/>	AGENT0			9/17/17 11:41 PM 101	11	MASTERDM	Agent	
<input type="checkbox"/>	ALPHA			9/17/17 11:41 PM 101	11	MASTERDM	Dynamic Pool	
<input type="checkbox"/>	BRAVO			9/17/17 11:41 PM 101	11	MASTERDM	Dynamic Pool	
<input type="checkbox"/>	BROKER0			9/17/17 11:41 PM 101	11	MASTERDM	Workload Broker	
<input type="checkbox"/>	CHARLIE			9/17/17 11:41 PM 101	11	MASTERDM	Dynamic Pool	
<input type="checkbox"/>	ECHO			9/17/17 11:41 PM 101	11	MASTERDM	Dynamic Pool	
<input type="checkbox"/>	MASTERAGENTS			9/17/17 11:41 PM 101	11	MASTERDM	Pool	
<input type="checkbox"/>	MDMO			9/17/17 11:41 PM 101	11	MASTERDM	MASTER	

4. On the Monitor Workstations page, click **CHARLIE** to see the CHARLIE Properties page. Notice the **Limit** field and **Fence** field. Click **Close View** to return to the All Workstations page.
5. In the row that contains workstation **CHARLIE**, click the number in the **Limit** column.

6. On the CHARLIE workstation limit page, in the **Value** field, enter 0, and click **OK**.

**CHARLIE workstation limit**

**Set Limit**

Current Limit

**New Limit**

System  
 Value

**OK** **Cancel**

7. On the Insert justification page, complete the following fields, and click **OK**.

<b>Category</b>	Trouble ticket
<b>Ticket number</b>	16251
<b>Description</b>	Stop processing on CHARLIE

**Insert justification**

Your Administrator requires to insert a justification for changes in this environment

\* Category:

\* Ticket number:

\* Description:

486/512

**OK** **Cancel**

8. You see the workstation limit of the workstation that is named CHARLIE changed.

# Exercise 2 Managing other dependencies in the plan

In this exercise, you continue from managing workstations to managing other dependencies.

1. On the Monitor Workstations page, right-click the row that contains workstation CHARLIE, and click **More Actions > Job Streams**. You can instead select workstation CHARLIE and choose **Job Streams** from the **More Actions** menu.

The screenshot shows the 'Monitor Workload' page with the following details:

- Plan Name:** Current Plan
- Workstation List:** AGENT0, ALPHA, BRAVO, BROKER0, CHARLIE, ECHO, MASTERAGENTS, MDM0
- Context Menu (for CHARLIE):** Shows options like Start, Stop, Link, Unlink, More Actions, and a submenu for 'Job Streams...' which is highlighted.
- Domain Column:** Shows the domain for each workstation.
- Filter Bar:** Shows 'Lines per page: 25' and a search bar with '1 << 1 >> 1'.

2. On the Monitor 'CHARLIE' Job Stream page, enter **sx7** in the **Filter** field, and press Enter. You see job streams with names that start with SX7 and status *Waiting*.

The screenshot shows the 'Job Stream View' page for workstation CHARLIE, with the following details:

- Filter Bar:** Shows 'Filter: SX7'.
- Table Headers:** Internal Status, Job Stream, Workstation, Scheduled Time, Not Satisfied Dependencies, Total Jobs, Successful Jobs, Jobs Limit, Priority, Ear.
- Data Rows:** Four rows are listed, all with Internal Status 'HOLD' and Job Stream names starting with 'SX7JAX\_'. The first two rows have 'CHARLIE' as the Workstation, while the last two have 'HOLD' as the Workstation.

3. Scroll to the right to see the **Earliest Start** and **Deadline** columns.
4. Click the number in the **Not Satisfied Dependencies** column in any row. You see a new page that lists the dependencies for the job stream.

Dependency Status	Internal Status	Prompt	Message Text	Prompt Type
<input type="checkbox"/> Undefined	NOT ASKED	PROMPT1 (1)	Reply yes to resolve Predefined Prompt	

5. Notice the status of the prompt **PROMPT1**. Select the **PROMPT1** check box in the Prompt Dependencies section. Click **Reply Yes**.
6. On the “Insert justification” page, enter 16263 in the **Ticket number** field. Enter **Affirmative reply to PROMPT1** in the **Description** field, and click **OK**.
7. Scroll to the top of the page and click **Refresh All** to see the updated dependencies and their status. Notice that the prompt is no longer listed as a dependency, but a file dependency is still unresolved.
8. Open a terminal window, or restore a terminal window that you previously opened. To open a terminal window, select **Applications > Utilities > Terminal**.
9. To satisfy the file dependency, create a file that matches the requirement by running the following command.  

```
touch /tmp/file1.dat
```
10. Switch to the Dynamic Workload Console. Update the dependencies page by clicking **Refresh All**. You see that the file dependency remains cleared and unresolved.



**Important:** Workload Scheduler does not check prompt and file dependencies if there are other unresolved dependencies such as earliest start time.

11. Click **Close View** to close the dependencies page and return to the Monitor 'CHARLIE' Job Stream page.
12. Click **SX7JAX\_UMJ** in the **Job Stream** column. You see the 'SX7JAX\_UMJ' Properties page.



**Attention:** If you see more than one occurrence of SX7JAX\_UMJ, choose the occurrence that shows today's date in the **Scheduled Time** column.

13. Scroll to the bottom of the page so that you can see the time restrictions for the job stream.
14. Click **Time Restrictions**. You see the SX7JAX\_UMJ Time Restrictions page.
15. In the **Earliest Start** and **Latest Start** sections, clear the **Specify date and time** check box and click **OK**.

**SX7JAX\_UMJ Time Restrictions**

**Time Restrictions**

**Earliest Start**

Specify date and time  
  \*  Example: 12:30:00 PM

**Latest Start**

Specify date and time  
  \*  Example: 12:30:00 PM

**Action**

Suppress  Continue  Cancel

**Deadline**

Specify date and time  
  \*  Example: 12:30:00 PM

16. On the “Insert justification” page, enter 16264 in the **Ticket number** field. Enter **Clear start time** in the **Description** field, and click **OK**.
17. On the ‘SX7JAX\_UMJ’ Properties page, click **Refresh** and check that the **Earliest Start** and **Latest Start** lines are cleared.
18. Click **Close View** to return to the Monitor ‘CHARLIE’ Job Stream page.

Next, you repeat the steps to remove time dependencies from the SX7JAX\_TCB job stream.

19. Click **SX7JAX\_TCB** in the **Job Stream** column. You see the ‘SX7JAX\_TCB’ Properties page.



**Attention:** If you see more than one occurrence of SX7JAX\_TCB, choose the occurrence that shows today’s date in the **Scheduled Time** column.

20. Scroll to the bottom of the page so that you can see the time restrictions for the job stream.
21. Click **Time Restrictions**. You see the SX7JAX\_TCB Time Restrictions page.
22. In the **Earliest Start** and **Latest Start** sections, clear the **Specify date and time** check box, and click **OK**.
23. On the “Insert justification” page, enter 16264 in the **Ticket number** field. Enter **Clear start time** in the **Description** field, and click **OK**.
24. On the ‘SX7JAX\_TCB’ Properties page, click **Refresh** and check that the **Earliest Start** and **Latest Start** lines are cleared.
25. Click **Close View** to return to the Monitor ‘CHARLIE’ Job Stream page.
26. Click **Refresh**. The status of SX7JAX\_TCB and SX7JAX\_UMJ changes to READY.



**Hint:** If the status is Waiting or HOLD, wait a few seconds and click **Refresh**.

27. Click **Clear filter** to show all job streams running on workstation CHARLIE.
28. Select **Status** from the filter menu, and enter **Ready** in the filter field. Click **Filter**. You see a list of job streams ready to start on workstation CHARLIE. Job stream SX7JAX\_UMJ has zero successful jobs.



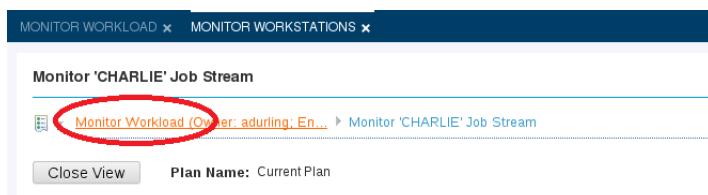
**Hint:** Jobs and job streams that run on workstation CHARLIE remain ready because the workstation limit is set to zero.

29. Scroll to the right so you can see the **Priority** column. Click the priority **61**. You see the SX7JAX\_UMJ job stream priority page.
30. Click **Go**. The new priority field changes to 101. Click **OK**.
31. On the “Insert justification” page, enter 16265 in the **Ticket number** field. Enter **Set go priority** in the **Description** field, and click **OK**.
32. On the Monitor ‘CHARLIE’ Job Stream page, click **Refresh**. You see that the job stream SX7JAX\_UMJ is no longer in the READY filter.
33. Click **Refresh**. You see that the job stream SX7JAX\_UMJ is in the READY filter. Now SX7JAX\_UMJ has two successful jobs.



**Hint:** You might have to wait a few minutes and click **Refresh** again.

34. Click **Close View**.



35. On the Monitor Workload (Monitor Workstations tab) page, click **0** in the **Limit** column.
36. On the CHARLIE workstation limit page, enter 11 in the **Value** field. Click **OK**.
37. On the “Insert justification” page, enter 16265 in the **Ticket number** field. Enter **Resume jobs on CHARLIE** in the **Description** field, and click **OK**.

Now that the workstation limit is raised, jobs start running on workstation CHARLIE.

38. Close the **Monitor Workload** tab, and the **All configured tasks** tab.

# Exercise 3 Managing workstations and dependencies by using the command-line interface

In this exercise, you manage workstations and scheduling object dependencies by using the conman interface. To use the conman program, perform the following steps.

1. To open a terminal window, select **Applications > Utilities > Terminal**. You can instead restore a terminal window that you previously opened.
2. Resize the terminal window so that you see at least 132 columns and 25 rows.
3. Source the Workload Scheduler environment by running the following command.  
`/opt/IBM/TWA/TWS/tws_env.sh`
4. Start the conman program.



**Hint:** For the next steps, you use the conman command-line interface. You see a percent prompt (%) instead of the shell prompt. The percent sign (%) that you see in the exercise instructions signifies that the command you run is a conman command.

5. Display the list of workstations in the plan, with their status.

```
% sc
```

6. Raise the limit of all the workstations.

```
% limit cpu=@;99;noask
```



**Hint:** The **noask** option inhibits the program from prompting you to change the limit of each workstation individually.

7. Check the limit of the workstations by showing the status

```
% sc
```

8. Raise the fence of all the workstations to GO.

```
% fence @;GO;noask
```

9. To see which prompts are in the production plan, use the `showprompts` (sp) command.

```
% sp
```

10. You see the prompt that is named PROMPT1 has the YES state because you performed *Reply Yes* previously.

11. To see the objects that depend on the prompt that is named PROMPT1, use the DEPS option for the SHOWPROMPTS command.

```
% sp PROMPT1;deps
```

12. You see that the job stream SX7JAX\_UMJ on workstation CHARLIE uses the prompt PROMPT1 as a dependency. The first job also has a dependency on a job that is named J7JAX\_CREPT\_00001. In the next steps, you remove the job dependency.

13. Remove the job dependency from the job stream that is named J7JAX\_PIKAS\_00001 on workstation CHARLIE.

```
% release job=CHARLIE#SX7JAX_UMJ.J7JAX_PIKAS_00001;follows
```

You see a message that confirms the command was accepted.

14. Check which jobs do not start because of the workstation fence.

```
% sj @#@.@+state=fence
```

15. Lower the workstation fence to zero

```
% fence @;0;noask
```

16. Exit the conman program.

```
% exit
```

# Exercise 4 Submitting new work, releasing, and canceling jobs

In this exercise, you submit new work into the production plan. Before submitting new work into the plan, you lower the workstation limit to zero so that jobs do not automatically start when you complete the submit function.

1. From the **System Status and Health** menu, choose **Monitor Workload**.
2. On the Monitor Workload page, complete the following fields.

---

**Engine:** Select **WS94d**, and clear all other options

**Object Type:** Workstation

**List Plan** current-plan

**Query:** @

---

3. Click **Run**. You see the **Monitor Workstations** task on a new tab.
4. On the Monitor Workstations page, in the row that contains workstation **ALPHA**, click the number in the **Limit** column.
5. On the ALPHA workstation limit page, enter 0 in the **Value** field, and click **OK**.
6. On the “Insert justification” page, enter 16267 in the **Ticket number** field. Enter **Limit jobs on ALPHA** in the **Description** field, and click **OK**.
7. You see that the workstation limit for ALPHA is zero.

In the next steps, you submit a new job stream into the production plan and view it graphically.

1. From the **Administration** menu, choose **Submit Predefined Job Streams**.
2. On the “Submit Job Stream into Plan” page, complete the fields as shown in the following table.

**Table 1 Submit job stream into plan**

Field	Value
<b>Engine name</b>	WS94d (Distributed)
<b>Job Stream</b>	SK1DFW_TMK
<b>Workstation Name</b>	ALPHA
<b>Alias</b>	AAA-10
<b>Variable Table</b>	DYNPOOL
<b>Specify date and time</b>	<i>cleared</i>

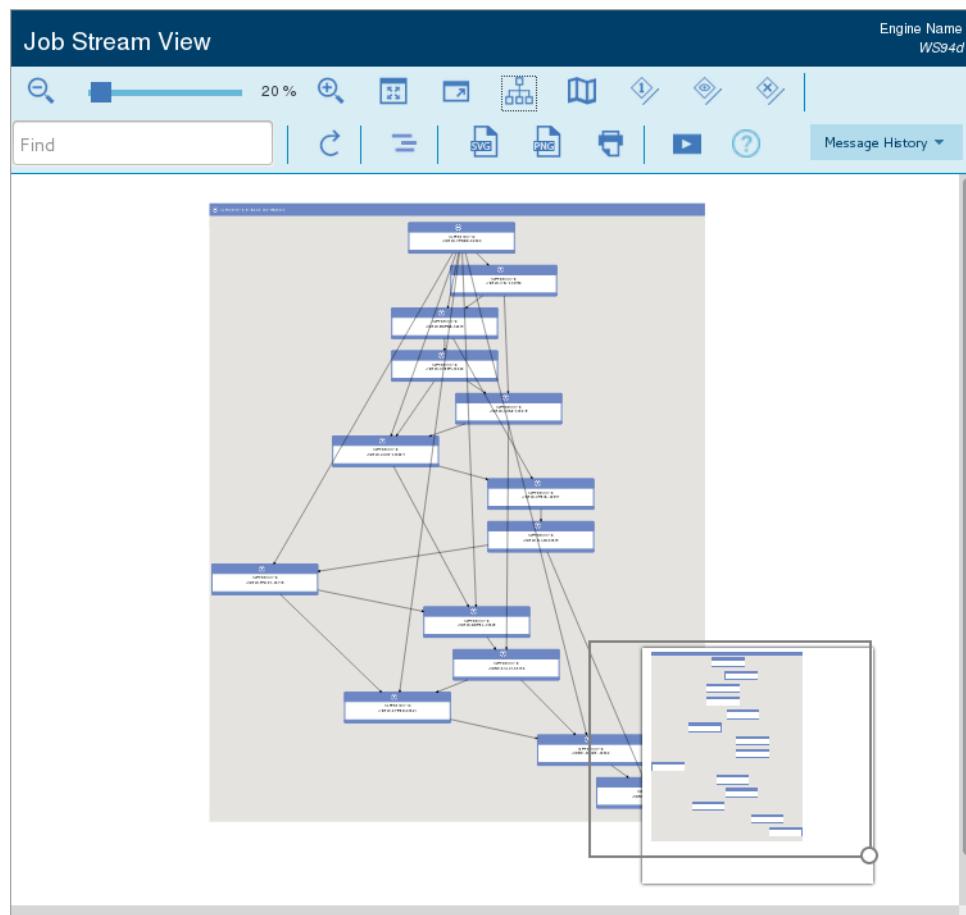
The screenshot shows the 'Submit Job Stream into Plan' page with the following filled-in fields:

- Select an Engine:** Engine name: WS94d [smadmin] (Distributed)
- Job Stream:**
  - \*Job Stream: SK1DFW\_TMK
  - \*Workstation Name: ALPHA
  - Alias: AAA-10
  - Variable Table: DYNPOOL
- Scheduled Time:**
  - Specify date and time
  - Date: 9/18/17
  - Time: 3:51 PM
  - Example: 12:30 PM
  - Properties...

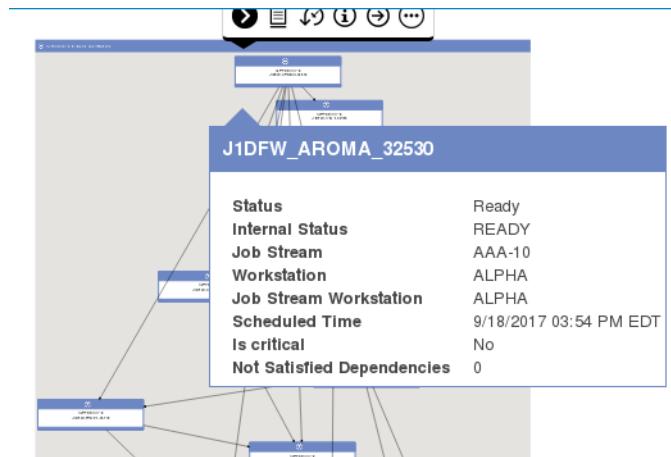
3. Click **Submit**.
4. On the “Insert justification” page, enter 16268 in the **Ticket number** field. Enter **Submit job stream on ALPHA** in the **Description** field, and click **OK**. You see the message, **The operation has been completed successfully**.
5. Click **OK** to return to the “Submit Job Stream into Plan” page.

In the next steps, you use the Plan View to view and change the new jobs that you submitted.

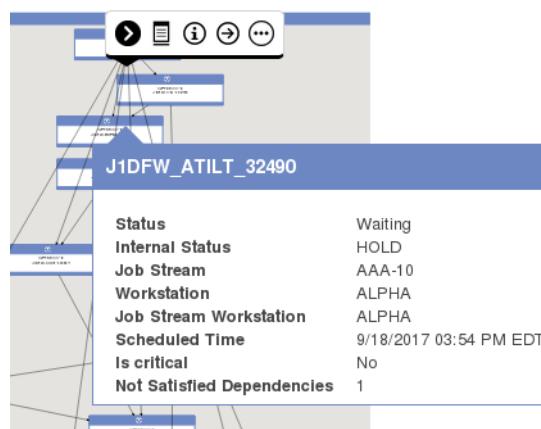
1. From the **System Status and Health** menu, click **Show Plan View**.
2. On the Choose Engine page, choose **WS94d (Distributed)** from the **Engine name** menu, and click **Go**. You see the Plan View in a new browser window.
3. Enter **AAA** in the search field, and click **Find**. You see a job stream that is highlighted in the plan view.
4. Right-click the highlighted job stream, and click **Open > Job Stream View**. You see a new browser window that contains the AAA-10 job stream.



- Click the first job in the job stream, and see that **J1DFW\_AROMA\_32530** has the **Ready** status.

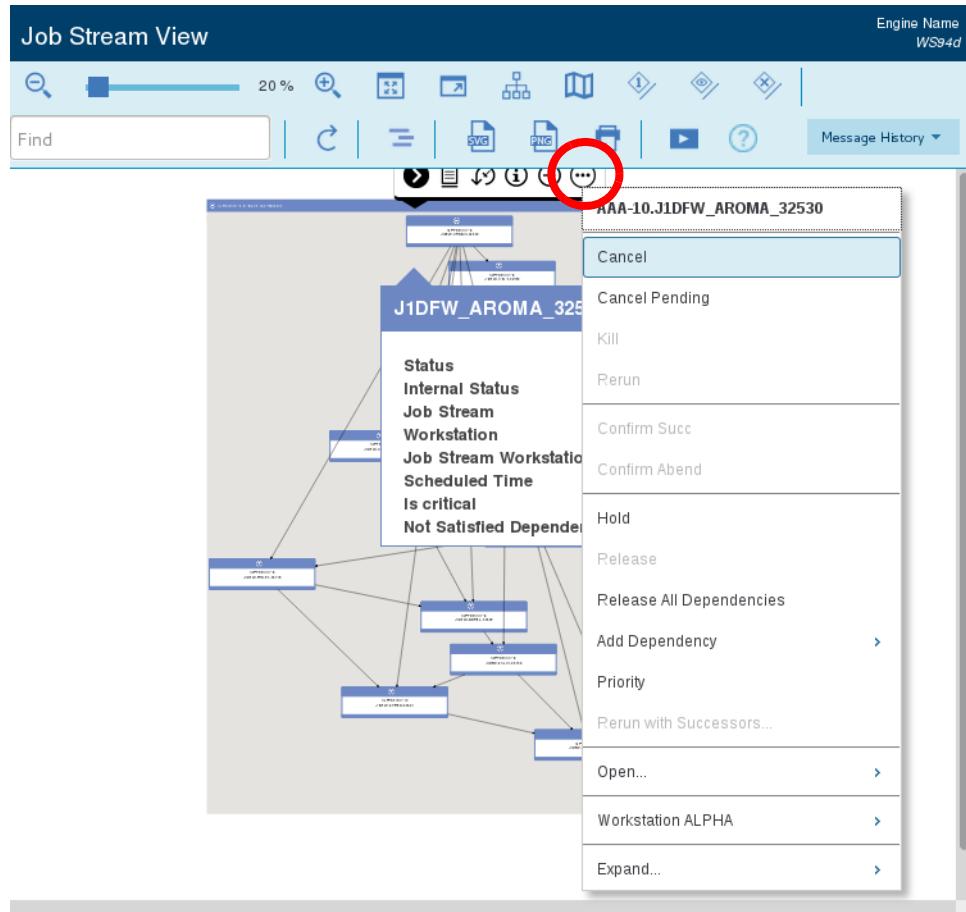


- Click other jobs in the job stream, and see that they have the **Waiting (HOLD)** status.

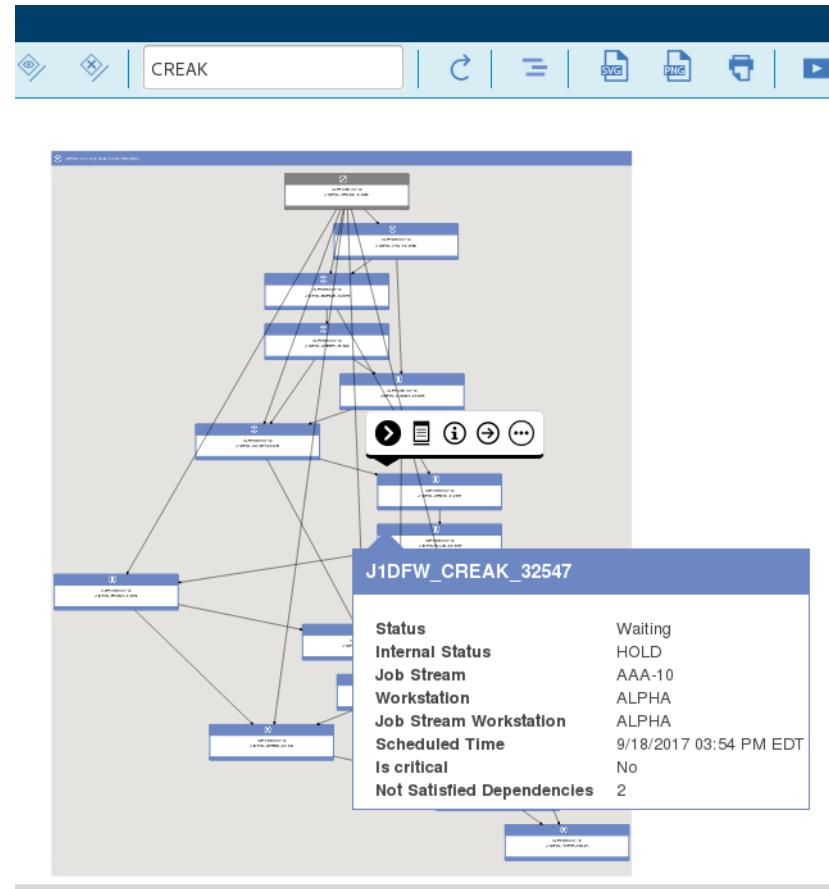


- Click the first job in the job stream, and see that **J1DFW\_AROMA\_32530** still has the **Ready** status. Click the **More options** menu, and select **Cancel**. Click **Ok** in the Confirm Action window.

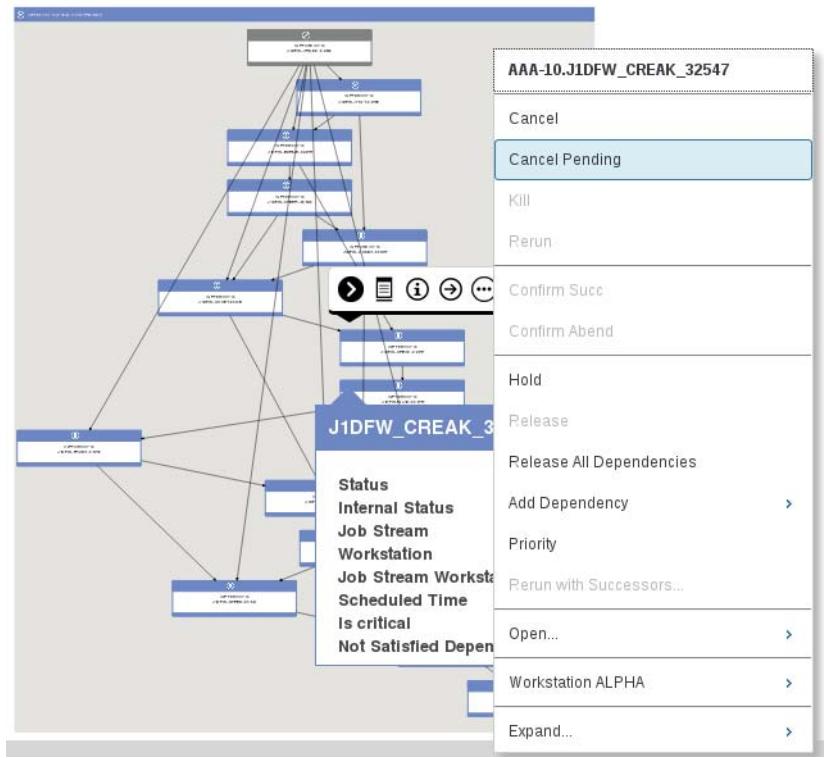
8. On the “Insert justification” page, enter 16269 in the **Ticket number** field. Enter **Cancel AROMA** job in the **Description** field, and click **Save**. You see a message that the job was successfully canceled.



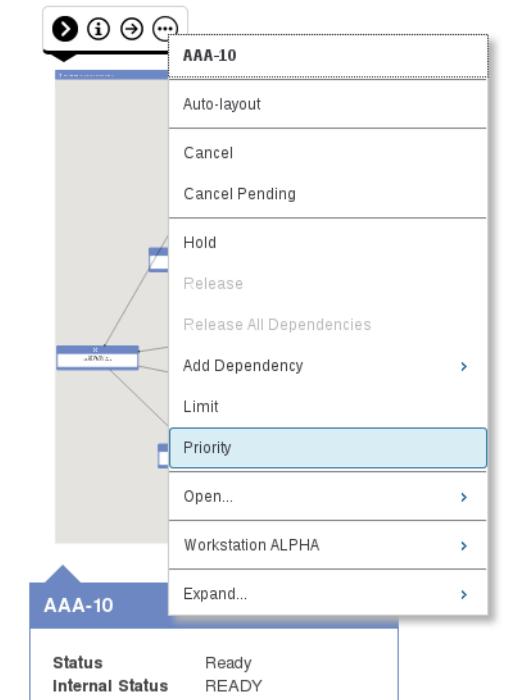
9. Enter **CREAK** in the search field, and press Enter. The job that is named **J1DFW\_CREAK\_32547** is highlighted.



10. Click **More actions > Cancel pending**. In the Confirm Action window, click **OK**.



11. On the “Insert justification” page, enter 16270 in the **Ticket number** field. Enter **Cancel CREAK** job in the **Description** field, and click **Save**. You see a message that the job was successfully canceled.
12. Click **Refresh**. You see that no status changed.
13. Zoom out, and right-click the shaded area outside any jobs. Click **Priority** from the menu.



14. In the Set AAA-10 Priority window, click **Go**. The **New Priority** field shows 101. Click **Save**.
15. On the “Insert justification” page, enter 16271 in the **Ticket number** field. Enter **Set AAA-10 to go** in the **Description** field, and click **Save**.
16. Click **Refresh**. You see that a job is running.

In the next steps, you restore the workstation limit to a higher value.

1. Right-click the shaded area. Click **Workstation ALPHA > Limit** from the menu.
2. On the “Insert justification” page, enter 16272 in the **Ticket number** field. Enter **Restore ALPHA limit** in the **Description** field, and click **Save**.
3. In the Set Workstation Limit - ALPHA window, select **Value**, enter 90 for the new value, and click **Save**. You see a message that confirms your change limit request.
4. On the “Insert justification” page, enter 16272 in the **Ticket number** field. Enter **Restore ALPHA limit** in the **Description** field, and click **Save**. You see a message that the command was successfully submitted.
5. Close the Job Stream View by closing the browser window that contains it.
6. Close the Plan View by closing the browser window that contains it.
7. Close the Show Plan View tab.

# Exercise 5 Using the What-If Interface

The **What-if Analysis** interface lists jobs and job streams in the production plan visually in a Gantt chart. You can use the interface to estimate the outcome of changes to the production plan.

The What-if page displays a list of jobs and job streams in the production plan that depends on your selection from the monitoring tasks. To start the What-if Analysis page, complete the following steps.

1. Click the **Monitor Workload** tab, or open a new one by clicking **System Status and Health > Monitor Workload**.
2. On the Monitor Workload page, complete the following fields.

**Engine:** Select **WS94d**, and clear all other options

**Object Type:** Job stream

**List Plan** current-plan

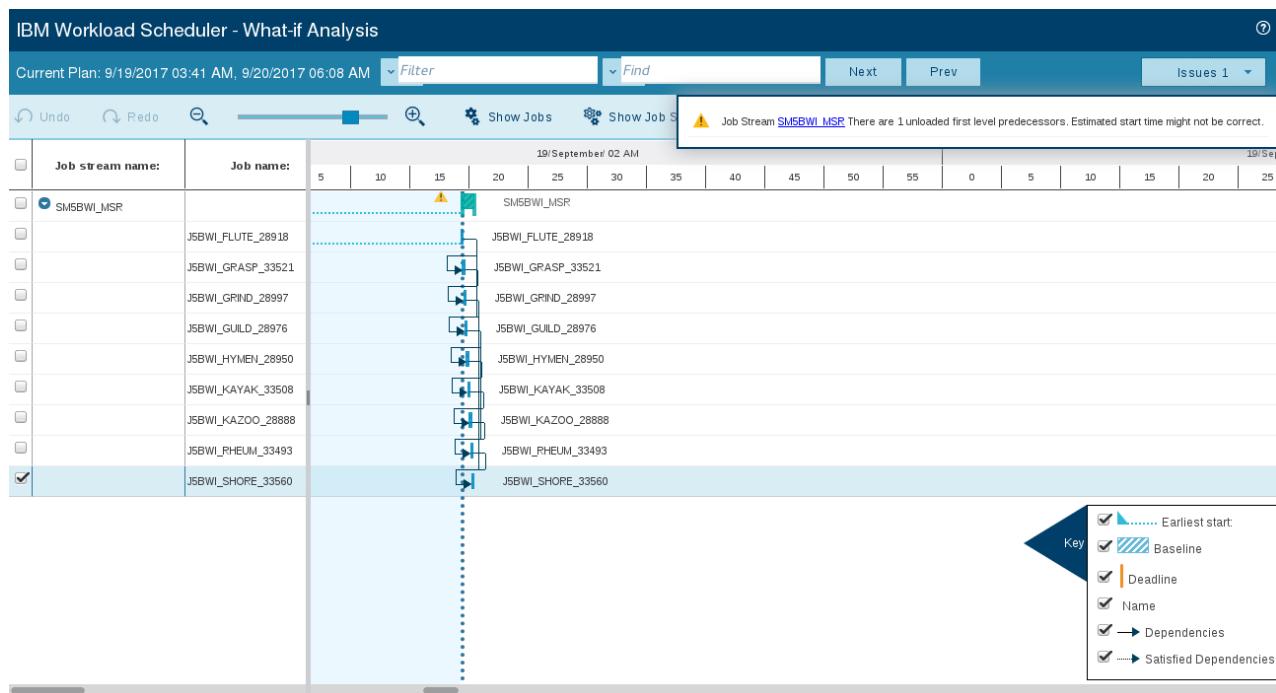
**Query:** @#SM5@+State=#Waiting

3. Click **Run**. You see the **Monitor Job Streams** task on a new tab.
4. On the **Monitor Job Streams** tab, select a job stream that has more than one total jobs, and click **What-if**. A new browser tab opens that displays the What-if interface.

The screenshot shows the IBM Workload Scheduler interface. At the top, there's a navigation bar with links like Default, Administration, Planning, Reporting, System Configuration, System Status and Health, and Troubleshooting and S. Below the navigation bar, there are two tabs: MONITOR WORKLOAD (selected) and MONITOR JOB STREAMS. The main area is titled "Monitor Workload (Owner: adurling; Engine: WS94d,Distributed)". It shows a table of jobs with the following columns: Status, Internal Status, Job Stream, Workstation, Scheduled Time, Not Satisfied Dependencies, Total Jobs, Successful Jobs, and Jobs. One row in the table has a checked checkbox in the Status column. The "What-if" button in the toolbar is circled in red.

Status	Internal Status	Job Stream	Workstation	Scheduled Time	Not Satisfied Dependencies	Total Jobs	Successful Jobs	Jobs
<input type="checkbox"/> Waiting	HOLD	SM5BOS_CMM	ECHO	9/20/17 12:00 AM	0	1	0	
<input checked="" type="checkbox"/> Waiting	HOLD	SM5BWI_MSR	ECHO	9/19/17 12:00 AM	1	9	0	
<input type="checkbox"/> Waiting	HOLD	SM5BWI_MSR	ECHO	9/20/17 12:00 AM	1	9	0	

5. Click the browser tab that shows the What-if Analysis. In the interface, you can see these areas of interest.



- The **Views and filters**, where you can see the time span that is selected, search for objects in the plan to view, and zoom in and out tools to show more or less detail in the timeline.
  - A **Jobs and job streams** list, where you can see the names and estimated times for the plan objects that are selected for analysis.
  - The **Gantt view**, from which you can change the conditions of jobs and job stream in the plan in a graphical way. For example, you can change a job's start time by dragging it in the timeline. You can add dependencies by graphically connecting two jobs. You open a menu by right-clicking an object in the view. This menu lists many actions that you can use to change the plan or your view of it.
  - The **List of potential issues** menu shows items that might cause problems. You can select an issue from the list to focus the Gantt view on the potential issue.
  - From the **More actions** menu, you can use many scheduling features, and simulate actions on the production plan. For example, you can simulate the changes that occur when you submit a job stream. You can also simulate a workstation outage interval to recommend scheduling changes that divert work loads around the outage.
  - The legend **Key** link shows a menu where you can see the description of the icons in the Gantt view. From the menu, you can clear the display of icons that you do not want to use in the view.
6. Try the features of the What-if Analysis interface. You can revert your changes by clicking **More Actions > Reset**. Changes that you initiate in the interface do not affect the production plan until you click **Apply or Print changes**.

7. Close the What-if interface by closing the browser tab that contains it.



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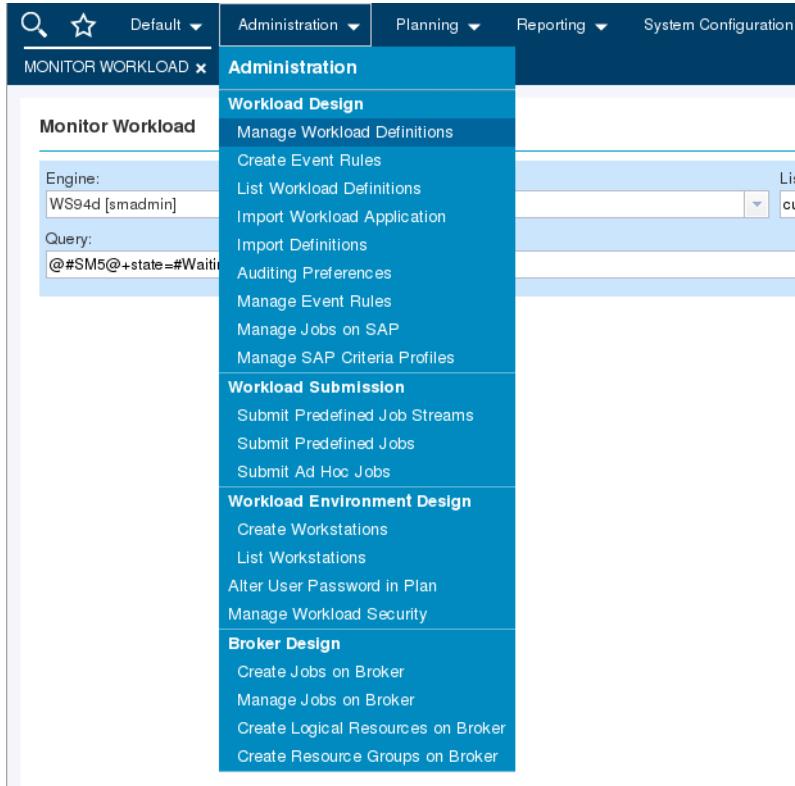
# **Unit 5 Creating scheduling objects exercises**

In the exercises for this unit, you create scheduling objects. In the next two units, you document and create a workflow. You are responsible for implementing the workload for one department. In your role as scheduler, you take the job stream requirements from the department. You then create the scheduling objects in Workload Scheduler to implement the workflow.

Read all instructions carefully and remember that the exercises build on each other. You use objects that are created in this unit to create job streams in the next unit. You must complete all the steps in this unit to successfully complete the following unit.

# Exercise 1 Using the Workload Designer

For this exercise, you use the Workload Designer. To open the workload designer, follow these steps.



1. Open the browser tab that contains the Dynamic Workload Console.
2. Select **Administration > Manage Workload Definitions**.

3. A new browser window opens to display the Workload Designer. The Workload Designer has three functional areas:
- **Create New**, where you can create a scheduling object or job stream
  - **Search**, where you can find an object in the database to edit or view
  - **Recent Activity**, where you can open an object that you recently edited

The screenshot shows the SAP Workload Designer interface. At the top right, it says "Engine name: WS94d [smadmin] (Distributed)".

**Create New** section:

- Job Definition
- Remote SAP R/3 Job
- Job Stream
- Prompt
- Resource
- User
- Calendar
- Workstation Class
- Variable Table
- Workload Application Template
- Run Cycle Group

**Search** section:

Search Job Stream

**Recent Activity** section:

CHARLIE#SX8AUS_POS Modified by adurling
PREPOOL.TIMEOUT Modified by wsuser
CHARLIE#SX8AUS_PRE Modified by adurling
PREPOOL.ITERATIONS Modified by wsuser
PREPOOL.EXITCODE Modified by wsuser
CHARLIE#J8AUS_WEDGE_00001 Modified by wsuser
CHARLIE#J8AUS_SITAO_00001 Modified by wsuser
CHARLIE#J8AUS_PLIER_00001 Modified by wsuser

Select a scheduling object among those you have recently worked on.

Select the scheduling object type you want to create.

# Exercise 2 Creating a variable table

In this exercise, you create variable tables that contain variables you use in job and job stream definitions. A variable table is an object that groups multiple variables. All the variables that you use in workload scheduling are contained in at least one variable table.

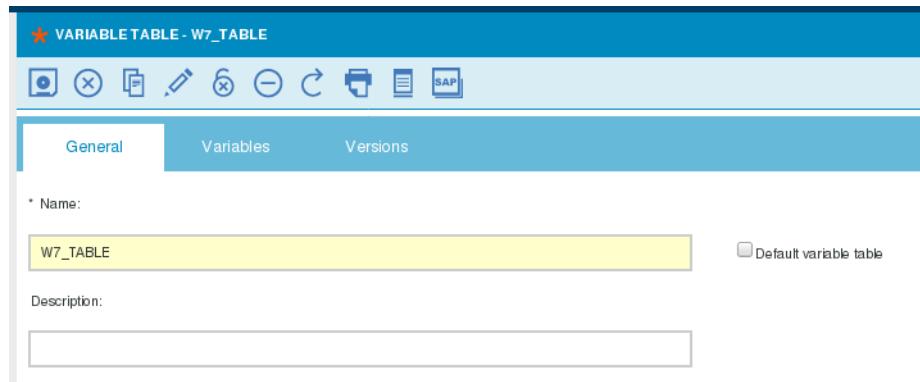
You are not required to create variable tables to be able to create and use variables. You might never create a table and never use one explicitly. When you create or manage a variable without naming the table, Workload Scheduler stores it or looks for it in the variable table that is already provided by default.

You can define more than one variable with the same name but different values and place them in different tables. Using variable tables, you assign different values to the same variable and reuse the same variable name within job definitions and when defining prompts and file dependencies. You can assign the variable tables at the run cycle, job stream, and workstation levels.

Variable tables can be useful in job definitions when a job definition is used as a template for a job that belongs to more than one job stream. For example, you can assign different values to the same variable and reuse the same job definition in different job streams.

To create a variable table, complete the following steps.

1. On the Workload Designer start page, in the **Create New** section, click **Variable Table**. You create the definition in a pane like the one shown in the following figure.



2. In the **Name** field, enter **W7\_TABLE**. Leave the **Default variable table** check box cleared.
3. Click the **Variables** tab. You see the (empty) list of variables in the new table.
4. Click the plus sign to add a variable to the table.
5. Add two variables to the variable list, as described in the following table:

**Table 1 FILEDATA variable table contents**

Variable name	Variable value
FILENAME	/home/wsuser/Documents/random.txt
FILEDATE	2018-01-01



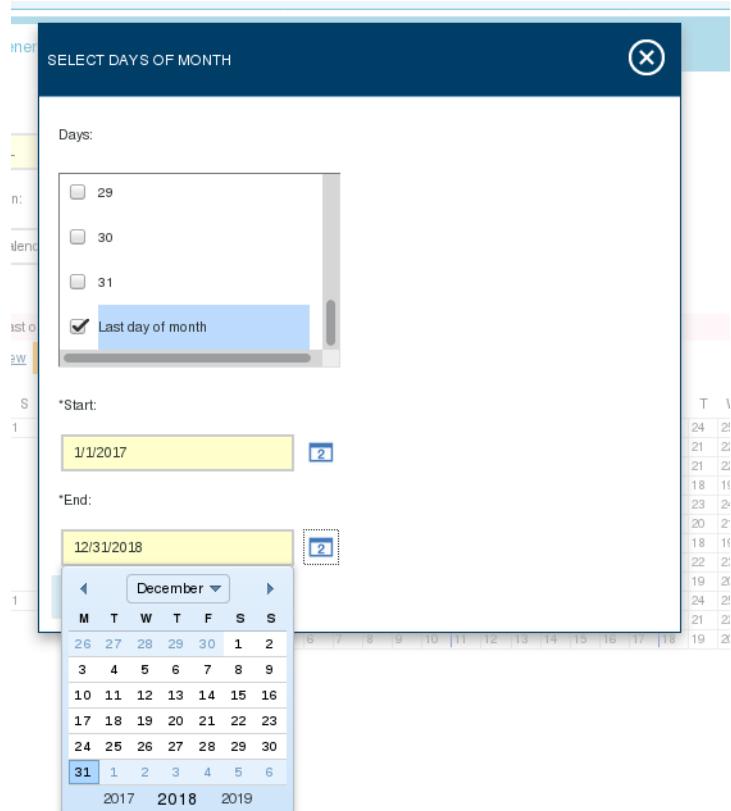
**Important:** Variable names are not case-sensitive. Variable values are case-sensitive.

6. Save the variable table by clicking **Save**.
7. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17150 in the **Ticket number** field. Enter **Added file data variable table** in the **Description** field, and click **Save**.
8. A message window shows that the variable table was successfully saved.
9. Close the variable table by clicking **Close** ( ).

# Exercise 3 Creating calendars

In this exercise, you create a calendar that you later use in run cycles. To create a calendar, complete the following steps.

1. Click **Create New > Calendar**.
2. On the **General** tab, enter `w7_CAL` in the **Name** field.
3. In the **Description** field, enter `Class calendar expires December 31`.
4. Click **Select Days of Month** (  ).
5. In the “Select days of month” window, scroll to the bottom and select **Last day of month**.
6. In the **End** field, select the last day of the year. You can type the date or choose it from the calendar tool.



- Click **OK** to return to the calendar editor. You see the last day of each month selected.

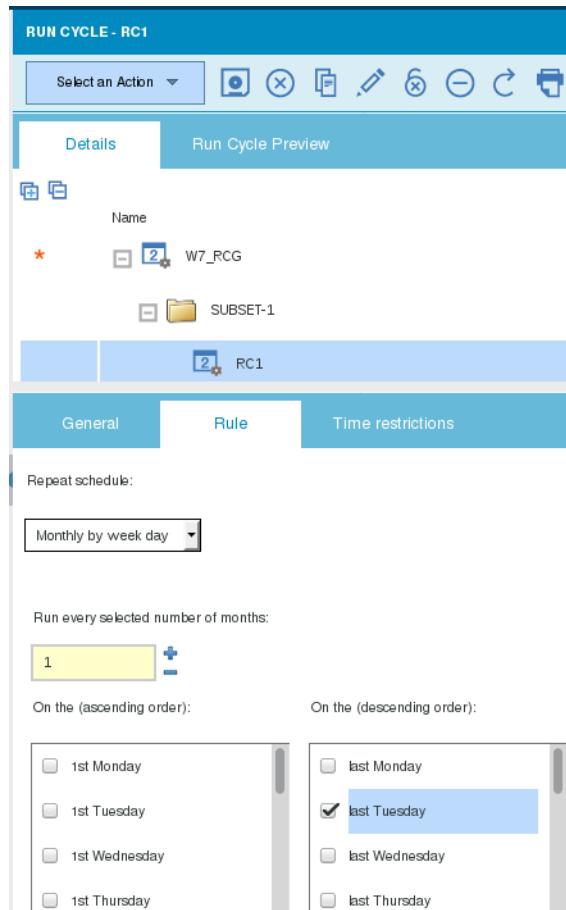
The screenshot shows the SAP Fiori calendar editor for the object 'W7\_CAL'. The top navigation bar includes icons for search, refresh, and SAP logo. Below the bar is a navigation menu with 'General' and 'Versions' tabs, with 'General' being the active tab. The main area has fields for 'Name:' (containing 'W7\_CAL') and 'Description:' (containing 'Class calendar expires December 31'). At the bottom is a monthly calendar grid for the year 2017, showing all days from January 1 to December 31. The days are color-coded: blue for most days, red for Saturday and Sunday, and green for the last day of each month (31st).

- Click **Save**.
- On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17151 in the **Ticket number** field. Enter **Added calendar w7** in the **Description** field, and click **Save**. You see the message **The object W7\_CAL has been created**.
- Click **Close** ( ).

# Exercise 4 Creating run cycle groups

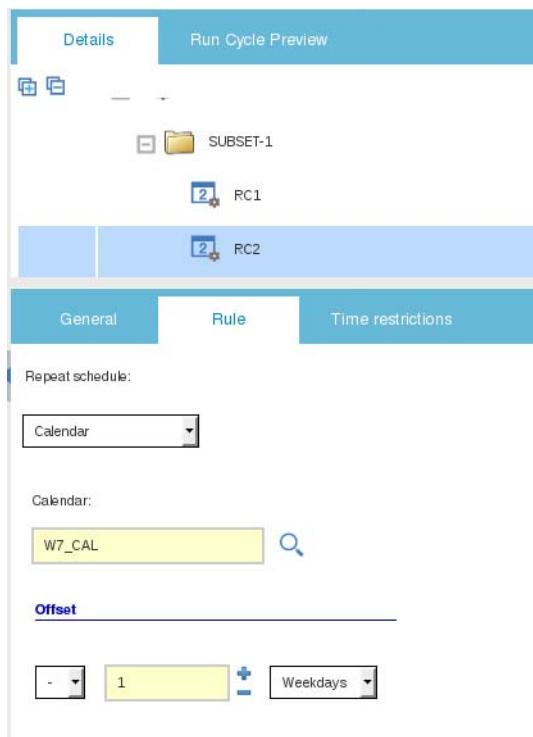
In this exercise, you create a run cycle group to use in your job streams. To create a run cycle group, perform the following steps.

1. Click **Create New > Run Cycle Group**.
2. In the Properties pane, enter **W7\_RCG** in the **Name** field.
3. Select **Add Subset** from the **Select an Action** menu. You see a new subset and its properties.
4. Click **Add Run Cycles** to create a run cycle.
5. In the Properties pane for RC1, switch to the rule definition page by clicking the **Rule** tab.
6. Select **Monthly by week day** from the **Repeat schedule** menu.
7. Select **last Tuesday** from the list of weekdays.



8. Click the row that contains **SUBSET-1**, and click **Add Run Cycles** to add another run cycle.

9. In the Properties pane for RC2, on the **General** tab, scroll to the bottom of the pane, and click **Exclusive**.
10. Switch to the rule definition page by clicking the **Rule** tab.
11. Select **Calendar** from the **Repeat schedule** menu.
12. Enter **w7\_CAL** in the **Calendar** field. You can instead click **Pick calendar** and search from a list of available calendars.
13. Select minus (-) from the **Offset** menu.
14. Enter 1 in the offset number field.
15. Choose **Workdays** from the offset type menu.
16. Click **Save**.



17. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17152 in the **Ticket number** field. Enter **Added run cycle group w7** in the **Description** field, and click **Save**. You see the message **The object W7\_RCG has been created**.
18. Click the **Run Cycle Preview** tab to see a summary of the run cycles in the run cycle group.
19. Click **Legend** to see a description of the colors that the display presents. Close the legend after you review it.
20. Choose **RC2** from the **Display** menu. You see the dates the RC2 run cycle selected.
21. Click **Close**.

# Exercise 5 Creating job definitions

In the exercises for this unit, you create jobs that run on Workload Scheduler agents, as part of job streams that you create later.

## Creating the File Transfer job

The **W7\_XFER** job transfers a file that you create from one computer to another by using the Workload Scheduler file transfer job method.

1. From the Workload Designer, click **Create New > Job Definition**.
2. In the list of job types, click **FileTransfer**.
3. On the **General** tab, enter the following items for each field.

**Table 2 XFERFILE job properties**

Field	Value
Name	W7_XFER
Workstation	AGENT0



**Hint:** You can search for the workstation name by clicking the **Find** icon next to the **Workstation** field.

4. On the **File Transfer** tab, enter the following items for each field.

**Table 3 File transfer properties**

Field	Value
Transfer type	Upload
Server	ws94mdm0
Remote file	/var/tmp/incoming.txt
Local file	^FILENAME^
Protocol	SSH
<b>Remote credentials</b>	
User name	wsuser
Password	object00

**Table 3 File transfer properties**

Field	Value
<b>Local credentials</b>	
User name	wsuser
Password	object00

- Click **Test Connection** to verify the fields. You see a message that the connection test that is completed successfully.



**Note:** FILENAME is a variable that you created in a previous exercise. Variable names are enclosed in carets (^). You later create a start condition, which detects the presence of a file and substitutes the variable name for the name of the file.

- On the **Transfer Options** tab, select **Text** as the transfer mode option.
- Save the job definition by clicking **Save**.
- On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17153 in the **Ticket number** field. Enter **Added file transfer job** in the **Description** field, and click **Save**. You see the message **The object W7\_XFER has been created**.
- A message confirms that your definition was stored. Keep the job definition open so you can use it later.

# Creating the file monitor job

The W7\_WAIT job uses the Workload Scheduler **filemonitor** utility to pause processing until a file stops changing. The utility is useful when a large file that is being transferred to a server is detected before the file's upload is complete.

1. To create the W7\_WAIT job, from the **Create New** menu, select **Job Definition**. In the **Native** section of the job definition window, click **UNIX**.
2. On the **General** tab, enter the following items for each field.

**Table 4 W7\_WAIT job properties**

Field	Value
Name	W7_WAIT
Workstation	AGENT0
Login	wsuser



**Hint:** You can search for the workstation name by clicking **Find** next to the **Workstation** field.

3. On the **Task** tab, click **Command** and enter the following command text (all on one line):

```
source /opt/IBM/TWA/TWS/tws_env.sh && /opt/IBM/TWA/TWS/bin/filemonitor -path
^FILENAME^ -event fileModified -scanInterval 61
```



**Hint:** You can search for the FILENAME variable by clicking **Add variable**.

4. Click **Save** to store the W7\_WAIT job.
5. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17154 in the **Ticket number** field. Enter **Added file monitor job** in the **Description** field, and click **Save**. You see the message **The object AGENT0#W7\_WAIT has been created**.

# Creating the file process job

The next job that you create is a UNIX job that uses the *Executable* job type. To create the W7\_PROC job, perform the following steps:

1. From the Workload Designer **Create New** menu, choose **Job Definition**. In the **Native** section, click **Executable**.
2. On the **General** tab, enter the following items for each field.

**Table 5 W7\_PROC job properties**

Field	Value
Name	W7_PROC
Workstation	AGENT0

3. On the **Credentials** tab, enter `wsuser` in the **User** field.
4. On the **Task** tab, select **Inline script** and enter the script as shown.

```
#!/bin/sh
in=/var/tmp/incoming.txt
out=/var/tmp/${(basename $1)}.${(date +%s)}
wc -w $in
mv $in $out
```

- Add an argument to pass the script by clicking the plus sign (+) and entering the following Value.

**^FILENAME^**

The screenshot shows the SAP GUI interface for creating an executable job. The top bar indicates it's an 'EXECUTABLE (9.4.0.01) - AGENT0#W7\_PROC'. The 'Task' tab is selected. In the 'Script body' field, there is a shell script:

```
#!/bin/sh
in=/var/tmp/incoming.txt
out=/var/tmp/${basename $1}.$(date +%s)
wc -w $in
mv $in $out
```

In the 'Arguments' section, there is a 'Value' input field containing **^FILENAME^**. There are also minus and plus buttons for managing arguments.

- Click **Save** to store the job definition.
- On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17155 in the **Ticket number** field. Enter **Added file process job** in the **Description** field, and click **Save**. You see the message **The object AGENT0#W7\_PROC has been created.**

# Exercise 6 Creating jobs with conditions

In this exercise, you create job definitions which contain output and success conditions.

You can specify to have jobs complete successfully when variables other than the return code evaluate as true. For example, you can set the success condition by analyzing the output that the job creates, by checking contents of the `this.stdlist` variable. For example, to set the job as successful when the job output contains the word *Complete*, use the following return code mapping expression:

```
contains(${this.stdlist}, "Complete")
```

You can analyze the job properties by examining the properties of the job, or another job in the same job stream. Properties that you can reference are listed in the documentation at the following location.

[https://www.ibm.com/support/knowledgecenter/SSGSPN\\_9.4.0/com.ibm.tivoli.itws.doc\\_9.4/distr/src\\_ref/awsgpassjobprop.htm](https://www.ibm.com/support/knowledgecenter/SSGSPN_9.4.0/com.ibm.tivoli.itws.doc_9.4/distr/src_ref/awsgpassjobprop.htm)

## ***Creating a job with expanded condition mappings***

In the next section, you create a job, which has four possible conditions, each representing a cardinal direction (north, south, east, or west). To create a job with condition mappings, complete the following steps.

1. In the Workload Designer, select **Create New > Job Definition**. In the **Native** section, click **Executable**.
2. Enter `W1_DIRECTION` in the **Name** field, and `CHARLIE` in the **Workstation** field.
3. In the **Successful Output Conditions** section, click the plus (+) sign to add a condition.
4. Enter `NORTH` for the condition name, and `contains(${this.stdlist}, "North")` for the condition value.
5. Click the plus (+) sign to add a second condition.
6. Enter `SOUTH` for the condition name, and `contains(${this.stdlist}, "South")` for the condition value.
7. Click the plus (+) sign to add a third condition.
8. Enter `EAST` for the condition name, and `contains(${this.stdlist}, "East")` for the condition value.
9. Click the plus (+) sign to add a fourth condition.

10. Enter **WEST** for the condition name, and `contains(${this.stdlist}, "West")` for the condition value.

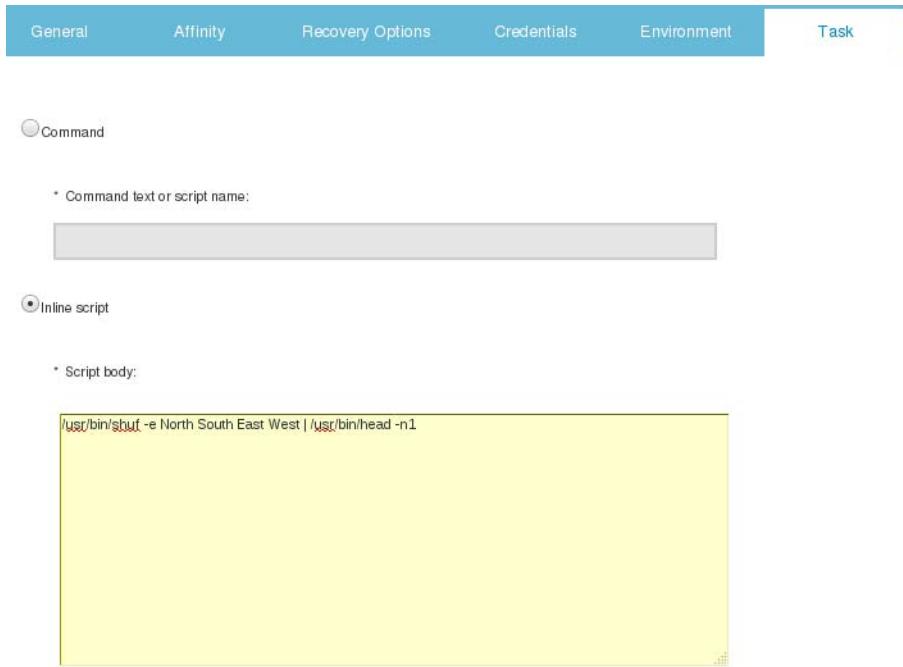
Condition Name	Condition Value
NORTH	<code>contains(\${this.stdlist}, "North")</code>
South	<code>contains(\${this.stdlist}, "South")</code>
East	<code>contains(\${this.stdlist}, "East")</code>
West	<code>contains(\${this.stdlist}, "West")</code>

11. Click the **Task** tab to enter the command that the job runs.

12. Select **Inline script** for the job's task.

13. In the **Script body** field, enter the following command, which causes the system to randomly print one of the words North, South, East, or West.

```
/usr/bin/shuf -e North South East West | /usr/bin/head -n1
```



14. Click **Save** to store the job definition.

15. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17156 in the **Ticket number** field. Enter **Added DIRECTION job** in the **Description** field, and click **Save**. You see the message **The object CHARLIE#W1\_DIRECTION has been created**.

## **Creating jobs to follow a condition**

In the next section, you create four jobs to follow each of the possible conditions. To create the jobs, complete the following steps.

1. In the Workload Designer, select **Create New > Job Definition**. In the **Native** section, click **UNIX**.
2. Enter **w2\_NORTH** in the **Name** field, **CHARLIE** in the **Workstation** field, and **wauser** in the **Login** field.
3. On the **Task** tab, enter the following command in the **Command text** field.  
`echo North`
4. Click **Save** to store the job definition.
5. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17156 in the **Ticket number** field. Enter **Added w2\_NORTH job** in the **Description** field, and click **Save**. You see the message **The object CHARLIE#W2\_NORTH has been created**.

To create the second job, complete the following steps.

6. Click **Create Like** (  ) to duplicate the job definition.
7. On the **General** tab, change the **name** field to **w2\_SOUTH**.
8. On the **Task** tab, change the **Command text** field to **echo South**.
9. Click **Save**.
10. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter **17156** in the **Ticket number** field. Enter **Added W2 South job** in the **Description** field, and click **Save**. You see the message **The object CHARLIE#W2\_SOUTH has been created**.



**Hint:** On the “Insert justification” page, as a shortcut, you can change North to South, and click **Save**.

To create the third job, complete the following steps.

11. Click **Create Like** (  ) to duplicate the job definition.
12. On the **General** tab, change the **name** field to **w2\_EAST**.
13. On the **Task** tab, change the **Command text** field to **echo East**.
14. Click **Save**.
15. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter **17156** in the **Ticket number** field. Enter **Added W2 East job** in the **Description** field, and click **Save**. You see the message **The object CHARLIE#W2\_EAST has been created**.

To create the fourth job, complete the following steps.

16. Click **Create Like** (  ) to duplicate the job definition.
17. On the **General** tab, change the **name** field to **w2\_WEST**.
18. On the **Task** tab, change the **Command text** field to **echo West**.
19. Click **Save**.
20. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter **17156** in the **Ticket number** field. Enter **Added W2 West job** in the **Description** field, and click **Save**. You see the message **The object CHARLIE#W2\_WEST has been created**.

## **Creating a job to end the stream**

In the next section, you create a job to follow one of the four you created. To create the last job, complete the following steps.

1. In the Workload Designer, select **Create New > Job Definition**. In the **Native** section, click **UNIX**.
2. Enter **w3\_END** in the **Name** field, **CHARLIE** in the **Workstation** field, and **wauser** in the **Login** field.
3. On the **Task** tab, enter the following command in the **Command text** field.  
`/bin/false`
4. Click **Save** to store the job definition.
5. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter **17156** in the **Ticket number** field. Enter **Added W3 end job** in the **Description** field, and click **Save**. You see the message **The object CHARLIE#W3\_END has been created**.
6. You should see the completed jobs in the **Working List**.



---

# **Unit 6 Scheduling, forecasting, and migrating workloads exercises**

In the exercises for this unit, you create job streams and event rules. You also migrate workload definitions by using workload application templates.

# Exercise 1 Creating a job stream

In this exercise, you create a job stream. The job stream includes the jobs that you created and schedules them to run regularly.

1. To create a job stream, choose **Create New > Job Stream**. You define the job stream by completing the fields in the job stream panes.
2. On the **General** tab, complete the fields as shown in the following table.

**Table 1 W7\_PROCESS properties**

Field	Value
Name	W7_PROCESS
Workstation	AGENT0
Variable table	W7_TABLE



**Hint:** You can use the search tool to enter the **Workstation** and **Variable table** fields.

3. Click the **Dependency resolution** tab, and choose **Closest preceding**.



#### Resolution criteria

Closest preceding

Same scheduled date

Within a relative interval

# Adding jobs to a job stream

In the next steps, you add jobs to the job stream by using two different methods.

1. Select **AGENT0#W7\_XFER** and **AGENT0#W7\_WAIT** in the Working List pane.
2. Right-click the job stream name **W7\_PROCESS** in the definition pane, and click **Add Objects Selected in Working List**. You see the jobs that are selected in the **Jobs** list.

3. In the **Search** field, click **Job Definition** (  ), and type **w7** in the **Search** field. After a brief pause, you see a list of jobs with names that start with W7.
4. Select the job that is named **AGENT0#W7\_PROC** from the **Found** list and click **Add**. The job is added to the job stream.



**Hint:** You can instead drag the job that is named **AGENT0#W7\_PROC** from the **Found** list and drop it on top of the job stream name, **W7\_PROCESS**. As you drag the job, you see that the icon indicates a red plus sign (+). When the mouse pointer is over the job stream, the icon changes to a green plus sign.

There are three jobs in the job stream.

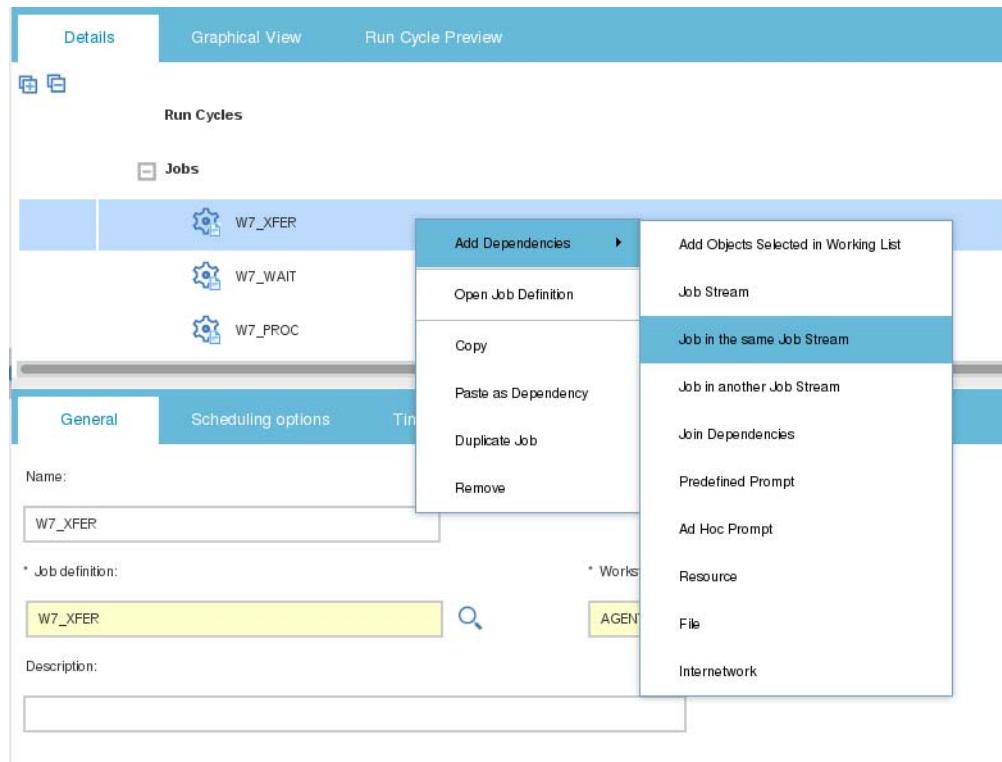
# Adding job dependencies

In the next steps, you create dependencies for the jobs. The jobs run in the following order:

1. W7\_WAIT
2. W7\_XFER
3. W7\_PROC

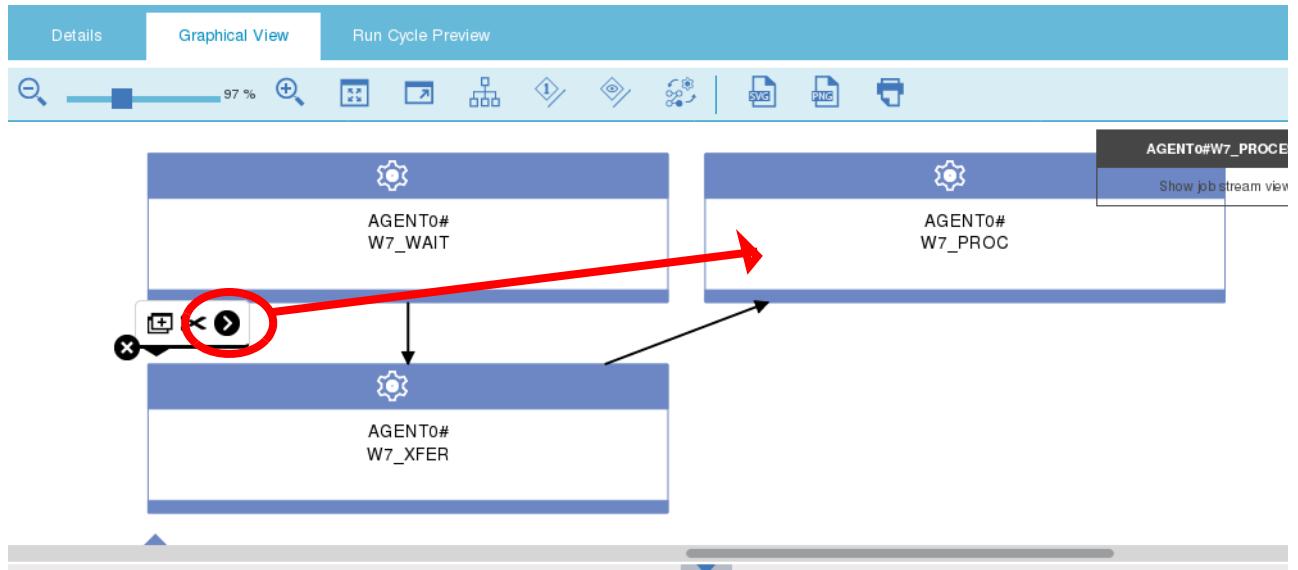
To add dependencies to the job stream, complete the following steps.

1. Right-click the **W7\_XFER** job, and click **Add Dependencies > Job in the same Job Stream** from the menu.



2. In the “Add to Selected - Internal Job Dependency” window, click **Search**, and select **W7\_WAIT**.
3. Click **Add** to add the job dependency to the W7\_XFER job.
4. Click the **Graphical View** tab to change to the graphical view. You see a pictorial view of the jobs in the W7\_PROCESS job stream.
5. Click **Auto-layout graph** (  ) to size the icons in the graph view.

- Click the **W7\_XFER** job. Drag the **>** to the **W7\_PROC** job. The dragging action draws a line from **W7\_XFER** to **W7\_PROC**, creating a job dependency.



- Click **Auto-layout graph** (  ) to draw the graph view.

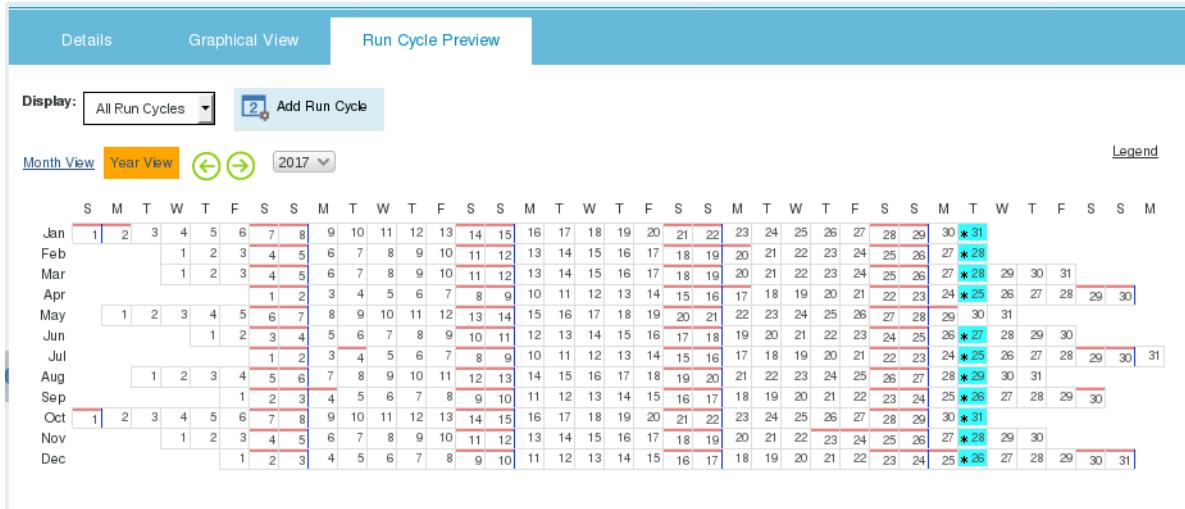


**Hint:** You can save a picture of the job stream and its jobs and dependency flow by clicking the SVG or PNG links near the upper-right corner.

# Adding run cycles

In the next steps, you add run cycles to the job stream. To create run cycles, complete the following steps.

1. Click the **Run Cycle Preview** tab to change to the run cycles definition pane.
2. Click **Add Run Cycle**. You change the run cycle in the Properties - Run Cycle - RC1 pane.
3. In the Properties pane, click **Rule** to change to the **Rule** tab.
4. Select **Run Cycle Group** from the **Repeat schedule** menu.
5. Enter **W7\_RCG** in the **Run Cycle Group** field. Optionally, you can click **Search** and choose the **W7\_RCG** object from the list of available run cycles.
6. In the Definition pane, choose **All Run Cycles** from the **Display** menu. You see the selected dates change from green to cyan.



7. On the calendar, click any of the highlighted dates. You see the information about the selected date and which rules affect it.



**Hint:** Click **Legend** to see the meaning of the color codings of the calendar view.

8. Click **Save**.
9. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17156 in the **Ticket number** field. Enter **Added W7 process job stream** in the **Description** field, and click **Save**. You see the message **The object AGENT0#W7\_PROCESS has been created**.

# Exercise 2 Creating job streams with conditional dependencies

In this exercise, you create a job stream that includes jobs that require conditional dependencies.

In Workload Scheduler, you can specify that one job depends on another only when specific conditions are met. By using different sets of jobs that match known possible conditions, you can map alternative processing branches to the output conditions, return code conditions, or completion status of a job.

1. To create a job stream, choose **Create New > Job Stream**. You define the job stream by completing the fields in the job stream panes.
2. On the **General** tab, complete the fields as shown in the following table.

**Table 2 W0\_DIRECTION properties**

Field	Value
Name	W0_DIRECTION
Workstation	CHARLIE



**Hint:** You can use the search tool to enter the **Workstation** field.

In this section, you add jobs to the job stream with conditional dependency logic. To add jobs and dependencies, complete the following steps.

1. In the **Working List**, select the six jobs from the following list, that you created earlier.
  - CHARLIE#W1\_DIRECTION
  - CHARLIE#W2\_NORTH
  - CHARLIE#W2\_SOUTH
  - CHARLIE#W2\_EAST
  - CHARLIE#W2\_WEST
  - CHARLIE#W2\_END
2. In the job stream definition, click **Details** to view the details tab in the job stream definition, and highlight the job stream name in the details list by clicking the name.
3. Right-click the job stream name, and click **Add Objects Selected in Working List**.

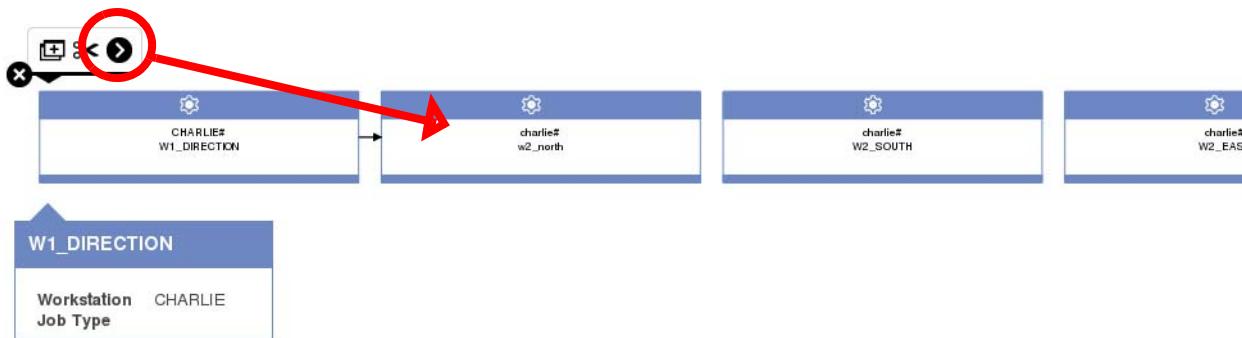
- Click **Graphical View** to see the graph view tab.



**Hint:** Resize the panes if necessary to better see the graph layout.

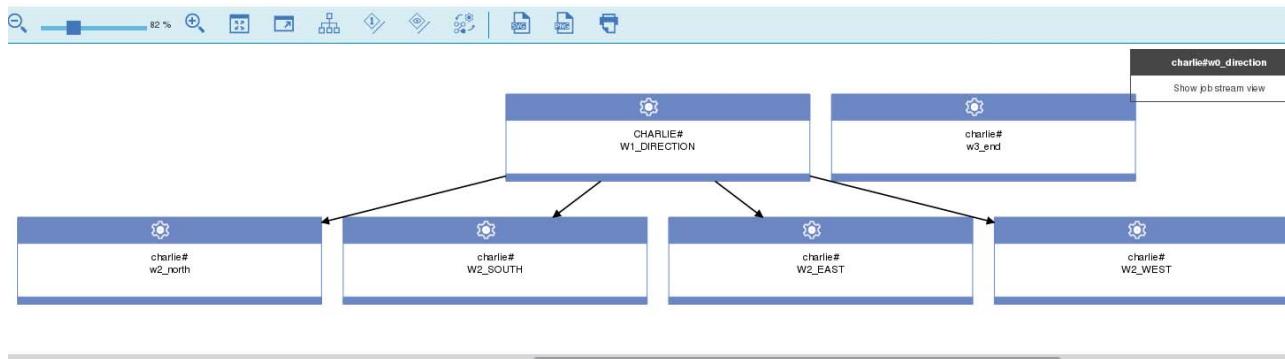
- Click **Auto-layout graph** ( ) to draw the graph view, and zoom in so that you can read the job names.

- Click the **w1\_DIRECTION** job, and drag the **>** from **w1\_DIRECTION** to **w2\_NORTH** to create a dependency. The graph refreshes.



- Create dependencies from **w1\_DIRECTION** to **w2\_SOUTH**, **w2\_EAST**, and **w2\_WEST** in the same way.

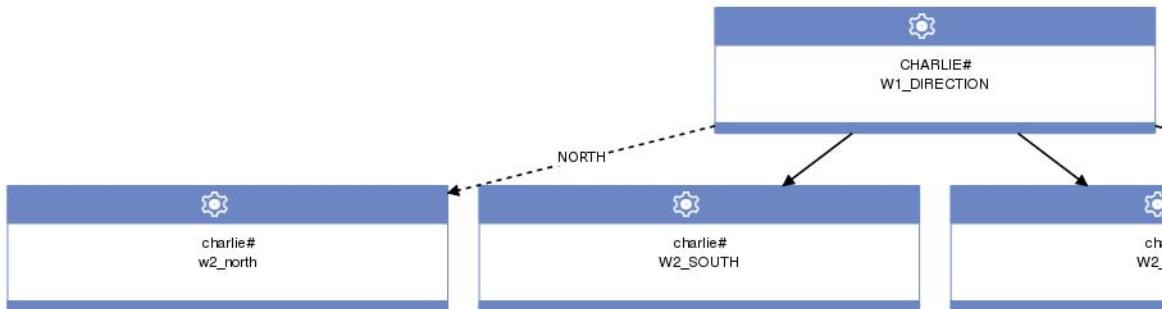
- Click **Auto-layout graph** ( ) to draw the graph view.



In the following steps, you configure the dependencies to use conditions.

- Select the dependency from **w1\_DIRECTION** to **w2\_NORTH** by clicking the arrow that connects them.
  - In the **Properties** pane, select **Conditional Dependency**.
  - Select **Successor job runs if any of these conditions are satisfied**.

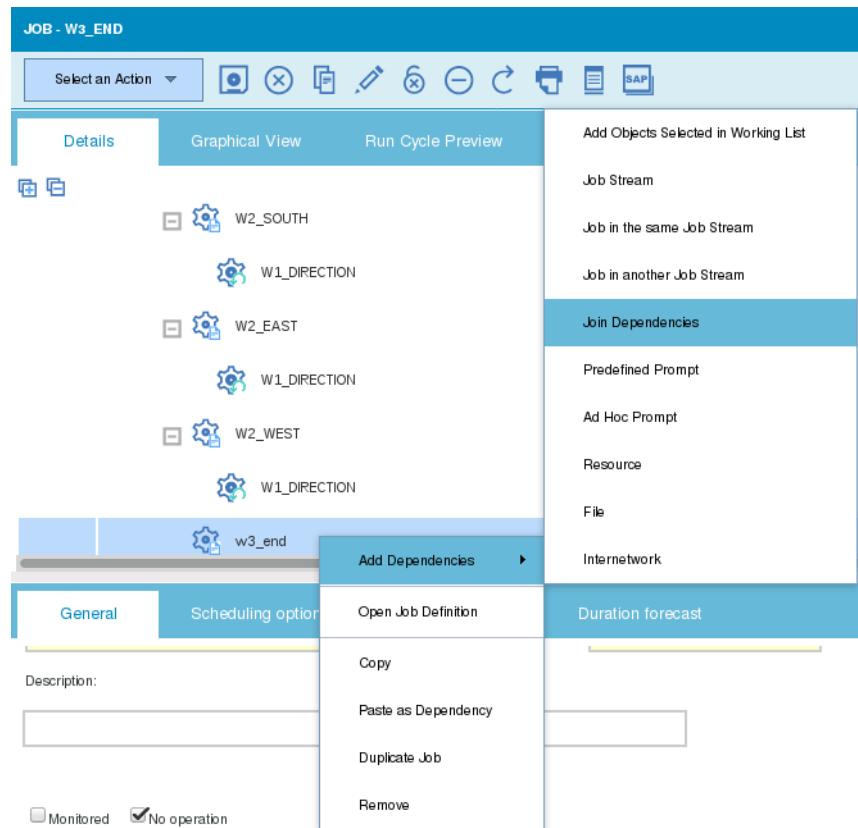
- c. Select **NORTH**.
- d. You see that the arrow that connects the jobs changes from a solid line to a dashed line.



10. Select the dependency from **W1\_DIRECTION** to **w2\_SOUTH** by clicking the arrow that connects them.
  - a. In the **Properties** pane, select **Conditional Dependency**.
  - b. Select **Successor job runs if any of these conditions are satisfied**.
  - c. Select **SOUTH**.
  - d. You see that the arrow that connects the jobs changes from a solid line to a dashed line.
11. Select the dependency from **W1\_DIRECTION** to **W2\_EAST** by clicking the arrow that connects them.
  - a. In the **Properties** pane, select **Conditional Dependency**.
  - b. Select **Successor job runs if any of these conditions are satisfied**.
  - c. Select **EAST**.
  - d. You see that the arrow that connects the jobs changes from a solid line to a dashed line.
12. Select the dependency from **W1\_DIRECTION** to **W2\_WEST** by clicking the arrow that connects them.
  - a. In the **Properties** pane, select **Conditional Dependency**.
  - b. Select **Successor job runs if any of these conditions are satisfied**.
  - c. Select **WEST**.
  - d. You see that the arrow that connects the jobs changes from a solid line to a dashed line.
13. Click **Save**.

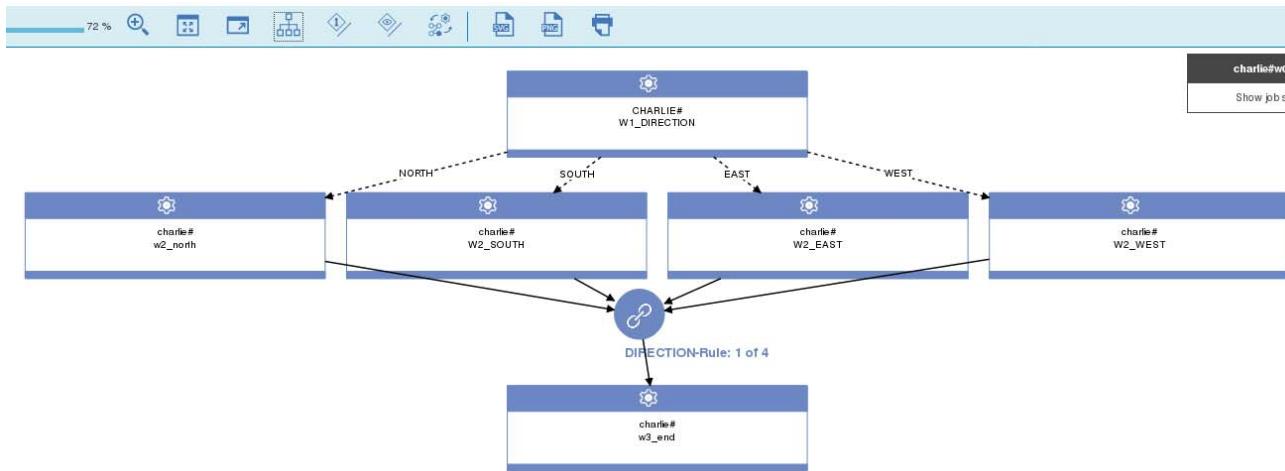
In the next section, you create a non-operational job, and add a joined relationship to the ending job.

14. Switch to the Details view, and select the W3\_END job in the list of jobs.
15. In the **Properties - Job - W3\_END** pane, on the General tab, select **No operation**.
16. Right-click W3\_END, and click **Add Dependencies > Join Dependencies**.



17. In the **Properties - Join Dependencies - <not named>** pane, enter DIRECTION in the **Name** field. You see the join dependency in the list of jobs.
18. Right-click **DIRECTION-Rule: 1 of 0**, and click **Add Dependencies > Job in the same job stream** from the menu.
19. Click **Search**.
20. Select **W2\_NORTH**, **W2\_SOUTH**, **W2\_EAST**, and **W2\_WEST** from the list of search results. Click **Add**.

21. Click **Graphical View**, and click **Auto-layout graph** to draw the graph and review your changes.



22. Click **Save**.

23. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter 17157 in the **Ticket number** field. Enter **Added directions job stream** in the **Description** field, and click **Save**. You see the message **The object CHARLIE#W0\_DIRECTION has been created**.
24. Click **Show job stream view** in the graph to select the job stream.
25. Right-click the job stream, and click **Submit Job Stream into Current Plan**.
26. On the “Insert justification” page, select **New application** from the **Category** menu. Enter 17158 in the **Ticket number** field. Enter **Submitted directions job stream** in the **Description** field, and click **Save**. You see a message that the job stream was submitted.

# Monitoring your job stream

To monitor the job stream you submitted, complete the following steps.

1. Change to the browser window that contains the Dynamic Workload Console.
2. Select **System Status and Health > Monitor Workload**.
3. On the Monitor Workload page, select **Job Stream** from the **Object Type** menu.
4. Enter `@#W0_DIRECTION` in the **Query** field, and click **Run**. You see a monitoring task that contains the job stream you submitted.
5. Select the job stream that is running, or successful, and click **Jobs...** A new task opens to monitor the jobs in the job stream you selected.
6. Select the `w1_DIRECTION` job, and click **Job Log**.

```

W1_DIRECTION - Mozilla Firefox
https://ws94mdm0:16311/ibm/TWSWebUI/ServiceDispatcherServlet?ServiceName=JobLog&twsJobId=eJxLT

Job Log Details
Job W1_DIRECTION
Workstation [Job] CHARLIE
Job Stream W0_DIRECTION
Workstation [Job Stream] CHARLIE

<jSDL:variables>
<jSDL:stringVariable name="tws.jobstream.name">W0_DIRECTION</jSDL:stringVariable>
<jSDL:stringVariable name="tws.jobstream.id">0AAAAAAAAAAHwJ</jSDL:stringVariable>
<jSDL:stringVariable name="tws.job.name">W1_DIRECTION</jSDL:stringVariable>
<jSDL:stringVariable name="tws.job.workstation">CHARLIE</jSDL:stringVariable>
<jSDL:stringVariable name="tws.job.iawstz">201709190617</jSDL:stringVariable>
<jSDL:stringVariable name="tws.job.promoted">NO</jSDL:stringVariable>
<jSDL:stringVariable name="tws.job.resourcesForPromoted">10</jSDL:stringVariable>
<jSDL:stringVariable name="tws.job.num">415277895</jSDL:stringVariable>
</jSDL:variables>
<jSDL:application name="executable">
<jSDL:executable interactive="false">
<jSDL:script>/usr/bin/shuf -e North South East West | /usr/bin/head -n1</jSDL:script>
</jSDL:executable>
</jSDL:application>
<jSDL:resources>
<jSDL:candidateOperatingSystems>
<jSDL:operatingSystem type="LINUX"/>
</jSDL:candidateOperatingSystems>
</jSDL:resources>
</jSDL:jobDefinition>
= TWSRCHAP : {"$UCOC": [{"value": "contains(${this.stdlist}, \"North\")", "key": "NORTH"}, {"value": "contains(${this.stdlist}, \"South\")", "key": "SOUTH"}, {"value": "contains(${this.stdlist}, \"East\")", "key": "EAST"}, {"value": "contains(${this.stdlist}, \"West\")", "key": "WEST"}]}
= AGENT : AGENTO
= Job Number: 415277895
= Tue 09/19/2017 06:17:49 EDT
=====
North
=====
= Exit Status : 0
= Successful Output Conditions:
= NORTH : true
= WEST : false
= SOUTH : false
= EAST : false
= Other Output Conditions:
= Elapsed Time (hh:mm:ss) : 00:00:01
= Job CPU usage (ms) : 7
= Job Memory usage (kb) : 1496
= Tue 09/19/2017 06:17:49 EDT
=====
```

7. Review the output of the job, and its output conditions. Close the job log details window.

8. In the Monitor 'W0\_DIRECTION' Jobs window, compare the jobs that were suppressed and successful with the output conditions of the `w1_DIRECTION` job.
9. Notice that the `w3_END` job is canceled.

# Exercise 3 Selecting jobs to use advanced statistics

The SPSS Statistics tool records and analyzes only jobs that you select within job streams. In this section, you see a job stream that has jobs with custom statistics. To select jobs to be analyzed, complete the following steps.

1. Change to the browser window that contains the Workload Designer.
2. In the workload designer, select **Job Stream** (  ) in the **Search** field.
3. Enter **DFW** in the **Job stream name** field.
4. Select the job stream that matches the search, and click **Edit**.
5. In the **Details** pane, select the first job on the list, **J1DFW\_AROMA\_32530**.
6. In the **Properties** pane, click the **Duration forecast** tab. Select **Use Advanced analytics**.



**Hint:** When you select a job that does not use advanced analytics, you must save the job stream by clicking **Save** after selecting the analytics option.

7. Click **Save**.
8. On the “Insert justification” page, select **Change request** from the **Category** menu. Enter **17159** in the **Ticket number** field. Enter **Adding statistics to AROMA job** in the **Description** field, and click **Save**. You see a message that the job stream was modified.
9. Click **Override Estimations** to open the Override Estimations window. You can see the estimated durations, in **hh:mm:ss** format, in one or more of the following groups.

OVERRIDE ESTIMATIONS (X)

**Run Cycle**

RGWORKDAYS	00:07:10	±00:00:35
------------	----------	-----------

**Monthly**

**Weekly**

On the following days of the week:

Sunday	00:07:08	±00:00:04	Thursday	00:04:26	±00:03:29
Monday	00:06:32	±00:02:59	Friday	00:04:13	±00:03:36
Tuesday	00:06:33	±00:02:51	Saturday	00:00:48	±00:02:05
Wednesday	00:04:02	±00:03:26			

**All Instances**

	Apply to all
--	--------------

Save Discard Changes

- Expand the **Run Cycle** section. You see the estimated durations for the job when it is selected to run by the RGWORKDAYS run cycle.
- Expand the **Monthly** section. You see the estimated durations for the job when it runs on specific days of the month. On days when the job did not run, the estimated duration is blank.
- Expand the **Weekly** section. You see the estimated durations for the job when it runs on each of the days of the week. If the job never runs on Saturday, for example, the estimated duration for Saturday is blank.
- In the **All Instances** section, you can enter an estimated duration to apply to all of the other estimations in the Override Estimations window.

10. Click **Discard Changes** to close the window without saving the changes.

11. Click **Close** to close the job stream.

# Exercise 4 Setting time restrictions

In this exercise, you use repeating times for job streams, and setting parallel instance actions for job streams that repeat.

Time restrictions are optional. By specifying the time restrictions, you can define a window in which jobs in a job stream run. If you have difficulty correctly specifying the time, click the clock icon beside the time field. Insert a time from the selection list and use it as a sample.

Several types of time constraints determine when jobs can begin, and when jobs must complete. Time restrictions are available at the job or job stream level.

## **Repeat range and parallel instance actions**

The **repeat range** (EVERY keyword) specifies that the job or job stream should start repeatedly at the specified interval after all other dependencies are satisfied.

**Repeat every** for job streams specify that the job stream is scheduled repeatedly at the interval of hours and minutes you select. At plan generation time, a number of instances of the job streams that apply this run cycle are created in the plan. The instances begin at the defined *Earliest start time*, or at the start of the processing day when no start time is defined. If you use a repeat interval, you must complete the **Repeat end** time field with the time to end scheduling instances.

Workload Scheduler can repeat a task in one of several ways. Use the method that fits your purpose without using too much system resources or flooding your workload plan with too much information. In this lesson, you learn how to apply the repeat time to job streams. You can specify how job streams that repeat through the day are configured to run when another instance of the same job stream is still running. You can choose from three options:

- **Run the new instance in parallel** (the default): If another instance of this job stream is scheduled, start the new instance. Two (or more) instances of the job stream can run in parallel.
- **Queue the new instance**: If another instance of the same job stream is scheduled, an external dependency is applied. The dependency queues the instances to run after previous instances complete successfully.
- **Do not start the new instance**: If another instance of the same job stream is scheduled, a *Latest Start Time* is applied to prevent the instances from overlapping.

To create a job stream add repeat times, and specify parallel actions, complete the following steps.

1. Select **Create New > Job Stream**.
2. In the **Properties - Job Stream - <not named>** pane of the **General** tab, enter **w5\_REPEATS** in the **Name** field, and **CHARLIE** in the **Workstation** field.
3. Click the **Scheduling options** tab, and scroll down to the **Actions** section.

- Select **Queue the new instance** from the menu.

In the next section, you create a run cycle that repeats the job stream.

- Click **Run Cycle Preview** to see the run cycles tab.
- a. Click **Add Run Cycle** to create a run cycle.
- b. In the **Properties** pane, click **Rule**.
- c. Select **Daily** from the **Repeat schedule** menu.
6. Click **Time restrictions** to see the time settings tab.
- a. In the **Earliest start** section, select **Use as time dependency**.
  - Enter 10:00 AM in the **Time** field.
  - Enter 0 in the **Delay for days** field.
- b. In the **Repeat Every** section, enter the following information:
  - Enter 1 in the **Hours** field.
  - Enter 0 in the **Minutes** field.
  - Enter 2:00 PM in the **Repeat end time** field.
  - Enter 0 in the **Delay for days** field.

The screenshot shows the 'Run Cycle Preview' tab selected in the top navigation bar. The 'Display' dropdown is set to 'RC1'. The 'Year View' button is highlighted. The main area shows a monthly calendar grid from January to October. Each day of the month has a green background, indicating a scheduled run cycle. Below the calendar, the 'Repeat Every' section is visible, showing the configuration for the run cycle. The 'Hours' field is set to 1, and the 'Minutes' field is set to 0. The 'Repeat end time' field is set to 2:00 pm. The 'General' and 'Rule' tabs are also visible in the bottom navigation bar.

S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	
Jan	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Feb	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Mar	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Apr	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
May	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Jun	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Jul	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Aug	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Sep	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Oct	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

In the next section, you add jobs to the job stream.

To add jobs to the job stream, complete the following steps.

1. Click **Details** to see the job stream details.
2. Click **W5\_REPEATS** to highlight the job stream name.
3. In the **Search** field, select **Jobs**.
4. Type **J7** in the **Search** field.
5. Click **Select all** to select the 6 jobs that match the search criteria.
6. Click **Add** to add the 6 jobs to the job stream.
7. Click **Save** to store the job stream definition.
8. On the “Insert justification” page, select **New application** from the **Category** menu. Enter **17160** in the **Ticket number** field. Enter **Adding repeating job stream** in the **Description** field, and click **Save**. You see a message that the job stream was created.
9. Click **Close** to close the job stream.

# Exercise 5 Creating event rules

In this exercise, you create an event rule that is used for submitting the job stream that you created in [Exercise 1, "Creating a job stream"](#). To create an event rule, complete the following steps.

1. Switch to the browser tab or window that runs the Workload Console.
2. From the navigation menu, select **Administration > Create Event Rules**.
3. Enter **W7\_TRIGGER** in the **Rule name** field.
4. Clear **Draft**.
5. In the **Events** section, click **File monitor** to expand the file monitor section.

The screenshot shows the 'Create Event Rules' interface. At the top, there is a toolbar with buttons for 'Go', 'Save', 'Close', and 'New'. Below the toolbar, there is a 'General information' section with a 'Rule name' field containing 'W7\_TRIGGER' and a 'Draft' checkbox which is unchecked. Under the 'Events' section, there is a list of event types: 'IBM Workload Scheduler plan events', 'SAP Monitor', 'IBM Workload Scheduler application monitor', 'Centralized agent update event', 'File monitor', 'Log message monitor', 'File created', 'File deleted', and 'Modification completed'. The 'File created' event is highlighted with a red border. To the right of the event list, there is a placeholder text 'Select an even'.

6. Click **File created**. You see a red **File created** event.
7. Scroll down to the **Properties** section, and enter the properties shown the following table.

**Table 3 File monitor event properties**

Field	Value
File name	/home/wsuser/Documents/*

**Table 3 File monitor event properties**

Field	Value
Sample Interval	30
Workstation	AGENT0

8. Scroll to the **Actions** section, and click **IBM Workload Scheduler actions** to expand the section.
9. Click **Submit job stream**. You see a red **Submit job stream** action.
10. Scroll down to the **Properties** section, and choose **Custom parameter 1** from the **Select a property to add** menu.
11. Enter the properties shown the following table.

**Table 4 File monitor event properties**

Field	Value
Job stream name	W7_PROCESS
Job stream workstation name	AGENT0
Custom parameter 1	FILENAME=

12. In the **Custom parameter 1** field, click **Variable**, and click **File name**. In the result field, you see the following text.

FILENAME=%{fileCrtEvt1FileName}

The screenshot shows the 'Create Event Rules' interface. In the 'Actions' section, a 'Submit job stream' action is selected. In the 'Properties' section, the 'Job stream name' is set to 'W7\_PROCESS' and the 'Custom parameter 1' is set to 'FILENAME=%{fileCrtEvt1FileName}'. There is a note at the bottom of the properties section: '-- Select a property to add -- ▾'.

13. Scroll to the top of the page, and click **Save**.

14. Click **Close** to close the event rule editor.
15. Close the **Create Event Rules** tab.

## Checking if the event rule is active

Within 5 minutes, the event rule you created becomes active. To check whether the rule is active, complete the following steps.

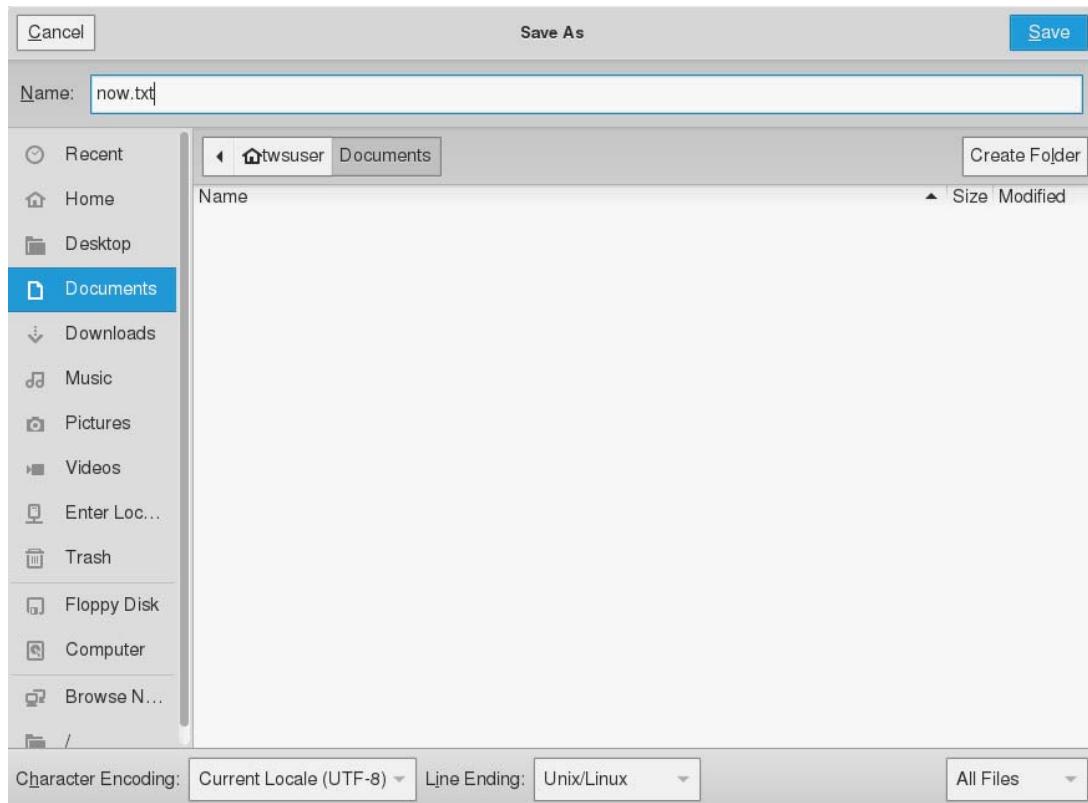
1. From the navigation menu, select **Administration > Manage Event Rules**.
2. On the Manage Event Rules page, click **All Event Rule Definitions**.
3. On the Choose Engine page, select **WS94d (Distributed)** from the **Engine name** menu, and click **OK**.
4. On the All Event Rule Definitions page, check the status of the **W7\_TRIGGER**.
5. If the status is not *Active*, wait a few seconds and click **Refresh**.

## Testing the event rule

When the event rule is active, you can test it. Perform the following steps.

1. From the navigation menu, select **System Status and Health > Monitor Event Rules**.
2. On the Monitor Event Rules page, click **All Event Rules**.
3. On the Choose Engine page, select **WS94d (Distributed)** from the **Engine name** menu, and click **OK**.
4. From the system menu, select **Applications > Accessories > gedit** to open the text editor.
5. Type some random text into the text editor, and click **Save**.
6. Select the **Documents** folder in the **wsuser** folder.

- Enter **now.txt** in the **Name** field, and click **Save**.



- Close the text editor.
- On the All Event Rules page, click **Refresh**. You see the event rules that started.

Name	Type	Time Stamp	Status	Generated By
MESSAGE_TEXT	Single	9/19/17 7:22 AM E	Successful	Satisfied
W7_TRIGGER	Single	9/19/17 7:22 AM E	Successful	Satisfied
MESSAGE_TEXT	Single	9/19/17 2:09 AM E	Successful	Satisfied

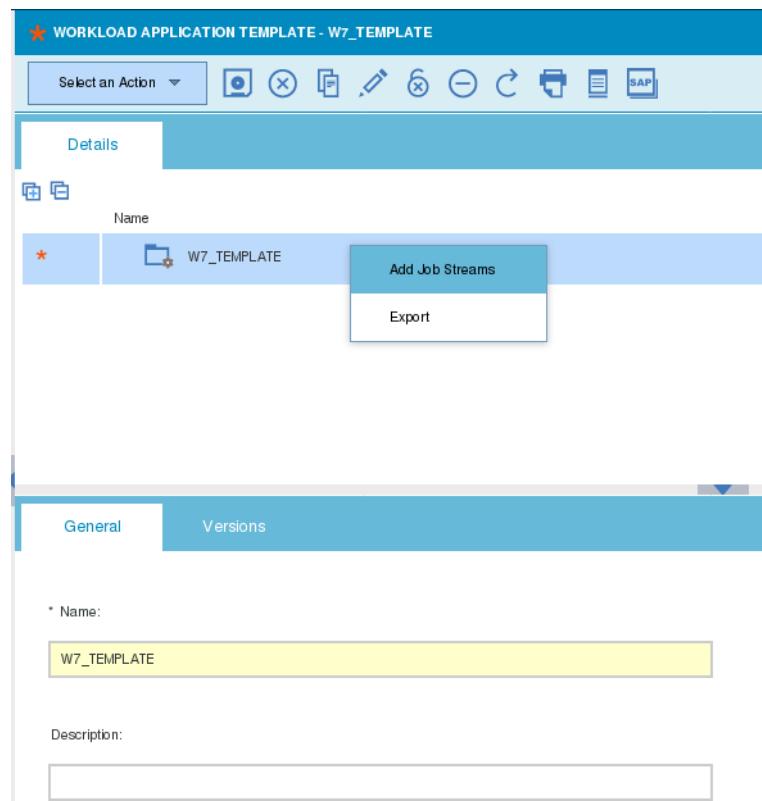
- Click **W7\_TRIGGER** to see the properties of the job stream that was submitted and the evaluation of the variables that were created during the process.

Using what you learned in [Unit 3, “Monitoring Workload Scheduler production”](#), you can monitor the progress of the workflow that you submitted by the event process to see the results.

# Exercise 6 Using workload application templates

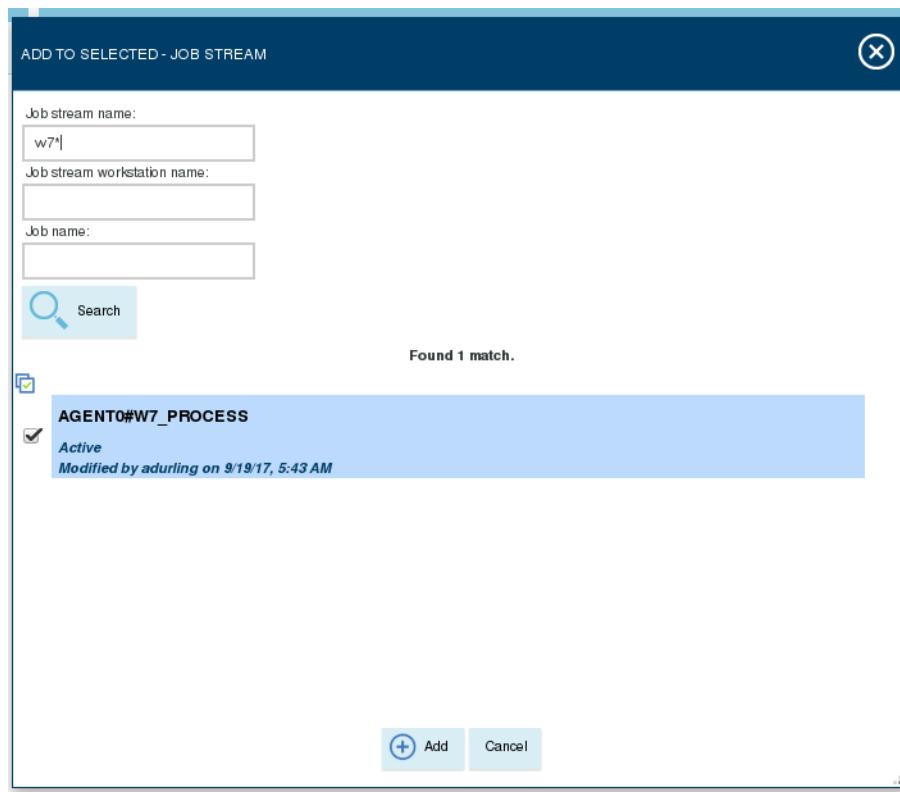
In this exercise, you create a workload application template to use for migrating workload definitions to different environments. To create and export a workload application template, complete the following steps.

1. Switch to the Workload Designer, or open it by selecting **Administration > Manage Workload Definitions**.
2. From the Workload Designer, select **Create New > Workload Application Template**.
3. On the **General** tab, enter **w7\_TEMPLATE** in the **Name** field.
4. On the **Details** tab, right-click **w7\_TEMPLATE**, and click **Add Job Streams**.



5. In the “Add to Selected - Job stream” window, enter **w7\*** in the **Job stream name** field.

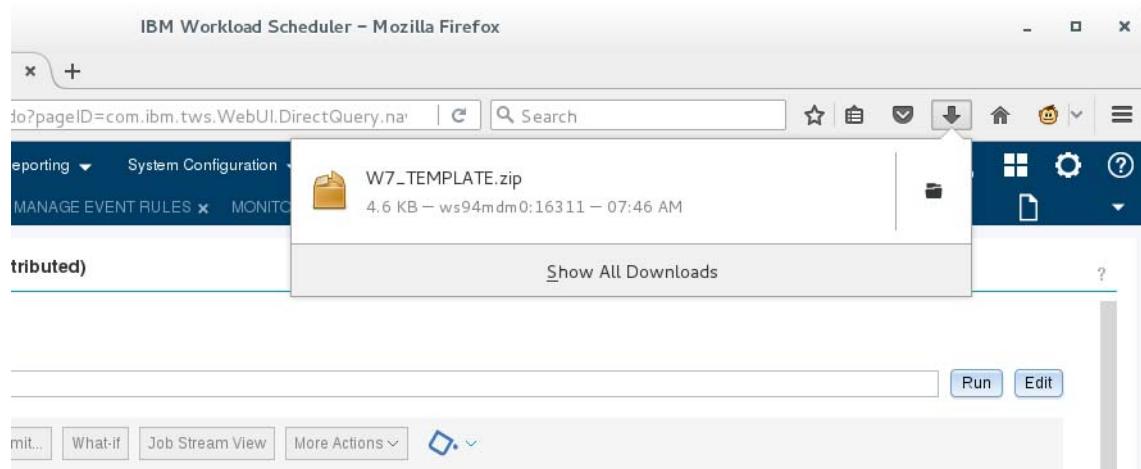
- Select **AGENT#W7\_PROCESS** from the list, and click **Add**.



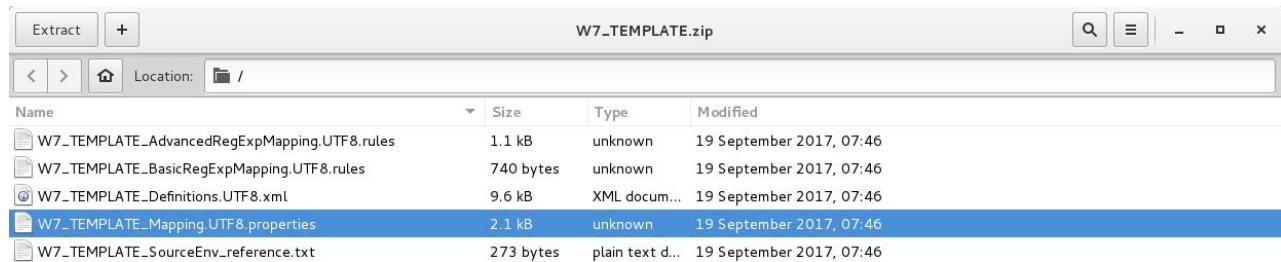
- Click **Save**.
- On the “Insert justification” page, select **New application** from the **Category** menu. Enter **17161** in the **Ticket number** field. Enter **Application template for W7** in the **Description** field, and click **Save**. You see a message that the application template was created.

To export the Workload Application Template, complete the following steps.

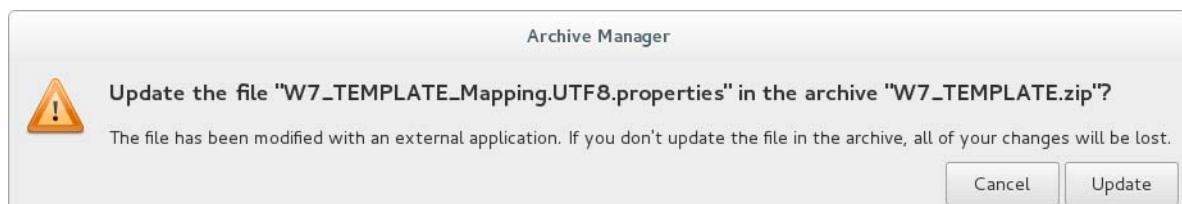
- On the **Details** tab, right-click the **W7 TEMPLATE** title, and click **Export** from the menu. Optionally, you can instead select **Export** from the **Select an Action** menu.
- In the Opening **W7 TEMPLATE.zip** window, click **Save File**.
- Switch to the browser window that contains the main Dynamic Workload Console page.
- Select **Downloads** from the browser’s menu.



5. Click **W7\_TEMPLATE.zip**.
6. In the W7\_TEMPLATE.zip window, double-click **W7\_TEMPLATE\_Mapping.UTF8.properties**.



7. In the "W7\_TEMPLATES\_Mapping.UTF8.properties - gedit" window, change **WORKSTATION\_AGENT0=AGENT0** to **WORKSTATION\_AGENT0=BRAVO**.
8. Click **Save**. Close the editor.
9. In the Archive Manager window, click **Update**.



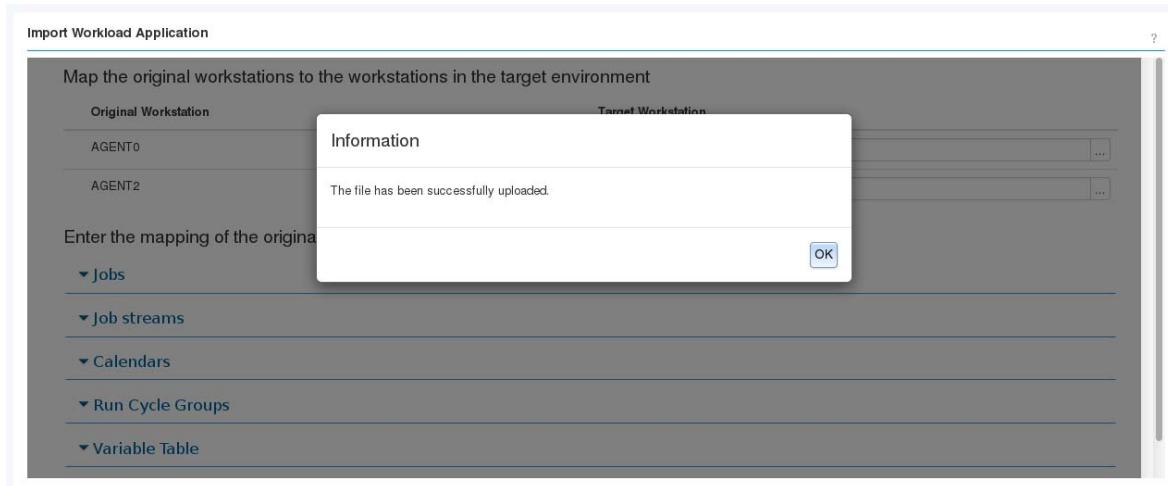
10. Close the "W7\_TEMPLATE.zip" window.
11. Close the Workload Designer window.

# Exercise 7 Importing application templates

In this exercise, you import the workload application template that you created.

To import Workload Scheduler definitions, perform the following steps.

1. Select **Administration > Import Workload Application** to open the import page.
2. On the Import Workload Application page, click **Choose file**.
3. In the file browser window, select **w7 TEMPLATE.zip** in the **Downloads** folder, and click **Open**.
4. Click **Upload** to transfer the application template to the server. You see an information window that confirms the upload. Click **OK** to close the window.



5. In the **Map the original workstations to the workstations in the target environment** section, select BRAVO as the target workstation.
6. In the **Enter the mapping of the original objects to the target objects** section, click **Jobs** to expand the jobs section. Click **Find and Replace**.
7. In the **Find what:** field, enter **w7**. In the **Replace with:** field, enter **x7**. Click **Replace all**. You see a window that confirms three replacements. Click **OK**.

Enter the mapping of the original objects to the target objects.

**▼ Jobs**

**Find and Replace**

Find what:	W7
Replace with:	X7
<input type="button" value="Find"/> <input type="button" value="Replace"/> <input type="button" value="Replace all"/>	

8. In the **Job streams**, **Calendars**, **Run cycle groups**, **Variable Table**, and **Event Rule** sections, replace **W7** with **X7** in the target objects' names.
9. Click **Import**. If you see a window that asks for your confirmation to replace the W7 TEMPLATE application template, click **Yes**.



10. You see an information window that confirms the successful import. Click **OK**.



11. Close the **Import Workload Application** tab.

# Exercise 8 Importing crontab definitions

In this exercise, you create a crontab definition, and import it into Workload Scheduler.

To create a crontab definition, complete the following steps.

1. Open the text editor by clicking **Applications > Accessories > gedit** from the desktop menu.
2. Enter the following text in the editor.  
`30 8 * * 1,2,3,4,5 /opt/IBM/TWA/TWS/bin/rmstdlist 14`
3. Click **Save**.
4. In the Save As window, click **Home**, and type `crontab.txt` in the **Name** field.
5. Close the editor.

To import a crontab definition, complete the following steps.

1. Switch to the browser that runs the Dynamic Workload Console.
2. Select **Import Definitions** from the **Administration** menu.
3. Select **WS94d** from the **Engine** menu
4. Click **Browse** and find the file that is named `crontab.txt` in the home directory.
5. Click **Upload** to transfer the file to the Workload Scheduler server.  
You see the tasks that are included in the file you transferred.
6. Complete the following fields.

**Table 5 Import processes fields**

Field name	Description
Specify the user	Select <b>User name</b> , and enter <code>wsuser</code> in the field
Name	In the first <b>Name</b> field, change <b>crontab1</b> to <b>rmstdl</b> .
Workstation	Select <b>AGENT0</b> for the workstation field.

**Import Definitions**

Engine: WS94d [smadmin]

Browse crontab.txt Upload

Time zone: America/New\_York (GMT -5:00)

Use workstation time zone

Prefix for imported objects:

Specify the user: Defined in the file User name wsuser

Select the workstation on which to import the rules:

Name: rmstcl	<input type="checkbox"/> Skip import
30 * * 1,2,3,4,5 /opt/IBM/TWA/TWS/bin/rmstclist 14	
Workstation: AGENT0	<input type="button" value="Open job streams"/> <input type="button" value="Import"/>

7. Click **Import**. You see a message that confirms a successful import, or messages that show syntax or other errors.
8. To change the properties of the imported tasks in the Workload Designer, click **Open job streams**.
9. Close the Workload Designer by closing the browser window that contains it. Click **Leave Page** to exit the designer window.

# Exercise 9 Creating and viewing a forecast

Complete the following steps to create a forecast that shows how the run cycles that you used in the job streams you created earlier match one date.

10. In the Dynamic Workload Console, select **Planning > Create Forecast Plan**.In the **Generate Forecast Plan** pane, complete the following fields:

- **Plan filename:** FCdec17
- **Date:** December 26, 2017 (12/26/2017)
- **Time:** 12:00:00 AM

**Generate Forecast Plan**

---

**Plan Information**

Engine name  \*Plan filename

**Plan Start**

Date   Time  Example: 12:30:00 PM

**Plan End**

Date and time  
Date   Time  Example: 12:30:00 PM

Duration  
Days  Hours  Minutes

**Plan Time Zone**

Time zone

11. Click **Generate Plan**. You see a confirmation message that shows that the plan is created. Click **OK** to close the message.
12. Close the **Create Forecast Plan** tab by clicking its **X**.
13. Select **System Status and Health > Monitor Workload**.

14. On the Monitor Workload page, complete the following fields, and click **Run**.

**Table 6 Monitoring a forecast plan**

Field	value
Engine	WS94d
Object Type	Job Stream
List Plans	FCdec17
Query	@#W@

Monitor Workload (Owner: adurling; Engine: WS94d,Distributed)

Plan Name: FCdec17

Status	Internal Status	Job Stream	Workstation	Scheduled Time	Not Satisfied Dependencies	Total Jobs	Successful Jobs
<input type="checkbox"/> <span style="color: green;">■</span> Ready	READY	W7_PROCESS	AGENT0	12/26/17 12:00 AM	<span style="color: green;">■</span> 0	3	0
<input type="checkbox"/> <span style="color: green;">■</span> Ready	READY	W5_REPEATS	CHARLIE	12/26/17 10:00 AM	<span style="color: green;">■</span> 0	6	0
<input type="checkbox"/> <span style="color: blue;">☒</span> Waiting	HOLD	W5_REPEATS	CHARLIE	12/26/17 11:00 AM	<span style="color: orange;">▲</span> 1	6	0
<input type="checkbox"/> <span style="color: blue;">☒</span> Waiting	HOLD	W5_REPEATS	CHARLIE	12/26/17 12:00 PM	<span style="color: orange;">▲</span> 1	6	0
<input type="checkbox"/> <span style="color: blue;">☒</span> Waiting	HOLD	W5_REPEATS	CHARLIE	12/26/17 1:00 PM	<span style="color: orange;">▲</span> 1	6	0
<input type="checkbox"/> <span style="color: blue;">☒</span> Waiting	HOLD	W5_REPEATS	CHARLIE	12/26/17 2:00 PM	<span style="color: orange;">▲</span> 1	6	0

In the monitored result, you see the following items.

- The W7\_PROCESS job stream is included in the plan because December 26, 2017 is the last Tuesday of the month.
  - Five occurrences of W5\_REPEATS are in the plan because it contains the **Repeat** option. Each occurrence has a unique start time.
  - The first occurrence of W5\_REPEATS is *Ready to run* because it has no unresolved dependencies.
15. Click the **1** in the **Not Satisfied Dependencies** column for the W5\_REPEATS job stream that is Waiting. You see that it has a dependency on the previous occurrence of the same job stream.
16. Close the **Monitor Job Streams** view.

---

# **Unit 7 Reporting with Workload Scheduler exercises**

In the exercises for this unit, you create and run reports.

# Exercise 1 Creating a job statistics report

In this exercise, you create a job statistics report by using the Dynamic Workload Console. To create a report, complete the following steps.

1. In the Dynamic Workload Console, select **Reporting > Manage Workload Reports**.
2. On the Manage Workload Reports page, click **New**.
3. On the Create Task page, confirm that **Job Run Statistics Report** is selected, and click **Next**.

**Create Task**

---

**Select Task Type**

Monitor Task       Event Management Task       Report Definition

**Monitor Task**       **Event Management Task**       **Historical Report Task**

Monitor Jobs       List Event Rule Definitions  
 Monitor Critical Jobs       Monitor Event Rules  
 Monitor Job Streams       Monitor Triggered Actions  
 Monitor Workstations       Monitor Operator Messages  
 Monitor Resources  
 Monitor Domains  
 Monitor Files  
 Monitor Prompts  
 Show Plan View

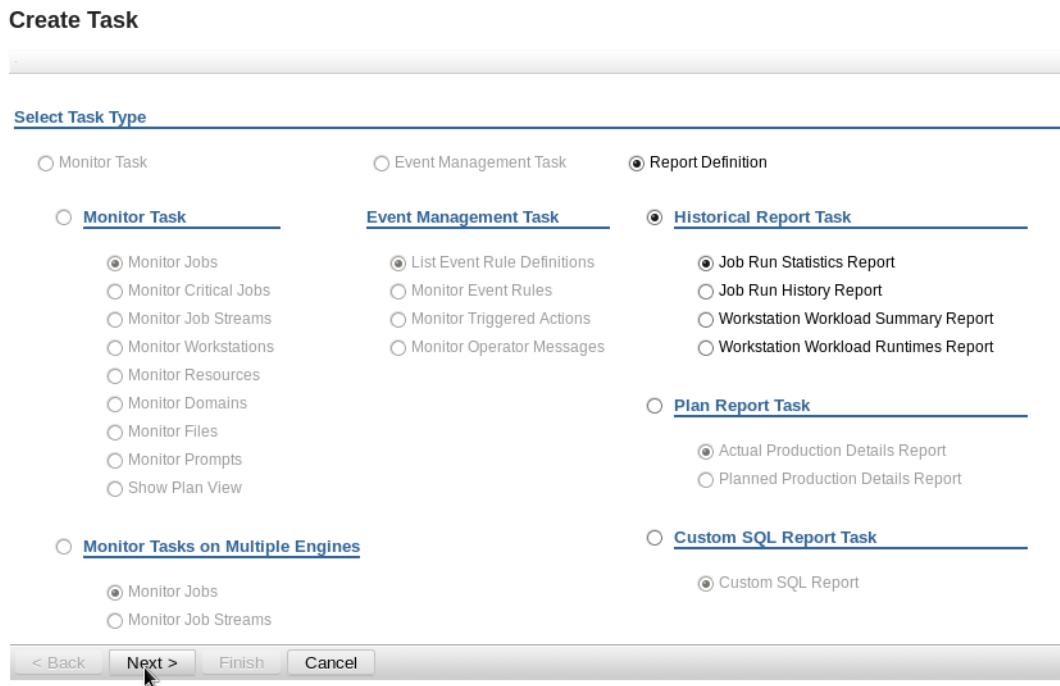
**Monitor Tasks on Multiple Engines**       **Plan Report Task**

Monitor Jobs       Actual Production Details Report  
 Monitor Job Streams       Planned Production Details Report

**Custom SQL Report Task**

Custom SQL Report

**< Back    Next >    Finish    Cancel**



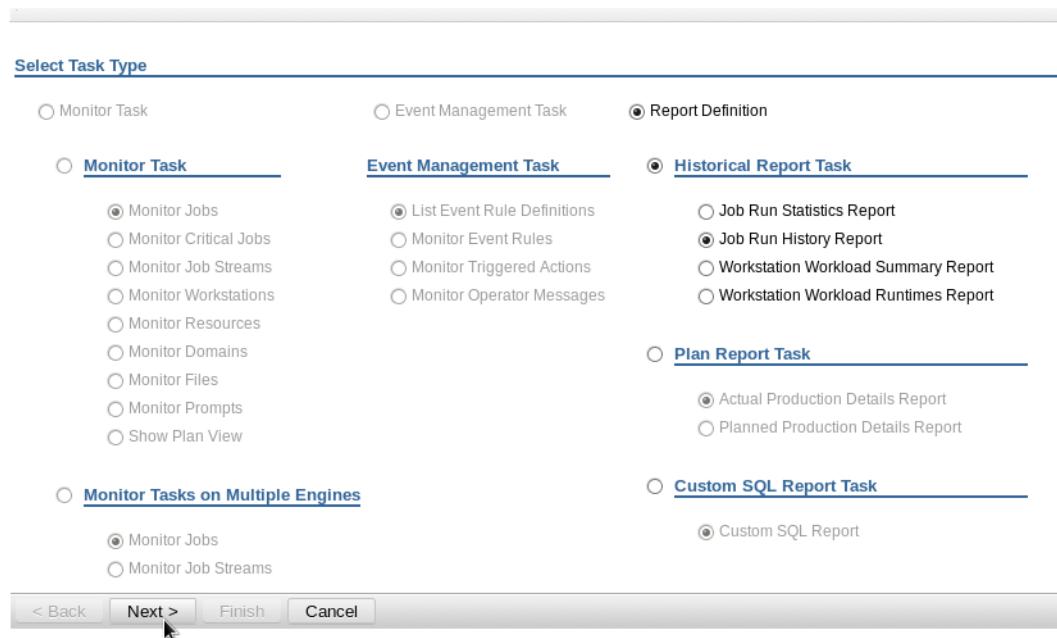
4. On the Job Run Statistics Report page, perform the following steps:
  - a. Enter **Job Statistics for DFW** in the **Task Name** field.
  - b. Select **WS94d (Distributed)** from the **Engine** menu.
  - c. Click **Next**.
5. On the “Job Run Statistics Report Task (Distributed): Job Statistics for DFW” page, in the **Report Description** field, enter **Statistics report for DFW jobs**, and click **Next**.
6. On the “Job Run Statistics Report Task (Distributed): Job Statistics for DFW” page, perform the following tasks.
  - a. In the **Job Name** field, enter **J?DFW\***.
  - b. In the **Total Runs** field, enter **2**.

- c. Click **Next**.
- 7. On the “Job Run Statistics Report Task (Distributed): Job Statistics for DFW” page, click **Next**.
- 8. On the “Job Run Statistics Report Task (Distributed): Job Statistics for DFW” page, select **Run this Task Now**, and click **Finish**.
- 9. In the Manage Workload Reports window, click **Yes**.
- 10. In the new browser window, scroll through the jobs that are listed on the report. Close the report window.

# Exercise 2 Creating a job history report

In this exercise, you create a job history report by using the Dynamic Workload Console. To create a report, perform the following steps.

1. On the Manage Workload Reports page, click **New**,
2. On the Create Task page, select **Job Run History Report**, and click **Next**.



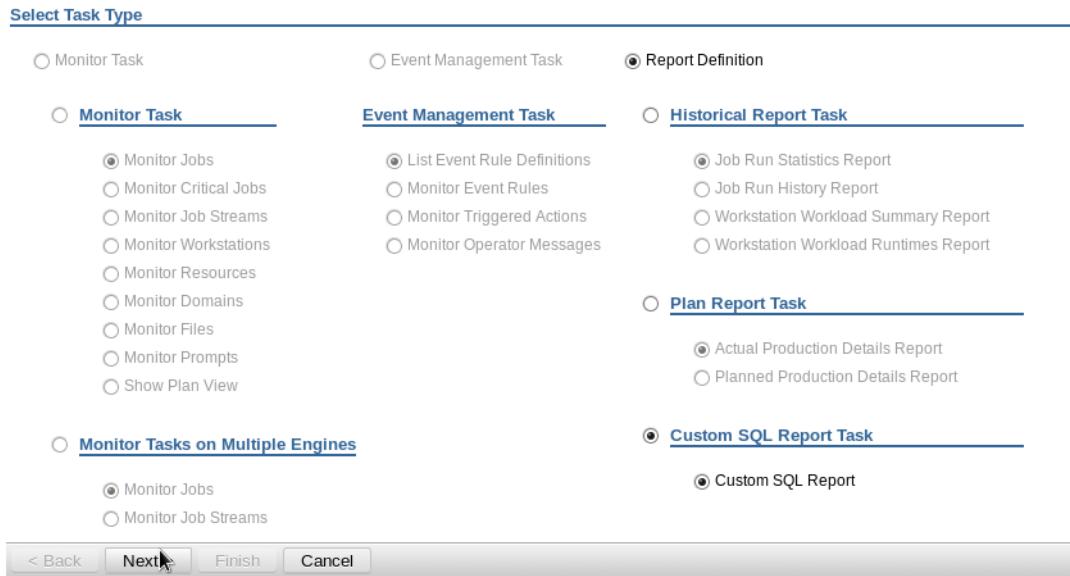
3. On the Job Run History Report page, perform the following steps:
  - a. Enter **Job history for DFW** in the **Task Name** field.
  - b. Select **WS94d (Distributed)** from the **Engine** menu.
  - c. Click **Next**.
4. On the “Job Run History Report Task (Distributed): Job history for DFW” page, perform the following tasks.
  - a. In the **Report Description** field, enter **History detail report for DFW jobs**.
  - b. Select **Include Table of Contents**.
  - c. Click **Next**.

5. On the “Job Run History Report Task (Distributed): Job history for DFW” page, perform the following tasks.
  - a. In the **Job Name** field, enter **J?DFW\***.
  - b. In the **Job Execution Interval** section, select **Job runs: retrieve the latest 10**.
  - c. Click **Next**.
6. On the “Job Run History Report Task (Distributed): Job history for DFW” page, click **Next**.
7. On the “Job Run History Report Task (Distributed): Job history for DFW” page, select **Run this Task Now**, and click **Finish**.
8. In the Manage Workload Reports window, click **Yes**.
9. In the new browser window, scroll through the jobs that are listed on the report. Close the report window.

# Exercise 3 Creating a custom SQL report

In this exercise, you create a custom job report with SQL by using the Dynamic Workload Console. To create a report, perform the following steps.

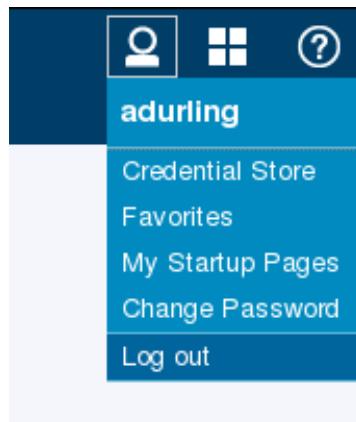
1. On the Manage Workload Reports page, click **New**,
2. On the Create Task page, select **Custom SQL Report**, and click **Next**.



3. On the Custom SQL Report page, perform the following steps:
  - a. Enter **Monthly job runs** in the **Task Name** field.
  - b. Select **WS94d (Distributed)** from the **Engine** menu.
  - c. Click **Next**.
4. On the “Custom SQL Report Task (Distributed): Monthly job runs” page, in the **Report Description** field, enter **Monthly job runs count**. Click **Next**.

5. On the “Custom SQL Report Task (Distributed): Monthly job runs” page, complete the following tasks.
  - a. In the **Query SQL statement**, enter the following text:
 

```
SELECT
    YEAR(JOB_RUN_DATE_TIME) AS YEAR,
    MONTH(JOB_RUN_DATE_TIME) AS MONTH,
    WORKSTATION_NAME || '#' || JOB_NAME AS JOB,
    COUNT(*) AS RUNS
FROM MDL.JOB_HISTORY_V
GROUP BY
    WORKSTATION_NAME,
    JOB_NAME,
    YEAR(JOB_RUN_DATE_TIME),
    MONTH(JOB_RUN_DATE_TIME)
```
  - b. Click **Validate**. Confirm that you see The SQL query is correct, and click **OK**.
  - c. Click **Next**.
6. On the “Custom SQL Report Task (Distributed): Monthly job runs” page, click **Next**.
7. On the “Custom SQL Report Task (Distributed): Monthly job runs” page, select **Run this Task Now**, and click **Finish**.
8. In the Manage Workload Reports window, click **Yes**.
9. In the new browser window, scroll through the jobs that are listed on the report. Close the report window.
10. Log out of the Dynamic Workload Console by selecting **Log out** from the user menu.



# Exercise 4 Using the Common Reporting tool

IBM Workload Scheduler delivers Common Reporting, a portal for IBM Cognos. You can administer, run, customize, and create reports on the IBM Workload Scheduler database. You can start and use IBM Cognos from the Dynamic Workload Console.

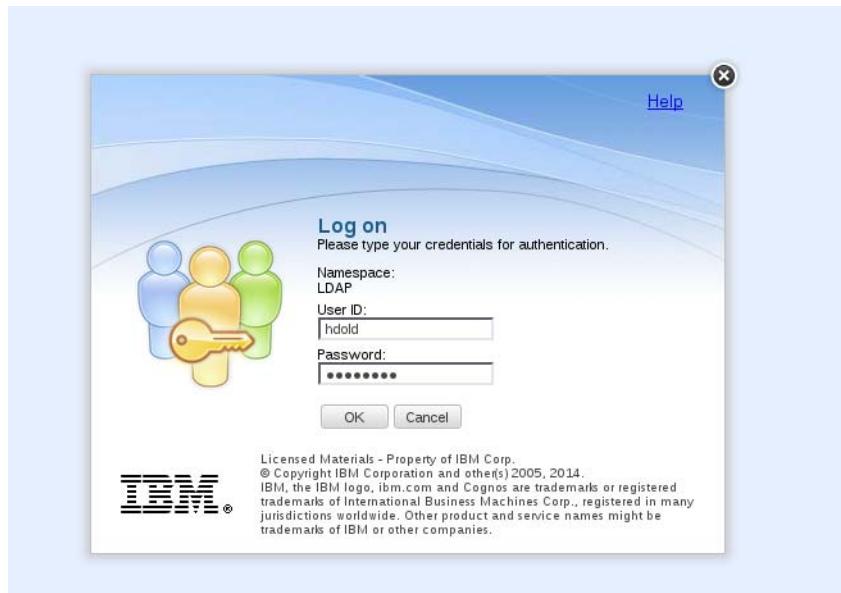
To use common reporting and view some reports of statistical analysis, complete the following steps:

1. Log in to the Workload Console with user ID `hdo1d` and password `object00`.
2. On the IBM Workload Scheduler page, in the **Dynamic Workload Console** section, click **Go**.
3. From the Dynamic Workload Console menu, select **Reporting > Common Reporting**.
4. On the “Log on” page, select **LDAP** from the **Namespace** menu, and click **OK**.



5. On the “Log on” page, enter User ID `hdo1d` and password `object00`. Click **OK**.

#### Exercise 4 Using the Common Reporting tool

A screenshot of the "COMMON REPORTING" interface. The top navigation bar includes links for Default, Administration, Planning, Reporting, System Configuration, System Status and Health, and Troubleshooting and Support. Below the navigation is a breadcrumb trail: WELCOME TO DWC > COMMON REPORTING. On the left, there's a "Connection" sidebar with tabs for Public Folders (selected) and My Folders. The main content area displays a list of "Public Folders" with the following items:

- ☐ | Name ◇
- ☐ Analysis\_Job\_Duration\_Estimation\_Error
- ☐ Analysis\_Job\_Duration\_Standard\_Deviation
- ☐ AuditingReportsDB2
- ☐ Common Reporting
- ☐ IWS\_DB2

6. Click **Analysis\_Job\_Duration\_Standard\_Deviation**.
7. On the next page, click **Analysis job duration standard deviation**.
8. On the “Filter Criteria - Analysis job duration standard deviation” page, select **Last 365 days** from the **Job Execution Interval** menu.
9. Click **Finish**.

You see the results of the report on the next page.

*Exercise 4 Using the Common Reporting tool*

10. Scroll to the bottom of the page to see a pie chart that represents the results.



11. Log out of the Common Reporting tool by selecting **Log Off** from the **Log on** menu.



12. Log out of the Dynamic Workload Console by selecting **Log out** from the **User (User icon)** menu.

# Appendix A Troubleshooting

If the service process does not start, you see that its icon in the IBM Workload Automation page is red, as illustrated in the following figure.

The screenshot shows the 'IBM Workload Automation' dashboard. At the top, there's a navigation bar with tabs: AppServer, JazzSM, Batchman (which is red), JobManager, and Plan freshening. Below the navigation bar, there are several sections:

- Workload Console:** A dark interface for monitoring and managing the Workload Scheduler database and plan.
- Application Lab:** An interface to create and monitor workload definitions simply.
- Self-service Console:** A mobile interface for managing workload applications from a mobile device.
- Mobile dashboard:** A mobile dashboard to quickly monitor workload production from a tablet or smartphone.
- WS Websphere Console:** A Websphere Administrative Console for managing application services.
- DASH Websphere Console:** A WebSphere administrative console for managing the application server for DASH.
- Workload Scheduler log files:** A terminal window showing log files.
- RedHat Cockpit:** A Red Hat Enterprise Service cockpit for managing services, network devices, and system logs.

Figure A-1 Workload Automation dashboard with red batchman

You can restart the process graphically, by using the Red Hat Cockpit, or by using system commands from a terminal window. To restart the process by using Red Hat Cockpit, complete the following steps.

1. On the IBM Workload Automation page, click the red label to start **RedHat Cockpit**. You see the RED HAT ENTERPRISE LINUX SERVER login page.
2. Select **Reuse my password for privileged tasks**.
3. Log in with user name `wsuser` and password `object00`.
4. On the Services page, click **Start** to start the service and its dependencies.
5. You see in the *Service Logs* section that the service is started. From the user menu, which is labeled **Workload Scheduler**, select **Log out**

To restart the process by using system commands, complete the following steps.

1. Open a Terminal window, and enter the following command.

```
sudo systemctl start wsplan.service
```

2. To view the results, enter the following command.

```
journalctl -u wsplan.service -u wsagent.service
```

The other services you can start are listed in the following table.

**Table 1 Services you can manage**

Service unit	Description
db2fmcd.service	DB2 Fault Monitor
ibmslapd.service	IBM Security Directory Service (LDAP)
jazzsm.service	IBM Jazz for Service Management
wsagent.service	IBM Workload Scheduler agent (Batchman)
wsnode.service	IBM Workload Scheduler application server
wsplan.service	Workload Scheduler plan freshening (create or extend a production plan)





IBM Training



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