Tivoli Job Scheduling Console Guide for OPC Users

Feature Level 1.0
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Preface

The Operations Planning and Control (OPC) extension of the Tivoli Job Scheduling Console provides users with an additional, Java-based user interface that supplements the traditional OPC ISPF panels on the host. The Tivoli Job Scheduling Console does not totally replace the functions of the ISPF panels of OPC. It enables users to work with OPC objects in the following ways:

- Define applications (job streams), operations (jobs), workstations, and special (logical) resources in the OPC database.
- Modify definitions of job streams, jobs, workstations, and logical resources in the OPC database.
- Monitor and modify occurrences (job stream instances), operations (job instances), workstation instances, and resource instances in the current plan (plan).

The Tivoli Job Scheduling Console for OPC Users provides an introduction to and an explanation of the Tivoli Job Scheduling Console with the OPC extension. It explains how to install the Tivoli Job Scheduling Console. It also provides instructions for performing the tasks available with the OPC extension.

Who Should Read This Guide

This guide is intended for use by readers who have the following roles:

- System administrators who have the task of installing the Tivoli Job Scheduling Console. They should be familiar with the Windows NT®, Unix or Sun Solaris operating systems.
- Schedulers who have the responsibility of creating and updating definitions of objects in the OPC database and of creating lists of objects in the OPC database and plan. They should be familiar with performing these specific OPC tasks and with working in the Windows NT environment.
- Operators who have the responsibility of controlling and monitoring the OPC current plan. They should be familiar with performing the tasks inherent to monitoring and modifying objects.
Preface

in the OPC plan and with working in the Windows NT environment.

Prerequisite and Related Documents

You can find useful reference in the following OPC documents:

- Planning and Scheduling the Workload (SH19-4376-01)
  Explains the tasks involved in planning and scheduling operations with OPC.

- Controlling and Monitoring the Workload (SH19-4377-01)
  Explains the tasks involved in controlling and monitoring the OPC plan while it is being carried out.

What This Guide Contains

The Tivoli Job Scheduling Console Guide for OPC Users contains the following sections:

- Part I - Introduction to the Tivoli Job Scheduling Console.
  Describes the functionality of the Job Scheduling Console and explains how to work with its objects.
  - Chapter 1, “The Job Scheduling Console” on page 1
  - Chapter 2, “The Job Scheduling Console for OPC” on page 7
  - Chapter 3, “Working with the Job Scheduling Console for OPC” on page 13

- Part II - System Administrator Tasks
  Explains how to install and maintain the Job Scheduling Console.
  - Chapter 4, “Installing the Tivoli Job Scheduling Console for OPC” on page 33

- Part III - Scheduler Tasks
  Explains how to execute the tasks associated with scheduling the workload in an enterprise.
  For the Scheduler, these tasks involve first setting up the environment in terms of available workstations and resources, then creating job streams and defining their run cycles. Finally, the tasks
involve creating lists to manage workstations, resources, job
streams, and jobs in both the OPC database and plan.

- Chapter 5, “Creating, Listing, and Modifying Workstations”
on page 61
- Chapter 6, “Creating, Listing, and Modifying Special
Resources (Resources)” on page 83
- Chapter 7, “Creating an Application (Job Stream)” on page
103
- Chapter 8, “Listing and Modifying Applications (Job Streams)
in the Database” on page 157
- Chapter 9, “Listing Occurrences and Operations (Job Stream
and Job Instances)” on page 179

Part IV - Operator Tasks

Describes how to use the Job Scheduling Console to monitor and
control plan instances such as job streams, jobs, workstations, and
resources.

- Chapter 10, “Monitoring and Modifying Occurrences (Job
Stream Instances)” on page 189
- Chapter 11, “Monitoring and Modifying Operations (Job
Instances)” on page 205
- Chapter 12, “Monitoring and Modifying Workstations in the
Plan” on page 237
- Chapter 13, “Monitoring and Modifying Resources in the
Plan” on page 259

Conventions Used in This Guide

The guide uses several typface conventions for special terms and
actions. These conventions have the following meaning:

**Bold**

Commands, keywords, file names, authorization roles,
URLs, or other information that you must use literally
appear like **this**, in **bold**. Names of windows, dialogs,
and other controls also appear like **this**, in **bold**.
Variables and values that you must provide appear like this, in italics. Words and phrases that are emphasized also appear like this, in italics.

New terms appear like this in bold italics when they are defined in the text.

Code examples, output, and system messages appear like this, in a monospace font.

The Job Scheduling Console provides contextual online help. To display help information you can do one of the following:

- Select the Help button at the bottom of a window, to see an explanation of how to complete the fields in the window.
- Select the item of a pull-down menu or of a pop-up window and press F1, to see an explanation of that item.
- Select the Where Do I Start? tutorial, available in the Help pull-down menu, to learn how to use the Job Scheduling Console to schedule and monitor the workload.
- Select How Do I…?, available in the Help pull-down menu, to see step by step instructions for performing a specific task.
- Select Glossary, available in the Help pull-down menu, to see the definition of terms commonly used in the Job Scheduling Console.

The following table identifies the supported platforms and minimum hardware and operating system requirements for the Job Scheduling Console for OPC. For more detailed and up-to-date information, see the release notes.
Additional Software Requirements

In addition, you need to have the following software installed on your machine or on a machine you can access:

- The OPC Connector on a TMR Server running Tivoli Management Framework Version 3.6.1
- TME 10 OPC Version 2.1 or Tivoli OPC Versions 2.2 or 2.3
- MVS Version 5.0, or OS/390 Versions 1.0 or 2.0
- If you are running MVS Version 5.0 or OS/390 Version 1.0, you need TCP/IP Version 3.2 with C socket API support.
- For AIX systems running the Job Scheduling Console: you must install the Java Development Kit (JDK) 1.1.8. This kit is automatically installed with the Job Scheduling Console on all the other platforms.

The next table summarizes the supported platforms and minimum hardware and operating system requirements for the OPC Connector.

<table>
<thead>
<tr>
<th>Platform</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required: Pentium 233 with 64MB RAM&lt;br&gt;Recommended: Pentium II 266 with 128MB RAM</td>
<td>Microsoft Windows NT Version 4.0 with Service Pack 3 or later&lt;br&gt;Microsoft Windows 95&lt;br&gt;Microsoft Windows 98</td>
</tr>
<tr>
<td>RS/6000</td>
<td>AIX 4.2 or 4.3</td>
</tr>
<tr>
<td>SPARC System</td>
<td>Sun Solaris 2.6 or 2.7</td>
</tr>
</tbody>
</table>
The Job Scheduling Console and the OPC Connector can run in the same machine. In this case, the supported environments are limited to the following machines:

- Pentium PC running Microsoft Windows NT
- RS/6000
- SPARC System

### Platform

<table>
<thead>
<tr>
<th>Platform</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP9000 700/800 series</td>
<td>UX 10.x and 11</td>
</tr>
<tr>
<td>SPARC System</td>
<td>Sun Solaris 2.6 or 2.7</td>
</tr>
</tbody>
</table>

**Contacting Customer Support**

For support inside the United States, for this or any Tivoli product, contact Tivoli Customer Support in one of the following ways:

- Send e-mail to support@tivoli.com
- Call 1-800-TIVOLI
- Navigate our Web site at [http://www.support.tivoli.com](http://www.support.tivoli.com)


When you contact Tivoli Customer Support, be prepared to provide identification information for your company so that support personnel can assist you more readily.

We are very interested in hearing from you about your experience with Tivoli products and documentation. We welcome your suggestions for improvements. If you have comments or suggestions about this documentation, please send e-mail to pubs@tivoli.com.
The Job Scheduling Console

The Tivoli Job Scheduling (JS) Console enables you to work with Operations Planning and Control (OPC) and other supported job schedulers. If you use more than one kind of job scheduling product in your enterprise, you can work with these products simultaneously from the same graphical console.

Extensions, built into the Job Scheduling Console, extend its base scheduling functions to specific scheduling functions of OPC and of the other supported job schedulers.

Connectors manage the traffic between the JS Console and the job schedulers. Connectors are installed separately on a Tivoli management server and on managed nodes that have access to the specific job scheduling product.

If you plan to use the JS Console to schedule the workload with OPC, you need to install the OPC Connector. If you plan to use the JS Console to schedule the workload with one of the other supported job schedulers, you need to install a Connector that has been specifically designed for that product.

The Job Scheduling Console provides two main functions:

**Scheduling**

Enables you to define and list job streams, jobs, and resource availability in the scheduler database.
Scheduler Tasks

Monitoring and control

Enables you to monitor and control scheduled jobs and job streams in the scheduler plan. In the JS Console, a scheduled job stream is called a job stream instance whereas a scheduled job is called a job instance.

For each of these functions, you can use a list creation mechanism that enables you to list database or plan objects that you select according to filtering criteria. Filtering criteria narrow a list down to selected objects that you want to work with. You can list objects without using filtering criteria; in this case, the list displays all the existing objects of a kind. You can use both pre-defined lists that are packaged with the JS Console and lists that you create.

This chapter describes the features of the base Job Scheduling Console. The base JS Console provides a common set of functions on which the specific functions of the supported job schedulers’ extensions are implemented. The next chapter provides a functional overview of the Job Scheduling Console for OPC.

Scheduler Tasks

From the JS Console, you can define and manage the following objects in the scheduler database:

- Job streams
- Jobs
- Resources

Working with Job Streams

Job streams are a collection of jobs, scheduling information, and the resources they require to run. The jobs that comprise a job stream usually follow a sequence where the execution of a job depends on the successful completion of another job. Creating a job stream involves:

- Defining job stream properties
- Creating jobs, which includes defining what resources each job requires to run and the timing of its execution
Scheduler Tasks

- Defining the necessary dependencies, or sequencing, among the jobs of the job stream and with jobs that belong to other job streams
- Defining one or more run cycles, or the days on which the job stream must run and when it must start

Modifying a job stream involves adding, deleting, or modifying any of the jobs that comprise it, along with the dependencies and run cycles. You can also delete an entire job stream.

Job stream definitions are stored in the job scheduler databases. To browse or update job streams you have created, you must make and run a list of job streams in the database.

Working with Jobs

Jobs are the units of work in a job stream. You cannot create jobs outside of a job stream. You must first create a job stream and define its properties before you can start to create the jobs that comprise it. Creating a job involves:

- Defining job properties
- Specifying when the job must run (time restrictions) within its job stream’s run cycle
- Defining the properties of the task associated with the job, if applicable
- Specifying the resources that the job requires to run

Jobs are stored in the job scheduler database as parts of job streams. To browse, update, or delete a job definition, you must list the parent job stream in the database.

Working with Run Cycles

A run cycle provides the scheduling information of a job stream. Like jobs, you can create run cycles only after you have defined the job streams to which they apply. A job stream can have more than one run cycle. Creating a run cycle involves:

- Defining run cycle properties
- Specifying when the run cycle starts and how long it lasts
Operator Tasks

- Specifying the rules that define the run days for the job stream

Run cycle definitions are stored in the scheduler database as parts of the job streams. To browse, update, or delete a run cycle definition, you must list the parent job stream in the database.

Working with Resources

Resources represent physical or logical devices that jobs use in order to run. Defining a resource involves:

- Defining the resource’s general properties
- Specifying availability intervals, periods during which the resource’s state and quantity available for running jobs differ from the values specified as general properties.

Resource definitions are stored in the scheduler database. To browse, update, or delete a resource definition, you must make and run a list of resources in the database.

Operator Tasks

From the JS Console, you can monitor and control the following objects in the scheduler plan:

- Job stream instances
- Job instances
- Resource instances

To monitor and control these objects, you must first display them in a list in the Job Scheduling Console.

Working with Job Stream Instances

Job streams that are scheduled in the plan are job stream instances. You can browse, modify, and delete job stream instances, provided you display them in a job stream instance list. Modifying a job stream instance includes changing some of its general properties and the start and deadline times.
Working with Job Instances

Jobs belonging to a job stream that is scheduled in the plan are job instances. You can browse, modify, and delete job instances after displaying them in a job instance list. Modifying a job instance involves:

- Changing its state, resource dependencies, and time restrictions
- Deleting predecessor and successor jobs in the job instance’s dependency chain

Working with Resource Instances

A resource instance is a resource allocated to the plan. The resource is reserved for the duration of the plan for use by the jobs that depend on it. The status and quantities of the resource are specified in the general properties and availability intervals definitions in the database. You can, however, modify the resource’s availability intervals and quantity after the resource has been allocated to the plan.
The Tivoli Job Scheduling Console for OPC is an interactive interface for Operations Planning and Control Version 2, Releases 1, 2, and 3. The Console enables you to create, modify, and delete objects in the OPC database. It also enables you to monitor and control objects scheduled in the OPC current plan. It does not enable you to create plans, nor to extend them. To create or extend plans you must use OPC commands and traditional OPC user interfaces. See the Tivoli OPC Planning and Scheduling the Workload (SH19-4376) guide to learn how to create or extend a plan.

Supported OPC Tasks

The OPC extension supports all the tasks of the base Job Scheduling Console described in the preceding chapter. In addition, it supports OPC specific functions and resources, such as OPC special resources and OPC workstations. These are described in the following sections of this chapter.

Scheduler Tasks

All the tasks that involve working with object definitions in the OPC database are referred to as Scheduler tasks in this guide. Once you have saved an object in the database, you must first list it in the JS Console if you want to browse, change, or delete it.
Supported OPC Tasks

**Working with Workstations**

You can create, update, and delete OPC workstation definitions in the OPC database. You define the following workstation characteristics:

- General properties
- Availability status during specific periods of time
- Available quantities during specific periods of time

You can list workstations defined in the OPC database, selected according to filtering criteria, and browse or modify their properties. You can also delete workstations from the OPC database.

**Working with Applications (Job Streams)**

In the JS Console for OPC, applications are called job streams. In addition to the basic JS Console functions and objects, the OPC extension supports also application groups, which are called *job stream templates* in the JS Console. Job stream templates contain only scheduling information. When you define a job stream as belonging to a template, you imply that it must share the template’s OPC calendar and run cycles. You can:

- Create, update, or delete job stream templates
- Add or remove a job stream from a job stream template
- List job stream templates in the OPC database

**Working with Operations (Jobs)**

OPC operations are referred to as *jobs* in the JS Console. When you create or modify a job, the OPC extension adds the following features to basic job definition:

- Assigning the necessary special (logical) and workstation resources for the execution of the job
- Defining the job’s automatic and feedback options
Working with Special Resources (Resources)

OPC special resources are referred to as logical resources in the JS Console. You can create, update, and delete OPC resource definitions in the OPC database. You define the following resource characteristics:

- General properties
- Availability status on a given workstation during specific periods of time
- Available quantities on a given workstation during specific periods of time
- Workstations connected to the resource

You can list resources defined in the OPC database, selected according to filtering criteria, and browse or modify their properties. You can also delete resources from the OPC database.

Operator Tasks

All the tasks that involve working with objects in the current plan, simply called plan in the JS Console, are referred to as Operator tasks in this guide. You must first list the objects in the plan in order to work with any of them.

Working with Occurrences (Job Stream Instances)

OPC occurrences are referred to as job stream instances. In addition to basic JS Console functionality, you can also change the status of an OPC job stream instance to Waiting and Complete.

Working with Operations in the Current Plan (Job Instances)

OPC operations in the current plan are referred to as job instances. In addition to basic JS Console functionality, you can also:

- Change the status to: Running, Ready, Interrupted, Error, or Successful
- Execute, hold, or release the job instance
- Remove or restore (NOP or UN-NOP) the job instance in the plan
Scheduling Job Streams

**Working with Workstations in the Current Plan**

You can create and update workstation instance definitions in the plan. This includes editing the following:

- Control properties
- Availability status to run jobs during specific intervals of time
- Available quantities that jobs can use during specific intervals of time

You can also view the job instances scheduled to run on a given workstation at any time during the plan.

**Working with Special Resources in the Current Plan**

You can create and update resource instance definitions in the plan. This includes editing the following:

- Control properties
- Availability status on a given workstation during specific intervals of time
- Available quantities on a given workstation during specific intervals of time
- Workstations connected to the resource

**Scheduling Job Streams**

When you create a job stream, the job stream’s run cycles are used to generate the dates and times at which the job stream will run. Each occurrence of a job stream is called a job stream instance, and each job stream instance contains job instances.

After you complete the definition of a job stream in terms of jobs, dependencies, and run cycles, and you mark it active in the Job Stream Properties window, you have to go to OPC to schedule the job stream into the current plan. You cannot add a job stream to the plan from the Job Scheduling Console.
Terminology Used in the Job Scheduling Console

The terminology used in the JS Console differs somewhat from that used in OPC. The following table lists OPC terms, their JS Console equivalents, and a brief explanation. Refer to the glossary for more detailed definitions of these and other JS Console terms.

<table>
<thead>
<tr>
<th>OPC</th>
<th>JS Console</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application description</td>
<td>Job stream</td>
<td>A sequence of jobs, including the resources and workstations that support them, and scheduling information.</td>
</tr>
<tr>
<td>Application group</td>
<td>Job stream template</td>
<td>A grouping of job streams that provides scheduling information, such as a calendar, a free-day rule, and run cycles that can be inherited by all the job streams that have been created using the template.</td>
</tr>
<tr>
<td>Current plan</td>
<td>Plan</td>
<td>A detailed plan of system activity that covers a period of at least one minute and not more than 21 days, but typically one or two days. The plan encompasses all job and job stream instances and the resources and workstations involved in running them.</td>
</tr>
<tr>
<td>External dependency</td>
<td>External job</td>
<td>A job from one job stream that is a predecessor for a job in another job stream.</td>
</tr>
<tr>
<td>In-effect date for run cycles</td>
<td>Valid from</td>
<td>The first date that a run cycle applies.</td>
</tr>
<tr>
<td>Input arrival time</td>
<td>(Earliest) start time</td>
<td>The time before which the job or job stream cannot start.</td>
</tr>
<tr>
<td>Negative run cycle</td>
<td>Exclusionary run cycle</td>
<td>Specifies when a job stream must not run.</td>
</tr>
<tr>
<td>Occurrence</td>
<td>Job stream instance</td>
<td>A job stream that is scheduled for a specific run date in the plan.</td>
</tr>
</tbody>
</table>
## Terminology Used in the Job Scheduling Console

<table>
<thead>
<tr>
<th>OPC</th>
<th>JS Console</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPC controller</td>
<td>Engine</td>
<td>The OPC component that runs on the controlling system, and that contains the OPC tasks that manage the OPC plans and databases.</td>
</tr>
<tr>
<td>Operation</td>
<td>Job</td>
<td>A unit of work that is part of a job stream and that is processed at a workstation.</td>
</tr>
<tr>
<td>Operation number</td>
<td>Job identifier</td>
<td>The number that identifies a job.</td>
</tr>
<tr>
<td>Operations in the current plan</td>
<td>Job instances</td>
<td>A job scheduled for a specific run date in the plan.</td>
</tr>
<tr>
<td>Out-of-effect date for run cycles</td>
<td>Valid to</td>
<td>The last date that a run cycle applies.</td>
</tr>
<tr>
<td>Run cycle with offsets</td>
<td>Offset-based run cycle</td>
<td>Includes a user-defined period and an offset, such as the 3rd day in a 90-day period.</td>
</tr>
<tr>
<td>Run cycle with rules</td>
<td>Rule-based run cycle</td>
<td>Includes a rule, such as the first Friday of March or the second workday of the week.</td>
</tr>
<tr>
<td>Special resources</td>
<td>Logical resources</td>
<td>Any type of limited resource, such as tape drives, communication lines, databases, or printers, that is needed to run a job.</td>
</tr>
<tr>
<td>Status: Complete</td>
<td>Successful</td>
<td>The job or job stream has been completed.</td>
</tr>
<tr>
<td>Status: Delete</td>
<td>Canceled</td>
<td>The job or job stream has been deleted from the plan.</td>
</tr>
<tr>
<td>Status: Started</td>
<td>Running</td>
<td>The job has started (jobs only).</td>
</tr>
<tr>
<td>Task</td>
<td>Job</td>
<td>A job performed at a computer workstation.</td>
</tr>
</tbody>
</table>
Working with the Job Scheduling Console for OPC

3. Working with the Job Scheduling Console for OPC

The Job Scheduling View

The Job Scheduling view is the main window of the JS console. As the next figure shows, it consists of two panes.
The Job Scheduling View

Figure 1. The Job Scheduling view.

The left pane is a tree view that displays your scheduler engines (OPC or other). If you expand any of the objects that represent the scheduler engines, you see the lists and groups of lists available for that particular engine.

The right-hand pane displays a detailed view of the object selected in the tree. This can be either a number of list objects or the contents of a list in the shape of a table or of a Gantt diagram.

The upper part of the Job Scheduling view contains the window’s menu bar and a number of icons. You can use the icons to:

- Size the panes.
- Browse scheduler general properties and set defaults for refreshing list contents.
- Remove an object from the tree.
- Create objects in the OPC database.
The Job Scheduling View

- Create lists of objects in the OPC database and in the OPC plan.
- Create groups of lists.

As an alternative to using the icons, you can right-click your intended OPC controller to open a pop-up menu displaying the same options for creating lists, groups of lists, and objects in the OPC database.

Using the Icons of the Job Scheduling View

Use the following icons, located in the toolbar of the Job Scheduling view, to create an object in the OPC database, or to create a list of objects defined in the OPC database or in the OPC plan:

- Create a job stream in the database. Click this icon to display the Job Stream Editor window, where you define job stream properties and create jobs, job dependencies, and run cycles.

- Create a resource in the database. Click this icon to display the Properties-Resource window, where you define a resource’s properties, associated workstations, and availability intervals.

- Create a workstation in the database. Click this icon to display the Properties-Workstation in Database window, where you define a workstation’s properties, resources, and availability intervals.

- List job streams defined in the database. Click this icon to display the Properties - Job Stream List window, where you create a filtered list of selected job streams.

- List workstations defined in the database. Click this icon to display the Properties - Database
The Job Scheduling View

Workstation List window, where you create a filtered list of selected workstations.

List resources defined in the database. Click this icon to display the Properties - Database Resource List window, where you create a filtered list of selected resources.

List job stream instances in the plan. Click this icon to display the Properties - Job Stream Instance List window, where you create a filtered list of selected job streams scheduled in the plan.

List job instances in the plan. Click this icon to display the Properties - Job Instance List window, where you create a filtered list of selected jobs scheduled in the plan.

List workstations in the plan. Click this icon to display the Properties - Plan Workstation List window, where you create a filtered list of selected workstations allocated to the plan.

List resources in the plan. Click this icon to display the Properties - Plan Resource List window, where you create a filtered list of selected resources allocated to the plan.

Create a group of lists. Click this icon to display the Properties - Group of Lists window, where you enter a name for the new group. The group is added to the tree of your selected scheduler and you can thereafter create lists as part of it.
Working with Lists

Display the properties of the object selected in the tree view. Click this icon to browse or modify the properties of the selected object. If you have selected a scheduler, it opens the Properties-Scheduler window. If you have selected a list, it opens the Properties window of that list. If you have opened the Job Stream Editor, it displays the Properties window of the job stream.

Delete the object selected in the tree view.

Stop loading a list. This icon becomes available while the results of a list are being uploaded.

Refresh the results of a list. This icon becomes available only after you have opened a list. Click it to reload the results of the list on display in the right-hand pane of the Job Scheduling view.

Note: Remember to select your intended OPC controller in the tree before you use an icon to create or to list an object. By default, the JS console selects the first engine in the list.

Icon availability in the Job Scheduling view dynamically follows the tasks you perform. For instance, if you open a list, many of the icons just described disappear from the Job Scheduling view. To display the initial layout, collapse the tree view to OPC controller level.

Working with Lists

To browse, update, or delete objects already defined in the OPC database and plan, you must create and display a list of the objects.

Lists and list groups are displayed both in the tree view and in the right-hand pane of the Job Scheduling view. The right-hand pane displays all lists and list groups available for the selected OPC controller. In the right-hand pane, you can only double-click a list to display its results.
Working with Lists

In the tree view, double-click an OPC controller to display the lists available for the controller. Right-click one of the lists to open a pop-up menu that displays the following options:

Properties Opens the list’s properties window. Choose this option to change the list’s name, refresh options, or filter criteria.

Delete Deletes the list from the tree.

Open Runs the list and displays the results in the right-hand pane of the Job Scheduling view.

Detach View Takes the results of a list from the Job Scheduling view and places them in a separate window.

Default Lists

The console provides default lists for every scheduler engine in your installation. There is a default list for every type of OPC object. Default lists are general; that is, no selection criteria are specified, so that, when you open them, they list all the existing objects of the kind. Default lists are grouped in lists that show objects defined in the OPC database and lists that show objects defined in the OPC current plan.

Default database lists are:

All Job Streams Shows all job stream definitions, including jobs, dependencies, and run cycles.

All Resources Shows all resource definitions.

All Workstations Shows all workstation definitions.

Default plan lists are:

All Scheduled Job Streams Shows all job stream instances.

All Scheduled Jobs Shows all job instances.

Status of all Resources Shows the status of every resource instance.
Status of all Workstations
   Shows the status of every workstation instance.

You can edit the properties of each default list to add more restrictive selection criteria or to change its name or refresh options.

Creating a List

To create a list:
   1. Select an OPC controller in the tree.
   2. Click one of the icons displayed in the Job Scheduling view. The next figure shows how to create a list of resources in the database.

Figure 2. Creating a list of resources

A properties window, like the one shown in the next figure, is displayed.
Working with Lists

Figure 3. The Properties - Database Resource List window

3. Enter a name for list identification. You can use the same name for more than one list, if you want. Different lists maintain their individual properties even if they have the same name.

4. Specify refresh options for the list. This is optional. If a default periodic refresh period is already specified in the Properties-Scheduler window, this value is automatically displayed for every new list. You can change or deselect the default.

5. Enter or select filtering criteria from those displayed in the window. You can use combinations of more parameters. A higher number of filters results in a more restricted search. On the contrary, to generalize your search, use wildcard characters, such as an asterisk (*) to represent strings of characters, or a question mark (?) to represent a single character. If you leave all fields blank, then all the objects of the kind are displayed when you open the list.

For lists of resources only, you can specify if you want the special characters in the search items to be treated as wildcards, real letters, prefixes, or suffixes.

6. Click OK to save the list. The new list is added in the tree under the OPC controller you selected when creating the list. Optionally, before saving the list, you can select the Apply button to display the list’s results immediately.
Specifying Defaults for Lists

You can use the Properties-Scheduler window to specify the following defaults for lists:

**Periodic refresh**
Select the check box and type the number of seconds after which a list display will periodically refresh. After you do this, this information is used every time you click the **Apply defaults** button in the Properties window of a list. This information is also automatically displayed in editable form in the Periodic refresh Options group of the Properties window of each new list you create.

**Buffer size for lists**
Select a value from the drop-down list. The value determines at which rate the results of a list are sent onto your screen. For example, if you select 100, the results of a list are sent in blocks of 100 lines. The default is 50. If you select a higher number, it takes more time to display the list initially, but less time to display the entire list when it is scrolled.

To set or change these defaults:

1. In the Job Scheduling view, select a scheduler engine and click the **Properties** icon in the toolbar. The Properties-Scheduler window is displayed.
2. Open the **Settings** page and make your adjustments.

Creating a Group of Lists

The JS Console enables you to organize your lists into groups. You can organize your groups of lists by any criterion that will help you to quickly display the objects that you want to work with. For example, you can create a group gathering lists that enable you to work with all the objects associated with a particular plan.

You must first create a group, and then you can create the lists that comprise it. To create a group of lists, do the following:

1. Select an OPC controller in the tree.
Working with Lists

2. Click the **Create a Group of Lists** icon in the Job Scheduling view, as shown in the next figure.

*Figure 4. Creating a group of lists*

![Create a Group of Lists icon](image1)

A Properties - Group of Lists window, like the one shown in the next figure, is displayed.

*Figure 5. The Properties - Group of Lists window*

![Properties - Group of Lists window](image2)
3. In the **Name** field, enter a name for the group. You can use the same name for more than one group, if you want. Different groups maintain their individual properties even if they have the same name.

4. Click **OK** to save the group. The group is added in the tree under the selected OPC controller.

After creating a group, you can create its member lists and subgroups. Right-click the group to display a pop-up menu with the following options:

- **Properties** To change the group’s name.
- **Delete** To delete the group and all its contents.
- **Create Database List** To create a new list of job stream, resource, or workstation definitions in the database.
- **Create Plan List** To create a new list of job streams, jobs, resources, or workstations in the plan.
- **Create Group** To create a subgroup of more lists.

### Displaying the Results of a List

1. In the tree of the Job Scheduling view, double-click an OPC controller.

2. Right-click the list you want to run. A pop-up menu is displayed.
3. Select **Open**, as shown in the preceding figure. The list tool searches the OPC database or plan and displays the objects it found in the right-hand pane of the Job Scheduling view, as the next figure shows.
3. Working with the Job Scheduling Console for OPC Users

Figure 7. Displaying the results of a list

You can display several lists in sequence. The newest list is displayed above the preceding ones. However, as long as a list is kept open, it is maintained and refreshed according to the refresh options specified. To view the list, click the corresponding object in the Job Scheduling view.

Detaching the Results of a List

You can take the results of a list from the Job Scheduling view and place them in a separate window. This is useful if you want to monitor the list while running another list or performing another task that will use the right-hand pane.

1. Open a list and wait for results to be displayed.

**Note:** As an alternative, you can select an OPC controller in the tree and double-click the list you want to run in the right-hand pane of the Job Scheduling view.

You can display several lists in sequence. The newest list is displayed above the preceding ones. However, as long as a list is kept open, it is maintained and refreshed according to the refresh options specified. To view the list, click the corresponding object in the Job Scheduling view.

Detaching the Results of a List

You can take the results of a list from the Job Scheduling view and place them in a separate window. This is useful if you want to monitor the list while running another list or performing another task that will use the right-hand pane.

1. Open a list and wait for results to be displayed.
Figure 8. Detaching a view

2. Right-click the list in the tree view and select **Detach View** in the resulting pop-up menu, as shown in the preceding figure. The results of the list are displayed in a new window, like the one shown in the next figure.

Figure 9. A detached view

Note, however, that the right-hand pane of the console is not disabled, so that you can run other lists or perform other tasks.
3. To place the list back in the right-hand pane, either close the detached window or select Attach View in the pop-up menu that appears when you right-click the list in the tree view.

Notes:
- You can have a maximum number of seven detached views open at the same time.
- To prevent from overloading your system, do not have frequent refreshes of many detached views open at the same time.

Modifying a List

1. In the tree of the Job Scheduling view, double-click an OPC controller.
2. Right-click the list you want to modify. A pop-up menu is displayed.

Figure 10. Modifying a list

3. Select Properties, as shown in the preceding figure. The properties window of the list is displayed.
Working with Lists

4. Apply your changes.
5. Click **OK** to save the list.
   Before doing this, you can use the any following push-buttons:
   - **Apply** to try the list before saving it.
   - **Reset** to bring the list back to its original values.
   - **Cancel** to save the list unchanged.

Deleting a List

1. In the tree of the Job Scheduling view, double-click an OPC controller.
2. Right-click the list you want to delete. A pop-up menu is displayed.
   ![Figure 11. Deleting a list](image)
3. Select **Delete**, as shown in the preceding figure. A confirmation message is displayed.
4. Click **OK**. The list is deleted from the tree.
Finding OPC Objects

A contextual search tool in the JS console helps you in finding the name of a resource, workstation, job, or job stream when you are asked to provide one. The availability of the search tool is indicated by an ellipsis located next to the field where you are asked to enter the name.

The following example shows how you can use the search tool to enter the name of an alternate workstation when you are defining a workstation’s open time intervals.

To use the search tool:

1. Click the ellipsis, as the next figure shows.

*Figure 12. Clicking for the search tool to find a workstation.*

A Find Workstations window, like the one shown in the next figure, is displayed.
Finding OPC Objects

Figure 13. The Find Workstations window

2. Enter search criteria. You can do one or more of the following:
   - Enter a name in the **Find** field. You can generalize your search by using wildcard characters. Use an asterisk (*) to represent strings of characters, or a question mark (?) to represent a single character. Or leave the field blank to use no filters on the object’s name.
   - Select one or more check boxes when available.
   - Add no input. This results in an unfiltered search that produces a list of all the objects (workstations in this example) defined in OPC.

3. Click **Start**. The found objects are listed at the bottom of the window.
4. Select the object of your choice and click the **Apply** button, as shown in the preceding figure. The object’s name is automatically entered in the field where it was required, as the next figure shows.
Finding OPC Objects

Figure 15. The found workstation is entered automatically.

5. Click **OK** in the Find Workstations window to close it.
This chapter describes how to install the Tivoli Job Scheduling Console for OPC. The Job Scheduling Console for OPC communicates with the OPC system through the OPC Connector, a protocol converter that translates the instructions entered through the Console into OPC commands.

Although the OPC Connector must be up and running in order to use the Console, you can proceed to install them in the order you prefer.

You follow two distinct processes to install the Console and the Connector. You must install the OPC Connector on a TMR server or managed node, while you can install the Job Scheduling Console on any workstation that has a TCP/IP connection with the machine running the OPC Connector.

The first part of this chapter explains how to install the OPC Connector. The rest of the chapter explains how to install the Job Scheduling Console.

Refer to “Supported Platforms and Minimum System Requirements” on page xii of this document for details on prerequisites. See the Installation chapter of the Tivoli Framework Planning and Installation Guide and the Tivoli Framework Release Notes for information on how to install a TMR server or managed node.
Installing and Customizing the OPC Connector

The installation of the OPC Connector is divided into three steps:

1. Install the Job Scheduling Services (JSS). Skip this step if you already have the JSS installed on your server and managed nodes.
2. Install the OPC Connector.
3. Create OPC Connector instances. You must create one instance for each OPC Controller that you want to access from the Job Scheduling Console.

Installing the Job Scheduling Services (JSS)

You can install the Job Scheduling Services either from the Tivoli desktop or from the command line.

Installing JSS from the Tivoli Desktop

To install the JSS from the Tivoli Desktop:

1. Enter one of the following commands to set the Tivoli environment,
   - on UNIX:
     ```bash
     ./etc/Tivoli/setup_env.sh
     ```
   - on NT, from the UNIX shell:
     ```bash
     .c:/WINNT/system32/drivers/etc/Tivoli/setup_env.sh
     ```
   - on NT, from the DOS shell:
     ```bash
     c:/WINNT/system32/drivers/etc/Tivoli/setup_env.cmd
     ```

2. Open the Tivoli Desktop.
3. From the Desktop menu select Install and then select Install Product, as shown in the next figure.
4. In the Install Product window click **Select Media** to select the directory where the installation is, as shown in the next figure.
5. In the File Browser window type or select the path where the installation is, as shown in the next figure. It is the directory where the file named CONTENTS.LST is.

*Figure 18. Setting the path of the JSS installation programs*

6. Click **Set Media & Close**.

7. Do the following in the Install Product window, as shown in the next figure:
   a. Select **Tivoli Job Scheduling Services**.
   b. Select the managed nodes to install on. You must install JSS at least on the Tivoli management server. You will be able to install the OPC Connector only on managed nodes on which the JSS is installed.
   c. Click **Install**.
8. The Product Install window, shown in the next figure, is displayed. When the **Continue Install** button is enabled, click on it.
9. The installation program copies the files and configures the Tivoli database with the new classes. When the installation is complete, the Close button is enabled. Click Close to close the window.

**Installing JSS from the Command Line**

To install the JSS from the command line:

1. Enter one of the following commands to set the Tivoli environment,
   - on UNIX:
     
     . /etc/Tivoli/setup_env.sh
Installing and Customizing the OPC Connector

- on NT, from the UNIX shell:
  . c:/WINNT/system32/drivers/etc/Tivoli/setup_env.sh
- on NT, from the DOS shell:
  c:/WINNT/system32/drivers/etc/Tivoli/setup_env.cmd

2. Enter one of the following installation commands:
   - To install on all managed nodes:
     wininstall -c <cdrom_dir> -i TMF_JSS
   - To install only on one managed node:
     wininstall -c <cdrom_dir> -i TMF_JSS <node>

where:

- cdrom_dir is the path where the JSS installation programs are.
- node is the name of the destination managed node.

You must install JSS at least on the Tivoli management server. You will be able to install the OPC Connector only on managed nodes on which the JSS is installed.

Installing the OPC Connector

You can install the OPC Connector either from the Tivoli desktop or from the command line.

Installing the OPC Connector from the Tivoli Desktop

To install the OPC Connector from the Tivoli Desktop:

1. Enter one of the following commands to set the Tivoli environment,
   - on UNIX:
     . /etc/Tivoli/setup_env.sh
Installing and Customizing the OPC Connector

- on NT, from the UNIX shell:
  ```bash
  c:/WINNT/system32/drivers/etc/Tivoli/setup_env.sh
  ```
- on NT, from the DOS shell:
  ```cmd
  c:/WINNT/system32/drivers/etc/Tivoli/setup_env.cmd
  ```

2. Open the Tivoli Desktop.

3. From the Desktop menu select **Install** and then select **Install Product**, as shown in the next figure.

*Figure 21. Getting ready to install the OPC Connector*

4. In the Install Product window click **Select Media** to select the directory where the installation is, as shown in the next figure.
5. In the File Browser window type or select the path where the installation is, as shown in the next figure. It is the directory where the file named CONTENTS.LST is.
6. Click **Set Media & Close**.

7. Do the following in the Install Product window, as shown in the next figure.
   a. Select **Tivoli OPC Connector**.
   b. Select the managed nodes to install on. You must install the OPC Connector at least on the Tivoli management server. You will be able to create instances only on managed nodes on which the OPC Connector is installed.
   c. Click **Install**.
8. The Product Install window, shown in the next figure, is displayed. When the **Continue Install** button is enabled, click on it.
9. The installation program copies the files and configures the Tivoli database with the new classes. When the installation is complete, the Close button is enabled. Click Close to close the window.

**Installing the OPC Connector from the Command Line**

To install the OPC Connector from the command line:

1. Enter one of the following commands to set the Tivoli environment,
   - on UNIX:
     
     . /etc/Tivoli/setup_env.sh
Installing and Customizing the OPC Connector

- on NT, from the UNIX shell:
  . c:/WINNT/system32/drivers/etc/Tivoli/setup_env.sh
- on NT, from the DOS shell:
  c:/WINNT/system32/drivers/etc/Tivoli/setup_env.cmd

2. Enter one of the following installation commands:
   - To install on all managed nodes:
     `winstall -c <cdrom_dir> -i OPC`
   - To install only on one managed node:
     `winstall -c <cdrom_dir> -i OPC <node>`

   where:
   - `cdrom_dir` is the path where the installation programs of the OPC Connector are.
   - `node` is the name of the destination managed node.

   You must install the OPC Connector at least on the Tivoli management server. You will be able to create instances only on managed nodes on which the OPC Connector is installed.

Creating OPC Connector Instances

Create one OPC Connector instance for each OPC Controller that you want to access with the Tivoli Job Scheduling Console. To create an instance, provide the information that enables the OPC Connector to connect to the OPC TCP/IP server.

Use the following command, from the command line, to create each new OPC Connector instance:

```
wopcconn -create [-h node] -e engine_name -a address -p port
```

where:
- `node` is the name or the ID of the managed node on which you are creating the instance. The name of the TMR server is the default.
Authorization Roles

**engine_name** is the name of the new instance.

**address** is the IP address of the OS/390 system where the OPC subsystem that you want to connect to is installed.

**port** is the port number of the OPC TCP/IP server to which the OPC Connector will connect.

You can also run the **wopcconn** utility in interactive mode. To do this:

1. In the command line enter **wopcconn** with no arguments.
2. Select choice number 1 in the first menu.

**Authorization Roles**

To manage OPC Connector instances from a TMR server or managed node, you must be a Tivoli administrator.

To control access to OPC, the TCP/IP server associates each Tivoli administrator to a RACF user. For this reason, a Tivoli administrator should be defined for every RACF user.

Each Tivoli administrator has one or more roles. To use or manage OPC Connectors, you need the following roles:

- **user**
  - To use the instances
  - To view instance settings

- **admin, senior, or super**
  - To perform all actions available to the user role
  - To create and remove instances
  - To change instance settings
  - To start and stop instances

**Managing OPC Connector Instances**

Use the **wopcconn** utility to create, remove, and manage OPC Connector instances. This program is downloaded when you install the OPC Connector.
Managing OPC Connector Instances

The following table describes how to use `wopcconn` in the command line to manage OPC Connector instances:

<table>
<thead>
<tr>
<th>If you want to:</th>
<th>Use this syntax:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create an instance.</td>
<td><code>wopcconn -create [-h node] -e engine_name -a address -p port</code></td>
</tr>
<tr>
<td>Stop an instance.</td>
<td>`wopcconn -stop -e engine_name</td>
</tr>
<tr>
<td>Start an instance.</td>
<td>`wopcconn -start -e engine_name</td>
</tr>
<tr>
<td>Restart an instance.</td>
<td>`wopcconn -restart -e engine_name</td>
</tr>
<tr>
<td>Remove an instance.</td>
<td>`wopcconn -remove -e engine_name</td>
</tr>
<tr>
<td>View the settings of an instance.</td>
<td>`wopcconn -view -e engine_name</td>
</tr>
<tr>
<td>Change the settings of an instance.</td>
<td>`wopcconn -set -e engine_name</td>
</tr>
</tbody>
</table>

where:

- **node** is the name or the object ID (OID) of the managed node on which you are creating the instance. The name of the TMR server is the default.
- **engine_name** is the name of the new or existing instance.
- **object_id** is the object id of the instance.
- **new_name** is the new name for the instance.
- **address** is the IP address of the OS/390 system where the OPC subsystem that you want to connect to is installed.
- **port** is the port number of the OPC TCP/IP server to which the OPC Connector must connect.
- **trace_level** is the trace detail level, from 0 to 5.
- **trace_length** is the maximum length of the trace file.
Uninstalling the OPC Connector

You can also use wopcconn in interactive mode. To do this, just enter the command, without arguments, in the command line.

**Uninstalling the OPC Connector**

To uninstall the OPC Connector, enter the following command in a UNIX shell of the Tivoli management server:

```
wuninst OPCConnector <host> -rmfiles
```

where **host** is the name of the managed node from which you want to uninstall OPC Connector. To uninstall the OPC Connector from all the managed nodes on which it is installed, enter the name of the TMR server for **host**.

This command removes the following:

- The OPC Connector files
- All the defined OPC Connector instances
- All the related class definitions

**Installing the Job Scheduling Console**

Perform the following steps to install the Job Scheduling Console for OPC:

1. Insert the Tivoli Job Scheduling Console CD-ROM into the system CD-ROM drive or mount the CD-ROM from a drive on a remote system. For this example, the CD-ROM drive is drive **F**.

2. Run the installation command:
   - On Windows:
     - From the **Start** menu, select the **Run**... option to display the Run dialog.
     - Enter **F:\Install** in the **Open** field.
   - On AIX:
     - type the following command:
       ```
jre -nojit -cp install.zip install
```
4. Installing the Tivoli Job Scheduling Console for OPC Users

- If that does not work, try:

  jre -nojit -classpath [path to]
  classes.zip:install.zip install

- If that does not work either, on sh-like shells, try:

  cd [to directory where install.zip is located] CLASSPATH=[path to]
  classes.zip:install.zip export
  CLASSPATH java -nojit install

- Or, for csh-like shells, try:

  cd [to directory where install.zip is located] setenv CLASSPATH [path to]
  classes.zip:install.zip java -nojit install

  On Sun Solaris:
  a. Change to the directory where you downloaded
     install.zip before running the installer.
  b. Type:

     sh install.bin

     The splash window, shown in the next figure, is displayed.

   Figure 26. The Tivoli Job Scheduling Console splash window

3. In the splash window, click the down arrow in the language field. This displays a drop-down list containing all the available languages in which you can perform installation.
Installing the Job Scheduling Console

4. Select your language and click **OK** in the splash window.
   The **Introduction** window, shown in the next figure, is displayed.

   **Figure 27. The Introduction window**

   ![Introduction window](image)

   This window will lead you through the installation process, displaying a series of option windows that enable you to provide the necessary information. You can use the **Previous**, **Next** or **Exit** button, when enabled, to move through these windows.

5. Click the **Next** button to continue to the **Choose Install Folder** window, shown in the next figure.
6. Enter the path in which to install the Job Scheduling Console. If you need to, edit the default location provided in the field, or select the Choose... button to open the Select a folder window from where you can specify another location.

7. For Windows and Sun Solaris only: Click Next to continue to the Choose Shortcut Location window. The next figure shows the Windows version of Choose Shortcut Location. The Sun Solaris version is similar, but it displays different choices.
8. For Windows and Sun Solaris only: Click one of the available radio buttons to specify where the Job Scheduling Console icons are to be placed.

9. Click **Next** to continue to the **Choose Install Set** window, shown in the next figure.

*Figure 30. The Choose Install Set window*
10. In this window, choose between installing the Job Scheduling Console in all the available languages (Full package) or only in the languages you select (Customized Install). In either case, the English version is automatically installed.

- If you are choosing Full package, click **Install** to install the Job Scheduling Console.
- If you are choosing Customized install:
  
a. Click **Customize** to open the **Customize Install** window, shown in the next figure.

*Figure 31. The Customize Install window*

b. In the Customize Install window, select in which languages, beside English, you want to install the Job Scheduling Console and click **Install**.

**Notes:**

- The Job Scheduling Console will display in your selected language, only if the language matches the regional settings of your computer. If they do not, English will be the default.
- The Job Scheduling Console will automatically adjust to the Country, Language and Timezone settings of your system or UNIX shell.
Installing the Job Scheduling Console

An information window containing a progress indicator, shown in the next figure, is displayed.

Figure 32. The progress indicator window

11. When the **Install Complete** window shown in the next figure is displayed, click the **Done** button to close it and complete installation.

Figure 33. The Install Complete window
12. If you installed the JS Console on AIX, you must update the AIXconsole.sh file with the path where you installed Java Development Kit (JDK) 1.1.8. To do this:

- Go to the /bin/java subdirectory of the directory where you installed the JS Console.
- Open AIXconsole.sh in editing mode.
- Find the following statement:
  \[ \text{JAVAPATH}=/usr/jdk\_base \]
- Change \%ENTRY\% with the path to JDK 1.1.8.
- Save your changes and exit the editor. You can now start the Tivoli Job Scheduling Console.

### Starting the Tivoli Job Scheduling Console

1. Depending on your platform, start the JS Console in the following way:

- On Windows, depending on the shortcut location that you specified during installation, click the JS Console icon or select the corresponding item in the Start menu. An MS-DOS window, like the one shown in the next figure, opens in the background.
Starting the Tivoli Job Scheduling Console

On Windows 95 and Windows 98, you can also start the JS Console from the command line. Just type RUNCON from the \bin\java subdirectory of the installation path.

- On AIX, type:
  
  ./AIXconsole.sh

- On Sun Solaris, type:
  
  ./SUNconsole.sh

A Tivoli Job Scheduling Console startup window, like the one shown in the next figure, is displayed.

Figure 35. The Tivoli Job Scheduling Console startup window

2. Enter the following information and click the OK button to proceed:

**Host Machine**

The name of the Tivoli managed node that runs the OPC Connector.

**Login As**

The user id of the Tivoli administrator of the host machine running the OPC controller.

**Password**

The password to the host machine running the OPC Connector.

3. If you are logging onto the managed node of Host Machine for the first time, an information pop-up, like the one shown in the next figure, is displayed that tells you how to specify a user preference file for initialization, if it exists.
4. Installing the Tivoli Job Scheduling Console for OPC Users

Figure 36. The information pop-up

![Information Pop-up]

Read the information and click OK to continue to the **Open Location** window, shown in the next figure.

Figure 37. The Open Location window

![Open Location Window]

4. Use this window to do one of the following:
   - Specify a URL where user preferences are defined. Enter the URL and select the **Load from URL** button.
   - Select the **Get from file** button to open a window from where you can choose a file that contains initialization data.
   - Select the **Cancel** button to use default user preferences.

5. Make your selection. The Welcome window, shown in the next figure, is displayed. The Tivoli Job Scheduling Console window is displayed in the background.
Uninstalling the Tivoli Job Scheduling Console

Figure 38. The Welcome window of the Tivoli Job Scheduling Console

6. In the Welcome window, select a radio button and then click OK to start working with the Job Scheduling Console. Or click Cancel to close the Welcome window and work with the Job Scheduling Console without online assistance.

Uninstalling the Tivoli Job Scheduling Console

To uninstall the Tivoli Job Scheduling Console on Windows:

1. Go to the shortcut location that you specified during installation, and click the Uninstall Tivoli Job Scheduling Console icon. The InstallAnywhere Uninstaller window, shown in the next figure, is displayed.
4. Installing the Tivoli Job Scheduling Console

To uninstall the Tivoli Job Scheduling Console on AIX and Sun Solaris, go to the /UninstallerData subdirectory of the installation path and enter the following command:

```bash
./Uninstall_JSconsole
```
Creating, Listing, and Modifying Workstations

The OPC environment is defined in terms of resources and workstations. A workstation describes how jobs have to be run. A workstation is not necessarily hardware. It is a stage in the processing that is controlled by OPC.

In order to schedule a job instance, you must have previously defined a workstation. Before OPC can start a job instance, the workstation on which the job instance is defined must be available. So, by controlling workstation availability, you control the running of job instances that are defined on the workstation.

OPC establishes the availability of a workstation by using the open intervals in the list of available workstations in the database. These are the times when workstation resources and parallel servers are available to process work. Parallel servers and resources are usually necessary to run work at the workstation.

In OPC, workstations are usually created to represent specific elements in your system configuration. The availability of these workstations should reflect the availability of those elements in the real world. For instance, a computer workstation might be created for each MVS system in an OPC complex. So, the availability of the computer workstation should reflect the availability of the MVS system it represents. This prevents OPC from submitting work to an MVS system that is not physically available. Also, the accuracy of any planning predictions that
Creating Workstations

OPC produces for you depends on how accurately you have described the installation to OPC.

This chapter describes how to use the Job Scheduling GUI to define and administer the availability of workstations. See the Tivoli OPC Planning and Scheduling the Workload for a full description of workstations.

Creating Workstations

Perform the following steps to create a workstation in the OPC database:

1. Select the OPC Controller in whose database you want to work and click the New Workstation icon in the toolbar, as shown in the next figure. The new workstation will be defined in the database of that OPC Controller.

![Figure 40. Creating an OPC workstation](image_url)

The Properties-Workstation in Database window opens on the General page, shown in the next figure, where you enter general information for the workstation.
5. Creating, Listing, and Modifying Workstations

2. In the **Name** and **Description** fields, enter a name and a description for the new workstation. The name is required.

3. In the **Workstation type** field, depending on the task that the workstation is to be used for, select one of the following:
   - **General** for preparation of jobs and for control of operations that are normally not controlled automatically
   - **Computer** for execution of jobs and started tasks
   - **Printer** for printing

4. In **Reporting attribute**, select one of the following mechanisms for reporting status updates on the jobs defined on the workstation:
   - **Automatic** if the status change of jobs is reported automatically, in response to event records created by OPC. Typically, you should use this reporting attribute for
computer and print workstations, or for workstations that specify a user-defined destination.

- **Manual start and completion** if the status change of jobs is reported either from the Ready List ISPF panels on the host or from the results of a workstation status list (see “Using Workstation Lists” on page 77 for details). Typically, you should use this reporting attribute for general workstations that are used for job preparation, or for other general workstations if the duration of the task needs to be tracked.

- **Completion only** if the status change of jobs is reported either from the Ready List ISPF panels on the host or from the results of a workstation status list (see “Using Workstation Lists” on page 77 for details). Typically, you should use this reporting attribute for general workstations that are not used for job preparation.

- **Non reporting** if jobs on this workstation are set to complete as soon as they become eligible to be started. Typically, you should use this reporting attribute for dummy jobs created to simplify the sequencing of other jobs.

5. **Printout routing** enter the ddname of the daily printout dataset where reports for this workstation are to be written.

6. Use the two check boxes, **Control on servers** and **Planning on servers**, to specify how the workstation uses parallel servers. When you create an OPC job, you specify how many parallel servers it requires. The workstation that the job is using must have that number of parallel servers available before the job can run. You set this value when you create the workstation, but you can change it later.

We recommend that you select both the **Control on servers** and the **Planning on servers** boxes, so that OPC submits jobs only up to the limit of the number of servers specified. If you select the **Planning on servers** check box only, or no check box at all, then OPC will not consider the number of parallel servers when deciding when to start an operation. In addition, the number of parallel servers will be used only for planning purposes, and the plans that OPC produces cannot accurately predict the behavior of
real work in your system, because OPC will submit as many jobs as are ready, regardless of its count of the number of servers in use.

**Note:** At a non–STC computer workstation, a parallel server can represent a JES initiator. You must allocate at least one parallel server when you define a job.

If you select both check boxes, or the **Control on servers** box only, the number of parallel servers required by the job must also be available on the workstation before the job can be started.

7. Select the **Splittable** check box to specify that jobs on the workstation can be interrupted and then continued at a later time. Use this attribute for a job setup general workstation where you prepare JCL for submission. If the preparation of the JCL is interrupted by the preparer issuing the TSAVE command, the operation is given status I, interrupted. Preparation of the JCL can continue at a later time.

Printer workstations can also be splittable, but operations on computer workstations cannot be split.

8. Select one of the next three check boxes depending on what workstation type you chose:
   - **Select Started task, STC** if this is a computer workstation that will run started tasks rather than jobs.
   - **Select Job setup** if this is a general workstation on which to prepare job JCLs or started task JCLs manually before execution. You do not need this attribute if OPC can resolve all the JCL variables automatically.
   - **Select WTO** if this is a general workstation on which the OPC scheduling facilities can issue a write-to-operator message at the operator console designated in **Destination**.

9. In **Destination**, enter a destination that corresponds to the destination specified on a ROUTOPTS initialization statement. For computer workstations and WTO general workstations this is the name of the OPC tracker. The default destination is the system where the OPC controller is started.

10. Enter the following information in the **Defaults** group:
Creating Workstations

a. In **Transport time** enter the time, in hours:minutes (HH:MM) format, that the system should allow between the end of a predecessor job and the beginning of the present job. The transport time of the workstation is the default transport time for all the jobs defined on the workstation and is used for planning purposes only.

b. In **Duration**, enter the default estimated processing time, in HH:MM format, for all jobs on that workstation. OPC uses the estimated processing time, when creating the plan, to work out a timetable for all jobs. The minimum value is one minute.

You do not need to give an exact figure, because OPC can adjust this figure dynamically from its experience of the actual durations, however you should attempt to estimate as close as possible.

You can override this value by specifying a duration when you create a new job.

11. In the **Access Methods** group, enter details of any optional access methods that enable the workstation to submit and track jobs that are run by an external product.

   **Note:** This option applies only to workstations running on OPC 2.2 or later.

   a. In **Name**, enter the name of the access method that handles the external product.

   b. In **Node address**, write the optional TCP/IP address or hostname of the tracker agent that is hosting the access method.

   c. In **Port number**, enter the optional TCP/IP port number of the tracker agent that is hosting the access method.

12. Click the **Resources** tab to move onto the next page, shown in the next figure.
Figure 42. The Resources page of the Properties-Workstation in Database window

Here, you can define a maximum of two workstation, or fixed, resources, called Resource 1 (R1) and Resource 2 (R2), to schedule or run jobs on this workstation.

When defined, these two resources are associated to the workstation and are taken account of automatically when you schedule and run jobs on the workstation. However, they are subject to the following limitations, that in some instances could make it more practical to use logical resources in their place:

- You can have a quantity of no more than 99 of each resource.
- They cannot be shared by other workstations.
- Their name is limited to two characters.

R1 and R2 can represent any physical resource in your system that is significant for scheduling purposes. When you create a new job,
you can specify how many of the workstation resources (R1, R2, or both) the job will use. Unless the specified quantity of resources is available, the job will not start.

13. To define the use of each resource:
   a. Enter a 2-character name in Name if you want to change their name from the R1 or R2 default.
   b. Select the Used for planning check box, if you want this resource to be considered when a plan involving this workstation is built.
   c. Select the Used for control check box, if you want this resource to be used when a job runs on this workstation.

   The plan contains the best estimation of when operations will start. If something unexpected happens (for example, a job exceeds its expected run time), OPC may need to reassess the start time of some of its operations. At this point, the Control option becomes important. If you selected it, OPC considers the workstation resource when rescheduling its operations. Otherwise, the workstation resource is ignored.

14. Click the Open Time Intervals tab to move onto the next page, shown in the next figure.
Here you define, on a time-interval basis, the availability of parallel servers, the capacity of workstation resources, and the name of an alternate workstation that will allow work to run at this workstation.

15. To add or delete an Open time interval, click the **Add Row** or **Remove Row** icons. To delete an interval, you must first select the row and then you can click the icon.

After adding a row, to enter the information defining the new interval, double-click under each heading in order to make a choice or to write data.

The next figure shows an example of adding a new interval.
Creating Workstations

Figure 44. Adding an open time interval

Complete the following fields:

a. From the pull-down menu in the Day column, choose: a day of the week, Standard, or Specific Date (where a calendar pops up from which you select a date). The Standard interval defines the values that are true at all times, with the exception of the additional intervals that you also specify on this page. When you define a new workstation, you find a default Standard row where you enter the name of an alternate workstation and the quantities of parallel servers and of workstation resources that you want to be available on a general basis. Select a day or Specific Date to specify the time intervals when the quantities, name, or both are different from Standard.
b. From the pull-down menu in **Status**, specify the availability status of the workstation in the given interval. Select one of the following:

**Defined** To specify that during the interval the workstation is available in the quantities and with the properties defined in the current row.

**Closed**
To specify that the workstation is not available during the interval. If you select this value, then the remaining cells in the row are disabled.

c. **In From Time** and **To Time**, specify a time range, with times in the 24-hour format.

d. **In Parallel servers**, write the quantity, to a maximum of 99, of parallel servers available to the workstation during the time interval. Leave this field blank, if you did not specify usage of parallel servers in the General page.

e. **In R1 capacity** and **R2 capacity**, write the available quantities, to a maximum of 99 each for every interval, of resources R1 and R2 if you specified their use for this workstation in the **Resources** page.

f. **In Alternate workstation**, write the name of another workstation of the same type that can be used during the interval if this workstation becomes unavailable. This option is possible only for computer workstations and for WTO general workstations.

**Note:** For best results, make the configurations of the two workstations symmetrical, so that the two workstations can be alternates for each other.

If you need assistance in finding it, click the ellipsis next to the field to open a Find Workstations window. See “Finding OPC Objects” on page 29 for instructions on using it.

16. Click **OK** to add the new workstation to the database and to close the window. Click **Cancel** if you do not want to add the new workstation.
Managing Workstations

After you have created the workstations, create one or more workstation lists to manage them. From a workstation list you can view the characteristics and status of workstations. You can also modify workstation properties and delete workstations.

You can create two types of lists:

**Database workstation lists**
- To view and update workstation definitions stored in the OPC Workstation description database.

**Plan workstation lists**
- To view and update the status and properties of the workstations allocated to the plan and of the jobs associated with them.

The following sections explain how to create database and plan workstation lists. They also explain how to use database workstation lists to update definitions in the OPC database. “Monitoring and Modifying Workstations in the Plan” on page 237 provides information on how to use plan workstation lists to modify the allocation of workstations in the plan.

**Default Workstation Lists**

The Job Scheduling Console for OPC provides two workstation lists. You can find them in the default lists groups in the tree of every OPC controller showing in the Job Scheduling view. The workstation lists are:

**All Workstations**
- Is in the Default Database Lists group. It displays a list of all the workstations defined in the OPC Workstation definition database.

**Status of All Workstations**
- Is in the Default Plan Lists group. It displays a list of all the workstations currently allocated to the plan.

The default workstation lists have the same behavior as the user lists. You can display their properties and see from the empty fields that no
selection criteria are specified. You can modify their properties and make them less general by adding the filters of your choice.

**Listing Workstations in the Database**

A workstation list produces a filtered list of workstations defined in the Workstation Description database of OPC.

To make a database workstation list:

1. In the Job Scheduling view, select an OPC controller and click the List Workstations in Database icon, as shown in the next figure.

*Figure 45. Creating a list of workstations defined in the OPC database*

A Properties-Database Workstation List window, like the one shown in the next figure, opens.
Managing Workstations

Figure 46. The Properties - Database Workstation List window

2. In the Name field, enter a name for the list.

3. If you want the list results refreshed automatically, select the Periodic Refresh check box and specify a refresh interval in seconds. Or select the Apply Defaults button to use the default specified in the Scheduler Properties window available from the Job Scheduling view.

4. In the Filter Criteria group, specify any of the following search parameters or combinations of two or more parameters. To generalize your search, use wildcard characters, such as an asterisk (*) to represent strings of characters, or a question mark (?) to represent a single character. If you leave all fields blank, then all the workstations defined in the OPC database are displayed when you open the list.

Workstation
Lists all the workstations with this name or namestring.

Reporting Attributes
Lists all the workstations characterized by the reporting attributes you select with the following check boxes:
- Automatic
- Completion only
- Manual start at completion
Managing Workstations

- Non reporting

**Types** Lists all the workstations of the type you select with the following check boxes:
- General
- Computer
- Printer

5. Select **OK** to save the list. The object for the new list is added in the tree under the OPC controller you selected when creating the list. To display the list, right-click it and select **Open**. Optionally, before saving the list, you can select the **Apply** button to display the list’s results immediately.

### Listing Workstations in the Plan

A plan workstation list produces a filtered list of workstations allocated to the plan.

To make a plan workstation list:

1. In the Job Scheduling view, select an OPC controller and click the **List Workstations in Plan** icon, as shown in the next figure.

*Figure 47. Creating a plan workstation list*
Managing Workstations

A Properties-Plan Workstation List window, like the one shown in the next figure, opens.

Figure 48. The Properties - Plan Workstation List window

2. In the Name field, enter a name for the list.

3. If you want the list results refreshed automatically, select the Periodic Refresh check box and specify a refresh interval in seconds. Or select the Apply Defaults button to use the default specified in the Scheduler Properties window available in the Job Scheduling view.

4. In the Filter Criteria group, specify any of the following search parameters or combinations of two or more parameters. To generalize your search, use wildcard characters, such as an asterisk (*) to represent strings of characters, or a question mark (?) to represent a single character. If you leave all fields blank, then all the workstations currently allocated to the plan are displayed when you open the list.

   **Workstation**
   Lists all the workstations with this name or namestring.

   **Reporting Attributes**
   Lists all the workstations characterized by the reporting attributes you select with the following check boxes:

   - Automatic
Managing Workstations

- Completion only
- Manual start at completion
- Non reporting

Types
Lists all the workstations of the type you select with the following check boxes:
- General
- Computer
- Printer

5. Select the OK button to save the list. The object for the new list is added in the tree under the OPC controller you selected when creating the list. To display the list, right-click it and select Open. Optionally, before saving the list, you can select the Apply button to display the list’s results immediately.

Using Workstation Lists
When you open a database workstation list object, all the workstations defined in the OPC database that respond to the filter criteria are displayed in the right-hand pane of the Tivoli Job Scheduling Console.

The following sections explain how you can use database workstation lists to work on workstations defined in the OPC database. From the display produced by opening a database workstation list, you can:
- Modify the properties of workstations defined in the database
- Delete workstation definitions from the database
- Define new workstations starting from existing definitions

To work with workstations allocated to the plan, you must use a plan workstation list. Go to “Monitoring and Modifying a Workstation in the Plan” on page 238 for an explanation of how to work with workstations allocated to the plan.

Displaying a List of Workstations in the Database
To display a list of workstations defined in the OPC database:

1. In the Job Scheduling view, right-click the list object you want to use to list the workstations. A pop-up menu is displayed.
Managing Workstations

Figure 49. Displaying a list of workstations in the OPC database

2. Select **Open**, as shown in the preceding figure. The found workstations are displayed in the right-hand pane, as shown in the next figure.

Figure 50. Displaying the results of a database workstation list
Managing Workstations

For each workstation, the display shows:

- Name and description
- Reporting attribute
- Type
- Date and operator’s user ID of last update of the workstation properties

Browsing and Modifying Workstation Properties in the Database

To modify the properties of a workstation displayed in a list:

1. Select the workstation and right-click on it. A pop-up menu is displayed.

Figure 51. Displaying a workstation’s properties

2. Select Properties..., as shown in the preceding figure. The Properties-Workstation in Database window is displayed, as shown in the next figure.
3. Apply your changes to the workstation’s properties. See “Creating Workstations” on page 62 for a description of the fields in the Properties-Workstation in Database window.

4. Click **OK** in the Properties-Workstation in Database window to save your changes to the workstation definition in the OPC Workstation Description database.

**Deleting a Workstation from the Database**

Do the following to use a list display to delete a workstation from the OPC Workstation Description database:

1. Select the workstation and right-click on it. A pop-up menu is displayed.
5. Creating, Listing, and Modifying Workstations

Creating Workstations from Existing Ones in the Database

You can select a workstation from a list and use its definition to create other workstations with equal or similar properties. After you have displayed a list of workstations, do the following:

1. Right-click the workstation that you want to use as a model for creating another workstation. A pop-up menu is displayed.
2. Select Create Another..., as shown in the next figure. The Properties-Workstation in Database window for the workstation that you selected is displayed.

2. Select Delete, as shown in the preceding figure. A window with a confirmation message is displayed.
3. Click Yes. The workstation is deleted from the database.

Figure 53. Deleting a workstation from the OPC database
3. In the **Name** field, change the default name to the name of your choice. If you do not change the name, the new workstation is saved as COPY (an OPC workstation’s name cannot be more than four characters in length).

4. Change any other properties that you need to customize for the new workstation.

5. Click **OK** to save the new workstation. The Properties-Workstation in Database window is closed and the new workstation is added to the database.

6. In the Tivoli Job Scheduling Console window click the Refresh List Results icon, or run another list, to view the new workstation.
6

Creating, Listing, and Modifying Special Resources (Resources)

In OPC, resources represent the physical or logical objects that are used by jobs. You can use a resource to prioritize access to a dataset or to limit the number of simultaneous file transfers on a particular network link. You specify how a job uses resources when you create the job. But first you must create the resource and its attributes and specify what workstations it is associated with and the number of resources available in each interval.

Creating Resources

To create a resource in the OPC database:

1. Select an OPC controller in the Job Scheduling view and click New Resource in the toolbar, as shown in the next figure.
Creating Resources

Figure 55. Creating a resource

The Properties-Resource in Database window opens. It contains the Resource, Default Workstations, and Availability Intervals pages. On the first two pages, you enter the default information for the new resource. These values are valid at all times, except for the periods that you optionally define on the Availability Intervals page.

2. On the Resource page, shown in the next figure, enter information that describes the resource you are creating.
Enter:

a. In the **Name** field, a name identifying the resource. The name of the resource is converted to uppercase.

b. A description of the resource in **Description**.

c. The quantity of the resource (from 1 to 99999) in **Quantity**. Specify the number of the resource that is available (when you check the **Is Available** box) for the Availability intervals associated with the resource. This information is used as the default unless otherwise specified for a given interval on the Availability Intervals page.

d. A name of up to 8 characters in **Group ID** identifying a group to which the resource belongs. The group ID can be used as a list filter for selecting subsets of resources.

e. Check **Hiperbatch** to specify whether the resource is a dataset eligible for Hiperbatch. Hiperbatch is an MVS/ESA performance enhancement that works with the Data Lookaside Facility (DLF) to enable batch jobs and started tasks to share access to datasets.
Creating Resources

f. Select from the Used for drop-down list how Tivoli OPC is to use the resource: for Planning, Control, Planning and Control, or Neither Planning Nor Control.

g. Select from the On Error pull-down menu what action Tivoli OPC will take on the resource when a job that allocates this resource ends in error (and does not have an overriding keep-on-error specification in the job definition):

- Free: Free the full allocation of this resource, both exclusive and shared.
- Keep: Keep the full allocation of this resource. You may want critical jobs to keep their resources even when they fail, to avoid having to wait for resources when the job is restarted.
- Free If Exclusive: Free the full exclusive allocation of this resource.
- Free if Shared: Free the full shared allocation of this resource.
- Assume System Default: Use the default specified in the ONERROR keyword of the RESOPTS statement. Refer to the OPC Customization and Tuning manual.

3. Switch to the Default Workstations page.

List the workstations associated with, and reserved for, the resource. To add all the workstations defined in OPC, click the Add All Workstations icon in the toolbar, as shown in the next figure. An asterisk (*) is added to the list of connected workstations.

Note: By default, all workstations are already added when the Resource Editor window for a new resource opens.
To remove a workstation from the list, select it and then click the **Remove Row** icon, as shown in the next figure.

A search tool enables you to pick from a list of available workstations. Click the **Find Workstations** icon, as shown in the next figure.
A Find window opens.

Several filtering items are available to search for the connected workstation(s) you want. You can either enter a name directly in the **Workstation** field or you can check one or more boxes from the **Reporting Attributes** and the **Types** groups. Click **Start** to begin searching.

Once the search results are listed in the container, you can select a workstation and click **Add** to enter it to the **Default Workstations** list.

4. Switch to the **Availability Intervals** page, shown in the next figure.

On this page, you define the time intervals during which the resource can be used with the **Quantity**, **Availability**, and **Connected Workstations** values defined as defaults in the previous two pages or with other values that you specify for each different interval. To add or delete an Availability interval, click the **Add Row** or **Remove Row** (after having selected the specific interval) icons.
After adding a row, to enter the information defining the new interval, double-click under each heading to make a choice or to write data:

a. From the pull-down menu in **Day**, choose: a day of the week, **Standard**, or **Specific Date** (where a calendar pops up from which you select a date).

The **Standard** interval represents the norm where the resource is used with the values you entered in the other two pages. When you define a new resource, you find a default **Standard** row where you need not add any values except for optionally a time range.

Select a day or **Specific Date** to specify the intervals in which the resource is available with different Quantity, Availability, and Connected Workstations characteristics that you specify in the row itself.

b. In **From Time** and **To Time**, specify a time range.

c. In **Quantity**, write the quantity of the resource in this time interval.

d. From the pull-down menu in **Is available**, choose: **Available**, **Not Available**, or **Default** (the default specified in the
Managing Resources

Resource page). To put a resource off limits for a certain period, click No.

e. In Workstations, write the names of one or more Connected Workstations, each separated by a blank, or click the ellipsis and then Find Workstation, as shown in the next figure, to open a Find window that helps you search for available workstations. See “Finding OPC Objects” on page 29 for an explanation of using the search tool.

Figure 61. Finding workstations for a resource’s availability interval

5. Click OK to save the new resource.

Managing Resources

Once you have created resources, create one or more resource list to manage them. From a resource list you can view the characteristics and status of resources. You can also modify resource properties and delete resources.

You can create two types of lists:

Database resource lists
To view and update resource definitions stored in the OPC Resource Description database
Plan resource lists

To view and update the status and properties of the resources allocated to the plan.

The following sections explain how to create database and plan resource lists. They also explain how to use database resource lists to update definitions in the OPC database. “Monitoring and Modifying Resources in the Plan” on page 259 provides information on how to use plan resource lists to modify resource allocation in the plan.

Default Resource Lists

The Job Scheduling Console for OPC provides two resource lists. You can find them in the default lists groups in the tree of every OPC controller showing in the Job Scheduling view. The resource lists are:

All Resources

In the Default Database Lists group. It displays a list of all the resources defined in the OPC Resource definition database.

Status of all Resources

In the Default Plan Lists group. It displays a list of all the resources currently allocated to the plan.

The default resource lists have the same behavior as the user lists. You can display their properties and see from the empty fields that no selection criteria are specified. If you want, you can modify their properties and make them less general by adding the filters of your choice.

Listing Resources in the Database

A database resource list yields a filtered list of resources defined in the Resource Description database of OPC.
Managing Resources

To make a database resource list object:

1. Select an OPC controller in the Job Scheduling view and click the **List Resources in Database** icon, as shown in the preceding figure.

   A Properties-Database Resource List window, like the one shown in the next figure, opens.

   **Figure 63. The Properties - Database Resource List window**

2. Write a name that will identify this query in **Name**.
3. Select the **Periodic Refresh** check box and specify a refresh interval in seconds, if you want the list results refreshed automatically. Or click the **Apply Defaults** button to use the default specified in the Scheduler Properties window available in the Job Scheduling view.

4. In the **Filter Criteria** group, you specify search parameters or combinations of parameters.

To generalize your search, use wildcard characters, such as an asterisk (*) to represent strings of characters, or a question mark (?) to represent a single character. If you leave all fields blank, then all the resources defined in the Resource Description database are displayed when you open the list.

Specify a parameter or a combination of parameters:
- In **Resource** specify a resource name.
- Specify in **Treat input as** how you want the input you entered in the **Resource** field to be treated. Select one of the following options:
  - **Wildcard**
    - Treat special characters as wildcards and character substitutes.
  - **Exact match**
    - Treat special characters as part of the resource name.
  - **Prefix**
    - Treat the string as a name prefix.
  - **Suffix**
    - Treat the string as a name suffix.
- Specify a resource group name in **Group**.
- Specify whether the resources are datasets with the DLF attribute or not, or if this is to be ignored, in **Hiperbatch**.

5. Press the **OK** button to save the list. The object for the new list is added in the tree under the OPC controller you selected when creating the list. To display the list, right-click it and select **Open**. Optionally, before saving the list, you can click the **Apply** button to display the list’s results immediately.
Listing Resources in the Plan

A plan resource list produces a filtered list of resources allocated to the plan.

To make a plan resource list object:

1. Select an OPC controller in the Job Scheduling view and click the List Resources in Plan icon in the toolbar, as shown in the next figure.

Figure 64. Creating a plan resource list

A Properties - Plan Resource List window, like the one shown in the next figure, opens.
2. Write a name that will identify this query in **Name**.

3. Select the **Periodic Refresh** check box and specify a refresh interval in seconds, if you want the list results refreshed automatically. Or click the **Apply Defaults** button to use the default specified in the Scheduler Properties window available in the Job Scheduling view.

4. In the **Filter Criteria** group, you specify search parameters or combinations of parameters.

   To generalize your search, use wildcard characters, such as an asterisk (*) to represent strings of characters, or a question mark (?) to represent a single character. If you leave all fields blank, then all the resources defined in the Resource Description database are displayed when you open the list.

   Specify a parameter or a combination of parameters:

   - In **Resource** specify a resource name.
Managing Resources

- Specify in **Treat input as** how you want the input you entered in the **Resource** field to be treated. Select one of the following options:
  - **Wildcard**
    - Treat special characters as wildcards and character substitutes.
  - **Exact match**
    - Treat special characters as part of the resource name.
  - **Prefix**
    - Treat the string as a name prefix.
  - **Suffix**
    - Treat the string as a name suffix.
- Specify a resource group name in **Group**.
- Specify whether the resources are datasets with the DLF attribute or not, or if this is to be ignored, in **Hiperbatch**.
- In **Allocation Options**, specify whether or not the resources have been allocated for shared or exclusive use, or whether this is to be ignored.
- In **Waiting**, specify whether or not there are job instances waiting to allocate the resources, or whether this is to be ignored.
- In **Available**, specify whether or not the resources are available, or whether this is to be ignored.

5. Press the **OK** button to save the list. The object for the new list is added in the tree under the OPC controller you selected when creating the list. To display the list, right-click it and select **Open**. Optionally, before saving the list, you can click the **Apply** button to display the list’s results immediately.

### Using Resource Lists

When you open a database resource list object, all the resources defined in the OPC database that respond to the filter criteria are displayed in the right-hand pane of the Tivoli Job Scheduling Console.
The following sections explain how to use database resource lists to work on resources defined in the Resource Description database. From the display produced by opening a database resource list, you can:

- Browse and modify the properties of resources defined in the database
- Delete resource definitions from the database
- Define new resources starting from existing definitions

To work with resources allocated to the plan, you must use a plan resource list. Go to “Monitoring and Modifying a Resource in the Plan” on page 260 for an explanation of how to work with resources allocated to the plan.

**Displaying a List of Resources in the Database**

To display a list of resources defined in the OPC database:

1. In the Job Scheduling view, select the list object you want to use to list the resources and right-click on it. A pop-up menu is displayed.

   *Figure 66. Displaying a list of resources in the OPC database*

2. Select **Open**, as shown in the preceding figure. The found resources are displayed in the right-hand pane, as shown in the next figure.
Managing Resources

Figure 67. Displaying the results of a resource list

For each resource, the display shows:

- Name and description
- Resource group name
- If the resource has the DLF attribute
- How the resource is to be acted upon when a job that allocates this resource ends in error
- Date and operator of last update of the resource’s properties

Browsing and Modifying Resource Properties in the Database

To modify the properties of a resource displayed in a list:

1. Right-click the resource. A pop-up menu is displayed.
2. Select **Properties...**, as shown in the preceding figure. The Properties-Resource window is displayed, as shown in the next figure.

*Figure 69. The Properties-Resource window*
Managing Resources

3. Apply your changes to the resource’s properties. See “Creating Resources” on page 83 for a description of the fields of the Properties-Resource window.

4. Click OK in the Properties-Resource window to save your changes to the definition of the resource in the OPC Resource Description database.

Deleting Resources from the Database

Do the following to use a list display to delete a resource from the OPC Resource Description database:

1. Right-click the resource. A pop-up menu is displayed.

Figure 70. Deleting a resource from the OPC database

2. Select Delete, as shown in the preceding figure. A window with a confirmation message is displayed.

3. Click OK. The resource is deleted from the database.
Creating Resources from Existing Ones in the Database

You can select a resource in a list and use its definition to create other resources with equal or similar properties. After you have displayed a list of resources, do the following:

1. Right-click the resource that you want to use as a model for creating another resource. A pop-up menu is displayed.

2. Select Create Another..., as shown in the next figure. The Properties-Resource window for the resource that you selected is displayed.

**Figure 71. Using an existing definition to create another resource**

3. In the Name field, change the default name to the name of your choice. If you do not change the name, the new resource is saved as CopyOfname, where name is the model resource’s name.

4. Change any other properties that you need to customize for the new resource.

5. Click OK to save the new resource. The Properties-Resource window is closed and the new resource is added to the database.

6. In the Tivoli Job Scheduling Console window click the Refresh List Results icon, or run another list, to view the new resource.
You can create three types of job streams. You determine the type when you specify the job stream’s properties:

- A job stream template. It does not go into the plan. It contains only scheduling information for the job streams that belong to it. You create run cycles but no jobs.
- A job stream that inherits its scheduling information from a job stream template. Because the job stream uses the scheduling information of the job stream template, you create jobs but no run cycles.
- A normal job stream. You create both jobs and run cycles.

To create a job stream, you perform the following tasks:

- Specify the new job stream’s properties. See “Specifying Properties for the Job Stream” on page 104.
- Create jobs. See “Creating a Job” on page 107.
- Create dependencies between jobs, where necessary. See “Creating Dependencies between Jobs” on page 127 and “Creating a Dependency on an External Job” on page 130.
- Create one or more run cycles to specify when the job stream runs. See “Specifying When a Job Stream Should Run” on page 135.
Specifying Properties for the Job Stream

Specifying Properties for the Job Stream

To create a job stream or job stream template:

1. Select an OPC controller in the Job Scheduling view and click **New Job Stream** in the toolbar, as shown in the next figure.

*Figure 72. Creating a job stream*

The Job Stream Editor and the Job Stream Properties windows open, as shown in the next figure.

*Figure 73. The Job Stream Editor and the Job Stream Properties windows*
2. In the Job Stream Properties window, enter a name and a description for the job stream or template in **Name** and **Description**. The name, the valid-from date, and the status, uniquely identify each job stream or template.

**Note:** You can define up to four job streams and job stream templates that share the same name but have different valid-from dates.

3. If you are defining a new job stream template, click the **Is a template** box. A job stream template contains run cycles but no jobs. All job streams defined as belonging to a job stream template inherit the run cycles defined for the template.

4. If you are defining a job stream as belonging to a job stream template, write the name of the template in the **Inherits from template** field. The job stream will be scheduled using the template’s run cycle information.

5. Click the **Active** box, if you are ready to schedule the job stream. If you are creating a complex job stream that requires time to define, do not click this checkbox until you have added all jobs, specified dependencies, and created a run cycle. In this way, you avoid the risk that your incomplete job stream will be included in any plans. You can make the job stream active after you have completed it.

6. In the **Valid Date** field, specify the time period covered by the job stream. You can only specify the valid-from date. A valid-to date of 31 December 2071 is automatically assigned by OPC. To change the **From** value, click the small icon to display a pop-up calendar, as shown in the next figure, where you can select a valid-from date. You can create several job streams with the same name but with different valid-from dates; OPC picks the correct version for the day it is planning.
Specifying Properties for the Job Stream

Figure 74. Using the pop-up calendar to select the valid date

7. In the **Priority** field, specify how this job stream ranks in importance compared to other jobs streams. The lowest priority is 1 and the highest priority is 9, which means that a job stream with a priority of 3 will run before a job stream with a priority of 1 when job streams are competing for resources. This value is not definitive. Other factors, such as resource and workstation dependency, are considered in determining priority. This field does not apply to job stream templates.

8. In the **Authority group name** field, enter a name to be used to generate a RACF resource name for authority checking. This information is optional.

9. In the **Calendar** field, specify the name of the calendar of workdays and freedays, including holidays, that you associate to the job stream. If you need to, click the ellipsis button to open a Find Calendar window that helps you search the database for a list of calendars from which to choose (See “Finding OPC Objects” on page 29 to learn how to use this window). If you leave this field blank, OPC uses the calendar specified in the initialization parameter CALENDAR during startup of the TCP/IP server.
Creating a Job

Note: The calendar that you specify here is used to display the run days of the job stream in the Run Cycle view of the Job Stream Editor. It is not necessarily the calendar that is used to determine the actual run days of the job stream instances that are generated.

10. In the Owner and Owner description fields, write the name and add descriptive information to be used by the person who is responsible for the job stream or template.

11. Click OK to proceed. The following happens:

- If you are creating a job stream template, the Job Stream Editor opens the Timeline view from where you can also open the Run Cycle view. You can add only run cycle information.

- If you are creating a job stream as belonging to a template, the Job Stream Editor opens the Graph view where you can create jobs.

- If you are creating a single job stream, the Job Stream Editor opens the Graph view from where you can add jobs and dependencies, and switch to the Run Cycle view to add run cycles.

Note: The OPC ISPF main panel, option 1.8, provides a direct method to create an application (job stream) when it consists of a single operation (job). In this panel the scheduler only needs to specify the name of the JCL associated with the operation and OPC will manage the operation as an application. The new application is named after the JCL.

A similar option is not available in the JS Console. To create job streams with a single job, you must follow the steps explained in this chapter.

Creating a Job

After you have specified the properties of a job stream, you can create the jobs that comprise it in the Graph view of the Job Stream Editor.
Creating a Job

The Graph view displays an icon for each possible type of job that you can define in OPC. The following list shows the job icons and the corresponding job types:

- **JCL job.** JCL jobs consist of JCL statements and run on computer workstations.

- **Started task job.** Started task jobs start or stop started tasks and run on computer workstations.

- **Printer job.** Printer jobs print the output of a predecessor job and run on printer workstations.

- **General job.** General jobs include activities other than printing and processing, such as manual activities, and run on general workstations.

- **Setup job.** Setup jobs require preparation of a set of JCL statements for a JCL or started task job and run on general workstations.

- **Write-to-operator (WTO) job.** Write-to-operator jobs consist of an operator instruction displayed on the system console and run on general workstations.

The property windows for the different job types are identical. However, when you save the job stream, OPC applies different validation policies, based on the job type, to the properties that you specified. Moreover, when you use the Find tool to search for a target workstation, the tool lists only workstations that are compatible with the specific job type.

To create a job in the job stream:
1. Click one of the job icons in the toolbar of the Graph View of the Job Stream Editor, depending on the type of job that you want to define, as shown in the next figure.

![Figure 75. Clicking the Add JCL Job icon to create a JCL job](image)

Drag your mouse inside the window (the mouse pointer becomes cross shaped) and click again, as shown in the next figure.
Creating a Job

Figure 76. Clicking again to open the Job Properties window

A Job Properties window, like the one shown in the next figure, opens.
2. On the **General** page, specify the following job details:

a. In the **Identifier** field, enter the job number. This information is required and must be unique within the job stream.

b. In the **Target workstation** field, enter the name of the workstation on which the job is run. This information is required. If you do not know it, perform the following steps to browse a list of available workstations:

   1. Click the ellipsis. The Find window is displayed.

   2. In the **Find** field, enter the name of the workstation. You can use wildcard characters such as asterisks (*) to represent strings, or question marks (?) to represent single characters. For example, if you enter * or leave the field blank, a list of all the workstations on which this type of job can run is displayed. You can also run your search by selecting boxes in the **Reporting attributes** group box.
Creating a Job

(3) Click **Start**. A list of workstations is displayed.

(4) In the list, double-click the name of a workstation, or click it once and click **Apply**. The name of the workstation is displayed in the **Target workstation** field in the Job Property Editor.

(5) If you used the Apply button, click **OK** to close the Find window.

c. In the **Description** field, enter information that will help you identify the job in a list of jobs.

d. Click the **Auto submit** check box to automatically start the job or to issue a WTO message when all dependencies have been satisfied and all required resources are available. The default is **yes**.

e. Click the **Cancel if late** check box to prevent the job from being started if it is late according to time dependencies specified in the Time Restrictions page.

    **Note:** select this option only for time dependent jobs. For time dependent jobs you must specify an earliest start time and a deadline in the Time restrictions page.

f. Click the **Deadline WTO** check box to issue an operator message if the job passes its deadline. The message is also written to the OPC message log.

g. Click the **Auto release** check box to release the job when it is not submitted by OPC and is in the HOLD status. OPC releases the job when all dependencies are satisfied and the requested resources are available. The default is **yes**.

h. Click the **Auto error completion** check box to have the job marked ended-in-error (E) if an error occurs during execution. The default is **yes**. If you set this box blank, the job is marked complete (C) when it ends, regardless of the outcome.

i. In the **Catalog Management** group box, specify whether OPC must automatically perform catalog management actions when the job ends in error:

    ■ Select **None** to perform no actions. This is the default.
7. Creating an Application

Creating a Job

- Select **Immediate** to automatically conduct catalog management actions.
- Select **Deferred** to defer data set cleanup to manual operation.

j. In the **Restartable** group box, specify whether to restart the job if its workstation becomes inactive:
- Select **Yes** to restart the job from the beginning on the alternate workstation (if one was defined), or on this workstation when it becomes active again.
- Select **No** to not restart the job, even if it overrules the installation default in the WSFAILURE or WSOFFLINE parameter of the JTOPTS initialization statement.
- Select **Default** to use the installation default action specified in the OPRESTARTDEFAULT keyword of the JTOPTS statement. This is the default job property.

k. In the **Reroutable** group box, specify whether to make the job eligible to be rerouted if its workstation becomes inactive. This option applies to the job only when it is in status **ready (R)** or **waiting (W)**:
- Select **Yes** to make the job reroutable.
- Select **No** to make the job not reroutable.
- Select **Default** to take the installation default action specified in the OPRESTARTDEFAULT keyword of the JTOPTS statement. This is the default job property.

l. In the **Highest acceptable return code** field, specify the highest acceptable return code from any step in the job before the job is set to **ended-in-error (E)** status. If you leave this field blank, OPC uses the value specified in HIGHRC in the OPC initialization parameter JTOPTS.

m. OPC automatically monitors the actual durations of jobs. It can use these durations to modify the estimates in the application description (AD) database. In the **Feedback options** group box, specify two parameters that control how measured durations are used:
Creating a Job

- In the **Smoothing factor** field, enter a number, from 0 to 999, that determines how much a measured duration will change existing values in the AD database. If a measured duration is outside the limits established by the Limit for feedback, the smoothing factor is not applied and the AD database is not updated.

- In the **Limit for feedback** field, write a number, from 100 to 999, that establishes the limits within which measured values are regarded as normal and acceptable. A measured value outside the limits is ignored; that is, no smoothing factor is applied and the AD database is not updated.

n. Click the **Critical job** check box if you want to define the job as a critical job. This makes the job eligible for Workload Manager (WLM) service class promotion when the job runs late. Available for OPC 2.3 only.

o. If you marked the Critical job check box, click the **WLM policy** drop-down list to select the type of policy applied for WLM service class promotion when this job is late. The policy can be:

  - **Conditional** OPC uses an algorithm to determine whether to apply the Deadline or the Latest start option.
  - **Deadline** OPC intervenes if the job runs beyond the deadline.
  - **Latest start** OPC intervenes immediately if the job starts after the latest start time.
  - **Long duration** OPC intervenes if the job takes longer than it should as compared to the statistics that OPC keeps.

  This option is available for OPC 2.3 only.

3. Click the **Task** tab. On this page, shown in the next figure, enter information about the program associated with the job. If the task is a manual operation, leave this page blank.
Creating a Job

### 7. Creating an Application (Job Stream)

#### Figure 78. The Task page of the JCL Job Properties window

- In the **Task name** field, write the name of the JCL associated with the job when applicable. Together with the Identifier that you specified in the previous page, the Task name labels the job in the Graph view.

- In the **Form number** field, write the printer form number that appears on the daily plan and ready lists. For printer workstations with automatic reporting, it enables the controller to identify the different print operations that belong to a specific job.

- Click the **Job class** drop-down list and select a letter that matches the MVS job class from the JCL.

4. Click the **Time Restrictions** tab. On this page, shown in the next figure, specify the period of time in which the job is allowed to run and the amount of time the job requires.
Creating a Job

Figure 79. The Time Restrictions page of the Job Properties window

a. Specify the time at which the job can start in one of the following ways in the Start time group box:
   - Select the No restrictions check box to run the job as soon as all dependencies are met. No time restrictions can result in more efficient processing for certain jobs when extending a plan. In this way, they are executed as soon as dependencies are satisfied. If this job is not time dependent, click this option.
     - **Note:** This choice is not valid if you checked the Cancel if late box in the General page.
   - Select the Follow job stream rules button to specify that the earliest time the job can start is when the job stream starts. This is the default.
     - **Note:** This choice is not valid if you checked the Cancel if late box in the General page.
Creating a Job

7. Creating an Application

Creating an Application

(7) Creating an Application

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Select the Specify earliest start time button to define a specific time before which the job should not start. Then:

(1) In the At field, enter a time, according to your local settings. For example, enter 12:00 if you do not want the job to start before noon.

(2) In the Delay for field, enter a number of days to specify a start time on a day other than the first day of the job stream. For example, if you enter 3, the job will not start before the specified time on the fourth day after the job stream begins.

b. In the Deadline time group box, specify the latest time when the job must end. To do this, select the Specify deadline check box and use the At and Delay for fields. The default is no deadline time.

c. In the Duration group box, specify how long the job is expected to run, in hours and minutes.

5. Click the Resources tab. On this page, describe the parallel servers and the logical and workstation resources that the job utilizes.
Click the arrow, as shown in the preceding figure, to unfold the following two drop-down lists:

**Target resources**
Where you specify the workstation (or fixed) resources, as well as the parallel servers, the job needs to run

**Logical resources**
Where you specify the logical and physical resources the job needs to run

a. In Target resources, double-click each cell in the **Quantity** column, as shown in the next figure, to edit the amount of resources Resource 1 and Resource 2 that are needed by the job. Do the same for parallel servers.
b. In Logical resources, click **Add row**, as shown in the next figure, for each resource that you need to assign to the job.
Enter the name of the resource. If you do not know it, perform the following steps to browse a list of available resources:

1. Double-click under Resource. An ellipsis is displayed in the cell.
2. Click the ellipsis, as shown in the next figure.
7. Creating an Application (Job Stream)

Creating a Job

Figure 83. Finding resources for a job

The Find Resource window, shown in the next figure, is displayed.

Figure 84. The Find Resource window

(3) In the Resource field, enter the name of a resource. Or, in the Group field, enter the name of a group of resources. You can use wildcard characters such as asterisks (*) to represent strings, and question marks (?) to represent
Creating a Job

single characters. For example, if you enter * or leave the field blank, a list of all the resources is displayed. You can also run your search by making a selection in the Hiperbatch group box.

(4) Click the Start button. A list of resources is displayed.

(5) In the list, double-click the name of a resource, or click it once and push Apply. The name of the resource is added in the new row under Resource in the list of logical resources on the Job Properties window.

(6) Click OK to close the Find Resource window.

c. For each logical resource, double-click under each of the next three columns to edit the following attributes:

**Quantity**
Specify the amount of the resource needed by the job.

**Access type**
Specify whether the job needs shared or exclusive access to the resource.

**Keep on error**
Specify whether the job keeps or frees the resource when it fails. You can also specify to use the default defined in the ONERROR keyword of the RESOPTS statement.

6. When you have completed the fields on all four pages, click OK in the Job Properties window. The new job is displayed as an icon in the Graph View of the Job Stream Editor window, as shown in the next figure. The name of the icon is made up by the name of the task with which the job is associated and by the job identifier. You can drag and drop the icon to position it.
7. Repeat the previous steps to create as many jobs as you need.

You can use the slider, positioned on the left margin of the Graph view, to zoom in and zoom out the jobs displayed in the view. When you move the slider downwards to zoom out the Graph view, the job icons change their appearance, changing color depending on the job type.

Creating a Job with the Copy and Paste Functions

You can also create a job by using the copy and paste functions on an existing job. To do this:

1. Right-click the job you want to copy. A pop-up menu is displayed, as shown in the next figure.
2. Select **Copy**, as shown in the next figure.

*Figure 87. Copying a job to the clipboard*
3. Right-click your mouse somewhere in the window and select **Paste** in the ensuing pop-up menu, as shown in the next figure.

**Figure 88. Pasting a job**

The Job Properties window of the copied job is displayed, as shown in the next figure.
Creating a Job

Figure 89. The Job Properties window of the copied job

4. Change the identifier and edit the properties as required.
5. Click **OK** in the Job Properties window. The new job is added in the Graph view, as shown in the next figure.
Creating Dependencies between Jobs

When you create dependencies, you link jobs and organize jobs into a sequence. A successor job cannot begin until the predecessor job is complete. Dependencies determine when the successor job runs, even if the successor job has time restrictions. For example, if you are printing bank account statements, you must subtract ATM withdrawals from an account (Job A) before you calculate the account balance (Job B). You must calculate the balance before you can print the account report (Job C).

To create a dependency between jobs, you must specify the jobs and the order of the jobs. You can create dependencies within a job stream or between job streams. To create a dependency on a job in another job stream, you must first add the external job and then create a dependency on the external job. See “Creating a Dependency on an External Job” on page 130 for instructions on adding an external job.

1. In the Graph view, click the Add Link icon, as shown in the next figure.
Creating Dependencies between Jobs

Figure 91. Creating a dependency between jobs

2. Click the predecessor job and drag the link, by keeping the left mouse button pressed, to the successor job. A line is displayed between the two jobs, with an arrowhead pointing to the successor job, as shown in the next figure.
3. Repeat the previous steps to create as many dependencies as you need, as shown in the next figure.
Creating Dependencies between Jobs

Figure 93. Jobs 11 and 30 can start only when job 10 has completed. Job 10 can start only when job 20 has completed.

Creating a Dependency on an External Job

External jobs represent jobs that are part of other job streams. You create a dependency between jobs in different job streams by creating a dependency on an external job. For example, if Job C, in the Accounts job stream depends on Job B in the Reports job stream, you create an external job in the Accounts job stream to represent Job B, and then you create a dependency between Job C and the external job.

This section describes one way to add an external job to a job stream. Another method, based on the use of job stream lists, is described in “Using the Copy Function to Add an External Job to a Job Stream” on page 174.

To create a dependency:

1. In the Graph view of the Job Stream Editor window, click the Add Dependency on External Job icon, as shown in the next figure, then click in the window.
7. Creating an Application (Job Stream)

Figure 94. Adding an external job

The External Job Properties window, shown in the next figure, is displayed.

Figure 95. The External Job Properties window

2. In the **Job Stream** field, enter the name of the job stream in which the external job resides. If you do not know the name of the job
Creating Dependencies between Jobs

stream that contains the external job, perform the following steps to search the database for job streams:

a. Click the ellipsis to open the Find Job Stream window, shown in the next figure. This window enables you to enter criteria to search the database for existing job streams.

Figure 96. The Find Job Stream window

b. In the Find field, enter a search string to locate the job stream. You can use wildcard characters such as asterisks (*) to represent strings or question marks (?) to represent single characters. For example, if you enter * or blank, a list of all job streams is displayed.

c. Use any of the Filter Criteria elements to find the job stream that contains the job you want. You can write search strings with wildcard characters:

(1) In the Task name field, enter the name of a task contained in the job stream.

(2) In the Job stream template field, enter the name of the job stream template to which the job stream belongs.

(3) In the Owner field, enter the identity of the owner of the job stream.
Creating Dependencies between Jobs

(4) Click the **Is a template** box to search for job stream templates.

(5) In the **Status of Job Stream** group box, select one of the buttons to search for active, inactive, or all job streams regardless of their status.

d. Click the **Start** button. A list of job streams is displayed.

e. Double-click on the name of a job stream. The Find Job Stream window is dismissed and the job stream is displayed in the **Job Stream** field in the External Dependency Properties window.

3. Click the **Show Jobs** button. The jobs in the job stream are displayed, as shown in the next figure.

*Figure 97. Selecting the external job*

4. Select a job and click the **OK** button. An icon for the external job is displayed in the Graph view, as shown in the next figure.
5. Repeat the steps explained in “Creating Dependencies between Jobs” on page 127 to define links with the other jobs. See the example in the next figure.
Specifying When a Job Stream Should Run

After creating the jobs and defining any existing dependencies between them, specify the scheduling information for the job stream. Run days are generated from a combination of the following:

- A calendar of workdays and freedays. The calendar is defined in OPC. You specify its name in the Job Stream Properties window (see “Specifying Properties for the Job Stream” on page 104).

- The validity date of the job stream, which you specify in the Job Stream Properties window (see “Specifying Properties for the Job Stream” on page 104).

- The run cycles you create. You can create two types of run cycle:
  
  **Rule-based**
  
  Uses rules based on lists of ordinal numbers, types of days, and common calendar intervals or period names. For example, the last Thursday of every month.
Specifying When a Job Stream Should Run

Rule-based run cycles are based on conventional periods, such as calendar months, weeks of the year, and days of the week, or periods that you define, such as a semester.

**Offset-based**

Uses a combination of user-defined periods and offsets. For example, an offset of 3 in a period of 15 days is the third day from the beginning of the period. It is more practical to use offset-based run cycles when the cycle is based on cyclic periods.

You can specify multiple run cycles when you create a job stream, and you can add new ones afterwards. You can mix rule-based and offset-based run cycles.

Both types of run cycles can be either inclusionary or exclusionary. Exclusionary run cycles specify the days that the job stream must not run. You can add run cycles to generate more days, or to have multiple instances on the same day. You can add exclusionary run cycles to exclude some of the days already generated. Exclusionary run cycles prevent any run cycle from generating an instance with a start time that matches the date and time combination that the exclusionary run cycle generates.

To create a run cycle:

1. Click the **Run Cycle** icon in the toolbar of the Job Stream Editor window to open the Run Cycle view, as shown in the next figure.
In the Run Cycle view, click **Rule-based Run Cycle**, as shown in the next figure, if you are going to use rules, or **Offset-based Run Cycle**, as shown in the figure that follows, if you are going to use offsets.
Specifying When a Job Stream Should Run

Figure 101. Opening a Rule-based Run Cycle window

Figure 102. Opening an Offset-based Run Cycle window
The Rule-based or Offset-based Run Cycle Properties window opens. The next figure shows the General page, which is identical for both rule-based and offset-based run cycles.

Figure 103. The General page of the Run Cycle Properties window

2. On the General page, specify whether the run cycle is exclusionary, the period that the run cycle is valid, and how to handle freedays in the schedule:
   
   a. Write a name and a description for the run cycle in the Name and Description fields.

      Note: Offset-based run cycles take the name of the period specified in the Offsets page.

   b. Select the Exclusionary run cycle checkbox, if the run cycle keeps the job stream from running.

   c. In the Valid Date group box, specify an interval of time for which the run cycle applies.

   d. Enter the dates in the From and To fields. Click the calendar buttons next to each field to select dates using pop-up calendars. The intersection between this valid date and the
Specifying When a Job Stream Should Run

valid date you defined in the Job Stream Properties window is the interval during which the job stream is actually scheduled.

e. Click the **Rule for freedays** drop-down list and select how you want OPC to treat freedays when calculating the rundays of the job stream. Select one of the following:

**Count workdays only**
Excludes freedays when calculating on which days the job stream runs. This is the default for offset-based run cycles.

**Schedule on last workday before freeday**
Counts both workdays and freedays. If the runday falls on a freeday, it is shifted to the closest workday before the freeday.

**Schedule on next workday after freeday**
Counts both workdays and freedays. If the runday falls on a freeday, it is shifted to the closest workday after the freeday.

**Count workdays and freedays alike**
Counts both workdays and freedays. The job stream is scheduled on the runday, regardless whether it is a freeday or a workday. This is the default for rule-based run cycles.

**If freeday, do not schedule at all**
Counts both workdays and freedays. If the runday falls on a freeday, the job stream is not scheduled to run.

f. In the **JCL variable table** field, write the name of the variable table that OPC can use on the days generated by this run cycle. Alternatively, click the ellipsis to search for a variable table name.

g. Click the **Time Restrictions** tab. The next figure shows the Time Restrictions page, which is identical for both rule-based and offset-based run cycles.
3. On the Time Restrictions page, specify the start and deadline times for the run cycle.
   a. In the **Start time** field, specify the time when the job stream must start. The default is 00:00 of the scheduled day.
   b. In the **Deadline time** group box, specify the latest time when the job stream must end. To do this, select the **Specify deadline** check box.
   c. Write a time in the **At** field, and a number of days after the start of the schedule in the **Delay for** field. The default is no deadline time. You can use deadline time to control the correct completion of the schedule and also to make closer estimates of the duration of a job stream.

   **Note:** If you are creating an exclusionary run cycle, be sure to match the time restrictions of the run cycle that it is intended to annul.
   d. Click the **Rules** tab, if you are creating a rule-based run cycle, and continue to the following section. Click the **Offsets** tab, if
Specifying When a Job Stream Should Run

you are creating an offset-based run cycle, and see “Creating Offset-based Run Cycles” on page 147.

Creating Rule-based Run Cycles

1. On the Rules page, shown in the next figure, specify the elements that make up the rules on which the run cycle is based.

Figure 105. The Rules page of the Rule-based Run Cycle Properties window

![Rule-based Run Cycle Properties window](image)

a. In the Periods field, select Week, Month, Year, or User-defined (a period that you have defined in OPC). You can check more than one period at a time for complex rules specifying more cycles. For example, you can check Week and Month, and then choose the days that apply to both rules. You do not need to select the same days twice, since they are fitted automatically to all cycles.

Ensure that the period you select is also highlighted so that the other options in the page are enabled. The period that you select affects the number of days listed in the Available days scroll-list. Also, the In the following... group changes depending on the period you select.
Specifying When a Job Stream Should Run

7. Creating an Application (Job Stream)

b. In the **Frequency** group box:
   - Select **Only**, if the rule applies to only one day in the specified period. The rule does not repeat within the period. For example, *Only last Monday in Month* schedules the job stream to run on the last Monday of the month.
   - Select **Every**, if the rule is used to calculate more than one day within the period. For example, *Every last Monday in Month* schedules the job stream to run on every Monday in the month, since this rule generates a series of Mondays starting from the last Monday.

   **Note:** *Every first day* yields the same rundays as *Every day*.

If you use **Every**, you can shift the origin of the run cycle by the number of days you write in the **Shift origin** field. You shift the origin of the run cycle with respect to the default origin, which is Monday in the Week period, and the first week with at least 4 days in the Month and Year periods.

You can also shift the origin from the end, if you specify a combination of Every and ordinal-last days.

c. In the **Available days** list, click the days of the period to which the rule applies. The number of available days changes according to the period you select. You can also specify ordinal-last days to count backwards from the end of the period. The days you select are displayed in the Selected Days field.

d. In the **Available types of days** list, click the types of days to which the rule applies. The types of days you select are displayed in the Selected Types of Days field.

e. Click the **In the following…** check box to specify by name the periods to which you want the rule to apply. Depending on the period you select (Week, Month, Year, User-defined), this option displays lists of weeks of the year by number, or months by name.
Specifying When a Job Stream Should Run

If you selected a user-defined period, a list of available periods is displayed in the In the following Periods group. Select the check box next to the period you want to use.

The next figure shows a rule that schedules the job stream to run on the fifth day of every week.

2. Click OK. The following happens:

- OPC calculates the days of the run cycle.
- The run cycle’s name is displayed in a list to the left of the graphic calendar in the Run Cycle view. If you right-click on it, you can then select a number of actions on the run cycle, such as Properties, Copy, and Delete.
- The rundays are displayed in blue in the graphic calendar. When you select the run cycle from the list, a blue stripe is displayed at the top of the corresponding generated days.

The next figure shows a rule-based run cycle that uses the rule shown in the preceding example, starting from a Valid
date of January 3 of 2000, and where workdays and freedays are counted alike.

*Figure 107. Example of a rule-based run cycle*

The next figure shows an exclusionary run cycle named WPREXCEP that prevents job stream PAYRO21 to run the last Friday of January 2000.

The rundays of an exclusionary run cycle are marked with a red bar in the graphic calendar.
Specifying When a Job Stream Should Run

Figure 108. Exclusionary run cycle WPREXCEP annuls run cycle WEEKLYPR in the week marked in red.

The next figure shows the rule defined for exclusionary run cycle WPREXCEP. The selected days are equal to those for run cycle WEEKLYPR. The week when the job stream must not run is specified in the In the following weeks box.
Creating Offset-based Run Cycles

1. On the Offsets page, shown in the next figure, specify the combination of period and offsets on which the run cycle is based.
Specifying When a Job Stream Should Run

Figure 110. The Offsets page of the Offset-based Run Cycle Properties window

Figure 111. The Find Period window

a. In the **In the following period** field, write the name of a user-defined period. If you do not know the name, click the ellipsis to open the **Find Period** window, shown in the next figure.

Here, you can use wildcard characters, such as asterisks (*) and question marks (?), to find all the available user-defined periods in OPC. See “Finding OPC Objects” on page 29 for an explanation of how to find OPC objects.

**Note:** The name of the period is also used as the run cycle’s name.
Specifying When a Job Stream Should Run

If you need to specify more than one period, create an offset-based run cycle for each period within the job stream.

b. In the Available offsets list, click the days when you want the job stream to run in the period. Select ordinal-last days to count the days from the end of the period.

2. Click OK. The following happens:
   ■ OPC calculates the days of the run cycle.
   ■ The run cycle’s name is displayed in a list to the left of the graphic calendar in the Run Cycle view. If you right-click on it, you can then select a number of actions on the run cycle, such as Properties, Add, Copy, Delete.
   ■ The rundays are displayed in blue in the graphic calendar. When you select the run cycle from the list, a blue stripe is displayed at the top of the corresponding generated days.

The next figure shows an offset-based run cycle named CYCLIC7. This run cycle schedules job stream PAYRO21 to run on the second day (Tuesday) of each cycle, beginning from a Valid date of January 3, 2000.

Figure 112. Example of an offset-based run cycle
Checking Time Restrictions in the Timeline View

The next figure shows the offset for run cycle CYCLIC7. The offset is the second day of the user defined period, also named CYCLIC7, which is a week.

Figure 113. Example of an offset

Checking Time Restrictions in the Timeline View

The Timeline view of the Job Stream Editor shows graphically the time restrictions of the jobs and run cycles of a job stream in the database. While you create a job stream, the Timeline view helps you, with a glance, to make sure that the time dependencies you specified are correct and coherent among each other. It can point out inconsistencies between the time restrictions of jobs and those of run cycles. It can also show if there are inconsistencies within the time restrictions of individual jobs. From the Timeline view, you can modify the time restrictions of a job or run cycle with a click of your mouse.

To open the Timeline view of a job stream, click the Timeline icon from the toolbar of any of the other views of the Job Stream Editor window, as shown in the next figure.
See the sample timeline view in shown in the next figure.
Checking Time Restrictions in the Timeline View

Figure 115. The Timeline view of a job stream definition in the OPC database

The inside of the window has four quadrants. You can size the quadrants by dragging the horizontal and vertical lines that divide the window. The left half of the window, or Table frame, lists the job stream’s run cycles in the top quadrant, and the job stream’s jobs in the lower quadrant.

The right half of the window contains activity bars that represent, on a daily (A) and hourly (B) scale, the time restrictions defined for every run cycle and job. You can customize the timescale in the following way:

1. Right-click anywhere along the lower scale (B). A pop-up menu is displayed.
2. Move your pointer to Timescale to display a available choices.
3. Select the radio button that matches your preference.
The Table frame contains columns that display the following information:

- A warning icon (2) for inconsistencies in time restrictions. This icon marks a run cycle when OPC detects that there are jobs with time restrictions outside the time restrictions of the run cycle.

- The run cycle name (1) or job identifier (5).

- An information icon (6) showing what type of time restriction, if any, each job has. The jobs with no restrictions have a lightning bolt, the jobs with a specified start time have a clock, and the jobs that follow job stream rules have a clock superimposed on a job stream.

- The expected start and deadline times of the run cycle or job.

- The expected duration of the job.

On the upper right half of the window, the run cycle time restrictions are displayed by a blue bar (3) that represents the time interval from the start to the deadline of the run cycle. The deadline is indicated by a vertical black line (4) at the end of the blue bar. You can change the start and the deadline by dragging the left and right ends of the two bars, or by dragging the whole activity bar. As you move the bar, an indicator displays the selected time.

**Note:** The run cycle time restrictions inherited from a template are displayed in read-only mode. To modify them, you have to open the Job Stream Editor window of the particular template.

Time restrictions for a job are shown by a thick blue bar (8) that represents the time interval from the start to the deadline of the job, and by a thinner, light blue line (7) that represents the expected duration. Where the duration of the job exceeds the deadline, the blue bar becomes red. You can move the interval of time between the start and the deadline times of the job by dragging either end of the thicker bar (or the whole bar). You can only move the right end of the thinner bar because the start position is calculated automatically based on the job’s dependencies. The job’s deadline is indicated by a black vertical line. If a job has no specified deadline, the thick bar is replaced by a vertical stripe indicating the start. You can only move it forward or backward. To specify a
Saving a Job Stream

deadline for the job, you have to double-click the job in the Table frame and open a Time Restrictions Property window.

In the Timeline view you can also do the following:

- Detect inconsistencies in time restrictions. Specifically, if the time restrictions of any job are such that it is not within the time restrictions of a run cycle, a yellow triangle (2) marks the run cycle that does not include the job. If you point your mouse on the triangle, a hover help on the triangle lists the jobs that are not included.

- View the earliest start time of the first job and latest deadline time for the last job to see the total run time of the job stream.

- Click on a run cycle to see how it affects the jobs that start with the job stream. The activity bars for jobs that start with the job stream change position when you select different run cycles.

- See which jobs have a specified start time, which jobs follow job stream rules, and which jobs have no restrictions on start time, by looking at the icon (6) at the beginning of the job activity bar.

- Open the Time Restrictions page of a Run Cycle Properties window or of a Job Properties window by double-clicking on a run cycle or job in the Table frame.

- Change the earliest start time, duration, and deadline time of a job by moving different components of the activity bar. In the same way, you can change the earliest start time and deadline of a run cycle.

- See which jobs start according to the start time of the job stream, and how those jobs are affected by various rules.

Saving a Job Stream

After you have specified job stream properties and defined jobs, job dependencies, and run cycles, you can save the job stream. Job streams are saved in the OPC database. To save the new job stream, click **Save** in the Job Stream Editor toolbar, as shown in the next figure.
Figure 116. Saving a job stream

The job Stream Editor checks for any missing or invalid information and then saves the job stream in the Application Description database.

**Note:** You can save a job stream from any of the three views available in the Job Stream Editor. You can define parts of a job stream, for instance the jobs that are in it, then save it and open it again later, as explained in the next chapter, to define its run cycles. Just remember to wait to mark it active when it is ready to be scheduled.
Saving a Job Stream
Listing and Modifying Applications (Job Streams) in the Database

To view job streams, you must create and display a job stream list in the Job Scheduling view. You can create two types of job stream lists:

**Job stream list**
- Produces a filtered list of job streams or job stream templates defined in the OPC Application Description database.

**Job stream instance list**
- Produces a filtered list of already scheduled job stream instances together with their time restrictions.

This chapter explains how to list job streams from the OPC database and how to use job stream lists. To learn how to list job stream instances, see “Listing Occurrences and Operations (Job Stream and Job Instances)” on page 179. To learn how to use job stream instance lists, see “Monitoring and Modifying Occurrences (Job Stream Instances)” on page 189.

**Default Job Stream List**

The Job Scheduling Console for OPC provides a job stream list. You can find it in the Default Database Lists group in the tree of every OPC controller showing in the Job Scheduling view. The list is called All Job Streams and displays all the job streams defined in the OPC database.
Listing Job Streams

This list works as any other user list. You can display its properties and see from the empty fields that no selection criteria are specified. If you want, you can modify properties and make them less general by adding the filters of your choice.

Listing Job Streams

A job stream list enables you to view and modify job stream definitions, which are stored in the OPC database. You can:

- Open and delete a job stream, and modify job stream properties
- Define new job streams starting from existing definitions
- Create and delete jobs and external jobs, and modify job properties
- Add and delete dependencies between jobs
- Create and delete run cycles, and modify run cycle properties
- View and change the time restrictions of run cycles and jobs

The changes you make from a job stream list are saved in the OPC database. Instances of the job stream that have already been generated will not reflect these changes.

To create a job stream list:

1. Select an OPC controller in the Job Scheduling view and click **List Job Streams** in the toolbar, as shown in the next figure.
Listing Job Streams

8. Listing and Modifying Applications (Job Streams)

Figure 117. Creating a list of job streams defined in the OPC database

The Job Stream List Properties window, shown in the next figure, opens.

Figure 118. The Properties - Job Stream List window
2. Write a name that identifies this query in the **Name** field.

3. If you want the list results refreshed automatically, click the **Periodic Refresh** check box and specify a refresh interval in seconds. Or click the **Apply Defaults** button to use the default specified in the Scheduler Properties window available in the Job Scheduling view.

   **Note:** Do not specify frequent refreshes of many detached views open at the same time in order to prevent from overloading your system.

4. In the Filter Criteria group, specify any of the following search parameters, or combinations of two or more parameters. Use asterisks (*) or question marks (?) as wildcard characters to generalize your search with partial strings.

   **Job stream**
   
   Lists all the job streams with this name or namestring.

   **Task name**
   
   Lists all the job streams where this task or JCL is used.

   **Job stream template**
   
   Lists all the job streams that are part of this template.

   **Owner**
   
   Lists all the job streams that belong to this owner.

   **Authority group**
   
   Lists all the job streams that use this authority group for RACF authority checking.

   **Calendar**
   
   Lists all the job streams that use this calendar.

   **Workstation**
   
   Lists all job streams containing jobs that run on this workstation.

   **Is a template**
   
   Click this box to list job stream templates.

   **Dates**
   
   Lists all the job streams valid within the interval you specify in **From** and **To**.
Displaying a List of Job Streams in the Database

Priority
Lists all the jobs streams that have the priority level you select in From and To.

Status of Job Stream
Lists all the currently active or inactive job streams, depending on which button you select. The default is to ignore this criteria.

5. Click OK to save the list. A list object with the name you specified is added to the tree under the OPC controller you selected at the beginning. Optionally, before saving it, you may run the list by clicking Apply.

Displaying a List of Job Streams in the Database

To display a list of job streams in the database, create a list as described in “Listing Job Streams” on page 158 and run it by clicking the Apply push button, or use an existing list.

To use an existing Job stream list on the database:

1. Select an OPC controller to display all the created lists in the right-hand view of the console.

2. Double-click the list object you want to use, as shown in the next figure.

Figure 119. Displaying a list of job streams
Modifying Job Streams in the Database

The list displays all the job streams selected according to your filter criteria.

The list of job streams is displayed in the right-hand pane of the console, as shown in the next figure.

*Figure 120. Displaying the results of a job stream list*

The job streams are listed by:

- Name
- Description
- Priority level
- Start of validity
- End of validity
- Status (active or inactive)
- Authority group ID
- Calendar
- The owner’s ID and description
- When and by who the definition was last updated

**Modifying Job Streams in the Database**

Modifying a job stream in the OPC database involves changing any of the following:

- The job stream’s properties.
Modifying Job Streams in the Database

- Any of the jobs that it comprises, as well as any dependencies that may exist among them.
- Any of the run cycles that define its scheduling.

To modify jobs and run cycles, open the job stream from the list display. The type of job stream determines which views you can access in the Job Stream Editor:

- For job stream templates, you can open the Timeline and Run Cycle views.
- For normal job streams you can open the Graph, Timeline, and Run Cycle views.
- For job streams that inherit their scheduling information from a template, you can open the Graph view only. Open the template to see the scheduling information for the job stream.

Modifying Job Stream Properties

To modify the properties of a job stream in the database:

1. Run a job stream list.
2. Right-click the job stream to open a pop-up menu.
3. Choose Properties..., as shown in the next figure.

Figure 121. Modifying a job stream’s definition
Modifying Job Streams in the Database

The Job Stream Properties window opens, as shown in the next figure.

*Figure 122. Editing the Job Stream Properties window*

![Job Stream Properties window]

4. Make the changes you want in the window (see “Specifying Properties for the Job Stream” on page 104 for details on the Job Stream Properties window).

5. Click OK to save the changes or Cancel to discard your changes and dismiss the window.

Adding and Modifying Jobs and Dependencies in the Graph View

To add, modify, or delete jobs and dependencies in an existing job stream:

1. Display a job stream list.

2. When the list is displayed, double-click the job stream you want to open. The Graph view of the Job Stream Editor opens:
   - For a description of how to create a new job in the job stream, see “Creating a Job” on page 107.
For a description of how to add a new external job in the job stream, see “Creating a Dependency on an External Job” on page 130.

For a description of how to add a new dependency between jobs in the job stream, see “Creating Dependencies between Jobs” on page 127.

Modifying a Job

1. In the Graph view of the Job Stream Editor, right-click the job. A pop-up menu opens.

   **Note:** If any of the job icons in the Graph view display a superimposed question mark, this is an indication that the definition of the workstation associated with the particular job cannot be found in the database. Likewise, if an external job is missing, because the job or the job stream to which it belongs were deleted in the meantime, its icon label displays a (Not Found) string.

2. Click **Properties**, as shown in the next figure.

   **Figure 123. Modifying a job**
Modifying Job Streams in the Database

The Job Properties window, shown in the next figure, opens.

**Figure 124. Editing the Job Properties window**

<table>
<thead>
<tr>
<th>Properties</th>
<th>Started Task Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td></td>
</tr>
<tr>
<td>Task</td>
<td></td>
</tr>
<tr>
<td>Time Restrictions</td>
<td>Resources</td>
</tr>
</tbody>
</table>

3. Apply your changes in the Job Properties window (for reference, see “Creating a Job” on page 107) and click **Save**.

**Adding a New Job with the Copy and Paste Functions**

You can use the Copy and Paste functions to save time when creating a job that shares many of the properties of an existing job in the job stream. See “Creating a Job with the Copy and Paste Functions” on page 123 for reference.

**Deleting a Job or External Job from the Job Stream**

1. In the Graph view of the Job Stream Editor, right-click the job or external job. A pop-up menu opens.

2. Click **Delete**, as shown in the next figure, and then **OK** in the confirmation message.
The job is deleted from the job stream. In case you change your mind, you can use the **Undo Delete** option in the same pop-up menu or in the toolbar of the Graph view to put the job back in the job stream, as shown in the next figure. This option is valid until you save the job stream.
3. Click **Save** to save the job stream.

**Editing Another Job Stream from an External Job**

Use an external job to open a second Job Stream Editor window and edit the job stream to which the job belongs. To do this:

1. In the Graph view of the Job Stream Editor, right-click the external job. A pop-up menu opens.
2. Select **Edit->External Job Stream**, as shown in the next figure.
An additional Job Stream Editor window displays, as shown in the next figure, and from there you can open the views to work on that job stream and its components.
Modifying Job Streams in the Database

Figure 128. The Job Stream Editor window of the external job stream

Removing a Dependency between Jobs

1. In the Graph view of the Job Stream Editor, right-click the line that represents the dependency. The line becomes red and a pop-up menu is displayed, as shown in the next figure.
Modifying Job Streams in the Database

Adding and Modifying Run Cycles

Select a job stream from a job stream list and open the Run Cycle view of the Job Stream Editor. In this way, you can work on existing run cycles or create new ones.

1. Run a job stream list.
2. When the list is displayed, double-click the job stream you want to open.
3. Click Run Cycle to open the Run Cycle view of the job stream.
4. Select a run cycle in the run cycle list and right-click on it to display the pop-up menu shown in the next figure.
Modifying Job Streams in the Database

Figure 130. Working on existing run cycles

From here you can:

- Click the Properties… option to edit the run cycle’s properties in the Run Cycle Properties window. See “Specifying When a Job Stream Should Run” on page 135 for reference.
- Click the Copy option to create an additional run cycle with the same properties as the selected one. A Rule-based or Offset-based Run Cycle Properties window opens with the same definitions as the “model” run cycle. Modify any definitions you need to, and enter a new name before saving.
- Click the Delete option to delete the run cycle from the job stream.

**Viewing and Modifying Time Restrictions in the Timeline View**

The Timeline view of the Job Stream Editor shows the time restrictions of the jobs and run cycles of a job stream. You can modify the time
Deleting Job Streams from the Database

restrictions of a job or of a run cycle, in the same way you created them, by using either the Job Properties window of the Graph view or the Run Cycle Properties window of the Run Cycle view.

In addition, you can view and modify time restrictions for more than one run cycle and more than one job in the Timeline view. See “Checking Time Restrictions in the Timeline View” on page 150 for a full description of the Timeline view of a job stream in the database.

Deleting Job Streams from the Database

You can use a job stream list, to delete a job stream from the Application Description database.

To do this:

1. Run a job stream list.
2. When the list is opened, right-click the job stream you want to delete.
3. Choose **Delete**, as shown in the next figure, and click **OK** in the confirmation window. The job stream is deleted.

*Figure 131. Deleting a job stream definition from the OPC database*
Using the Copy Function to Add an External Job to a Job Stream

Use the Copy function on a listed job stream to add any of the jobs that comprise it as external jobs to another job stream.

For example, do the following if you want to add one of the jobs in job stream ADPONE01 as an external job of job stream PAYRO21:

1. List job stream ADPONE01 and right-click on it. A pop-up menu is displayed.

2. Select **Copy**, as shown in the next figure.

3. Go to the Graph view of the job stream editor for PAYRO21 and right-click anywhere in the window. A pop-up menu is displayed.

4. Select **Paste**, as shown in the next figure.
Using the Copy Function to Add an External Job to a Job Stream

Figure 133. Pasting the job stream

The External Job Properties window for job stream ADPONE01 is displayed.

5. In the External Job Properties window select **Show jobs**. All the jobs that comprise job stream ADPONE01 are listed, as shown in the next figure.
Using the Copy Function to Add an External Job to a Job Stream

Figure 134. Displaying the jobs of ADPONE01

6. Select the job that you want to add as an external job of PAYRO21, SSS-10 for example, and click OK. The External Job Properties window is closed and an icon for SSS-10 is added to the graph view of PAYRO21, as shown in the next figure.
Using Existing Definitions to Create Other Job Streams in the Database

You can select a job stream from a list and use its definition to create other job streams with equal or similar properties. After you have displayed a list of job streams, do the following:

1. Right-click the job stream that you want to use as a model for creating another job stream. A pop-up menu is displayed.
2. Select **Create Another...**, as shown in the next figure. The Job Stream Editor and the Job Stream Properties windows for the job stream that you selected are displayed.
Using Existing Definitions to Create Other Job Streams in the Database

Figure 136. Using an existing definition to create another job stream

3. In the **Name** field of the Job Stream Properties window, change the default name to the name of your choice. If you do not change the name, the new job stream is saved as CopyOf*name*, where *name* is the name of the model job stream.

4. In the Job Stream Properties and Job Stream Editor windows make any other changes that you need to customize the new job stream for your requirements.

5. Save the new job stream and close the Job Stream Editor window.

6. In the Tivoli Job Scheduling Console window click the Refresh List Results icon, or run another list, to view the new job stream.
For jobs and job streams, an instance, also known as an occurrence in OPC, is a job or job stream that has been scheduled in the plan. The plan contains past, present, and future scheduled job streams. It also contains the workstations and resources that support this workload.

To monitor and modify job and job stream instances, create and display lists for each.

This chapter describes how to list job and job stream instances. The next chapter describes how to work with instances from the lists you create.

Creating Lists of Job Stream and Job Instances

You can maintain several lists by creating list objects with different sets of filter criteria. For example, you can maintain lists of job streams for different status and error conditions. You can also create lists to monitor the workload in progress or the outcome of scheduled jobs.

The following are some examples of how to use job and job stream instance lists:

- To list jobs that have ended in error in the last 24 hours, create a list of jobs with a status of Error and a time interval between yesterday’s and today’s dates.
Creating Lists of Job Stream and Job Instances

- To discover all the scheduled jobs that depend on a job that you know will end in error, list the job in error and look at all its successors.
- To search for all job streams that include a specific job, create a job instance list and specify the identifier in the filter criteria. The resulting list displays all instances of job and the job stream instance to which it belongs.
- To see all job stream instances scheduled for the month of December 2000, create a job stream instance list and specify the dates in the filter criteria.

Default Instance Lists

The Job Scheduling Console for OPC provides instance lists. You can find them in the Default Plan Lists group in the tree of every OPC controller showing in the Job Scheduling view. The instance lists are:

All Scheduled Job Streams

Displays a list of all the existing job stream instances in the OPC subsystem.

All Scheduled Jobs

Displays a list of all the existing job instances in the OPC subsystem.

The default instance lists work in the same way as the user lists. You can display their properties and see from the empty fields that no selection criteria are specified. You can modify their properties and make them less general by adding the filters of your choice.

Listing Job Stream Instances

1. In the Job Scheduling view, select an OPC controller and click **List Job Stream Instances** in the toolbar, as shown in the next figure.
Creating Lists of Job Stream and Job Instances

Figure 137. Listing job stream instances

A Properties - Job Stream Instance List window, like the one shown in the next figure, opens.
Creating Lists of Job Stream and Job Instances

Figure 138. The Properties - Job Stream Instance List window

2. In the Name field, enter a name for the list.

3. If you want the list results refreshed automatically, click the Periodic refresh check box and specify a refresh interval in seconds, or click Apply defaults to use the default specified in the Settings page of the Scheduler Properties window.

4. In the Filter Criteria group, complete any of the following fields. You can use combinations of more than one parameter. Use asterisks (*) to substitute strings or question marks (?) to substitute a single character, as wildcard characters to generalize your search with partial strings. If you leave all fields blank, then all the job stream instances currently in the plan are displayed when you open the list.

   **Job stream**
   
   Lists all the job stream instances with this name or namestring.
Creating Lists of Job Stream and Job Instances

Job stream template

Lists all the job stream instances that are part of this template.

Owner

Lists all the job stream instances that belong to this owner.

Authority group

Lists all the job stream instances that use this authority group for RACF authority checking.

Dates

Lists all job stream instances scheduled to run in an interval period starting on the day and time specified in the From Date and Time fields and ending in the day and time specified in the To Date and Time fields. Pop-up calendars are provided to help you select the days.

Priority

Lists all the job stream instances that have the priority level you select in From and To.

Manually Added

Lists all those job stream instances that were added manually to the plan (and not automatically through a plan extension), if you select the Yes radio button. Select No to exclude manually added job streams from the list. Select Ignore criteria to omit this filter.

Rerun requested

Lists all those job stream instances for which a rerun was requested, if you select the Yes radio button. Select No to exclude these job stream instances from the list. Select Ignore criteria to omit this filter.

Status

Lists all the job stream instances with any of the following Job Scheduling Console status codes that you specify in the drop-down list:
Creating Lists of Job Stream and Job Instances

- Waiting
- Running
- Successful
- Error
- Canceled

Internal Status

Lists all the job stream instances with any of the following OPC status codes that you specify in the drop-down list:

- Complete
- Deleted
- Error
- Pending predecessor
- Started
- Undecided
- Waiting

Note: Status and Internal status exclude each other as filter criteria. However, they are both displayed among the properties of job stream instances. Internal status refers to the status code assigned by the specific job scheduling engine, OPC in this case. It generally provides more detail than the broader status code assigned by the Job Scheduling Console.

5. Click OK. An icon of the new list is displayed in the tree under the OPC controller you selected when creating it. To display the list, right-click it and select Open. List results are displayed in the window on the right of the tree.

Optionally, before saving the list, you can use the Apply button to display the list’s results immediately.

Listing Job Instances

1. In the Job Scheduling view, select an OPC controller and click List Job Instances in the toolbar, as shown in the next figure.
Creating Lists of Job Stream and Job Instances

Listing Occurrences and Operations (Job Stream and Job Instances)

Figure 139. Listing job instances

A Properties - Job Instance List window, like the one shown in the next figure, opens.

Figure 140. The Properties - Job Instance List window
Creating Lists of Job Stream and Job Instances

2. In the **Name** field, enter a name for the list.

3. If you want the list results refreshed automatically, click the **Periodic refresh** check box and specify a refresh interval in seconds, or click **Apply defaults** to use the default specified in the Settings page of the Scheduler Properties window.

4. In the Filter Criteria group, complete any of the following fields. You can use combinations of more than one parameter. Use asterisks (*) to substitute strings or question marks (?) to substitute a single character, as wildcard characters to generalize your search with partial strings. If you leave all fields blank, then all the job instances currently in the plan are displayed when you open the list.

   **Job stream**
   - Lists all the job instances that are in the job stream with this name or namestring.

   **Job identifier**
   - Lists all the job instances that have this identifier. You cannot use wildcard characters with this filter.

   **Task name**
   - Lists all the job instances that are associated with this task or JCL.

   **Workstation**
   - Lists all the job instances run on this workstation.

   **Owner**
   - Lists all the job instances that belong to this owner.

   **Authority group**
   - Lists all the job instances that use this authority group for RACF authority checking.

   **Priority**
   - Lists all the job instances that have the priority level you select in **From** and **To**.

   **Dates**
   - Lists all job instances that are part of job stream instances.
Creating Lists of Job Stream and Job Instances

scheduled to run in an interval period starting on the day and time specified in the **From Date** and **Time** fields and ending in the day and time specified in the **To Date** and **Time** fields. Pop-up calendars are provided to help you select the days.

**Status**

Lists all the job instances with any of the following Job Scheduling Console status codes that you specify in the drop-down list:
- Waiting
- Ready
- Running
- Successful
- Error
- Canceled
- Interrupted
- Undecided

**Internal Status**

Lists all the job instances with any of the following OPC status codes that you specify in the drop-down list:
- Arriving
- Ready
- Started
- Complete
- Deleted
- Interrupted
- Ready-non reporting workstation
- Error
- Waiting
- Undecided

**Note:** Status and Internal status exclude each other as filter criteria. However, they are both displayed among the properties of job instances. Internal status refers to the status code assigned by the specific job scheduling engine, OPC in this case. It generally provides more detail than the
Creating Lists of Job Stream and Job Instances

broader status code assigned by the Job Scheduling Console.

**Critical job**
Lists all the job instances defined as critical jobs.
Available for OPC 2.3 only.

**WLM policy** Lists all the job instances defined as critical jobs and for which the WLM policy you indicate here was defined.
Click the arrow and select one of the available policies.
Available for OPC 2.3 only.

5. Click **OK**. An icon of the new list is displayed in the tree under the OPC controller you selected when creating it. To display the list, right-click it and select **Open**. List results are displayed in the window on the right of the tree.
Optionally, before saving the list, you can use the **Apply** button to display the list’s results immediately.
Monitoring and Modifying Occurrences (Job Stream Instances)

This chapter explains how to do the following:

- Browse and modify a job stream instance.
- Delete a job stream instance.
- Change the status of a job stream instance to successful.
- Change the status of a job stream instance to waiting.

To perform these actions, you use job stream instance lists. Job stream instance lists are displayed in two ways, the List view and the Timeline view. The List view, displayed in the next figure, shows details about each instance.
The Timeline view displays graphic information about time restrictions.

In the Timeline view, job stream instances with the same names are listed in groups. A group contains two or more job stream instances that have the same job stream name but different run times. Groups are indicated by a small arrow on their left side. Click on the arrow to display the individual instances, as shown in the next figure.
Browsing and Modifying Job Stream Instances

The only possible action on a group of job stream instances is **Delete all**, which you can select when you right-click the group. To perform the actions listed above and to display activity bars on the individual instances, you must first expand the group by clicking the arrow.

**Browsing and Modifying Job Stream Instances**

1. List the job stream instance and right-click it. A pop-up menu is displayed.
2. Select **Properties…**, as shown in the next figure.
The Job Stream Instance Properties window opens. Most of the details you see are in read-only mode. However, you can modify some editable fields.
The General page, shown in the preceding page, displays:

- The name and description of the job stream.
- If the status is running, at what time the instance started.
- If the status is successful, the amount of time it took the instance to complete.
- The current status.
- The earliest time at which you estimated the instance should start.
- The authority group name, if applicable, and the owner.
- The name of the calendar used for the schedule.
- The priority level. You can raise or lower it if the instance has not yet started.
Browsing and Modifying Job Stream Instances

- The name of the table of JCL variables, if any, used by the job stream. You can enter or change the name of a table. Click the ellipsis button (…) to search for available tables.
- The name of the job stream template, if any, to which the job stream belongs.
- The name of the function used to schedule the job stream.
- Whether or not the instance has been run again.
- The number of jobs that remain to be run in the critical path, their expected duration, and the identifier of the next job scheduled to run on the critical path.

The Time Restrictions page, shown in the next page, contains the earliest start time and deadline that you specified when you created the job stream. You can change them here in the same way as you can change them by moving the activity bar in the Timeline view.

Figure 145. The Time Restrictions page of the Job Stream Instance Properties window
3. Click **OK** to save any changes you made and close the window. Or click **Apply**, if you want to save the changes and keep the window open. If you want to disregard the changes or just browse the window, click **Cancel** to close it.

**Changing the Time Restrictions of a Job Stream Instance in the Timeline View**

The left-hand pane of the Timeline view, shown in the next figure, displays the following job stream instance details:

- **Name** The job stream name
- **Status** The current status
- **Start at** The planned start time
- **Deadline** The planned deadline
- **Start** The actual start time
- **Runtime** The actual duration

*Figure 146. The left-hand pane of the Timeline view for job stream instances*
Browsing and Modifying Job Stream Instances

The right-hand pane, displayed in the next figure, has activity bars that show the actual run time if the instances have begun, as well as the specified time restrictions for the instances.

Figure 147. The right-hand pane of the Timeline view for job stream instances

![Tivoli Job Scheduling Console](image)

By moving components of the activity bars, you can change the time restrictions of each instance and view the results of your changes, as you would by following the steps described in “Browsing and Modifying Job Stream Instances” on page 191 and going directly to the Time Restrictions page of the Job Stream Instance Properties window.

The activity bar shows the runtime of a job stream instance in terms of the start and deadline times that were specified as time restrictions for the job stream. The deadline is indicated by a vertical black stripe at the end of the activity bar, which is colored blue. As the instance starts, a horizontal black line unfolds inside the activity bar to show the actual runtime.

You can change the time restrictions of an instance that has yet to run or that is running in the following ways:

- Reschedule the instance in ready status by moving the activity bar, as shown in the next figure. To move the bar, position the pointer
of your mouse inside the bar and, when the pointer becomes cross-
shaped, keep the left button of your mouse pressed while moving
the bar in either direction.

Figure 148. Rescheduling a job stream instance

As you move the bar, a tooltip tells you the new deadline time at
every position of the right end of the bar. When you find the
position you want, release the mouse button. The Time
Restrictions page of the Job Stream Instance Properties window
opens to displays the new start and deadline times, as shown in the
next figure.
Figure 149. Saving the new Start and Deadline times of a job stream instance

Click **OK** in the Time Restrictions page to save the new settings. The activity bar is set on the new position.

- Reschedule the start time by positioning the pointer of your mouse on the left end of the bar. When the pointer becomes a double arrow, keep the left button of your mouse pressed while moving the end of the bar, as shown in the next figure.
As you move your mouse, a tooltip tells you the corresponding start time at every new position of the left end of the bar. When you find the position you want, release the mouse button. The Time Restrictions page of the Job Stream Instance Properties window opens to show the new start time. Click OK in the Time Restrictions page to save the new settings. The activity bar’s left end is set on the new position.

- Reschedule the deadline time by positioning the pointer of your mouse on the right end of the bar. When the pointer becomes a double arrow, keep the left button of your mouse pressed while moving the end of the bar, as shown in the next figure.
Deleting Job Stream Instances

As you move your mouse, a tooltip tells you the corresponding deadline time at every new position of the right end of the bar. When you find the position you want, release the mouse button. The Time Restrictions page of the Job Stream Instance Properties window opens to show the new deadline time. Click OK in the Time Restrictions page to save the new settings. The activity bar’s right end is set on the new position.

Deleting Job Stream Instances

1. In a list, select the name of an instance or group of instances and right-click on it. A pop-up menu is displayed.
2. Select Delete to delete a job stream instance, as shown in the next figure.
Deleting Job Stream Instances

Select **Delete all** to delete a group of job stream instances, as shown in the next figure.
Manually Setting a Job Stream Instance to Complete (Successful)

Figure 153. Deleting a group of job stream instances

3. Click **OK** in the ensuing confirmation message to proceed. The instance or instances are deleted and removed from the plan.

Manually Setting a Job Stream Instance to Complete (Successful)

To force the completion of a job stream instance:

1. In a list, right-click the job stream instance. A pop-up menu is displayed.
2. Select **Set to Complete**, as shown in the next figure.
3. Click **OK** in the ensuing confirmation message to proceed.

   The status of the job stream instance is changed to *Successful*. The status of all the job instances that are part of the job stream is also set to *Successful*.

### Manually Setting a Job Stream Instance to Waiting

Set a job stream instance to the *waiting* status to force it to restart.

**Note:** Use this option only if no external jobs have started.

1. In a list, right-click the job stream instance. A pop-up menu is displayed.
2. Click **Set to Waiting**, as shown in the next figure.
3. Click **OK** in the ensuing confirmation message to proceed. The status of the job stream instance is changed to *Waiting*. The status of all the job instances that are part of the job stream is also set to *Waiting*. 

---

**Figure 155. Setting a job stream instance to Waiting**
This chapter explains how to do the following:

- Browse and modify a job instance
- Add, remove, or change dependencies of a job instance on other jobs
- Delete a job instance from the plan
- Hold a job instance
- Release a held job instance
- Remove a job instance from the plan
- Restore a job instance to the plan
- Run a job instance immediately
- Change the status of a job instance

To perform these actions, you use job instance lists. Job instance lists are displayed in two ways, the List view and the Timeline view.

The List view, displayed in the next figure, shows details about each instance.
The Timeline view displays graphic information about time restrictions.

In the Timeline view, job instances that share the same job stream instance and runtime are listed in groups. A group contains two or more job instances that have the same runtime but different identifiers. Groups are indicated by a small arrow on their left side. Click on the arrow and the individual instances are displayed.
Browsing and Modifying Job Instances

As shown in the preceding figure, you can perform the following actions on a group of job instances:

- Delete all the job instances
- Put all the job instances on hold
- Release all the held job instances

To perform the actions available to individual job instances and to display activity bars on the job instances arranged in a group, you must first expand the group by clicking the arrow.

Browsing and Modifying Job Instances

1. List the job instance that you want to work on and right-click on it. A pop-up menu is displayed.
2. Select Properties..., as shown in the next figure.
The Job Instance Properties window opens. Many of the details you see are in read-only mode. However, you can modify the editable fields and save the changes to the current plan. To save the changes to the current plan and to keep the window open at the same time, use the **Apply** button.
The General page, shown in the preceding figure, displays the following read-only information:

**Identifier** The job identifier.

**Workstation** The name of the workstation running the job.

**Priority** The priority level of the job stream to which the job belongs.

**Started** The actual date the instance started.

**Runtime** The time it took the instance to run if completed.

**Belongs to job stream** The name of the job stream to which the job belongs.

**Description** A description of the job. This field is editable.

**Authority group** The name of the Authority group of the job stream.

**Internal status** The OPC status of the job instance.
Browsing and Modifying Job Instances

**Status details**
Additional information on the OPC status of the job instance.

**Error code** The code with which the instance ended in error, when applicable.

**Start Time** This group box displays the earliest, latest, planned, and actual start times of the job instance.

The **Task** page, shown in the next figure, contains editable information about any task or JCL that the job instance may be associated with:

- **Task name** The name of the task associated with the job instance
- **Form number** The printer form number if the job is a printer job
- **Job class** The job class letter

*Figure 160. The Task page of the Job Instance Properties window*

The **Time Restrictions** page, shown in the next figure, contains the start time, deadline, and duration that you specified when you defined the job in the database. You can change them here if the
job has not started yet. However, OPC calculates the planned start time and deadline.

Figure 161. The Time Restrictions page of the Job Instance Properties window

The Details page, shown in the next figure, displays the following additional information on the job instance:
Browsing and Modifying Job Instances

**Figure 162. The Details page of the Job Instance Properties window**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JES job number</td>
<td>The job number assigned by JES.</td>
</tr>
<tr>
<td>Planned duration</td>
<td>The planned duration time.</td>
</tr>
<tr>
<td>Intermediate start</td>
<td>If there is an intermediate start.</td>
</tr>
<tr>
<td>Actual end</td>
<td>The time of actual end, if the instance completed.</td>
</tr>
<tr>
<td>Transport time</td>
<td>The transport time.</td>
</tr>
<tr>
<td>Dependencies</td>
<td>This group box displays:</td>
</tr>
<tr>
<td></td>
<td>■ The number of jobs whose completion is necessary for this instance to run.</td>
</tr>
<tr>
<td></td>
<td>■ The number of predecessors that have completed.</td>
</tr>
</tbody>
</table>
The number of jobs that depend on the completion of this instance. See the Successors page of the Job Instance Dependencies window for a list.

The number of logical resources reserved for the job.

**Catalog management status**

The status code of the catalog management function.

**Latest out passed**

The latest end time passed.

**On critical path**

Whether the job instance is on the critical path.

**Urgent**

The urgency indicator.

**JCL preparation**

Whether JCL preparation is required.

**Deadline WTO**

Whether a write-to-operator message should be sent when the job misses its deadline.

**WLM policy**

The policy applied for WLM service class promotion if this job is late. To use this option, you must also select the Critical job check box. Available for OPC 2.3 only. The policy can be:

- **Conditional** OPC uses an algorithm to determine whether to apply the Deadline or the Latest start option.

- **Deadline** OPC intervenes if the job runs beyond the deadline.

- **Latest start** OPC intervenes immediately if the job starts after the latest start time.

- **Long duration** OPC intervenes if the job takes longer than it should as compared to the statistics that OPC keeps.

**Critical job**

Whether or not the job has been defined as a critical job. If a critical job runs late, it is eligible for Workload Manager
Browsing and Modifying Job Instances

(WLM) service class promotion. Available for OPC 2.3 only.

The **Options** page, shown in the next figure, contains job instance properties that you can change:

*Figure 163. The Options page of the Job Instance Properties window*

Auto release
Whether the instance should be automatically released. Click the check box to set this feature on or off.

Auto error completion
Whether the instance should be automatically completed in the event it ends in error. Click the check box to set this feature on or off.

Cancel if late
Whether the instance should be cancelled automatically if late on schedule. Click the check box to set this feature on or off.
Browsing and Modifying Job Instances

Auto submit Whether the instance should be submitted automatically. Click the check box to set this feature on or off.

Restartable Whether the instance should be made restartable. You can change to Yes, No, or Default to keep the original job definition.

Reroutable Whether the instance should be made reroutable. You can change to Yes, No, or Default to keep the original job definition.

Catalog Management
Whether catalog management is used if the job instance ends in error. This field is read-only.

Highest acceptable return code
The highest acceptable return code for the instance. You can update this field.

User data Editable user data.

The Resources page, shown in the next figure, contains information about the target and logical resources used by the job instance.
Click the pull-down arrow to unfold a list and click on the type of resources you want to see.

The Target resources list, shown in the next figure, displays the quantities of workstation resources 1 and 2, and of the parallel server. You can modify quantities by double-clicking the field and entering a new value.
The Logical resources list, shown in the next figure, displays the details listed below for any defined resource. Double-click any cell to enter new values or to choose values from drop-down lists.
Browsing and Modifying Job Instances

Figure 166. Logical resources for a job instance

<table>
<thead>
<tr>
<th>Resource</th>
<th>Quantity</th>
<th>Access type</th>
<th>Keep on error</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU1</td>
<td>10</td>
<td>Shared</td>
<td>Default</td>
</tr>
<tr>
<td>CPU2</td>
<td>12</td>
<td>Shared</td>
<td>Default</td>
</tr>
</tbody>
</table>

**Resource** The resource name.

**Quantity** The resource quantity.

**Access type** The access type. Available options are **Shared** or **Exclusive**.

**Keep on error**

Whether or not to keep the resource allocated, if it goes on error. Available options are: **Yes**, **No**, **Default**, to use the choice specified in the original job definition.

For logical resources only, click the **Add Row** or **Remove Row** buttons to add or exclude resources in the list. When adding a resource, click the ellipsis (...) under the Resource field to locate resources with a Find tool. When removing a resource, select the resource before clicking the **Remove Row** button.

3. Click **OK** to save any changes you made and close the window. Or click **Apply**, if you want to save the changes and keep the window open. If you want to disregard the changes or just browsed the window, click **Cancel** to close it.
Browsing and Modifying the Job Dependencies of a Job Instance

1. List the job instance that you want to work on and right-click on it. A pop-up menu is displayed.
2. Select Dependencies. The Job Instance Dependencies window is displayed.

The Predecessors page, shown in the next figure, displays the following details about the job instances that must complete before this instance can start running:

- **Job Stream Name**
  The name of the job stream to which the predecessor belongs, if it is external

- **Identifier**
  The identifier of the predecessor job

- **Job Stream Start**
  The start time of the job stream to which the predecessor belongs, if it is external

- **Task Name**
  The name of the task associated with the predecessor job

- **Status**
  The current status of the predecessor

*Figure 167. The Predecessors page of the Job Instance Properties window*

**Note:** Use your mouse to widen the cells that contain the column headings, if you cannot read the headings completely.

You can modify the information of this page in the following way:
To change listed predecessors, double-click each field to replace the information.

To add another predecessor, click the **Add Row** icon in the upper right of the window and then fill in the fields of the new row.

If you need assistance to find an external predecessor job, or information about it, select the ellipsis that displays when you double-click the Job Stream Name, Identifier, or Job Stream Start fields. This opens a Find Job Instance window where you can start a filtered search of the job you are seeking. The search produces information in terms of job stream name, job identifier, and job stream start date. To insert these data in the row you are working on, just click **Apply** in the Find Job Instance window.

To delete a predecessor from the list, select it and then click the **Delete Row** icon in the upper right of the window.

3. To go to the **Successors** page, click the **Successors** tab.

This page, shown in the next figure, displays the following details about other job instances that depend on the completion of this instance to start running:

- **Job Stream Name**
  - The name of the job stream to which the successor job belongs, if it is external

- **Identifier**
  - The identifier of the successor job

- **On critical path**
  - Whether the successor job is on the critical path

- **Job Stream Start**
  - The start time of the job stream to which the successor job belongs, if it is external

- **Task Name**
  - The name of the task associated with the successor job

- **Status**
  - The current status of the successor

**Note:** Use your mouse to widen the cells that contain the column headings, if you cannot read the headings completely.
You can modify the information of this page in the following way:

- To change listed successor jobs, double-click each field to replace the information.

- To add another successor, click the **Add Row** icon in the upper right of the window and then fill in the fields of the new row.

If you need assistance to find an external successor job, or information about it, select the ellipsis that displays when you double-click the Job Stream Name, Identifier, or Job Stream Start fields. This opens a Find Job Instance window where you can start a filtered search of the job you are seeking. The search produces information in terms of job stream name, job identifier, and job stream start date. To insert these data in the row you are working on, just click **Apply** in the Find Job Instance window.

- To delete a successor from the list, select it and then click the **Delete Row** icon in the upper right of the window.

4. Click **OK** to save any changes you made and close the window. Or click **Apply**, if you want to save the changes and keep the window open. If you want to disregard the changes or you just browsed the window, click **Cancel** to close it.
Browsing and Modifying Job Instances

Changing the Time Restrictions of a Job Instance in the Timeline View

The left-hand pane of the Timeline view displays the following job instance details:

- **Name** The job name
- **Status** The current status
- **Start at** The planned start time
- **Duration** The planned duration
- **Deadline** The planned deadline
- **Start** The actual start time
- **Runtime** The actual duration

The right-hand pane, displayed in the next figure, has activity bars that show the runtime of a job instance in terms of start, duration, and deadline times.

*Figure 169. The Timeline view of job instances*
The deadline is indicated by a black stripe at the end of the activity bar. The activity bar, which is colored blue, represents the time difference between the earliest planned start and the planned end that were specified as time restrictions for the job. A pale blue bar represents the duration of the job. It turns red if the duration exceeds the deadline and it becomes diamond shaped if the duration is zero. A black line represents the actual runtime of the job instance.

By moving components of the activity bars, you can change the time restrictions of each instance and view the results of your changes, as you would by following the steps described in “Browsing and Modifying Job Instances” on page 207 and going directly to the Time Restrictions page of the Job Instance Properties window.

You can graphically change the time restrictions of an instance in the following ways:

- Reschedule the instance in ready status by moving the activity bar. To move the bar, position the pointer of your mouse inside the bar. When the pointer becomes cross-shaped, keep the left button of your mouse pressed while moving the bar in either direction, as shown in the next figure.

**Figure 170. Rescheduling a job instance**
As you move the bar, a tooltip tells you the new deadline time at every position of the right end of the bar. When you find the position you want, release the mouse button. The Time Restrictions page of the Job Instance Properties window opens to show the new times, as shown in the next figure.

Figure 171. Saving the new Start and Deadline times of a job instance

Click **OK** in the Time Restrictions page to save the new settings. The activity bar is set on the new position.

- Reschedule the start time by positioning the pointer of your mouse on the left end of the bar. When the pointer becomes a double-headed arrow, keep the left button of your mouse pressed while moving the end of the bar, as shown in the next figure.
As you move your mouse, a tooltip tells you the corresponding start time for every new position of the left end of the bar. When you find the position you want, release the mouse button. The Time Restrictions page of the Job Instance Properties window opens to show the new start time.

Click **OK** in the Time Restrictions page to save the new settings. The activity bar’s left end is set on the new position.

- Reschedule the deadline time by positioning the pointer of your mouse on the right end of the bar. When the pointer becomes a double arrow, keep the left button of your mouse pressed while moving the end of the bar, as shown in the next figure.
Deleting Job Instances

**Figure 173. Rescheduling the Deadline of a job instance**

As you move your mouse, a tooltip tells you the corresponding deadline time for every new position of the right end of the bar. When you find the position you want, release the mouse button. The Time Restrictions page of the Job Instance Properties window opens to show the new deadline time.

Click **OK** in the Time Restrictions page to save the new settings. The activity bar’s right end is set on the new position.

**Deleting Job Instances**

1. Select the name of a job instance or group of job instances and right-click on it. A pop-up menu appears.
2. Select **Delete** to delete a job instance, as shown in the next figure.
Deleting Job Instances

3. Select **Delete all** to delete a group of job instances, as shown in the next figure.

---

**Figure 174. Deleting a job instance**
Putting Job Instances on Hold

4. Click **OK** in the confirmation window to delete the instance or group of instances. The instance or instances are deleted and removed from the plan.

### Putting Job Instances on Hold

1. Select the name of a job instance or group of job instances and right-click on it. A pop-up menu appears.
2. Select **Hold** to put a job instance on hold, as shown in the next figure.
3. Select **Hold all** to put a group of job instances on hold, as shown in the next figure.
Releasing Job Instances

Figure 177. Putting a group of job instances on hold

Note: Within a group, only the job instances whose status is compatible with the Hold command are actually held.

4. Click OK in the confirmation window. The instance or instances are placed on hold from the plan until they are released again.

Releasing Job Instances

1. Select the name of a job instance or group of job instances and right-click on it. A pop-up menu appears.

2. Select Release, as shown in the next figure, to release a job instance from a held status.
3. Select **Release all**, as shown in the next figure, to release a group of job instances from a held status.
Removing a Job Instance from the Plan

4. Click **OK** in the confirmation window. The instance or instances are released into the plan.

### Removing a Job Instance from the Plan

With the NOP option, you can remove a job instance that is already in the plan and is ready or waiting to run. Use this option on job instances whose internal status is one of the following:

- Arriving
- Ready
- Ready-non reporting workstation
- Waiting
- Completed (only for computer workstations with automatic reporting)

To use this option:

**Note:** Within a group, only the job instances whose status is compatible with the Release command are actually released.
1. Select the name of a job instance and right-click on it. A pop-up menu appears.

2. Select NOP, as shown in the next figure.

Figure 180. Removing a job instance from the plan

The job instance is removed from the plan. The job instance’s NOP condition is identified by the N Status Details code in the Job Instance Properties window.

Restoring a Job Instance to the Plan

With the UN-NOP option, you can restore to the plan a job instance previously removed with NOP.

1. Select the name of a job instance and right-click on it. A pop-up menu appears.

2. Select UN-NOP, as shown in the next figure.
Running a Job Instance Immediately

You can use the *Execute* option to immediately run a job instance that is ready to run regardless of normal scheduling rules excluding dependencies. In order to run, the resources the job instance depends on must be available. Otherwise, the option is rejected. To force the execution of a job instance:

1. Select the name of a job instance and right-click on it. A pop-up menu appears.
2. Select *Execute*, as shown in the next figure.
Changing the Status of a Job Instance

You can manually set the status of a job instance. To change the status of a job instance:

1. Select the name of a job instance and right-click on it. A pop-up menu appears.
2. Select Set Status..., as shown in the next figure.

If all conditions are met, the job instance is run immediately.
Changing the Status of a Job Instance

Figure 183. Changing the status of a job instance

A Change Status dialog, like the one displayed in the next figure, opens. You can click the button for the status you want to use.

Figure 184. The Change Status dialog

Note: If you are changing to an Error status, a field becomes available for entering any code you want to show in the Job Instance Properties window.
This chapter describes how to monitor and update workstations in the plan. You can:

- Monitor the status of a workstation in the plan and of the job instances scheduled to run on it
- Modify the settings and availability of the workstation
- Reroute the job instances that are scheduled to run on a workstation
- Modify the status of the job instances running on the workstation

To do this, use a filtered list of workstations in the plan. To create a list that displays selected workstations for the plan, see “Listing Workstations in the Plan” on page 75.

### Displaying Workstations in the Plan

To display a list of workstations in the plan:

1. Double-click an OPC controller.
2. In the tree that is displayed, right-click the plan workstation list object of your choice. A pop-up menu is displayed.
3. Select **Open**. A list of workstations in the plan is displayed on the right.
Monitoring and Modifying a Workstation in the Plan

Plan workstation lists are displayed in windows composed of two horizontal panes. In addition to the workstation list, there is a lower pane that contains details about the jobs scheduled on the workstations. To view the lower pane, drag the horizontal dividing bar located at the bottom of the window, as shown in the next figure.

Figure 185. A plan workstation list display

See “Displaying by Status the Job Instances Scheduled on a Workstation” on page 255 for details.

Monitoring and Modifying a Workstation in the Plan

From a plan workstation list you can view details of a workstation allocated to the plan. You can also:

- Modify some of the attributes of the workstation
- Specify what action to take on the jobs running or scheduled to run on the workstation if it becomes unavailable
- Change the quantities of workstation resources available for defined time slots and update time slot definitions
Monitoring and Modifying a Workstation in the Plan

- Check the statistics of jobs scheduled on the workstation
- Specify the name of a new alternate workstation

The changes you make from a workstation status list update the current workstation plan information, which is stored in the current plan dataset of OPC.

**Browsing and Modifying Workstation Properties**

1. Select a workstation from the list and right-click on it. A pop-up menu is displayed.
2. Select **Properties…**, as shown in the next figure.

*Figure 186. Opening the Properties window of a workstation in the plan*

The General page of the Properties—Workstation in Plan window, shown in the next figure, is displayed. Several fields are read-only.
Monitoring and Modifying a Workstation in the Plan

Figure 187. The General page of the Properties-Workstation in Plan window

The following is read-only information:

- Name, description, and type
- Whether the workstation is used for job setup, started task support, or WTO purposes
- Whether the workstation will reroute job instances to an alternate workstation, before failing or going offline
- Whether an alternate workstation was defined
- The current status of the workstation

You can modify the following details:

1. To modify the workstation’s reporting attribute, click the Reporting attribute drop-down list. The choices are Manual start and completion, Automatic, Completion only, and Non reporting.
Monitoring and Modifying a Workstation in the Plan

2. If you want to change the Control on servers selection from its current status, click the **Control on servers** check box. When the Control on servers check box is selected, OPC will not start more job instances at the workstation than there are available servers.

3. When you have finished, click **OK** if you want to save your changes and close the Properties-Workstation in Plan window. Click **Apply**, if you want to save the changes and you want to leave the window open and proceed to another page. Otherwise, click **Cancel** to close the window without saving any changes.

**Browsing and Modifying Workstation Resources**

1. In the Properties-Workstation in Plan window, click the **Resource** tab to go to the page, shown in the next figure, that displays details about the two workstation resources.

*Figure 188. The Resource page of the Properties-Workstation in Plan window*
Monitoring and Modifying a Workstation in the Plan

For each of the two resources the window displays the name, the amount in use, and the type of use.

2. To change the type of use of each resource, click the **Used for control** check box. A selected check box means that, if an unexpected event happens while job instances are running, OPC considers the resource when it reschedules them.

3. Click **OK** if you want to save your changes and close the Properties-Workstation in Plan window. Click **Apply**, if you want to save the changes and you want to leave the window open and proceed to another page. Otherwise, click **Cancel** to close the window without saving any changes.

**Browsing Job Statistics**

In the Properties-Workstation in Plan window, click the **Job Summary** tab to go to the page that displays the number, estimated duration, and actual duration (where applicable) of all the job instances scheduled to run on the workstation. The next figure shows a sample Job Summary page.
12. Monitoring and Modifying Workstations in the Plan

The information is provided for instances in the following status:

- Completed
- Interrupted
- Started
- Ready
- Waiting

**Browsing and Modifying Workstation Availability Intervals**

1. In the Properties-Workstation in Plan window, click the **Open Time Intervals** tab.
Monitoring and Modifying a Workstation in the Plan

Figure 190. The Open Time Intervals page of the Properties-Workstation in Plan window

This page, displayed in the preceding figure, shows a list of time slots when the workstation is available to run jobs with resource quantities different from the default. The list shows the boundaries of each time slot and, for every slot, the planned quantities of workstation resources and of parallel servers available, together with the name of the alternate workstation.

You cannot edit the resource quantities and the alternate workstation names in the Planned fields. They correspond to the workstation’s Open Time Intervals definitions in the OPC database and can only be modified there (from a list of workstations in the database, for example). You can change the time boundaries and the values in the Modified fields. These values override the Planned values for the duration of the plan.
You can also add and delete time slots. To alter a value in a time slot, select the row describing the time slot and double-click the field you want to change.

2. To change the starting day, double-click the **Start Date** field. Click the pop-up calendar icon and select the new day in the calendar, as shown in the next figure. The new day is automatically entered in the field.

![Figure 191. Changing the Start date](image)

3. To change the initial time, double-click the **Start Time** field and enter the new time, as shown in the next figure.
Figure 192. Changing the Start time

4. To change the last day, double-click the **End Date** field. Click the pop-up calendar icon and select the new day in the calendar, as shown in the next figure. The new day is automatically entered in the field.
5. To change the final time, double-click the **End Time** field and enter the new time, as shown in the next figure.
6. To adjust the quantity of available parallel servers, double-click the **Modified PS** field and enter a new quantity, as shown in the next figure.
7. To adjust the available quantity of resource R1, double-click the **Modified R1** field and enter a new quantity, as shown in the next figure.
Figure 196. Changing the quantity of Resource1

8. To adjust the available quantity of resource R2, double-click the Modified R2 field and enter a new quantity, as shown in the next figure.
9. To change or add the name of the alternate workstation, double-click the Modified Alternate field, and enter a name, as shown in the next figure.
To open a Find Workstations window, click the ellipsis (see “Finding OPC Objects” on page 29 for reference).

10. To add a new time interval, click the Add Row icon and enter details as explained in the preceding steps.

11. To delete a time interval, select the row and click the Remove Row icon.

12. Click OK if you want to save your changes and close the Properties-Workstation in Plan window. Click Apply, if you want to save the changes and you want to leave the window open and proceed to another page. Otherwise, click Cancel to close the window without saving any changes.
Changing Workstation Status and Rerouting Scheduled Job Instances

You can manually change the status of a workstation and reroute scheduled job instances to an alternate workstation. This overrides, for the duration of the current plan, the corresponding values defined in the database. To do this:

1. Select a workstation from the list display and right-click on it. A pop-up menu is displayed.

2. Select Set Status….

Figure 199. Setting the status of a workstation in the plan

The Change Status-Workstation window is displayed, as shown below.
Changing Workstation Status and Rerouting Scheduled Job Instances

3. Click one of the following radio buttons:
   - **Active**  When the workstation is functioning and available
   - **Offline**  When communication between OPC and the workstation fails
   - **Failed**  When system failure makes the workstation unavailable

   **Note:** Only if you change the status to Offline or Failed, the options in the adjacent group box become available.

4. To specify how to handle the job instances scheduled on the workstation, if they have already started when the status is changed, click the arrow in the drop-down list. The choices are **Restart**, **Leave**, or **Set to error**.

5. To reroute scheduled job instances to an alternate workstation different than the one defined in the database, select the **Reroute jobs** check box.

6. Enter a valid name in the **Alternate workstation** field.

7. Click **OK** to save your changes and close the Change Status-Workstation window. Otherwise, click **Cancel** to close the window without saving any changes.
Displaying by Status the Job Instances Scheduled on a Workstation

Use a workstation status list to browse the status of the job instances scheduled on a workstation and also to take action on a job instance of which you know the status. To display the job instances:

1. Select a workstation from the list display and right-click on it. A pop-up menu is displayed.
2. Click **List Jobs** and a status, as shown in the next figure.

Figure 201. Listing jobs scheduled on a workstation

All the job instances scheduled to run on the workstation and currently in this status are displayed in the bottom pane of the window, as shown in the next figure.
Modifying the Job Instances Scheduled on a Workstation

Figure 202. List of jobs scheduled on the workstation and in Waiting status

![Image of Tivoli Job Scheduling Console with a list of jobs in Waiting status]

Modifying the Job Instances Scheduled on a Workstation

Workstation status lists are useful, since they enable you to perform the same actions on job instances as the Timeline or List views of a job instance list.

1. Obtain a list of jobs scheduled on a workstation.
2. Right-click a selected job. A pop-up menu is displayed, as shown in the next figure.
You can select any of the following actions, if they are available:

- Delete the job instance from the plan
- Hold the job instance
- Release the job instance
- Browse and modify the properties and dependencies of the job instance
- NOP or UN-NOP the job instance
- Run the job instance immediately
- Change the status of the job instance

3. See “Monitoring and Modifying Operations (Job Instances)” on page 205 for an explanation on how to use these options.
Modifying the Job Instances Scheduled on a Workstation
13. Monitoring and Modifying Resources in the Plan

This chapter describes how to monitor and update resources allocated to the plan. You can:

- Browse and modify the status of a resource
- Modify the names of the workstations connected with a resource
- Modify the availability of a resource

To do this, use a filtered list of resources in the plan. To create a list that displays selected resources allocated to the plan, see “Listing Resources in the Plan” on page 94.

Displaying Resources in the Plan

To display a list of resources in the plan:

1. Double-click an OPC controller.
2. In the resulting tree, right-click the plan resource list object of your choice. A pop-up menu is displayed.
3. Select **Open**. A list of resources allocated to the plan is displayed on the right. The entries displayed are in read-only mode. To modify details of resources already allocated to the plan, you must use the Properties-Resource in Plan window as explained in the next section.
Monitoring and Modifying a Resource in the Plan

Plan resource lists are displayed in windows composed of two horizontal panes. In addition to the resource list, there is a lower pane that contains details about the jobs associated with the resources. To view the lower pane, drag the horizontal dividing bar located at the bottom of the window, as shown in the next figure.

Figure 204. A Plan Resource list display

See “Displaying the Job Instances Associated with a Resource” on page 267 for details.

Monitoring and Modifying a Resource in the Plan

From a plan resource list you can view details of a resource in the plan. You can also:

- Change some of the resource’s attributes
- Change resource’s status
- Specify which workstations can use the resource
- Specify time intervals during which the resource allocation is different from specified defaults
The changes you make from a plan resource list update the current resource plan information, which is stored in plan.

**Browsing and Modifying Resource Properties and Status**

1. Select a resource from the list and right-click on it. A pop-up menu is displayed.
2. Select Properties..., as shown in the next figure.

*Figure 205. Opening the Properties window of a resource instance*

The Resource page of the Properties-Resource in Plan window, shown in the next figure, is displayed.
Monitoring and Modifying a Resource in the Plan

Figure 206. The Resource page of the Properties-Resource in Plan window

The information displayed is partly read-only, partly editable.

The following is read-only information:

- The name and description of the resource.
- The Group ID.
- Whether the resource is enabled to Hiperbatch. It can be Yes or No.
- The day and time the resource was last updated, and the name of the operator.

You can modify the following details. They are either definitions stored in the Resource Description database or definitions last updated by an operator on the date displayed in the message at the bottom of the page:

1. To change the availability status of the resource, select or deselect the **Is Available** check-box. To adjust the default resource quantity that must be available while the plan is running, enter a new quantity in the **Quantity** field.

2. To modify the type of use of the resource, make a selection in the **Used for** drop-down list. The choices are **Planning**, **Control**, **Planning And Control**, and **Neither Planning Nor Control**.
3. To change what to do with the resource if a job instance that allocates the resource ends in error (and does not have an overriding keep-on-error specification in the job definition), select one of the actions available in the On Error drop-down list. Choices are Free, Keep, Free if Exclusive, Free if Shared, and Assume System Default.

4. To update the deviation in the resource quantity that must be available while the plan is running, enter a value in the Deviation field. The deviation is an additional quantity with respect to the default quantity. A value of 0 means that no change in quantity was made for the plan.

5. Verify in the Quantity field the new total quantity available as the sum of the default and deviation quantities. If you did not specify any additions in Deviation, this field shows a 0, meaning that no change in quantity was made for the plan.

6. To change the type of resource availability, for Is available select the Yes, No, or Ignore radio button.

7. Click OK if you want to save your changes and close the Properties-Resource in Plan window. Click Apply, if you want to save the changes and you want to leave the window open and proceed to another page. Otherwise, click Cancel to close the window without saving any changes.

Note: While the updates you make to most of these details are replaced by the database values at the end of the plan, the updates in Quantity and Deviation are retained also through plan extensions, unless they are manually changed.

**Specifying Connected Workstations**

1. In the Properties-Resource in Plan window, click the Default Workstations tab. This page, shown in the next figure, displays the workstations that can use the resource. You can add or remove workstations in this list by using the icons in the upper-right side of the page.
Monitoring and Modifying a Resource in the Plan

Figure 207. The Default Workstations page of the Properties-Resource in Plan window

2. To remove a workstation, select the workstation and click the **Remove Row** icon.

3. To add all the available workstations, click the **Add All Workstations** icon. A new row is added. It contains an asterisk, meaning that all available workstations are connected to the resource.

4. To add specific workstations, click the **Find Workstations** icon. A **Find** dialog is displayed.

5. Enter search parameters, or leave the field blank to make a general search, and click **Start**. The found workstations are displayed in a list. Double-click on them to copy their name to the Default Workstations page.

6. Click **OK** if you want to save your changes and close the Properties-Resource in Plan window. Click **Apply**, if you want to save the changes but you want to leave the window open and proceed to another page. Otherwise, click **Cancel** to close the window without saving any changes.
Modifying Resource Availability Intervals

1. In the Properties-Resource in Plan window, click the Availability Intervals tab. This page, displayed in the next figure, shows a list of time intervals when the resource is available with properties different from the defaults. You can use this list to change the resource availability values in the defined intervals, or to add or remove availability intervals. Blank fields in an availability interval mean that the default values, as specified in the database or in the other pages of this window, are the valid ones during the interval.

Figure 208. The Availability Intervals page of the Properties-Resource in Plan window

2. To change the day in which the interval occurs, double-click the Date field and select the pop-up calendar icon. In the pop-up calendar choose a date and click it to have it entered in the field.

3. To change the starting time, double-click the From Time field and enter the new time.

4. To change the finishing time, double-click the To Time field and enter the new time.
5. To change the resource quantity that is made available or unavailable for the workstations defined in the availability interval, double-click the **Quantity** field and enter a number.

6. To change the availability status of the quantity defined in the previous field, double-click the **Is available** field and select **Available**, **Not available**, or **Default**. Choosing **Default** results in using the value specified in the database.

7. To browse the workstations for which the availability specified in the previous fields is applicable, click the ellipsis in the **Workstations** field to display a dialog with a list of workstations already defined for the time interval, as shown in the next figure.

Figure 209. Displaying a list of workstations connected to a resource in an availability interval

The dialog also contains the **Find Workstations**, **Add all Workstations**, and **Remove Row** icons featured in the Default Workstations page that enable you to update the list.

8. In the Availability Intervals page, to add a new availability interval, click the **Add Row** icon and enter details as explained in the preceding steps.
9. To delete an availability interval, select the row and click the **Remove Row** icon.

10. Click **OK** if you want to save your changes and close the Properties-Resource in Plan window. Click **Apply**, if you want to save the changes and you want to leave the window open and proceed to another page. Otherwise, click **Cancel** to close the window without saving any changes.

## Displaying the Job Instances Associated with a Resource

Use a plan resource list to browse the status of the job instances associated with a resource and also to take action on a job instance of which you know the status. To display the job instances:

1. Select a resource from the list display and right-click on it. A pop-up menu is displayed.

2. Click **List Jobs** followed by either **Waiting for Resource** or **Using Resource** in the ensuing menu, as shown in the next figure.

*Figure 210. Displaying job instances associated with a resource*
Modifying Job Instances Associated with a Resource

All the job instances scheduled to use the resource and currently in this status are displayed in the bottom pane of the window, as shown in the next figure.

*Figure 211. The list of jobs associated with a resource*

---

**Modifying Job Instances Associated with a Resource**

Plan resource lists are useful, since they enable you to perform the same actions on job instances as the Timeline or List views of a job instance list.

1. Obtain a list of jobs associated with a resource.
2. Right-click a selected job. A pop-up menu is displayed, as shown in the next figure.
You can select any of the following actions, if they are available:

- Delete the job instance from the plan
- Hold the job instance
- Release the job instance
- Browse and modify the properties and dependencies of the job instance
- NOP or UN-NOP the job instance
- Run the job instance immediately
- Change the status of the job instance

3. See “Monitoring and Modifying Operations (Job Instances)” on page 205 for an explanation on how to use these options.
Setting Traces for the Job Scheduling Console

This appendix explains how to set tracing facilities for the Job Scheduling Console.

You can set the tracing facility by customizing the two variables:

- TRACELEVEL
- TRACEDATA

located in the following files:

- For Windows: console.bat in the \Benjamin subdirectory of the directory hosting the JS Console files.
- For AIX: AIXconsole.sh in the /bin/java subdirectory of the directory hosting the JS Console files.
- For Sun Solaris: SUNconsole.sh in the /bin/java subdirectory of the directory hosting the JS Console files.

To customize either variable, open the file in editing mode and set the variable to a value ranging from 0 to 3. Values enable you to tune the tracing facilities to report the type and detail of data that best fits your needs.

TRACELEVEL enables you to choose what type of program information flow the tracing facility must record, so that you can check for program correctness in terms of sequences of instructions. The following table displays what each value does:
TRACEDATA enables you to choose what type of data flow the tracing facility must record. You can set it to record the contents of the JS Console beans or the data structures exchanged between the JS Console and the OPC Connector. The following table displays what each value does:

<table>
<thead>
<tr>
<th>TRACEDATA Value</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No data is traced.</td>
</tr>
<tr>
<td>1</td>
<td>Data structures from/to the OPC Connector are recorded.</td>
</tr>
<tr>
<td>2</td>
<td>The internal values of the JS Console beans are recorded.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRACELEVEL Value</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Only errors and warnings are recorded.</td>
</tr>
<tr>
<td>1</td>
<td>Errors, warnings, and info/debug lines are recorded.</td>
</tr>
<tr>
<td>2</td>
<td>Errors, warnings, and method entry/exit are recorded.</td>
</tr>
<tr>
<td>3</td>
<td>Errors, warnings, info/debug lines, and method entry/exit are recorded (maximum trace level).</td>
</tr>
</tbody>
</table>
Setting Traces for the Job Scheduling Console

The various combinations of values for TRACELEVEL and TRACEDATA give you the maximum flexibility in terms of information provided by the log file. However, it is important to point out that the combination of values of 2 or greater for TRACELEVEL and of 1 or greater for TRACEDATA can be quite heavy for system performance: they can slow program operation and generate very big log files.

Tracking of error conditions is active by default (TRACELEVEL is already set to 0). You can also set TRACELEVEL to -1 to force the tracing facility not to create a log file at all.

The log file is named JSCONSOLE.LOG and is placed in the DAT subdirectory of the directory hosting the JS Console files.

By default, the maximum size of JSCONSOLE.LOG can be 3MB. When this limit is reached, the tracing facility creates an additional log file. The tracing facility can create up to ten log files for a total of 30MB. You can, however, change this by using the advanced customization options described in the next section.

### Using the Log File Advanced Customization Options

These options enable you to customize the log file produced by the tracing facilities. They are listed under a section named [trace] inside of the JSS.INI file in the \dat\tmeconsole subdirectory of the directory hosting the JS Console files. The options, and their default values, are listed in JSS.INI as shown below:

```ini
[trace]
traceFileMaxLen=3000000
```

<table>
<thead>
<tr>
<th>TRACEDATA Value</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Both data structures and bean internal values are recorded (maximum trace level).</td>
</tr>
</tbody>
</table>
Setting Traces for the Job Scheduling Console

traceFileMaxNum=10
printTimeDate=true
printMilliseconds=false
printThreadID=false
printComponent=false
printType=true

where:

**traceFileMaxLen**
Defines the maximum size, in bytes, that the log file can be. When the file reaches this size, it is renamed and a new log file is created. The value is an integer of your choice.

**traceFileMaxNum**
Defines the maximum number of log files that can be present on disk during each instance of the JS Console. When this number is exceeded, the older files are replaced first. This includes only the files created during the current session of the JS Console. You have to manually delete the files stored during previous sessions. The value is an integer of your choice.

**printTimeDate**
Specifies if the trace calls write date and time information in the log file. The value can be True or False.

**printMilliseconds**
Specifies if the trace calls write timestamp information, in milliseconds, in the log file. The value can be True or False.

**printThreadID**
Specifies if the trace calls write an identifier for the current thread in the log file. The value can be True or False.

**printComponent**
Specifies if the trace calls write the name of the source component in the log file. The value can be True or False.

**printType**
Specifies if the trace calls write the message type (error, warning or information) in the log file. The value can be True or False.
Setting Traces for the Job Scheduling Console

Use `traceFileMaxLen` and `traceFileMaxNum` to decide how much disk space you want to allocate to the tracing facility. They enable you to achieve a correct trade-off between disk space occupancy and debug data availability.

Use the other options to determine what type of information you want included in the trace file.
Setting Traces for the Job Scheduling Console
Job Scheduling Console Messages

Job Scheduling console message numbers have a GJS prefix and are followed by a letter indicating the type of message, as described next:

- **E** Error
- **I** Information
- **W** Warning

The list below includes all the messages displayed by the base Job Scheduling console.

---

**GJS0001E** Cannot save the job stream

**Explanation:** Cannot save a job stream if it does not contain at least one job.

**System Action:** The job stream is not saved.

**Operator Response:** Define at least one job for the job stream.

---

**GJS0001I** No jobs have been found for job stream *job stream*

**Explanation:**

**System Action:**
Job Scheduling Console Messages

Operator Response:

GJS0001W You are renaming a resource

Explanation: You are renaming a resource that may be part of a dependency for a job scheduler object.

System Action: If the resource is part of a dependency, and you rename it, any action you perform that refers to the old name will return an error.

Operator Response: Click OK to continue renaming the resource. Otherwise, click Cancel.

GJS0002E Cannot save the resource

Explanation: Cannot save the resource. The resource name is mandatory.

System Action: The resource is not saved.

Operator Response: Enter a name for the resource and try saving again.

GJS0003E You cannot close the window until you type all the required information

Explanation: You are leaving some required field blank and therefore you cannot close the window.

System Action: The window is left open.

Operator Response: Either type all the required information and then click OK, or click the Cancel button to dismiss the window.

GJS0003W Cannot add this dependency

Explanation: Cannot add the job dependency for one of the following reasons:

A dependency between the jobs already exists.

The new dependency creates a dependency loop.

System Action: The job dependency is not added.

Operator Response: Do not add the dependency or add a dependency that does not create a loop.

GJS0004E The jobs in the job stream instance were not found

Explanation: The jobs in the job stream instance were not found.

System Action: The job instance list is displayed with no entries.

Operator Response: Try a new list by changing filter criteria.
<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
<th>System Action</th>
<th>Operator Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>GJS0005E</td>
<td>Job stream instance not found</td>
<td>The job stream instance was not found.</td>
<td>The job stream instance list is displayed with no entries.</td>
<td>Try a new list by changing filter criteria.</td>
</tr>
<tr>
<td>GJS0009E</td>
<td>Cannot load the job stream instance because it is unknown</td>
<td>A job stream instance with this name cannot be found.</td>
<td>The job stream instance is not loaded.</td>
<td>Try a different name.</td>
</tr>
<tr>
<td>GJS0012E</td>
<td>Cannot save the workstation</td>
<td>Cannot save the workstation for one of the following reasons:</td>
<td>The workstation definition is not saved.</td>
<td>Do one of the following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ You did not enter the workstation’s name.</td>
<td>Enter a name for the workstation and try saving again.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ You ran into the OPC error reported below.</td>
<td>See the of Operations Planning and Control Messages and Codes document for an explanation of the OPC message.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>System Action: The workstation definition is not saved.</td>
<td>Operator Response: Do one of the following:</td>
<td></td>
</tr>
<tr>
<td>GJS0014E</td>
<td>Cannot perform the action specified on the selected objects</td>
<td>The action cannot be performed on multiple objects at the same time.</td>
<td>The action is not performed.</td>
<td>Perform the action on a single object at a time.</td>
</tr>
<tr>
<td>GJS0016E</td>
<td>You are renaming a workstation</td>
<td>You are renaming a workstation that may be part of a dependency for a job scheduler object.</td>
<td>If the workstation is part of a dependency, and you rename it, any action you perform that refers to the old name will return an error.</td>
<td>Click OK to continue renaming the workstation. Otherwise, click Cancel.</td>
</tr>
</tbody>
</table>
Job Scheduling Console Messages

GJS0017E  Error connecting to host

Explanation: Error connecting to the Tivoli server or managed node that runs the Connector program.

System Action: The Job Scheduling Console is not started.

Operator Response: Check the following:

- On your workstation:
  - Password is spelled correctly
  - Caps Lock is not accidentally on

- On the Tivoli server or managed node:
  - Remote connections are enabled
  - Login account is a TME Administrator
  - Login account has a valid group property on the host

GJS0052E  Cannot link to the connector

Explanation: The connector is not present on the server you are using.

Operator Response: Do the following on the server:

1. Ensure that a connector has been installed.
2. Create an instance of the connector.

See the Tivoli Job Scheduling Console User’s Guide for details on installing and configuring the connector.

Messages Originated by OPC

All the Job Scheduling Console messages that contain the GJSQ prefix are due to OPC error conditions. The explanation of each one of these messages displays a specific OPC message. OPC message codes are identified by the EQQ prefix.

When you receive one of these messages, refer to the Operations Planning and Control Messages and Codes manual for details of the OPC message.

The following list shows the message number and message text of all GJSQ messages.
<table>
<thead>
<tr>
<th>Code</th>
<th>Message Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GJSQ001E</td>
<td>Cannot load the job stream list</td>
</tr>
<tr>
<td>GJSQ002E</td>
<td>Cannot load the plan view</td>
</tr>
<tr>
<td>GJSQ003E</td>
<td>Cannot load the resource list</td>
</tr>
<tr>
<td>GJSQ004E</td>
<td>Cannot load the resource plan view</td>
</tr>
<tr>
<td>GJSQ005E</td>
<td>Cannot load the workstation list</td>
</tr>
<tr>
<td>GJSQ006E</td>
<td>Cannot open the job stream instance</td>
</tr>
<tr>
<td>GJSQ007E</td>
<td>Cannot update job stream job stream</td>
</tr>
<tr>
<td>GJSQ009E</td>
<td>Cannot open the Job Stream Instance Editor</td>
</tr>
<tr>
<td>GJSQ010E</td>
<td>Cannot open the Resource Editor</td>
</tr>
<tr>
<td>GJSQ011E</td>
<td>Cannot build the structure</td>
</tr>
<tr>
<td>GJSQ012E</td>
<td>Cannot load the job stream</td>
</tr>
<tr>
<td>GJSQ013E</td>
<td>Cannot load the definition of resource availability</td>
</tr>
<tr>
<td>GJSQ014E</td>
<td>Cannot load the job stream instance</td>
</tr>
<tr>
<td>GJSQ015E</td>
<td>Cannot process the OK request</td>
</tr>
<tr>
<td>GJSQ016E</td>
<td>Cannot change the job</td>
</tr>
<tr>
<td>GJSQ017E</td>
<td>Cannot add the new job</td>
</tr>
<tr>
<td>GJSQ018E</td>
<td>Cannot modify the instance</td>
</tr>
<tr>
<td>GJSQ019E</td>
<td>Cannot delete the instance</td>
</tr>
<tr>
<td>GJSQ020E</td>
<td>Cannot hold the instance</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>GJSQ021E</td>
<td>Cannot release the instance</td>
</tr>
<tr>
<td>GJSQ022E</td>
<td>Cannot delete the object</td>
</tr>
<tr>
<td>GJSQ023E</td>
<td>Cannot undelete the object</td>
</tr>
<tr>
<td>GJSQ024E</td>
<td>Cannot modify the status of the object in the database</td>
</tr>
<tr>
<td>GJSQ025E</td>
<td>Cannot remove the job</td>
</tr>
<tr>
<td>GJSQ026E</td>
<td>Cannot remove the job dependency</td>
</tr>
<tr>
<td>GJSQ027E</td>
<td>Cannot remove the dependency</td>
</tr>
<tr>
<td>GJSQ028E</td>
<td>Cannot remove the external dependency</td>
</tr>
<tr>
<td>GJSQ029E</td>
<td>Cannot perform the action on the selected objects</td>
</tr>
<tr>
<td>GJSQ030E</td>
<td>Cannot perform the job stream operation</td>
</tr>
<tr>
<td>GJSQ031E</td>
<td>Cannot perform the action on the selected object</td>
</tr>
<tr>
<td>GJSQ032E</td>
<td>Cannot perform the action on the selected objects</td>
</tr>
<tr>
<td>GJSQ033E</td>
<td>Cannot update the instance from services</td>
</tr>
<tr>
<td>GJSQ034E</td>
<td>Cannot perform the action specified on the selected object</td>
</tr>
<tr>
<td>GJSQ035E</td>
<td>Cannot perform the action specified on the selected objects</td>
</tr>
<tr>
<td>GJSQ036E</td>
<td>Cannot perform this action</td>
</tr>
<tr>
<td>GJSQ037E</td>
<td>Cannot open the workstation</td>
</tr>
<tr>
<td>GJSQ038E</td>
<td>Cannot open the Workstation Editor</td>
</tr>
<tr>
<td>GJSQ039E</td>
<td>Cannot perform the action specified on the selected objects</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>GJSQ040E</td>
<td>Cannot delete the workstation</td>
</tr>
<tr>
<td>GJSQ041E</td>
<td>Cannot delete the selected workstations</td>
</tr>
<tr>
<td>GJSQ042E</td>
<td>Cannot create another run cycle</td>
</tr>
<tr>
<td>GJSQ043E</td>
<td>Cannot perform this action</td>
</tr>
<tr>
<td>GJSQ044E</td>
<td>Cannot interrupt the operation</td>
</tr>
<tr>
<td>GJSQ045E</td>
<td>Cannot delete the resource</td>
</tr>
<tr>
<td>GJSQ046E</td>
<td>Cannot delete the selected resources</td>
</tr>
<tr>
<td>GJSQ047E</td>
<td>Cannot get the resource header</td>
</tr>
<tr>
<td>GJSQ048E</td>
<td>Cannot open the resource</td>
</tr>
<tr>
<td>GJSQ049E</td>
<td>Cannot save changes in resource dependency</td>
</tr>
<tr>
<td>GJSQ050E</td>
<td>Cannot add scheduling specifications</td>
</tr>
<tr>
<td>GJSQ051E</td>
<td>Cannot add scheduling specifications</td>
</tr>
<tr>
<td>GJSQ052E</td>
<td>There is a problem with your job scheduler engine</td>
</tr>
<tr>
<td>GJSQ053E</td>
<td>Cannot close the window</td>
</tr>
<tr>
<td>GJSQ054E</td>
<td>Cannot save the workstation</td>
</tr>
<tr>
<td>GJSQ055E</td>
<td>Cannot save the resource</td>
</tr>
<tr>
<td>GJSQ056E</td>
<td>Cannot save the job stream</td>
</tr>
<tr>
<td>GJSQ057E</td>
<td>This object is currently locked because it is being updated by another user. It will be displayed in read-only mode until the user releases it. Try again later</td>
</tr>
</tbody>
</table>
Glossary

A

Actual start time. The time, as logged, at which the job or job stream instance started.

In the timeline, the actual start time is represented by a black bar running down the center of the navy blue activity bar.

See also earliest start time and planned start time.

C

Calendar. A definition of workdays, freedays, and holidays. The scheduler uses the calendar combined with run cycles to determine on which days to run the job stream. In the JS GUI, you can assign a calendar to a job stream. However, you must use the ISPF panels to create or modify calendars in the database.

D

Database. A collection of data that is fundamental to a system. The database for each OPC controller contains calendars, JCL variable tables, job streams, operator instructions, periods, resources, and workstations. From the Console, you can define and modify job streams, resources, and workstations. This information is stored in the database of the OPC controller and is used to generate instances for the plan.

Deadline. The time by which the job or job stream must be completed. The deadline is your estimate, based on your experience in running the job or job stream.

In the timeline, the deadline is represented by the black border at the right end of the navy blue activity bar.
**Dependency.**  A relationship between two jobs in which the first job must be completed before the second can begin. When you create a job stream in the database, you define the dependencies between jobs.

**DLF.**  Data Lookaside Facility. The MVS/ESA component that manages Hiperbatch objects.

**Duration.**  The amount of time you expect the job to take to complete.

In the Timeline view of jobs in the database, the duration is represented by a light blue bar at the center of the activity bar or by a light blue diamond.

**E**

**Earliest start time.**  The time before which the job or job stream cannot start. The earliest start time is your estimate, based on your experience in running the job or job stream. The job or job stream can, however, start after the time you specify as long as all other dependencies are satisfied.

In the timeline, the start time is represented by the left edge of the navy blue activity bar. For job instances, the start time that OPC calculates is represented by a light blue bar.

See also actual start time and planned start time.

**Exclusionary run cycle.**  A run cycle that specifies the times when a job stream must not run.

**External job.**  A job from one job stream that is a predecessor for a job in another job stream. An external job is represented by a place holder icon in the Graph view of the job stream. When you delete an external job either from the database or the plan, the job stream that includes it as a predecessor skips it as if it did not exist, and OPC logs the error.

**F**

**Freeday rule.**  Determines how to calculate freedays when you are scheduling the job stream. There are the following freeday rules:
Count workdays only.
Count workdays and freedays alike.
Schedule on last workday before freeday.
Schedule on next workday after freeday.
If freedays, don’t schedule at all.

Hiperbatch. The MVS/ESA facility that stores VSAM and QSAM data in Hiperspace for access by multiple jobs. The facility can significantly reduce the execution time of certain batch streams that access VSAM and QSAM.

Job. A unit of work in a job stream that is processed at a workstation. It usually includes all necessary computer programs, linkages, files, and instructions to the operating system.

When you create a job in the database, you also define its dependencies on predecessor jobs and its time restrictions, such as the estimated start time and deadline. The type of job determines the type of target workstation on which it can run:

- JCL jobs consist of JCL statements and run on computer workstations.
- Started task jobs start or stop started tasks and run on computer workstations.
- Printer jobs print the output of a predecessor job and run on printer workstations.
- General jobs include activities other than printing and processing, such as manual activities, and run on general workstations.
- Setup jobs require preparation of a set of JCL statements for a JCL or started task job and run on general workstations.
- Write-to-operator (WTO) jobs consist of an operator instruction displayed on the system console and run on general workstations.

Job instance. A job scheduled for a specific run date in the plan.
Glossary

See also *job*.

**Job scheduling object.** A generic term that includes jobs, job streams, resources, and workstations.

**Job status.** See *status*.

**Job stream.** A sequence of jobs, including the resources and workstations that support them, and scheduling information. The dependency of one job on the completion of another determines the sequence of the jobs. The scheduling information, such as run cycles and a calendar, determines when and how often the job stream is run. See also *job stream instance*.

**Job stream instance.** A job stream that is scheduled for a specific run date in the plan.

See also *job stream*.

**Job stream template.** An entity that contains scheduling information, such as a calendar, a freeday rule, and run cycles, that can be inherited by all the job streams that have been created using the template. Unlike typical templates, job streams created from a job stream template continue to be part of the template and any changes to the scheduling information for the template are inherited by the job streams. Therefore, you do not define run cycles for job streams created from a template.

**List.** A list displays job scheduling objects. You must create separate lists for each job scheduling object.

For each job scheduling object, there are two types of lists: one of definitions in the database and another of instances in the plan.

**Logical resource.** See *resource*. 
O

OPC/ESA. Operations Planning and Control/ESA

P

Plan. A detailed plan of system activity that covers a period of at least one minute and not more than 21 days. It typically covers one or two days. The plan encompasses all job and job stream instances and the resources and workstations involved in running them. All job streams for which you have created run cycles are automatically scheduled and included in the plan.
Contrast with database.

Planned start time. The estimated start time, based on the durations of predecessors, that OPC sets for the job instance to start.
See also actual start time and earliest start time.

Predecessor. A job that must be completed before jobs that are dependent on it can begin.
Contrast with successor.

R

Resource. Any type of limited resource, such as tape drives, communication lines, databases, or printers, that is needed to run a job. You designate when a resource is available, in what quantities, and by which logical workstations the resource can be used. This information helps to determine when job stream instances are scheduled to run.
In the Console, resources are also called logical resources

Resource availability. Fixed times when the job can use a resource. You define conditions, similar to run cycles, that generate the calendar days when a resource is available. You can also define conditions for when a resource is not available.
Run cycle.  A specification of the days that a job stream is scheduled to run. It can be either rule-based or offset-based:

Rule-based Includes a rule, such as, the first Friday of March or the second workday of the week

Offset-based Includes a user-defined period and an offset, such as, the 3rd day in a 90-day period

See also exclusionary run cycle.

S

Status.  The state of a job or job stream instance. It can be one of the following:

Arriving The instance is waiting for input to arrive (jobs only).
Canceled The instance has been deleted from the plan.
Error The instance has ended in error.
Interrupted The instance has been interrupted (jobs only).
Pending predecessor The job stream instance is waiting for a predecessor to be completed (job streams only).
Ready The instance is ready to start. All predecessors are complete (jobs only).
Ready-nonreporting workstation The job instance is ready to start. All predecessors, except a predecessor at a nonreporting workstation, are complete (jobs only).
Running The job has started.
Successful The instance has completed successfully.
Undecided The status of the instance is not known.
Waiting The instance is waiting for a predecessor job to end.

Successor.  A job that cannot start until all of the jobs on which it has a dependency are completed.
Contrast with *predecessor*.

**T**

**TME.** Tivoli Management Environment  
**TMR.** Tivoli Management Region

**V**

**Valid from, to dates.**  
1. The interval for which a job stream is available for scheduling and can be run.  
2. The first and last date that a run cycle is in effect.

**W**

**Workstation.** The logical machine on which a job runs. When you create a job, you identify at least one workstation on which it will run.  
There are three types of workstations:  
- Computer  
- Printer  
- General  

**WTO.** Write-to-operator. See also *job*. 