IBM Workload Scheduler

Readme File for Fix Pack 3

Version 9.4.0

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Note

Before using this information and the product it supports, read the information in "Notices" on page 55.

Contents

Chapter 1. IBM Workload Scheduler Readme File for Fix Pack 3 for version 9.4.0

Date   30 March 2018

Fix Pack
>   9.4.0-IBM-IWS-FP0003

Product
>   IBM® Workload Scheduler version 9.4.0

General Description
>   IBM Workload Scheduler Fix Pack 3 for version 9.4.0

This readme file provides important information about Fix Pack 3 for IBM Workload Scheduler version 9.4.0.

This readme file is the most current information for the fix pack and takes precedence over all other documentation for IBM Workload Scheduler version 9.4.0.

Note: Before you apply the fix pack, consider that IBM Workload Scheduler V9.4 Fix Pack 3 is available in IBM Fix Central in English only, as well as the related documentation updates in IBM Knowledge Center.

It is divided into the following sections:
- "About this fix pack"
- "Fix pack structure" on page 19
- "Installing the fix pack" on page 20
- "Documentation updates for IBM Workload Automation Fix Pack, version 9.4.0" on page 51

IBM Workload Scheduler version 9.4.0 Fix Pack 3 supports all product versions indicated in the IBM Workload Scheduler version 9.4 Release Notes which can be accessed at the following link: http://www-01.ibm.com/support/docview.wss?uid=swg27048863#h3interop_tables.

For the most up-to-date information about supported operating systems, software and hardware requirements, see the Detailed system requirements document at the following URL: http://www-01.ibm.com/support/docview.wss?uid=swg27048858 .

Review this section thoroughly before installing or using this Fix Pack.

About this fix pack

This section contains information specific for this fix pack including what has been modified or introduced, what has been fixed, product versions or components to which the fix pack applies, and compatibility issues, if any.

Product versions and components to which the fix pack applies
>   This fix pack can be applied only on top of IBM Workload Scheduler V9.4.0

This section includes the following subsections:

Features introduced with Fix Pack 3

The following new product features, enhancements (RFE), and changes are introduced with this fix pack:

Modifying job instances in the plan (RFE 89523)

Modify a job instance in the plan before it runs or modify an instance of a job in the plan that has already run and rerun the modified job.

You can modify a job definition in the database whenever and as many times as you want. However, there are times when you need to make changes to the job definition, but it has already been submitted into the plan and runs as is. This results in extra work and lost time in updating the definition in the database and then getting it into the plan to run.

This feature adds the flexibility you need so that you can now make changes to the definition even after it has already been submitted into the plan, maintaining the original definition in the database. With this additional flexibility, you can edit the job definition on-the-fly before it runs or rerun a job with a different definition. This can be done from either the Job Stream Graphical View, the job monitoring view, or from the conman command line.

Maybe you want to substitute the command or script executed by the job with a different one? Maybe you just need to tweak an argument? Maybe you need to rerun a job updating the logon name, priority, or connection server? Whatever the change, this enhancement allows you to quickly react and avoid possible disasters, and increase your productivity by addressing additional scenarios in your workload that were not contemplated at the time you modeled or planned your workload.

For details about how to modify the job definition in the plan using the `conman` command line, see the commands Altjob and Rerun.

See the video: New opportunities to react and recover on the Workload Automation YouTube channel.

Easy installation for patches on agents

You can now easily install patches on agents using the `twsinst` command with the -patch option.

Enhancements to IBM i ob monitoring and control (RFE 114590)

Monitoring and control facilities for IBM i jobs have been enhanced to simplify the management of IBM i inquiry messages.

Automated reply to inquiry messages

For the most frequent IBM i inquiry messages, you can define standard rules to automate the reply to the waiting messages. When defining an IBM i job, by using the Workload Designer of the Dynamic Workload Console or the composer command line, you can specify the list of messages for which you want to set up an automated reply. When specifying the automated replies, a new parameter has been added to the job definition: the **Message Max Replies** parameter. It represents the maximum number of

automated replies accepted for a specific message. This new parameter optimizes the management of IBM i inquiry messages.

For example, when you set a wrong reply to a message in the job definition, IBM i system keeps on sending out the same inquiry message repeatedly, while waiting for the correct reply. To avoid this issue, IBM Workload Scheduler has now the capability to intercept and disable the wrong reply and require, with a prompt, a direct reply from the Dynamic Workload Console. The job remains in SUSP (suspended) status until the correct reply is provided.

Reliable monitoring of IBM i job status changes

As an inquiry message receives an automated reply, the IBM i job status changes from SUSP (suspended) to EXEC (executing) and vice versa. All the job status changes are monitored and tracked. This is useful, for example, when you want to create an event rule definition to send an email every time a job status change occurs.

Improved trace facilities

Trace facilities for IBM i jobs have been improved. To specify the desired tracking level, customize your IBM i agent by setting the required parameters in the JobManager.ini file, in accordance with the settings on the IBM i system.

For more information, see Scheduling and monitoring jobs on IBM i systems. See the video Simplify workload management for your IBM i Systems.

New Plug-ins for Cloud Automation

Amazon EC2, IBM SoftLayer®, and Microsoft Azure plug-ins are available to manage the provisioning and de-provisioning of virtual machines in the cloud, on as-needed basis.

Customers choose to move their application to the cloud to focus on business optimization. Once in the cloud, applications rely on systems provisioned and de-provisioned to run defined business workflows but unpredictable workload volumes. Customers face a new question: Is it better to over-provision cloud resources with the risk of wasting them, or under-provision with the risk of degrading performance and delay the business process?

How about provisioning just the right amount of resources for only the time-period you need them? Exactly what you need, when you need it, and rather than incur extra costs and waste, de-provision when you're done, all automatically.

To succeed in this challenge, a new approach is required, that strictly ties business workflows with cloud resource management. While managing a business application, IT organizations need to be able to orchestrate provisioning and de-provisioning of the infrastructure needed by the business application in the cloud.

IBM Workload Scheduler provides three Cloud Automation plug-ins, for different cloud providers, to manage the provisioning and de-provisioning of virtual machines in the cloud, on as-needed basis. By orchestrating the application workflow and the workflow that manages the entire lifecycle of the virtual machines needed by the applications (including the actions:

start, stop, snapshot, etc...), IBM Workload Scheduler can increase both business and infrastructure agility. The plug-ins are:

- Plug-in for **Amazon Web Services (EC2)**
- Plug-in for **IBM SoftLayer**
- Plug-in for **Microsoft Azure**

Select your cloud provider, and add one or more jobs in the job stream that automates your business process flow to provide a flexible and dynamic allocation of cloud resources to your workload.

For more information about the Cloud Automation plug-ins, see Scheduling Applications with IBM Workload Automation.

See the video: Workload Scheduler for Cloud Automation on the Workload Automation YouTube channel. More videos are available for the features released with V9.4 Fix Pack 3 on this dedicated playlist: Workload Scheduler V9.4, Fix Pack 3.

Apache Spark Plug-in

With the new IBM Workload Scheduler plug-in for Apache Spark, you can schedule, monitor and control Apache Spark jobs.

Apache Spark a lightning-fast cluster computing technology, designed for fast computation. It is based on Hadoop Map Reduce and extends the MapReduce model to efficiently use it for more types of computations, which includes interactive queries and stream processing. The main feature of Apache Spark is its in-memory cluster computing that increases the processing speed of an application. IBM Workload Scheduler provides a plug-in for Apache Spark that helps you manage your big data processing and analytics. With the plug-in for Apache Spark, you can define, schedule, monitor, and control Apache Spark jobs. Add one or more Apache Spark jobs in the job stream that automates your business process flow to obtain an end-to-end workload management solution.

For details, see *Scheduling Applications with IBM Workload Automation*.

Restarting JSR 352 Java™ Batch jobs from the point of failure (RFE 110252)

You can restart JSR 352 Java Batch jobs from the point of failure.

During the execution of a JSR 352 Java Batch job, when monitoring the job from the Dynamic Workload Console

More flexibility in managing successors for job actions

You can now hold, release and rerun the successors during your job monitoring.

You have a list of all successors for the selected job, view the successors in two separate tables and decide if you want to run all internal successors, all internal and external successors, or a subset of them. By default, all successors are selected. By selecting the mode you can also control how successors are selected: manually, including successors in the same job stream or including successors in other job streams.

For more information about how to rerun successors from the command line, see the listsucc and rerunsucc commands .

Updated version of WebSphere Application Server (WAS)

Fix Pack 3 has been tested using WAS version 8.5.5.13

Updated OpenSSL libraries

IBM Workload Scheduler has been updated with OpenSSL version 1.0.2l.

Resolved Common Vulnerabilities and Exposures (CVE)
The following CVEs have been resolved with this fix pack:
- CVE-2017-15095
- CVE-2017-7525
- CVE-2017-17485

Additional support for agents
Support for Oracle Enterprise Linux version 6.x has been extended to fault-tolerant agents, dynamic agents, and z/OS agents.

Features introduced with Fix Pack 2

The following new product features, enhancements, and changes are introduced with this fix pack:

Support for updated versions of WebSphere Application Server (WAS)
Fix Pack 2 has been tested using WAS version 8.5.5.12

Support for updated versions of Dashboard Application Services Hub (DASH)
Fix Pack 2 has been tested using DASH version 3.1.3.0 CP4

Support for updated versions of JazzSM
Fix Pack 2 has been tested using Jazz version 1.1.3

Rollback procedure

Roll back a master domain manager to a previous fix pack level or release if the master domain manager was installed with IBM Installation Manager.

To roll back a master domain manager to a previous fix pack level or release, you first need to create a backup before installing the new fix pack or release. This allows you to then perform a rollback procedure after the fix pack or release has been installed.

The roll back procedure is supported starting with Version 9.3 Fix Pack 3.

Mixed pricing models

Easily define different pricing models on workstations in your environment.

According to your IBM Workload Scheduler license, IBM® License Metric Tool helps you maintain your license compliance. By using License Metric Tool, you can generate reports that summarize your license consumption. The generated reports are maintained on the License Metric Tool server and should be periodically reviewed and signed, creating a history for audit purposes in the process. If you are contacted by a third-party software compliance auditor who plans to visit your enterprise to carry out a software audit, ensure that all reports are up-to-date and signed, and then supply copies of reports that cover the time periods that the auditor requests.

You can now take advantage of improved flexibility when defining your pricing model. For each single workstation in your environment, you can define the pricing model to be applied.

When you set the license Type keyword to by Workstation in optman, you can define for each single workstation the pricing model to be applied to it at the workstation creation time.

The following are requests for enhancements (RFEs) introduced in Fix Pack 2:

RFE 179819: Database job executor handles stored procedure errors
Enhance the database job executor to handle stored procedure errors.

RFE 15616: Actual workstation displayed when monitoring jobs

The name of the workstation where a job, scheduled to run on a pool or dynamic pool, actually ran.

When jobs are scheduled to run on pools or dynamic pools, you might want to monitor the job or the workstation where the job ran. Previously, this information was available only in the job log. With this enhancement, the name of the actual workstation where the job ran is also available in a new column in the monitor job query. This detail is available if the job has started or has already run. This information can also be output in reports.

This information can also be useful when you need to determine your license consumption and therefore need to know on which workstation in the pool the job actually ran.

For details about the actual workstation see the columns that can be defined when monitoring jobs in the Dynamic Workload Console. The runtime information contained in the **conman showjobs** command also contains this information.

RFE 108425: File monitor support for already created files
Normally the **filemonitor** utility runs an initial scan and then runs subsequent scans to detect any new or changed files since the initial scan that match specific criteria. This means that if there are any existing files matching the criteria when the initial scan runs, they are not considered. The utility has been updated with a new parameter to be able to discover existing files during the initial scan that match the criteria and can therefore generate an event. , and the description of the **-generateEventsOnFirstScan** argument.

RFE 111032: Need ability for File monitor in IWS z/OS to detect file existence on UNC path
Use the filemonitor utility to check for changes of files (files that were either created or modified). This could be useful when, for example, you want to make sure that a file exists before running a job that processes that file. By defining a job that runs the filemonitor utility, you can implement file dependency, that is, a relationship between a file and an operation in which specific activity on the file determines the starting of the operation.

RFE 106345: RUN PJP and PVU License Networks in the SAME Network
Easily define different pricing models on workstations in your environment

For more information about new features introduced with this fix pack, see:
* The online product documentation in IBM Knowledge Center:IBM Workload Scheduler version 9.3 Fix Pack 2 enhancements.
* The IBM Workload Automation portfolio What's New page at: https://start.wa.ibmserviceengage.com/ibm/TWSSandbox/wa/wa_whatisnew_v2.jsp.
* Helpful videos demonstrating new features for IBM Workload Scheduler on the Workload Automation channel.

Features introduced with Fix Pack 1

Job Management Plug-in

The new Job Management plug-in is available in the Automation Utilities plug-in category. Automation Utilities are plug-ins that facilitate specific IBM Workload Scheduler operations. Use the Job Management plug-in, to run one of the following actions on any job in the job stream where the Job Management job is running:

Table 1.

Actions that you can run on a job
• Rerun
• Rerun the job and all its successor jobs
• Rerun the job and its successor jobs in the same job stream
• Release
• Release Dependencies
• Cancel
• Cancel Pending
• Hold
• Kill
• Confirm ABEND
• Confirm SUCC

The Job Management plug-in simplifies recovery scenarios and enables the automation of iterative workflows.

For more information, see the topic about Job Management jobs in the *User's Guide and Reference.*

Automation of Iterative Workflows

For complex workflows, the iteration of a sequence of jobs within the overall orchestration can be a challenging task. By selecting the option to rerun a job with all its successors jobs in the same job stream, the Job Management plug-in enables iterative processing of a sequence of jobs while a condition is met. It is like a DO WHILE statement in programming languages.

It is just a matter of adding a Job Management job at the end of the sequence of jobs that you want to iterate. The Job Management job requests to rerun the first job in the sequence along with its successor jobs. The iteration is controlled by the output conditions of the first job in the sequence: it stops when the condition is no longer satisfied.

For more information, see the topic about Job Management jobs in the *User's Guide and Reference.*

Advanced rerun flexibility

The new advanced rerun options help you orchestrate your workflows seamlessly, building recovery logic into the job definition itself and rerunning job successors directly from the Monitor Workload view.

When you create a job definition, you can now specify that you want the job to rerun for a specific number of times and after a specific interval, in case of failure. This ensures that fewer alerts are generated and the workflow continues smoothly. For example, if you have a job that needs to connect to a server which is periodically restarted, you can specify in the job definition that you want the job to rerun for a specific number of times and after a specified interval.

If the parent job ran on a workstation that is part of a pool or a dynamic pool, you can decide whether it must rerun on the same workstation or on a different one. This is because the workload on pools and dynamic pools is assigned dynamically based on a number of criteria and the job might be rerun on a different workstation.

Also, if a job fails, you can identify all its successors at a glance and decide whether you want to rerun the job with its successors. You can rerun either all successors in the same job stream, or all successors overall, both in the same job stream and in other job streams, if any.

For more information about how to specify the rerun options in the job definition from the command line, see the section about defining job rerun and recovery actions in *User's Guide and Reference*. For more information about how to specify the rerun options in the job definition from the Dynamic Workload Console, see the section about using job recovery actions to control job processing in the *Dynamic Workload Console User's Guide*.

For more information about how to rerun the job and its successors from the command line, see the section about the **listsucc** and **rerunsucc** commands in the *User's Guide and Reference*.

Use the **Job Management** plug-in to further automate your workflows. With the plug-in, you can perform a number of actions on jobs, such as rerun the job, with or without its successors, release its dependencies, or cancel the job, and many more. For example, in a recovery scenario, you can insert a Job Management job in your workflow. This causes the original job to rerun automatically when the relevant recovery job completes successfully, reducing effort and time consumption.

Job Stream Submission Plug-in

The new Job Stream Submission plug-in is available in the Automation Utilities plug-in category. Automation Utilities are plug-ins that facilitate specific IBM Workload Scheduler operations. Use the Job Stream Submission plug-in, to submit a job stream for processing.

By adding the Job Stream Submission plug-in to your workflow, you can automate the submission of a specific job stream, minimizing code scripts and manual effort. Also, you can specify the earliest start time for the job stream and define the variable table associated to the job stream.

For more information, see the topic about Job Stream Submission jobs in the *User's Guide and Reference*.

Condition-based workload automation

Condition-based workload automation provides a simple and immediate way to have your workflows start at just the right time. You can define in your job stream a condition that, when met, releases the job stream to run as scheduled.

For example, if you have a job stream containing jobs which analyze one or more files, you can have the job stream start only after the file or files have been modified or created. Also, if the job stream contains jobs which process the data in a database, you might want to have the job stream start after enough rows have been written into the database. You can also have IBM Workload Scheduler check repeatedly whether the condition is met.

You can start your workflow based on one of the following conditions:
- One or more files being created

- One or more files being modified
- A job completing with its output condition satisfied. You can apply this logic to the job stream or to specific jobs in the job stream.

For more information, see the section about condition-based workflow automation in the *User's Guide and Reference*.

Monitor file changes using the filemonitor utility

Use the filemonitor utility to check for changes of files (files that were either created or modified). This could be useful when, for example, you want to make sure that a file exists before running a job that processes that file. By defining a job that runs the filemonitor utility, you can implement file dependency, that is, a relationship between a file and an operation in which specific activity on the file determines the starting of the operation.

You can use the **filemonitor** utility as a stand-alone command, or you can set the **filemonitor** keywords as additional parameters for the start condition of a job stream, either in the Workload Designer or from the **composer** command line. For more information about the start condition, see the section about condition-based workflow automation in the *User's Guide and Reference*.

For more information, see the section about filemonitor in the *User's Guide and Reference*.

New keyword for defining the latest start time in job streams

The **jsuntil** keyword defines the latest start time of a job stream. It also determines the behavior of the jobs in the job stream when the job stream is approaching its latest start time. Use the **jsuntil** keyword to avoid that the job stream is either suppressed, canceled, or set to continue (depending on the action specified in the **onuntil** keyword) if it starts before its latest start time. For example, if you have a job stream with **jsuntil** set to 10:00 am, and one of the jobs starts running at 9:59 am, the job and its successors run as scheduled.

This keyword is mutually exclusive with the **until** keyword.

There is also a major difference with between the **until** and **jsuntil** keywords:

If you specify the until keyword in your job stream definition
This keyword is evaluated also after the job stream has started. As a result, if the latest start time expires before the job stream completes successfully, the action specified in the related **onuntil** keyword is performed on the job stream and on its jobs, which have not yet started.

If you specify the jsuntil keyword in your job stream definition
This keyword is evaluated only once, as soon as all dependencies of the job stream are satisfied and the job stream state changes to READY. If the latest start time defined using the **jsuntil** keyword has not expired at this time, it is no longer evaluated and the job stream runs independently of it. However, to prevent the job stream from remaining in READY state indefinitely, two days after the time specified in the **jsuntil** keyword has expired, the job stream is suppressed by default.

For more information, see the section about the **jsuntil** keyword in *User's Guide and Reference*.

New keyword for defining actions on late jobs

The **onlate** keyword defines the action to be taken on a job in job stream when the job's deadline expires. If the job is running when the deadline expires, it is killed. Killed jobs end in the ABEND state. Any jobs or job streams that are dependent on a killed job are not released. If the dependency on the job is a conditional dependency on the job completing in ABEND state, that dependency is released.

For more information, see the section about the **onlate** keyword in *User's Guide and Reference*.

Preparing and installing a Docker image for dynamic agents

A Docker container automates the task of installing a running dynamic agent, along with everything that is required to run it: code, runtime, system tools, system libraries, and settings.

It provides a mechanism known as a **Dockerfile**, which is used to codify the steps to install and configure your dynamic agent. This is a plain text file that uses a standard set of commands to perform the all the installation and configuration steps. The resulting Docker image is a static image of the full set of software for the dynamic agent with the exact configuration.

An image is then built to become a Docker Container, which is a unique running instance of the software with its own processes, state, and configuration. You can start as many Docker Containers from a given image as necessary. This gives you the possibility to quickly provision multiple running instances of your software, each with their own processes, state, and configuration, quickly and easily.

For more information, see the section about preparing and installing a Docker image for dynamic agents in the *Planning and Installation*.

New options in managing workload applications
The following new options are available:

Export a job stream definition as a workload application template
From the Workload Designer, you can export a job stream definition and save it as a workload application template in a compressed file. The job stream definition can then be imported in another environment.

For more information, see the topic about exporting a job stream definition as a workload application template in the *Dynamic Workload Console User's Guide*.

Rename a workload application during the import process
A new parameter **-workloadApplicationName <workload_application_name>** is available for the **wappman -import** command to rename the workload application during the import process.

For more information, see the topic about the **wappman** command in the *User's Guide and Reference*.

Modify the mapping file according to rules defined using regular expressions
You can optionally request that the mapping file produced by the export process is automatically modified by the import process, according to rules defined using regular expressions and specified

in ad-hoc files. For more information, see the topic about using regular expressions to modify the mapping file in the *User's Guide and Reference*.

Integration with IBM UrbanCode Deploy

Workload applications can be created and then exported so that they can be imported in other IBM Workload Scheduler environments.

To export and import a workload application you can use either the Dynamic Workload Console or the **wappman** command line.

In alternative to the import process, you can automate the deployment of an application from one environment to another by using the Workload Automation plug-in of the IBM UrbanCode Deploy tool. For details about this plug-in, see the IBM UrbanCode Deploy documentation.

Upgrade from version 8.6

IBM Workload Scheduler V9.4 General Availability supported upgrades from V9.x. With this fix pack, support is being extended to V8.6.x instances.

For IBM Workload Scheduler V8.6.x instances, the upgrade is supported only for the master domain manager using the parallel upgrade method. The direct upgrade is not supported for IBM Workload Scheduler V8.6.x instances. The only supported scenario for the upgrade of a V8.6.x master domain manager is to install a new master domain manager configured as a backup. All other components must be upgraded at version 9.3 first, or can optionally remain at 8.6 level. For more information see the *Planning and Installation Guide.*.

MSSQL database support extended on Linux
Microsoft SQL Server Enterprise Edition database is now supported on Linux.

Windows 2016 support
Windows 2016 is supported on all components.

The following are requests for enhancements (RFEs) introduced in Fix Pack 1:

RFE 17980
Restart the job stream from the given job of a job stream. (Internal ID 57221)

RFE 25295
Rerun a specific job and all of it successors, both in the same job stream and in other job streams (see the Condition-based Workload Automation feature). (Internal ID 65671)

RFE 33200
Create external dependency from the graphical Plan View. (Internal ID 79752)

RFE 44226
Need a copy button on the Monitor Jobs panel EDIT JCL. (Internal ID 99136)

RFE 46521
Improve recovery options for a job. (Internal ID 103418)

RFE 65873
Changed behavior of selections in tables in the Dynamic Workload

Console. When performing an action on a selected item in the table, either by right-clicking or from the toolbar, after the action is performed the selection is cleared so that you can perform a different action on a different selection. You can also multi-select items in a table and perform an action on all selected items. (Internal ID 125267)

RFE 69212

When rerunning a job in a pool, you can optionally rerun the job on the same workstation where it previously ran (see the Condition-based Workload Automation feature). (Internal ID 130343)

RFE 78682

Additional columns are now available when monitoring jobs on multiple engines. (Internal ID 144976)

RFE 80759

Hyperlinked properties when updated should auto-refresh automatically in DWC. (Internal ID 146988)

RFE 101904

Search option improvements in the Dynamic Workload Console Workload Designer allows for object selection before inputting keyword so that the search is run against the object selected. (Internal ID 172565)

RFE 101905

The search field in the Dynamic Workload Console Workload Designer now provides user assistance with examples of the syntax that can be used in the field. (Internal ID 172564)

RFE 104082

Dynamic Workload Console - Disable IE Compatibility View. (Internal ID 175746)

For more information about new features introduced with this fix pack, see IBM Workload Scheduler version 9.4 Fix Pack 1 enhancements.

Helpful videos demonstrating new features for IBM Workload Scheduler is available on Workload Automation channel.

Problems fixed in IBM Workload Scheduler Fix Pack 3 for version 9.4.0

This section lists APARs and internal defects solved by Fix Pack 3.

This fix pack includes a number of fixes for internal defects found by the verification team that mainly cover the following product capabilities: installation, auditing, and mirroring.

Table 2. APARs and defects fixed

APAR	ABSTRACT
IV91745	CONMAN SJ; INFO WRONG FORMAT
IJ02038	BACKWARD COMPATIBILITY FOR FILETRANSFERS JOBS: JOBS DEFINED IN 9.X MASTERS ARE NOT RUNNING ON 8.6 AGENTS, RETURNING AWKSUL020E
IJ00114	UNIXSSH XA AGENTS - RCCONDSUCC ENABLEMENT CODE ADDED AS COMMENT TO UNIXSSH SCRIPT

Table 2. APARs and defects fixed (continued)

IV98325	REP11 INCLUDING JOB STREAMS IN "DRAFT" STATE
IV98138	EXCLUDE CALENDARS ARE BEING IGNORED BY REP11
IJ00338	JOB STREAM IS PLANNED UNEXPECTEDLY ON EXCEPT CALENDAR DATE
IJ03479	ISSUE WHEN OPEN A COMPLEX VARIANT SAP
IJ02712	TWS ELEVATED PRIVILEGES (SETGID AND SETUID PROGRAMS) LIBRARIES HAVE INSECURE LOCATIONS IN RPATH (.)
IJ02596	INCREASE ROBUSTNESS OF TSAMP MONITORCOMMAND
IJ01535	TWS ZCENTRIC AGENT STOP WORKING AFTER Z/OS SERVER IPL/REBOOT/ NETWORK DISCONNECT
IJ01061	IMPLEMENT THE LOGIC OF APAR IV88912 IN JOBMANRC FILE
IJ00336	MSSQL SUPPORT DOES NOT INCLUDE ANY LANGUAGE SUPPORT
IJ00950	IF A TRIAL PLAN EXTENSION IS LONGER THAN 3 MINS IT CAN BE EXECUTED TWICE
IJ00910	MIRRORING: IF A SUB_QUEUE BECAME FULL A DEADLOCK COULD OCCURR
IJ03167	ERRONEOUS WARNING MESSAGE AWSBHX032W THE STARTED DATE OF THE FOLLOWING JOB IS NULL
IJ03583	USING OFFSETS FROM WORKDAYS WHEN CREATING RUNCYCLE GROUPS USING COMPOSER RESULTS IN INCORRECT DATES BEING SELECTED
IJ02415	OPENS ON DYNAMIC AGENTS AND POOLS WITH DYNAMICAGENTSSTAYS IN ASKED STATE WHEN BATCHMAN IS NOT ABLE TO COMMUNICATEWITH BROKER
IJ01506	JOBS ON POOL WORKSTATIONS ARE STUCK ON WAIT STATE
IV94273	AWSJIM920E ERROR DURING THE INSTALL OF A NEW 9.2-FP02 BACKUP MASTER WITH ORACLE.
IJ02042	IWS WEB SERVICE FAILS WHERE OUTPUTCONDITION IS SET TO NULL
IJ02011	OPENSSL FLAG IN TWS/BIN FOLDER HAS SUID FLAG
IJ01948	SERVER.MSG NOT CLEARING WHEN WORKLOAD ASSURANCE IS ACTIVE

Table 2. APARs and defects fixed (continued)

IJ03999	REST API JOB STREAM issue
IJ04395	RERUN TOOK UP TO 2 MINUTES
IJ03686	LOCALOPTS FILE DOES CONTAIN REFERENCE TO THE MOZART DIRECTORY, BUT THE MOZART DIRECTORY IS NOT CREATED IN INSTALLING AGENTS.
IJ03531	AWSITA141E ON MDM ADHOC CONMAN SBD WITH RCCONDSUCC ON AIX DA ONLY WITH TWS9402. THE JCLFILE IS EMPTY, TWSRCMAP IS CORRECT.
IJ00572	BACKUPINSTANCE.SH/ RESTOREINSTANCE.SH SCRIPTS ASSUME DEFAULT
IJ02494	JOB EVENT CODES 123-127 NEED TO BE ADDED TO THE DOCUMENTATION
IJ04102	DWC DISPLAYS NEGATIVE PROMPT NUMBERS

Problems fixed in IBM Workload Scheduler Fix Pack 2 for version 9.4.0

This section lists APARs and internal defects solved by Fix Pack 2.

This fix pack includes a number of fixes for internal defects found by the verification team that mainly cover the following product capabilities: installation, auditing, and mirroring.

APAR	ABSTRACT
IJ00606	The Filedep on a pool or dynamic pool remains unresolved in case one agent in the pool is down
IV98138	EXCLUDE CALENDARS ARE BEING IGNORED BY REP11
IV98325	REP11 INCLUDING JOB STREAMS IN "DRAFT" STATE
IJ00392	Filecheck dependency (OPENS) on file on dynamic agent remains in "asked" even if the file is present
IJ00463	IWS SERVICE ON FTA FAILS TO START ON 9.4
IJ00166	A HUGE NUMBER OF FILEDEP HAS A NEGATIVE IMPACT ON MIRRORING
IV87038	TWS 9.2 JVM CRASH AND JAVA CORE IS GENERATED
IV83728	JOBlog archived zip file is readable only for TWS user
IV99870	TWS 9.4 GA&FP1 COMPOSER MANAGES ONLY THE USER ON THE ACL DEFINITION
IV98396	CP: ./PREREQUISITES/UNIX_LINUX/DWC_09000000.CFG.TPL: A FILE OR IN THE PATH NAME DOES NOT EXIST
IJ00078	IWS composer 9.4 fp1 fails on replace character when find an incorrect one
IV99644	Job status mismatch between DWC & conman
IV99590	ROLE BASED SECURITY COMPOSER OUTPUT RETURNS NULL VALUES FOR GROUPS
IV98735	TWS PREREQ SCANNER IS UNABLE TO READ THE OS.FILE.FUSER PROPERTY
IV98671	USEROPTS FILE IS CREATED WITH AN INCORRECT NAME

IV97712	conman sr @#@ coredump on AIX 7 when 1 holder of resource exist (of type job)
IV90852	THE XRXTRCT COMMAND DOES NOT DISPLAY THE INTERNETWORK DEPENDENCIES
IV94011	TWS 9.X HANDLE MUTEX LEAKS ON GSKIT WINDOWS
IV99112	TWS REST API GETJOB IS SLOW WHEN THE JOBKEY IS USED
IV98229	ENHANCE THE TWS BROKER SERVICEABILITY
IV98043	REMOTE CLI COMPOSER.EXE FUNCTIONALITY DOES NOT OPERATE PROPERLY
IV98210	ORACLE DATABASE DEADLOCK OCCURRING WHEN CANCELLING A CARRIED FORWARD JS WITH EXTERNAL DEPENDENCIES
IV98945	CHECKSYNC ABENDS WITH RC=8
IV98476	EVENTS LOST ON A DISTRIBUTED TWS ZCENTRIC WORKSTATION
IV98172	IWS PACKAGE CONTAINS VULNERABLE TOOL "UNZIP.EXE" ACCORDING TO CVE-2005-2475 : UNZIP 5.52 FROM FEB 2005. THIS MUST BE REMOVED
IV98395	JobManager occasionally fails to start when ExecutorsMinThreads in JobMananger.ini is high (more than 600)
IJ00599	PLN.PFDP tables not cleaned up by mirroring plan delete
IV97903	TWS EVENTPROCESSOR COULD HANG IF A NETWORK ISSUE OCCURS
IV98265	MONMAN MEMORY LEAK WHEN STARTS R3EVMAN.EXE
IV78030	When DST starts, if SOD falls on the hour missing, plan is extended for 24 hours instead than for 23
IV98646	IWS 9.3-FP03 IMPLEMENTED A CHANGE IN DEFAULT BEHAVIOR OF THE EXECUTECMD.SH COMMAND PER APAR IV87679
IV98638	PLAN MIRRORING STALLS FOLLOWING A SWITCHMGR FOR A SUB-DOMAIN MANAGER
IV94783	NMAN REPORTS AWSBCX013E ERROR WHEN PARSING EVENT 51 RELATING
IV95276	add tls11 and tls12 in localopts for fta
IJ00716	It is necessary to update OpenSSL libraries in IBM Workload Scheduler build because of the following vulnerabilities of OpenSSL: CVE-2016-3732 and CVE-2016-3735

Problems fixed in IBM Workload Scheduler Fix Pack 1 for version 9.4.0

This section lists APARs and internal defects solved by Fix Pack 1.

This fix pack includes a number of fixes for internal defects found by the verification team that mainly cover the following product capabilities: installation, auditing, and mirroring.

APAR	ABSTRACT
IV69128	THE NET SERVICE NAME MAX LENGTH IN CONFIGURING DB DURING INSTALLATION CANNOT BE GREATER THAN NINE.
IV81576	NETMAN FOR A 8.6 WINDOWS AGENT NEVER RELEASES MEMORY AFTER RUNNING CONMAN SJ;STDLIST ON IT
IV93078	A composer hanging could negatively affect the WAS startup (EDWA)"

IV73429	DEADLOCK ON THREADS ON JOBMANAGER CAUSING AGENTS TO HANG
IV76015	JOB STREAM CONTAINING A PARTICULAR OPENS DEPENDENCY ENCOUNTERS AN AWSJPL525W ERROR IF AD HOC SUBMITTED
IV78321	UPDATE ZONE INFO ACCORDING TO LATEST CHANGES FOR 2015
IV81521	ERROR IMPORTING INTO TWS 9.1 VIA WAPPMAN DEFINITIONS.XML
IV82747	JobManagerGW DOES NOT START UP BECAUSE JOBMANAGERGW.INI IS EMPTY
IV83754	THE TWS MONMAN PROCESS IS EXPERIENCING A RANDOM FAILURE DURING THE SWITCH OF THE STDLIST AT FINAL
IV83761	TWS LIBJOBMANAGERCORENEEDS TO HAVE 555 AS PERMISSION
IV83962	DISPLAY ALERTS UNTIL A JOB COMPLETES
IV86072	UNABLE TO INCREASE SIZE AND/OR NUMBER OF Z/CENTRIC AGENT LOG/TRACE FILES ON WINDOWS SYSTEMS
IV86852	AWSJOM200E ERROR OCCURS IF AT AND EVERYENDTIME ARE DEFINED ACROSS 00:00 WHEN SOD IS NOT 0000
IV87679	GENERIC ACTION PLUG-IN SCRIPT EXECUTECMD.SH ON AIX HAS ROOT ENV
IV88912	Dynamic jobs fail with 126 on AIX
IV88971	INSTALL OF DYNAMIC AGENT ON WINDOWS TESTS VALUE FOR TWS_THISCPU
IV89009	SYNCHRONIZATION BETWEEN DEPENDENCIES AND JOB/JOBSTREAM
IV89649	WEBSPHERE RECYCLES AFTER A NORMAL RESTART IN WORKLOAD SCHEDULER
IV89492	MSSQL UPDATESTATS GIVES WARNING AWSJPL804W
IV89990	PLANMAN CONFIRM HANGS
IV90602	JOB SUBMITTED INTO CARRYFORWARD SCHEDULE NOT SHOWING CORRECT STATUS
IV90614	DYNAMIC AGENT HAS PROBLEMS IN MANAGING OPEN DEPENDENCY EXECUTING EXTERNAL PROGRAMS
IV90830	USERPROFILE IS NOT LOADED FOR XAGENT RUNNING ON WINDOWS
IV90870	ESTIMATED DURATION WRONG ON MONITOR JOBS IN DYNAMIC WORKLOAD CONSOLE AND CONMAN
IV91018	JOBRUNSTATISTICS REPORT FOR JOB DURATION ALWAYS SHOWS TWO PARTS INSTEAD OF THREE AS SHOWNN HH:MM:SS
IV91072	CONMAN SBD TO WINDOWS FTA TRUNCATES THE CONMAND LINE WITH TWSRCMAP
IV91175	INSTALLING AGENT, PRE-REQ SCANNER FAILS IF THE <TWAHOME> DIRECTORY PATH CONTAINS A (.) CHARACTER
IV91219	MB EVENTS SENT BY 9.3FP1 CAUSES RANDOM UNLINK OF PRE-9.3FP1 FTA
IV91269	CORRUPT JMJOBTABLEDIR CAN CAUSE JOBMANAGER TO CORE
IV92161	STAGEMAN CRASHES IF enCarryForward = NO
IV92306	MIRRORBOX.MSG SIZE INCREASE IF MANY FILE DEPENDENCIES ARE DEFINED IN THE WORKLOAD
IV92352	AFTER SWITCH MASTER SOME DYNAMIC JOBS REMAIN IN EXEC STATUS ON COMPOSER

IV92358	UPDATE CURL COMPONENT FOR CVE-2016-8616 CVE-2016-8624 AND CVE-2016-8621
IV92378	AFTER PLANMAN RESYNC XA-EXTENDED AGENT ARE SET UNLINKED ON DWC MONITOR JOBS/CPUS THOUGH CONMAN STATUS IS CORRECT
IV92447	NEED TO EXPLAIN HOW "OVERLAP DONOTSTART" WORKS IN DETAIL
IV92455	BROKER AGENTS WILL NOT LINK TO BACKUP DOMAIN MANAGER
IV92859	IWS 9.4 SILENT INSTALL RESPONSE FILE REFERENCES IBM JAVA.V70.
IV93048	stageman can cause A JOB STREAM to be put at pri=0
IV93052	Unable to view joblog from DWC/conman when job defined on XA hosted by DWB using jsdl and with resources
IV93337	POOR PERFORMANCE OF PLANDELETE ON ORACLE
IV93482	AWSJDB810E ERROR ENCOUNTERED WHILE RUNNING SWITCHPLAN ON MDM INSTALLED AS A BACKUP MDM DURING A PARALLEL UPGRADE
IV93505	LFTA NOT LINKED IF CENTRALIZED SECURITY IS ENABLED
IV93578	ITA NOT UPDATED TO 64-BIT IF UPGRADE FROM TWS 8.6 FP4 TO 9.2+
IV95368	DA/POOL jobs erroneously in ABEND close to MAKEPLAN/SWITCHPLAN
IV93890	MAILSENDERPLUGIN DOES NOT SET FULLY-QUALIFIED NAME OF THE CLIENTSENDING THE MAIL.THIS CAUSES ISSUE IN HELO PART OF SMTP SERVER
IV93899	ONOVERLAP DONOTSTART STREAM STAYS ON HOLD WHEN STREAM JOBS ARE MIXED IN LINUX AND WINDOWS
IV95378	MODIFY TWS WINDOWS SERVICE

Known limitations and workarounds

The following are software limitations and workarounds that affect IBM Workload Scheduler version 9.4.0 Fix Pack 3. For a list of known problems and limitations documented for the V9.4 General Availability release, refer to the product Release Notes.

9.4.0 Fix Pack 3

SSH protocol fails to perform remote command (71149)
File transfer and remote command do not work with the following version of SSH: 5.3p1 release 123.3l6_9

Usage for the command altjob is incomplete(70578)

Azure plug-in does not work after changing the default SSL (70807)
When trying to change the default SSL protocol to the Java Client Application, editing

TWA\TWS\JavaExt9.4.0.03\jre\jre\lib\security\java.security

to start Azure, the plug-in does not work.

Workaround: Open the file

/opt/IBM/TWA_ITAuser/TWS/JavaExt/jre/jre/lib/security/java.security

replace

```
jdk.tls.disabledAlgorithms=SSLv3, RC4, MD5withRSA, DH keySize
< 768, 3DES_EDE_CBC, DESede, \ EC keySize < 224
```

with

```
jdk.tls.disabledAlgorithms=SSLv3, RC4, MD5withRSA, DH keySize
< 768, \ EC keySize < 224
```

9.4.0 Fix Pack 2

Changing language in Windows environment does not change IBM Workload Scheduler language as well (184736)

In a Windows environment, if you change the language from English to another language, IBM Workload Scheduler does not change the language, but remains in English.

Workaround: To workaround this problem, add the `LANG` environment variable and set it as new preferred language.

Japanese, Chinese, Korean Language: Warning message in installation panel: the temporary directory does not have at least 5 MB (184727)

Running the installation or the upgrade of IBM Workload Scheduler 9.4 fix pack 2, in Chinese, Korean and Japanese language, the Prerequisite Scan displays a warning message:

The scan cannot be run for different reasons: the temporary directory does not have at least 5 MB, the system registries are corrupted. Analyze the Installation Manager log files to see more details on the error. Check the Troubleshooting section of the Planning and Installation for a solution.Despite this message the installation or the update process completes successfully.

Installation setup IBM Workload Scheduler fails if there is another IBM Workload Scheduler instance (184059)

When trying to install IBM Workload Scheduler 9.4 GA + Fix Pack 2 on a machine where a master domain manager instance already exists, the installation fails.

Workaround: When launching the script to run Installation Manager, ensure that the script is launched from the folder where you unzipped the Fix Pack Image and specify the path to the folder where you unzipped the General Availability image.

Unexpected success message written in stderr instead of stdout (180169)

When using the composer command line, a message of success is erroneously written to the Standard Error instead of Standard Output.

9.4.0 Fix Pack 1

IV60757: AFTER SWITCHING MANAGER CANNOT BROWSE JOBLOGS

Conman cannot retrieve job logs in archived plans for jobs which ran on dynamic agents if the master domain manager in the archived plan is different from the current master.

178943: Agent installation does not find prerequisite 32 bit libraries on LINUX PPC64LE SELS 12 SP2

On LINUX PPC64LE workstations, the installation might fail because the following 32 bit libraries are missing with the following info in the log file/opt/IBM/TWA_twsuser/logs/result.txt:

```
The prerequisite fails because the 32 bit libraries are not available.
os.lib.libstdc.so.5_32    FAIL    Unavailable   /usr/lib/libstdc++.so.5
os.lib.libstdc.so.6_32    FAIL    Unavailable   /usr/lib/libstdc++.so.6
os.strings.libstdc        FAIL    Unavailable   /usr/lib/libstdc++.so.6:
GLIBCXX_3.4.6
```

Workaround: To workaround this problem,restart the installation using the twsinst script with the -skipcheckprereq parameter.

178681: JobStream re-submission does not work when the original job stream containing the start condition is defined on a workstation class
If you define a job stream for a workstation class specifying a start condition, you must select the **Start Once** option.

177195: supported number of concurrent filemonitor commands
If you plan to run hundreds of job streams containing start conditions on the same agent, you might want to take into consideration the resource overhead due to the **filemonitor** process.

Fix pack structure

This section describes the structure of the images contained in this fix pack.

Fix pack files available for IBM Workload Scheduler using Fix Central

This is the structure of the fix pack for the engine on Fix Central:

```
+---9.4.0-IBM-IWS-FP0003.README.zip
|
+---9.4.0-IBM-IWS-AIX-FP0003.zip
|
+---9.4.0-IBM-IWS-HPIA64-FP0003.zip
|
+---9.4.0-IBM-IWS-LINUX390-FP0003.zip
|
+---9.4.0-IBM-IWS-LINUXPPC-FP0003.zip
|
+---9.4.0-IBM-IWS-LINUX_X86_64-FP0003.zip
|
+---9.4.0-IBM-IWS-SOLARIS_I386-FP0003.zip
|
+---9.4.0-IBM-IWS-WINDOWS_X86_64-FP0003.zip
|
+---9.4.0-IBM-IWS-LINUX_X86_64_WORKBENCH-FP0003.zip
|
+---9.4.0-IBM-IWS-WINDOWS_X86_64_WORKBENCH-FP0003.zip
|
+---9.4.0-IBM-IWS-AIX_AGENT-FP0003.zip
|
+---9.4.0-IBM-IWS-HPIA64_AGENT-FP0003.zip
|
+---9.4.0-IBM-IWS-IBM_I_AGENT-FP0003.zip
|
+---9.4.0-IBM-IWS-LINUXPPC_LE_AGENT-FP0003.zip
|
+---9.4.0-IBM-IWS-LNX_PPC_AGENT-FP0003.zip
|
+---9.4.0-IBM-IWS-LNX_S390_AGENT-FP0003.zip
|
+---9.4.0-IBM-IWS-LNX_X86_64_AGENT-FP0003.zip
|
+---9.4.0-IBM-IWS-SOL_I386_AGENT-FP0003.zip
|
```

```
                    +---9.4.0-IBM-IWS-WIN_X86_64_AGENT-FP0003.zip
                    |
                    +---9.4.0-IBM-IWS-AIX_ZOS_AGENT-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-HPIA64_ZOS_AGENT-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-IBM_I_ZOS_AGENT-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-LINUXPPC_LE_ZOS_AGENT-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-LNX_PPC_ZOS_AGENT-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-LNX_S390_ZOS_AGENT-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-LNX_X86_64_ZOS_AGENT-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-SOL_I386_ZOS_AGENT-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-WIN_X86_64_ZOS_AGENT-FP0003.zip
                    |
                    +---9.4.0-IBM-IWS-AIX_BATCH_REPORTS-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-HPIA64_BATCH_REPORTS-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-LNX_PPC_BATCH_REPORTS-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-LNX_S390_BATCH_REPORTS-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-LNX_X86_64_BATCH_REPORTS-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-SOL_I386_BATCH_REPORTS-FP0003.tar
                    |
                    +---9.4.0-IBM-IWS-WIN_X86_64_BATCH_REPORTS-FP0003.zip
```

Installing the fix pack

This section describes how to apply Fix Pack 3 to IBM Workload Scheduler.

The section is divided into the following subsections:
- "Installation notes"
- "Interoperability notes" on page 22
- "Disk space requirements" on page 22
- "Installation methods" on page 24
- "Installing IBM Workload Scheduler v9.4FP3 for the first time using the IBM Installation Manager wizard" on page 31
- "Installing the fix pack on the IBM Workload Scheduler General Availability version 9.4 using the IBM Installation Manager wizard" on page 35
- "Installing the fix pack on an IBM Workload Scheduler version earlier than 9.4 using the IBM Installation Manager wizard" on page 32
- "Installing the fix pack using IBM Installation Manager silent installation" on page 38
- "Installing the fix pack on agents using the twsinst script" on page 43
- "Uninstalling the entire IBM Workload Scheduler instance" on page 50
- "Installation log files" on page 50

Installation notes

When installing the IBM Workload Scheduler fix pack, follow these recommendations:

- Before installing the fix pack, ensure you have installed the required prerequisite software. To obtain the latest information about software requirements for IBM Workload Scheduler, run the Software Requirements report and browse to the relevant section.
- This fix pack supports DB2 Advanced Enterprise Server Edition, Version 10.5 on HP-UX and Sun Solaris operating systems only. It is available for download from the Passport Advantage web site with part number: CNED3ML. After the installation of DB2 Advanced Enterprise Server Edition, Version 10.5, you must manually apply the license activation key (.lic file). The license key must be downloaded separately from the Passport Advantage web site. The part number related to the license activation key is CNED3ML. The key must be registered using the **db2licm** command. See Applying DB2 licenses licenses for the procedure to register the key.

  If you already have installed DB2 Advanced Workgroup Server Edition, you can switch this license with a DB2 Advanced Enterprise Server Edition license, by following the procedure in Updating licenses. Note that when the procedure references the product-identifier as in step 3:`db2licm -a product-identifier`, replace the product-identifier with the file representing the license activation key (.lic).
- Before installing this fix pack on AIX® V7.1 operating systems, you must apply the patch for APAR IZ99634. For more information, see: http://www-01.ibm.com/support/docview.wss?uid=isg1IZ99634.
- On UNIX operating systems, before installing the IBM Workload Scheduler fix pack, ensure that your **umask** is set to **022**. To verify that **umask** is set to the correct value, from a command prompt, run the **umask** command. If the value is different from **022**, modify it by running the command:
  ```
  umask 022
  ```
- On UNIX operating systems, the database administrator must have read and run privileges for the IBM Workload Scheduler installation path; otherwise the installation fails. (54367)
- If you get an error message indicating *permission denied* for the installation process, to run a script in the `tws_tools` directory as a user, different from the root user because this user does not have write, read, and execute rights in this directory, you must:
  1. Extract the eImages to a directory where all users have write, read, and execute rights.
  2. Restart the installation process from this directory.
- During the upgrade of the master domain manager, the installation process attempts to retrieve information from your environment. If the installation fails to perform the retrieve, and you have recently upgraded WebSphere® Application Server to version 8.5.5.4, then you need to stop, start, and stop again, the WebSphere Application Server, and then restart the upgrade installation process for the master.
- When installing the fix pack on a Solaris operating system where an Oracle database is used, the installation must be performed using a connection that is not in SSL between the machine where the installation is being performed and the machine where the Oracle database is installed.
- When upgrading the master domain manager to V9.4 by using Installation Manager, a Java fresh install is required before proceeding with the master domain manager upgrade. When upgrading the master domain manager to V9.4, run the following steps:
  1. Upgrade WebSphere Application Server to V8.5.5.9.
  2. Perform a fresh install of Java V8.0.2.10.

3. Upgrade the master domain manager to V9.4.

After the fix pack installation completes, verify the following information:

- This fix pack installs a new version of the file tws_env.sh (tws_env.cmd) and also creates a backup file named, tws_env.sh.bk (tws_env.cmd.bk), which are both saved to the *<TWA_HOME>*/TWS directory, where *<TWA_HOME>* is the IBM Workload Scheduler installation directory. After installing the fix pack, if you have modified the original version, merge the content of the new version with the content of the original version to carry your customized content into the new version.

- On IBM i operating systems, if you want to install the fix pack on the IBM Workload Scheduler for z/OS Agent and IBM Workload Scheduler Dynamic Agent, verify that the user profile used as TWSUser is not a member of a group profile. Set the group profile associated with the TWSUser to *NONE*. If the TWSUser is a member of a group, the fix pack installation fails.

- Only on Windows operating systems, to correctly display double-byte character set (DBCS) characters, you must perform the following actions:
  - Set the `LANG` environment variable to the DBCS language code you want to use, for example, `set LANG=zh_CN`.
  - Set the `TWS_TISDIR` environment variable to the IBM Workload Scheduler home directory, for example, `set TWS_TISDIR=C:\FTA\TWS`.
  - Open the Control Panel window and click **Clock, Language, and Region**.
  - Click **Region and Language**.
  - In the **Format** tab, choose from the **Format** drop-down list the language you want to use.
  - In the **Keyboards and Languages** tab, under **Display Language**, click install and follow the steps to install the DBCS language pack you want to use.
  - In the **Administrative** tab, click **Change system locale** and, from the drop-down list, choose the language (system locale) you want to use.

  Note that all the settings must be coherent, that is they must refer to the same DBCS language setting. After you have completed these changes, reboot your workstation to have the changes take effect.

- **168833**: When installing this fix pack on AIX V7.2, ensure that you have WebSphere V8.5.5.8 and DB2 V10.5 Fix Pack 7 installed.

- When installing a dynamic agent or a fault-tolerant agent, ensure that the agent name does not start with a number. If the name of the dynamic agent starts with a number, use the **-displayname** parameter at installation time to specify a different name. If the name of the fault-tolerant agent starts with a number, use the **--thiscpu** parameter at installation time to specify a different name.

Interoperability notes

IBM Workload Scheduler version 9.4.0 Fix Pack 3 supports all product versions indicated in the IBM Workload Scheduler version 9.4 Release Notes which can be accessed at the following link: http://www-01.ibm.com/support/docview.wss?uid=swg27048863#h3interop_tables.

Disk space requirements

For the most up-to-date information about disk space and memory requirements, generate a dynamic hardware requirements report from the IBM Software Product Compatibility Reports web site at the following URL: http://www-969.ibm.com/software/reports/compatibility/clarity-reports/report/html/

hardwareReqsForProduct?deliverableId=196702D00EBC11E58BF1AF9D8B1D437A
&osPlatforms=AIX|HP|IBM%20i|Linux|Solaris|Windows|z/OS
&duComponentIds=S002|S001|A005|A003|A004.

Before starting the fix pack installation, ensure that you have the necessary disk space available on the file system. Consider that the disk space check calculated by the installation considers the entire space occupied by the *<TWA_HOME>* directory. The space required by the backup is the sum of the following directories:

`<TWA_HOME>`/TWS + `<TWA_HOME>`/TDWB + `<TWA_HOME>`/wastools + `<TWA_HOME>`/properties

In addition to the disk space in the following table, the installation requires an additional 600 MB on the file system where the `IMShared` directory is located.

Table 3. Disk space requirements for installing a master domain manager or a backup master fix pack

Operating System	Installation directory	Temporary directory
AIX	2,5 GB	1,5 GB
HP-UX	2,5 GB	1,5 GB
Solaris	1.5 MB	800 MB
Microsoft Windows	2 GB	1 GB
Linux	1,5 GB	800 MB

Table 4. Disk space requirements for installing the fix pack for IBM Workload Scheduler fault-tolerant agents

Operating System	Installation directory	Temporary directory
AIX	900 MB	400 MB
HP-UX	1.3 GB	400 MB
Solaris	920 MB	400 MB
Microsoft Windows	700 MB	350 MB
Linux	720 MB	350 MB

Table 5. Disk space requirements for installing the fix pack for IBM Workload Scheduler dynamic agents and z/OS agents

Operating System	Installation directory	Temporary directory
AIX	600 MB	250 MB
HP-UX	920 MB	400 MB
Solaris	580 MB	120 MB
Microsoft Windows	800 MB	400 MB
Linux	600 MB	250 MB

Note: Only on HP and Solaris operating systems, the fix pack installation requires also 300 MB free disk space in the temporary directory `/var/tmp`.

Installation methods

You can install the fix pack using one of the following methods:

For Master domain manager or dynamic domain manger or their backups:

- "Installing IBM Workload Scheduler v9.4FP3 for the first time using the IBM Installation Manager wizard" on page 31
- "Installing the fix pack on the IBM Workload Scheduler General Availability version 9.4 using the IBM Installation Manager wizard" on page 35
- "Installing the fix pack on an IBM Workload Scheduler version earlier than 9.4 using the IBM Installation Manager wizard" on page 32
- "Installing the fix pack using IBM Installation Manager silent installation" on page 38.

For fault-tolerant agent, dynamic agent or domain manager:

- "Installing the fix pack on agents using the twsinst script" on page 43.
- "Installing the fix pack on multiple fault-tolerant and dynamic agents" on page 45

Before Installing

Before installing the fix pack using any of the methods described in the following sections, perform the following actions:

1. Unlink the host on which you are installing the fix pack from the IBM Workload Scheduler network.
2. Shut down IBM Workload Scheduler.
3. Run the following commands, depending on your configuration:

Master domain manager or dynamic domain manger or their backups:

    On Windows operating systems:

```
conman "unlink @; noask"
conman "stop; wait"
conman "stopmon;wait"
ShutDownLwa.cmd
stopServer.bat
```

    On UNIX and Linux operating systems:

```
conman "unlink @; noask"
conman "stop; wait"
conman "stopmon;wait"
conman "shut;wait"
ShutDownLwa
./stopServer.sh
```

Fault-tolerant agent or domain manager:

    On Windows operating systems:

```
conman "unlink @; noask"
conman "stop; wait"
conman "stopmon;wait"
ShutDownLwa.cmd
```

    On UNIX and Linux operating systems:

```
conman "unlink @; noask"
conman "stop; wait"
conman "stopmon;wait"
conman "shut;wait"
ShutDownLwa
```

IBM Workload Scheduler for z/OS agent or IBM Workload Scheduler dynamic agent:

> **On Windows operating systems:**
>> `ShutDownLwa.cmd`
>
> **On UNIX and Linux operating systems:**
>> `ShutDownLwa`

If you have jobs scheduled to run on the instance you are upgrading, make sure that they have completed otherwise some processes, such as `jobmon` or `joblnch`, might still be active.

4. Download the appropriate ZIP file specific for the operating system from IBM Fix Central.

5. Delete the content of the following directory: `<TWA_HOME>`/TWS/ITA/cpa/temp/ipc, where `<TWA_HOME>` is the IBM Workload Scheduler installation directory.

6. Extract the content of the ZIP files into a directory, using one of the extraction tools available on your system or downloadable from the Internet. The tool you use must be able to keep the file permissions on the extracted files, for example, infozip.

Note:

- If you want to install the fix pack on IBM i, to untar the eImages, see "Extract the eImages for the IBM Workload Scheduler for z/OS Agent and Dynamic Agent on IBM i operating systems" on page 30.
- To extract the **.zip** file onto a Windows 64-bit system, ensure that the eImage is not located on the desktop because the Windows operating system extract tool has a problem. Choose another directory into which to extract the fix pack eImage.

Creating or updating the IBM Workload Scheduler database schema

Before launching any of the installation methods, manually create the SQL database tables following the procedure in the *Planning and Installation* guide that best suits your environment. To update or upgrade the database schema, follow the directions in this section.

Depending on the IBM Workload Scheduler component you install, the following database tables must be created or upgraded:

Master domain manager or backup master domain manager:
- IBM Workload Scheduler tables
- Dynamic workload broker tables.

Dynamic domain manager or backup dynamic domain manager:
> Dynamic workload broker tables.

For a DB2® or Oracle database, the database tables can be created or upgraded at the same time as when you install or update the product component using either the Installation Manager wizard or the silent installation, or you can choose to create or update the database tables manually, and then install and update the component at a later time. For Informix® Dynamic Server and Microsoft SQL Server databases, the database tables must be created or updated manually, before installing the product.

Creating the database tables for DB2 and Oracle:

About this task

Create the database tables for the first time manually using the procedure documented in the *Planning and Installation Guide* and then install the product using the fix pack installation procedure. The IBM Workload Scheduler version 9.4 Fix Pack 1 image contains an updated `dbtools` directory. When performing the following procedures, always use the files contained in the `dbtools` directory of the fix pack image.

DB2   Creating the IBM Workload Scheduler and the dynamic workload broker database tables involves the following high-level steps:
1. Customize the properties file.
2. Generate the SQL files.
3. Create the SQL tables.

Refer to "*Creating or upgrading the database tables if you are using DB2*" in *IBM Workload Scheduler Planning and Installation*.

Oracle Creating the IBM Workload Scheduler and the dynamic workload broker database tables involves the following high-level steps:
1. Customize the properties file.
2. Generate the SQL files.
3. Create the SQL tables.

Refer to "*Creating or upgrading the database tables if you are using Oracle*" in *IBM Workload Scheduler Planning and Installation*.

Updating or upgrading the database schema for DB2 or Oracle:

Starting with the previous fix pack, a new method for updating and upgrading the IBM Workload Scheduler and the dynamic workload broker database schema is provided for DB2 and Oracle databases. The update or upgrade can be performed manually before you install the product component fix pack or, using the Installation Manager wizard or silent installation, the schema is updated during the fix pack installation procedure.

Before you begin

This manual procedure requires an installation of Java Runtime Environment version 1.7 or later. If you already have a supported version installed, refer to the *JAVA_HOME* installation directory where required in this procedure. This manual procedure can also be run from a remote computer where the Java Runtime Environment is installed.

About this task

Updating or upgrading the database schema for DB2 and Oracle using this method involves the following high-levels steps:
1. Modify the `upgradeDB2IWSDB.properties` or the `upgradeOracleIWSDB.properties` file assigning the appropriate values to the parameters.
2. Run the `launchUpgradeIWSDB.bat` or the `launchUpgradeIWSDB.sh` script to generate and apply the SQL statements. Optionally, you can choose to only generate the statements and apply them later, but before installing the product component fix pack.

To update or upgrade the IBM Workload Scheduler and the dynamic workload broker database tables, run the following procedure:

Procedure

1. From the IBM Workload Scheduler version 9.4 Fix Pack 1 image, locate the `dblighttool` directory and extract the compressed file, `IWSDBUpgrade.zip`, to a path on the database server computer or on a remote computer.

2. Modify the properties file located in the `IWSDBUpgrade` folder assigning values to the parameters as follows:

   DB2   `upgradeDB2IWSDB.properties`

   Oracle `upgradeOracleIWSDB.properties`

Table 6. Properties for DB2 and Oracle update and upgrade procedure

Property	DB2	Oracle
COMPONENT_TYPE	The IBM Workload Scheduler component to be updated or upgraded: MDM, BKM, DDM or BDM. The default value is MDM.	
DB_NAME	The name of IBM Workload Scheduler database. The default value is TWS.	The Oracle instance name (SID) of the IBM Workload Scheduler database. The default value is orcl. On Solaris operating systems where an Oracle database is used, DB_NAME corresponds to the Service Name.
DB_HOST_NAME	The host name or IP address of the DB2 server.	The host name or IP address of the Oracle server. On Solaris operating systems where an Oracle database is used, type the hostname or IP address of the Oracle server and uncomment this property in the property file.
DB_PORT	The port of the DB2 server. The default value is 50000.	The port of the Oracle server. By default, this property is commented in the properties file. On Solaris operating systems where an Oracle database is used, type the port number of the Oracle server and uncomment this property in the property file.
DB_ADMIN_USER	The database administrator user that creates the IBM Workload Scheduler schema objects on the DB2 server.	N/A
DB_ADMIN_USER_PWD	The password of the database administrator user that creates the IBM Workload Scheduler schema objects on the DB2 server.	N/A

Table 6. Properties for DB2 and Oracle update and upgrade procedure (continued)

Property	DB2	Oracle
DB_USER	The user that has been granted access to the IBM Workload Scheduler tables on the DB2 server. The default value is db2admin.	The database user that accesses the IBM Workload Scheduler tables on the Oracle server.
DB_USER_PWD	N/A	The password of the database user that will access to IBM Workload Scheduler tables on the Oracle server.
IWS_TS_NAME	The name of the tablespace for IBM Workload Scheduler data (default: TWS_DATA)	The name of the tablespace for IBM Workload Scheduler data. The default value is USERS.
IWS_LOG_TS_NAME	The name of the tablespace for the IBM Workload Scheduler log (default: TWS_LOG)	The name of the tablespace for the IBM Workload Scheduler log. The default value is USERS.
IWS_PLAN_TS_NAME	The name of the tablespace for IBM Workload Scheduler plan (default: TWS_PLAN)	The name of the tablespace forIBM Workload Scheduler plan. The default value is USERS.
IWS_PLAN_TS_PATH	The path of the tablespace forIBM Workload Scheduler plan (default: TWS_PLAN and used only for upgrade from IBM Workload Scheduler versions 8.5.1 and 8.6)	N/A
HOST_NAME	The host name of the IBM Workload Scheduler broker (no default).	
WAS_SEC_PORT	The HTTPS port of the IBM Workload Scheduler broker. The default value is 31116.	
UPGRADE_DB	Set to TRUE to automatically apply the generated SQL statements to upgrade the IBM Workload Scheduler database schema. Set to FALSE to manually apply the generated statements in the customSQL.sql file. The default value is TRUE.	

3. Run the upgrade script located in the IWSDBUpgrade folder specifying the usage and all of the required parameters as follows:

On Windows operating systems

```
launchUpgradeIWSDB.bat JAVA_HOME_PATH DB_PATH PROPERTY_FILE
```

For example,

DB2

```
launchUpgradeIWSDB.bat D:\TWS\JavaExt\jre\jre
D:\Program Files\IBM\SQLLIB\java
D:\IWSDBUpgrade\upgradeDB2IWSDB.properties
```

Oracle
```
launchUpgradeIWSDB.bat D:\TWS\JavaExt\jre\jre
D:\oracle12\product\12.1.0\dbhome_1 D:\IWSDBUpgrade\
upgradeOracleIWSDB.properties
```

On UNIX and Linux operating systems
```
./launchUpgradeIWSDB.sh JAVA_HOME_PATH DB_PATH PROPERTY_FILE
```

For example,

DB2
```
 ./launchUpgradeIWSDB.sh /opt/TWS/JavaExt/jre/jre
/home/db2inst1/sqllib/java
/IWSDBUpgrade/upgradeDB2IWSDB.properties
```

Oracle `./launchUpgradeIWSDB.sh /opt/TWS/JavaExt/jre/jre` `/app/oracle/product/12.1.0/dbhome_1 /IWSDBUpgrade/` `upgradeOracleIWSDB.properties`

Table 7. Upgrade script parameters

Parameter	Description
JAVA_HOME_PATH	The Java home directory, where the bin directory is present.
DB_PATH	**DB2** The fully qualified directory path to the JDBC driver JAR file that contains the JDBC driver class. Specify only the path and not the JAR file name. **Oracle** The *ORACLE_HOME* directory.
PROPERTY_FILE	The fully qualified name of the file that contains a number of properties, one on each line with an assigned value, that are required for the database upgrade. **DB2** `upgradeDB2IWSDB.properties` **Oracle** `upgradeOracleIWSDB.properties`

The script creates an SQL file with all the statements needed to upgrade the IBM Workload Scheduler database schema to the latest version. The SQL file is named: `IWSDBUpgrade/customSQL.sql`.

If the UPGRADE_DB parameter is set to `TRUE`, then the generated SQL statements are applied to the database automatically when the script is run.

If UPGRADE_DB parameter is set to `FALSE`, then the SQL statements are generated but not applied to the database. You can inspect the generated `customSQL.sql` and when you are ready to apply them to the database, set the value of the UPGRADE_DB parameter to `TRUE` in the `upgradeDB2IWSDB.properties/upgradeOracleIWSDB.properties` file and then rerun the `launchUpgradeIWSDB.bat/launchUpgradeIWSDB.sh` script to regenerate the SQL statements and apply the SQL statements .

What to do next

You can now proceed with updating the product.

Creating and upgrading the database tables for Informix and Microsoft SQL:

Create or update the database tables manually before installing the product.

About this task

This is a mandatory procedure if you use either Informix Dynamic Server or Microsoft SQL Server databases and it must be performed before you install or upgrade the product with a user different from the database administrator user. The IBM Workload Scheduler version 9.4 Fix Pack 1net image contains an updated `dbtools` directory. When performing the following procedures, always use the files contained in the `dbtools` directory of the fix pack image.

Informix Dynamic Server

Creating the IBM Workload Scheduler and the dynamic workload broker database tables involves the following high-level steps:

1. Customize the properties file.
2. Generate the SQL files.
3. Create the SQL tables.

Refer to "*Creating or upgrading the database tables if you are using Informix Dynamic Server*" in *IBM Workload Scheduler Planning and Installation*.

Microsoft SQL Server

Creating the IBM Workload Scheduler and the dynamic workload broker database tables involves the following high-level steps:

1. Customize the properties file.
2. Generate the SQL files.
3. Create the SQL tables.

Refer to "*Creating or upgrading the database tables if you are using Microsoft SQL Server*" in *IBM Workload Scheduler Planning and Installation*.

Extract the eImages for the IBM Workload Scheduler for z/OS Agent and Dynamic Agent on IBM i operating systems

The following packages are available with this fix pack:

- `9.4.0-IBM-IWS-IBM_I_ZOS_AGENT-FP0003.tar`: The IBM Workload Scheduler for z/OS Agent on IBM i image.
- `9.4.0-IBM-IWS-IBM_I_AGENT-FP0003.zip`: The dynamic agent on IBM I image. This package also contains an extraction tool executable that can be copied to the IBM i workstation.

To untar or unzip the fix pack eImages, you can use the *PASE* shell or the *AIXterm*.

Using *PASE* shell:

1. Open the *PASE* shell.
2. Run the command:

   `"CALL QP2TERM"`
3. Locate the folder where you downloaded the fix pack eImage and run the command:

   IBM Workload Scheduler for z/OS Agent
   "tar xvf 9.4.0-IBM-IWS-IBM_I_ZOS_AGENT-FP0003.tar"

   Dynamic agent
   "unzip 9.4.0-IBM-IWS-IBM_I_ZOS_AGENT-FP0003.zip"
4. Exit from the *PASE* shell.

Using *AIXterm*:

1. Start the *Xserver* on your desktop.
2. On the iSeries machine, open a *QSH shell* and export the display.

3. In QSH shell, go to the directory /QopenSys and run the command:
   `"aixterm -sb"`

4. A pop-up window is displayed on your desktop. Using this pop-up window, unzip the `9.4.0-IBM-IWS-IBM_I_AGENT-FP0003.zip` file, or untar the `9.4.0-IBM-IWS-IBM_I_ZOS_AGENT-FP0003.tar`.

Installing IBM Workload Scheduler v9.4FP3 for the first time using the IBM Installation Manager wizard

To install IBM Workload Scheduler v9.4FP3 for the first time using the interactive wizard, complete the following steps:

1. Complete the actions described in section "Before Installing" on page 24.

2. Download the IBM Workload Scheduler version 9.4 General Availability eImage from Passport Advantage Online from https://www-01.ibm.com/software/passportadvantage/pao_customer.html, specific for the operating system and extract it into a path of your choice.

3. Download the TAR or ZIP file specific for the operating system from IBM Fix Central and extract it. To extract the **.tar** file, ensure that you use the GNU version of the TAR command. Otherwise, if you extract the file using a version other than GNU, your fix pack installation fails. If you are installing on a UNIX operating system, run the following command:

   `chmod -R 755 <imagesDir>`

4. Depending on the type of operating system, run the following command:

   On Windows operating systems:
   From the directory where you extracted the files, run `setupTWS.cmd -gapath <extraction_path>`.

   On UNIX and Linux operating systems:
   From the directory where you extracted the files, run `setupTWS.sh -gapath <extraction_path>`.

   where *<extraction_path>* is the path into which you extracted the IBM Workload Scheduler General Availability eImage.

   The IBM Installation Manager window opens.

5. Select the packages you want to install and the click **Next** to continue.

6. In the Validating Results page, check that all the prerequisites are fulfilled and then click **Next** to continue.

7. In the Licenses page, read the license agreement for the selected package. If you agree to the terms of all the license agreements, click **I accept the terms in the license agreements** and then click **Next**.

8. In the Install Packages page, type the directory where you want to install the product and then click **Next** to continue.

9. In the Features page, select the IBM Workload Scheduler features:
   - master domain manager
   - dynamic domain manager

   Click **Next** to continue.

10. Complete the not disabled fields in the following panels:

    For master domain manager
    - User information
    - Master configuration
    - Database configuration

- WebSphere profile configuration
- WebSphere ports configuration
- Disk space check

For dynamic domain manager
- User information
- Dynamic domain manager configuration
- Database configuration
- WebSphere profile configuration
- WebSphere ports configuration
- Disk space check

For each panel, click **Validate** to validate that the information you entered is correct and then click **Next** to continue.

11. In the Summary page, review your choices before upgrading the product package. To change any choices that you made on previous pages, click **Back** and make the changes. When you are satisfied with your installation choices, click **Install** to install the packages.

12. Ignore any request to create the WebSphere Application Server administrator user.

13. Click **Finish** to complete the installation.

Installing the fix pack on an IBM Workload Scheduler version earlier than 9.4 using the IBM Installation Manager wizard

Before you begin

If you are updating the master domain manager and you use an Oracle database, then ensure that you run IBM Installation Manager from a shell with the *ORACLE_HOME* environment variable set correctly. Also, ensure that you add the Oracle native client libraries located in `%ORACLE_HOME%/lib` to the appropriate environment variable:

- Linux and Solaris: LD_LIBRARY_PATH. For example:

  ```
  export ORACLE_HOME=/oracle/app/oracle/product/12.1.0/dbhome_1
  export LD_LIBRARY_PATH=/oracle/app/oracle/product/12.1.0/dbhome_1/lib
  ```
- AIX: LIBPATH
- HP-UX: SHLIBPATH
- Windows: PATH

About this task

To install the fix pack on a IBM Workload Scheduler version earlier than 9.4 using the interactive wizard, complete the following steps:

Procedure

1. Perform the actions described in section "Before Installing" on page 24.

2. Download the TAR or ZIP file specific for the operating system from IBM Fix Central and extract it. To extract the **.tar** file, ensure that you use the GNU version of the TAR command. Otherwise, if you extract the file using a version other than GNU, your fix pack installation fails. If you are installing on a UNIX operating system, run the following command:

   ```
   chmod -R 755 <imagesDir>
   ```

3. Depending on the type of operating system, run the following command:

   On Windows operating systems:
   > From the directory where you extracted the files, run `setupTWS.cmd` `-gapath <extraction_path>`.

   On UNIX and Linux operating systems:
   > From the directory where you extracted the files, run `setupTWS.sh` `-gapath <extraction_path>`.

   where *<extraction_path>* is the path into which you extracted the IBM Workload Scheduler General Availability TAR or ZIP file specific for your operating system.

   The IBM Installation Manager window opens.

4. Ensure you have installed or upgraded the prerequisites, see "Installation notes" on page 20 about installing prerequisite software before installing the fix pack, and then click **Next** to continue.

5. In the Validating Results page, check that all the prerequisites are fulfilled and then click **Next** to continue.

6. In the Licenses page, read the license agreement for the selected package. If you agree to the terms of all the license agreements, click **I accept the terms in the license agreements** and then click **Next**.

7. When upgrading from version 8.*x*, you are prompted to perform the following steps. If upgrading from a version 9.*x*, skip this step and proceed to the next.

   a. In the Install Packages page, type the directory where the earlier IBM Workload Scheduler version is installed and then click **Next** to continue.

   b. A warning window opens with the message:
   ```
   The location <installation_path> already contains a IBM Workload Scheduler
   instance of version <version> that will be upgraded.
   ```

   where *<installation_path>* is the directory where the earlier IBM Workload Scheduler version is installed and *<version>* is the installed version.

   Click **OK** to continue.

8. In the Features page, select the IBM Workload Scheduler features:
   - master domain manager
   - dynamic domain manager

   Click **Next** to continue.

9. Complete the fields related to the component you are installing:

   For master domain manager
   > - Upgrade configuration
   > - User information
   > - Master configuration
   > - Database configuration: Some fields are prefilled with information retrieved from your environment. Complete the fields where required as follows:

Table 8. Database configuration options for DB2

Option	Description
`JDBC Driver Directory Path`	The fully qualified directory path to the JDBC driver JAR file that contains the JDBC driver class.
`Database Administrator user`	The database administrator user that creates the IBM Workload Scheduler schema objects on the DB2 server.
`Database Administrator password`	The password of the database administrator user that creates the IBM Workload Scheduler schema objects on the DB2 server.
`Plan tablespace name` *Only for master domain manager and dynamic domain manager*. The name that identifies the table space where planning data is stored. This table space must have been previously created by the database administrator. The default for this field is **TWS_PLAN**. This applies only to upgrades from IBM Workload Scheduler version 8.5.1 or 8.6.	
`Plan tablespace path` *Only for master domain manager and dynamic domain manager*. The path to the plan tablespace where planning data is stored. This table space must have been previously created by the database administrator. This applies only to upgrades from IBM Workload Scheduler version 8.5.1 or 8.6.	

Table 9. Database configuration options for Oracle

DB2	Oracle
`JDBC Driver Directory Path`	The fully qualified directory path to the JDBC driver JAR file that contains the JDBC driver class.
`IBM Workload Scheduler database user password`	The password for the IBM Workload Scheduler Oracle user. It must comply with the Oracle naming rules.
`Oracle instance name (SID)`	The Oracle instance name (SID) of the IBM Workload Scheduler database. The default value is `orcl`.
`Data tablespace name`	*Only for master domain manager and dynamic domain manager*. The name that identifies the table space where scheduling objects data, and event rules data is stored. This table space must have been previously created by the database administrator. The default for this field is **USERS**. This applies only to upgrades from IBM Workload Scheduler versions 9.*x*.

Table 9. Database configuration options for Oracle (continued)

DB2	Oracle
`Plan tablespace name`	*Only for master domain manager and dynamic domain manager*. The name that identifies the table space where planning data is stored. This table space must have been previously created by the database administrator. The default value for this field is **USERS**. This applies only to upgrades from IBM Workload Scheduler version 8.5.1 or 8.6. This value is prefilled when upgrading from version 9.*x*.
`Log tablespace name`	*Only for master domain manager and dynamic domain manager*. The name that identifies the tablespace where log data is stored. This table space must have been previously created by the database administrator. The default value for this field is **USERS**. This applies only to upgrades from IBM Workload Scheduler versions 9.*x*.

- WebSphere profile configuration
- WebSphere ports configuration
- Disk space check

For dynamic domain manager
- Upgrade configuration
- User information
- Dynamic domain manager configuration
- Database configuration: same information as for a master domain manager.
- WebSphere profile configuration
- WebSphere ports configuration
- Disk space check

For each panel, click **Validate** to validate that the information you entered is correct and then click **Next** to continue.

10. In the Summary page, review your choices before upgrading the product package. To change any choices that you made on previous pages, click **Back** and make the changes. When you are satisfied with your installation choices, click **Install** to install the packages.

11. In the Install packages page, in the **Which program do you want to start?** pane, select **None** and the click **Finish** to complete the installation.

Installing the fix pack on the IBM Workload Scheduler General Availability version 9.4 using the IBM Installation Manager wizard

Before you begin

If you are updating the master domain manager and you use an Oracle database, then ensure that you run IBM Installation Manager from a shell with the

ORACLE_HOME environment variable set correctly. Also, ensure that you add the Oracle native client libraries located in *%ORACLE_HOME*/lib to the appropriate environment variable:

- Linux and Solaris: LD_LIBRARY_PATH. For example:

  ```
  export ORACLE_HOME=/oracle/app/oracle/product/12.1.0/dbhome_1
  export LD_LIBRARY_PATH=/oracle/app/oracle/product/12.1.0/dbhome_1/lib
  ```

- AIX: LIBPATH
- HP-UX: SHLIBPATH
- Windows: PATH

About this task

To install the fix pack using the interactive wizard, complete the following steps:

Procedure

1. Perform the actions described in section "Before Installing" on page 24.
2. Download the TAR or ZIP file specific for the operating system from IBM Fix Central and extract it. To extract the **.tar** file, ensure that you use the GNU version of the TAR command. Otherwise, if you extract the file using a version other than GNU, your fix pack installation fails. If you are installing on a UNIX operating system, run the following command:

   ```
   chmod -R 755 <imagesDir>
   ```

3. You can start the installation process by using one of the following methods:

   Method 1: IBM Installation Manager program

       a. Start the Installation Manager in wizard mode. For Windows, use **IBMIM.exe**. For Linux and UNIX, use the **./IBMIM** command line. The IBM Installation Manager window opens.

       b. In the menu bar, click **File** > **Preferences**.

       c. The Repositories window opens. Click **Add Repository**.

       d. In the Select a Repository window, in the Filter pane, type the path to the directory where the fix pack files are located.

       e. In the Directories pane, select the directory containing the fix pack files and click **OK**.

   Method 2: The scripts `update.bat` or `update.sh`

       Depending on the type of operating system, run the following command:

       On Windows operating systems:

           On Windows platforms, you must use only the 32-bit version of IBM Installation Manager. From the root directory of the eImages, run `update.bat`.

       On UNIX and Linux operating systems:

           From the root directory of the eImages, run `update.sh`.

       The IBM Installation Manager window opens.

4. Verify that the check box **Search service repositories during installation and updates** is not selected, then click **OK** in the Repositories window.
5. Click **Update**.
6. In the Installation Packages page, select the "IBM Workload Scheduler" > "Version 9.4.0.1" product package. Click **Next** to continue.

7. In the Licenses page, read the license agreement for the selected package. If you agree to the terms of all the license agreements, click **I accept the terms in the license agreements** and then click **Next**.

8. In the Features page, select the IBM Workload Scheduler features:
   - master domain manager
   - dynamic domain manager

   Click **Next** to continue.

9. Complete the not disabled fields in the following panels:

   For master domain manager
   - Upgrade configuration
   - User information
   - Master configuration
   - Database configuration: Most fields are prefilled with information retrieved from your environment. Complete the fields where required as follows:

   Table 10. Database configuration options for DB2

Option	Description
`Database Administrator user`	The database administrator user that creates the IBM Workload Scheduler schema objects on the DB2 server.
`Database Administrator password`	The password of the database administrator user that creates the IBM Workload Scheduler schema objects on the DB2 server.

   Table 11. Database configuration options for Oracle

Option	Description
`IBM Workload Scheduler database user password`	The password for the IBM Workload Scheduler Oracle user. It must comply with the Oracle naming rules.

   - WebSphere profile configuration
   - WebSphere ports configuration
   - Disk space check

   For dynamic domain manager
   - Upgrade configuration
   - User information
   - Dynamic domain manager configuration
   - Database configuration: same information as for a master domain manager.
   - WebSphere profile configuration
   - WebSphere ports configuration
   - Disk space check

   For each panel, click **Validate** to validate that the information you entered is correct.

10. In the Summary page, review your choices before upgrading the product package. To change any choices that you made on previous pages, click **Back**

and make the changes. When you are satisfied with your installation choices, click **Update** to install the update packages.

11. Click **Finish** to complete the installation.

Results

Note: If the fix pack installation fails, the IBM Workload Scheduler General Availability version 9.4 instance might not work properly and the following error is shown in the installation logs:

```
An error occurred while restoring the IBM Workload Scheduler instance
from the backup, located in the folder <backup_folder>
```

where *<backup_folder>* is the folder where the IBM Workload Scheduler backup files are located.

To recover from this issue, complete the following steps:

1. Check that you have right permissions for the IBM Workload Scheduler installation path, that there is enough disk space, and that no process is locking the files located in the IBM Workload Scheduler installation path.

2. Access the *<backup_folder>* and remove the folders with the same names as those located in the IBM Workload Scheduler installation folder.

3. Copy all the folders from the *<backup_folder>* to the IBM Workload Scheduler installation folder.

4. Rerun the fix pack installation steps.

Installing the fix pack using IBM Installation Manager silent installation

Apply the fix pack using the Installation Manager silent installation method.

Before you begin

After you complete the actions described in the section "Before Installing" on page 24, if you want to install the fix pack in silent mode, use the silent installation method. When you run a silent installation, you must create a response file to use as input to the IBM Installation Manager silent installation commands. The response file includes all the information required to run the installation without user intervention.

As a prerequisite step, specifically for the master domain manager silent installation, you can run a script that checks the system against the product system requirements to ensure a successful installation without delays or complications. The prerequisite check script checks requirements such as:

• Supported operating system.

• Sufficient RAM.

• Sufficient swap file space.

• Disk space for the creation of the installation and temporary directories passed in input to the script.

For specific details about the product system requirements see "Disk space requirements" on page 22.

To run the prerequisite check script, copy the script `iwsPrereqCheck.bat` or `iwsPrereqCheck.sh` and the `Prerequisites` folder from the fix pack image to a

folder on the system where you plan to run the installation. Ensure you have read, write, and execute permissions on the `Prerequisites` folder. If the fix pack image is already on this system, then you can run the script directly from the fix pack image location. Submit the script to run as follows:

On Windows operating systems:
Run the following command:

`iwsPrereqCheck.bat -instdir <TWA_HOME> -tmpdir <tmp>`

On UNIX or Linux operating systems:
Run the following command:

`iwsPrereqCheck.sh -instdir <TWA_HOME> -tmpdir <tmp>`

where,

<TWA_HOME>
Represents the product installation directory.

<tmp> Represents the temporary folder on the system where you are running the installation.

The results of the prerequisite check are written to a text file named, `result.txt`, located in the `Prerequisites` folder.

About this task

You are provided with several sample response files located in the `\response_files\` directory. Select the appropriate response file, determine the eImages you need to download and extract, and then customize the properties in the response file including the settings for the repository location of the eImages before performing the silent installation. For example, the following is an extract from a sample response file with the repository locations specified:

```
<server>
      <!-- The IBM Workload Scheduler repository.   -->
      <!-- Insert the value of the directory where you downloaded the
           IBM Workload Scheduler image.   -->
      <repository location='/tmp/Images/TWS94ga/TWS/disk1'/>
      <!-- Define the location  where you store the current IBM Workload Scheduler
           fixpack eImages -->
      <repository location='/tmp/Images/TWS94fp3/TWS'/>
</server>
```

Important: During the silent installation, if the location specified for a repository is not found, then correct the location and before rerunning the installation, clear the repository locations from IBM Installation Manager.

1. Open the **Preferences** panel in Installation Manager.
2. From the **Repositories** page, select and remove the repository location in error.
3. Correct the repository location in the response file.
4. Rerun the silent installation.

Table 12. Response files for fix pack installation

Response File Name	Description	Required Images			
		9.4 GA	9.4 FP3	Installation Manager	WebSphere Application Server
IWS94_UPDATE_*<component_name>* _from93_*<os_name>*.xml	This response file applies the fix pack to version 9.3 component bringing it to the 9.4 FP3 level.	✔	✔		
IWS94_UPGRADE_*<component_name>* _from9*x*_*<os_name>*.xml	This response file upgrades a version 9.1 or 9.2 component to the 9.4 FP3 level.	✔	✔		
IWS93_UPGRADE_*<component_name>* _from86_*<os_name>*.xml	This response file upgrades a version 8.6 component to the 9.3 FP3 level.	✔	✔		
IWS93_UPGRADE_*<component_name>* _from851_*<os_name>*.xml	This response file upgrades a version 8.5.1 component to the 9.3 FP3 level.	✔	✔		
IWS94_FRESH_*<component_name>* _*<os_name>*.xml	This response file performs a fresh installation of the version 9.4 GA product plus fix pack 3. Use this installation if you have WebSphere Application Server and Installation Manager already installed.	✔	✔		
IWS94_FRESH_FULL_*<component_name>* _*<os_name>*.xml	This response file performs a first time fresh installation of the version 9.4 GA product, fix pack 3, WebSphere Application Server, and Installation Manager. WebSphere Application Server must be purchased separately.	✔	✔	✔	✔

Create your own response file or customize a sample response file to include the options required to complete the installation you require. The properties in the response files are described in more detail in this topic of the *Planning and Installation* guide. In particular, with this fix pack, the following new properties have been introduced for DB2 and Oracle databases:

Table 13. DB2 database configuration properties in the response file

Name	Description	Permitted Values
user.dbJDBCDB2AdminUser	The user name of the administrator of the DB2 server instance.	db2inst1

Table 13. DB2 database configuration properties in the response file (continued)

Name	Description	Permitted Values
user.dbJDBCDB2AdminPassword	The DB2 administrator password.	For more information about encrypting passwords using Installation Manager, see Encrypting user passwords for response files.
user.dbJDBCPort	Optional, type the TCPIP port number only if DB2 is configured to use an SSL connection.	50000
user.db2PlanTableSpaceName	The name of the DB2 instance tablespace for storing plan data.	TWS_PLAN
ser.db2PlanTableSpacePath	The relative path of the DB2 instance tablespace for storing plan data. Only for upgrades from IBM Workload Scheduler versions 8.5.1 and 8.6.	TWS_PLAN

Table 14. Oracle database configuration properties in the response file

Name	Description	Permitted Values
user.dbJDBCOraclePassword	The Oracle IBM Workload Scheduler user that accesses the IBM Workload Scheduler schema.	For more information about encrypting passwords using Installation Manager, see Encrypting user passwords for response files.
user.oraclePlanTableSpace	The name of the tablespace for storing plan data.	USERS

Procedure

1. Copy the relevant response file to a local directory.
2. Edit the IBM Workload Scheduler section.
3. Save the file with your changes.
4. Open a command-line prompt.
5. Go to the Installation Manager `tools` directory. The default `tools` directory is:
   - **On Windows operating systems:**
     `C:\Program Files\IBM\Installation Manager\eclipse\tools`
   - **On UNIX and Linux operating systems:**
     `/opt/IBM/InstallationManager/eclipse/tools`
6. Run the following command:
   - **On Windows operating systems:**
     `imcl.exe -c`
   - **On UNIX and Linux operating systems:**
     `./imcl -c`

7. Type *P* and press the Enter key to access the **Preferences** menu.
8. Type *1* and press the Enter key to access the **Repositories** menu.
9. Remove all the listed repositories by typing the number beside each repository to edit it and then type *2* to remove the repository. Perform these actions for each of the listed repositories.
10. If there is an *X* beside the **S** menu item related to **Search service repositories**, type *S* and press the Enter key to deselect it.
11. Type *A* and press the Enter key to apply the changes.
12. Type *R* and press the Enter key to return to the main menu.
13. Type *X* and press the Enter key to exit.
14. Go to the Installation Manager `tools` directory. The default `tools` directory is:
    * **On Windows operating systems:**

      `C:\Program Files\IBM\Installation Manager\eclipse\tools`
    * **On UNIX and Linux operating systems:**

      `/opt/IBM/InstallationManager/eclipse/tools`
15. Run the following command:
    * **On Windows operating systems:**

      ```
      imcl.exe input <local_dir>\response_file.xml
      -log <local_dir>\log_file.xml
      -acceptLicense -nosplash
      ```
    * **On UNIX and Linux operating systems:**

      ```
       ./imcl input /<local_dir>/response_file.xml
      -log /<local_dir>/log_file.xml
      -acceptLicense -nosplash
      ```

    where *response_file* is the name of the response file to be used for the installation, and *log_file* is the name of the log file that records the result of the silent installation.

After installing the fix pack

After you have installed the fix pack for the master domain manager or backup domain manager, create the event and the event rules related to the centralized agent update feature. This procedure enables you to monitor future updates of fault-tolerant and dynamic agents using the centralized agent update method.

Before you begin

Ensure you have already upgraded your master domain manager or backup domain manager to IBM Workload Scheduler V9.4 Fix Pack 3.

About this task

To create the update event and event rules:

Procedure

1. Create the update event definition.
   a. Perform a dump of your custom events by entering the following command:

      `evtdef dumpdef <file_name>`

      where *<file_name>* is the name of a new XML file to where your custom events are saved.

b. Edit the new XML file by appending the following section between the <eventPlugin>...</eventPlugin> XML tags maintaining the correct XML syntax and save the file.

```
<!-- Update Event -->
<event baseAliasName="updateEvt" scope="Generic">
    <complexName displayName="Update event" name="Upgrade"></complexName>
    <displayDescription>The event is sent when the specified expression is matched.</displayDescription>
    <property type="string" required="true" wildcardAllowed="true" multipleFilters="true" minlength="1">
        <complexName displayName="Message" name="Message" />
        <displayDescription>The message for which the event is generated.</displayDescription>
    </property>
    <property type="string" required="true" wildcardAllowed="true" multipleFilters="false" minlength="1">
        <complexName displayName="Workstation" name="Workstation" />
        <displayDescription>The workstation for which the event is generated.</displayDescription>
    </property>
    <property type="string" required="true" wildcardAllowed="true" multipleFilters="true" minlength="1">
        <complexName displayName="Update Status" name="UpgradeStatus" />
        <displayDescription>The status of the running update.</displayDescription>
    </property>
</event>
```

c. Load the new update event definition by running the following command:

```
evtdef loaddef <file_name>
```

where *<file_name>* is the name of the XML file you created and modified in the previous steps.

2. Create the update event rules.

a. Run the following command from the composer command line:

```
composer replace <TWA_home>/TWS/eventrulesdef.conf
```

where *<TWA_home>* represents the installation directory for the IBM Workload Scheduler instance.

What to do next

To display and verify the new update event and event rules, log out and log back in to the Dynamic Workload Console.

Installing the fix pack on agents using the twsinst script

You can use the following procedure to install the fix pack on an existing agent installation using the **twsinst** script with the -update option. To perform a fresh installation of the agent, you can use the **twsinst** script with the -new option, refer to the *Planning and Installation* guide for the complete procedure.

Note: If you are upgrading an agent from version 8.5.1, you must obligatorily specify the -password *user_password* parameter.

To show command usage:

On Windows operating systems:
```
cscript twsinst.vbs -u | -v
```

On UNIX and Linux operating systems:
```
./twsinst -u | -v
```

To install a fix pack:

On Windows operating systems:

```
cscript twsinst -update -uname TWS_user -password user_password
[-domain user_domain]
[-inst_dir installation_dir
[-recovInstReg {true | false}]] [-wait <minutes>] [-lang <lang_id>]
```

On UNIX and Linux operating systems:

```
./twsinst -update -uname TWS_user [-inst_dir installation_dir
[-recovInstReg {true | false}]]  [-wait <minutes>][-lang <lang_id>]
```

Where:

-update
> Upgrades an existing agent that was installed using the **twsinst** script.

-uname *TWS_user*
> The name of the user for which IBM Workload Scheduler is upgraded.

-password *user_password*
> Windows operating systems only. The password of the user for which you are upgrading IBM Workload Scheduler.

-domain *user_domain*
> Windows operating systems only. The domain name of the IBM Workload Scheduler user. The default is the name of the workstation on which you are upgrading the product.

-inst_dir *installation_dir* **[-recovInstReg** *true | false* **]**
> The name of the directory where you installed IBM Workload Scheduler. When installing the fix pack the *inst_dir* parameter is used:
> - If the installation process cannot retrieve the product installation location from the registries.
> - If you need to re-create the IBM Workload Scheduler registries again before the fix pack installation. Set the value of *recovInstReg* to *true* if you want to re-create the registry files while performing a fix pack installation on a fault-tolerant agent.

-wait *minutes*
> The number of minutes that the product waits for jobs that are running to complete before starting the fix pack installation. If the jobs do not complete during this interval the installation process does not proceed and an error message is displayed. Valid values are integers or -1 for the product to wait indefinitely. The default is 60.

-lang *lang_id*
> The language used for the **twinst** messages displayed. The default is the value of the system variable *LANG*. If the language catalog for the value you specified is missing, the default C language catalog is used.

twsinst for Windows is a Visual Basic Script (VBS) that you can run in CScript and WScript mode. The IBM Workload Scheduler user is automatically created. The software is installed by default in the IBM Workload Scheduler installation directory. The default value is %ProgramFiles%\IBM\TWA. If you enabled the Security Warning, a dialog box is displayed during the installation. In this case, answer **Run** to continue.

After you complete the actions described in the section "Before Installing" on page 24, perform the following action:

- Run **twsinst** with the options you need for your fix pack installation scenario.

Note:

- On IBM i operating systems, if you are installing the fix pack on a IBM Workload Scheduler for z/OS Agent or a IBM Workload Scheduler Dynamic Agent, after you complete the actions described in the section "Extract the eImages for the IBM Workload Scheduler for z/OS Agent and Dynamic Agent on IBM i operating systems" on page 30, run the **twsinst** script from the *QSH shell*.

- When the agent upgrade completes, if your agent is a fault-tolerant agent, you have to restart all the IBM Workload Scheduler processes and services, with exception of *netman* that restarts automatically.
  - On Windows operating systems:

    ```
    mailman, batchman, writer, jobman,stageman,
    JOBMON, tokensrv, batchup, monman
    ```
  - On UNIX operating systems:

    ```
    mailman, batchman, writer, jobman, JOBMAN,
    stageman, monman.
    ```

  To restart the upgraded fault-tolerant agent, `conman start` and `conman startmon` commands must be issued.

Installing the fix pack on multiple fault-tolerant and dynamic agents

You can install fix packs for multiple fault-tolerant agent and dynamic agent instances, by downloading a package on the master domain manager workstation and updating the multiple agent instances by running an action from the Dynamic Workload Console. You can also schedule the centralized update of multiple agent instances, by using the Dynamic Workload Console or the command line.

Before you begin

This procedure can be used from an IBM Workload Scheduler master domain manager version 9.3.0 or later to centrally update only instances of fault-tolerant agents version 9.3.0 or later and dynamic agents version 9.3.0 or later.

In the master domain manager Security file, you must have manage authorization for all the agent workstations for TWS_master_user, root, or Administrator users. If your master domain manager is a version 9.3.0 or later fresh installation, the authorization role is automatically added to the Security file. If your master domain manager is an upgraded version 9.3.0 or later instance, you must manually add the authorization. For more information about the manage keyword usage, see the Object type - cpu topic in the *Administration Guide*. For an example of a master domain manager Security file, see topic about the security file on the master domain manager to install fix packs or upgrade fault-tolerant agents and dynamic agents in the *Administration Guide*.

About this task

Complete the following steps:

Procedure

1. From IBM Fix Central, download on to the master domain manager workstation, the fix pack installation package you want to install on fault-tolerant agent or dynamic agent instances, to the following default directory:

   On Windows operating systems:
   > *<TWA_home>*\TWS\depot\agent

   On UNIX operating systems:
   > *<TWA_home>*/TWS/depot/agent

   where *<TWA_home>* is the master domain manager installation directory.

   You can change the default directory value executing the following steps:

   - Stop the WebSphere Application Server on the master domain manager.
   - Modify the com.ibm.tws.conn.engine.depot key value in the following property file:

     On Windows operating systems:
     > *<TWA_home>*\WAS\TWSProfile\properties\TWSConfig.properties

     On UNIX operating systems:
     > *<TWA_home>*/WAS/TWSProfile/properties/TWSConfig.properties

   - Start the WebSphere Application Server.

2. Log on to the Dynamic Workload Console.

3. Create a `Monitor Workstations` task.

4. Run a `Monitor Workstations` task and select one or more dynamic agent or fault-tolerant agent instances that you want to update.

5. Click **More Actions** > **Update agent**. The **Update agent** action checks whether the selected agent is a supported workstation type.

   The **Update agent** action is applicable to the following workstation types only:

   - Dynamic Agent
   - Fault-tolerant agent

   The **Update agent** action is not applicable to the following workstation types:

   - Master domain manager
   - Backup master domain manager
   - Dynamic domain manager
   - Backup dynamic domain manager
   - Extended agent
   - Standard agent
   - Remote engine
   - Broker
   - Pool
   - Dynamic pool
   - Limited fault-tolerant agent

   The process updates the agent only if the workstation type is supported. Otherwise, either an error message is displayed on the Dynamic Workload Console, or is written in the operator log messages console, depending on the workstation type.

   You can schedule the centralized update of multiple agent instances, by using the Dynamic Workload Console or the command line. For a description of how

to scheduler the update see the topic about scheduling the centralized agent update in the upgrading section of the *Planning and Installation* guide.

For a description of the **Update agent** action on fault-tolerant agents and dynamic agents, see the topic about Updating fault-tolerant agent and dynamic agent instances in the *Planning and Installation* guide.

Results

Verify the update agent results by completing one of the following actions in the Dynamic Workload Console:

Check the operator log messages console:
> Click **System Status and Health** > **Event Monitoring** > **Monitor Triggered Actions** and check the messages related to the agent workstation update.
>
> The following event rules are triggered:
>
> **UPDATESUCCESS**
>> When the workstation is successfully updated
>
> **UPDATEFAILURE**
>> When an error occurs
>
> **UPDATERUNNING**
>> With the information about the update process status

Check the workstation version changes:
> After the next plan update, in the `Monitor Workstations` view of the Dynamic Workload Console, you can check the updated version in the `Version` column of the selected agent. Otherwise, if you do not want to wait for the next plan update to see the updated version, run the command **JnextPlan -for 0000** with the **-noremove** option.

You can also perform a **manual check of the update agent results** by looking at the following log files on the agent system:

On Windows operating systems:
> `<TWA_home>\TWS\logs\centralized_update.log`

On UNIX operating systems:
> `<TWA_home>/TWS/logs/centralized_update.log`

Rolling back a master domain manager installation

This topic describes how to roll back a master domain manager to a previous fix pack level or release.

Before you begin

Important: The first step of the procedure is to create a backup copy of some directories before you install the new fix pack or upgrade to a new release. The backup is required for the subsequent restore operation which returns the master domain manager to the previous version.

About this task

The rollback procedure is supported for a master domain manager that was installed using IBM Installation Manager. When upgrading the master domain manager, the installation also upgrades the database. After the rollback procedure,

the database remains at the newer fix pack level or release and is not rolled back. It is still compatible with the master domain manager at the previous level.

You can revert back to an earlier version of an installed fix pack or release on the master domain manager by performing the following rollback procedure.

Procedure

1. Stop the IBM Workload Scheduler instance by running the following commands:
   - `conman "stopappserver;wait"`
   - `conman "stopmon;wait"`
   - `conman "stop;wait"`
   - `conman "shut;wait"`
   - `ShutDownLwa`

2. The backup phase. On the IBM Workload Scheduler instance, run the following commands to create a backup copy of the directories needed for a subsequent restore operation:

   Linux and UNIX

   a. Create a backup of the `/var/ibm/InstallationManager` directory, maintaining the file and directory permissions:
      1) `cd /var/ibm`
      2) `cp -fRp InstallationManager <REPOSITORY>`

      where *<REPOSITORY>* represents the directory where the backup files are stored, for example, `/repo`.

   b. Back up the IBM Workload Scheduler instance:
      1) `mkdir <REPOSITORY>/instance`
      2) `cd <TWA_HOME>/TWS/_uninstall/ACTIONTOOLS`
      3) `./backupInstance.sh -backupDir <REPOSITORY>/instance -installDir <TWA_HOME> -user <TWS_USER>`

      Verify that a sub-directory named with a timestamp has been created in the *<REPOSITORY>*/instance directory.

   c. Back up the IBM Workload Scheduler registries:
      1) `mkdir <REPOSITORY>/registries`
      2) `cd <REPOSITORY>/registries`
      3) `cp -pR /etc/TWA .`
      4) `cp -pR /etc/TWS .`

   Windows

   a. Create a backup of the `C:\ProgramData\ibm\Installation Manager\` directory and store it in a directory, for example, `C:\REPO\`. In this procedure, the backup directory is represented by *<REPOSITORY>*.

   b. Back up the IBM Workload Scheduler instance by running the following commands:
      1) `create <REPOSITORY>\instance`
      2) `cd <TWA_HOME>\TWS\_uninstall\ACTIONTOOLS`
      3) `backupInstance.cmd -backupDir <REPOSITORY>\instance -installDir <TWA_HOME> -user <TWS_USER>`

      Verify that a sub-directory named with a timestamp has been created in the *<REPOSITORY>*\instance directory.

   c. Back up the IBM Workload Scheduler registries by running the following commands:
      1) `create <REPOSITORY>\registries`
      2) `create <REPOSITORY>\registries\TWS`

3) Copy the `C:\Windows\TWSRegistry.dat` file into the *<REPOSITORY>*`\registries\TWS` directory.

4) Copy the `C:\Windows\TWA` directory into the *<REPOSITORY>*`\registries` directory.

5) `cp -pR \etc\TWS .`

3. The restore phase. After installing the fix pack or upgrading to the new release, you perform the restore phase when you want to revert back to the previous fix pack level or release. Complete the following steps:

a. Stop the IBM Workload Scheduler instance by running the following commands:
   - `conman "stopappserver;wait"`
   - `conman "stopmon;wait"`
   - `conman "stop;wait"`
   - `conman "shut;wait"`
   - `ShutDownLwa`

a. From the instance with the new fix pack level or release installed, create a backup copy of the IBM Workload Scheduler core files and folders, maintaining file permissions.

   Linux and UNIX

   Copy the files and folders as follows:

   `mkdir <REPOSITORY>/core`

   `cp -fRp Symphony Sinfonia Symnew *.msg pobox Jobtable jmJobTableDir nxtjobno mozart stdlist schedlog <REPOSITORY>/core`

   Windows

   Copy the following files from the *<TWA_HOME>*`\TWS` directory to the *<REPOSITORY>*`\core` directory:

   `create <REPOSITORY>\core`

   `Symphony, Sinfonia, Symnew, *.msg, pobox\*.msg, Jobtable, jmJobTableDir, nxtjobno, mozart, schedlog, stdlist`

4. Restore the IBM Workload Scheduler files.

   Linux and UNIX

   a. Restore IBM Workload Scheduler registries by running the following commands. In this example, 94fp2 refers to the newer installation.
      1) `cd /var/ibm`
      2) `mv InstallationManager InstallationManager.94fp2`
      3) `cp -fRp <REPOSITORY>/InstallationManager`

   b. Restore the IBM Workload Scheduler instance by running the following commands:
      1) `cd <TWA_HOME>/TWS/_uninstall/ACTIONTOOLS`
      2) `./restoreInstance.sh -backupDir <REPOSITORY>/instance -installDir <TWA_HOME>-user <TWS_USER>`
      3) `chown <TWS_USER>:<TWS_USER_GROUP> <TWA_HOME>/TWS`

   c. Restore the IBM Workload Scheduler registries by running the following commands:
      1) `cd <REPOSITORY>/registries`
      2) `cp -pR TWA /etc/`
      3) `cp -pR TWS /etc/`

   d. Restore the IBM Workload Scheduler core files by running the following command:
      `cp -fRp <REPOSITORY>/core/* <TWA_HOME>/TWS`

   Windows

a. Restore IBM Workload Scheduler registries by performing the following steps. In this example, `94fp2` refers to the newer installation.

   1) Rename `"C:\ProgramData\ibm\Installation Manager\"` to `"C:\ProgramData\ibm\Installation Manager.94fp2\"`

   2) Copy `"<REPOSITORY>\Installation Manager"` to `"C:\ProgramData\ibm\"`

b. Restore the IBM Workload Scheduler instance by running the following commands:

   1) `cd <TWA_HOME>\TWS\_uninstall\ACTIONTOOLS`

   2) `restoreInstance.cmd -backupDir <REPOSITORY>\instance -installDir <TWA_HOME> -user <TWS_USER>`

c. Restore the IBM Workload Scheduler registries by running the following commands:

   1) Copy `cd <REPOSITORY>\registries\TWS\TWSReigstry.dat` to `"C:\Windows\"`

   2) Copy `<REPOSITORY>\registries\TWA` to `"C:\Windows\"` overwriting both files and folders.

d. Restore the IBM Workload Scheduler core files by copying the files and folders in the `<REPOSITORY>\core` directory to the `<TWA_HOME>\TWS` directory.

   `cp -fRp <REPOSITORY>\core\* <TWA_HOME>\TWS`

Results

The IBM Workload Scheduler has now been restored to the previous fix pack level or release.

Uninstalling the entire IBM Workload Scheduler instance

Master domain manager or dynamic domain manger or their backups:
To uninstall using the IBM Installation Manager, see *Planning and Installation*.

Fault-tolerant agent or domain manager:
To uninstall the entire IBM Workload Scheduler instance, use the **twsinst -uninst -uname** *username* command from the *TWS_home* directory, where *username* is the name of the user for which the IBM Workload Scheduler agent is uninstalled.

Installation log files

The following installation log files give you details about the status of the fix pack installation for the master domain manager, backup master domain manager, the agents, and the connector:

- Log file for master domain managers, dynamic domain managers, and their backups:

On Windows operating systems:

   `C:\ProgramData\IBM\InstallationManager\logs\<YYYYMMDD_HHMM>.xml`

   Note: The folder `ProgramData` is a hidden folder.

On UNIX and Linux operating systems:

   `/var/ibm/InstallationManager/logs/<YYYYMMDD_HHMM>.xml`

where *<YYYYMMDD>* is the date and *<HHMM>* is the time when the log file is created.

- Log file for fault-tolerant agents and dynamic agents:

    On Windows operating systems:

    `%Temp%\TWA\tws9400\`
    `twsinst_<operating_system>_<TWS_user>^9.4.0.1n.log`

    On UNIX and Linux operating systems:

    `/tmp/TWA/tws9400/`
    `twsinst_<operating_system>_<TWS_user>^9.4.0.1n.log`

    where

    <operating_system>
    > is the operating system running on the workstation where you are applying the fix pack.

    <TWS_user>
    > is the name of the user for which IBM Workload Scheduler was installed (the name you supplied during installation).

    n   is the fix pack number.

Documentation updates for IBM Workload Automation Fix Pack, version 9.4.0

Any additions or changes to the documentation as a result of fix pack 1, 2 and 3 have been integrated into the online product documentation available in IBM Knowledge Center.

Chapter 2. Contacting IBM Software Support

Before contacting IBM Software Support with a problem, refer to the IBM Software Support site by accessing the following Web address:

http://www.ibm.com/software/support

To access IBM support, click the IBM support link at the bottom right of the page.

If you want to contact IBM Software Support, see the *IBM Software Support Handbook* at the following Web site:

http://techsupport.services.ibm.com/guides/handbook.html

The guide provides information about how to contact IBM Software Support, depending on the severity of your problem, and the following information:
- Registration and eligibility.
- Telephone numbers, depending on the country in which you are located.
- Information you must have before contacting IBM Software Support.

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