



# Control-M/Assist 9.0.00 Implementation Guide



July 2015

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### United States and Canada

**Address**    **BMC SOFTWARE INC**                      **Telephone**    ▪    **713 918 8800**    **Fax**    **713 918 8000**  
                  **2101 CITYWEST BLVD**                                      ▪    **800 841 2031**  
                  **HOUSTON TX**  
                  **77042-2827**  
                  **USA**

### Outside United States and Canada

**Telephone**    **(01) 713 918 8800**                                      **Fax**        **(01) 713 918 8000**

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  - License number and password (trial or permanent)
- Operating system and environment information
  - Machine type
  - Operating system type, version, and service pack or other maintenance level such as PUT or PTF

- System hardware configuration
- Serial numbers
- Related software (database, application, and communication) including type, version, and service pack or maintenance level
- Sequence of events leading to the issue
- Commands and options that you used
- Messages received (and the time and date that you received them)
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  - Messages from the operating system, such as `file system full`
  - Messages from related software

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# Introduction to Control-M/Assist

This chapter contains the following topics:

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## Who should read this book

This document explains Control-M/ Assist and addresses the following:

- Environment
  - Third-party-vendor scheduling product users other than Control-M for z/OS in your mainframe environment (for example, IBM's OPC/ESA or Computer Associates' CA-7).
  - Control-M/Server and Control-M/EM for distributed applications running on UNIX or Microsoft Windows operating systems.

- Task needs
  - Trigger a job execution in the distributed environment by Control-M/Server after the completion of a job on the mainframe side.
  - View jobs which executed in the mainframe in the Control-M/EM Active environment (colored according to their completion status)
  - Raise an Alert in the Control-M/EM Alert window for jobs executed in the mainframe depending on their completion status.
  - Trigger the execution of a job in the mainframe after the completion of a job scheduled by Control-M/Server in the distributed environment.

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**NOTE**

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The following books are referred to in this manual:

- *Control-M for z/OS User Guide*
  - *INCONTROL for z/OS Administrator Guide*
  - *INCONTROL for z/OS Installation Guide*
  - *Control-M for z/OS for CA-7 Conversion Guide*
- 

## Overview

Control-M/ Assist is a solution set designed for customers that use a third-party scheduling product on their mainframe (that is, a scheduler other than Control-M for Z/OS), but that use Control-M for Distributed Systems (Control-M/Server and Control-M/EM) in their distributed environment.

It enables these customers to control and track the entire scheduling enterprise, including the Z/OS environment, through Control-M/EM.

Control-M/ Assist does the following:

- detects jobs submitted manually or by a non-Control-M scheduler into the batch workload of the z/OS environment.
- automatically forces the schedule definition of those jobs into the active environment of Control-M.
- utilizes the job scheduling definitions forced into the Control-M Active Environment to control and define the processing logic that should be executed for that job, for example, creating shout and alerts messages, handling the job SYSOUT, and sending an e-mail.

- enables you to monitor the jobs are forced into the Control-M Active Environment, through the centralized control station of Control-M/EM. Using Control-M/EM. For more information, see [“Monitoring mainframe jobs from Control-M/EM” on page 35](#).
- enables you to create bidirectional jobs dependencies among jobs on any platform (UNIX, Microsoft Windows, and so on) in the distributed environment and jobs in the z/OS environment. For more information, see [“Creating dependencies between cross-platform jobs” on page 46](#).

## How does it work?

All the Control-M/ Assist software components are installed on your z/OS environment.

Using the Control-M Event Manager (CMEM) facility, defined jobs can be captured when submitted for execution by the non-Control-M scheduler, and their schedule definition will then be forced in the Control-M Active Job environment. The Control-M for z/OS monitor then executes the processing logic you defined in the Job Schedule Definitions.

Finally, using the Control-M Application Server and the IOAGATE, the information is transferred between Control-M for z/OS and Control-M/EM. See [“Overall look at the Control-M/ Assist environment” on page 29](#) for a graphic presentation and detailed explanation.

## Control-M/Assist main components

Control-M/ Assist consists of the BMC Software components described in the following sections:

### IOA

The Control-M for z/OS Automated Production Control and Scheduling System is a component member of the INCONTROL family of products, a fully integrated suite designed to automate, manage and streamline operations on the z/OS mainframe.

The Integrated Operations Architecture (IOA) is at the heart of the INCONTROL family of products. IOA has a common core of shared code as the foundation of its architectural design. INCONTROL's IOA environment has several inherent design advantages, including a common user interface and a shared data repository. A key feature of the IOA environment is its integrated application design, which includes:

- integrated user notification
- management by exception
- integrated scheduling
- interdependency and interrelationship handling
- common help facility
- integrated management reporting
- common method for sharing information
- unified installation and maintenance
- unified security implementation
- open interface design

For further details, see the section about INCONTROL products and IOA in the *Control-M for z/OS User Guide*.

## Control-M

Control-M automates job processing in your data center. CONTROL-M

- performs virtually all the job handling tasks of computer operators.
- provides an interface that enables the user to intervene in the process of production management.
- provides continual data and status information regarding job processing.

This chapter introduces the Control-M facilities and components from a functional perspective, beginning with the major components that comprise the heart of Control-M and progressing to the less major components that enhance the functionality of Control-M.

The following components are essential to Control-M:

- Job scheduling definitions
- Active Jobs File (AJF)
- Control-M monitor

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**— NOTE —**

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Not all components described below are necessarily needed or available to Control-M/ Assist users. They are presented below only in the interests of giving a complete overview of CONTROL-M. For example, Control-M/ Assist users will most likely not use or be interested in the IOA Calendar facility, the Statistics facility, Automatic tape adjustment, and the Reporting facility.

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## Job scheduling definitions

A job scheduling definition specifies criteria that identify decisions to be made, and actions to be taken, regarding the handling of a particular job. Each job scheduling definition contains the following sections:

- General Parameters

General information about the job (for example, identify the library and member in which the JCL is stored).

- Basic Scheduling Parameters

Criteria according to which Control-M schedules the job.

- Runtime Scheduling Parameters

Runtime requirements that must be satisfied before Control-M submits the job.

- Post-processing Parameters

Actions Control-M performs after the job ends, depending upon the outcome of job execution. For example, Control-M performs one set of actions if the job ends OK, but another set of actions if an abend occurs.

Users of Control-M/ Assist are required to define Job Scheduling definitions for jobs or groups of jobs to be managed by Control-M/ Assist. When defining jobs definitions in Control-M/ Assist environment, consider the following:

- Job definition Basic scheduling parameters and the Runtime Scheduling sections are irrelevant to Control-M/ Assist users since the jobs are scheduled externally to Control-M.
- The post-processing section is the most relevant section and specifies the Control-M post-processing logic to be executed after the job enters the Control-M/ Assist environment.

The mechanisms used to define job scheduling definitions are discussed in the online facilities chapter of the *Control-M for z/OS User Guide*.

Once defined, a job scheduling definition is saved. It can be modified later if required. Job scheduling definitions are stored in members in partitioned datasets (libraries), as follows:

- Job scheduling definitions for related applications are generally placed in a single member, called a table.
- Multiple tables are stored in partitioned datasets, called scheduling libraries.
- Multiple scheduling libraries can be defined.

## Active Jobs File

Each job scheduling definition contains criteria that determine whether the job must be scheduled on a given day. If based on these criteria a job must be scheduled, a copy of its job scheduling definition is placed in a file called the Active Jobs File. The mechanism by which job scheduling definitions are placed in the Active Jobs File is discussed in the job ordering and job forcing section of the *Control-M for z/OS User Guide*. Only jobs in the Active Jobs File are candidates for submission by the Control-M. In the Control-M/ Assist environment, however, jobs are scheduled and submitted externally to Control-M.

In the Control-M/ Assist environment, CMEM rules capture JOBARRIVAL events, forcing the jobs definition to the Active Job File as a special kind of jobs known as ONSPOOL jobs (jobs that Control-M needs to post-process but not to submit).

## Control-M monitor

The Control-M monitor handles and controls job processing as follows:

- Checks the runtime requirements specified in each job scheduling definition in the Active Jobs File, monitors available resources and conditions in the environment, and when it determines that the conditions and resources required by a job are available, it allocates the resources and submits the job.

In the Control-M/ Assist environment jobs are submitted externally to Control-M.

- Monitors the execution of the job.
- Implements post-processing decisions based on instructions in the job scheduling definition and the results of the job execution. This phase enables CTM/ Assist users to trigger activities in Control-M/DS.

The Control-M monitor operates continuously. It evaluates the production environment and implements decisions.

---

## Expanded Control-M functionality

This following features and capabilities of Control-M are described in details in the *Control-M for z/OS User Guide* and the *INCONTROL for z/OS Administrator Guide*.

### Automating job scheduling: New Day processing

The mechanism used to place job scheduling definitions automatically on the Active Jobs File is called New Day processing. At a set time each day, Control-M performs New Day processing, during which:

- Control-M performs a number of maintenance and cleanup functions.
- Job scheduling definitions are selected from the tables and are placed in the Active Jobs File. These jobs can then be submitted and tracked by the Control-M monitor.

### Automatic JCL update: JCL and AutoEdit facility

The JCL and AutoEdit facility offers a method to automate manual JCL update activities.

### Automated job submission

Automated job submission controlled by runtime scheduling criteria.

### Monitoring of resources

Three types of runtime criteria resources can be monitored by Control-M: Conditions, Quantitative resources and control resources. Only when the conditions and resources required by a job are available is the job submitted by the monitor.

### Immediate detection and notification of problems: Shout facility

When a problem or an unexpected situation or delay occurs, Control-M can notify the appropriate personnel using the shout facility.

### History Jobs File

During New Day processing, jobs that have ended OK are deleted from the Active Jobs File and can be placed in the History Jobs File.

## **Journaling and restoration capability**

Permits forward recovery of the Control-M environment to any time of the day you may choose.

## **IOA Log facility**

Provides a message repository through which the user can examine messages issued by Control-M during the processing of a job.

## **Automated job post-processing**

Once the job has executed, the Control-M monitor implements the post-processing instructions defined in the job scheduling definition.

## **Utilities**

Utilities provided with Control-M are used to perform a variety of management functions and generate reports that assist in the efficient use of Control-M.

## **Using calendars to schedule jobs: IOA Calendar facility**

Specification of scheduling criteria for jobs can be simplified by using calendars. A calendar defines which days jobs should be ordered.

## **Accumulating statistics: Statistics facility**

All accumulated information regarding job execution, including the elapsed run time, is written to the IOA Log file. Periodically, a statistics utility may be used to scan and analyze the IOA Log file.

## **Simulating job execution and forecasting resource usage: Simulation and Forecasting facility**

Using statistics accumulated by the Statistics facility, the Simulation and Forecasting facility simulates the actions of the Control-M monitor under the conditions specified in simulation parameters.



## Automatic Tape Adjustment facility

The Automatic Tape Adjustment facility collects and analyzes statistics regarding tape drive usage to automatically allocate the appropriate number of tape drive resources at job order time.

## Reporting facility

Control-M supports a comprehensive reporting facility.

## Reports description

Keystroke Language (KSL) is a general purpose reporting language, based on the online facility, capable of producing numerous reports from the database.

## Online user interface to Control-M

Control-M provides an online user interface that enables the user to

- interface with most of the previously described facilities
- intervene in the process of production management
- immediately access up-to-date information from the production environment

## Scheduling Definition facility

The Control-M Scheduling Definition facility is accessed through Option 2 of the Primary Option menu. It is the main online facility for creating, defining, modifying, and deleting tables and job scheduling definitions. In addition, this facility can be used to

- edit the JCL of a job
- produce a job (scheduling) plan
- display job statistics
- copy a job definition
- manually order or force jobs
- graphically display a job flow of the jobs in a table

## Active Environment (Status) screen: Online Tracking and Control facility

The Online Tracking and Control facility is accessed through Option 3 of the IOA Primary Option menu. It is the main user interface to the monitoring of the jobs scheduled for the day.

In the Online Tracking and Control facility, you can perform the following functions:

- View the status of each job order in the Active Jobs File
- Place a job in HELD status or free a HELD job
- Delete a job order
- Obtain a statistical overview of the status of jobs in the Active Environment screen
- See why a job in the Active Jobs File has not been submitted. If job submission is held up due to missing prerequisite conditions, you can optionally add those conditions manually
- Display the Log file of a job to view all messages issued for the job
- Zoom in on the parameters of a job order This includes not only the job scheduling definition parameters, but also parameters determined by the Control-M monitor at runtime. Manual update of most of these parameters for the job order is permitted.
- View the documentation of a job
- Add notes to a job, for example, to document actions that were taken
- Confirm the scheduling, rerun, or restart (if Control-M/Restart is active), of a job that has been defined as requiring manual confirmation
- View the execution history of all orders of a job, and view the job order SYSOUTs
- View the accumulated statistics of successful executions of a job
- View the list of job dependencies for a specific job (that is, the predecessor and successor jobs of the selected job), and perform manual job flow adjustment, such as priority adjustment You can filter which jobs in the Active Jobs File are displayed in the Active Environment screen.
- Simulate job execution
- Bypass runtime scheduling criteria

## CMEM Rule Definition facility

The CMEM Rule Definition facility is accessed through Option C of the INCONTROL Primary Option menu. CMEM rules enable Control-M to respond to external events. The CMEM Rule Definition facility is an online facility that enables the user to create, define, modify and delete CMEM rule tables and CMEM rules.

## IOA Conditions/Resources screen

The IOA Conditions/Resources screen is accessed through Option 4 of the IOA Primary Option menu. It displays information from the IOA Conditions file, which contains the list of all existing prerequisite conditions, and the Control-M Resources file, which contains the list of Quantitative resources and Control resources. The IOA Conditions/Resources screen enables the user to

- view IOA prerequisite conditions
- view Control-M Quantitative resources
- add or delete prerequisite conditions and/or resources
- change the available quantity of Quantitative resources

## IOA Log screen

The IOA Log screen, accessed through Option 5 of the IOA Primary Option menu, displays the IOA Log file. The IOA Log file contains messages that record every significant event in the life of all jobs or started tasks, rules, missions, and other functions that are under the control of IOA products. This includes messages generated for normal processing, such as job submitted, error conditions (if any) encountered during processing, and messages directed to the Log file from the SHOUT facility.

The user can filter IOA log file contents displayed in the IOA Log screen.

## IOA Manual Conditions screen

The IOA Manual Conditions screen is accessed through Option 7 of the IOA Primary Option menu. It displays the IOA Manual Conditions file, which contains the list of prerequisite conditions that must be added manually. These are IN conditions that are required by scheduled jobs but are not added by scheduled jobs, that is, these conditions are not listed as OUT or DO COND conditions in the Active Jobs File. These conditions fall into the following categories:

- Conditions that are never automatically added by scheduled jobs because manual confirmation is always desired.

- Conditions that are normally added automatically by scheduled jobs, but the jobs that add them are not scheduled.

For the conditions listed in the Manual Conditions screen to be added to the IOA Conditions file, manual intervention is required.

The IOA Manual Conditions screen enables the user to:

- View the list of Manual Conditions
- Select and add listed conditions, as desired, to the IOA Conditions file

## IOA Calendar facility

The IOA Calendar facility is accessed through Option 8 of the IOA Primary Option menu. IOA calendars allow definition of common scheduling patterns that simplify the entering of basic scheduling criteria in job scheduling definitions. The IOA Calendar facility enables the user to create, define, modify and delete IOA calendars.

## Online Utility screens (under ISPF)

When Control-M and other INCONTROL products (if any) are active under ISPF, a number of utilities and facilities can be activated online. The IOA Online Utilities menu is accessed through Option 6 of the IOA Primary Option menu (under ISPF). The IOA Online Utilities menu displays available utilities from which the desired utility or facility can be selected.

## CMEM

The Control-M Event Manager (CMEM) facility enables Control-M to perform specified actions in response to external events. External events are events in the system that occur outside Control-M's direct control (for example, submission of a job not under the control of the Control-M monitor).

The CMEM facility utilizes sets of user-defined rules that specify events to monitor and actions to perform if a specified event occurs. These rules are defined online through the CMEM Rule Definition facility.

Multiple rules can be defined in a table (member) in a standard partitioned dataset (library). Related rules are usually defined in the same table. Multiple tables can be defined in a library, and multiple CMEM rule libraries can be defined.

The CMEM discussion below contains general and technical information on CMEM for all users. Where noted, not all the requirements and recommendations may be appropriate for Control-M/ Assist users.

For more information, see the chapter about the Control-M Event Manager in the *Control-M for z/OS User Guide*.

## Types of events managed by CMEM

The CMEM facility handles the following events that can be specified in ON statements in the rule:

- DSNEVENT – Dataset disposition (such as cataloged, deleted or kept) during step termination or dynamic decollation, or the occurrence of a NOT CATLGD 2 event (when a dataset name is created in a job step but not cataloged because its name already exists in the MVS catalog)
- JOBARRIV – Arrival of a job on the JES spool from any source, for example, jobs submitted by a TSO user or by CICS, or jobs received over an NJE network.
- JOBEND – Completion of a job regardless of its source.
- STEP – Termination of a job step.

## Types of actions that CMEM can perform

Any combination of the following actions may be performed when the specified event occurs. They are specified in DO statements in the rule definition:

- DO COND statement – Prerequisite conditions may be added to or deleted from the IOA Conditions file. This may trigger the submission of jobs in the Active Jobs File.
- DO FORCEJOB statement – A Control-M table or individual job can be forced (that is, ordered to the Active Jobs File regardless of its basic scheduling criteria). Jobs can be forced for one of the following reasons:
  - To start a new process in Control-M (that is, new job submission).
  - To enable Control-M to assume full control of an externally submitted job that triggers the event. These jobs are referred to as on spool jobs, discussed in [“On Spool jobs” on page 22](#).
- DO STOPJOB statement – Stop (terminate) the job in which the event occurs at the end of the current job step.

The following actions can be defined if CONTROL-O is installed:

- DO RULE statement – CONTROL-O rules can be invoked within the current rule.
- DO SHOUT statement – Messages can be sent via the CONTROL-O Shout facility.

## CMEM rule ordering, triggering and deactivation

CMEM tables are usually ordered (loaded to memory) when CMEM is started. They can also be refreshed or loaded by an operator command, or manually using the FORCE option in the CMEM Table List screen.

A CMEM rule is triggered (that is, all its DO statements are performed) by the occurrence of the events specified in the rule's ON statements.

More than one rule can be triggered by the occurrence of an event. An event triggers each rule whose ON statement matches the event. Generally, all actions from all triggered rules are performed.

The one exception occurs when multiple rules are triggered by the same job arrival event and more than one of the triggered rules contains DO FORCEJOB statements. In this case, the DO FORCEJOB statements of the first triggered rule are performed, but the DO FORCEJOB statements of the other rules triggered by the event are not performed. For more information, see [“On Spool jobs” on page 22](#).

CMEM rules remain activated (that is, in memory) until they are overridden by the reloading of the rule table or deleted by an operator command.

## Control-M/Assist and CMEM

Control-M/Assist uses CMEM in order to capture job arrival events and to force the jobs definition to the Active Job File to enable Control-M to assume full control of an externally submitted job that triggers the event. These jobs are referred to as on spool jobs and are discussed in [“On Spool jobs” on page 22](#).

The CMEM rules defined in Control-M/Assist environment will be triggered by ON JOBARRIVAL events and will use the DO FORCEJOB action to force the jobs definition into the AJF.

## On Spool jobs

On Spool jobs are jobs or started tasks that are submitted externally to Control-M, that is, jobs submitted by TSO users or CICS, or jobs received over an NJE network, and brought under the control of the Control-M monitor using a CMEM rule.

The CMEM rule that causes a job to be an On Spool job (that is, a CMEM rule that brings the external job under the control of the Control-M monitor), must be an ON JOBARRIV rule with a DO FORCEJOB statement.

To inform Control-M that this is an On Spool job and not a regular FORCEJOB request, the job scheduling definition forced by the DO FORCEJOB must "match" the arriving job, as described later in this section.

Control-M controls the entire life cycle of the job, from determining when to execute the job to performing job post-processing, according to the forced job scheduling definition.

Control-M processes On Spool jobs slightly differently than it processes regular jobs. Control-M does not submit the job because the job has already been submitted. Instead, Control-M releases the job (if held) when the runtime scheduling criteria are met. Once the job starts execution (whether the job previously required releasing or not), it is controlled by Control-M in the same way that Control-M controls regular jobs. Control-M waits for the job to finish, reads its SYSOUT, and performs all post-processing actions defined in the job scheduling definition.

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— **NOTE** —

For Control-M/ Assist users CONTROL-M will not release the job, since the user will most likely will not submit the job in held status from his third-party-vendor scheduling product.

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### Creating On Spool jobs

The following components are necessary to create On Spool jobs:

- Job on spool

The job must have the following characteristics:

- The MSGCLASS SYSOUT of the job:

- For JES3 users: must be equal to the Control-M SYSOUT held class.
- For JES2 users: can be any held SYSOUT class.

This enables Control-M to read the job's SYSOUT and perform post-processing according to the job scheduling definition.

- To delay the job's execution and permit Control-M to determine when to run it, submit the job with TYPRUN=HOLD.

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— **NOTE** —

Control-M/ Assist users may not wish to implement this recommendation.

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- CMEM rule definition

The CMEM rule definition must contain the following:

- ON JOBARRIV statement. The job name specified in the ON JOBARRIV statement in this rule must match the name of the job to be monitored. It can be a full job name, or it can be a mask if a group of jobs is to be monitored.
- DO FORCEJOB statement. The first DO FORCEJOB statement in the rule must force a matching job scheduling definition (described below).

- Job scheduling definition

The job scheduling definition must have the following characteristics:

- The job scheduling definition must be forced by the first DO FORCEJOB statement in the CMEM rule.
- The MEMNAME value in the job scheduling definition must match the name of the external job. A mask can be specified in the MEMNAME field if the same job scheduling definition is used for more than one job.
- Appropriate runtime scheduling criteria for the job may be defined in the job scheduling definition. This enables Control-M to control the execution of the job (that is, when the job must be run).

---

— **NOTE** —  
Control-M/ Assist users may not wish to implement this recommendation.

---

- Desired post-processing actions must be defined in the job scheduling definition.

## Handling On Spool jobs

On Spool jobs are handled as follows:

- When the job arrival event occurs, Control-M forces the requested table or job.

If the MEMNAME value in the requested table or job does not match the name of the arriving job, the table or job is forced and processed regularly by Control-M (a job is submitted when its runtime scheduling criteria are met, and so on).



If the MEMNAME value in the requested table or job matches the name of the arriving job, the job becomes an On Spool job and Control-M performs the following actions:

- Replaces the MEMNAME mask (if a mask was specified in MEMNAME) with the name of the arriving Job.
  - Assigns the job ID of the job that triggered the event to the forced job.
  - Forces the job, the forced job appears in the Active Environment screen with status WAIT SCHEDULE ON SPOOL.
- Control-M starts processing the forced job when all runtime scheduling criteria defined in the job scheduling definition are satisfied. If there are no runtime scheduling criteria in the job scheduling definition, Control-M starts processing the job immediately.
  - Control-M looks for the job in the spool (to release it, if required).

If the external job is waiting for execution in HELD state (that is, if the job arrives on spool with TYPRUN=HOLD), Control-M releases it for execution. Otherwise, Control-M verifies that the job is still in the spool (waiting for execution, executing or ended) before deciding to perform post-processing.

- Control-M waits for the job to finish execution, reads its SYSOUT, analyzes the execution results and performs all the post-processing actions defined in the job scheduling definition.

---

— **NOTE** —

---

Control-M can only handle NJE jobs as On Spool jobs when they originate on the same NJE node as that on which Control-M is running.

---

## On Spool job scheduling definition considerations

- Job forcing considerations

Only one On Spool job can be created in response to a job arrival event.

However, in several cases, multiple DO FORCEJOB actions might match the arriving job. Each of these cases and the job forcing logic applied to them (to prevent multiple On Spool processes for the same external job) are described below.

- The job arrival rule contains multiple DO FORCEJOB requests. (Each might match the arriving job.) In this case, job forcing logic is as follows:

The On Spool process (the match between the external job name and MEMNAME) is performed for the first DO FORCEJOB in the first matching job arrival rule only:

- If a match is found, the job is an On Spool job.
- If a match is not found, the job is not an On Spool job, even if subsequent DO FORCEJOB actions might match.

In either case, all subsequent DO FORCEJOB statements in the same rule (if they exist) are handled normally (that is, not as forcing On Spool jobs).

- The DO FORCEJOB forces a table in which more than one MEMNAME matches the arriving job. In this case, job forcing logic is as follows:

If a table containing more than one job is forced (by the first DO FORCEJOB statement in the rule, as described above), the first matching job causes the job to be an On Spool job. All the other jobs in the table are forced as regular Control-M jobs, even if they match the job name of the external job.

- Multiple job arrival rules are triggered by the same job arrival event, and each rule contains one or more DO FORCEJOB statements that might match the arriving job. In this case, job forcing logic is as follows:

Only the DO FORCEJOB statements from the first triggered rule are executed (as described above). DO FORCEJOB from all other triggered job arrival rules are ignored.

---

**NOTE**

If an On Spool job was purged from the spool but still remains in the Active Jobs File, and another job with the same name arrives on spool and is assigned the same job ID, that later job is not forced.

---

## JCL management considerations

When defining JCL, the following issues must be considered:

- Any attempt to rerun the job (that is, as a cyclic job, by a DO RERUN statement, or by a manual rerun request) might fail if the JCL of the job is not found in the library specified in the MEMLIB parameter of the job scheduling definition.

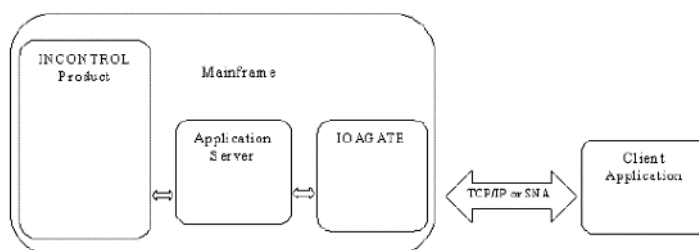
- If the job is not submitted with TYPRUN=HOLD, Control-M cannot determine when the job runs, even if runtime scheduling criteria are defined. In this case, the job might start executing before all the runtime scheduling criteria are satisfied. Post-processing, however, is not performed by Control-M until the runtime scheduling criteria are satisfied.
- The JCL of the On Spool job cannot contain AutoEdit statements, and SETVAR statements in the job definition are ignored. This is because the job is not submitted by Control-M.
- Because the job is not submitted by Control-M, the following job scheduling definition parameters are ignored:
  - SCHENV
  - SYSTEM ID
  - NJE NODE
  - NJE enhanced tracking support is inoperative

## IOAGATE

IOAGATE is communications gateway software (middleware) on the mainframe that enables IOA mainframe applications to communicate with other, mainframe and non-mainframe, applications over the network.

Client applications access INCONTROL products by means of an application server through IOAGATE.

The application server is a separate address space distinct from the IOAGATE address space. It is started by IOAGATE according to IOAGATE parameters. The responsibility of the application server is to handle the application logic, while IOAGATE performs the actual communications and passes the messages between the clients and the application servers.



IOAGATE supports multiple concurrent application servers of different applications and their clients. A single IOAGATE can support Control-M, CONTROL-D/Page On Demand, CONTROL-D File Transfer Option, CONTROL-D/WebAccess Server, and CONTROL-O applications.

For further details regarding IOAGATE refer to

- the IOAGATE chapter in the *INCONTROL for z/OS Administrator Guide*
- the section about IOAGATE configuration in the *INCONTROL for z/OS Installation Guide*
- Step 20, Install IOAGATE in the installing IOA chapter in the *INCONTROL for z/OS Installation Guide*

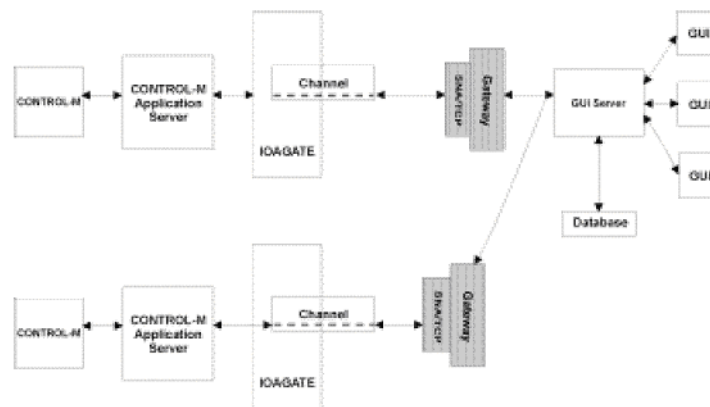
## Control-M/Assist and IOAGATE

The Control-M/ Assist environment uses the IOAGATE gateway to connect between the CONTROL-M Application Server and CONTROL-M/EM, which enables the customer to control the z/OS work from the CONTROL-M/EM control panels.

## Control-M Application Server

Using the IOAGATE and the CTMAS (CONTROL-M Application Server) a connection between CONTROL-M for z/OS environment and the CONTROL-M/EM is established.

The following example illustrates communication between Control-M on an MVS platform with CONTROL-M/EM (via IOAGATE and CTMAS).

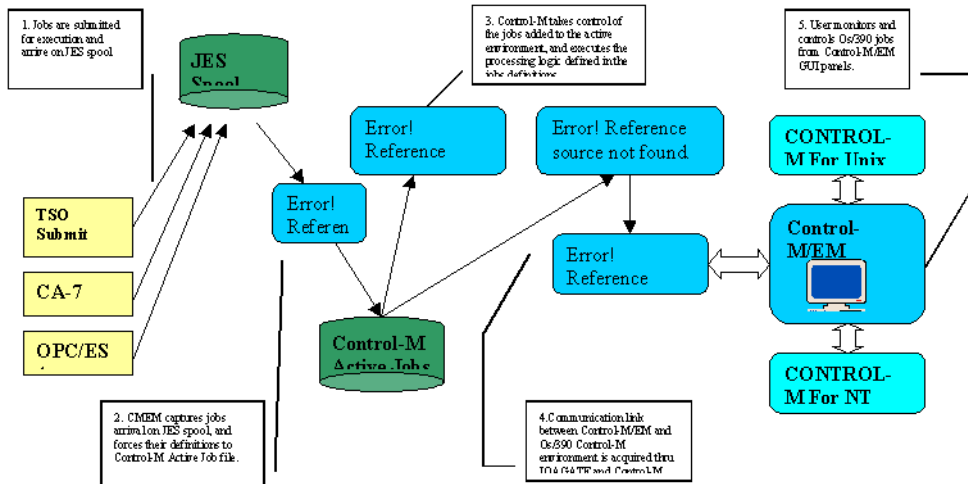


For further details, see Step 21, Install Control-M Application Server in the installing IOA chapter in the *INCONTROL for z/OS Installation Guide*.

## Overall look at the Control-M/Assist environment

This section describes the Control-M/ Assist environment data flow and ties together all the Control-M/ Assist components into a single framework.

- Step 1 - Jobs are submitted for execution on the z/OS environment externally to CONTROL-M. The jobs can be submitted by scheduling products or by any other alternative method (TSO submit command, user programs, and so on). After jobs are submitted, they arrive on the JES spool.
- Step 2 - CMEM facility captures the job arrival events defined by the CMEM rule definitions that were activated (loaded to CMEM memory via an order/force command or via operator modify command). Using the action DO FORCEJOB that is specified in the CMEM rules, the jobs definitions are forced into the Active Jobs File and become on spool jobs. For more details, see [“On Spool jobs” on page 22](#).
- Step 3 - After the CMEM rule brings the external job under the control of the Control-M monitor, Control-M releases the job (if held) when the runtime scheduling criteria are met, and once the job starts execution (whether the job previously required releasing or not), it is controlled by Control-M in the same way that Control-M tracks regular jobs. Control-M waits for the job to finish, reads its SYSOUT, and performs all post-processing actions defined in the job scheduling definition.
- Step 4 - Communication between Control-M/EM and a Control-M for z/OS environment is established through IOAGATE and Control-M Application Server. After a connection is established via the TCP/IP or APPC communication protocol, information is transferred between Control-M/EM and Control-M for z/OS.
- Step 5 - Control-M/EM, which runs on UNIX and Microsoft Windows workstations, provides centralized control of the job scheduling production environment for the entire enterprise, including the z/OS environment batch work. Users can now monitor z/OS jobs from Control-M/EM GUI panels.



## Terminology

Refer to the relevant conversion guide listed below to familiarize yourself with the parallel Control-M technology:

- Control-M for z/OS A-AUTO Conversion Guide
- Control-M for z/OS ADC2 Conversion Guide
- Control-M for z/OS APEX Conversion Guide
- Control-M for z/OS APM/HS5000 Conversion Guide
- Control-M for z/OS CA-7 Conversion Guide
- Control-M for z/OS CA-JOBTRAC Conversion Guide
- Control-M for z/OS CA-MANAGER Conversion Guide
- Control-M for z/OS CA-SCHEDULER Conversion Guide
- Control-M for z/OS Cybermation ESP Conversion Guide
- Control-M for z/OS DJC Conversion Guide
- Control-M for z/OS OPC/A, OPC/ESA, and Tivoli Workload Scheduler Conversion Guide
- Control-M for z/OS ZEKE Conversion Guide

# Online facilities

This chapter includes the following topics:

Introduction to the scheduling definition facility .....	31
Introduction to the CMEM rules definition facility .....	31
Introduction to the active environment .....	32

## Introduction to the scheduling definition facility

This chapter includes an introduction to the scheduling definition facility, to enable Control-M/ Assist users to create, view, and modify job scheduling definitions.

See the section about the Scheduling Definition facility in the *Control-M for z/OS User Guide*.

## Introduction to the CMEM rules definition facility

This chapter includes an introduction to the CMEM rule definition facility, to enable Control-M/ Assist users to create view and modify CMEM rule definitions.

See the section about the CMEM Rule Definition facility in the *Control-M for z/OS User Guide*.

# Introduction to the active environment

This chapter includes an introduction to the Tracking and Control facility that provides relevant information about the status of each job and task in the Active environment and enables the user to manually intervene in the processing of jobs.

See the section about the Tracking and Control facility in the *Control-M for z/OS User Guide*.



## Control-M/Assist implementation

This chapter includes the following topics:

Installing Control-M/ Assist components .....	33
Administering Control-M/ Assist components .....	33
Control-M/ Assist definitions maintenance .....	34

### Installing Control-M/Assist components

All software components described in “[Control-M/ Assist main components](#)” on [page 11](#) (IOA, IOAGATE, CONTROL-M Application Server, CONTROL-M for z/OS, CMEM, and CONTROL-M/Restart) must be installed on your z/OS environment. For a complete Control-M/ Assist environment you should also have CONTROL-M/EM installed and running in order to connect it to the Control-M/ Assist components.

The installation process should follow the installation steps described in details in the *INCONTROL for z/OS Installation Guide*. This section guides the installation process of the Control-M/ Assist components via the Installation and Customization Engine (ICE) and lists the steps that are mandatory and optional.

### Administering Control-M/Assist components

This section includes some of the administration tasks that should be considered when using Control-M/ Assist.

- Administering IOA

For details, refer to the IOA administration chapter in the *INCONTROL for z/OS Administrator Guide*.

- Administering Control-M

For details, refer to the Control-M chapter in the *INCONTROL for z/OS Administrator Guide*.

- Administering CMEM

For details, refer to the section about managing the CMEM facility in the Control-M chapter in the *INCONTROL for z/OS Administrator Guide*.

- Administering IOAGATE

For details, refer to the IOAGATE chapter in the *INCONTROL for z/OS Administrator Guide*.

## Control-M/Assist definitions maintenance

The customer must define Control-M scheduling definitions and CMEM rules in order to utilize Control-M/Assist abilities. For examples, see [Chapter 4, “Sample implementation tasks.”](#)

BMC Software recommends that users adopt a standard job naming convention that allows them to utilize existing generic Control-M and CMEM definitions or rules whenever changes or additions are made in the existing (third-party) job scheduling definitions. Otherwise, modifications in the Control-M/Assist environment are needed to reflect and synchronize these changes. A generic naming methodology will minimize the amount of maintenance necessary to properly maintain Control-M/Assist definitions.

## Sample implementation tasks

This chapter includes the following topics:

Overview .....	35
Monitoring mainframe jobs from Control-M/EM .....	35
Monitoring specific job - PRDDBUP .....	36
Monitoring all production jobs (PRD*) .....	40
Using generic and specific definitions .....	42
Creating dependencies between cross-platform jobs .....	46
z/OS jobs trigger cross-platform jobs, managed by CONTROL-M/EM .....	46
Cross-platform jobs, managed by Control-M/EM, trigger z/OS jobs .....	50

### Overview

This chapter describes the implementation of common sample tasks using Control-M/ Assist.

After installing Control-M/ Assist, follow the steps described in this chapter to implement it. The sample jobs, scheduling definitions and CMEM rule definitions exist in the CONTROL-M sample library, delivered on the installation tape.

### Monitoring mainframe jobs from Control-M/EM

Control-M/EM provides centralized control of the job scheduling environment for the entire enterprise. Control-M/EM advanced graphical user interface provides enhanced perception of production flows throughout the entire active environment.

Control-M/EM works in conjunction with Control-M, Control-M/Restart and the Control-M/ Assist solution to allow viewing and monitoring, from the centralized CONTROL-M/EM GUI interface, of your mainframe jobs which were scheduled and submitted by any scheduler or user (Control-M, CA-7, OPC, manual submission, and so on). The CONTROL-M/EM GUI thereby becomes the centralized mechanism from which to view and track the entire scheduling environment across all platforms.

## Monitoring specific job - PRDDBUP

### Task Description

The customer wishes to monitor the status of his z/OS production job PRDDBUP, which was scheduled and submitted outside of CONTROL-M. The customer wants to be given an alert on the CONTROL-M/EM Alerts Window in case the job ends NOTOK, i.e., any of its steps return a non-zero completion code.

The Control-M/ Assist solution uses one CMEM rule and one job definition which will allow the customer to view job PRDDBUP, via the Control-M/EM GUI panels, after it has been submitted, and to execute all processing logic which were specified in the job definition.

### Step 1 – Creating CMEM rule - PRDDBUP

The CMEM rule below captures the arrival of job PRDDBUP and forces its scheduling definition onto the Active Jobs File.

First, we create a rules table, which will also be used for succeeding examples. Use option C (from the IOA primary menu) to enter the CMEM Rule Definition facility - Entry panel and after filling the rule library, table and name enter into the PRDDBUP rule definition.

```

----- CMEM RULE DEFINITION FACILITY - ENTRY PANEL -----(C
COMMAND ==>

SPECIFY LIBRARY, TABLE NAME, RULE NAME
LIBRARY ==> CTHP.V600.RULES
TABLE ==> PRDRULES (Blank for table selection list)
RULE ==> PRDDBUP_ (Blank for rule selection list)

```

Below is the PRDDBUP CMEM rule definition which is triggered by the ON JOBARRIV event of job PRDDBUP. The rule issues a FORCEJOB request which forces the PRDDBUP job definition into the Active Jobs File, thus allowing users to view it from the CONTROL-M/EM panels.

```

RL: PRDDBUP LIB CTMP.V600.RULES TABLE: PRDRULE
COMMAND ==> SCROLL==> CRS
ON JOBARRIV = PRDDBUP JTYPE SHFID SYSTEM And/Or/Not
OWNER K4B GROUP MODE PROD RUNTSEC
THRESHOLD
DESCRIPTION
=====
DO FORCEJOB = TABLE PRDTABLE JOB PRDDBUP DATE ODAT
LIBRARY CTMP.V600.SCHEDULE
DO
===== >>>>>>>>>>>>>>> END OF RULE DEFINITION PARAMETERS <<<<<<<<<<<<<<< =====

```

For full details on CMEM rule parameters, see the chapter about the Control-M Event Manager in the *Control-M for z/OS User Guide*.

## Step 2 – Creating table and JOB definition - PRDDBUP

The CONTROL-M job definition below defines the job processing logic for the job forced when the PRDDBUP CMEM rule is triggered.

First we create a table, which will be used also for succeeding samples. Using option 2 (from the IOA primary menu) enter the Scheduling Definition facility - Entry panel and after filling the job definitions library, table and job name we enter the PRDDBUP job definition.

```

CONTROL-M SCHEDULING DEFINITION FACILITY - ENTRY PANEL
COMMAND ==>
SPECIFY LIBRARY, SCHEDULING TABLE, JOB
LIBRARY ==> CTMP.V600.SCHEDULE (Blank for table selection list)
TABLE ==> PRDTABLE (Blank for job selection list)
JOB ==> PRDDBUP
TYPE OF TABLE ==> J ( J Job - default
G Group - for new tables only)
SHOW JOB DOCUMENTATION ==> N (Y/N)
AUTO-SAVE DOCUMENTATION ==> N (Y/N)

```

In job definition PRDDBUP:

- the first section includes General information about the job:
  - MEMNAME: PRDDBUP – the member name containing the job JCL,
  - MEMLIB: CTMP.V600.SCHEDULE – the PDS library containing the job.
- The second and third sections include basic and runtime scheduling criteria, both sections are left with their default values.
- The fourth section (post-processing section) is updated with the following values:
- ON PGMST ANYSTEP CODES >C0000, indicating that the following post-processing logic (Do Statements) will be executed only in case any of the job steps ends with RC greater than 0.
- DO NOTOK - Sets the final termination status of ENDED NOTOK for the job.



```

-----
14:54:37 M0F15C1 TABLE PRDRULES ODATE 120302 WILL BE ORDERED BY CHEM MON.
===== >>>>>>>>>>>> END OF MESSAGE LIST <<<<<<<<<<<<<<<< ==

```

Now that the rule is active, whenever job PRDDBUP is submitted manually or by any other alternative method, CMEM captures this JOB ARRIVAL event when the job arrives on the JES spool, and forces the PRDDBUP job definition to the Active Jobs File. After forcing the job definition we can monitor the job from Control-M Active Environment (Option 3 from IOA Primary Menu).

**Figure 1 PRDDBUP in the active environment (Screen 3)**

```

filter: CONTROL-M Active Environment  UP  (D)  (3
COMMAND ==> SCROLL ==> GRP
O Name  Owner  Odate  Jobname  JobID  Jup  Status
-----
PRDDBUP  K4B    190302  K48RUN  /23959  JOB  Executing OrderID=0099D
=====
>>>>>>>>>>>> Bottom of Jobs List <<<<<<<<<<<<<<<<

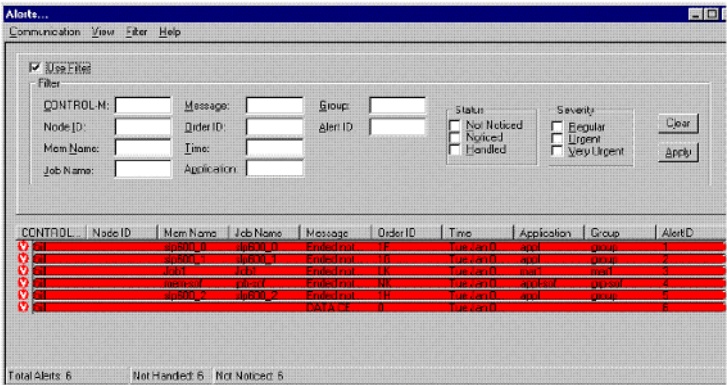
```

We can also view and monitor it from the Control-M/EM GUI panels.

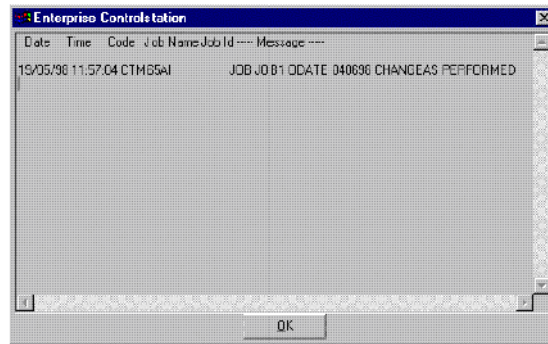
The job PRDDBUP can also be viewed and monitored from the Control-M/EM GUI panels.

If any of the job's steps return an RC greater than 0, its end status will be ENDED-NOTOK and a shout message will appear in the CONTROL-M/EM alerts panel and log file.

**Figure 2 Control-M/EM alerts panel**



**Figure 3 CONTROL-M Log file**



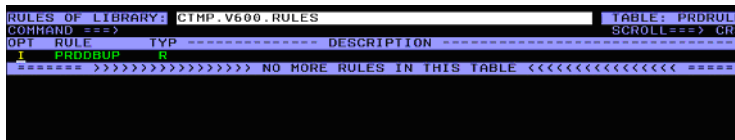
## Monitoring all production jobs (PRD\*)

### Task description

The user wishes to monitor the status of all his production jobs (PRD\*), running in the z/OS environment and managed by CA-7, from CONTROL-M/EM. All production job names start with the prefix PRD.

#### Step 1 – Creating generic CMEM rules - PRD\*

In the previously defined CMEM rules table PRDRULES, create a new generic rule to capture job arrival events for jobs whose name prefix is PRD. Using the insert command (I) in the CMEM rule list screen, we create the new PRD\* rule.



The PRD\* CMEM rule definition is shown below. This rule is activated for an ON JOBARRIV event of jobs whose names are prefixed by PRD. When this event is triggered, the FORCEJOB request forces the job definition into the Active Jobs File. In this FORCEJOB action we use a special CMEM AUTOEDIT variable, %\$JNAME, which will be replaced by the actual job name of the job that triggers this rule.

If, for example, a job whose name is PRDDB2 is submitted, this rule will be triggered and will force job definition PRDDB2 from table PRDTABLE in library CTMP.V600.SCHEDULE.







The following definitions are required:

- A generic CMEM rule to capture all production jobs.

```

ON JOBARRIV = PRD*      JTYPE SWFID   SYSTEM      And/Or/Not
OWNER PRDUSER GROUP          MODE PROD   RUNTSEC
THRESHOLD
DESCRIPTION
=====
DO FORCEJOB = TABLE  PRODJOBS JOB %$JNAME    DATE ODAT
      LIBRARY CTMP.V600.SCHED
DO
=====
>>>>>>>>>>>>>>>> END OF RULE DEFINITION PARAMETERS <<<<<<<<<<<<<<<<<<<<<<<<<<<< =====
    
```

- Table PRODJOBS, to include all jobs definitions

```

JOB LIST      LIB: CTMP.V600.SCHEDULE          TABLE: PRODJOB
COMMAND ==>                               SCROLL==> CR$
OPT NAME ----- DESCRIPTION -----
-----
      PRDCICS
      PRDBCKUP
      PRDDB2
      PRD*
===== >>>>>>>>>>>>>>>> NO MORE JOBS IN TABLE <<<<<<<<<<<<<<<<<<<<<<<<<<<< =====
    
```

One generic job definition - PRD\* to describe the default processing logic of on spool jobs, and three more job definitions for the jobs that required special processing logic.

The following are the 4 jobs definitions:

- PRD\* - job scheduling definition

```

MEMNAME PRD*      MEMLIB  CTMP.V600.JOB
OWNER K48         TASKTYPE JOB      PREVENT-NCT2   DFLT  Y
APPL
DESC
OVERLIB
SET VAR
CTB STEP AT      NAME      TYPE
DOCHMH PRD*     DOCLIB
=====
DAYS ALL               DCAL    AND/OR
WDAVS              WCAL    AND/OR
MONTHS  1- Y 2- Y 3- Y 4- Y 5- Y 6- Y 7- Y 8- Y 9- Y 10- Y 11- Y 12- Y
DATES
CONFCAL          SHIFT     RETRO N MAXWAIT 05  D-CAT
MINIMUM          PDS
=====
IN
CONTROL
RESOURCE
PIPE
TIME: FROM      UNTIL     PRIORITY   DUE OUT    SAC        CONFIRM
=====
OUT
AUTO-ARCHIVE Y         SYSDB   Y          MAXDAYS    MAXRUNS
RETENTION:  # OF DAYS TO KEEP  # OF GENERATIONS TO KEEP
SYSOUT OP   (C,D,F,N,R)
MAXRERUN  RERUNMH
STEP RANGE FR (PGM.PROC)   INTERVAL   FROM
ON PGMST1  PROCST        CODES      TO         FROM
DO
SHOUT WHEN NOTOK          TO U-ECS          URGN R
TS %JOBNAME ENDED NOT - PLEACH CHECK IT          TO           URGN
SHOUT WHEN
HS
===== >>>>>>>>>>>>>>>> END OF SCHEDULING PARAMETERS <<<<<<<<<<<<<<<<<<<<<<<<<<<< =====
    
```

- The generic definition contains a MEMNAME PRD\*, and is placed as the last definition in the table.
- When ended NOTOK, the shout message is routed to U-ECS, i.e., the CONTROL-M/EM Alerts Window and the CONTROL-M log.

- The shout message contains the special AUTOEDIT variable %%JOBNAME, which is replaced with the full job name before the shout is executed.

- PRDCICS - job scheduling definition

```

===== TOP OF SCHEDULING PARAMETERS =====
MEMNAME PRDCICS      MEMLIB  CTMP.V600.JOB
OWNER   K48          TASKTYPE JOB   PREVENT=NCT2  DFLT  Y
APPL                                 GROUP
DESC
OVERLIB
SET VAR
CTB STEP AT           NAME         TYPE
DOCMEM PRDCICS      DOCLIB
=====
DAYS    ALL                      DCAL
WDAYS                                 WCAL  AND/OR
MONTHS  1- Y 2- Y 3- Y 4- Y 5- Y 6- Y 7- Y 8- Y 9- Y 10- Y 11- Y 12- Y
DATES
CONFCAL             SHIFT        RETRO N MAXWAIT 05  D-CAT
MINIMUM             PDS
=====
IN
CONTROL
RESOURCE
PIPE
TIME: FROM           UNTIL       PRIORITY   DUE OUT      SAC        CONFIRM
=====
OUT
AUTO-ARCHIVE Y       SYSDB    Y          MAXDAYS      MAXRUNS
RETENTION:  # OF DAYS TO KEEP      # OF GENERATIONS TO KEEP
SYSOUT OP   (C,D,F,N,R)
MAXRERUN   RERUNMEM                    INTERVAL     FROM
STEP RANGE FR (PGM.PROC)              TO          FROM
ON PGMST1 ANYSTEP  PROCST              CODES >C0004  TO          A/0
DO NOTOK
DO MAIL
TO SERVICE@BMC.COM
CC
SUBJ PRDCICS ENDED NOT-OK
TEXT PRDCICS ENDED NOT OK DUE TO MAXCC>0 - PLEASE CONTACT TECHNICAL
SUPPORT - 00-972-55-873456
=====

```

```

===== >>>>>>>>>>>>>>>> END OF SCHEDULING PARAMETERS <<<<<<<<<<<<<< =====
DO
ON PGMST1      PROCST      CODES              A/0
DO
SHOUT WHEN NOTOK            TO OPER2            URGN R
PS %%JOBNAME ENDED NOT OK DUE TO MAXCC > 0        TO                URGN R
SHOUT WHEN
MS
=====

```

NOTE

- If any of the job steps (ANYSTEP), complete with completion code higher than 4, than the job end status is set to ENDED-NOTOK (DO NOTOK).
- An e-mail message (DO MAIL) is sent to address SERVICE@BMC.COM in case the job ends NOTOK.
- When ended NOTOK the shout message is routed to OPER2, meaning that the message will be routed to the CONTROL-M/EM Alerts Window, CONTROL-M log and to the z/OS CONSOLE as an unrollable message.



## Creating dependencies between cross-platform jobs

In a multi-platform Control-M environment define global conditions, which are special prerequisite conditions, can be used to create job dependencies between jobs residing in different Control-M installations. For example, you can specify that jobs in Control-M installations on UNIX or Microsoft Windows machines begin executing only after the successful completion of a job that was scheduled and submitted on the z/OS environment.

The standard handling of global conditions is similar to that of non-global prerequisite conditions, that is, view, create, and delete global conditions using the Prerequisite Conditions window. In addition, when Control-M/EM detects the creation or deletion of a global condition in one Control-M or Control-M/ Assist installation, it automatically creates or deletes the same global condition in the other Control-M installations, as required.

Global conditions are defined via prefixes specified in the CONTROL-M/EM Global Conditions window. A prerequisite condition is recognized as a global condition when its name starts with a prefix listed in this window and its Control-M installation is defined for that prefix. The following 2 examples demonstrate how to create dependencies between multi-platform jobs. All job definitions, unlike previous samples, will be defined and maintained using the Control-M/EM Graphical User Interface (GUI), and not via the CONTROL-M for z/OS Job Definition facility.

## z/OS jobs trigger cross-platform jobs, managed by CONTROL-M/EM

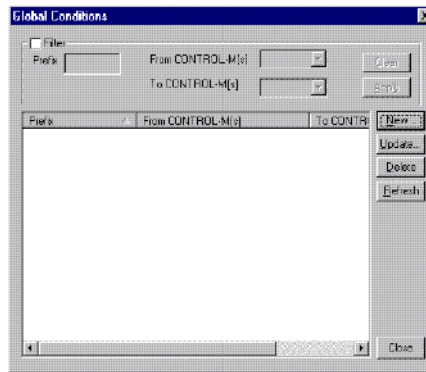
### Task Description

All production jobs (PRD\*) must set a global OUT condition indicating they ended OK. This allows the creation of dependency relationships between z/OS jobs and other cross platform jobs managed by CONTROL-M/EM. The example below illustrates how to create a dependency between a z/OS job called PRDOS390 and a UNIX job called PRDUNIX. PRDUNIX should be submitted only after successful execution of PRDOS390.

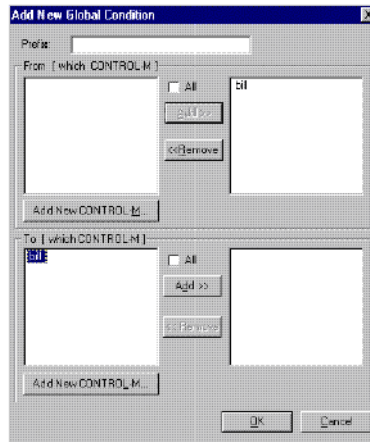
### Step 1 – Defining Global Condition prefixes

We use the prefix PRD for all global conditions that originate from z/OS jobs and are targeted to all other CONTROL-M installations across other platforms.

We open the Global Conditions window by choosing Resources => Global Conditions

**Figure 4 Global Conditions Window**

After clicking the New button. The Global Conditions Details window opens.

**Figure 5 Global Conditions Details window**

We specify the prefix for the new global condition - PRD.

In the 'From' area, select the Control-M installation on the z/OS environment. Conditions starting with this prefix on the CONTROL-M z/OS platform will thus be recognized as global conditions.

In the 'To' area, select all other Control-M installations where the conditions are to be automatically added/deleted when the same condition is added/deleted in the Control-M for z/OS environment.

Click OK to complete the window.

## Step 2 – Creating z/OS CMEM rule and job definitions

We use the previously prepared CMEM rule definition - PRD\*, to capture all job arrival events and to force their job definition to the active job file.

```

RL: PRD* LIB: CTHP.V600.RULES TABLE: PRDRULE
COMMAND ==>>>> SCROLL==>>>> CRS
=====
JOB JOBARRIV = PRD* JTYPE SHFID SYSTEM And/Or/Not
OWNER K4B GROUP MODE PROD RUNTSEC
THRESHOLD
DESCRIPTION
=====
DO FORCEJOB = TABLE PROTABLE JOB %%SJNAME DATE ODAT
LIBRARY CTHP.V600.SCHEDULE
=====
====>>>>>>>>>>>>>>>> END OF RULE DEFINITION PARAMETERS <<<<<<<<<<<<<<<<=====

```

Using the previously prepared general job definition - PRD\*, add an OUT condition %%JOBNAME-ENDED-OK to the IOA Conditions file. The OUT condition contains AutoEdit variable %%JOBNAME which will be replaced by the job name of the job that triggered this event. Because the job names all begin with prefix PRD, the conditions also begin with the prefix PRD, and thus will be considered as global conditions and be added to the defined target CONTROL-M installation.

```

HEIRNAME PRD* HEIRLIB CTHP.V600.JOB
OWNER K4BA TASKTYPE JOB PREVENT-NCT2 DFLT Y
APPL GROUP
DESC
OVERLIB
SET VAR
CTB STEP AT NAME TYPE
DOCMEM PRD* DOCLIB
=====
DAYS ALL DCAL AND/OR
WDAYS MONTHS 1- Y 2- Y 3- Y 4- Y 5- Y 6- Y 7- Y 8- Y 9- Y 10- Y 11- Y 12- Y
DATES
CONFCAL SHIFT RETRO N MAXWAIT 05 D-CAT
MINIMUM PDS
=====
IN CONTROL
RESOURCE
PIPE
TIME: FROM UNTIL PRIORITY DUE OUT SAC CONFIRM
=====
OUT %%JOBNAME-ENDED-OK ODAT +
AUTO-ARCHIVE Y SYSD8 Y MAXDAYS MAXRUNS
RETENTION: # OF DAYS TO KEEP # OF GENERATIONS TO KEEP
SYSOUT OP (C,D,F,N,R)
MAXRERUN RERUNMEM INTERVAL FROM
STEP RANGE FR (PGM.PROC) TO
DO NOTOK ANYSTEP PROCST CODES >C0000 A/O
DO SHOUT TO U-ECS URGENCY R
= %%JOBNAME ENDED NOT OK DUE TO MAXCC > 0
DO
DO ANYSTEP PROCST CODES
SHOUT WHEN TO URGN
MS
=====
====>>>>>>>>>>>>>>>> END OF SCHEDULING PARAMETERS <<<<<<<<<<<<<<<<=====

```

Additional methods of adding conditions to the IOA Conditions file are:

- IOA utility IOACND
- IOA online Conditions Resources screen (Screen 4)
- IOA ISPF utility I1
- From the CONTROL-M Active Environment, Screen 3.?

Examples using the above facilities can be found in the *CONTROL-M for z/OS User Guide* and the *INCONTROL for z/OS Utilities Guide*.



### Step 3 – Creating UNIX job definitions

Using CONTROL-M/Desktop, define a UNIX job with an IN condition PRDOS390-ENDED, so the job will be submitted only after the successful execution of the z/OS job PRDOS390.

The screenshot shows the 'Job Editing Form' dialog box with the following fields and values:

- Mem Name: MEM10
- Mem Lib: [Empty]
- Q Job Lib: 000 LLL
- J User: JONES
- Task type: Batch Job
- Checkboxes:  Cycle,  Emergency,  Prevent NCT2,  Priority
- CONTROL-M: FIGARO
- Scheduling Table Name: TABLE1
- Scheduling Table Lib: [Empty]
- Application: APPL
- Group: GRP

The screenshot shows the 'Job Editing Form' dialog box with the 'Conditions' tab active. It displays two tables for defining job conditions:

IN conditions		
Name	Date	And/Or
prdos390 ended	DDAT	And

OUT conditions		
Name	Date	+/-

At the bottom of the dialog, there are buttons for 'Save To Draft', 'Cancel', and 'Help'.

# Cross-platform jobs, managed by Control-M/EM, trigger z/OS jobs

## Task Description

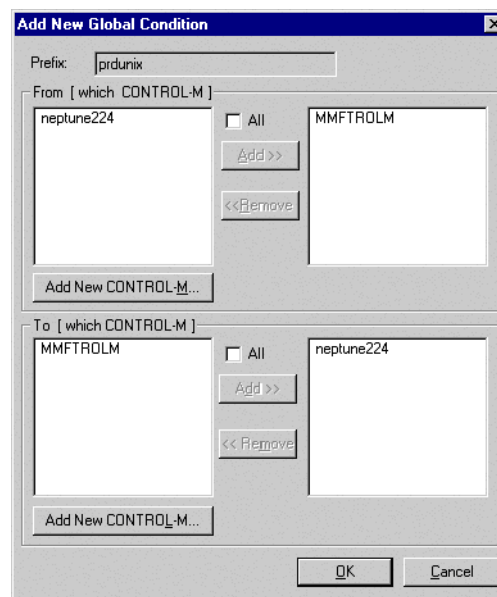
Schedule a UNIX job (PRDUNIX) in CONTROL-M for UNIX that sets a global OUT condition upon ending OK which, in turn releases a z/OS job for execution.

Using Control-M/ Assist, z/OS jobs are captured only after they are submitted and arrive on the JES spool. The z/OS job's JCL must include the JOB parameter TYPRUN=HOLD so that any IN conditions in the job definition can be used for purposes of releasing the job for execution (since the jobs were already submitted). After submission the jobs wait on the JES held queue and are released only after all scheduling runtime criteria of the job are satisfied.

### Step 1 – Defining Global Condition prefixes

Using the CONTROL-M/EM Global Conditions Window, add a new global prefix PRDUNIX.

In the 'From' area select the CONTROL-M for UNIX installation, and in the 'To' area select the CONTROL-M for z/OS installation. After clicking OK the definition will be added. Every condition starting with prefix PRDUNIX and originating on the UNIX environment will automatically be added to the CONTROL-M for z/OS environment.







# Control-M/Assist vs. Control-M for z/OS functionality

This chapter includes a comparison of the functionality available when using Control-M as the main scheduler in the z/OS environment, as opposed to the limited functionality Control-M/Assist provides.

This chapter gives a brief overview of the limited range of functionality of the Control-M/Assist solution as opposed to a fully implemented CONTROL-M environment. We will use the GUI features available in CONTROL-M/EM as the basis of our comparison.

Control-M/Assist consists of the following components: Control-M for z/OS, CMEM, Control-M Application Server, IOAGATE and Control-M/EM.

The Control-M/Assist solution is designed for customers who have chosen to purchase the Control-M distributed systems solution and wish to utilize Control-M/EM as the overall GUI from which to control and track the entire scheduling environment across all platforms (including the z/OS environment) but still want to retain a non-Control-M mainframe scheduling product.

First we discuss the limitations of Control-M/Assist.

- Job definition maintenance

Using CMEM, Control-M for z/OS can track jobs that have been submitted to MVS external to Control-M. This is accomplished by creating Control-M job scheduling definitions and corresponding CMEM rules which allows proper tracking under CONTROL-M/EM. Hence, jobs for which CONTROL-M/EM tracking is desired must be defined in CMEM and Control-M (or CONTROL-M/Desktop).

To minimize the number of definitions that must be created, the CONTROL-M and CMEM generic definition facility (see [“Monitoring all production jobs \(PRD\\*\)” on page 40](#)) should be utilized, thereby reducing the overhead of redefining the work logic contained in the customer's native scheduling product.

---

- Using IOA and CONTROL-M utilities

Another area in which the Control-M mainframe component cannot be treated as a 'black box' is in the use of IOA and CONTROL-M utilities. To realize the full potential of CONTROL-M and to ease in its implementation, several utilities should be utilized. For example, utility CTMBLT can be used to build tables in batch, utility CTMTBUPD is useful in performing mass updates to the job scheduling definitions, utility IOACND can be used to add/delete/check conditions to the IOA Conditions files. The user should familiarize himself with the IOA Utility Guide and determine which utilities would be helpful in his implementation of Control-M/Assist.

- Handling jobs only after they are submitted

Control-M/Assist handles jobs only after they are submitted and arrive on the JES spool, hence monitoring of jobs from the active environment (Screen 3) can only be done after jobs have been submitted.

The CONTROL-M/EM Viewpoint feature, which can be specified to filter the job list according to various criteria, is very similar to the Control-M for z/OS SHOW Filter capability (discussed in [“Introduction to the active environment.”](#) However, with Control-M/Assist, the Viewpoint feature is limited to filtering jobs beginning with their appearance on the JES spool, that is, from the post-processing phase and onward. For example, filtering on job status WAIT SCHEDULE or WAIT SUBMISSION would be meaningless, unless the customer chooses to modify the JCL of his scheduling product jobs to specify TYPRUN=HOLD, in which case Control-M runtime criteria such as FROM/UNTIL time and IN conditions are relevant. Should the user choose to specify TYPRUN=HOLD, Control-M would not release affected jobs for execution until all their runtime criteria are satisfied. This would then provide greater filter capability in the Viewpoint feature.

In addition to the TYPRUN=HOLD parameter, if the user requires that CONTROL-M perform post processing tasks for the z/OS jobs, then the jobs must be submitted in a CONTROL-M held SYSOUT class (specified in the MSGCLASS parameter). This may require additional JCL modification. For more details, see the description of the HLDCLAS parameter the *INCONTROL for z/OS Installation Guide*.

No connection exists between the Control-M/Assist environment and the customer's scheduling product.

Using the Control-M/Assist solution there is no connection or data flow between the customer's scheduling product and the Control-M/Assist environment. CONTROL-M/EM manual Order or Force of job (equivalent to the actions available in the job definition screen, Screen 2) will only effect the Control-M/Assist environment and will not effect or update the customer's scheduling product environment.

---

CONTROL-M/EM permits users to add/delete/update conditions, control resources and quantitative resources. These services are not meaningful outside Control-M/ Assist as there is no natural link from the IOA Conditions and Resources files to update the user's scheduling product.

There are a host of actions that may be performed against jobs via CONTROL-M/EM (parallel to options in Screen 3, Active Environment screen, in the mainframe environment). Some of these actions are not available or relevant for jobs within the Control-M/ Assist framework.

Below is a list of actions and whether these actions are available or meaningful for Control-M/ Assist:

- HOLD – Not available
- CONFIRM – Not available
- FREE – Not available
- RERUN – Available, however, the user must ensure that the JCL submitted via the third-party-vendor scheduling product matches the Control-M MEMLIB parameter specified in the job scheduling definition
- RESTART – Not available
- REACT – Not available
- DELETE – Not available
- UNDELETE – Not available
- KILL – Not available
- FORCEOK – Not available
- SYSOUT (View) – Available (only if CONTROL-M/Restart is installed as part of the Control-M/ Assist components)
- STAT – Available (as long as the Control-M CTMJSA batch utility is run on a regular basis)
- DOC – Not available (third-party-vendor scheduling product documentation may not be kept in PDS/member format, but in a database with record keys)
- LOG – Semi-available (naturally, only actions on jobs performed from within ECS are recorded and not actions performed from third-party-vendor scheduling product)

- 
- VIEW JCL – Available, however, the user must ensure that the JCL submitted via third-party-vendor scheduling product matches the Control-M MEMLIB parameter specified in the job scheduling definition
  - EDIT JCL – Not available (since third-party-vendor scheduling product may maintain its own JCL repository database where modified job JCL members are placed)
  - WHY – Not relevant (all jobs are in post processing status). If TYPRUN=HOLD was specified for the job (see above), then the user can view which runtime criteria are not yet satisfied (according to the Control-M definition)
  - Properties – Available (zoom screen)

Below are listed some additional limitations imposed by the use of Control-M/ Assist besides those listed above:

- No SMART Table support, since the CMEM rules are triggered by real external jobs which do not correspond to Control-M SMART Table Entities within tables
- No support for enhanced NJE job tracking
- JCL members cannot contain Auto-edit variables (neither local nor global)
- Several job scheduling parameters are inoperative: SETVAR, SCHENV, SYSTEM-ID, NJE-NODE
- No support for Control-M exit 2 (Submission) functionality. This includes any access security authorization checking done through exit 2.
- Duplicate job definitions in Control-M tables are not supported.

■ Customization of the CONTROL-M environment

In order to activate certain desired features the user may need to customize the installation of CONTROL-M. Some typical examples of this are

- IOA and CONTROL-M exits for security processing, special shout handling, and so on
- Modification of operational parameters (via the IOAPARM and CTMPARM members) to change default actions taken by the products

For details on these activities, see the appendix about customizing INCONTROL products in the *INCONTROL for z/OS Installation Guide*, and the chapter about exits in the *INCONTROL for z/OS Administrator Guide*.



## Considering conversion to Control-M

In summary, Control-M/ Assist provides some added functionality to help integrate customer's z/OS schedulers other than CONTROL-M into the overall Control-M distributed enterprise. With substantial effort, this level of functionality may prove sufficient for customer needs, otherwise the customer should consider converting his scheduling environment to CONTROL-M.

CONTROL-M conversion tools enable you automatic conversion from other scheduling products like CA-7, CA-MANAGER, CA-SCHEDULER, A-AUTO, ADC2, APEX, OPC, ZEKE, DJC, APM/HS5000, CA-JOBTRAC.

For further information regarding the conversion procedure, refer to the appropriate conversion guide.

In addition, Control-M utilities such as CTMBLT can be very useful in migrating other or home-grown scheduling products.



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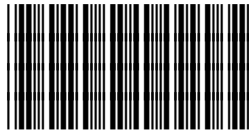
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## Notes



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