

# **Fujitsu Software Technical Computing Suite V4.0L20**

## **Job Operation Software Release Notes**

J2UL-2598-01ENZ0(11)  
September 2024

# Preface

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## Purpose of This Manual

This manual describes the Job Operation Software functions added to Technical Computing Suite V4.0L20 or later and provides information on their compatibility.

## Intended Readers

This manual is intended for everyone who is considering installing or upgrading (version or level) to Technical Computing Suite V4.0L20 or later.

## Organization of This Manual

This manual is organized as follows.

### [Chapter 1 Overview of New Functions](#)

This chapter describes new and improved functions added in this version.

### [Chapter 2 Compatibility Information](#)

This chapter describes incompatibilities pertaining to functions changed from earlier levels and how to deal with the incompatibilities.

## Notation Used in This Manual

Notation of model names

In this manual, the computer that based on Fujitsu A64FX CPU is abbreviated as "FX server", and FUJITSU server PRIMERGY as "PRIMERGY server" (or simply "PRIMERGY").

Also, specifications of some of the functions described in the manual are different depending on the target model. In the description of such a function, the target model is represented by its abbreviation as follows:

[FX]: The description applies to FX servers.

[PG]: The description applies to PRIMERGY servers.

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## Date of publication and Version

Version	Manual Code
September 2024, Version 1.11	J2UL-2598-01ENZ0(11)
September 2023, Version 1.10	J2UL-2598-01ENZ0(10)
September 2022, Version 1.9	J2UL-2598-01ENZ0(09)
March 2022, Version 1.8	J2UL-2598-01ENZ0(08)
November 2021, Version 1.7	J2UL-2598-01ENZ0(07)
August 2021, Version 1.6	J2UL-2598-01ENZ0(06)
March 2021, Version 1.5	J2UL-2598-01ENZ0(05)
January 2021, Version 1.4	J2UL-2598-01ENZ0(04)
December 2020, Version 1.3	J2UL-2598-01ENZ0(03)
September 2020, Version 1.2	J2UL-2598-01ENZ0(02)
June 2020, Version 1.1	J2UL-2598-01ENZ0(01)

Version	Manual Code
March 2020, First version	J2UL-2598-01ENZ0(00)

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## Update history

Changes	Location	Version
Added following descriptions as new functions. - Support for GPU NVIDIA H100	1.1	1.11
Added a description of differences in the default domain of papi by OS version.	2.10	1.10
Changed compatibility information about man manuals.	2.9	1.9
Added following compatibility information about the system log messages. - HPC extension message deprecated [ERR.] xos SEC 0004-0007, 0012 [ERR.] xos HWB 0001-0004	2.3.3	1.8
Added compatibility information about man manuals.	2.9	1.7
Added compatibility information about the messages. - The fheto command message (Message ID 1001) is deprecated.	2.2.5	1.6
Added following compatibility information about the system log messages. - HPC extension message deprecated [ERR.] xos IRS 0304, 0305 [ERR.] xos FHE 1001 [INFO] xos FHE 1111, 1112 [ERR.] xos HPCPWR 1009	2.3.3	
Added compatibility information about the papjm.conf file.	2.7	
Added compatibility information about the pmpjm.conf file.	2.8	
Added following descriptions as new functions. - Support for environment variable PLE_RANK_ON_NODE - Support for GPU NVIDIA A100	1.1	1.5
Added support for the node that function as the system management node, compute cluster management node, and login node in the system with only compute cluster of the PRIMERGY servers.	1.1	1.4
Added support for Red Hat Enterprise Linux 8 on the compute cluster of the PRIMERGY servers.	1.1	1.3
Added a description of differences in the behavior of the pmgater command depending on the OS version.	2.6	
Added following descriptions as new functions in V4.0L20. - The --check option of the pachecker command - The all-status option of the papwrctl command - The item esnum of the job statistical information	1.1	1.2
Added compatibility information about the pjsub command message (Message ID 0002).	2.2.4	
Added following compatibility information about the system log messages. - Changing TofuD driver (TOF) messages	2.3.2	

Changes	Location	Version
Added compatibility information about the pmpjmopt command.	2.4	
Added compatibility information about the pjs.conf file.	2.5	
Added support for environment variable PMIX_RANK.	1.1	1.1
Added compatibility information about the messages. <ul style="list-style-type: none"> <li>- The pxinst command message (Message ID 1021) is deprecated.</li> <li>- The plexec command message (Message ID 0021) has changed.</li> </ul>	2.2.2 2.2.3	

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# Chapter 1 Overview of New Functions

This chapter describes the new Job Operation Software functions added in Technical Computing Suite V4.0L20 or later.

## 1.1 New Functions in V4.0L20

This chapter provides an overview of the functions added in Technical Computing Suite V4.0L20.

(\*) "Job Operation Software" is omitted from manual titles shown below.

Table 1.1 New Functions in V4.0L20

New Function	Description	Related Manual
Dynamic change of job communication paths [FX]	Added the --net-route option of the pjsub command.	End-user's Guide "Specifying the operation when a Tofu interconnect link is down"
		pjsub(1)
	Added the following for the contents displayed by the pjacl command: - net-route parameter in the item 'define' - pjsub (--net-route) parameter in the item 'execute'	End-user's Guide "Checking Job-related Information"
	Added PJM_NET_ROUTE as an environment variable that is set within a job script.	End-user's Guide "Environment variables in jobs"
	Added PJM_NET_ROUTE as an environment variable that is set within a hook function script.	Administrator's Guide for Job Operation Manager Hook Appendix "Environment Variables"
	Added the PJCMD_SUBMIT_NET_ROUTE parameter in the pjcmd_submit_put_param() function of the command API.	API user's Guide for Command API "pjcmd_submit_put_param()"
	Added 0x0000000000000001 (--net-route dynamic specification) as a set value for the pjsub_option_exflg member of the Pjmap_info_job_t structure of the job information notification API.	API user's Guide for Job Information Notification API "Job Information Notification Structure (PJM_INFO_JOB)"
	Added pjsplg_net_route_t net_route to the PjsplgJobSubmitParam_t structure of the scheduler API.	API user's Guide for Scheduler API "PjsplgJobSubmitParam_t"
	Added message 0596 for the pjalter command.	Command Reference "pjalter command"
	Added message 1096 for the pmalter command.	Command Reference "pmalter command"
	Added a message related to the Tofu interconnect as a message output during job execution.	Command Reference "Tofu Interconnect [FX]" in "Messages in job outputs"
	Added the item 'TofuDynamicReroute' to the pamonitor.conf file.	pamonitor.conf(5)
Added the following to the definition items of the job ACL function:  define net-route execute pjsub-net-route	Administrator's Guide for Job Management Appendix "Defined items of the job ACL function"	
	pmjacladm(8)	

New Function	Description	Related Manual
Change of the elapsed time limit values of running jobs [FX]	Can change the elapsed time limit values of jobs running on FX servers by using the pjalter and pmalter command.	End-user's Guide "Changing job parameters"
		Administrator's Guide for Job Management "Job Operations"
		pjalter(1), pmalter(8)
	Added the item 'RunJobAlterElapse' to the papjm.conf file.	Administrator's Guide for Job Management "Job manager function settings"
		papjm.conf(5)
	Added the detailed error code PJCMD_SUBERR_REJECT_OPT for the command API.	API user's Guide for Command API "Detailed Error Code"
Addition of job ACL function definition items for standard output and standard error output of the mpiexec command. [FX]	Added the following to the definition items of the job ACL function:  define mpiexec-stdouterr-unit define mpiexec-stdout define mpiexec-stderr define interact-mpiexec-stdout define interact-mpiexec-stderr define mpiexec-std-emptyfile	Administrator's Guide for Job Management Appendix "Defined items of the job ACL function"
		pmjacladm(8)
	Added the following for the contents displayed by the pjacl command:  The parameters in the item 'define': mpiexec-stdouterr-unit mpiexec-stdout mpiexec-stderr mpiexec-stdout(interact) mpiexec-stderr(interact) mpiexec-std-emptyfile	End-user's Guide "Checking restriction information" "Standard output/Standard error output of the mpiexec command"
Support for GPUs [PG]	Can allocate GPUs in the PRIMERGY compute node as custom resources to jobs so that the jobs use the GPUs.	Administrator's Guide for Job Management Appendix "Settings for Using GPUs"
		Setup Guide Appendix "Configuring GPUs"
Support for Singularity	Can execute Singularity in Docker mode. Singularity is container virtualization software for HPC.	Administrator's Guide for Job Management Appendix "Settings for Using Singularity"
		Setup Guide Appendix "Configuring Singularity"
Extension of the method for setting Docker mode	Can apply, in addition to fixed character strings, variable values appropriate to the execution environment as a means to configure a file system mounted from within a container in Docker mode.	Administrator's Guide for Job Management "Creating a container startup configuration file (Docker mode only)" Appendix "How to Use Dynamic Parameters in Startup Configuration Files (Docker Mode)"

New Function	Description	Related Manual
Support for KVM mode [PG]	Added KVM mode as a job execution environment where KVMs can execute jobs. Only PRIMERGY compute nodes can use KVM mode.	End-user's Guide "Job Execution Environment" "Specifying a job execution environment"
		Administrator's Guide for Job Management "Job Execution Environment Customization Function"
Output control for the job information when deleting jobs	Added following options of the pjdel command: --no-stats --no-history	End-user's Guide "Deleting a job"
		pjdel(1)
	Added the PjdelNoStats and PjdelNoHistory items to the papjm.conf file.	Administrator's Guide for Job Management "Job manager function settings"
		papjm.conf(5)
	Added the item "execute pjdel-no-history" to the definition items of the job ACL function.	Administrator's Guide for Job Management Appendix "Defined items of the job ACL function"
		pmjacladm(8)
Added the parameter "pjdel(--no-history)" in the item 'execute' for the contents displayed by the pjacl command.	End-user's Guide "Checking restriction information"	
Added the PJCMD_KILL_NO_STATS and PJCMD_KILL_NO_HISTORY parameters in the pjcmd_kill_put_param() function of the command API.	API user's Guide for Command API "pjcmd_kill_put_param()"	
Support for the environment variables PMIX_RANK and PLE_RANK_ON_NODE [FX]	The Job Operation Software sets the environment variables PMIX_RANK and PLE_RANK_ON_NODE in MPI processes.	End-user's Guide "Environment variable in MPI processes"
Addition of the --check option of the pachecker command	Added the --check option to the pachecker command.	Administrator's Guide for Job Management "Checking the Software Environment"
		pachecker(8)
Addition of the all-status option of the papwrctl command	Added the all-status option to the papwrctl command.	papwrctl(8)
Addition of the item esnum of the job statistical information	The item esnum of the job statistical information can be set in the papjmstats.conf file.	pjstatsinfo(7)
Support for Red Hat Enterprise Linux 8 on the compute cluster of the PRIMERGY servers [PG]	The compute cluster of the PRIMERGY servers supported Red Hat Enterprise Linux 8.	Setup Guide "Performing the Work After OS Installation" "Installing the Installation Function" "Confirming the Completion of Installation"
		Administrator's Guide for System Management "Configuring the Shared File System for a Redundant Configuration"



New Function	Description	Related Manual
		"Displaying All Information of the System" "Items to be Set" "Disk Partition Definition File" Administrator's Guide for Job Management "Maria DB Settings"
Support the node functioning as the system management node, compute cluster management node, and login node in the system with only compute cluster of the PRIMERGY servers [PG]	In the system with only compute cluster of the PRIMERGY servers, the system management node, compute cluster management node, and login node can function on a single node.  [Note] On a system with a single node functioning as the system management node, compute cluster management node, and login node, only NFS is supported for shared file system on the compute nodes. On this system, KVM mode is not available.	End-user's Guide "Specifying a job execution environment"  Setup Guide "New System Installation" "Adding a Node" "Deleting a Node" "Changing Configuration Information"  Administrator's Guide for System Management "Software Abnormality Monitoring"  Administrator's Guide for Job Management "Settings for advanced job scheduling" "Configuring a Job Execution Environment" "Creating a job execution environment information file"  Administrator's Guide for Maintenance "Transitioning the System Management Node to Software Maintenance Mode"  Troubleshooting "The Node Serving as All of System Management Node, Compute Cluster Management Node, and Login Node Down" "How to Restart the Node Serving as All of System Management Node, Compute Cluster Management Node, and Login Node"  pxsystem.conf(5)
Support for NVIDIA A100 [PG]	NVIDIA A100 is supported to allocate GPU as custom resources.	Setup Guide "Configuring GPUs" Appendix "Applying the NVIDIA Fabric Manager" Appendix "Configuring the number of GPUs on a compute node with NVLink"  Administrator's Guide for Job Management

New Function	Description	Related Manual
		Appendix "Settings for Using GPUs"
Support for NVIDIA H100 [PG]	NVIDIA H100 is supported to allocate GPU as custom resources.	Setup Guide "Configuring GPUs" Appendix "Applying the NVIDIA Fabric Manager" Appendix "Configuring the number of GPUs on a compute node with NVLink" Administrator's Guide for Job Management Appendix "Settings for Using GPUs"

## Chapter 2 Compatibility Information

This chapter describes incompatibilities related to changes in functions from earlier versions or levels.

### Information

Compatibility with products earlier than Technical Computing Suite V4.0 is not described in this manual.

Table 2.1 List of Incompatibilities

Function	Item
System management function	<a href="#">Change in Job Operation When an FX Server Hardware Error Occurs</a>
	<a href="#">Command Message Change : pxinst Command</a>
	<a href="#">Differences in the behavior of the pmgather command</a>
	<a href="#">Change in the man manuals</a>
Job operation management function	<a href="#">Command Message Change : pjsub Command</a>
	<a href="#">Change in the pmpjmopt Command</a>
	<a href="#">Change in the pjs.conf File</a>
	<a href="#">Change in the papjm.conf File</a>
	<a href="#">Change in the pmpjm.conf File</a>
Power management function	<a href="#">Command Message Change : papwrmgradm Command</a>
	<a href="#">System Log Message Change : Power Management Function (PWRM) Message</a>
Parallel execution environment	<a href="#">Command Message Change : plexec Command</a>
TofuD driver	<a href="#">System Log Message Change : TofuD Driver (TOF) Message</a>
HPC extension function	<a href="#">Command Message Change : fhetbo Command</a>
	<a href="#">System Log Message Change : HPC Extension Function Messages</a>
	<a href="#">papi Default Domain Differences</a>

## 2.1 Change in Job Operation When an FX Server Hardware Error Occurs

A new function in V4.0L20 dynamically changes the communication paths of jobs. The following incompatibility occurs due to this new function.

There are changes in the job operations in cases where the "PortRouterFatal" hardware error occurs on an FX server node that has a job allocated to it.

[V4.0L10]

REASON	Description
PortRouterFatal	A fatal error occurred at the Tofu port. The Job Operation Software will kill jobs running on that node and no longer allocate new jobs to the node.

[V4.0L20]

REASON	Description
PortRouterFatal	A fatal error occurred at the Tofu port.

REASON	Description
	<p>If the job running on the relevant node has an instruction to change the communication path when a Tofu interconnect link goes down, the Job Operation Software waits for the job to end. After the job ends, no new jobs are allocated to that node.</p> <p>If the job has an instruction not to change the communication path when a Tofu interconnect link goes down, the Job Operation Software forcibly terminates the job. After that, no new jobs are allocated to that node.</p>



See

For more information, refer to "Hardware Abnormality Monitoring" and "Detailed Display of Operation Status of the System" under "Chapter 3 Details of the System Management Function" in the manual "Job Operation Software Administrator's Guide for System Management."

## 2.2 Command Message Change

There is an incompatibility related to a command message.

### 2.2.1 papwrmgradm Command

[V4.0L10]

[\[ERR.\] PWRM 0108 papwrmgradm Invalid option argument: \*opt arg\*](#)

Meaning

The setting value for the argument *arg* of the command option *opt* is invalid.

[V4.0L20]

[\[ERR.\] PWRM 0108 papwrmgradm Invalid option argument: \*details\*](#)

Meaning

The setting value for the argument of the command option is invalid. Alternatively, the file specified in the argument of the command option contains an invalid setting value.

*details*: Invalid command option and its arguments, or invalid setting value in the file

### 2.2.2 pxinst Command

[V4.0L10]

[\[ERR.\] INST 1021 pxinst The specified RPM filename does not contain the kernel module.](#)

[V4.0L20]

This message is obsolete.

### 2.2.3 plexec Command

[V4.0L10]

[\[ERR.\] PLE 0021 plexec The interactive job has aborted with the signal.\(sig=\*sigum\*\)](#)

Meaning

The interactive job was forcibly terminated by the signal *sigum*.

[V4.0L20]

---

[INFO] PLE 0094 plexec The interactive job has received the signal.(sig=*signum*)

Meaning

The interactive job was received the signal *signum*.

## 2.2.4 pjsub Command

---

[V4.0L10]

---

[ERR.] PJM 0002 pjsub Invalid combination of options: *opt* and *opt*.  
Try `pjsub --help` for more information.

Meaning

The combination of specified options is invalid.

[V4.0L20]

---

[ERR.] PJM 0002 pjsub Invalid combination: *detail*  
Try `pjsub --help` for more information.

Meaning

Invalid combination of options or arguments for the command displayed in *detail*.

## 2.2.5 fhetbo Command

---

[V4.0L10]

---

[ERR.] xos FHE 1001 - file:*file\_name* function:*func\_name* line:*line\_num* Internal Error. rc = *value*

[V4.0L20]

This message is obsolete.

## 2.3 System Log Message Change

---

There are incompatibilities related to system log messages.

### 2.3.1 Power Management Function (PWRM) Message

---

[V4.0L10]

---

[WARN] [PWRM] 1240 - pxsypswrd cannot get power info from node: *details*

[V4.0L20]

This message is obsolete.

### 2.3.2 TofuD Driver (TOF) Message

---

[V4.0L10]

---

[WARN] xos TOF 6003 - *internal-information* QP is not ready. (qpno = *value*)

---

[WARN] xos TOF 6004 - *internal-information* Unexpected packet

---

[INFO] xos TOF 7001 - *internal-information* checking tof\_ib\_outstanding\_toq is not tested and may cause a deadlock

[V4.0L20]

---

[WARN] xos TOF 6003 - *internal-information* QP is not ready. (qpno = NUM1) tof\_ib\_tfap\_rcv\_locked. qp == NULL tlp = DATA1/DATA2/DATA3/DATA4/DATA5/DATA6/DATA7/DATA8

---

[WARN] xos TOF 6004 - *internal-information* Unexpected packet: lqjno=NUM1 rqjno=NUM2 node\_seqno=NUM3 packet\_seqno=NUM4

---

[INFO] xos TOF 7001 - *internal-information* Updating the tof\_ib\_outstanding\_toq(NUM1)

---

## 2.3.3 HPC Extension Function Messages

---

[V4.0L10]

---

[ERR.] xos IRS 0304 - *internal-information* ioras: GbE Rx-buffer overrun detected. (status = DATA1)

---

[ERR.] xos IRS 0305 - *internal-information* ioras: GbE memory UE detected. (status = DATA1)

---

[ERR.] xos SEC 0004 - *internal-information* Sector cache swapout callback register failed.(rc=value)

---

[ERR.] xos SEC 0005 - *internal-information* Sector cache swapin callback register failed.(rc=value)

---

[ERR.] xos SEC 0006 - *internal-information* Sector cache swapout callback unregister failed.(rc=value)

---

[ERR.] xos SEC 0007 - *internal-information* Sector cache swapin callback unregister failed.(rc=value)

---

[ERR.] xos SEC 0012 - *internal-information* Special mode can not swapout.

---

[ERR.] xos HWB 0001 - *internal-information* Hard barrier swapout callback register failed.(rc=value)

---

[ERR.] xos HWB 0002 - *internal-information* Hard barrier swapin callback register failed.(rc=value)

---

[ERR.] xos HWB 0003 - *internal-information* Hard barrier swapout callback unregister failed.(rc=value)

---

[ERR.] xos HWB 0004 - *internal-information* Hard barrier swapin callback unregister failed.(rc=value)

---

[ERR.] xos FHE 1001 - *internal-information* Internal Error. rc = value

---

[INFO] xos FHE 1111 - It is not a job, because krm\_get\_vnid return -NODATA, so we set cpumask on sched\_getaffinity.

---

[INFO] xos FHE 1112 - It is no krm component in this environment, so we set cpu on sched\_getaffinity

---

[ERR.] xos HPCPWR 1009 - *internal-information* failed to get cpufreq policy. (CPU=cpu).

---

[V4.0L20]

These messages are obsolete.

## 2.4 Change in the pmpjmopt Command

---

There is an incompatibility related to the pmpjmopt command.

[V4.0L10]

```
# pmpjmopt -c clstname --show-rsc-ug --rscunit runame
ResourceUnitName = runame
Apply Value          : STOP,ENABLE
```

#### [V4.0L20]

```
# pmpjmopt -c clstname --show-rsc-ug --rscunit runame
ResourceUnitName = runame
Apply Value           : ENABLE,STOP
```

The content of "Apply Value" has been changed to output in the order of job submission and job execution.

## 2.5 Change in the pjs.conf File

There are incompatibilities related to the setting item StepJobAcceptDate and StepSchedUnitpmpjmopt of the pjs.conf file.

#### [V4.0L10]

Item name	Description	Specifiable value
StepJobAcceptDate	Interpretation of submission times when scheduling sub jobs of a step job	0: Actual sub job submission time 1: Scheduled time of a sub job
StepJobSchedUnit	Scheduling unit of sub jobs in a step job	0: Simultaneously schedule all sub jobs already submitted to the same resource unit but not yet executed. In this case, the sub jobs already submitted to the same resource unit are scheduled at their submission time, regardless of the specified value of StepJobAcceptDate. 1: Schedule only the first sub job already submitted but not yet executed

#### [V4.0L20]

Item name	Description	Specifiable value
StepJobAcceptDate	Interpretation of submission times when scheduling sub jobs of a step job	0: Actual sub job submission time 1: Scheduled time of a sub job. However, if 0 is specified for StepJobSchedUnit, the sub jobs other than the first one of the submitted sub jobs in the same resource unit are the expected end times of the previous sub jobs.
StepJobSchedUnit	Scheduling unit of sub jobs in a step job	0: Simultaneously schedule all sub jobs already submitted to the same resource unit but not yet executed. 1: Schedule only the first sub job already submitted but not yet executed

## 2.6 Differences in the behavior of the pmgather command

There are no changes in the pmgather command specification between V4.0L10 and V4.0L20, but behavior for path expansion differs depending on the OS version of the system management node on which the pmgather command is executed.

For example:

#### [RHEL7]

File collection succeeds even if double quotes are escaped when specifying the file names to be collected by the pmgather command. (Example: `\"/etc/hosts\"`)

#### [RHEL8.1 or later]

If the file name collected by the pmgather command is specified by escaping double quotes, "protocol error: filename does not match request" will occur and file collection will fail. (Example: `\"/etc/hosts\"`)

This is because the behavior of the scp command used internally by the pmgather command depends on the OS version.



See

For more information, refer to "Note" of "Outputting the Execution Result of Collective Execution" under "Chapter 3 Details of the System Management Function" in the manual "Job Operating Software Administrator's Guide for System Management."

## 2.7 Change in the papjm.conf File

There are incompatibilities related to the setting item JobSchedulingTargetLimit and JobSchedulingTargetMode of the papjm.conf file.

### [V4.0L10]

Item name	Description	Default value
JobSchedulingTargetLimit	Setting of the maximum number of jobs to schedule	0
JobSchedulingTargetMode	Method for limiting the jobs to schedule	aprio

### [V4.0L20]

Item name	Description	Default value
JobSchedulingTargetLimit	Setting of the maximum number of jobs to schedule	10000
JobSchedulingTargetMode	Method for limiting the jobs to schedule	jobselectpolicy

## 2.8 Change in the pmpjm.conf File

There are incompatibilities related to the setting item JobSchedulingTargetLimit and JobSchedulingTargetMode of the pmpjm.conf file.

### [V4.0L10]

Item name	Description	Default value
JobSchedulingTargetLimit	Setting of the maximum number of jobs to schedule	0
JobSchedulingTargetMode	Method for limiting the jobs to schedule	aprio

### [V4.0L20]

Item name	Description	Default value
JobSchedulingTargetLimit	Setting of the maximum number of jobs to schedule	10000
JobSchedulingTargetMode	Method for limiting the jobs to schedule	jobselectpolicy

## 2.9 Change in the man manuals

There is an incompatibility with the man manuals for the following commands:

### [V4.0L10]

- \_pasetbootparam command
- \_pashowhard command

### [V4.0L20]

The man manual for these commands is obsolete.



## 2.10 papi Default Domain Differences

---

The default value of the domain that defines the event collection range of papi varies depending on the OS version. This may cause differences in measurement.

### [RHEL8.7 or earlier]

Default domain=USER/KERNEL/SUPERVISOR

Collects events that occur in user space, kernel space, or supervisor space.

### [RHEL8.8 or later]

Default domain=USER

Collects only events that occur in user space.



### Information

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This incompatibility does not affect measurement with the Development Studio profiler.

The domain can be changed using the `papi_set_domain(3)` function. See the Linux man pages for details.

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