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Red Hat Enterprise Linux Release 9.2 Manual Pages on 'qsub.1p' command

\$ man qsub.1p

QSUB(1P) POSIX Programmer's Manual QSUB(1P)

PROLOG

This manual page is part of the POSIX Programmer's Manual. The Linux implementation of this interface may differ (consult the corresponding Linux manual page for details of Linux behavior), or the interface may not be implemented on Linux.

NAME

qsub ? submit a script

SYNOPSIS

```
qsub [-a date_time] [-A account_string] [-c interval]
      [-C directive_prefix] [-e path_name] [-h] [-j join_list]
      [-k keep_list] [-m mail_options] [-M mail_list] [-N name]
      [-o path_name] [-p priority] [-q destination] [-r y|n]
      [-S path_name_list] [-u user_list] [-v variable_list] [-V]
      [-z] [script]
```

DESCRIPTION

To submit a script is to create a batch job that executes the script. A script is submitted by a request to a batch server. The qsub utility is a user-accessible batch client that submits a script.

Upon successful completion, the qsub utility shall have created a batch job that will execute the submitted script.

The qsub utility shall submit a script by sending a Queue Job Request to a batch server.

The qsub utility shall place the value of the following environment variables in the Variable_List attribute of the batch job: HOME, LANG, LOGNAME, PATH, MAIL, SHELL, and TZ. The name of the environment variable shall be the current name prefixed with the string PBS_O_.

Note: If the current value of the HOME variable in the environment space of the qsub utility is /aa/bb/cc, then qsub shall place PBS_O_HOME=/aa/bb/cc in the Variable_List attribute of the batch job.

In addition to the variables described above, the qsub utility shall add the following variables with the indicated values to the variable list:

PBS_O_WORKDIR The absolute path of the current working directory of the qsub utility process.

PBS_O_HOST The name of the host on which the qsub utility is running.

OPTIONS

The qsub utility shall conform to the Base Definitions volume of POSIX.1?2017, Section 12.2, Utility Syntax Guidelines.

The following options shall be supported by the implementation:

-a date_time

Define the time at which a batch job becomes eligible for execution.

The qsub utility shall accept an option-argument that conforms to the syntax of the time operand of the touch utility.

Table 4-19: Environment Variable Values (Utilities)

Variable Name	Value at qsub Time
PBS_O_HOME	HOME
PBS_O_HOST	Client host name
PBS_O_LANG	LANG
PBS_O_LOGNAME	LOGNAME
PBS_O_PATH	PATH

?PBS_O_MAIL ? MAIL ?
?PBS_O_SHELL ? SHELL ?
?PBS_O_TZ ? TZ ?
?PBS_O_WORKDIR ? Current working directory ?
??

Note: The server that initiates execution of the batch job will add other variables to the batch job's environment; see Section 3.2.2.1, Batch Job Execution.

The qsub utility shall set the Execution_Time attribute of the batch job to the number of seconds since the Epoch that is equivalent to the local time expressed by the value of the date_time option-argument. The Epoch is defined in the Base Definitions volume of POSIX.1?2017, Section 3.150, Epoch. If the -a option is not presented to the qsub utility, the utility shall set the Execution_Time attribute of the batch job to a time (number of seconds since the Epoch) that is earlier than the time at which the utility exits.

-A account_string

Define the account to which the resource consumption of the batch job should be charged.

The syntax of the account_string option-argument is unspecified.

The qsub utility shall set the Account_Name attribute of the batch job to the value of the account_string option-argument.

If the -A option is not presented to the qsub utility, the utility shall omit the Account_Name attribute from the attributes of the batch job.

-c interval

Define whether the batch job should be checkpointed, and if so, how often.

The qsub utility shall accept a value for the interval option-argument that is one of the following:

- n No checkpointing shall be performed on the batch job (NO_CHECKPOINT).
- s Checkpointing shall be performed only when the batch server is shut down (CHECKPOINT_AT_SHUTDOWN).
- c Automatic periodic checkpointing shall be performed at the Minimum_Cpu_Interval attribute of the batch queue, in units of CPU minutes (CHECKPOINT_AT_MIN_CPU_INTERVAL).

c=minutes Automatic periodic checkpointing shall be performed every minutes of CPU time, or every Minimum_Cpu_Interval minutes, whichever is greater. The minutes argument shall conform to the syntax for unsigned integers and shall be greater than zero.

The qsub utility shall set the Checkpoint attribute of the batch job to the value of the interval option-argument.

If the -c option is not presented to the qsub utility, the utility shall set the Checkpoint attribute of the batch job to the single character 'u' (CHECKPOINT_UNSPECIFIED).

-C directive_prefix

Define the prefix that declares a directive to the qsub utility within the script.

The directive_prefix is not a batch job attribute; it affects the behavior of the qsub utility.

If the -C option is presented to the qsub utility, and the value of the directive_prefix option-argument is the null string, the utility shall not scan the script file for directives. If the -C option is not presented to the qsub utility, then the value of the PBS_DPREFIX environment variable is used. If the environment variable is not defined, then #PBS encoded in the portable character set is the default.

-e path_name

Define the path to be used for the standard error stream of the batch job.

The `qsub` utility shall accept a `path_name` option-argument which can be preceded by a host name element of the form `hostname:`.

If the `path_name` option-argument constitutes an absolute pathname, the `qsub` utility shall set the `Error_Path` attribute of the batch job to the value of the `path_name` option-argument.

If the `path_name` option-argument constitutes a relative path name and no host name element is specified, the `qsub` utility shall set the `Error_Path` attribute of the batch job to the value of the absolute pathname derived by expanding the `path_name` option-argument relative to the current directory of the process executing `qsub`.

If the `path_name` option-argument constitutes a relative path name and a host name element is specified, the `qsub` utility shall set the `Error_Path` attribute of the batch job to the value of the `path_name` option-argument without expansion. The host name element shall be included.

If the `path_name` option-argument does not include a host name element, the `qsub` utility shall prefix the pathname with `hostname:`, where `hostname` is the name of the host upon which the `qsub` utility is being executed.

If the `-e` option is not presented to the `qsub` utility, the utility shall set the `Error_Path` attribute of the batch job to the host name and path of the current directory of the submitting process and the default filename.

The default filename for standard error has the following format:

`job_name.esquence_number`

`-h` Specify that a USER hold is applied to the batch job.

The `qsub` utility shall set the value of the `Hold_Types` attribute of the batch job to the value `USER`.

If the `-h` option is not presented to the `qsub` utility, the

utility shall set the Hold_Types attribute of the batch job to the value NO_HOLD.

-j join_list

Define which streams of the batch job are to be merged. The qsub -j option shall accept a value for the join_list option-argument that is a string of alphanumeric characters in the portable character set (see the Base Definitions volume of POSIX.1?2017, Section 6.1, Portable Character Set).

The qsub utility shall accept a join_list option-argument that consists of one or more of the characters 'e' and 'o', or the single character 'n'.

All of the other batch job output streams specified will be merged into the output stream represented by the character listed first in the join_list option-argument.

For each unique character in the join_list option-argument, the qsub utility shall add a value to the Join_Path attribute of the batch job as follows, each representing a different batch job stream to join:

- e The standard error of the batch job (JOIN_STD_ERROR).
- o The standard output of the batch job (JOIN_STD_OUTPUT).

An existing Join_Path attribute can be cleared by the follow?

ing join type:

n NO_JOIN

If 'n' is specified, then no files are joined. The qsub utility shall consider it an error if any join type other than 'n' is combined with join type 'n'.

Strictly conforming applications shall not repeat any of the characters 'e', 'o', or 'n' within the join_list option-argument. The qsub utility shall permit the repetition of characters, but shall not assign additional meaning to the repeated characters.

An implementation may define other join types. The conformance document for an implementation shall describe any addi?

tional batch job streams, how they are specified, their internal behavior, and how they affect the behavior of the utility.

If the `-j` option is not presented to the `qsub` utility, the utility shall set the value of the `Join_Path` attribute of the batch job to `NO_JOIN`.

`-k keep_list`

Define which output of the batch job to retain on the execution host.

The `qsub -k` option shall accept a value for the `keep_list` option-argument that is a string of alphanumeric characters in the portable character set (see the Base Definitions volume of POSIX.1?2017, Section 6.1, Portable Character Set).

The `qsub` utility shall accept a `keep_list` option-argument that consists of one or more of the characters `'e'` and `'o'`, or the single character `'n'`.

For each unique character in the `keep_list` option-argument, the `qsub` utility shall add a value to the `Keep_Files` attribute of the batch job as follows, each representing a different batch job stream to keep:

- `e` The standard error of the batch job (`KEEP_STD_ERROR`).
- `o` The standard output of the batch job (`KEEP_STD_OUTPUT`).

If both `'e'` and `'o'` are specified, then both files are retained. An existing `Keep_Files` attribute can be cleared by the following keep type:

`n` `NO_KEEP`

If `'n'` is specified, then no files are retained. The `qsub` utility shall consider it an error if any keep type other than `'n'` is combined with keep type `'n'`.

Strictly conforming applications shall not repeat any of the characters `'e'`, `'o'`, or `'n'` within the `keep_list` option-argument. The `qsub` utility shall permit the repetition of characters, but shall not assign additional meaning to the repeated

characters.

An implementation may define other keep types. The conformance document for an implementation shall describe any additional keep types, how they are specified, their internal behavior, and how they affect the behavior of the utility. If the -k option is not presented to the qsub utility, the utility shall set the Keep_Files attribute of the batch job to the value NO_KEEP.

-m mail_options

Define the points in the execution of the batch job at which the batch server that manages the batch job shall send mail about a change in the state of the batch job.

The qsub -m option shall accept a value for the mail_options option-argument that is a string of alphanumeric characters in the portable character set (see the Base Definitions volume of POSIX.1?2017, Section 6.1, Portable Character Set).

The qsub utility shall accept a value for the mail_options option-argument that is a string of one or more of the characters 'e', 'b', and 'a', or the single character 'n'.

For each unique character in the mail_options option-argument, the qsub utility shall add a value to the Mail_Users attribute of the batch job as follows, each representing a different time during the life of a batch job at which to send mail:

- e MAIL_AT_EXIT
- b MAIL_AT_BEGINNING
- a MAIL_AT_ABORT

If any of these characters are duplicated in the mail_options option-argument, the duplicates shall be ignored.

An existing Mail_Points attribute can be cleared by the following mail type:

- n NO_MAIL

If 'n' is specified, then mail is not sent. The qsub utility

shall consider it an error if any mail type other than 'n' is combined with mail type 'n'.

Strictly conforming applications shall not repeat any of the characters 'e', 'b', 'a', or 'n' within the mail_options option-argument.

The qsub utility shall permit the repetition of characters, but shall not assign additional meaning to the repeated characters. An implementation may define other mail types. The conformance document for an implementation shall describe any additional mail types, how they are specified, their internal behavior, and how they affect the behavior of the utility.

If the -m option is not presented to the qsub utility, the utility shall set the Mail_Points attribute to the value MAIL_AT_ABORT.

-M mail_list

Define the list of users to which a batch server that executes the batch job shall send mail, if the server sends mail about the batch job.

The syntax of the mail_list option-argument is unspecified.

If the implementation of the qsub utility uses a name service to locate users, the utility should accept the syntax used by the name service.

If the implementation of the qsub utility does not use a name service to locate users, the implementation should accept the following syntax for user names:

```
mail_address[,mail_address,, ...]
```

The interpretation of mail_address is implementation-defined.

The qsub utility shall set the Mail_Users attribute of the batch job to the value of the mail_list option-argument.

If the -M option is not presented to the qsub utility, the utility shall place only the user name and host name for the current process in the Mail_Users attribute of the batch job.

-N name Define the name of the batch job.

The `qsub -N` option shall accept a value for the name option-argument that is a string of up to 15 alphanumeric characters in the portable character set (see the Base Definitions volume of POSIX.1?2017, Section 6.1, Portable Character Set) where the first character is alphabetic.

The `qsub` utility shall set the value of the `Job_Name` attribute of the batch job to the value of the `name` option-argument.

If the `-N` option is not presented to the `qsub` utility, the utility shall set the `Job_Name` attribute of the batch job to the name of the script argument from which the directory specification if any, has been removed.

If the `-N` option is not presented to the `qsub` utility, and the script is read from standard input, the utility shall set the `Job_Name` attribute of the batch job to the value `STDIN`.

`-o path_name`

Define the path for the standard output of the batch job.

The `qsub` utility shall accept a `path_name` option-argument that conforms to the syntax of the `path_name` element defined in the System Interfaces volume of POSIX.1?2017, which can be preceded by a host name element of the form `hostname:`.

If the `path_name` option-argument constitutes an absolute pathname, the `qsub` utility shall set the `Output_Path` attribute of the batch job to the value of the `path_name` option-argument without expansion.

If the `path_name` option-argument constitutes a relative path name and no host name element is specified, the `qsub` utility shall set the `Output_Path` attribute of the batch job to the pathname derived by expanding the value of the `path_name` option-argument relative to the current directory of the process executing the `qsub`.

If the `path_name` option-argument constitutes a relative path name and a host name element is specified, the `qsub` utility

shall set the Output_Path attribute of the batch job to the value of the path_name option-argument without expansion.

If the path_name option-argument does not specify a host name element, the qsub utility shall prefix the pathname with hostname:, where hostname is the name of the host upon which the qsub utility is executing.

If the -o option is not presented to the qsub utility, the utility shall set the Output_Path attribute of the batch job to the host name and path of the current directory of the submitting process and the default filename.

The default filename for standard output has the following format:

job_name.osequence_number

-p priority

Define the priority the batch job should have relative to other batch jobs owned by the batch server.

The qsub utility shall set the Priority attribute of the batch job to the value of the priority option-argument.

If the -p option is not presented to the qsub utility, the value of the Priority attribute is implementation-defined.

The qsub utility shall accept a value for the priority option-argument that conforms to the syntax for signed decimal integers, and which is not less than -1024 and not greater than 1023.

-q destination

Define the destination of the batch job.

The destination is not a batch job attribute; it determines the batch server, and possibly the batch queue, to which the qsub utility batch queues the batch job.

The qsub utility shall submit the script to the batch server named by the destination option-argument or the server that owns the batch queue named in the destination option-argument.

The qsub utility shall accept an option-argument for the -q option that conforms to the syntax for a destination (see Section 3.3.2, Destination).

If the -q option is not presented to the qsub utility, the qsub utility shall submit the batch job to the default destination. The mechanism for determining the default destination is implementation-defined.

-r y|n Define whether the batch job is rerunnable.

If the value of the option-argument is y, the qsub utility shall set the Rerunable attribute of the batch job to TRUE.

If the value of the option-argument is n, the qsub utility shall set the Rerunable attribute of the batch job to FALSE.

If the -r option is not presented to the qsub utility, the utility shall set the Rerunable attribute of the batch job to TRUE.

-S path_name_list

Define the pathname to the shell under which the batch job is to execute.

The qsub utility shall accept a path_name_list option-argument that conforms to the following syntax:

```
pathname[@host][,pathname[@host], ...]
```

The qsub utility shall allow only one pathname for a given host name. The qsub utility shall allow only one pathname that is missing a corresponding host name.

The qsub utility shall add a value to the Shell_Path_List attribute of the batch job for each entry in the path_name_list option-argument.

If the -S option is not presented to the qsub utility, the utility shall set the Shell_Path_List attribute of the batch job to the null string.

The conformance document for an implementation shall describe the mechanism used to set the default shell and determine the current value of the default shell. An implementation shall

provide a means for the installation to set the default shell to the login shell of the user under which the batch job is to execute. See Section 3.3.3, Multiple Keyword-Value Pairs for a means of removing keyword=value (and value@keyword) pairs and other general rules for list-oriented batch job attributes.

-u user_list

Define the user name under which the batch job is to execute.

The qsub utility shall accept a user_list option-argument that conforms to the following syntax:

```
username[@host][,username[@host], ...]
```

The qsub utility shall accept only one user name that is missing a corresponding host name. The qsub utility shall accept only one user name per named host.

The qsub utility shall add a value to the User_List attribute of the batch job for each entry in the user_list option-argument.

If the -u option is not presented to the qsub utility, the utility shall set the User_List attribute of the batch job to the user name from which the utility is executing. See Section 3.3.3, Multiple Keyword-Value Pairs for a means of removing keyword=value (and value@keyword) pairs and other general rules for list-oriented batch job attributes.

-v variable_list

Add to the list of variables that are exported to the session leader of the batch job.

A variable_list is a set of strings of either the form <variable> or <variable=value>, delimited by <comma> characters.

If the -v option is presented to the qsub utility, the utility shall also add, to the environment Variable_List attribute of the batch job, every variable named in the environment variable_list option-argument and, optionally, values of specified variables.

If a value is not provided on the command line, the qsub utility shall set the value of each variable in the environment Variable_List attribute of the batch job to the value of the corresponding environment variable for the process in which the utility is executing; see Table 4-19, Environment Variable Values (Utilities).

A conforming application shall not repeat a variable in the environment variable_list option-argument.

The qsub utility shall not repeat a variable in the environment Variable_List attribute of the batch job. See Section 3.3.3, Multiple Keyword-Value Pairs for a means of removing keyword=value (and value@keyword) pairs and other general rules for list-oriented batch job attributes.

-V Specify that all of the environment variables of the process are exported to the context of the batch job.

The qsub utility shall place every environment variable in the process in which the utility is executing in the list and shall set the value of each variable in the attribute to the value of that variable in the process.

-z Specify that the utility does not write the batch job_identifier of the created batch job to standard output.

If the -z option is presented to the qsub utility, the utility shall not write the batch job_identifier of the created batch job to standard output.

If the -z option is not presented to the qsub utility, the utility shall write the identifier of the created batch job to standard output.

OPERANDS

The qsub utility shall accept a script operand that indicates the path to the script of the batch job.

If the script operand is not presented to the qsub utility, or if the operand is the single-character string '-', the utility shall read the script from standard input.

tion-argument. If TZ is unset or null, an unspecified default
timezone shall be used.

ASYNCHRONOUS EVENTS

Once created, a batch job exists until it exits, aborts, or is deleted.

After a batch job is created by the qsub utility, batch servers might
route, execute, modify, or delete the batch job.

STDOUT

The qsub utility writes the batch job_identifier assigned to the batch
job to standard output, unless the -z option is specified.

STDERR

The standard error shall be used only for diagnostic messages.

OUTPUT FILES

None.

EXTENDED DESCRIPTION

Script Preservation

The qsub utility shall make the script available to the server execut-
ing the batch job in such a way that the server executes the script as
it exists at the time of submission.

The qsub utility can send a copy of the script to the server with the
Queue Job Request or store a temporary copy of the script in a location
specified to the server.

Option Specification

A script can contain directives to the qsub utility.

The qsub utility shall scan the lines of the script for directives,
skipping blank lines, until the first line that begins with a string
other than the directive string; if directives occur on subsequent
lines, the utility shall ignore those directives.

Lines are separated by a <newline>. If the first line of the script
begins with "#!" or a <colon> (:'), then it is skipped. The qsub util-
ity shall process a line in the script as a directive if and only if
the string of characters from the first non-white-space character on
the line until the first <space> or <tab> on the line match the direc-
tive prefix. If a line in the script contains a directive and the final

characters of the line are <backslash> and <newline>, then the next line shall be interpreted as a continuation of that directive.

The `qsub` utility shall process the options and option-arguments contained on the directive prefix line using the same syntax as if the options were input on the `qsub` utility.

The `qsub` utility shall continue to process a directive prefix line until after a <newline> is encountered. An implementation may ignore lines which, according to the syntax of the shell that will interpret the script, are comments. An implementation shall describe in the conformance document the format of any shell comments that it will recognize.

If an option is present in both a directive and the arguments to the `qsub` utility, the utility shall ignore the option and the corresponding option-argument, if any, in the directive.

If an option that is present in the directive is not present in the arguments to the `qsub` utility, the utility shall process the option and the option-argument, if any.

In order of preference, the `qsub` utility shall select the directive prefix from one of the following sources:

- * If the `-C` option is presented to the utility, the value of the `directive_prefix` option-argument
- * If the environment variable `PBS_DPREFIX` is defined, the value of that variable
- * The four-character string `"#PBS"` encoded in the portable character set

If the `-C` option is present in the script file it shall be ignored.

EXIT STATUS

The following exit values shall be returned:

- 0 Successful completion.
- >0 An error occurred.

CONSEQUENCES OF ERRORS

Default.

The following sections are informative.

APPLICATION USAGE

None.

EXAMPLES

None.

RATIONALE

The `qsub` utility allows users to create a batch job that will process the script specified as the operand of the utility.

The options of the `qsub` utility allow users to control many aspects of the queuing and execution of a batch job.

The `-a` option allows users to designate the time after which the batch job will become eligible to run. By specifying an execution time, users can take advantage of resources at off-peak hours, synchronize jobs with chronologically predictable events, and perhaps take advantage of off-peak pricing of computing time. For these reasons and others, a timing option is existing practice on the part of almost every batch system, including NQS.

The `-A` option allows users to specify the account that will be charged for the batch job. Support for account is not mandatory for conforming batch servers.

The `-C` option allows users to prescribe the prefix for directives within the script file. The default prefix `"#PBS"` may be inappropriate if the script will be interpreted with an alternate shell, as specified by the `-S` option.

The `-c` option allows users to establish the checkpointing interval for their jobs. A checkpointing system, which is not defined by this volume of POSIX.1?2017, allows recovery of a batch job at the most recent checkpoint in the event of a crash. Checkpointing is typically used for jobs that consume expensive computing time or must meet a critical schedule. Users should be allowed to make the tradeoff between the overhead of checkpointing and the risk to the timely completion of the batch job; therefore, this volume of POSIX.1?2017 provides the checkpointing interval option. Support for checkpointing is optional for batch servers.

The -e option allows users to redirect the standard error streams of their jobs to a non-default path. For example, if the submitted script generally produces a great deal of useless error output, a user might redirect the standard error output to the null device. Or, if the file system holding the default location (the home directory of the user) has too little free space, the user might redirect the standard error stream to a file in another file system.

The -h option allows users to create a batch job that is held until explicitly released. The ability to create a held job is useful when some external event must complete before the batch job can execute. For example, the user might submit a held job and release it when the system load has dropped.

The -j option allows users to merge the standard error of a batch job into its standard output stream, which has the advantage of showing the sequential relationship between output and error messages.

The -m option allows users to designate those points in the execution of a batch job at which mail will be sent to the submitting user, or to the account(s) indicated by the -M option. By requesting mail notification at points of interest in the life of a job, the submitting user, or other designated users, can track the progress of a batch job.

The -N option allows users to associate a name with the batch job. The job name in no way affects the processing of the batch job, but rather serves as a mnemonic handle for users. For example, the batch job name can help the user distinguish between multiple jobs listed by the qstat utility.

The -o option allows users to redirect the standard output stream. A user might, for example, wish to redirect to the null device the standard output stream of a job that produces copious yet superfluous output.

The -P option allows users to designate the relative priority of a batch job for selection from a queue.

The -q option allows users to specify an initial queue for the batch job. If the user specifies a routing queue, the batch server routes the

batch job to another queue for execution or further routing. If the user specifies a non-routing queue, the batch server of the queue eventually executes the batch job.

The `-r` option allows users to control whether the submitted job will be rerun if the controlling batch node fails during execution of the batch job. The `-r` option likewise allows users to indicate whether or not the batch job is eligible to be rerun by the `qrerun` utility. Some jobs cannot be correctly rerun because of changes they make in the state of databases or other aspects of their environment. This volume of POSIX.1-2017 specifies that the default, if the `-r` option is not presented to the utility, will be that the batch job cannot be rerun, since the result of rerunning a non-rerunnable job might be catastrophic.

The `-S` option allows users to specify the program (usually a shell) that will be invoked to process the script of the batch job. This option has been modified to allow a list of shell names and locations associated with different hosts.

The `-u` option is useful when the submitting user is authorized to use more than one account on a given host, in which case the `-u` option allows the user to select from among those accounts. The option-argument is a list of user-host pairs, so that the submitting user can provide different user identifiers for different nodes in the event the batch job is routed. The `-u` option provides a lot of flexibility to accommodate sites with complex account structures. Users that have the same user identifier on all the hosts they are authorized to use will not need to use the `-u` option.

The `-V` option allows users to export all their current environment variables, as of the time the batch job is submitted, to the context of the processes of the batch job.

The `-v` option allows users to export specific environment variables from their current process to the processes of the batch job.

The `-z` option allows users to suppress the writing of the batch job identifier to standard output. The `-z` option is an existing NQS practice

tice that has been standardized.

Historically, the `qsub` utility has served the batch job-submission function in the NQS system, the existing practice on which it is based.

Some changes and additions have been made to the `qsub` utility in this volume of POSIX.1-2017, vis-a-vis NQS, as a result of the growing pool of experience with distributed batch systems.

The set of features of the `qsub` utility as defined in this volume of POSIX.1-2017 appears to incorporate all the common existing practice on potentially conforming platforms.

FUTURE DIRECTIONS

The `qsub` utility may be removed in a future version.

SEE ALSO

Chapter 3, Batch Environment Services, `qrerun`, `qstat`, `touch`

The Base Definitions volume of POSIX.1-2017, Section 3.150, Epoch, Section 6.1, Portable Character Set, Chapter 8, Environment Variables, Section 12.2, Utility Syntax Guidelines

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