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RSHUT v.2.0
INSTALLATION AND USER GUIDE

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RSHUT procedure allows to shut down or reboot a remote VMS node, or several VMS nodes, without logging on the nodes you need to shut down.

Some special features are available to perform particular tasks, such as shutting down a node in a future time without keeping an open session on it, and shutting down several nodes by a single command.

This document provides all the information needed to install and run RSHUT, and explains all its features.

History   This is a new document

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1 Introduction

1.1 Overview

RSHUT procedure allows to shut down or reboot[1] one or more VMS nodes, *without logging on them*. It has been tested on nodes running VAX/VMS, OpenVMS, and OpenVMS/AXP operating system.

The tool has been mainly thought as a support for managers of large VMS clusters, and for people who administrate more than one VMS system/cluster.

A list of nodes can be supplied to the procedure, so that they are automatically shut down in the desired sequence; the list may include nodes belonging to the same cluster of the node from which RSHUT procedure is invoked, remote nodes belonging to different clusters, and stand-alone nodes. You are also allowed to shut down all of the nodes in a VMS cluster by means of a single command, by invoking the procedure from a node belonging to the same cluster.

RSHUT allows to set up a shutdown in a future time fixed in advance, without keeping an open session on the node(s) you want to shut down or reboot.

To run RSHUT successfully, you need an account on the nodes you want to shut down; the account must own all of the privileges required for a normal shutdown: CMKRNL, EXQUOTA, LOG_IO, NETMBX, OPER, PHY_IO, SECURITY, SYSNAM, SYSPRV, TMPMBX, WORLD.

Unlike other similar packages, RSHUT does not need any processes to stay active in background on the nodes to shut down.

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[1] In this guide the term "shutdown" is sometimes used also as a synonym for "reboot", when the context is valid for both operations.

1.2 Release notes

Thanks to some precious feedback, the following improvements have been accomplished in the current version of RSHUT:

— The qualifiers that you can supply on the command line are now VMS-like designed (preceded by a slash character - "/"). This feature makes the tool more user-friendly.

— Security has been improved, in particular in the case that you want to schedule a shutdown in a future time; you do not need to submit the shutdown job as a batch job any more, so the password needed to access the privileged account, used to perform the shutdown, is no more stored as a parameter passed to the batch job. Scheduling is now performed by means of the /WAIT qualifier.

— The "wait-flag" qualifier, available in the previous version, has been replaced by the /[NO]CONFIRM qualifier. This qualifier causes the tool to wait for [RETURN] key to be pressed before starting each shutdown.

— Two new qualifiers, /[NO]VERBOSE and /WAIT, have been added; the first one allows to specify if you want the output from the shutdown job to be sent back to your terminal or not; the latest allows to schedule a shutdown in a future time.

2 Installation

Table 2–1 lists the files included in the package.

Table 2–1   Files included in RSHUT package

RSHUT.COM	DCL code
RSHUT.DOC	User Guide in text format
RSHUT.PS	User Guide in PostScript format
RSHUT.DECW$BOOK	Online User Guide in Bookreader format

You just need to move them to a directory accessible by any node you want to be capable of shutting down by remote, and on the nodes where you want to run RSHUT from (if not the same as the nodes to shut down); after this, you should enable Read and Execute access to World for RSHUT.COM file (**SET FILE/PROTECT=(W:RE) RSHUT.COM**), so that the procedure will be invokable by any user on your node and on remote nodes; this does not allow *any* remote user to shut down the node, as a privileged access on the node itself must be performed by the user, in order to complete the operation successfully.

Then just define an object in NCP for RSHUT, both in permanent and volatile database, *on each node that you want to be able to shut down by means of RSHUT*, by executing the following commands:

```
$ MC NCP SET OBJECT RSHUT FILE file-specification -
_$ NUMBER 0

$ MC NCP DEFINE OBJECT RSHUT FILE file-specification -
_$ NUMBER 0
```

For instance

```
$ MC NCP SET OBJECT RSHUT FILE SYS$MANAGER:RSHUT.COM -
_$ NUMBER 0

$ MC NCP DEFINE OBJECT RSHUT FILE SYS$MANAGER:RSHUT.COM -
_$ NUMBER 0
```

Use SYSMAN system utility to define the object on any node in a cluster by means of a single command (see related documentation for more information).

You should also define the symbol **RSHUT** such as

```
$ RSHUT=="@SYS$MANAGER:RSHUT "" """
```

in your common login procedure.

Please notice the *mandatory blank parameter* (in quotes) placed after the procedure name. This makes you able to invoke the procedure easily whenever you need it, and grants all qualifiers and parameters to be interpreted correctly.

If you want some qualifiers to be enabled by default, you should include them in the symbol assignment. For instance, if you are used to enable the /VERBOSE qualifier any time you run RSHUT, maybe the symbol RSHUT could be conveniently defined as

```
$ RSHUT=="@SYS$MANAGER:RSHUT "" "" /VERBOSE"
```

2.1 Installing the Bookreader documentation

Optionally, you might like to install the online documentation for the tool, available in Bookreader format. This should be done on sites where DECwindows (or DECwindows Motif) terminals or workstations, on which the Bookreader application can run, are available.

To make the online documentation available, you have to update the file DECW$BOOK:LIBRARY.DECW$BOOKSHELF to add an entry for the RSHUT documentation:

```
BOOK\rshut-doc-location:RSHUT\RSHUT User Guide
```

3 How RSHUT works

RSHUT works by means of a **client-server** structure. Both client and server portion of code are included into RSHUT.COM procedure.

When you run RSHUT, the client section is executed; this portion of the code can be activated by any user, with no dangers; the procedure tries to establish a link to the task RSHUT, which must be defined on the remote node to shut down; some basic checks are performed to verify if the node is known and reachable.

On the remote node, when the link is established, the server portion of code is activated; this section can work successfully only if a privileged access can be opened on the remote node itself, that is, only if the user is able to log into a privileged account on the remote node. The shutdown command is received by the server and executed: the usual SYS$SYSTEM:SHUTDOWN.COM procedure, distributed as part of VMS operating system, is run on the node; all the needed parameters are passed to it by the calling process.

The server portion of code is executed in a process named RSHUT_$nnnn$[2], on the remote node.

If the /VERBOSE qualifier has been supplied by the user on the command line, the output is sent back to the calling process, so that the user is able to see, on his/her terminal, what is happening on the remote node during the shutdown. This is called **verbose mode**. After a while, the link goes down due to the disconnection of the remote node, and the control is returned back to the calling process.

If RSHUT is run in **noverbose mode** , the output is not sent back to the calling process. The server process disconnects just after starting, and runs indipendently from the calling process; this lets the latest free to proceed to another shutdown (if any). If the /WAIT qualifier has been supplied, the server process on the remote node starts after the specified time, otherwise it immediately begins shutdown operations.

This procedure is repeated for each node included in the list: another link is established to the next node in the list (if any), on which the server portion of code is activated, and so on.

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[2] $nnnn$ is a unique number that grants unique process names to RSHUT processes.

Because of this method of performing shutdown, RSHUT does not need any processes to remain active in background on the nodes to shut down, unlike other similar tools; the only process needed is created when RSHUT is run.

4   Running RSHUT

RSHUT provides several optional qualifiers that may be supplied on the command line; however, some information is required by the procedure if you do not supply it on the command line. All of the parameters and qualifiers can be typed both in uppercase or lowercase.

The complete syntax of the command is:

```
$ RSHUT list-of-nodes [qualifiers]
```

The parameter *list of nodes* is mandatory: if you do not supply a list of nodes to shut down, you will be asked for it by the procedure. The list of nodes (if present) must be separated from the procedure name and qualifiers by inserting one or more blank characters in between.

The qualifiers that you supply on command line applies to *any* nodes in the list. There are not any *positional qualifiers*.

The list of nodes must be supplied as a single parameter, you are not allowed to split it in several parts.

Some examples follow; the first two ones are incorrect ones, the latest three ones are valid ones:

```
$ RSHUT PLUTO MARS VENUS
$ RSHUT NEPTUN/VERBOSE
$ RSHUT PLUTO,VENUS
$ RSHUT EARTH /NOVERBOSE/WAIT=00:10/SHUTDOWN
$ RSHUT/CONFIRM MARS /REBOOT/USER=COLLINS
```

4.1   Parameters

List of nodes

The only parameter that you can supply to the procedure is the comma-separated list of nodes to shut down or reboot. The nodes may belong to the same cluster of the node where you run RSHUT from, or to different clusters, or may be stand-alone nodes; the only requirement is that the RSHUT object must be correctly installed on each node to shut down or reboot.

The nodes will be shut down in the order they appear in the list; if you include the name of the local node in the list, it will be automatically moved to the end of the list, even if you placed it in a different position, to avoid the calling job to crash before completing the list of nodes.

Two special labels are available to make the list shorter; they both can be specified in the list of nodes:

- **LOCAL**: indicates the node where the RSHUT command is run from; the label is automatically translated to the correct node name; the local node will be shut down *as the latest one*, even if you put it in a different position in the list of nodes, to avoid the calling process to crash.

- **CLUSTER**: when you are running RSHUT on a VMS cluster, this label indicates that all of the nodes in the cluster to which the local node belongs, *except the one from which RSHUT is run*, must be shut down. If the local node is not a member of a VMS cluster, this label is ignored.

  To shut down all of the nodes in a VMS cluster, including the local one, you must specify both **LOCAL** and **CLUSTER** (**LOCAL,CLUSTER**).

Do not include cluster aliases in the list of nodes to shut down.

If you do not supply this parameter on the command line, you will be prompted for a list of nodes; follow the rules explained above to edit the list.

4.2 Qualifiers

All of the available qualifiers are optional ones. They are VMS-like designed and can be shortened to the first 4 characters (at least) after the "/" sign.

/SHUTDOWN

A orderly system shutdown will be executed on all the specified nodes, if this qualifier is supplied on the command line. A *orderly shutdown* is the one that you could perform by typing the following DCL command:

```
$ @SYS$SYSTEM:SHUTDOWN 0 SHUTDOWN YES NO LATER NO NONE
```

That is:

— Shutdown operations will start in 0 minutes

— Reason for shutdown is just "shutdown"

— Disk volumes will be spun down

— Site-specific shutdown procedure will not be invoked

— The system will not be automatically rebooted; it will be rebooted later

— No shutdown options

If none of /REBOOT, /SHUTDOWN and /PANEL qualifiers is provided, /SHUTDOWN is used by default. If you supply more than one of them on the command line, the latest appearance will be used.

/PANEL

When this qualifier is specified on the command line, the usual shutdown questions will be asked before starting shutdown operations:

```
How many minutes until final shutdown [0]:
Reason for shutdown [Standalone]:
Do you want to spin down the disk volumes [NO]?
Do you want to invoke the site-specific shutdown procedure [YES]?
Should an automatic system reboot be performed [NO]?
When will the system be rebooted [later]:
Shutdown options (enter as a comma-separated list):
  REMOVE_NODE          Remaining nodes in the cluster should
                       adjust quorum
  CLUSTER_SHUTDOWN     Entire cluster is shutting down
  REBOOT_CHECK         Check existence of basic system files
  SAVE_FEEDBACK        Save AUTOGEN feedback information from
                       this boot
  DISABLE_AUTOSTART    Disable autostart queues

Shutdown options [NONE]:
```

The information supplied as answer to these questions, will be applied to each node included in the list of nodes.

If none of /REBOOT, /SHUTDOWN and /PANEL qualifiers is provided, /SHUTDOWN is used by default. If you supply more than one of them on the command line, the latest appearance will be used.

/REBOOT

If this qualifier is supplied on the command line, a orderly system reboot
will be executed on all the specified nodes. A *orderly reboot* of the local
node could be performed by typing the following DCL command:

```
$ @SYS$SYSTEM:SHUTDOWN 0 SHUTDOWN YES NO LATER YES NONE
```

That is:

— Shutdown will start in 0 minutes

— Reason for shutdown is just "shutdown"

— Disk volumes will be spun down

— Site-specific shutdown procedure will not be invoked

— The system will be automatically rebooted

— No shutdown options

If none of /REBOOT, /SHUTDOWN and /PANEL qualifiers is provided,
/SHUTDOWN is used by default. If you supply more than one of them on
the command line, the latest appearance will be used.

/[NO]CONFIRM

If you specify the /CONFIRM qualifier on the command line, the
procedure will stop and wait for [RETURN] key to be pressed before starting
the shutdown operations on each node. Default is /NOCONFIRM.

/[NO]VERBOSE

If you supply the /VERBOSE qualifier on the command line, the output
produced by the shutdown procedure will be sent back to the terminal
from which RSHUT procedure has been invoked. This is very useful to
check what happens during the shutdown on the remote node; in this
mode of operating, called **verbose mode**, the connection between client
and server is closed *after* the shutdown is complete.

If you do not supply the /VERBOSE qualifier, the shutdown is performed
in **noverbose mode**; this causes the procedure not to send back its
output; the connection between client and server is closed immediately
after the RSHUT process is run on the remote node, and the shutdown
procedure for the next node in the list (if any) is immediately started.
This lets user's terminal available very soon, but does not allow any check
on shutdown operations on the remote node.

/WAIT=*delta-time*

This qualifier allows to set up a shutdown in a future time, without keeping an open session on the remote node(s) you want to shut down. For instance, you might like to shut down a node during the night, when no one is working on it.

If /WAIT qualifier is not used, the remote shutdown is started immediately; if you supply it, you must provide also the desired *delta time*, that is an offset from the current date and time to a time in the future. The format for *delta time* is *[dddd-][hh:mm:ss.cc]*, as required by DCL. For more information about specifying delta times, read DCL documentation.

/USER=*username*

This qualifier allows to specify a privileged account on the remote node to shut down, to which RSHUT client will connect to execute shutdown operations. SYSTEM account is used by default, if you do not specify a different one on the command line by means of this qualifier; the account must have the usual privileges needed to shut down a system.

/PASSWORD=*password*

This qualifier makes you able to supply a password for the remote account specified by the /USER qualifier (or SYSTEM account if the /USER qualifier is omitted).

WARNING

When you supply the command on keyboard, and provide the password on the command line, you should get sure that no one can read it while you are typing it: it is the password to access a privileged account!

If you do not supply the password on the command line, you will be asked for it; in this case, the password will not be echoed on the terminal, so the risk is strongly reduced.

4.3 Examples

1 ```
$ RSHUT PLUTO,MARS /REBOOT/NOVERBOSE
```

```
                Remote shutdown procedure v.2.0

Invoking shutdown procedure for node(s) PLUTO,MARS
Using remote account SYSTEM
Password for account SYSTEM (not echoed):

Orderly system REBOOT will be performed

Opening link to node PLUTO...
Starting shutdown in 00:00...

Opening link to node MARS...
Starting shutdown in 00:00...
$
```

> In the example above, a list of nodes is specified; the nodes will be
> automatically rebooted and the output will not be sent back to the calling
> process. SYSTEM account is used to run the tasks on the remote nodes.
> After the connection to node PLUTO is opened, and the remote RSHUT
> process is activated, the connection is closed and the shutdown for node
> MARS is immediately started.

2 ```
$ RSHUT CLUSTER /VERBOSE/USER=ALDRIN/CONFIRM
```

```
                Remote shutdown procedure v.2.0

Invoking shutdown procedure for node(s) MARS,VENUS,SATURN,PLUTO
Using remote account STRIZZOLO
Password for account STRIZZOLO (not echoed):

Orderly system REBOOT will be performed

Press RETURN key to start shutdown on node MARS [ RETURN ]

Opening link to node MARS...
Current time:  5-JUL-1993 16:20:23.76
Starting shutdown in 00:00...
Starting shutdown...


        SHUTDOWN -- Perform an Orderly System Shutdown
                    on node MARS

%SHUTDOWN-I-OPERATOR, This terminal is now an operator's console.
%SHUTDOWN-I-DISLOGINS, Interactive logins will now be disabled.
%SET-I-INTSET, login interactive limit = 0, current interactive value = 1
```

```
        .
        .
        .
Press RETURN key to start shutdown on node VENUS ⌐RETURN⌐

Opening link to node VENUS...
Current time:  5-JUL-1993 16:28:28.33
Starting shutdown in 00:00...
Starting shutdown...

        SHUTDOWN -- Perform an Orderly System Shutdown
                    on node VENUS

%SHUTDOWN-I-OPERATOR, This terminal is now an operator's console.
%SHUTDOWN-I-DISLOGINS, Interactive logins will now be disabled.
%SET-I-INTSET, login interactive limit = 0, current interactive value = 1
        .
        .
        .
```

In the example above, all of the nodes in the cluster will be shut down, except the one from which RSHUT is run. Account ALDRIN is used on the remote nodes to establish the client-server connection. An ordinary shutdown is performed on each node, and the output is sent back to the user's terminal, which remains busy until the end of the last shutdown. The user is asked to press ⌐RETURN⌐ key before starting each shutdown operation.

3 $ **RSHUT LOCAL,PLUTO /PANEL/USER=ALDRIN/PASSW=GUESSIT**

```
                    Remote shutdown procedure v.2.0

Invoking shutdown procedure for node(s) PLUTO,EARTH
Using remote account ALDRIN

How many minutes until final shutdown [0]: 2
Reason for shutdown [Standalone]: Just For Fun
Do you want to spin down the disk volumes [NO]?
Do you want to invoke the site-specific shutdown procedure [YES]?
Should an automatic system reboot be performed [NO]?
When will the system be rebooted [later]:
Shutdown options (enter as a comma-separated list):
  REMOVE_NODE         Remaining nodes in the cluster should
                      adjust quorum
  CLUSTER_SHUTDOWN    Entire cluster is shutting down
  REBOOT_CHECK        Check existence of basic system files
  SAVE_FEEDBACK       Save AUTOGEN feedback information from
                      this boot
  DISABLE_AUTOSTART   Disable autostart queues
```

```
Shutdown options [NONE]: REBOOT_CHECK

Opening link to node PLUTO...
Starting shutdown in 00:00...

Opening link to node EARTH...
Starting shutdown in 00:00...

$
```

In the example above, the local node (EARTH) and node PLUTO will be shut down; the local node is automatically put at the end of the list. The panel with the usual shutdown requests is shown, and the user is allowed to supply the desired information. Username and password for the remote account are supplied on the command line. Notice that, even if the /WAIT qualifier is not present on the command line, the shutdown on each node will start after 2 minutes, due to the first answer given by the user in the panel.

4.4 Scheduling a shutdown

One of the main features of RSHUT, is the possibility to schedule one or more shutdown or reboot operations, starting shutdown in a future time fixed in advance, without keeping an open session on the remote node(s).

The current version of RSHUT provides this feature by conveniently using some qualifiers; in general, the best solution is using a combination of /WAIT and /NOVERBOSE qualifiers. This gives you the ability to fix a delta time after which to start the shutdown on the nodes, but, as the output is not sent back to your terminal, the connection between the remote processes and your current section is closed very soon, making the remote shutdown jobs independent from the calling process.

For instance, let us suppose that you would like to start shutdown for nodes NEPTUN and MARS in 12 hours, without keeping an open session on the nodes; you could do it by entering:

```
$ RSHUT/NOVERBOSE/WAIT=12:00 NEPTUN,MARS

              Remote shutdown procedure v.2.0

Invoking shutdown procedure for node(s) NEPTUN,MARS
Using remote account SYSTEM
Password for account SYSTEM (not echoed):

Orderly system REBOOT will be performed

Opening link to node NEPTUN...
Starting shutdown in 12:00...
```

Running RSHUT

```
Opening link to node MARS...
Starting shutdown in 12:00...
$
```

5 Messages

Several informational or error messages could be displayed on your terminal while RSHUT is running. Look up in VMS documentation for an explanation of usual VMS messages; the complete list of RSHUT specific messages follows.

%RSHUT-W-INVOPT, invalid option *option*

Explanation: An unavailable option name has been supplied on the command line. The option is ignored.

%RSHUT-W-MAXPARM, too many parameters - reenter command with fewer parameters

Explanation: On command line, only a parameter can be specified (list of nodes to shut down); this message is shown if you entered more than one parameter.

%RSHUT-E-MISPWD, missing password specification

Explanation: This message is displayed when the password, needed to access remote privileged account, is not specified either on command line and on interactive request.

%RSHUT-I-NOCLUS, local node is not a member of a VAX cluster

Explanation: The special label "CLUSTER" has been included in the list of nodes to shut down, but the local node is not a member of a VAX cluster; the label will be ignored and any other nodes supplied in the list (if any) will be shut down.

%RSHUT-I-NONODE, no nodes to shut down

Explanation: The list of nodes to shut down has not been supplied either on command line and on request.

%RSHUT-E-NOSERV, connection to server failed

> **Explanation:** This message may be caused by several different
> problems, any of which causes the connection between client and
> server to fail; check the following items:
>
> - You supplied a wrong username and/or password for the remote
>   account on the node to shut down.
>
> - The RSHUT object is not defined in the NCP database of the node
>   to shut down.
>
> - The file RSHUT.COM was not found where expected, on the
>   node(s) to shut down, that is in the location defined for it when
>   the RSHUT object was set in NCP database. You should look at
>   the RSHUT object in NCP and see if the location of the file is
>   defined correctly.
>
> - The node to shut down is unreachable.

%RSHUT-W-UNREACH, unrecognized or unreachable node _nodename_

> **Explanation:** Before trying to shut down a node, RSHUT checks, in
> the NCP database, if the node is known and reachable; if not so, the
> procedure skips it and tries to shut down the next node in the list (if
> any).

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