Process Control Commands

To use these commands in System Admin VM, you must be in a user group associated with appropriate command rules and data rules. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

follow

To unobtrusively debug a live process or a live thread in a process, use the **follow process** command in XR EXEC modeSystem Admin EXEC mode.

follow process [{*pid* | **location** *node-id*}]

Syntax Description

pid	Follows the process with the process ID (PID) specified for the *pid* argument.
location *node-id*	Follows the target process on the designated node. The *node-id* argument is expressed in the *rack/slot* notation.

Command Default

Entering the **follow process** command without any keyword displays the stack information of the live processes with all the threads, heap memory usage, and register values.

Command Modes

XR EXEC mode

System Admin EXEC mode

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

Use this command to unintrusively debug a live process or a live thread in a process. This command is particularly useful for debugging deadlock and livelock conditions, for examining the contents of a memory location or a variable in a process to determine the cause of a corruption issue, or in investigating issues where a thread is stuck spinning in a loop. A livelock condition is one that occurs when two or more processes continually change their state in response to changes in the other processes.

The following actions can be specified with this command:

- Follow all live threads of a given process or a given thread of a process and print stack trace in a format similar to core dump output.
- Display register values and status information of the target process.

Take a snapshot of the execution path of a thread asynchronously to investigate performance-related issues by specifying a high number of iterations with a zero delay.

This example shows how to use the **follow process** command:

```
sysadmin-vm:0_RP0# follow process 1 location 0/RP0

Location : 0/RP0

************************************************************

2013-09-20 01:57:30
Text address        Size        Library name
-----------------------------------------
00007f4b8a66c000 48 r-x--   libnss_files-2.12.so
```

```
00007f4b8a879000 1444 r-x--   libc-2.12.so
00007f4b8abec000 48 r-x--   libpci.so
00007f4b8adf9000 32 r-x--   librt-2.12.so
00007f4b8b002000 248 r-x--   libdbus-1.so.3.4.0
00007f4b8b241000 96 r-x--   libpthread-2.12.so
00007f4b8b45e000 128 r-x--   ld-2.12.so
-----------------------------------------
#0  0x00007f4b8a955c83 in select+0x13 from /lib64/libc-2.12.so
#1  0x000000000041f974 in ?? () from /sbin/init
#2  0x0000000000404b9d in ?? () from /sbin/init
#3  0x00007f4b8a897cce in __libc_start_main+0xfe from /lib64/libc-2.12.so
#4  0x0000000000404659 in ?? () from /sbin/init
```

process

To terminate or restart a process, use the **process** command in the System Admin EXEC mode.

process {**crash** | **restart**} *executable-name* {*IID* **location** *node-id* | **location** *node-id*}

Syntax Description

crash	Ends a process. All active services hosted by the process that have high availability enabled are switched off and the process restarts.
restart	Restarts a process.
executable-name	Executable name of the process to be crashed or restarted. Supplying an executable name for the executable-name argument performs the action for all the simultaneously running instances of the process, if applicable.
IID	Process instance ID of the process to be crashed or restarted. Supplying a process ID for the *IID* argument performs the action for only the process instance associated with the process ID.
location *node-id*	Crashes or restarts a process on the designated node. The *node-id* argument is entered in the *rack/slot* notation.

Command Default

None

Command Modes

System Admin EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

Under normal circumstances, processes are started and restarted automatically by the operating system as required. If a process crashes, it is automatically restarted.

Use this command to manually stop or restart individual processes.

Caution Manually stopping or restarting a process can seriously impact the operation of a router. Use these commands only under the direction of a Cisco Technical Support representative.

process restart

The **process restart** command restarts a process, such as a process that is not functioning optimally.

This example shows how to restart a process:

```
sysadmin-vm:0_RP0# process restart syslogd_helper location 0/3

proc-action-status User root (127.0.0.1) requested restart for process syslogd_helper(0)
at 0/3  'Sending signal 15 to process syslogd_helper(IID 0) pid=1801'
```

show media

To display the current state of the disk storage media, use the **show media** command in System Admin EXEC mode.

show media location {*node-id* | **all**}

Syntax Description

location {*node-id* | **all**}	(Optional) Specifies the node where the file system is located. The *node-id* argument is expressed in the *rack/slot* notation. Use the **all** keyword to indicate all nodes.

Command Default

The disk storage media for the active RP is displayed.

Command Modes

System Admin EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

Use the **show media** command to view the status of the storage media on your system.

The following example displays the output of the **show media** command:.

```
sysadmin-vm:0_RP0#show media
Partition                      Size     Used  Percent    Avail
rootfs:                        2.0G     471M      26%     1.4G
log:                           494M      84M      18%     385M
config:                        494M      24M       5%     445M
disk0:                         965M      31M       4%     886M
harddisk:                       20G     185M       1%      19G
-------------------------------------------------------
rootfs: = root file system (read-only)
log: = system log files (read-only)
config: = configuration storage (read-only)
```

Table 1: show media Field Descriptions

Field	Description
Partition	Partition on the disk.
Size	Size of the partition.
Used	Partition size used.
Percent	Percentage used.
Avail	Available free partition space.

show memory

To display the available physical memory and memory usage information of processes on the router, use the **show memory** command in System Admin EXEC and XR EXEC mode.

show memory [{**location** *node-id* | **pid** *pid* [**location** *node-id*] | **summary** [**location** *node-id*]}]

Syntax Description

location *node-id*	Displays the available physical memory from the designated node. The *node-id* argument is entered in the *rack/slot* notation.
pid *pid*	Displays memory usage of the specified process.
summary	Displays a summary of the physical memory and memory usage information.

Command Default

None

Command Modes

System Admin EXEC

XR EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To display detailed memory information for the entire router, enter the **show memory** command without any parameters.

This example shows how to display the output of the **show memory location** command:

```
sysadmin-vm:0_RP0#show memory location 0/RP0
Tue Aug  20 00:49:41.649 UTC
**********************************************************


Location : 0/RP0

**********************************************************

Tue Aug 20 00:49:41 UTC 2013
1:   /sbin/init
Address           Kbytes     RSS    Anon  Locked Mode   Mapping
0000000000400000     204       -       -       - r-x--  init
0000000000632000       4       -       -       - rw---  init

Address - Memory Address
Kbytes - Memory Size
RSS - Resident Set Size (portion of mem in RAM)
Anon - Non-shared Anonymous
Locked - locked memory
Mode - Read/Write/Executable mode
Mapping - process Mapping
```

show memory compare

To display details about heap memory usage for all processes on the router at different moments in time and compare the results, use the **show memory compare** command in System Admin EXEC and XR EXEC mode.

show memory compare {**start** | **end** | **report**}

Syntax Description

start	Takes the initial snapshot of heap memory usage for all processes on the router and sends the report to a temporary file named /tmp/memcmp_start.out.
end	Takes the second snapshot of heap memory usage for all processes on the router and sends the report to a temporary file named /tmp/memcmp_end.out. This snapshot is compared with the initial snapshot when displaying the heap memory usage comparison report.
report	Displays the heap memory comparison report, comparing heap memory usage between the two snapshots of heap memory usage.

Command Default

None

Command Modes

System Admin EXEC

XR EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

Use the **show memory compare** command to display details about the heap memory usage of all processes on the router at different moments in time and compare the results. This command is useful for detecting patterns of memory usage during events such as restarting processes or configuring interfaces.

Use the following steps to create and compare memory snapshots:

1. Enter the **show memory compare** command with the **start** keyword to take the initial snapshot of heap memory usage for all processes on the router.
2. Perform the test you want to analyze.
3. Enter the **show memory compare** command with the **end** keyword to take the snapshot of heap memory usage to be compared with the initial snapshot.
4. Enter the **show memory compare** command with the **report** keyword to display the heap memory usage comparison report.

This example shows sample output from the **show memory compare** command with the **report** keyword:

```
sysadmin-vm:0_RP0# show memory compare start
Tue Aug  20 11:50:45.860 UTC
sysadmin-vm:0_RP0# show memory compare end
Tue Aug  20 11:50:57.311 UTC
```

```
sysadmin-vm:0_RP0# show memory compare report

PID       NAME            MEM BEFORE  MEM AFTER   DIFFERENCE  MALLOCS
-------------------------------------------------------------------------
21416  malloc_dump          34731       34731       0           0
21414  sh                   39652       39640       -12         0
21411  show_memory_common   984         984         0           0
8340   ntpd                 69033       69033       0           0
5172   inst_mgr             1800118     1800118     0           0
5166   fsdbagg              14907247    14907247    0           0
5175   fsdb_server          15475470    15475470    0           0
5177   led_mgr              3347339     3347339     0           0
5176   envmon_ui            889094      889094      0           0
5169   esdma                8954927     8954927     0           0
5164   fit_mgbl             952067      952067      0           0
5174   fab_fgid_service     9014924     9014924     0           0
5173   confd_helper         8018190     8018190     0           0
5171   debug_agent          8146830     8146830     0           0
5170   gaspp_mgbl           1285020     1285020     0           0
5168   ael_mgbl             787101      787101      0           0
5165   fpdserv              1149685     1149685     0           0
5167   ssh_key_server       661086      661086      0           0
2052   sfe_driver           35005323    35005323    0           0
2066   zen                  5083246     5083246     0           0
2017   ccc_driver           8872747     8882315     9568        1
2053   shelf_mgr            30666121    30666121    0           0
2031   esd                  6335087     6334783     -304        -2
2049   sdr_mgr              4366258     4366258     0           0
2025   dumper               616144      616144      0           0
2035   inst_agent           1820469     1820469     0           0
2062   syslogd_relay        657904      657904      0           0
2030   envmon               7853186     7853330     144         2
2041   ntp_helper           701348      701348      0           0
2539   ssh                  202441      202441      0           0
2015   bios_fpd             2950893     2950893     0           0
2042   obfl_mgr             2686006     2686006     0           0
2018   cm                   13755230    13755230    0           0
2047   obfl_show            686286      686286      0           0
2024   ds                   7826821     7826821     0           0
2060   syslogd_helper       912664      912664      0           0
2014   aaad                 804327      804327      0           0
2019   debug_client         577975      577975      0           0
2016   calv_alarm_mgr       2077250     2077250     0           0
2065   wdmon                3557984     3558056     72          1
2064   vm_manager           3149588     3149588     0           0
2037   mlap                 1520260     1520260     0           0
2056   ssh_key_client       612824      612824      0           0
2055   ship_server          778066      778066      0           0
2063   timezone_config      711110      711110      0           0
1744   pm                   7875584     7875584     0           0
```

Table 2: show memory compare report Field Descriptions

Field	Description
PID	Process ID.
name	Process name.
mem before	Heap memory usage at start (in bytes).

Field	Description
mem after	Heap memory usage at end (in bytes).
difference	Difference in heap memory usage (in bytes).
mallocs	Number of unfreed allocations made during the test period.
restarted	Indicates if the process was restarted during the test period.

show memory heap

To display information about the heap space for a process, use the **show memory heap** command in System Admin EXEC and XR EXEC mode.

show memory heap *pid*

Syntax Description

pid	Process ID

Command Default

None

Command Modes

System Admin EXEC

XR EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

This example shows the sample output from the **show memory heap** command:

```
sysadmin-vm:0_RP0#show memory heap 1933
Tue Aug  20 01:06:11.282 UTC

statistics (1933:vm_manager)

Global data:
 current usage:        3147787 bytes
 Wrapper uses:          109560 bytes(hash:32728)
 total high wm:        7342424 bytes
 current objs:            2401 entry
 malloc_db/malloc:       79946 times / 79946 times
 calloc_db/calloc:        1067 times / 1067 times
 realloc_db/realloc:     26342 times / 26342 times
 realloc_null:           25644 times
 realloc_db_miss :           0 times
 realloc_relocate:          39 times
 free_db/free:          104256 times / 104722 times
 free_null:                466 times
 free_db_miss:               0 times
 error:                      0 times
```

show processes

To display information about active processes, use the **show processes** command in System Admin EXEC mode.

show processes {*process-name* {[{**detail** | **run**}] **location** *node-id* | **location** *node-id*} | **aborts location** *node-id* | **all location** *node-id* | **blocked** [{*PID* | **extended** | **location** *node-id*}] | **family** [{*PID* | **location** *node-id*}] | **files** [{*PID* | **details** | **location** *node-id*}] | **location** [{**all***node-id*}] | **mandatory location** *node-id* | **memory** [{*PID* | **location** *node-id*}] | **services** {*service-name* | **active** | **all** | **run** | **standby**} **location** *node-id* | **signal** [{*PID* | **location** *node-id*}] | **startup location** *node-id* | **threadname** [{*PID* | **location** *node-id*}]}

Syntax Description

process-name	Name of the executable.
detail	Displays detailed information of the process.
run	Displays information of running processes.
location *node-id*	Displays information about the active processes from a designated node. The *node-id* argument is entered in the *rack/slot* notation.
aborts	Displays process abort information.
all	Displays summary process information for all processes.
blocked	Displays details about reply, send, and mutex blocked processes.
PID	Displays process ID.
extended	Displays blocked processes in detail.
family	Displays the process session and family information.
files	Displays information about open files and open communication channels.
mandatory	Displays process data for mandatory processes.
memory	Displays information about the text, data, and stack usage for processes.
services *service name*	Displays service data for processes.
active	Displays active services data.
standby	Displays standby services data.
signal	Displays the signal options for blocked, pending, ignored, and queued signals.

startup	Displays process data for processes created at startup.
threadname	Displays thread names.

Command Default

None

Command Modes

System Admin EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

Use the **show processes** command to display process level information across the system.

The **show processes** command with the **memory** keyword displays details of memory usage for a given process as shown in the following example:

```
sysadmin-vm:0_RP0# show process memory

PID         Text       Data      Stack    Dynamic Process
=========================================================
1         204 KB     204 KB     136 KB   14932 KB init
12680      16 KB      48 KB     136 KB    3852 KB sleep
12747      32 KB    8432 KB     136 KB   24776 KB cmdptywrapper
12751      12 KB    8508 KB     136 KB   74040 KB show_processes_
12754     724 KB    8456 KB     136 KB   25832 KB sh
1299      724 KB     208 KB     136 KB   11280 KB oom.sh
1305      724 KB     208 KB     136 KB   11280 KB oom.sh
1443      476 KB     540 KB     136 KB   14984 KB dhclient
1486       28 KB     188 KB     136 KB    6104 KB syslogd
1490       20 KB    3056 KB     136 KB    6864 KB klogd
1545      224 KB     204 KB     136 KB   13172 KB lldpad
1557      308 KB     204 KB     136 KB   12844 KB dbus-daemon
1588      412 KB     444 KB     136 KB   23252 KB sshd
1593      412 KB     444 KB     136 KB   23252 KB sshd
1602      192 KB     372 KB     136 KB   11120 KB xinetd
1618       40 KB     692 KB     524 KB    7008 KB crond
1630      792 KB   49720 KB     136 KB   83164 KB libvirtd
1711      116 KB     636 KB     136 KB    4540 KB udevd
1712      116 KB     636 KB     136 KB    4540 KB udevd
1722      324 KB   16164 KB     136 KB  148164 KB pm
```

Table 3: show processes memory Field Descriptions

Field	Description
PID	Process ID.
Text	Size of text region (process executable).
Data	Size of data region (initialized and uninitialized variables).
Stack	Size of process stack.
Dynamic	Size of dynamically allocated memory.

Field	Description
Process	Process name.

top

To display real-time view of running processes in different locations, use the **top** command in the System Admin EXEC and XR EXEC modes.

top [{**dumbtty** | **location** *node-id* [**dumbtty**]}]

Syntax Description

dumbtty	Displays the output of the command as if on a dumb terminal (the screen is not refreshed).
location *location*	Specifies the target location. The node-id argument is expressed in *rack/slot* notation.

Command Default

None

Command Modes

System Admin EXEC

XR EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

The **top** command provides a real-time list of CPU intensive tasks running in the system. To terminate the display and return to the system prompt, enter the **Ctrl+C** keys. Using the **dumbtty** option does not overwrite the logs but instead updates the real-time list one after the other.

This example displays the different processes running on 0/0:

```
sysadmin-vm:0_RP0#top location 0/0 dumbtty

Tue Aug  20 01:09:28.534 UTC
************************************************************
Location : 0/0
************************************************************
top - 01:09:29 up  3:35,  1 user,  load average: 0.00, 0.00, 0.00
Tasks: 170 total,   2 running, 168 sleeping,   0 stopped,   0 zombie
Cpu(s):  0.5%us,  0.4%sy,  0.0%ni, 98.9%id,  0.1%wa,  0.0%hi,  0.1%si,  0.0%st
Mem:    916860k total,   374500k used,   542360k free,    12080k buffers
Swap:    14444k total,     6200k used,     8244k free,    31736k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
 1764 root      20   0  140m 3844 2256 S  2.0  0.4   0:13.18 syslogd_helper
    1 root      20   0 14932 1080 1000 S  0.0  0.1   0:01.83 init
    2 root      20   0     0    0    0 S  0.0  0.0   0:00.00 kthreadd
    3 root      RT   0     0    0    0 S  0.0  0.0   0:00.00 migration/0
    4 root      20   0     0    0    0 S  0.0  0.0   0:00.27 ksoftirqd/0
    5 root      RT   0     0    0    0 S  0.0  0.0   0:00.00 watchdog/0
    6 root      20   0     0    0    0 S  0.0  0.0   0:00.61 events/0
    7 root      20   0     0    0    0 S  0.0  0.0   0:00.00 cpuset
    8 root      20   0     0    0    0 S  0.0  0.0   0:00.00 khelper
```