Troubleshoot CPU, Memory, and Files Usage of Tasks in StarOS

Contents

Introduction

This document describes how a task's resource usage works in StarOS and provides a list of logs that need to be collected to troubleshoot CPU/Memory/File high usage events. On StarOS, the Resource Management Subsystem (resctrl / resmgr) assigns a set of resource limits for each task in the system. It monitors each task's resource usage in order to ensure it stays within the limit. When a task has exceeded its limits, the Syslog or Simple Network Management Protocol (SNMP) traps are generated to notify the network operations.

Resource Monitoring Mechanism

There are a lot of tasks run on StarOS, for example sessmgr/aaamgr/vpnmgr and so on. Each task is set a limit for CPU/Memory/File usage and the limits are monitored by resource management. The limits can be different by task type (sessmgr and aaamgr have different limits), StarOS version, and hardware type. Also, the limits are defined by the system and are not configurable by users.

The description for each task on StarOS can be found in the StarOS Tasks chapter of the System Administration Guide.

The basic resource usage information can be found in the output of the **show task resources** CLI command.

good/warn/over

```
[local]asr5500-2# show task resources
Sunday January 12 01:03:42 JST 2014
                     task   cputime         memory       files        sessions
 cpu facility        inst used allc  used     alloc used allc  used   allc S status
-----------------------------------------------------------------------------------
 2/0 sitmain           20 0.1%  15% 10.54M 16.00M   13 1000    --     -- -   good
 2/0 sitparent         20 0.0%  20%  7.92M 14.00M   10  500    --     -- -   good
 2/0 hatcpu            20 0.1%  10%  8.16M 15.00M   11  500    --     -- -   good
 2/0 afmgr             20 0.1%  10% 11.40M 20.00M   13  500    --     -- -   good
 2/0 rmmgr             20 0.7%  15% 11.12M 23.00M  212  500    --     -- -   good
 2/0 hwmgr             20 0.1%  15%  8.06M 15.00M   12  500    --     -- -   good
 2/0 dhmgr             20 0.1%  15% 11.16M 26.00M   14 6000    --     -- -   good
 2/0 connproxy         20 0.1%  50%  9.09M 26.00M   11 1000    --     -- -   good
 2/0 dcardmgr          20 0.2%  60% 40.00M 600.0M   12  500    --     -- -   good
 2/0 npumgr            20 0.6% 100% 475.0M  2.27G   21 1000    --     -- -   good
 2/0 npusim            21 0.1%  33% 12.45M 60.00M   12  500    --     -- -   good
 2/0 sft              200 0.1%  50% 11.89M 30.00M   10  500    --     -- -   good
 2/0 vpnmgr             2 0.1% 100% 20.60M 37.00M   20 2000    --     -- -   good
 2/0 zebos              2 0.1%  50% 10.07M 25.00M   14 1000    --     -- -   good
 2/0 vpnmgr             3 0.1% 100% 20.73M 37.00M   20 2000    --     -- -   good
 2/0 zebos              3 0.1%  50% 10.07M 25.00M   15 1000    --     -- -   good
 2/0 vpnmgr             4 0.1% 100% 32.31M 73.74M   20 2000    --     -- -   good
 2/0 zebos              4 0.1%  50% 10.07M 30.00M   15 1000    --     -- -   good
 2/0 vpnmgr             5 0.1% 100% 21.27M 37.00M   30 2000    --     -- -   good
 2/0 zebos              5 0.1%  50% 10.20M 25.00M   15 1000    --     -- -   good
 2/0 aaaproxy           1 0.1% 100% 17.99M 160.0M   11 1000    --     -- -   good
 2/0 gtpumgr            1 0.3%  90% 21.52M  2.00G  160 1000    --     -- -   good
```

Field	Description
cputime used	CPU usage of task
cputime allc	Allocated CPU usage limit for task
memory used	Memory usage of task
memory alloc	Allocated memory usage limit for task
files used	Files usage of task
files allc	Allocated files usage of task
status	Status of task: good / warn / over

It is important to understand that the purpose is to keep watch on resources and does not limit the task functionality. The task must be able to work even after it consumes more CPU/Memory/Files than the limit. Syslog and SNMP traps are generated when the limit is crossed, but it does not always indicate an issue.

Suspected Cause

In many cases, a temporary usage spike is not a problem. But if it is persistent, for example, a task's CPU usage stays at 100% or memory usage continues to grow and never be reduced, such cases need to be investigated.

The typical causes for a temporary spike are:

- CLI command which generates huge output (CLI task)

- Amount of log information held in the system (evlogd task)

The cases that need to be investigated are:

- High CPU usage caused by the internal infinite loop (CPU usage stays at 100%)
- The constant increase of memory usage by a memory leak or fragmentation

The examples of the SNMP traps in sessmgr, npudrv and CLI facilities are shown here:

```
Mon Aug 26 11:32:19 2013 Internal trap notification 1221 (MemoryOver) facility sessmgr instance
16 card 1 cpu 0 allocated 204800 used 220392
Mon Aug 26 11:32:29 2013 Internal trap notification 1222 (MemoryOverClear) facility sessmgr
instance 16 card 1 cpu 0 allocated 1249280 used 219608

Fri Dec 20 13:52:20 2013 Internal trap notification 1217 (MemoryWarn) facility npudrv instance
401 card 5 cpu 0 allocated 112640 used 119588
Fri Dec 20 14:07:26 2013 Internal trap notification 1218 (MemoryWarnClear) facility cli instance
5011763 card 5 cpu 0 allocated 56320 used 46856

Wed Dec 25 12:24:16 2013 Internal trap notification 1220 (CPUOverClear) facility cli instance
5010294 card 5 cpu 0 allocated 600 used 272
Wed Dec 25 12:24:16 2013 Internal trap notification 1216 (CPUWarnClear) facility cli instance
5010294 card 5 cpu 0 allocated 600 used 272

Wed Dec 25 17:04:56 2013 Internal trap notification 1215 (CPUWarn) facility cli instance 5010317
card 5 cpu 0 allocated 600 used 595
Wed Dec 25 17:05:36 2013 Internal trap notification 1216 (CPUWarnClear) facility cli instance
5010317 card 5 cpu 0 allocated 600 used 220
```

CPU Usage

When the CPU task usage is close or over the limit, the CPUWarn and CPUOver SNMP traps are generated along with the Syslog warning.

SNMP Traps

```
Internal trap notification 1215 (CPUWarn) facility sct instance 0 card 8 cpu 0 allocated 500
used 451
Internal trap notification 1219 (CPUOver) facility cli instance 5010046 card 5 cpu 0 allocated
600 used 609
```

In the CPUOver example, the instance number 5010046 consumes 60.9% CPU usage while the limit is 60%.

Syslog

```
[resmgr 14502 warning] [2/0/2352 <rmmgr:20> _resource_cpu.c:2876] [software internal system] The
task ipsecmgr-202 is over it's cputime limit. Allocated 50.0%, Using 51.8%
```

> **Note:** This Syslog is a warning level and is not generated with the default logging setting. If this needs to be generated, the logging setting for resmgr must be configured as a warning.

Memory Usage

When memory task usage is close or over the limit, the MemoryWarn and MemoryOver SNMP

traps are generated along with the Syslog warning.

SNMP Traps

```
Internal trap notification 1217 (MemoryWarn) facility cli instance 5005588 card 5 cpu 0
allocated 66560 used 70212
Internal trap notification 1221 (MemoryOver) facility cli instance 5010046 card 5 cpu 0
allocated 66560 used 89940
```

In the MemoryOver example, the instance number 5010046 consumes 89940 memory while the limit is 66560.

Syslog

```
[resmgr 14500 warning] [8/0/4054 <rmmgr:80> _resource_cpu.c:3622] [software internal system
syslog] The task bulkstat-0 is over its memory limit. Allocated 46080K, Using 48120K
```

> **Note**: This Syslog is a warning level and is not generated with the default logging setting. If this needs to be generated, the logging setting for resmgr must be configured as a warning.

Files Usage

The **files** indicates the number of open files, or the file descriptor task uses. There is no SNMP trap for the file's usage, but a Syslog is generated when the limit is crossed.

```
2013-May-28+14:16:18.746 [resmgr 14517 warning] [8/0/4440 <rmmgr:80> _resource_cpu.c:3558]
[software internal system syslog] The task cli-8031369 is over its open files limit. Allocated
2000, Using 2499
```

Information Needed to Troubleshoot Issues

This section describes what information needs to be collected before you open a new Technical Assistance Center (TAC) Service Request when further investigation is needed. The log that needs to be collected is different based on the type of usage.

> **Note**: In addition to the list of commands, the output of the command **show support detail** is always required.

CPU Usage

Enter these commands in the StarOS CLI and capture the output:

- **show task resources**
- **show task resource max**
- **show snmp trap history**
- **show logs**
- **show profile facility <*task name*> instance <*instance number*> depth 4**

> **Note**: The **show profile** command is a hidden-mode CLI command.

Memory Usage

Enter these commands in the StarOS CLI and capture the output:

- **show task resources**
- **show task resource max**
- **show snmp trap history**
- **show logs**

Collect heap and system heap commands multiple times at regular intervals, for example, every 15 minutes and four outputs.

- **show messenger proclet facility *<task name>* instance *<instance number>* heap**
- **show messenger proclet facility *<task name>* instance *<instance number>* system heap**

> **Note**: The **show messenger proclet** command a hidden-mode CLI command.

Files Usage

Enter these commands in the StarOS CLI and capture the output:

- **show task resources**
- **show task resource max**
- **show snmp trap history**
- **show logs**