1968075 - WebI errors caused by BI Platform processes using an unusually high amount of virtual memory on some Linux plaforms

Version 2 **Validity:** 21.01.2014 - active **Language** English

Symptom

- Web Intelligence users may receive errors stating that the processing servers are busy and/or out of memory
  - "The server is busy. Please save any pending change and try again later. If the problem persists, contact your BusinessObjects administrator. (Error: ERR_WIS_30284)"
- CMS, WIReportServer, java processes may report large amounts of virtual (VIRT) memory being used in 'top'
- Web Intelligence Processing Servers may go into a Stopped or Failed state due to exceeded Maximum Memory limits

Environment

- Much more noticeable on systems with 4+ CPUs/cores
- Red Hat Enterprise Linux (May occur on other UNIX platforms as well)
- glibc version 2.10 or higher
- SAP BusinessObjects Platform BI 4.x

Reproducing the Issue

Scenario 1 - On Startup

1. Restart the BI Processes
2. Run 'top -u <BOE User>' to list the processes that are running as the <BOE User>
3. Notice the VIRT column is showing an unusually high amount of virtual memory usage by some processes (boe_cmsd, WIReportServer, java)

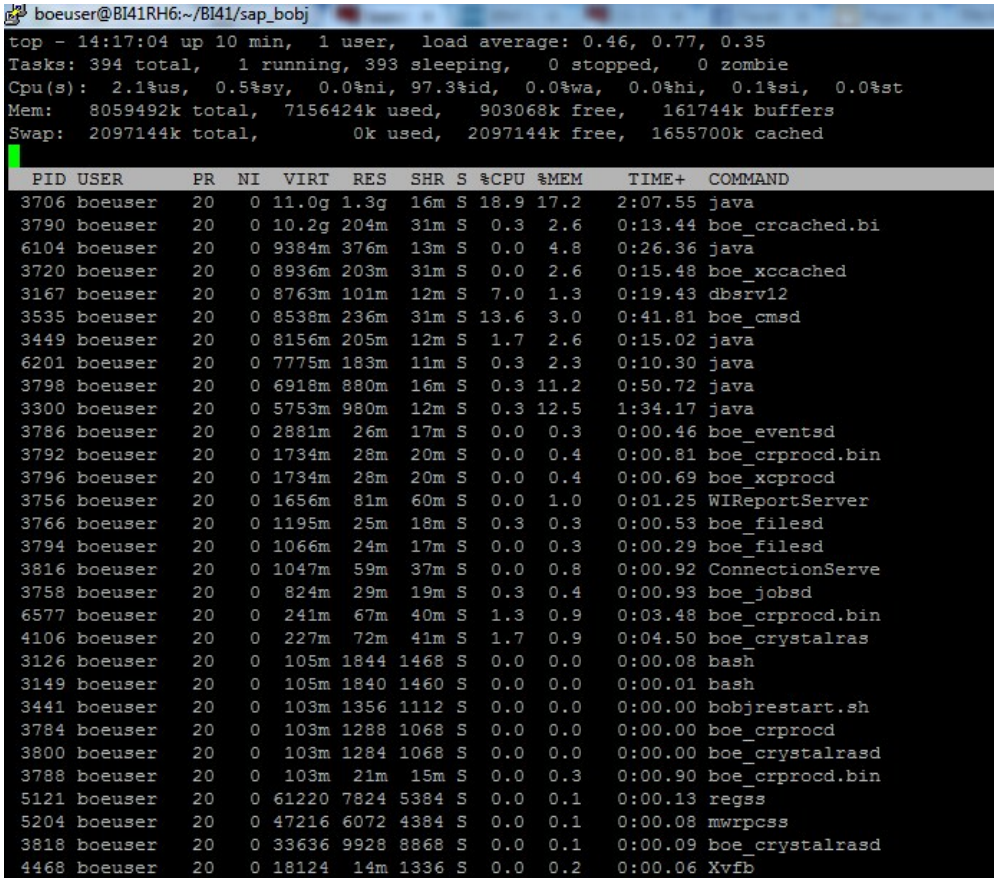
Scenario 2 - On Report Refresh

1. Restart the BI Processes to ensure that we have a baseline for our virtual memory usage
2. Run 'top -u <BOE User>' to list the processes details for the <BOE User> running the BI processes
3. Make note of the values in the VIRT column for the WIReportServer and java processes
4. Open a browser session and login to the BI Launchpad. View/Refresh a Web Intelligence report
5. Make note of the values in the 'top' application for the Virtual (VIRT) and note that they may increase substantially on refresh.

Internal testing on a 16 CPU machine showed about a 300% reduction in virtual memory by adding this environment variable

MALLOC_ARENA_MAX=1

Below is the screenshot of the Processes BEFORE setting this environment variable:



```
boeuser@BI41RH6:~/BI41/sap_bobj
top - 14:17:04 up 10 min,  1 user,  load average: 0.46, 0.77, 0.35
Tasks: 394 total,   1 running, 393 sleeping,   0 stopped,   0 zombie
Cpu(s):  2.1%us,  0.5%sy,  0.0%ni, 97.3%id,  0.0%wa,  0.0%hi,  0.1%si,  0.0%st
Mem:   8059492k total,  7156424k used,   903068k free,   161744k buffers
Swap:  2097144k total,        0k used,  2097144k free,  1655700k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
 3706 boeuser   20   0 11.0g 1.3g  16m S 18.9 17.2   2:07.55 java
 3790 boeuser   20   0 10.2g 204m  31m S  0.3  2.6   0:13.44 boe_crcached.bi
 6104 boeuser   20   0 9384m 376m  13m S  0.0  4.8   0:26.36 java
 3720 boeuser   20   0 8936m 203m  31m S  0.0  2.6   0:15.48 boe_xccached
 3167 boeuser   20   0 8763m 101m  12m S  7.0  1.3   0:19.43 dbsrv12
 3535 boeuser   20   0 8538m 236m  31m S 13.6  3.0   0:41.81 boe_cmsd
 3449 boeuser   20   0 8156m 205m  12m S  1.7  2.6   0:15.02 java
 6201 boeuser   20   0 7775m 183m  11m S  0.3  2.3   0:10.30 java
 3798 boeuser   20   0 6918m 880m  16m S  0.3 11.2   0:50.72 java
 3300 boeuser   20   0 5753m 980m  12m S  0.3 12.5   1:34.17 java
 3786 boeuser   20   0 2881m  26m  17m S  0.0  0.3   0:00.46 boe_eventsd
 3792 boeuser   20   0 1734m  28m  20m S  0.0  0.4   0:00.81 boe_crprocd.bin
 3796 boeuser   20   0 1734m  28m  20m S  0.0  0.4   0:00.69 boe_xcprocd
 3756 boeuser   20   0 1656m  81m  60m S  0.0  1.0   0:01.25 WIReportServer
 3766 boeuser   20   0 1195m  25m  18m S  0.3  0.3   0:00.53 boe_filesd
 3794 boeuser   20   0 1066m  24m  17m S  0.0  0.3   0:00.29 boe_filesd
 3816 boeuser   20   0 1047m  59m  37m S  0.0  0.8   0:00.92 ConnectionServe
 3758 boeuser   20   0  824m  29m  19m S  0.3  0.4   0:00.93 boe_jobsd
 6577 boeuser   20   0  241m  67m  40m S  1.3  0.9   0:03.48 boe_crprocd.bin
 4106 boeuser   20   0  227m  72m  41m S  1.7  0.9   0:04.50 boe_crystalras
 3126 boeuser   20   0  105m 1844 1468 S  0.0  0.0   0:00.08 bash
 3149 boeuser   20   0  105m 1840 1460 S  0.0  0.0   0:00.01 bash
 3441 boeuser   20   0  103m 1356 1112 S  0.0  0.0   0:00.00 bobjrestart.sh
 3784 boeuser   20   0  103m 1288 1068 S  0.0  0.0   0:00.00 boe_crprocd
 3800 boeuser   20   0  103m 1284 1068 S  0.0  0.0   0:00.00 boe_crystalrasd
 3788 boeuser   20   0  103m  21m  15m S  0.0  0.3   0:00.90 boe_crprocd.bin
 5121 boeuser   20   0 61220 7824 5384 S  0.0  0.1   0:00.13 regss
 5204 boeuser   20   0 47216 6072 4384 S  0.0  0.1   0:00.08 mwrpcss
 3818 boeuser   20   0 33636 9928 8868 S  0.0  0.1   0:00.09 boe_crystalrasd
 4468 boeuser   20   0 18124  14m 1336 S  0.0  0.2   0:00.06 Xvfb
```

```
 4473 boeuser   20   0 18124  14m 1332 S  0.0  0.2   0:00.04 Xvfb
 4479 boeuser   20   0 17740  14m 1220 S  0.0  0.2   0:00.03 Xvfb
 4484 boeuser   20   0 17740  14m 1220 S  0.0  0.2   0:00.03 Xvfb
 4489 boeuser   20   0 17740  14m 1220 S  0.0  0.2   0:00.03 Xvfb
 3563 boeuser   20   0 15264 1496  952 R  0.0  0.0   0:00.62 top
 5120 boeuser   20   0  3220  856  740 S  0.0  0.0   0:00.00 inner-watchdog
 4424 boeuser   20   0  2020  424  348 S  0.0  0.0   0:00.00 XvfbDaemon
```

And below is a screenshot of the processes AFTER setting the MALLOC_ARENA_MAX=1

```
boeuser@BI41RH6:~/BI41/sap_bobj
top - 14:21:04 up 14 min,  1 user,  load average: 0.92, 0.74, 0.41
Tasks: 393 total,   1 running, 392 sleeping,   0 stopped,   0 zombie
Cpu(s):  0.4%us,  0.3%sy,  0.0%ni, 99.3%id,  0.0%wa,  0.0%hi,  0.0%si,  0.0%st
Mem:   8059492k total,  6344112k used,  1715380k free,   162948k buffers
Swap:  2097144k total,        0k used,  2097144k free,  1669296k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
13846 boeuser   20   0 7460m  95m  12m S  5.6  1.2   0:13.25 dbsrv12
14499 boeuser   20   0 3270m 1.0g  15m S  1.0 13.3   1:16.24 java
14446 boeuser   20   0 3216m 517m  16m S  0.0  6.6   0:23.06 java
13979 boeuser   20   0 3196m 888m  12m S  0.7 11.3   1:24.19 java
14406 boeuser   20   0 3169m 227m  31m S  0.0  2.9   0:12.68 boe_crcached.bi
18131 boeuser   20   0 3034m 368m  13m S  0.0  4.7   0:26.85 java
14477 boeuser   20   0 1843m 206m  31m S  0.3  2.6   0:10.38 boe_xccached
17589 boeuser   20   0 1704m 175m  11m S  0.0  2.2   0:09.70 java
14129 boeuser   20   0  832m 196m  12m S  0.0  2.5   0:11.49 java
14213 boeuser   20   0  604m 208m  31m S  4.3  2.6   0:38.31 boe_cmsd
14448 boeuser   20   0  578m  81m  59m S  0.0  1.0   0:00.98 WIReportServer
14472 boeuser   20   0  480m  54m  37m S  0.0  0.7   0:00.47 ConnectionServe
14437 boeuser   20   0  264m  28m  20m S  0.3  0.4   0:00.69 boe_crprocd.bin
14444 boeuser   20   0  264m  28m  20m S  0.0  0.4   0:00.49 boe_xcprocd
14487 boeuser   20   0  261m  25m  17m S  0.0  0.3   0:00.31 boe_eventsd
14483 boeuser   20   0  251m  28m  19m S  0.0  0.4   0:00.53 boe_jobsd
14485 boeuser   20   0  237m  24m  18m S  0.0  0.3   0:00.27 boe_filesd
14439 boeuser   20   0  236m  23m  17m S  0.0  0.3   0:00.18 boe_filesd
17488 boeuser   20   0  224m  67m  40m S  1.7  0.9   0:01.60 boe_crprocd.bin
14502 boeuser   20   0  208m  75m  41m S  1.3  1.0   0:02.18 boe_crystalras
 3126 boeuser   20   0  105m 1844 1468 S  0.0  0.0   0:00.08 bash
 3149 boeuser   20   0  105m 1856 1464 S  0.0  0.0   0:00.03 bash
14121 boeuser   20   0  103m 1356 1112 S  0.0  0.0   0:00.00 bobjrestart.sh
14474 boeuser   20   0  103m 1288 1068 S  0.0  0.0   0:00.00 boe_crystalrasd
14490 boeuser   20   0  103m 1288 1068 S  0.0  0.0   0:00.00 boe_crprocd
14501 boeuser   20   0 84416  21m  15m S  0.0  0.3   0:00.63 boe_crprocd.bin
15342 boeuser   20   0 63268 7884 5384 S  0.0  0.1   0:00.08 regss
15348 boeuser   20   0 47220 6076 4384 S  0.0  0.1   0:00.03 mwrpcss
14481 boeuser   20   0 33636 9924 8868 S  0.0  0.1   0:00.05 boe_crystalrasd
14536 boeuser   20   0 18124  14m 1336 S  0.0  0.2   0:00.03 Xvfb
14541 boeuser   20   0 18124  14m 1332 S  0.0  0.2   0:00.02 Xvfb
14547 boeuser   20   0 17740  14m 1220 S  0.0  0.2   0:00.01 Xvfb
14560 boeuser   20   0 17740  14m 1220 S  0.0  0.2   0:00.00 Xvfb
14566 boeuser   20   0 17740  14m 1220 S  0.0  0.2   0:00.01 Xvfb
14241 boeuser   20   0 15276 1488  952 R  0.7  0.0   0:00.22 top
15341 boeuser   20   0  3220  856  740 S  0.0  0.0   0:00.00 inner-watchdog
14526 boeuser   20   0  2020  428  352 S  0.0  0.0   0:00.00 XvfbDaemon
```

As you can see, the memory usage in the VIRT column is much less after this variable is configured

Cause

This behavior is caused by a not so well known change in the glibc libraries that get distributed or updated on many Linux operating systems. The new default behavior causes excessive memory allocation to occur with multithreaded applications. This issue is documented as a bug in the below link but the developer is stating that this is not a bug and is by design with options to modify the behavior if need be.

Bug 11261 - malloc uses excessive memory for multi-threaded applications

The glibc libraries that are version 2.10 and higher contain these changes and could be causing this excessive virtual memory allocation to occur for any and all applications on your Linux servers.

Resolution

This issue can be resolved by taking the below recommendations into consideration:

1. Utilize the **MALLOC_ARENA_MAX** environment variable to tune memory usage for the user account that runs the BI application. (Recommended)

This variable sets the maximum number of arenas that are allocated. Previous versions of the glibc library utilized a value equivalent to "1" so by setting this environment variable to 1, you would be reverting back to the older behavior which allocates much less virtual memory per process. You can test with higher values as well to see if you can find a balance between performance and virtual memory allocation. Setting this number higher will increase the virtual memory allocated for each process but may increase performance as well. Setting it lower will reduce the amount of virtual memory allocated and may decrease performance in comparison to higher values.

There are multiple ways to set this environment variable. The easiest way would be to modify the profile file for the user that you installed SAP

BusinessObjects Platform Business Intelligence 4.x as. Below are the lines that we added in our testing:

MALLOC_ARENA_MAX=1
export MALLOC_ARENA_MAX

Some articles also suggest setting the MALLOC_ARENA_TEST variable to 0 to revert back to the old memory allocation functionality. We also tested this option and memory remained the same with it added or not.

MALLOW_ARENA_TEST=0
export MALLOC_ARENA_TEST

Once these variables are set, you will need to log off and log back in to your Linux terminal. You will also need to complete stop all BI 4.x processes and restart them with these new variables set.

2. Disable memory analysis functionality on the Web Intelligence Processing Server(s)

Each Web Intelligence Processing Server (WIPS) will monitor it's Virtual Memory usage by default. This is enabled/disabled in the Central Management Console (CMC) in the Servers section. If you modify the properties of a WIPS server, you will see an option called "Enable Memory Analysis" which is enabled, checked on, by default. By unchecking this, you will disable the memory monitoring thread for the WIPS and it will remove warnings and errors related to excessive memory usage by the WIReportServer processes.

NOTE: This only disables the memory analysis for the WIReportServer processes and does not change the amount of virtual memory that this process will use.

Option 1 above is the recommended solution as it will reduce the virtual memory usage for all of the processes. Option 2 can be used when a significant performance gain is found between keeping the default functionality and reducing the arenas using Option 1.

The "See Also" section of this article links to some other external sources for more details on this issue.

See Also

Linux glibc >= 2.10 (RHEL 6) malloc may show excessive virtual memory

Red Hat Enterprise Linux 6 Release Notes (13.4 GNU C library section)

Bug 11261 - malloc uses excessive memory for multi-threaded applications

Keywords

glib glibc libc gnu virtual memory vm virt excessive lots oom size tune tweak performance load startup extra exceed normal abnormal webi web intelligence

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Header Data

Released On	21.01.2014 22:09:02
Release Status	Released to Customer
Component	BI-BIP-ADM BI Servers, security & CrystalReports viewing in BI platform
Other Components	BI-BIP-DEP SBOP Web Application Deployment, Wdeploy
	BI-RA-WBI Web Intelligence
Priority	Normal
Category	Problem
Operating System	LINUX 2.6.X

Product

This document is not restricted to a product or product version