Hewlett Packard Enterprise

Cloud Service Automation

Software version: 4.80

Application Server Monitoring Guide

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Contents

Overview

This guide provides Jconsole, JavaMelody, and Jboss configuration information for monitoring the CSA 4.6 server with Jboss 8.2.0.Final for application-server administrators.

Tool	Monitored Processes	Prerequisites
Jconsole (Jconsole provides the monitoring and management user interface for Jboss, and can be installed locally or remotely.) 1.	Heap and memory pools, threads, HTTP sessions (CSA and IdM), datasources	Install JDK 1.8 or OpenJRE 1.8.0_60 on the machine that runs the Jconsole (locally or remotely). Set the `JAVA_HOME` environment variable, for example: `JAVA_HOME=C:\Program Files\Java\jdk1.8.0_66`
JavaMelody 1.57.0	Heap pools, CPU, threads, HTTP sessions (only CSA),HTTP requests, SQL queries	Enable in the CSA file web.xml. See Configurations.
Jboss	Heap and memory pools, memory threads, HTTP sessions (CSA and IdM), datasources	Install `curl` utility to send HTTP POST requests in text form. Responses to the POST can be stored in a file. **Note:** No JDK installation is required. See Use the curl tool to manage Jboss data.

Note: `JBOSS_HOME\bin\client\README-CLI-JCONSOLE.txt` provides instructions how to run both the Jconsole and the Jboss command-line management tools. `JBOSS_HOME` is the Jboss installation directory, for example: `C:\Program Files\HPE\CSA_HOME\jboss-as`.

Configurations

This section describes the file configurations and command-line options to set up the monitoring tools.

Note: Restart Jboss after you complete the configurations in this section.

Add management user

To add the management user, run `JBOSS_HOME\bin\add-user.bat` or `JBOSS_HOME\bin\add-user.sh` from the command line.

When prompted, enter the information in the following table. Press **Enter** to accept the default for all the other prompts.

Prompt	Information to enter
Type of user	`a) Management User`
Username and password	Chose any username and password. Note the password requirements that are displayed on the screen. You will need to use this same information to access the Management Console, and to establish a remote connection between Jconsole and the CSA installation machine (see the *CSA installation machine* row in the Configure files table).
User groups	Press **Enter** to accept the defaults.
AS process connection	`No`

The following shows a typical script output:

```
C:\Program Files\HPE\CSA\jboss-as\bin>add-user.bat

What type of user do you wish to add?
 a) Management User (mgmt-users.properties)
 b) Application User (application-users.properties)
(a):

Enter the details of the new user to add.
Using realm 'ManagementRealm' as discovered from the existing property files.
Username : john
Password recommendations are listed below. To modify these restrictions edit the add-user.properties configuration fi
 - The password should not be one of the following restricted values {root, admin, administrator}
 - The password should contain at least 8 characters, 1 alphabetic character(s), 1 digit(s), 1 non-alphanumeric symbo
 - The password should be different from the username
Password :
JBAS015269: Password must have at least 8 characters!
Are you sure you want to use the password entered yes/no? yes
Re-enter Password :
What groups do you want this user to belong to? (Please enter a comma separated list, or leave blank for none)[  ]:
About to add user 'john' for realm 'ManagementRealm'
Is this correct yes/no? yes
Added user 'john' to file 'C:\Program Files\HPE\CSA\jboss-as\standalone\configuration\mgmt-users.properties'
Added user 'john' to file 'C:\Program Files\HPE\CSA\jboss-as\domain\configuration\mgmt-users.properties'
Added user 'john' with groups  to file 'C:\Program Files\HPE\CSA\jboss-as\standalone\configuration\mgmt-groups.proper
Added user 'john' with groups  to file 'C:\Program Files\HPE\CSA\jboss-as\domain\configuration\mgmt-groups.properties
Is this new user going to be used for one AS process to connect to another AS process?
e.g. for a slave host controller connecting to the master or for a Remoting connection for server to server EJB calls
yes/no? no
Press any key to continue . . .
```

Configure associated files

Make the following configurations:

In this file	Do this

`JBOSS_HOME \standalone\configuration\ standalone.xml`	Set the Jboss management IP address to the `jboss.bind.address.management` JVM option or, if the JVM option is not provided, to the default value (`127.0.0.1`):
	`<interface name=”management”>`
	`  <inet-address value=”${`**`jboss.bind.address.management: 127.0.0.1`**`}”/>`
	`</interface>`

`JBOSS_HOME \bin\standalone.conf (.bat)`	For remote access, set the `jboss.bind.address.management` JVM option to the `CSA_PUBLIC_IP` address. Replace this: `JAVA_OPTS="$JAVA_OPTS -Djboss.bind.address.management=`**`127.0.0.1"`** With this: `set JAVA_OPTS=%JAVA_OPTS% -Djboss.bind.address.management=`**`CSA_PUBLIC_IP`**

`JBOSS_HOME \standalone\deployments\csa.war\ WEB-INF\web.xml`	Set the value of the `param-value` variable to `false`:
	Replace this:
	`<!-- BEGIN - JavaMelody monitoring configuration -->`
	`  …`
	`  <init-param>`
	`  <param-name>disabled</param-name>`
	`  <param-value>`**`true`**`</param-value>`
	`  </init-param>`
	With this:
	`<!-- BEGIN - JavaMelody monitoring configuration -->`
	`  …`
	`  <init-param>`
	`  <param-name>disabled</param-name>`
	`  <param-value>`**`false`**`</param-value>`
	`  </init-param>`

In this file	Do this

`JBOSS_HOME\standalone\deployments\csa.war\WEB-INF\web.xml`	**Optional:** Disable CSA-database monitoring to minimize possible JavaMelody overhead:
	Delete the `init-param` parameter:
	`<init-param>`
	`  <param-name>datasources</param-name>`
	`  <param-value>java:jboss/datasources/csaDS</param-value>`
	`</init-param>`

`JBOSS_HOME\standalone\deployments\csa.war\WEB-INF\ applicationContext-security.xml`	**Optional:** Enable JavaMelody report viewing from any machine, not just the CSA installation machine (default view is from: `127.0.0.1`)
	Find the `intercept-url pattern` line:
	`<intercept-url pattern="/monitoring/**" ..`
	Change the value to `isAuthenticated()`:
	`<intercept-url pattern="/monitoring/**" access="isAuthenticated()"/>`

CSA installation machine	**Optional:** Establish remote connection between Jconsole and CSA installation machine: 1. Copy `JBOSS_HOME\bin\jconsole.bat` to `MONITORING_HOME\bin` directory. 2. Copy `JBOSS_HOME\bin\client\jboss-cli-client.jar` to `MONITORING_HOME\bin\client` directory. 3. Run `MONITORING_HOME\bin\jconsole.bat`. 4. Remote connect to `service:jmx:http-remoting-jmx://<CSA_IP or CSA_HOSTNAME>:9990` using the same username and password you used when you added the user (see Add management user). **Note:** `MONITORING_HOME` is any directory on the monitoring tool installation machine.

Configure garbage-collection log

Garbage collection logs (GC logs) in Java-based applications provide detailed information about memory pools. For example, intervals between two major GCs of under 10 minutes can result in performance degradation. If the GC log option is enabled, a file (such as `gcoutput_20160112-120349.log`) is created in the `JBOSS_HOME\bin` directory each time Jboss starts.

Note: Use the `date.exe` utility, which is a Windows Unix utility, to add a date and timestamp to the GC log name so existing log data is not overwritten when Jboss restarts. Log file names *must* be unique.

Windows:

Add the following to the `JBOSS_HOME\bin\standalone.conf.bat` file:

```
set UNIX_UTIL=C:\UnxUtils

for /f "usebackq" %%a in (`%UNIX_UTIL%\date.exe +%%Y%%m%%d-%%H%%M%%S`) do set GC_LOG=gcoutput_%%a.log

set JAVA_OPTS=%JAVA_OPTS% -verbose:gc -Xloggc:%GC_LOG% -XX:+PrintGCDetails -XX:+PrintGCTimeStamps -XX:+PrintHeapAtGC
```

Linux:

Add the following to the `JBOSS_HOME\bin\standalone.conf` file:

```
TIMESTAMP=`date '+%Y%m%d_%H%M%S'`
```

```
WORK_DIR=`dirname $0`

GC_LOG=$WORK_DIR/gcoutput_$TIMESTAMP.log

JAVA_OPTS="$JAVA_OPTS -verbose:gc -Xloggc:$GC_LOG -XX:+PrintGCDetails -XX:+PrintGCTimeStamps -
XX:+PrintHeapAtGC"
```

Use the curl tool to manage Jboss data

If you do not have access to a JRE, or you must use a command line, or you do not have the option of installing a JDK and you use the Jconsole UI instead, you can gather memory, thread information, and other Jboss data by sending HTTP POST requests with the `curl` tool. HTTP POST calls return JSON textual format. Download curl (1.56MB) for win 64 at: http://curl.haxx.se/latest.cgi?curl=win64-ssl-sspi.

Note: For information about the Jboss management API, see:
https://docs.jboss.org/author/display/AS71/The+HTTP+management+API?_sscc=t

Run the curl tool

To run the `curl` tool, enter the following at the command line:

```
curl --digest -u %MGMT_USER%:%MGMT_PASSWORD% -H "Content-Type: application/json" -X POST
http://%CSA_HOST%:9990/manSampleagement -d %DATA% -o %OUTPUT_FILE
```

Where:

- `%MGMT_USER%:%MGMT_PASSWORD%` correspond to the username and password you entered in Add management user.
- `%DATA%` is the requested data (in JSON).

See Call samples.

Sample curl data

To access a script that periodically retrieves data, contact the PCoE team.

Use the following command samples and call data to create calls for `curl` data.

Note: You must use escape characters to 'escape' the quotation marks around field names on Windows. For example: `\"recursive\"`. See the sample commands below.

Windows command

```
curl --digest -u <mgmt._user>:<mgmt._password>  -H "Content-Type: application/json" -X POST
http://mpaph0231.hpeswlab.net:9990/management -d {\"operation\":\"read-resource\",\"include-
runtime\":\"true\",\"recursive\":\"true\",\"address\":[\"core-service\",\"platform-mbean\",\"type\",\"memory\"]}
```

`<mgmt._user>:<mgmt._password>` are the username and password you created in Add management user.

Linux command

```
curl --digest -u <mgmt._user>:<mgmt._password> -H "Content-Type: application/json" -X POST
http://CSA_HOST:9990/management -d '{"operation":"read-resource","include-
runtime":"true","recursive":"true","address":["core-service","platform-mbean","type","memory"]}'
```

Windows and Linux output

```
{"outcome" : "success", "result" : {"heap-memory-usage" : {"init" : 4253024256, "used" : 2470366512, "committed"
: 4236247040, "max" : 4236247040}, "non-heap-memory-usage" : {"init" : 2555904, "used" : 250615000, "committed"
: 273686528, "max" : -1}, "object-name" : "java.lang:type=Memory", "object-pending-finalization-count" : 0,
"verbose" : false}}
```

Call data

Below is sample data (%DATA%, as described in Run the curl tool) for different HTTP POST requests.

Memory: `{"operation":"read-resource","include-runtime":"true","recursive":"true","address":["core-service","platform-mbean","type","memory"]}`

Memory pools: `{"operation":"read-resource","include-runtime":"true","recursive":"true","address":["core-service","platform-mbean","type","memory-pool"]}`

Data source (MSSQL)**:** `{"operation":"read-resource","include-untime":"true","recursive":"true","address":["subsystem","datasources","data-source","mssqlDS","statistics","pool"]}`

Threads: `{"operation":"read-resource","include-runtime":"true","recursive":"true","address":["core-service","platform-mbean","type","threading"]}`

Sessions (CSA)**:** `{"operation":"read-resource","include-runtime":"true","recursive":"true","address":["deployment","csa.war","subsystem","undertow"]}`

Classes: `{"operation":"read-resource","include-runtime":"true","recursive":"true","address":["core-service","platform-mbean","type","class-loading"]}`

Other resources

To access an HTML user interface for Jboss management, see: http://CSA_HOST:9990/console.

To access the native user interface:

1. Access `JBOSS_HOME\bin\client\README-CLI-JCONSOLE.txt`. This script provides instructions on how to run the Jconsole and the Jboss CLI management tool.
2. Once the CLI GUI is launched:
   a. Enter the user name and password you entered when you ran the `add-user.(bat|sh)` script (see Add management user).
   b. Enter the following command:

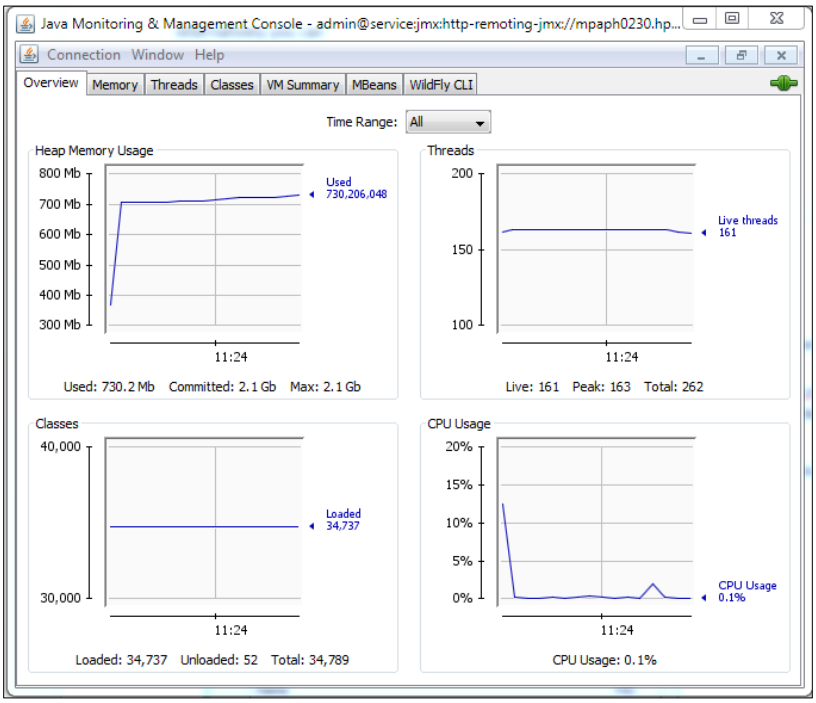
```
java -jar <PATH TO jboss-cli-client.jar> --gui --controller=CSA_HOST:9990 --user=%MGMT_USER% --password=%MGMT_PASSWORD%
```

Monitoring Screens

This section provides examples of how your data might be displayed in the user interface.

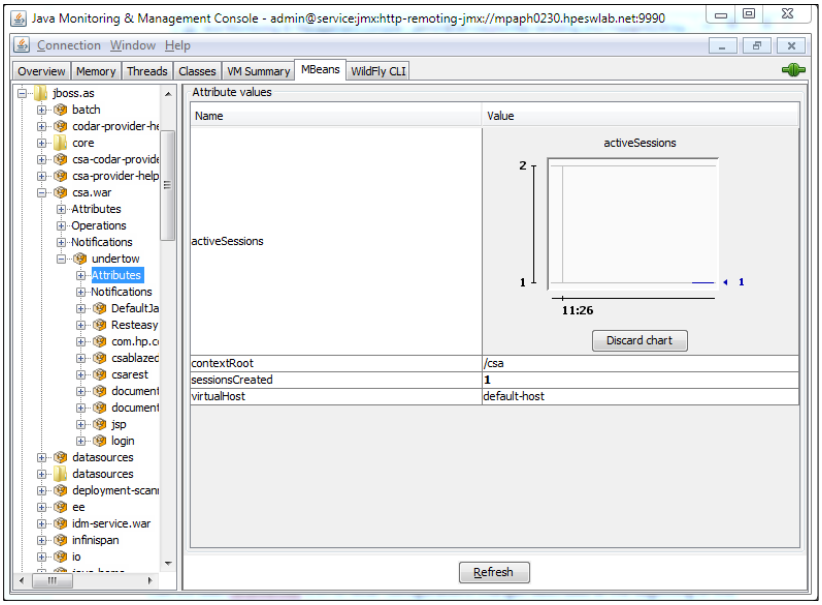
Java monitoring and management console

This console shows graphs for various metrics, including threads, heap-memory use, and CPU use.



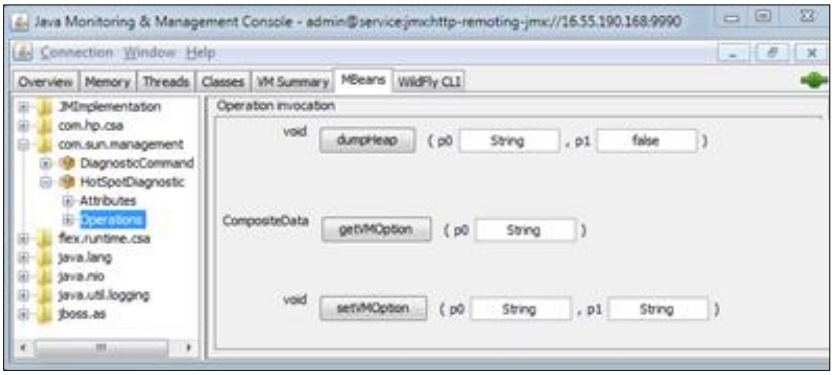
Active CSA sessions for Mbean

This screen shows Java metrics.



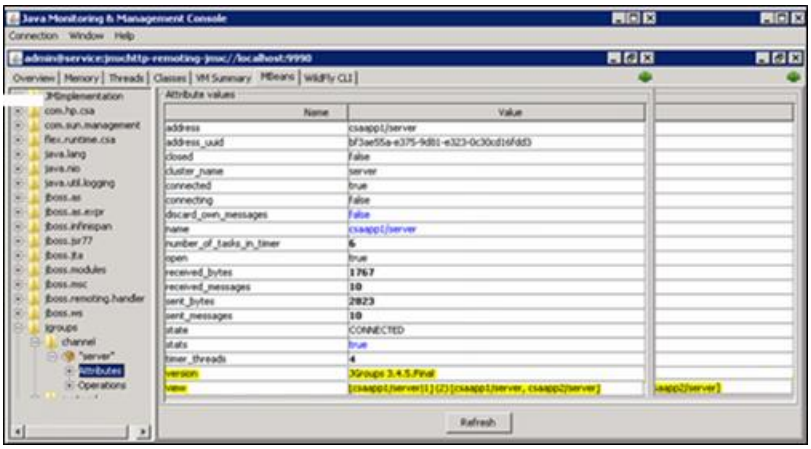
Jconsole heap dump

Change `p0` to the heap dump name, and `p1` to `false` (default is `true`) to avoid triggering a major GC before the heap dump, or to debug heap issues.



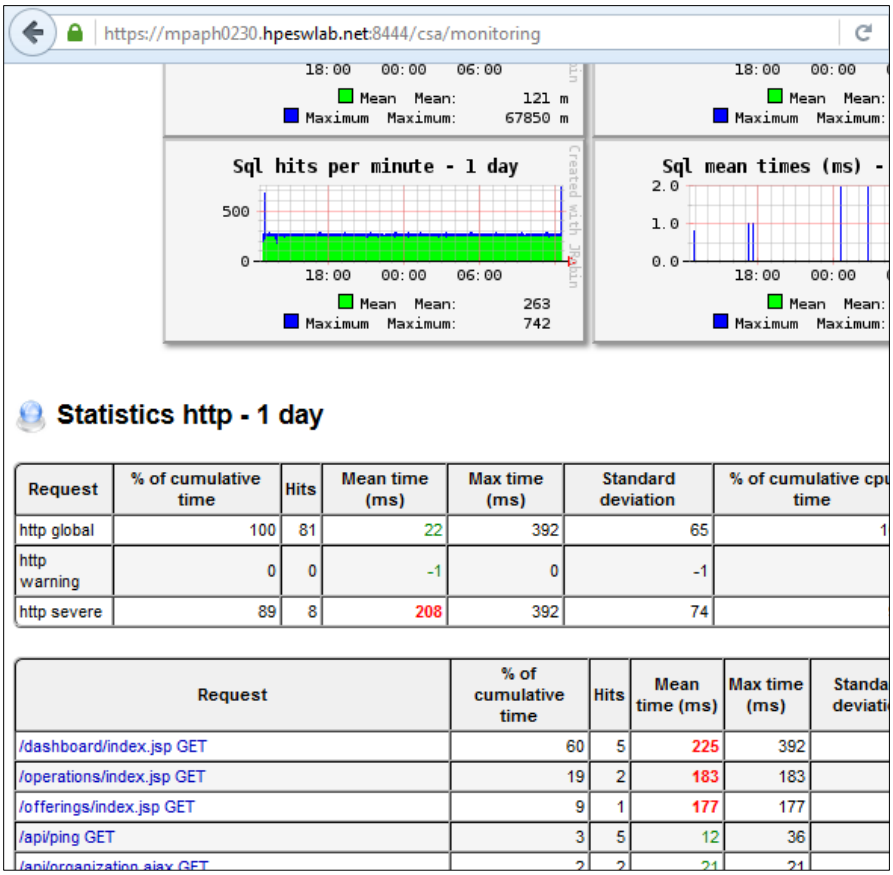
Jconsole cluster - Jgroups

`csaapp1` and `csaapp2` are members of a cluster and `csaapp1` is the master node. The Jconsole refresh interval shows changes dynamically.



JavaMelody reports

The JavaMelody report is available at: https://CSA_HOST:8444/csa/monitoring (login required). Here are screens displaying HTTP request statistics:



Request	% of cumulative time	Hits	Mean time (ms)	Max time (ms)	Standard deviation	% of cumulative cpu time
http global	100	81	22	392	65	1
http warning	0	0	-1	0	-1	
http severe	89	8	208	392	74	

Request	% of cumulative time	Hits	Mean time (ms)	Max time (ms)	Standa deviati
/dashboard/index.jsp GET	60	5	225	392	
/operations/index.jsp GET	19	2	183	183	
/offerings/index.jsp GET	9	1	177	177	
/api/ping GET	3	5	12	36	
/api/organization.ajax GET	2	2	21	21	

SQL statistics

This screen displays SQL statistics.

ajax GET	0	2	0	0	0	0	0	0.00
/offerings/config.json GET	0	1	1	1	0	0	0	0.00
/operations/config.json ajax GET	0	2	0	0	0	0	0	0.00
/shared/messages/messages.properties ajax GET	0	1	0	0	0	0	0	0.00
/shared/csa-html-lib/messages/common /messages.properties ajax GET	0	1	0	0	0	0	0	0.00

Statistics sql - 1 day

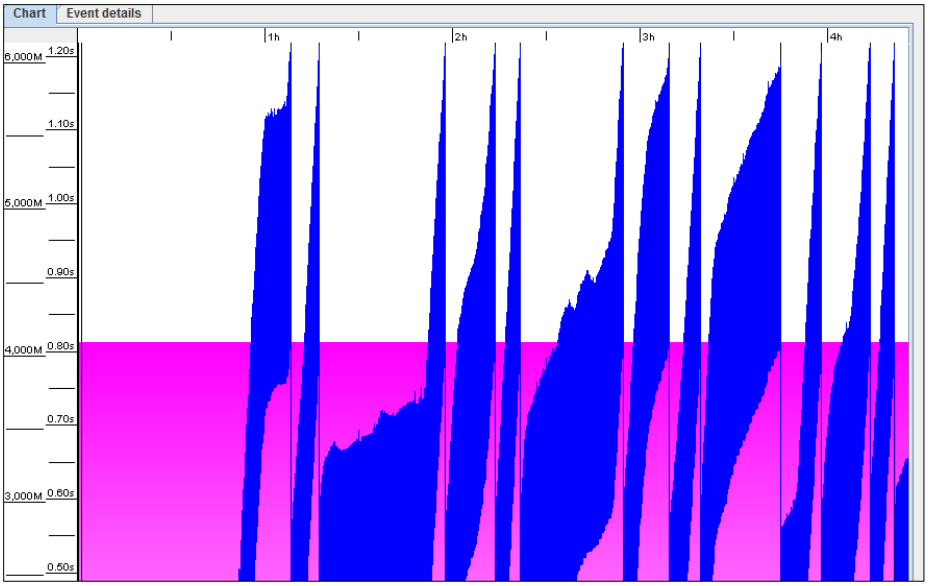
Request	% of cumulative time	Hits	Mean time (ms)	Max time (ms)	Standard deviation
sql global	100	197,817	0	200	1
sql warning	0	5	2	2	0
sql severe	0	3	4	7	3

263 hits/min on 87 r

Request	% of cumulative time	Hits
SELECT 1	28	48,731
select TOP(?) lifecyclee0_.UUID as col_0_0_ from CSA_LIFECYCLE_EX_RECORD lifecyclee0_ where lifecyclee0_.EXECUTION_STATUS_ID=? and lifecyclee0_.EXECUTION_STATE_ID=? and (lifecyclee0_.LOCK_ID is null)	7	17,988
select serviceins0_.UUID as col_0_0_, servicesub1_.UUID as col_1_0_, servicesub1_.INITIATING_SERVICE_REQUEST_ID as col_2_0_ from CSA_SERVICE_INSTANCE serviceins0_ inner join CSA_ARTIFACT serviceins0_1_ on serviceins0_.UUID=serviceins0_1_.UUID cross join CSA_SERVICE_SUBSCR servicesub1_ inner join CSA_ARTIFACT servicesub1_1_ on servicesub1_.UUID=servicesub1_1_.UUID cross join CSA_SERVICE_INSTANCE serviceins2_ inner join CSA_ARTIFACT serviceins2_1_ on serviceins2_.UUID=serviceins2_1_.UUID cross join CSA_SERVICE_BLUEPRINT serviceblu3_ inner join CSA_ARTIFACT serviceblu3_1_ on serviceblu3_.UUID=serviceblu3_1_.UUID where servicesub1_.UUID=serviceins2_.SUBSCRIPTION_ID and serviceins0_.SERVICE_BLUEPRINT_ID=serviceblu3_.UUID and serviceins0_.UUID=serviceins2_.UUID and (serviceins0_.SERVICE_INSTANCE_STATE_ID=? or serviceins0_.SERVICE_INSTANCE_STATE_ID=? and serviceblu3_.SERVICE_DESIGNER_EXP_TYPE_ID=?) and servicesub1_.START_DATE<? order by servicesub1_.START_DATE	5	8,998
select TOP(?) processins0_.UUID as col_0_0_ from CSA_PROCESS_INSTANCE processins0_ cross join CSA_PROCESS_DEFN processdef1_ where processins0_.PROCESS_DEFN_ID=processdef1_.UUID and processins0_.PROCESS_INSTANCE_STATE_ID=? and processdef1_.PROCESS_ENGINE_ID=? and processdef1_.NAME<>? and (processins0_.LOCK_ID is null) order by processins0_.CREATED_ON	4	8,997
select approvalpr0_.UUID as col_0_0_ from CSA_APPROVAL_PROCESS approvalpr0_ inner join CSA_ARTIFACT approvalpr0_1_ on approvalpr0_.UUID=approvalpr0_1_.UUID where approvalpr0_.APPROVAL_RESULT_ID=? order by approvalpr0_1_.UPDATED_ON	4	8,999
select TOP(?) lifecyclee0_.UUID as col_0_0_ from CSA_LIFECYCLE_EX_RECORD lifecyclee0_ cross join CSA_CATEGORY lifecyclee1_ where lifecyclee0_.EXECUTION_STATE_ID=lifecyclee1_.UUID and (lifecyclee1_.NAME in (?))	4	8,994
select TOP(?) releasegat0_.RG_REQUEST_ID as col_0_0_ from CSA_CD_RG_REQUEST releasegat0_ where (releasegat0_.STATUS=? or	4	9,000

Garbage collection log

Use the GCViewer to view the GC log (https://github.com/chewiebug/GCViewer).



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