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# Performance Management Advisors Hardware Sizing Guide

CCAdv Deployment Architecture and Recommendations for Optimal Performance

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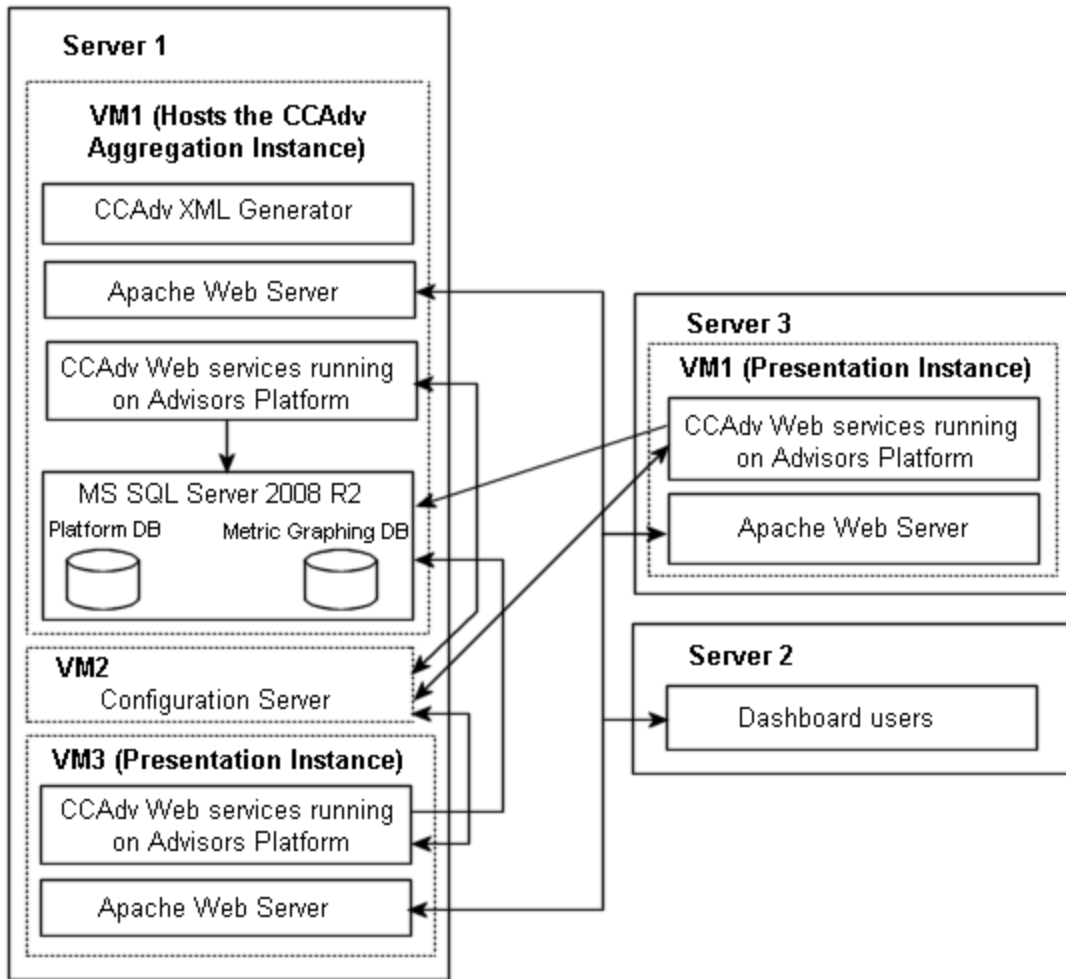
# CCAdv Deployment Architecture and Recommendations for Optimal Performance

The following table describes the high-level dimensions controlling the environment used to achieve the results described in [Load-Carrying Capacity](#).

**Contact Center Advisor Presentation Object Configuration**

Object	Count
Geographic Regions	1
Contact Centers	40
Reporting Regions	20
Operating Units	1
Application Groups	150
Applications	1600
Agent Groups	3200 (2 for each application)

The following diagram shows the environment topology used to successfully achieve 1500 concurrent users of Contact Center Advisor (CCAdv). "VM" is a *virtual machine*. The *Aggregation Instance* performs data aggregation; the *Presentation Instance* services the dashboard.



**Contact Center Advisor Environment Topology**

## Contact Center Advisor Presentation Machine and VM Information

The following table describes the characteristics of the hardware and virtualization environment shown in the figure, **Contact Center Advisor Environment Topology**, which supports 1500 concurrent users of CCAdv.

Server	# of Processors	Processor Type	# of Cores	Total Cores	RAM	OS	Application
Server 1:	2	Intel Xeon X5675 @	6	24 logical cores with	32 GB	VMWare ESXi 5.0	

Server	# of Processors	Processor Type	# of Cores	Total Cores	RAM	OS	Application
VM-Host		3.07GHz		hyper-threading		Standard 64bit	
Server 1: VM-1	2	Same as host	4	8	12 GB	Windows Server 2008 Standard SP2 64bit	MS SQL (Advisor database), Apache Geronimo CAXML on Advisors Platform), XML Generator Simulator, Apache
Server 1: VM-2	2	Same as host	1	2	1.5 GB	Windows Server 2003 Standard SP2 64bit  <b>NOTE:</b> At the time of testing, Genesys supported Windows Server 2003. In your enterprise, be sure to use a <b>Genesys-supported operating system.</b>	Configuration Server
Server 1: VM-3	2	Same as host	4	8	8 GB	Windows Server 2008 R2 Standard SP1 64bit	Apache Geronimo CAXML on Advisors Platform), Apache
Server 2	1	Intel Xeon X3440 @ 2.53GHz	4	4	8 GB	Windows Server 2008 R2 Standard SP1 64bit	Dashboard simulator
Server 3: VM-Host	2	Intel Xeon X5675 @ 3.07GHz	6	24 logical cores with hyper-threading	32 GB	VMWare ESXi 5.0 Standard 64bit	
Server-3: VM-1	2	Same as host	4	8	8 GB	Windows Server 2008 R2 Standard	Apache Geronimo CAXML on Advisors

Server	# of Processors	Processor Type	# of Cores	Total Cores	RAM	OS	Application
						SP1 64bit	Platform), Apache

## Recommendations for Contact Center Advisor Performance Improvement

The following table describes settings you can change to improve Contact Center Advisor performance.

Location	Sub-directory or File, where applicable	Settings
On each CCAdv node	<code>&lt;CCAdv home&gt;\geronimo-tomcat6-minimal-2.2.1\bin\setenv.bat</code> <p><b>Tip</b> Starting with release 8.5.2, the path to the setenv.bat file changes to <code>&lt;CCAdv home&gt;\apache-tomcat-&lt;version&gt;\bin\setenv.bat</code>.</p>	<p>Change</p> <pre>GERONIMO_OPTS=-ms128m -mx1024m -XX:MaxPermSize=128m</pre> <p>To</p> <pre>GERONIMO_OPTS=-Xms6g -Xmx6g -XX:MaxPermSize=256m</pre> <p>Starting with release 8.5.2, GERONIMO_OPTS becomes CATALINA_OPTS. In addition, the XX:MaxPermSize setting no longer exists in the setenv.bat file. So, starting with release 8.5.2, you make the following change in the setenv.bat file:</p> <p>Change</p> <pre>CATALINA_OPTS=-ms1024m -mx2048m</pre> <p>To</p> <pre>CATALINA_OPTS=-Xms6g -Xmx6g</pre>
	<code>&lt;CCAdv home&gt;\geronimo\var\catalina\server.xml</code>	<p>Under the <code>&lt;Connectorname="TomcatAJPConnector"&gt;</code> section, add <code>maxThreads="1600"</code></p> <p><b>Tip</b> Starting with release 8.5.2, you do not change the TomcatAJPConnector setting because it does not exist.</p>
On CCAdv presentation nodes only	<code>&lt;CCAdv home&gt;\geronimo-tomcat6-minimal-2.2.1\var\config\config-substitutions.properties</code>	<p>Set <code>MaxThreadPoolSize</code> to "3000"</p> <p><b>Tip</b> Starting with release 8.5.2, the <code>config-substitutions.properties</code> file does not exist. To change the value of the <code>MaxThreadPoolSize</code> setting, you update the following file: <code>&lt;CCAdv home&gt;\apache-tomcat-&lt;version&gt;\config\catalina.properties</code>.</p>
Dashboard administration		For optimal performance:

Location	Sub-directory or File, where applicable	Settings
setting		<ul style="list-style-type: none"> <li>• Select independent configuration mode (not integrated configuration mode)</li> <li>• Set <b>Show Totals and Averages</b> to No</li> </ul>
Advisors Platform database		<p>For optimal performance of CCAdv/WA, you can turn off agent monitoring. For release 8.1.5, see the <a href="#">Disabling the agent level statistics templates for CCAdv</a> procedure in the <i>Performance Management Advisors 8.1 Deployment Guide</i>. For release 8.5.0 and later, see <a href="#">Enable and Disable Agent-level Monitoring</a>.</p>
On AGA	<p><b>Releases 8.1.5 and 8.5.0:</b>                      &lt;AGA home&gt;\conf\wrapper.conf</p> <p><b>Release 8.5.1 and later:</b>                      conf\run.bat (Windows)                      bin\setenv.sh (Linux)</p>	<p><b>Releases 8.1.5 and 8.5.0:</b></p> <p>Change</p> <pre>Wrapper.java.initmemory=128 Wrapper.java.maxmemory=1024</pre> <p>To</p> <pre>Wrapper.java.initmemory=4096 Wrapper.java.maxmemory=14336</pre> <p><b>Release 8.5.1 and later:</b>                      In the JAVA_OPTS parameter, change</p> <pre>-ms128m -mx1024m</pre> <p>To</p> <pre>-ms4096m -mx14336m</pre>
	<p>&lt;AGA home&gt;\conf\                      inf_genesys_adapter.properties</p>	<p>Change</p> <pre>informiam.genesys_connector.stat Server.maxOpenReqsPerGroup = 1000 informiam.genesys_connector.stat Server.messages.queuesize = 500000 informiam.genesys_connector.GC StatisticsObjectDao.batchSize Override = 100 informiam.genesys_connector.stats issue.pausechecklimit = 5000</pre> <pre>informiam.genesys_connector.stat Server.maxOpenReqsPerGroup = 6000 informiam.genesys_connector.stat Server.messages.queuesize = 350000 informiam.genesys_connector.GC StatisticsObjectDao.batchSize Override = 1000 informiam.genesys_connector.stats issue.pausechecklimit = 10000</pre>

Location	Sub-directory or File, where applicable	Settings
		<p><b>Important</b></p> <p>The <code>informiam.genesys_connector.statsissue.pausechecklin</code> parameter is applicable only to releases earlier than 8.5.1.</p>
<p>On each Apache HTTP proxy</p>	<p>httpd.conf</p>	<ul style="list-style-type: none"> <li>Uncomment or add the following modules:           <pre>LoadModule deflate_module modules/mod_deflate.so  LoadModule headers_module modules/mod_headers.so  LoadModule proxy_module modules/mod_proxy.so  LoadModule proxy_ajp_module modules/mod_proxy_ajp.so  LoadModule proxy_balancer_module modules/mod_proxy_balancer.so  LoadModule proxy_http_module modules/mod_proxy_http.so</pre> </li> <li>Add the following block to increase the number of Apache worker threads (note that this is for a Windows-based server):           <pre>&lt;IfModule mpm_winnt_module&gt; ThreadsPerChild 512 MaxConnectionsPerChild 0 &lt;/IfModule&gt;</pre> <ul style="list-style-type: none"> <li>If you use a Linux server, add the following block:               <pre>&lt;IfModule mpm_event_module&gt; StartServer 6 ServerLimit 32 MinSpareThreads 150 MaxSpareThreads 250 ThreadsPerChild 25 MaxRequestWorkers 800 MaxConnectionsPerChild 0 &lt;/IfModule&gt;</pre> </li> </ul> </li> <li>Add the following to enable a request response proxy:           <pre>ProxyPass /am/ ajp://localhost:8009/am/  ProxyPass /admin/ ajp://localhost:8009/admin/  ProxyPass /am-admin/ ajp://localhost:8009/am-admin/</pre> </li> </ul>



Location	Sub-directory or File, where applicable	Settings
		ProxyPass /ca/ ajp://localhost:8009/ca/
		ProxyPass /ca-ws/ ajp://localhost:8009/ca-ws/
		ProxyPass /ea-ws/ ajp://localhost:8009/ea-ws/
		ProxyPass /base-ws/ ajp://localhost:8009/base-ws/
		ProxyPass /dashboard/ ajp://localhost:8009/dashboard/
		ProxyPass /nav-service/ ajp://localhost:8009/nav-service/
		ProxyPass /prefs-service/ ajp://localhost:8009/prefs-service/
		ProxyPass /wu/ ajp://localhost:8009/wu/
		ProxyPass /rmc/ ajp://localhost:8009/rmc/
		ProxyPass /gc-admin/ ajp://localhost:8009/gc-admin/
		ProxyPass /ca-xml/ ajp://localhost:8009/ca-xml/

## Best Practices for Contact Center Advisor Sizing

Use the following notes and best practices for optimizing CCAdv performance:

- Use Gigabit connectivity between the CCAdv aggregation node (runs CCAdv XML Generator) and CCAdv presentation node(s).
- Enable an Apache JServ Protocol (AJP) connection between the Apache HTTP proxy and CCAdv presentation node(s).
- Allocate as much CPU resource to CCAdv as possible; CCAdv performance is improved if you provide multiple CPU cores and faster clock speeds.
- Allocate sufficient memory for CCAdv components (Genesys recommends 6GB).
- Genesys recommends increasing the number of presentation nodes if the dashboard request response time exceeds acceptable thresholds.
- Apply role-based access control to minimize the number of hierarchy objects and metrics that each user can access.
- Regarding Stat Server performance:

- Stat Server is a single threaded process. Carefully monitor the CPU usage of your Stat Server(s).
- Consider adding more Stat Server pairs if a Stat Server is saturating a CPU. You may require up to four pairs of Stat Servers for best performance.
- Regarding XML Generator performance:
  - Increasing the "Thirty Mins And Today" metrics processing cycle duration reduces XML Generator processing overhead. The configuration parameter name is `generationForThirtyMinsAndToday` (default=120s) and it is located in the following file:  
`<XML Generator home>\conf\xmlgen.properties`
  - Performance improves with a small number of objects and degrades with a large number of objects, however a large number of reporting regions, geographic regions, and/or contact centers causes less degradation than a large number of operating units and/or application groups.
  - The number of columns displayed on the dashboard does not impact XML Generator performance.
- Regarding metrics graphing:
  - The greatest impact to load for the metrics graphing feature is against the aggregation node (XML Generator), not the presentation nodes.
  - The key scaling factor is the number of graphable metrics:
    - The XML Generator CPU usage scales up linearly with the number of graphable metrics. Up to 15 graphable metrics are supported.
  - The number of users and number of requests for distinct graphs has minimal impact on performance.