

Report Application Server: Best Practices



Applies to:

Business Objects Enterprise XI 3.1, BI 4.0. For more information, visit the [Business Objects homepage](#).

Summary

The main purpose of Report Application Server is to facilitate runtime Crystal Report creation and modification. However a large set of users also use it for viewing reports or exporting reports to various 3rd party formats using Report Application Server APIs. Applications using Report Application server APIs face various issues such as hanging threads, performance degrade, failures. This article discusses such issues and recommends best practices for using RAS APIs. It should guide a developer to use RAS and RAS API effectively to increase performance and manage the application for high load.

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Author Bio

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RAS Issues with Normal and Heavy Load

Report application Server SDK facilitates runtime crystal report creation and modification. Additionally it can also be used for exporting or printing on Application Server where the RAS SDK code is deployed. RAS SDK is popularly used to export to a 3rd party format such as PDF or XLS because it gives the report byte stream in that format. The byte stream can then be used in any ways such as write it to a disk file or redirecting it to the browser. RAS is sometimes preferred over Crystal Reports Processing Server or the Crystal Reports Job Server because of its ability to retrieve the byte stream. However RAS has its own downsides that must be considered when using it, especially for system with heavy loads.

The definition of “Heavy Load” for RAS really varies from system to system and depends on RAS server memory, number of processors, number of concurrent print jobs, number of requests if running in a batch, report complexity, size of dataset, backend or reporting database etc. Applications that use RAS SDK APIs to interact with RAS server face the following issues at normal and But for applications that use RAS heavily are known to exhibit the following issues at normal load:

- Connectivity issues between RAS and RAS API
- CORBA Request Timeout in RAS Application\API
- Hanging Java Threads on RAS server or RAS application layer at high load
- RAS becomes unresponsive at heavy load
- Out of memory error on RAS server or RAS application layer
- Weird errors in RAS logs which cannot be tracked back to any event.

Alternate Approaches

1. Crystal Reports Processing Server :

- For simple crystal report viewing in DHTML format, use Crystal Reports Processing Server. It is optimized for report rendering functionality. It also uses Crystal Reports Cache Server which manages cached report data, with which one can get a better performance. On the other hand Report Application Server doesn't use Cache server, but uses a limited internal cache. Thus it is unsuitable for report viewing.
- With processing server you can view the report in DHTML format as well as in the 3rd party for using ReportExportControl class in Viewers SDK.
- RAS is preferred since it gives report byte stream directly. You can also get the report byte stream, using a ReportExportControl object and tapping response object as shown [Kbase 1507322](#).

Note: The above sample is just to provide an example on how to retrieve a report byte stream without using RAS. It is not supported by SAP Business Objects and not meant for direct use in production.

2. Crystal Reports Job Server :

- To export report to a 3rd party format use Crystal Reports Job Server and schedule the report to run now. You can view the instance in a browser or save it to a Disk location using Job Server. This is particularly useful if you use RAS in a batch mode. Additionally you can maintain historical instances for to be viewed later whereas RAS doesn't have access to historical data.

3. Publication

- You can schedule a single report to multiple formats by adding it to a publication and setting appropriate document properties in the publication. When publication is scheduled the report will be exported in multiple formats but the report will be run against the database exactly once. This way it is more efficient since it requires only 1 database hit per report regardless of number of formats the report is being exported to.

Handling RAS and RAS SDK Connectivity Issues

1. Server running RAS service and server (application server) running RAS SDK code should be able to ping each other by IP, Full Qualified Domain Name (FQDN) and with shortname. If they cannot ping each other with short name, make sure to add appropriate entries in the hosts file on both servers.
2. RAS by default uses random ports for communication with RAS SDK. If RAS server is behind firewall then open a specific port or range of ports and configure the RAS service to communicate on the specific port or range of ports. This configuration can be done from CMC server section.
3. Use [Kbase 1565069](#) for further troubleshooting ideas.

RAS and RAS SDK Best Practices for Heavy Load Management

1. Call close() on ReportClientDocument in all workflows of the application. This will allow RAS to release all the resources associated with the specific document open immediately without waiting for any timeout.
2. Use the necessary SDK Jar files in application classpath and the jar files should be at the same patch level as the server.
3. Setting CORBA Request Timeout : RAS Server communicates with RAS SDK APIs with CORBA connection. The default CORBA request timeout on RAS SDK is 10 minutes. Therefore if SDK doesn't receive a response from RAS server in 10 minutes it gives the following error:
The request timed out because there has been no reply from the server for 600,000 milliseconds.
This can happen as result of:
 - Report takes around 10 minutes or more to run on.
 - RAS server is too busy to respond in less than 10 minutes.
 - RAS doesn't have sufficient resources to allocate to this request to respond in less than 10 minutes
 - Network Hiccup or CORBA connection drop

Specify a different CORBA request timeout using CRConfig.xml. It contains

```
<CORBAResponseTimeout>600000</CORBAResponseTimeout>
```

Where time is specified in milliseconds and currently set to 600000 ms or 10 minutes. For long running reports increase this number.

Here is a sample CRConfig.xml

```
<CrystalReports.ClientSDKOptions xmlns:xsi="http://www.w3.org/1999/XMLSchema-
instance" version="2" xsi:type="CrystalReports.ClientSDKOptions">
  <ServerInfos version="2" xsi:type="CrystalReports.ServerInfos" id="1">
    <ServerInfo version="2" xsi:type="CrystalReports.ServerInfo" id="2">
      <Server>%MACHINENAME%:1566</Server>
      <Adapter>TCPIP</Adapter>
    </ServerInfo>
  </ServerInfos>
  <CORBAResponseTimeout>600000</CORBAResponseTimeout>
  <VerifyDatabaseOnSetDataSource>true</VerifyDatabaseOnSetDataSource>
</CrystalReports.ClientSDKOptions>
```

4. Processor Affinity Mask

On Multiprocessor server machine by default the RAS server process will use the first processor it comes across in the hardware list. For more control over hardware resources bind the RAS server process to a certain processor instead of letting it choose its own. So theoretically, the performance will be better if we bind multiple RAS services on the same server to different processors. This can be done by adding the following switch to RAS Command from CMC, in Server section.

```
-ProcessorAffinityMask 0xffffffff
```

Each f stands for a processor. For each f substitute a 0 or 1. 0 indicates use of CPU not permitted and 1 indicates that the CPU usage is permitted. The list of processors reads from right to left and the last f represents the first processor.

E.g. on a 8 processor machine to use the 6th and 7th processor only for RAS use:

```
-ProcessorAffinityMask 0x01100000
```

RAS uses the first permitted processor in the string, up to the maximum specified by license (For Crystal Reports Server or Crystal Reports Server Embedded line of products that are sold with processor based licenses).

5. Increasing Java heap size

RAS is Java based. When it is processing complex reports, large datasets you can try increasing java heap size on RAS server to give it more memory for processing. By default the minimum is set to 32MB and maximum is set to 64 MB. In XI 3.1, all servers are 32 bit processes and the maximum memory they can access is only 2 GB.

To increase Java Heap Size for RAS locate CRConfig.xml on RAS Server box.

- XI 3.1

Windows Installations: <Business Objects Home>\common\4.0\java

AIX\ Linux\ Unix\ Solaris Installations: <BOBJ Home>/bobje/java

- BI 4.0

Windows Installations: <Business Objects Home>\SAP BusinessObjects Enterprise XI 4.0\java

AIX\ Linux\ Unix\ Solaris Installations: <BOBJ Home>/bobje/java

Change the following lines:

```
<JVMMaxHeap>64000000</JVMMaxHeap>
```

```
<JVMMinHeap>32000000</JVMMinHeap>
```

To increase minimum and maximum java heap size. Setting it to large number can help improve performance.

6. Use RAS only when you are doing runtime report modification. Try to take an alternate approach listed above for enhanced performance and stable system.
7. If you must use RAS, try avoiding pushing Datasets or ResultSets at runtime using RAS. With large datasets this would cause performance issue as well as make RAS unstable. Try to use a Database query whenever possible as it works better, faster than using datasets.
8. RAS is java based process and reclaiming resources in RAS is basically the same operation as Java garbage collection. It is known to happen that at a very heavy load, RAS fails to reclaim its resources at the same or faster rate than the rate at which incoming requests are received. This results in RAS becoming unresponsive. It cannot even allocate resources, CPU time to reclaim existing resources and also fails to respond to new requests. You will need to restart RAS to overcome this issue. If you are seeing this condition often then you may need to horizontally or vertically scale the system, add more RAS services or memory. You can have up to 1 RAS service per processor in XI 3.1. On BI 4.0 you can have up to 1 RAS service per machine.

Related Content

[Kbase 1324139](#)

[Kbase 1542846](#)

[Kbase 1565069](#)

[Kbase 1652806](#)

[Kbase 1507322](#)

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