



PUBLIC

Crystal Reports Server Embedded

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SAP Crystal Reports Server 2020, OEM edition Sizing and Configuration Guide

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1 Introduction

1.1 About this guide

This guide will go over the sizing and basic configuration of Crystal Reports Server 2020, OEM edition, also known as the unmanaged Report Application Server (RAS).

i Note

Crystal Reports Server 2020, OEM edition is now 64bit. It requires 64bit middleware (e.g. ODBC drivers) and can only run on 64bit Windows.

Crystal Reports Server 2020, OEM edition was previously known as Crystal Reports Server Embedded.

1.2 About Crystal Reports Server 2020, OEM edition

Crystal Reports Server 2020, OEM edition is a server-based embeddable reporting solution composed of the Report Application Server Windows service (RAS server) and the Report Application Server SDK (RAS SDK). This version of RAS is referred to as unmanaged RAS and is available only to OEM partners. Managed RAS is the version that is included with SAP BusinessObjects Business Intelligence platform, and it supports load balancing, scalability, and fault tolerance. This document will go over the sizing and configuration of unmanaged RAS.

1.3 About the RAS server

“RAS server” refers to the RAS server service and not to individual RAS server machines.

The RAS server is responsible for processing and rendering the Crystal Reports files. You can add more RAS servers to your deployment in order to scale and support more concurrent users with your RAS solution. This provides limited scalability, although load sharing between RAS servers is still round-robin and there is still no fault tolerance. For mission-critical applications that require scalability, true load balancing, and robust fault tolerance, it is recommended that you use the [SAP BusinessObjects Business Intelligence platform](#).

Adding more RAS servers will add support for more concurrent users. However, it will not necessarily improve overall performance. In order to scale the performance and throughput along with the extra concurrent users, you will need to add more processors and hardware to the deployment as well. There is no hard ratio of RAS servers to number of processors because RAS performance is heavily dependent on variables such as report design and the number of records. A conservative guideline is to keep the ratio of RAS servers and hardware relatively the same. However, this should be fine-tuned during your testing.

Each RAS server (with an un-throttled full processor license) can handle a maximum of 50 Simultaneous Report Requests. A Report Request is identified as any action performed on any report by the RAS server, such as opening the report, refreshing, printing, clicking [Next Page](#), and exporting. If two end users simultaneously click on [Next Page](#) within their report, then that is two Simultaneous Report Requests.

❖ Example

If your application needs to provide reporting for 100 concurrent users, then you can assume that they have the potential to make 100 Simultaneous Report Requests. In order to support this level of usage you will need to have two RAS servers in the deployment.

For more information about processor licensing, contact your SAP BusinessObjects Account Manager

2 Getting Started

2.1 Memory requirements

Memory requirements may vary depending on the design of a report and the number of records retrieved from the database. When a report is viewed and loaded into memory, the report is decompressed and expanded up to as much as 40 times the original report file size (with saved data/retrieved records).

❖ Example

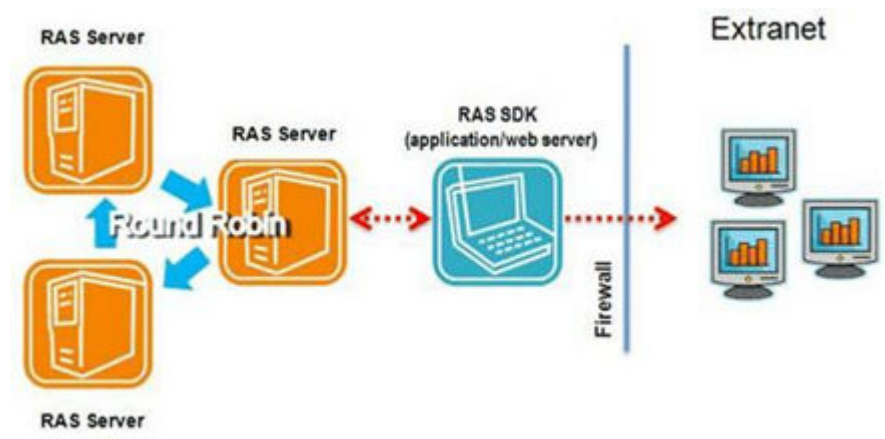
This is the minimum amount of memory required on each RAS for twenty-five 500KB reports:

500KB Report File Size (contains saved data) = 500KB * 40 (decompression ratio) = 20MB

25 Reports * 20MB = 500MB minimum memory

3 Configuring a Multi-RAS Server Solution

For a deployment with multiple RAS servers, you must configure the RAS SDK so that it can communicate effectively with each RAS server.

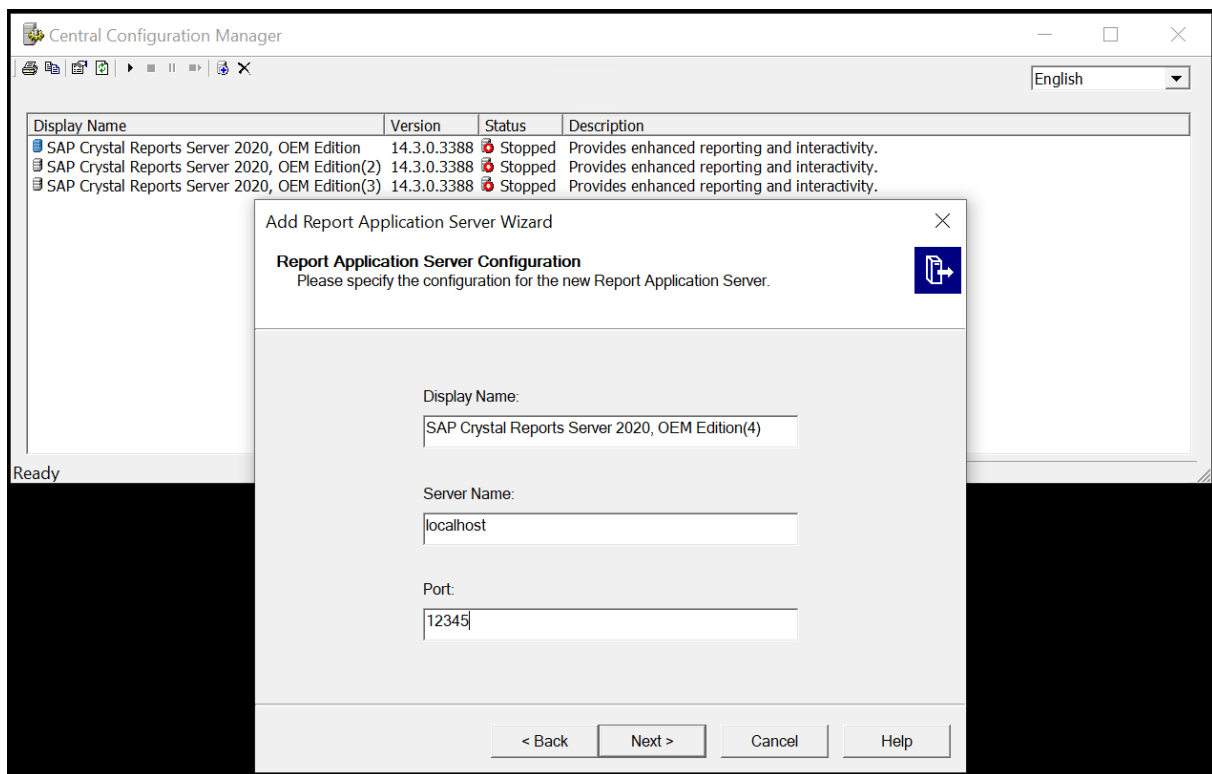


3.1 Server configuration

Having multiple RAS server services on the same physical server is now supported in Crystal Reports Server 2020, OEM edition. This means you can now scale your RAS deployments vertically (single multi-processor server machine) as well as horizontally (across multiple server machines).

You can add, remove, start, and stop additional RAS servers through the Central Configuration Manager

(CCM). Simply click the [Add Report Application Server](#) icon (🔧) and fill out the correct details for the new RAS server when prompted. Ensure that you use unique ports for your additional RAS servers.



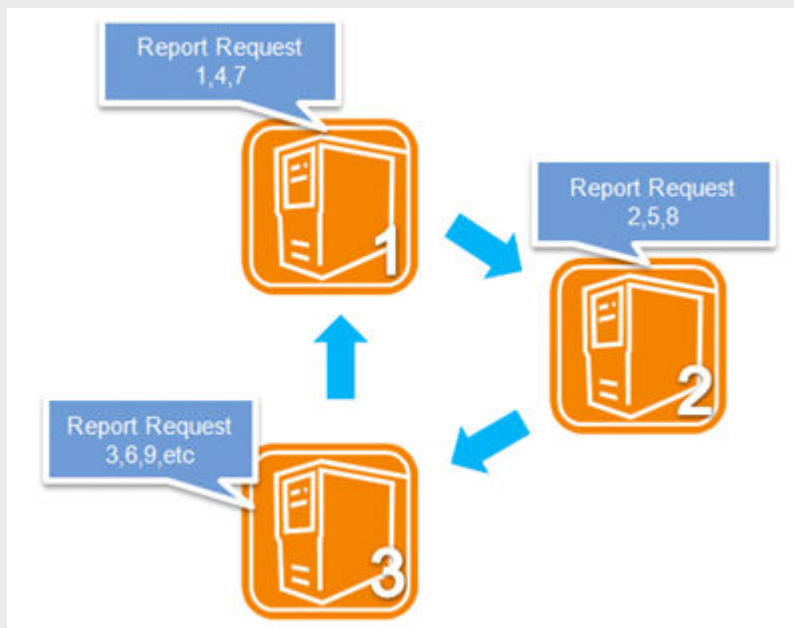
3.2 Round-robin

In a multi-RAS server solution, the load sharing between the RAS servers for opening or creating reports is done in a round-robin manner.

❁ Example

In a three-RAS server deployment configured for round-robin, the first request to open a report would go to the first RAS server listed in `clientSDKOptions.xml`, then the second and third requests would go to the second and third RAS servers on the list respectively, and then the next request would loop back to the first server, and so on. Each request afterwards, such as drill down, page through, print, export, and so on,

would then go back to the original RAS server that opened the report. See the figure below.



Round-robin is not automatically enabled after adding new RAS servers to the deployment. There are extra steps involved in linking the RAS SDK to these additional servers and enabling round-robin. For more information, see [To modify the clientSDKOptions.xml file \[page 16\]](#).

Round-robin provides limited scalability but no fault tolerance. If one of the round-robin RAS servers goes down, then all report requests going to that RAS server will fail.

❖ Example

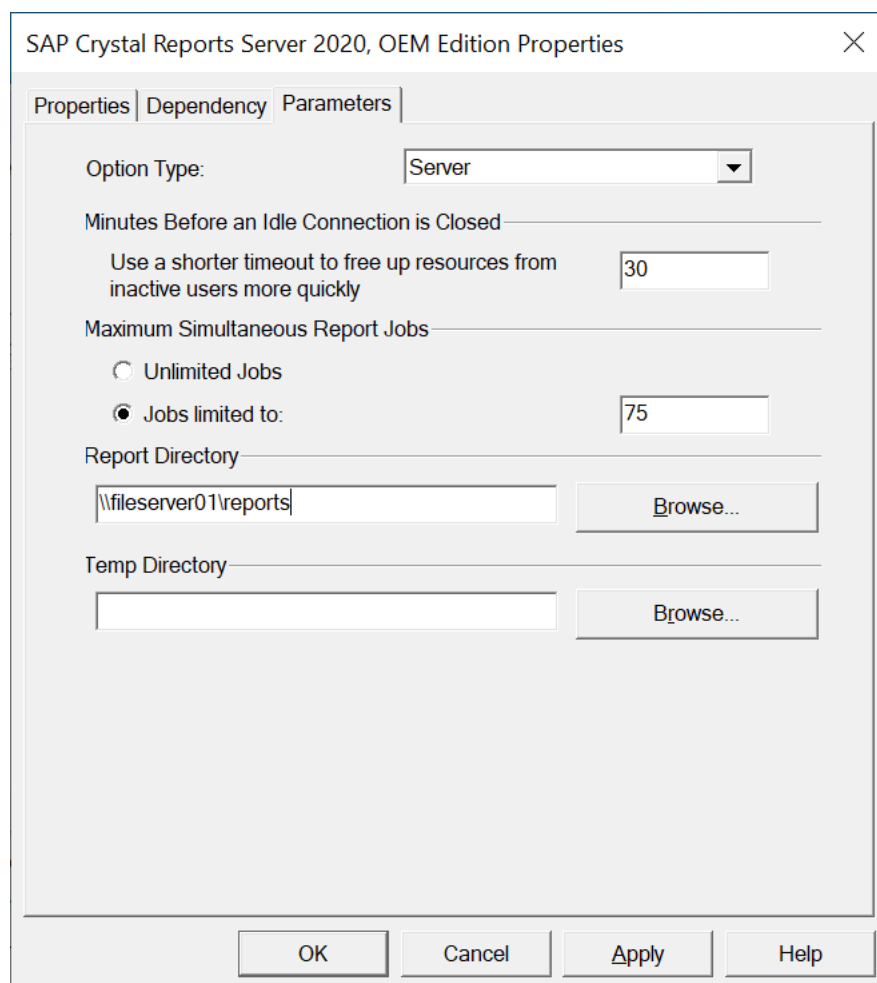
If RAS server 2 goes down, then report requests 2, 5, and 8 will fail. See the figure below.



For mission-critical applications that require scalability, true load balancing, and robust fault tolerance, it is recommended that you use the [SAP BusinessObjects Business Intelligence platform](#).

3.3 Report directories

With a multi-server RAS solution, you will need to ensure that each RAS server is pointing to the same report file location.



The screenshot shows the 'SAP Crystal Reports Server 2020, OEM Edition Properties' dialog box with the 'Parameters' tab selected. The 'Option Type' is set to 'Server'. Under 'Minutes Before an Idle Connection is Closed', there is a text input field with '30'. Under 'Maximum Simultaneous Report Jobs', the 'Jobs limited to:' radio button is selected with a value of '75'. The 'Report Directory' is set to '\\fileserv01\reports' with a 'Browse...' button. The 'Temp Directory' is empty with a 'Browse...' button. At the bottom are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Property	Value
Option Type	Server
Minutes Before an Idle Connection is Closed	30
Maximum Simultaneous Report Jobs	Jobs limited to: 75
Report Directory	\\fileserv01\reports
Temp Directory	

Keep in mind that the performance of RAS will be impacted by the speed at which it can load reports from the file server. If it takes a long time to copy reports from the file server to the RAS server machine, then it will take a long time to process and display reports to end users.

Ensure that the RAS servers are set to run under the same domain account that has sufficient rights to access the file share.

SAP Crystal Reports Server 2020, OEM Edition Properties

Properties | Dependency | Parameters

Server Type: Report Application Server

Display Name: SAP Crystal Reports Server 2020, OEM Edition

Server Name: localhost

Command: "\\CRSE2020\\C\$\\Program Files (x86)\\SAP Bus

Startup Type: Automatic

Log On As

☐ System Account

User: domain\\reportuser

Password: *****

Confirm password: *****

OK Cancel Apply Help

i Note

For best practice, the report files should be directly accessible by the RAS servers. This means the report files should be located on the RAS server itself for single-server deployments or on a file server accessible by a UNC path for multi-server deployments.

If the report files are located on the application server (where the RAS SDK is installed) and not accessible by the RAS servers, then you can use the `rasjdk://` prefix in front of the report path for the `ReportClientDocument.open()` call. For example:

```
rcd.open("rasjdk://c:\\applicationfolder\\reports");
```

This will allow the SDK to copy a temp file of the report onto the RAS server so that the RAS server can load and process the report. Note that this will have a performance impact on report delivery as the report object is being copied over the network to the RAS server processing the request.

3.4 Command line parameters

You can use the following parameters to configure a RAS server.

Parameter	Description
-name <server name>	The name for the new RAS server.
-ipport <portnumber>	The port number that RAS uses when listening for requests. The port number must be unique for each RAS server instance in the deployment. If the port number is unspecified, then RAS will default to port 1566. If the specified port is unavailable, then the RAS instance will fail to start.
-service	Runs RAS as a Windows service under the account executing the command. If unspecified, a RAS icon will appear in the system tray. Double-clicking on that icon will display the list of open reports. This parameter is optional.
-ProcessAffinityMask	Sets processor affinity for RAS. For more information about this parameter, see the Processor Requirements [page 12] chapter. This parameter is optional.
-restart	Server restarts if it exits with an unusual exit code.

4 Processor Requirements

Crystal Reports Server 2020, OEM edition keycodes will gatekeep the number of processors RAS can utilize. If you have only one processor keycode, then the RAS server system will restrict itself to using only one processor even if it is installed on a multi-processor machine. If you have a two-processor license, then it will be restricted to two processors. If they are multi-core processors, then the restrictions will be based on the cores.

❖ Example

On a machine with two dual-core processors, a two-processor license will restrict you to using only two out of the four cores.

However, hyperthreaded processors are not gatekept.

❖ Example

A two-CPU machine with hyperthreading enabled will show four logical processors in the task manager. RAS will be able to utilize all four logical processors even with a two-processor license.

For more information about processor licensing, contact your SAP BusinessObjects Account Manager.

4.1 Setting processor affinity

By default, the RAS server will simply use the first processors it comes across in the hardware list. For more control over hardware resources, you may want to bind the RAS server process to a specific processor. You can do this by setting processor affinity between the RAS server process and the processor. This procedure is also applicable to processor cores.

Processor affinity for RAS is configured by using the following command line switch in the Central Configuration Manager (CCM):

```
-ProcessAffinityMask
```

Use a mask to specify exactly which processors RAS will use when it runs on a multi-processor machine. The mask is in the format 0xffffffff where each f represents a processor, and the list of processors reads from right to left (that is, the last f represents the first processor). For each f, substitute either 0 (use of CPU not permitted) or 1 (use of CPU is permitted).

❖ Example

If you want only processor 1 to be used, you set processor affinity to 1 (20) = 0x0001

If you want only processor 2 to be used, you set processor affinity to 2 (21) = 0x0002

If you want only processor 3 to be used, you set processor affinity to 4 (22) = 0x0004

If you want only processor 4 to be used, you set processor affinity to 8 (23) = 0x0008

If you want two processors to be used together, add the numbers together and convert the total to hexadecimal.

❖ Example

Proc 3 and Proc 1 = $1 + 4 = 5 = 0x05 = 0101$

Proc 3 and Proc 4 = $4 + 8 = 12 = 0x0C = 1100$

i Note

RAS uses the first permitted processors in the string, up to the maximum specified by your license. If you have a two-processor license, 0x1110 has the same effect as 0x0110.

5 SDK Configuration

The RAS SDK initially relies on a configuration file named `clientSDKOptions.xml` to locate all the RAS servers in a deployment.

By default, the `clientSDKOptions.xml` file relevant to ASP and .NET development is installed to the following directory: `\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\win64_x64`

By default, the `clientSDKOptions.xml` file relevant to Java development is installed in the same directory as the Java SDK JAR files: `\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\java\lib`

For Java web applications, the `clientSDKOptions.xml` file must be accessible to your J2EE web application server. To ensure that the `clientSDKOptions.xml` file is accessible, add a copy of it to one of the following locations:

- Your application's class folder.
- A folder in your application's `CLASSPATH`.
- A JAR file within the application's `lib` directory.

Troubleshooting

If RAS is still unable to find the `clientSDKOptions.xml` file in a Java application environment, or you receive communication errors, then you may need to insert the following line in an entry module for your application:

```
System.setProperty("ras.config", configPath);
```

Note

`configPath` is the path to the folder of the `clientSDKOptions.xml` file. For example, the `config path` might be `String configPath = "C:\\\";`

For more information on troubleshooting RAS communication problems, see SAP Note [1218747](#) 

5.1 Modifying the `clientSDKOptions.xml` file

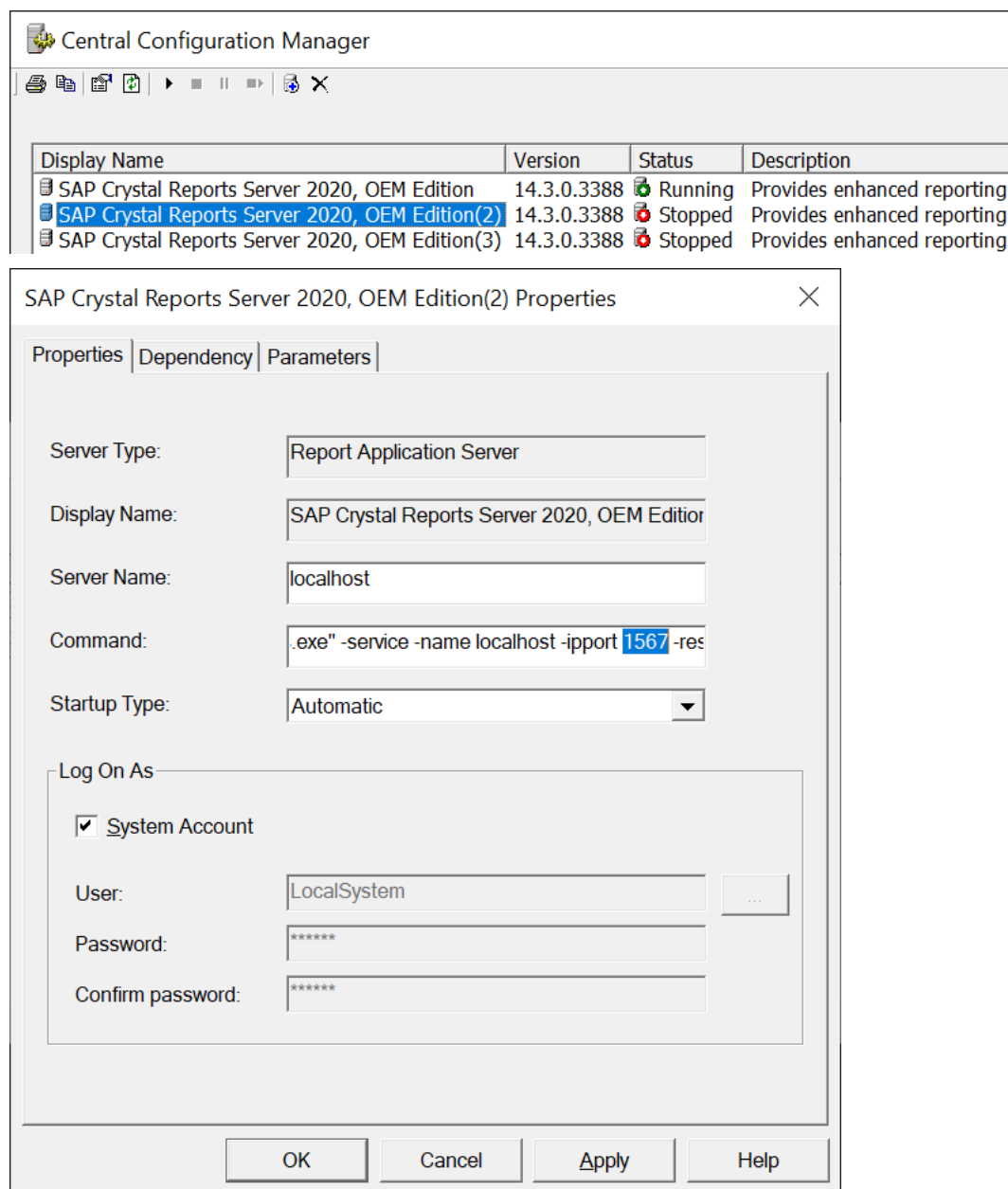
If you have a RAS deployment with multiple RAS servers, you will need to edit the `clientSDKOptions.xml` file in order for the RAS SDK to be aware of all the RAS servers within your deployment and enable round-robin. This applies to multi-machine and single-machine RAS deployments.

5.1.1 Finding the port number of a RAS server

Before you can modify the `clientSDKOptions.xml` file, you need to know the port numbers of your RAS servers.

If you do not know the port number of a RAS server, you can look it up by going to the Central Configuration Manager and double-clicking the RAS server to display its server properties. Then, in the "Command" field, look for the `-ipport` value. If there is no value beside `-ipport`, then you can assume that the RAS server is using the default port of 1566.

To change the port, stop the RAS server and change the value of `-ipport`.



5.1.2 To modify the clientSDKOptions.xml file

1. Open the appropriate `clientSDKOptions.xml` file in a text editor and locate these lines:

```
<ServerInfo xsi:type="CrystalReports.ServerInfo" version="2" id="2">
  <Server>SERVERNAME:PORT</Server>
  <Adapter>TCPIP</Adapter>
</ServerInfo>
```

By default, the setup program replaces `SERVERNAME` with the name of the machine where you ran the installation, and the `PORT` is replaced with the default RAS port of 1566. For example:

```
<ServerInfo xsi:type="CrystalReports.ServerInfo" version="2" id="2">
  <Server>SERVER01.intl.com:1566</Server>
  <Adapter>TCPIP</Adapter>
</ServerInfo>
```

2. Modify the file to meet your requirements.
 - To balance the report server load in a round-robin manner across multiple RAS servers, create additional `<ServerInfo>` elements and increment the value of the `id` attribute, as demonstrated in the following example:

```
<ServerInfo xsi:type="CrystalReports.ServerInfo" version="2" id="2">
  <Server>SERVER01.intl.com:1566</Server>
  <Adapter>TCPIP</Adapter>
</ServerInfo>
<ServerInfo xsi:type="CrystalReports.ServerInfo" version="2" id="3">
  <Server>SERVER02.intl.com:1567</Server>
  <Adapter>TCPIP</Adapter>
</ServerInfo>
```

- To add an entry pointing to a RAS server running on a different machine, replace `SERVERNAME` with the fully qualified domain name of the machine running your RAS server along with the `PORT` that it is running under. Refer to the example above.

i Note

Your RAS SDK code should be connecting to the first RAS server listed in `clientSDKOptions.xml`. For example, based on the examples above, your code should be one of the following:


- For Java:

```
rcd.setReportAppServer ("SERVER01.intl.com:1566");
```






- For .NET:

```
rcd.ReportAppServer = "SERVER01.intl.com:1566";
```

i Note

You can override the server value in `clientSDKOptions.xml` dynamically at runtime, through the RAS SDK. This option is useful if you want each application on a single web server to use its own RAS server for report processing. For more information about using this option, see the Setting up the development environment section in the RAS SDK Developer Guides, which are available on the Developer SDK Library: <https://archive.sap.com/documents/docs/DOC-27465> 

6 More Information



Information Resource	Location
SAP product information	http://www.sap.com 
SAP Help Portal	http://help.sap.com/analytics Access the most up-to-date English documentation covering all SAP Analytics products at the SAP Help Portal: <ul style="list-style-type: none">• BusinessObjects Business Intelligence• Enterprise Performance Management Certain guides linked to from the SAP Help Portal are stored on the SAP Service Marketplace. Customers with a maintenance agreement have an authorized user ID to access this site. To obtain an ID, contact your customer support representative. To find a comprehensive list of product documentation in all supported languages, visit: https://help.sap.com/viewer/product/SAP_ANALYTICS/latest/en-US
SAP Support Portal	https://support.sap.com/en/index.html  The SAP Support Portal contains information about Customer Support programs and services. It also has links to a wide range of technical information and downloads. Customers with a maintenance agreement have an authorized user ID to access this site. To obtain an ID, contact your customer support representative.
Developer resources	https://archive.sap.com/documents/docs/DOC-8777 
Notes	https://support.sap.com/en/my-support/knowledge-base.html  These notes were formerly known as Knowledge Base articles.
Forums on the SAP Community	https://community.sap.com/topics 

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