

Deploying IBM Rational License Key Server 8.1.1 effectively in your organization

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Introduction

If you work or have deployed either Telelogic or Rational products, then you are aware of licensing. This paper describes the key changes introduced in Rational License key Server version 8.1.1. It reduces overhead and provides additional features. If you already have older installation of a license server, you need not worry; this white paper caters to the necessary actions you need to perform for the migration.

This white paper provides recommendations on maintaining a stable and efficient license service. This white paper also offers tips for enhancing the performance. There is a case study on the performance benchmarks of Rational License Key Server 8.1.1. This benchmark figure can then used by administrators in sizing efforts for Rational License Key Server deployment.

The information covered in this white paper is helpful for anyone associated with the with the license server deployment. In particular, this affects license administrators, system administrators, network administrators, or end-users who might be involved in the process of deployment of RLKS in their organization.

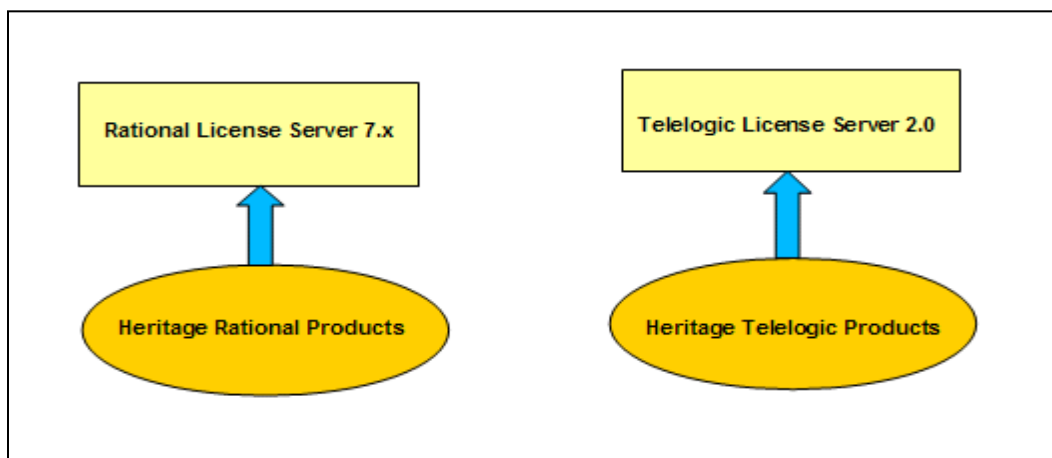
This white paper covers the different aspects essential for a successful deployment, such as system requirements, system resources, and network and security considerations for Rational License Key Server 8.1.1. The information presented here are guidelines. There are scenarios that might not mirror that of your environment. In such cases, you need to contact the IBM technical team for further information.

IBM Rational License Key Server 8.1.1

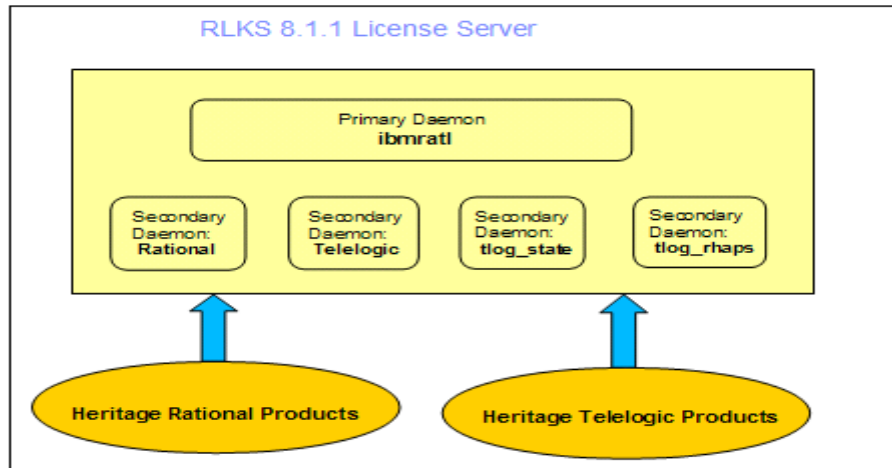
Rational License Key Server 8.1.1 is an application that serves floating license keys to the IBM Rational products running on remote client machines or on the same machine as the license server. It uses version 11.8 of the FlexLM components and replaces Telelogic license server TLOG 2.0. It also replaces Rational license server 7.x and beyond. Rational License Key Server 8.1.1 is compatible with earlier product versions.

Technical change Summary of V8.1.1

Before RLKS 8.1.1



Before Rational License Key Server 8.1.1 was released, to serve licenses to both Rational and Telelogic products, you needed to install a separate Rational license server 7.x for heritage Rational products. Similarly, with heritage Telelogic products, you needed Telelogic license server 2.0. However, the new release of 8.1.1 integrates the two solutions into one that can serve licenses for both Telelogic and Rational products.

After RLKS 8.1.1

- Rational License Key Server 8.1.1 is a Common Vendor Daemon (CVD). CVD is a FlexLM methodology.
- In addition, Rational License Key Server 8.1.1 adds token support for core rational products and formerly Telelogic products that already have token support.

Advantages of using V8.1.1 over older versions

- Rational License Key Server uses common vendor daemon technology (ibmratl). Hence, it reduces the overhead of installing a separate Rational license server 7.x for heritage Rational products and Telelogic license server 2.0 for heritage Telelogic products.
- Rational License Key Server 8.1.1 adds token support for core Rational products and formerly Telelogic products that already have token support.

Ensuring stable and efficient License server service

Before installing Rational License Key Server 8.1.1 in your enterprise, consider designing your license management architecture. Perform a proper high level planning of the different system requirements, hardware, software, security, and network bandwidth factors to ensure a stable and efficient license server service.

When you select a system for installing the license server, you need to consider:

- System requirements
- Networking requirements
- Security

System requirements for V8.1.1

Refer to this table for the platforms supported for Rational License Key Server 8.1.1. The system where you intend to install the license server should have either one of these operating systems installed.

Platform Type	Operating System	32 bit / 64 bit	IPv4 / Ipv6 Compatible
Windows	Win 2003 Win 2008 Win XP Vista Windows 7	32 bit	IPv6
Redhat Linux x86	RHEL 4 RHEL 5	32 bit	Both
SuSe Linux x86	SUSE 9 SUSE 10 SUSE 11	32 bit	Both
Redhat Linux PPC	RHEL 4 RHEL 5	32 bit	IPv6
SuSe Linux PPC	SUSE 9 SUSE 10	32 bit	IPv6
Solaris Sparc	Solaris Sparc 8, 9, 10	32 bit	Both
Solaris x86	Solaris 9 Solaris 10	32 bit	IIPv6
AIX	AIX 5, AIX 6	32 bit	IPv6
HP Itanium	HP 11i v2, 11i v3	64 bit	IPv6
HP PARISC	HP 11i v2, 11i v3	32 bit	IPv6

Note:

IPv4: IPv4 only license server

IPv6 Compatible: Dual stack license server

Both: Both versions of the server are available

1. Earlier versions implement FLEXlm on AIX and HP-UX in order to maintain support for older versions of the operating system
2. Imutil fails on Microsoft Windows 2008 and Windows 7 OS. The workaround is to edit the hosts file in the system32 folder (C:\Windows\System32\Drivers\etc\hosts) to contain the IP address and the machine name. (For example, 192.168.1.2 <host name>)
3. There is no support for Dongles on Windows 2008 and Windows 7.
4. Rational License Server is a 32-bit application and runs in 32-bit mode on 64-bit operating systems.

Processor

Rational License Key Server uses less processor (CPU) time. However, if you have many concurrent clients that are exchanging heartbeats with the license server, then the CPU cycle time increases. The system should have enough processor cycles.

Hard Disk space and Memory

A typical installation of Rational License Key Server 8.1.1 on the Windows platform take around 75~80 MB of hard disk space. However, the debug log files (Imgrd.log) created by the license server for diagnostic purpose can grow significantly over a time. This is due to the amount of logging that takes place, especially if there is a lot of licensing activity. You have to decide how to store and back up the log files when needed.

The memory consumption for license server is less and increases with the increase in number of concurrent users. On Windows and Solaris, Imgrd and vendor daemon use around 2MB each.

Network requirements

License transactions in the form of checkins and checkouts do not involve large amount of data sent through the network. Generally, transfers are less than 5KB of data. Hence, the license server runs fine on slow networks for less number of clients. For a large number of clients that runs into hundreds of clients, each of which exchange heartbeat messages with RLKS, the network bandwidth used might start to become significant and you might want to split the total number of licenses on two servers. The clients can then be configured to point at the two servers by the adding the appropriate path to the two servers in the environment variable LM_LICENSE_FILE.

Accessing your license server in a different domain

It is possible in a real time scenario to have your license server and the client applications located in different domains. In that case, you need to use fully qualified host name of the license server.

For example: abc.xyz.com, where abc is the host name of the license server.

To ensure that the clients are able to obtain licenses smoothly from the license server hosted on a different domain,

- Ensure that the clients are able to ping the server.
- Ensure you have the fully qualified host name for the server name in the license file.
- Add the server name alias in the hosts file.
- You should check if the server and client can telnet the FQDN.

Having said the above, the license server and the client machines should be hosted in the same subnet to avoid any network related issues.

Security considerations

Most organizations have their license server behind a firewall for security. In such scenarios, you need to open the ports for daemon and lmgrd bi-directionally in the firewall for the clients to be able to communicate with the license server. By default, the ibmratl DAEMON uses random ports. If you want to limit communication through a firewall, you can specify a port number for the ibmratl DAEMON to use. To do this, open your license file, and type **PORT=<port number>** at the end of the DAEMON ibmratl line.

For example:

```
DAEMON ibmratl "<Path to the daemon>" PORT=27000
```

You must allow bi-directional access through the firewall for the port specified on the DAEMON line and the port on the SERVER line.

Installation and configuration of V8.1.1

In this section covers the installation and configuration of Rational License Key Server 8.1.1 on Windows and UNIX platforms.

Configuring a license server on Microsoft Windows

Prerequisites and system requirements

- The license server installs on Windows operating systems, except Windows XP Home computers.
- The Windows server must have a C:\ drive.
- You must have Windows administrator privileges on the local computer.
- The default TCP/IP port number is 27000.

Note: Make sure that you have a current backup of your registry and system directories before you start the installation program.

Downloading the Rational License Key Server software

You can download the license server from the [IBM Rational Download and Licensing Center](#). Registration is required.

Installing the Rational License Key Server

You use IBM Installation Manager to install the IBM Rational License Key Server. For information about Installation Manager, see the Installation Manager Information Center: <http://publib.boulder.ibm.com/infocenter/install/v1r4/index.jsp>

You can install the Rational License Key Server for an IPv4 or IPv6 network.

Note:

For IPv6, you must enable the IPv6 stack on Windows before you install the Rational License Key Server.

You cannot upgrade from an earlier release of Rational License Key Server. If you have Rational License Server 7.1 or earlier installed, you must uninstall the license server before installing Rational License Key Server 8.x.

You cannot upgrade license server version 7.1 or earlier to version 8.x. Rational License Key Server version 8.x cannot be on the same computer as IBM Rational Common License version 7.1 or earlier and IBM Rational License Server TL 2.0.

To install the Rational License Key Server on Windows:

1. Log in as a user with administrator rights on the local computer on which you want to install the product.
2. Extract the installation files for Rational License Key Server. The extracted files are the repository for Rational License Key Server. The installation files include Installation Manager. You do not need to download Installation Manager separately.
3. Navigate to the `//RLKSSERVER_SETUP/disk1` directory.
4. Double-click **launchpad.exe**. The IBM Rational License Key Server splash screen opens.
5. Read the release information by clicking Readme.
6. Click **Install** or Update IBM Rational License Key Server to open the Installation Manager interface. If IBM Installation Manager is not installed or the installed version of Installation Manager is an earlier version than the Installation Manager version

shipped with Rational License Key Server, you must install Installation Manager before installing Rational License Key Server:

- a. Installation Manager opens to the Install Packages window. You will only see Installation Manager. Rational License Key Server is not listed.
 - b. To install Installation Manager, follow the instructions in the Install wizard.
 - c. When the installation of Installation Manager is complete, click **Restart Installation Manager**.
7. Click **Install** to install Rational License Key Server.
 8. Select Rational License Key Server. Click **Next**.
 9. Click **Next** after the prerequisites are validated. To validate prerequisites again, click **Recheck Status** located in the lower right corner.
 10. Accept the license agreement. Click **Next**.
 11. For both the Shared Resources directory and Installation Manager directory locations, either accept the default value or enter a different directory location. Click **Next**.

Important: You cannot change the location of the Shared Resources directory after Installation Manager is installed.

Default values

Shared Resources directory: C:\Program Files\IBM\IMShared

Installation Manager directory: C:\Program Files\IBM\Installation Manager\eclipse

12. Accept the default installation directory for the license server or enter a different installation directory. The default installation directory is: C:\Program Files\IBM\RationalRLKS.
13. Select additional languages to install then click **Next**.
14. Review the features to install then click **Next**.
15. Click **Install**.
16. Click **Finish**.

Configuring IBM Rational License Server 8.1.1 on UNIX

Note: If you have Rational License Server 7.1 or earlier installed, you must uninstall it before installing Rational License Key Server 8.x. You cannot upgrade license server version 7.1 or earlier to version 8.x. Rational License Key Server version 8.x cannot be on the same machine as IBM Rational Common License version 7.1 or earlier. It also cannot be on the same machine as IBM Rational License Server TL 2.0.

Steps for installation on UNIX

1. Download the IBM Rational License Key Server from the Passport Advantage Website:
<http://www.ibm.com/software/howtobuy/passportadvantage/index.html>

The download contains a tar.gz file, the name of which depends on the intended platform. Download the version for the platform on which you are installing.

2. Unpack the files. You can use gzip or gtar as shown in this example. The example of using the C85W8JA tar file:

```
gzip -dc C85W8JA.tar.gz | tar -xf -
```

A directory is created. The directory is named RLS.8.0.0.PLATFORM_x86, where PLATFORM is one of AIX®, Linux, Solaris, or HP-UX.

If you have GNU tar (gtar), it has the option to uncompress the file (-z) as it untars the file. For example:

```
gtar -xzf C85W8JA.tar.gz
```

3. Start the license_setup script in the directory created when you unpacked the files. For example:

```
cd RLS.8.0.0.PLATFORM_x86
./license_setup
```

The script starts by providing instructions for using license_setup. The script prompts you for a Rational directory, such as rational_dir/config directory.

4. Choose to accept or not accept the IBM Rational license agreement. If you accept the license agreement, the script continues. If you do not accept the license agreement, you cannot continue with the script. Exit the program. The script exits and does not change the server.
5. Provide your license file information. Import the information from the license file by providing a path.

Example path: /var/IBM/lic/license.

6. View the license information and click **Enter**.
7. Define the location for the file **license.dat** file created from the information supplied by the file. By default, license_setup creates the file **license.dat**.

Example path: `/var/IBM/Rational/license.dat`.

Choose either the default path that `license_setup` has selected or specify an alternate path.

8. Proceed with the License Check menu.
9. Perform options 1-3 sequentially and continue to the next menu. If you are setting up a permanent authorized user license, perform option 1 only.

Note: These options are the default settings provided by `license_setup`.

Migration scenarios for V8.1.1

These are scenarios of migration to Rational License Key Server 8.1.1.

Scenario A: Migration of Rational license server 7.x to V8.1.1

You already have an existing Rational license server 7.x serving licenses to Rational products. You require the migration to Rational License Key Server 8.1.1. To do that, follow these procedures:

- Uninstall Rational license server.
- Install Rational License Key Server 8.1.1.
- Installer runs the migration utility, changing the vendor line to "VENDOR ibmratl".

Scenario B: Migration of Telelogic license server 2.0 to V8.1.1

You already have an existing Telelogic license server 2.0 serving licenses to heritage Telelogic products. You require the migration to Rational License Key Server 8.1.1. To do that, follow these procedures:

- Uninstall Telelogic license server.
- Install Rational License Key Server 8.1.1.

Note: Heritage Telelogic products typically use port 19353. Rational License Key Server 8.1.1 uses 27000 as the default port. The migration utility does not change the port number. Telelogic clients can continue to use port 19353 once license file is migrated during installation.

Scenario C: Telelogic and Rational License server co-existing

You already have an existing Telelogic license server 2.0 serving licenses to heritage Telelogic products, and an existing Rational license server 7.x serving Rational products. You require a migration to Rational License Key Server 8.1.1. To do that, follow these procedures:

- Uninstall Telelogic license server and Rational license server
- Install RLKS 8.1.1
- During installation, migration utility changes VENDOR line in Telelogic license files and rational license files.

After you have performed the migration to Rational License Key Server 8.1.1...

The question arises: How do you start Rational License Key Server 8.1.1 with different license files?

Try these options to achieve this:

1. Use LMTOOLS on Windows. Put license files for Telelogic and Rational under **C:\Program Files\IBM\RationalRLKS\common** and specify the path in LMTOOLS. License server picks up all license files in this directory while starting up.
2. You can start the license server from the command Line by issuing this command:

For example, on Windows:

`lmgrd.exe -c rational.upd;telelogic.dat -l license.log` (Note the semi-colon).

3. Manually merge the two license files and start the server with a single merged license file. Modify the registry settings as specified in [Technote 1403433](#).

License file before and after migration

This is an example of a typical license file (.upd) generated for Rational products before the migration. It typically has two daemon lines, `ibmratl` and `rational`.

```
#####
# IBM Rational software
# License keys for host: 000C297A9536
#-# FLEXlm Version
#-# Last Issued: 2010-07-28 08:11:33
# #####
SERVER qsbfp 000C297A9536
VENDOR ibmratl
VENDOR rational

INCREMENT ClearQuest rational 1.10000 15-jan-2011 2 E432677A9118 \
  VENDOR_STRING="0|Floating|0| ClearQuest:1.1" DUP_GROUP=UH \
  vendor_info="0|IBM Rational ClearQuest Floating License Key|0" \
  ISSUED=28-jul-2010 NOTICE="Sales Order Number: IBM INTERNAL \
  ACCOUNT AP 2010 for IBM Internal Use 2010 AP" ck=69 SN=4790990
```

- After migration, only one vendor daemon line remains, that is `ibmratl`.
- For Telelogic products, the `VENDOR telelogic` line remains in the `license.dat` file. RCL will automatically point the telelogic daemon to `ibmratl.exe` (in Windows) or `ibmratl` (in UNIX).

```
#####
# IBM Rational software
# License keys for host: 000C297A9536
#-# FLEXlm Version
#-# Last Issued: 2010-07-28 08:11:33
# #####
SERVER qsbfp 000C297A9536
VENDOR ibmratl

INCREMENT ClearQuest rational 1.10000 15-jan-2011 2 E432677A9118 \
  VENDOR_STRING="0|Floating|0| ClearQuest:1.1" DUP_GROUP=UH \
  vendor_info="0|IBM Rational ClearQuest Floating License Key|0" \
  ISSUED=28-jul-2010 NOTICE="Sales Order Number: IBM INTERNAL \
  ACCOUNT AP 2010 for IBM Internal Use 2010 AP" ck=69 SN=4790990
```

Rational License Key Server 8.1.1 scalability

The maximum number of simultaneous checkouts performed by the license server varies by platform.

On Windows, the license server can perform up to a maximum of 4000 simultaneous checkouts. After reaching the limit, the license server stops responding to checkout requests from clients.

On UNIX platforms, the configuration of file descriptors determines the limit on simultaneous checkouts. Increasing the number of file descriptors increase the number of simultaneous checkouts.

- For example symptoms and solutions for simultaneous checkout problems, see [technote 1441775](#).
- On Windows, you can increase the limit by adding more license servers. The total number of licenses divides across the license servers. See [technote 1132735](#) for information on connecting to license servers in serial.
- For Windows products, you can configure the license server on any supported UNIX system. The UNIX system is configurable to support more simultaneous checkouts. [Technote 1441775](#) has more information on that subject.

Case study - Performance benchmark of V8.1.1 on Solaris

Disclaimer

Any performance data contained herein is measured in a controlled test environment. Therefore, the results obtained in other operating environments might vary significantly. You should verify the applicable data for their specific environment.

Purpose

The purpose of performance tests on Rational License Key Server is to help an administrator of RLKS to get a benchmark figure of RLKS performance on typical hardware. This benchmark figure can then be used by the administrator in sizing efforts for Rational License Key Server deployment. It is advisable to use the test data as approximate figures and not as an absolute one, since results will vary depending upon the environment.

Installation of Rational License Key Server 8.1.1 occurs on a standard, medium range, server-class hardware system. Here are the systems details:

System Details

System Configuration: Sun Microsystems sun4u Sun Fire V240
System clock frequency: 167 MHz
Memory size 4GB

CPU

1503 MHz 1MB SUNW,UltraSPARC-IIIi
1503 MHz 1MB SUNW,UltraSPARC-IIIi

Network configuration

The Server machine is behind a standard firewall protecting the intranet assets. The client machines are accessing from LAN.

Goals of the performance tests

Three goals have been identified for running these performance tests

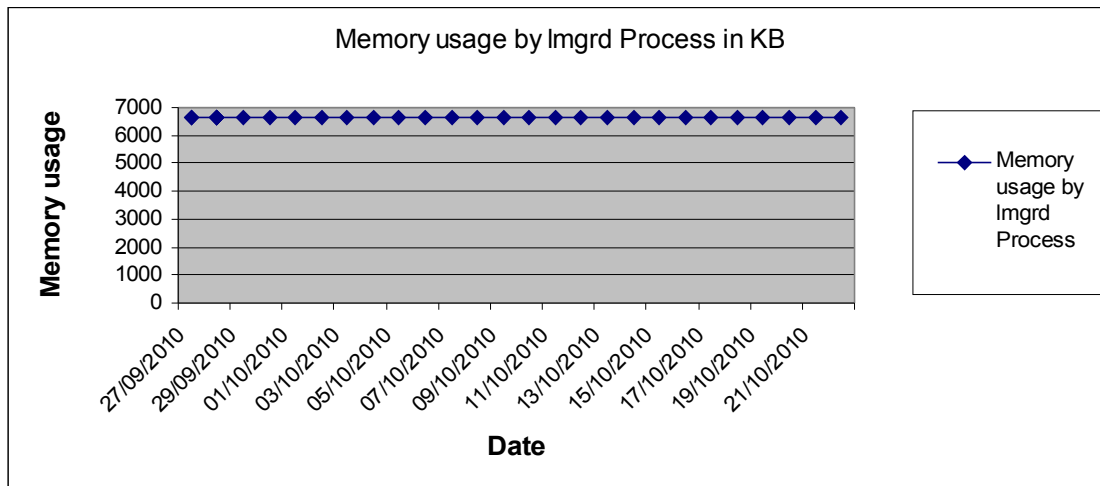
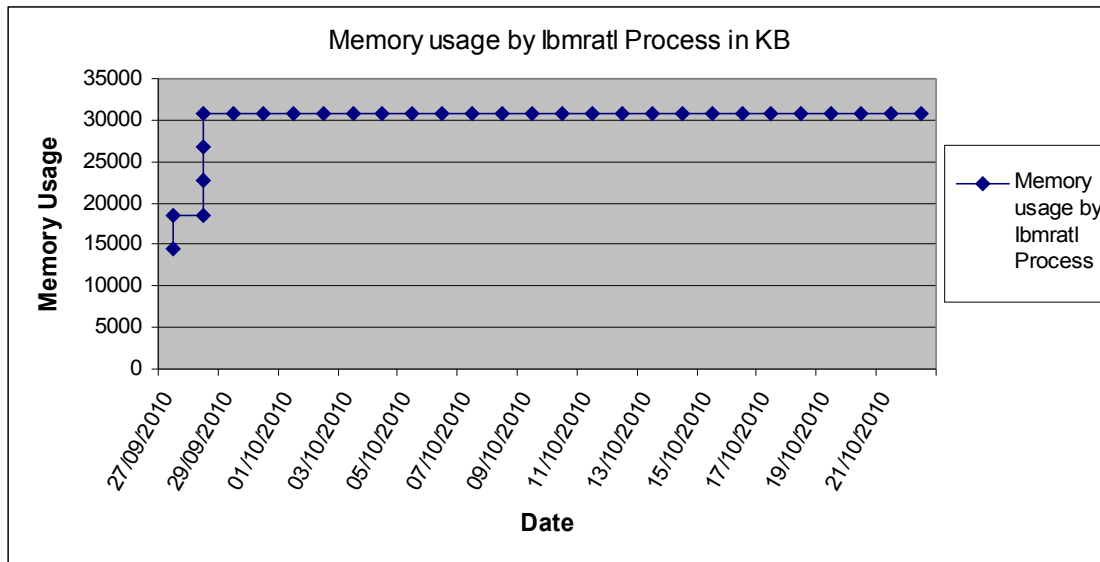
1. ***Capture response time of typical licensing operations*** (like checkout, checkin) in typical environment. You have defined typical environment as a window of 10 hours, with an average load of approximately 200 connections to the server during the peak time. These tests are "Normal usage" tests.
2. ***Capture the memory consumption of Rational License Key Server*** for a period of 25 days. Check for any degradation of the same.
3. ***Stress test the Rational License Key Server*** and capture the performance on various parameters. Test for parameters like number of simultaneous requests and the maximum number of checkouts the server can handle.

Test results

Normal usage test

During the normal usage tests there was monitoring of the system Processor Usage, License server Process Memory usage, and System Disk. There was no visible fluctuation. The average response time for client request was 660 ms; the maximum time taken for a request was 1047 ms.

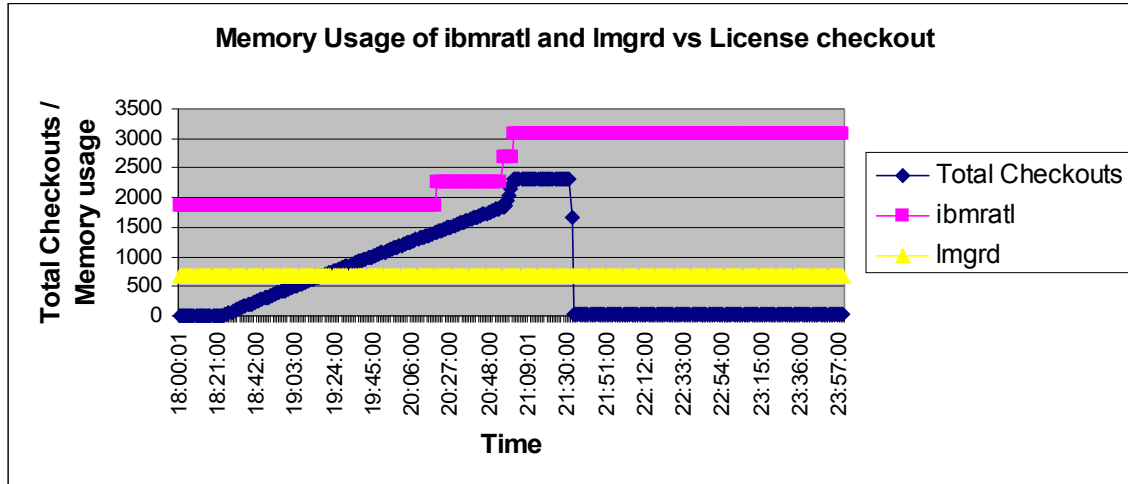
Memory usage over Period of 25 days



The vendor process "ibmratl" is allocated memory based on simultaneous connections it has to support. The allocation of memory is incremented in a chunk of 4096KB. Each connection consumes approximately 12KB. For 8000 Connections, ibmratl process uses 95248KB of memory.

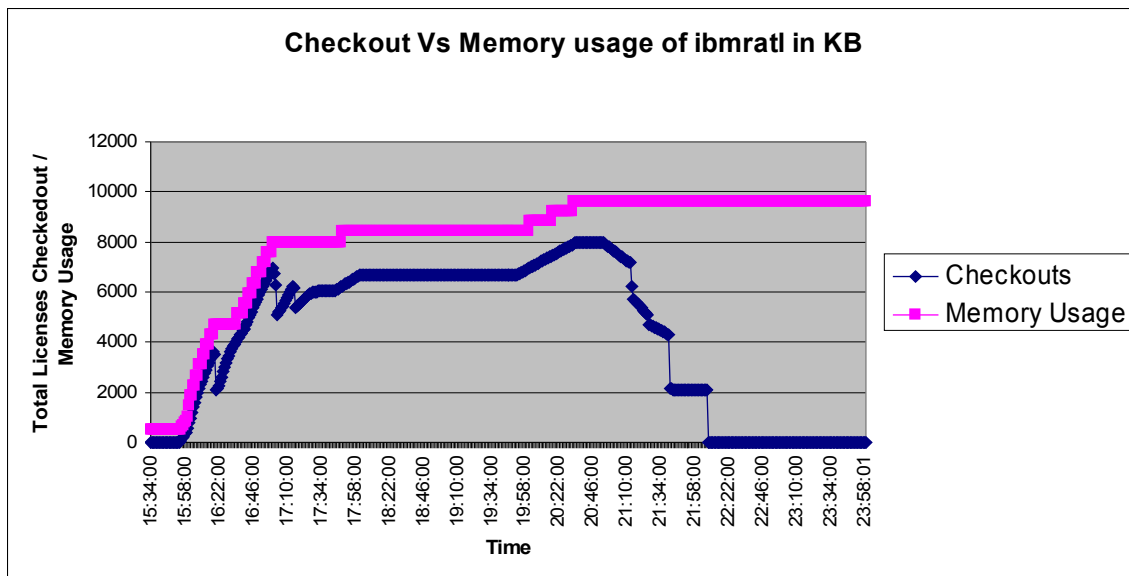
The lmgrd process usage is constant.

This chart describes the relationship between the simultaneous connection and memory usage:



Stress test

The stress test involves the bombardment of the license server is from four different machines. The license server was able to serve approximately three checkouts per second. The License server was able to serve 8000 active license checkouts at the end of the test. That number is not the limit; it is the number of licenses that were available on the server.



Each checkout opens up one TCP/IP Socket connection to the license server. Hence, at a load of 8000 checkouts, there are 8000 TCP/IP connections to the server.

Overall usage of memory at the end of the test was at 95248KB.

Summary of the results

Average response time of a licensing operation is approximately 660 ms. Memory usage over a period of time (25 days) has been constant and there are no signs of memory degradation. An average of three checkout operations completed by the server under stress conditions.

Rational License Key Server 8.1.1 performance tips

- The clients and the license server should be on the same sub-net.
- The Imgrd.log files can grow large and over a short time period. Large log files can slow down the system and in turn RLKS performance. When not required, you can clean up these files or back them up on another file storage system than the license server.
- The network should be reasonably stable and available. Otherwise, clients are not able to get licenses and will lose licenses that are already checked out.

Troubleshoot license issues

Here is a collection of common license questions and error messages. For more common license questions, see the Frequently Asked Question documents on the [IBM Rational Support Portal](#).

- [License server and floating licenses](#)
Using licenses from a different domain, installing on a second disk, and restarting a redundant server.
- [Upgrades](#)
Obtain temporary license keys before upgrading a server.
- [Check the Windows license server](#)
Determine whether one of the license daemons: lmgrd.exe or ibmratl.exe, is not working.
- [Check the Windows network connection](#)
Steps to test the network connection between the license server and the client.
- [Problems starting the redundant license servers on UNIX](#)
If the license server does not start, check the corresponding lmgrd log file. The lmgrd log file is specified by LICENSE_LOG in start_lmgrd.
- [Technotes](#)
The IBM Rational software site contains technotes about additional licensing issues.

Conclusion

In summary, it is important that proper planning goes into the deployment of the Rational license key server to ensure a stable and efficient license service available. This white paper gives you those insights of the implementation planning and the benefits of using Rational License Key Server 8.1.1 over earlier versions.

It integrates the two existing solutions of Rational and Telelogic into one solution under CVD technology. It also reduces administrative overhead and provides for token support. The performance tests on Rational License Key Server 8.1.1 can help you to derive a benchmark figure of Rational License Key Server performance on a certain hardware that can be used for sizing efforts for Rational License Key Server deployment.

References

Rational licensing Information Center:

<http://publib.boulder.ibm.com/infocenter/rational/v0r0m0/index.jsp>