

# **RLM License Administration**

**RLM v12.3**

**Oct, 2017**

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RLM contains software (the GoAhead WebServer)\_developed by GoAhead Software, Inc. (<http://www.goahead.com>)

# **Section 1 – License Management**

## **Introduction**

# Introduction

## About this Manual

This manual describes setup and maintenance of the RLM licensing system, and as such it is intended for license administrators and users at organizations which have purchased software which uses the Reprise License Manager. This manual explains how to install and configure the licensing system included with your software.

## Introduction To *RLM*

You are most likely reading this manual because one or more of your software vendors (ISVs) have included RLM in their product(s) to enforce their license agreements. This manual describes the components of RLM that you need to understand in order to accomplish day-to-day license administration tasks.

RLM allows your organization to know that you are using purchased software within the license limits set by your ISV. In addition, RLM collects usage information (at your option) for later reporting and analysis. This usage information is provided in a fully-documented report log format, described in Appendix A of this manual.

When one of your ISVs delivers software to you that incorporates RLM, in addition to the normal application files, you will receive some additional RLM components:

- the rlm (generic) license server provided by Reprise Software, called "rlm" on Unix systems, or "rlm.exe" on Windows. This is the same for every ISV who uses RLM.
- the rlm utilities ("rlmutil" on Unix, "rlmutil.exe" on Windows) provided by Reprise Software. This is the same for every ISV who uses RLM.
- A custom license server, built from components from Reprise Software by your ISV. This server will have a different name for each ISV.
- a license file to describe your rights to the product. This license file is unique to your site.

In addition to these components which your ISV supplies, you can create an ISV options file to control various aspects of operation of each licensed product. This options file is described later in this manual. In addition, an RLM options file allows you to restrict access to various administration commands.

RLM is a client-server system, with license requests transmitted over TCP/IP from the software application to a license server that controls license usage rights.

## What sets RLM apart?

RLM was designed from the start to emphasize *openness*, *transparency*, and *simplicity*.

RLM is *open* because we publish the format of our report log file, so that you can always examine and generate usage reports on licensing activity from the RLM servers.

RLM is *transparent* in the sense that we do not allow "back doors" which lead to unique behaviors from one ISV to another. In addition, we have removed policy from the application code, and placed it into the license key itself, so that everyone will be able to understand the license terms without having to understand a particular implementation by an ISV.

RLM is *simple* because we include functionality like truly automatic selection of license servers from a set of multiple, independent servers. In older license management systems, the ISV ends up writing much code to manage multiple license servers. This is handled by RLM itself.

## Software License Management Basics

RLM is similar in structure to most popular license managers. RLM consists of 3 major components:

1. a client library
2. a license server (RLM has 2 license servers - a generic server called *rlm* and an ISV-specific server.)
3. a text file which describes the licenses granted (the *license file*).

Your ISVs application is linked with the client library which provides access to the license management functions.

The license server is used for floating licenses and logging of usage data. You, as a License Administrator, have the ability to control certain aspects of the license server's operations by specifying options in a file called the ISV Options File.

The RLM client library (linked into your ISVs application) and the license server are both controlled by license authorizations stored in a text file called the *license file*.

Most license managers provide APIs with calls to control many of the aspects of licensing behavior, as well as options within the license servers to control licensing behavior. The design philosophy of RLM is to preserve the simplicity of the system for both ISVs and License Administrators by avoiding all unnecessary options in the client library and the license servers and moving all these options to the license file, where they are visible and understandable by everyone. In general, license policy should be kept out of the application and the license server, and placed into the license itself. This makes for a more understandable licensing system for both ISVs and License Administrators. The API is simpler, and the license server performs in a more standard way from ISV to ISV. This prevents license management confusion by customers. We learned this the hard way when we supported hundreds of customers in the past, and applied these lessons to the design of RLM.

## What's New in RLM v12.3

This section lists the new features in RLM v12.3, along with pointers to the relevant sections in the manual.

- *The report log now logs the server's timezone data.* See **Reportlog File Format** on page 99 for more information.
- *Licenses which are roaming can now have their roam duration extended even while the client system is disconnected.* See **If you want to extend the period of the Roamed License** on page 83 for more information.
- *The RLM report log now logs the timezone information at startup.* See **Reportlog File Format** on page 99 for more information.
- *When a server is acting as a failover server for another server, it now displays a list of valid licenses for the primary server upon startup,* in order to allow you to verify that there is a good license file for the primary accessible on the failover server.

## **Section 2 – License Administration Basics**

This section of the manual contains the information you need to install and manage your purchased applications which use the RLM license manager.

# Installing an RLM-licensed Product

When you receive a product licensed with RLM, your Software Provider (or Independent Software Vendor, referred to in this manual as your “ISV”) will provide an installation procedure that installs the license management components (in the case of floating licenses, this is typically separate from the installation procedure for the application, since the license server processes usually run on a different machine from the application). Your ISV will generally make the licensing installation as transparent as possible.

In some cases, your ISV will not provide you an installation procedure for the license server (the license server is required for floating licenses only – it is not required for nodelocked licenses). This might happen, for example, if you want to run the server on a platform which your ISV does not support. The remainder of this section describes a manual RLM server installation, in the event you need to install it yourself or troubleshoot your installation.

First, you need the three required licensing components for the license server:

- The generic license server, *rlm* on Unix, *rlm.exe* on Windows.
- The ISV's license server, either a settings file named *isv.set*, or a binary named *isv* on Unix, *isv.exe* on Windows.
- The license file which describes your rights to the product.

Optionally, you might want the RLM utilities - *rlmutil* on Unix, *rlmutil.exe* on Windows. These utilities are often installed as their separate command names, see License Administration Tools on page 39.

For the easiest installation, place all three components in the same directory (put the utilities, if you want to install them, in that directory as well.) In this way, license servers, utilities, and application programs will all be able to locate the license without any additional environment settings for users. All that remains to get floating licensing working is to start the license servers. (Note: if you did not locate the license file (or a link to it) in the binary directory, you need to provide a pointer to the license file (or license server) to the application, using the *RLM\_LICENSE* environment variable.)

To start the license server (again, only required for floating, or counted licenses):

1. place the license file into the binary directory (or startup directory) and name it *something.lic*. If you do not do this, then set the *RLM\_LICENSE* environment variable to the path of the license file.
2. execute the *rlm* command:

```
% rlm > output_file
```

To enable your users to find the license file or license server, either:

1. Put the license file (named *something.lic*) in the binary directory with the application program (RECOMMENDED), OR
2. `setenv RLM_LICENSE license_file_path`, OR
3. `setenv RLM_LICENSE port@host`, where *port* is the port # in the license file, and *host* is the hostname in the license file.

Note: if you are using RLM v10.0 or later (both clients and servers), and you are running on a local-area network, the client will broadcast to locate the license server, and no other configuration is required beyond setting up the license server.

## **Here are the details of how floating licensing works**

To use floating licenses, an RLM client connects to an RLM server to check out a floating license. (The RLM client is usually part of the licensed application.)

### **RLM Server**

- The RLM server is started by a start script on the server machine, or started manually.
- The RLM server scans for valid license files, for one or more ISVs. For each ISV, rlm will start the ISV server – either an ISV server binary, or another copy of rlm that takes on the personality of the ISV server via the ISV server settings file.
- The RLM server opens and listens on one or more ports to receive license requests from the RLM clients.
- The RLM server port numbers are specified on the HOST line of the license files. Default (if none is given) is 5053.
- The ISV server's port number is specified on the ISV line of the license file. If there is more than one license file, there can be more than one port defined for the ISV server. If no port number is set, a random free port number is used.
- Once a day - at midnight local time - the RLM server will trigger a re-read of all ISV license files. All ISV servers will then reread the license file and continue processing requests.

### **RLM Client**

- The *application* contains an embedded "RLM client". Eventually some part of the application will request a license "check out". To process this request, the RLM client connects to the RLM server.
- The RLM server gets the requests from the RLM client, looks up the ISV (in its internal list of ISV servers), and forwards the RLM client to the correct ISV server port number.
- The RLM client then connects to the ISV server and sends a "check out" request for the requested license.
- NB: The RLM client needs to 'know' only the RLM server host name and port number. The *application's* installation procedure must document how to set these values.

### **Troubleshooting in large networks**

- In order to check out a license, the RLM client (embedded in the *application*) needs to be able to connect to the RLM server **and** to the ISV server. Large companies with internal firewalls must make sure both ports are accessible for the RLM client to successfully check out a license.

# The License Server

The license server consists of at least two processes

- The generic server, called *rlm*
- At least one ISV server, named *isv*

The *rlm* server is provided by Reprise Software, and is completely generic. The ISV server is configured to contain license key validation that is ISV-specific.

The *rlm* server handles requests from clients and directs them to the appropriate ISV server. In addition, the *rlm* server watches for failures in ISV servers and restarts them when appropriate. The *rlm* server also provides status to the various utilities, when appropriate.

The *rlm* server initiates a reread of the license files (for itself and any ISV servers) at midnight every night.

The *rlm* server is delivered with an embedded Web Server to perform normal administration tasks. For more information on the web server interface, see The RLM Web Server on page 46.

**Note that you should *NEVER* run the *rlm* servers as a privileged user (root on unix or administrator on Windows).**

## **rlm startup options**

The *rlm* command is:

```
% rlm [-c license_file] [-dat] [-dlog [+]logfile] [-info] [-l]
      [-noudp] [-nows | -ws port] [-x [rlmdown|rlmremove]] [-v]
      [-install_service] [-service_name sname]
      [-user username -password password]
      [-isv_startup_delay seconds]
```

The **-c license\_file** option specifies which license file to use. This option overrides the setting of the RLM\_LICENSE environment variable. Note that the -c option first appeared in RLM v2.0. Beginning in RLM v6.0, the **license\_file** parameter can be a directory containing license files, all of which will be processed.

The **-dat** option specifies that license files should have the extension ".dat", rather than ".lic". If -dat is specified, the *rlm* server will search for all files ending in ".dat" instead of ".lic" as documented elsewhere. This option first appeared in RLM v3.0.

The **-dlog logfile** specifies the pathname for the server debug log. If **logfile** is preceded by the '+' character, the logfile will be appended, otherwise it is overwritten. This option first appeared in RLM v2.0. (Note: starting in RLM v4.0, all ISV servers will write their output to the same logfile specified in the -dlog option.)

The **-info** option causes RLM to print information about all copies of *rlm* that are running on this computer, including copies which have run in the prior 24 hours, then exit.

The **-install\_service** and **-service\_name sname** options are used to run the *rlm* server as a service under windows. Optionally a username and password of a user account under which you wish to

run the service may be specified, via the `-user` and `-password` arguments. See the description of running the `rlm` server as a service below.

**Notes on using the `-user` and `-password` options:**

1. Windows expects the username argument to be `<domain>\<user>`. To use the local system domain, specify `.\<username>`, eg `.\joe`. Without the `.\` you will get a service creation failure.
2. In order to run a service, the account specified by the `-user` argument must have the "Log on as a Service" property set. For details on how to set that property on an account, see this blog: <http://blogs.msdn.com/b/ablock/archive/2008/09/18/setting-the-properties-the-log-on-as-a-service-and-allow-log-on-locally.aspx>

The `-isv_startup_delay seconds` option specifies that when running as a Windows service, `rlm` should delay *seconds* seconds before starting up the ISV servers. If not specified, there is no delay. This is useful if a license file specifies a `hostid` of type `rlmid1` or `rlmid2` (hardware keys), the server is started at system boot time, and the key driver is not yet started at the time the ISV server needs to read it. This option was introduced in RLM v8.0BL6.

The `-l` switch causes `rlm` to only process command-line utilities from the local host (v12.1+)

The `-nows` and `-ws port` options control the operation of the embedded Web Server. The `-nows` option instructs the `rlm` server to not start the embedded web server. The `-ws port` option instructs the `rlm` server to use *port* as the port number for the web server.

The `-noudp` option tells RLM to not bind the UDP port (5053) used for replying to broadcast messages from clients in RLM v10.0 and later.

The `-v` option causes RLM to print its version and exit. This option was introduced in RLM v9.3BL2.

The `-x [rlmdown | rlmremove]` option controls whether the `rlmdown` and/or `rlmremove` commands will be processed by the server. Specifying only `-x` will disable both commands. Specifying either command name after the `-x` will disable just that command.

These options can appear in any order on the command line.

If you want to generate a report log file, specify this on an ISV-by-ISV basis in the individual ISV's options file. See the description of the `REPORTLOG` line in The ISV Options File on page 65 for more information.

Note that if the `rlm` server cannot bind the web server port (5054 by default), it will exit. Note that the web server default port was 9000 prior to RLM v6.0.

Also note that, prior to RLM v3.0, if there was not at least one license file with the current hostname (as returned by `gethostname()`), or "localhost", the servers would not run. This condition generates a warning in RLM v3.0 and later.

Starting in RLM v10.0, if the ISV server pathname is incorrect in a license file which RLM is processing, RLM will attempt to start that ISV server using the path information in other license files, if present.

## The Server Debug Log

Both RLM and the ISV servers write debug logs, useful for diagnosing licensing inconsistencies or failures. By default, this output goes to stdout, which is usually the window where you started rlm. You can change the location of the debug log with the `-dlog_logfile` command line argument to rlm, described above. You can also change the location of the ISV server debug log with the `DEBUGLOG` line in the ISV options file. See *The ISV Options File* on page 65 for more information.

When starting rlm as a service on windows, the debug logs will be written to the same directory which contains the rlm.exe binary, so long as this directory is writable. If it is not writable, the log files will be written to [\\Windows\system32](#). (However, note that RLM will not allow itself to be installed as a service when an unwritable debug log is specified).

RLM debug log is specified.

## Running the *rlm* server as a service on Windows

On Microsoft Windows servers, you may want to install and run the *rlm* server as a Windows service process. A service process can start automatically at boot time and remain running as long as the system is up, regardless of user logins and logouts.

You can install RLM as a service in a command window. Once installed as a service, it remains installed until it is explicitly deleted as a service. Installing RLM as a service does not start RLM; services are started via the Windows Services control panel, and at boot time.

You can only install RLM as a service in a command window. To do this, use the rlm program itself (in a command window), with special arguments:

```
rlm -install_service -dlog [+]logfile [-service_name sname] [-user username] [-password password] <rlm runtime args>
```

where:

- *logfile* is the pathname for the server debug log. This parameter is required. If preceded by the '+' character, the logfile will be appended, rather than created.
- *sname* is an optional name for the installed service. If not specified, *sname* defaults to "rlm". If *sname* contains embedded whitespace, it must be enclosed in double quotes.
- <rlm runtime args> are any other command line arguments to be passed to rlm when it is started.

Example:

```
rlm -install_service -service_name rlm-xyz -dlog c:\logs\server.log -c c:\licenses\xyz.lic
```

This installs rlm as a service under the name "rlm-xyz". When started via the Services control panel or at boot time, rlm will be passed the "-c c:\licenses\xyz.lic" args, and it will write its debuglog information to the file c:\logs\server.log

Installed RLM services are also deleted with the rlm program. Services must be stopped via the

service control panel before they can be deleted. Note that deleting a service deletes it from the Windows service database; it does not delete the rlm executable or associated license file(s):

```
rlm -delete_service [-service_name sname]
```

where:

- sname is an optional name for the installed service. If not specified, service\_name defaults to "rlm". If service\_name contains embedded whitespace, it must be enclosed in double quotes.

Notes:

- It is desirable to use the -c <license file> command line argument with RLM when installed as a service. Use of environment variables with Windows services is undesirable, as the environment passed to started services is the one in effect at boot time.
- On systems which run RLM license servers, it is a good idea to install each ISV's instance of rlm with a service\_name argument which reflects the ISV or ISVs whose licenses are being served by that instance of rlm. For example, if a system ran two instances of RLM as services, where the first instance served license for ISVs "Blue" and "Green", and the second instance served license for ISV "Yellow", they might be installed as "rlm Blue-Green" and "rlm Yellow", respectively.
- Because the Service Controller on Windows invokes services under a special user account in a special default directory, it is necessary to use full paths:
  - for the -c <license file> argument on the rlm command line
  - in ISV daemon paths in the license file
  - in options file paths in the license file
  - in debug log paths in the ISV options file
  - in report log paths in the ISV options file
  - for the -dlog debug\_log argument on the command line
- NOTE on the use of DEBUGLOG when running the server as a Windows Service:  
If no DEBUGLOG is specified in the ISV options file, rlm will write the ISV debug log in:  
<location of rlm.exe>\<isv>.dlog  
This file will be overwritten every time the ISV server starts, since there is no opportunity to specify that the file should be appended to in the default case. In fact, the ISV server logs a few lines to this file at startup time even if a DEBUGLOG is specified in the ISV options file. It is overwritten every time the ISV server starts, but its contents don't change startup to startup, so nothing important is lost.  
Reprise Software Inc. recommends that the debug log path be specified in the ISV options file, and that the append behavior be enabled with '+<path>'. However, it is important not to specify the debug log name as <isv>.dlog, as this specific file is overwritten at each startup.
- Beginning in RLM v8.0, when running as service, rlm now changes its working directory to the directory where rlm.exe is installed. This is so that log files will be written there instead of in c:\windows\system32 as in prior versions (if log file paths are not specified as absolute paths.) rlm.exe checks to make sure that it can write to that directory before changing its working directory. If it can't be written, rlm leaves its working directory as c:\windows\system32.
- The web interface service installation is new in RLM v7.0
- Prior to RLM v4.0 when running rlm as a service, it is strongly recommended that you specify a debug log location for each ISV server. This is done in The ISV Options File for

each ISV server, using the DEBUGLOG keyword. If no location is specified for the debug log, the ISV server's debug information is lost when running as a service. Starting in RLM v4.0, the ISV servers place their debug output in the same file as the rlm server's debug log, as specified in the -dlog option, so no DEBUGLOG specification is necessary.

- Starting in v9.4 when you install RLM as a service, it starts and then stops the installed service. This is so that if there are any firewall issues - ports blocked that rlm needs to use - the warnings come at service installation time rather than when rlm is started for the first time.
- Starting in v10.0, RLM checks the path you specify for the debug log (-dlog <log> or in the "Server Debug Log box in the web interface). If this file cannot be written, an error is printed and the service install fails.

## Starting the *rlm* server at system boot time on Unix systems

On most Unix systems, system services are started at boot time, usually via startup scripts located in /etc/rc.<something>. For example, on Solaris, the startup script might be placed in /etc/rc2.d/S98rlm. On Linux systems, the script could be located in /etc/init.d/rlm, with a link to /etc/rc5.d/S98rlm. Note that you must install this startup script as root.

**The startup script should *su* to a different user so that the *rlm* servers are not running as root.**

The following is an example of a script which would start rlm at boot time on Unix systems. Modify the first 5 variables for the target system.

```
#!/bin/sh
#
# rlm          Start/Stop rlm
#
#-----
#-----
# NOTE:
# NOTE: Configure these 5 variables for your system
# NOTE:
# Set rlmuser to the user under which rlm will run
rlmuser=bobm
# Set rlmkdir to the directory where the rlm binary is found
rlmkdir=/home/bobm/rlm/dev/rlm
# Set rlmkdir to the directory where the rlm down binary is found
rlmdowndir=$rlmkdir
# Set licfile to the path to the license file
licfile=$rlmkdir/x.lic
# Set debuglog to the path to the debug log
debuglog=+$rlmkdir/rlm.dl
#-----
#-----
```

```

#-----
start() {
echo $debuglog
    su - $rlmuser -c "$rlmdir/rlm -c $licfile -dlog $debuglog &"
}

stop() {
    su - $rlmuser -c "$rlmdownmdir/rlm RLM -q"
}

case "$1" in
start)
    start
    ;;
stop)
    stop
    ;;
restart)
    stop
    sleep 2
    start
    ;;
*)
echo $"Usage: $0 {start|stop|restart}"
    exit 1
esac

exit 0

```

## License Server Startup Processing

License servers use The License Environment to find their license file. In addition, any file whose name ends in **.lic** in the current directory when the *rlm* server is started (or when the *rlmread* command is issued) is implicitly added to the end of the license file path. Finally, any file whose name ends in **.lic** in the directory where the *rlm* binary resides is added to the list of license files processed. (Note: license files in the *isv* server's binary directory are **not** processed, only the *rlm* binary directory is searched.)

License servers ignore *port@host* specifications in the License Environment. Once the list of license files is created, the license servers process all the resulting license files. The *rlm* server starts all ISV servers in all license files, and the ISV servers process and support all licenses in all license files with valid *hostids*.

When the *rlm* server starts, it uses the port # from the first file with the hostname on which it is running. In *rlm* v2.0 and later, the *rlm* server will attempt to use all the port #s in all the license files. It **must** be able to bind the port # in the first file. Once this is done, it attempts to use the port number from each additional file, logging either success or failure in the debug log. This means that when you receive a new product or license file, it can be installed in the application and *rlm* server directories without changing the port number in that file, which simplifies license administration.

ISV servers process all licenses in all files that have a valid *hostid* (by this we mean a *hostid* that corresponds to the computer on which the license server is running). The ISV servers attempt to combine licenses whenever possible - see the next section - and when combined the license counts add to create a single *pool* of licenses. ISV servers log (in the debug log) licenses with invalid

signatures and (in RLM v2.0) licenses that will expire within 14 days. ISV servers do not process single-use (count==single) licenses.

Beginning in RLM v5.0, ISV servers will detect that they are running on a virtual machine, and by default will refuse to run. The decision to run or not on a virtual machine is controlled by your ISV, and Reprise Software has no part in this decision.

## ISV server open file limits

Beginning in RLM v6.0, ISV servers on Unix platforms will attempt to increase their open file limit. If a server is able to increase its open file limit, a line similar to the following will appear in the debug log when the server first starts up:

```
mm/dd hh:mm (isvname) File descriptor limit increased from 256 to 65536
```

If you do not wish the ISV server to unlimit its open descriptor limit, set the RLM\_NO\_UNLIMIT environment variable in the process where you run the server:

```
% setenv RLM_NO_UNLIMIT anything
```

## How Licenses are Pooled by the ISV Server

When the ISV server processes all its licenses in the license file, it combines as many as possible into single *pools* of licenses. In order for 2 licenses to be combined into a single license pool, the following license fields must match *exactly*:

- Product Name
- Product Version
- License Sharing specification
- License Timezone specification
- License Platform list
- Both licenses must be counted or uncounted
- License node-locked hostid
- Both licenses must be user-based or host-based (or neither)
- Neither license can be a named-user license
- License password
- License id (also, an id of 0 will pool with any prior license with non-zero id)

Once pooled, the following fields are processed as shown:

| Field        | Result                                |
|--------------|---------------------------------------|
| count        | both counts added together            |
| exp-date     | earlier date is remembered            |
| hold         | maximum of the 2 values               |
| max_roam     | minimum of the 2 values               |
| min_checkout | maximum of the 2 values               |
| min_timeout  | maximum of the 2 values               |
| soft_limit   | both soft_limit values added together |
| contract     | if original is empty, use new         |

|          |                               |
|----------|-------------------------------|
| customer | if original is empty, use new |
| issuer   | if original is empty, use new |
| type     | if original is empty, use new |

For all other fields, the field in the original license (ie, the first to appear in the license file) is used. Note that different **named\_user** licenses are *never* combined into one license pool.

The id of a license can affect license pooling as follows: A license that doesn't specify an id (or specifies 0), will pool with any other license that it would normally pool with. However, a non-zero id will only pool with the same same ID# (assuming all the other attributes make it eligible to pool).

## License Server Administration

There are various administration commands that can be used to cause the license servers to reread their license files, to remove licenses from certain users, etc. For a description of these administration commands, see License Administration Tools on page 39. In addition, options can be specified for each ISV server in The ISV Options File. You can restrict access to administration commands via The RLM Options File.

### A note on server lock files

On occasion, when you start the RLM servers, you will see messages similar to these in the debug log:

```
08/08 16:11 (reprise) Cannot set server lock - exiting
08/08 16:11 (reprise) This usually means another copy of "reprise" is running
08/08 16:11 (rlm)
08/08 16:11 (rlm) reprise initialization error: 8, not restarting
08/08 16:11 (rlm)
08/08 16:11 (rlm) reprise - lockfile problems
08/08 16:11 (rlm) This usually means another "reprise" server is running
```

This happens if another copy of the ISV server is running. Check to make sure that another copy is not running.

This can also happen if the lockfile directory is not writable by the user who started the server. Ensure that the lockfile directory is writable by the user who starts the server. The "rlm directory" is:

```
/var/tmp on unix/mac, or
ProgramData\Reprise (vista and later) or
Docs and Settings\All Users\Application Data\Reprise (pre-vista).
```

The server's lock file name is `rlmlock<isv>` on windows, and `.rlmlock<isv>` on linux, where `<isv>` is the ISV name. If you have lockfile problems on linux which can't be attributed to another copy of the server running, then check the protection on `/var/tmp` to make sure it allows world `rwX`. On Windows, what sometimes happens when the first version of the RLM server to run on a system is pre-v9.4, is that the lock file is created with restrictive permissions that don't allow a different user to lock it. 9.4 and later create the Reprise folder with wide-open access that is inherited by files created in it, so this problem doesn't occur. Deleting the lock file is OK to solve the immediate problem.

# The License File

The license file contains information which configures the license servers and describes all the licenses granted from the ISV to their customer. License Files have 3 types of lines:

1. HOST Lines that specify the license server host
2. ISV Lines which specify the ISV's license server information, and
3. LICENSE Lines which describe license grants from the ISV to the customer.

Applications, License Servers, and License Administration Tools locate the license file using The License Environment.

**Note:** the license file cannot be placed in a path where any component of the pathname contains the '@' character.

## Special License Names

Any product name beginning with "rlm\_" is reserved to Reprise Software.

The product name *rlm\_roam* is treated specially by RLM. *rlm\_roam* indicates that roaming has been enabled by an ISV. If an ISV issues an *rlm\_roam* license, then roaming is enabled on any computer which is able to check out the *rlm\_roam* license while in a disconnected state.

## Legal characters in the license file

In general, all license file fields are white-space delimited, meaning that no data item can contain embedded spaces, tabs, newlines or carriage returns. In addition, the following four characters are illegal in data items in the license (and options) file except as noted below: "<", ">", "&", and double-quote ("). Note: single quote (') and back-quote (`) were illegal prior to RLM v8.0. ISV license names cannot begin with the characters "rlm\_". As of RLM v12.1, the characters "<", ">", and "&" are legal in comments (lines beginning with "#"). As of RLM v12.2, "<", ">", "&", single quote(') and back quote(`) are legal characters in the customer field.

Note that all lines in option files (RLM or ISV) as well as license files must be shorter than 1024 characters. Anything over 1024 characters will be truncated.

Everything in the license file is case-insensitive, with the following three exceptions:

- *isv-binary-pathname* on ISV lines [Note: case-sensitive on Unix systems only]
- *options-file-filename* on ISV lines [Note: case-sensitive on Unix systems only]
- short (~62-character) license keys (keys with bits/character of 6)

**Note:** any time RLM processes a username, it will replace any white space in the name with the underscore '\_' character. This is true for usernames used as hostids, in server option files, or passed between client and server.

The 4 types of license lines (HOST, ISV, LICENSE, and UPGRADE) are described below.

## HOST line

HOST *hostname* *hostid* [tcp/ip port #]

The HOST line specifies which computer the license server is to run on. There is only one HOST line per license file. Note that if a license file contains only nodelocked-uncounted licenses, a HOST line is not required.

The *hostname* is the standard TCP/IP hostname for the system. This name is not an input to the license key signature algorithm, so you can change it at any time without affecting your licenses.

The *hostid* is RLM's idea of the computer's identification. The *hostid* is an input to the license key signature algorithm, so it cannot be changed. All licenses in the license file have this *hostid* as input to their license signatures, so it is important to avoid moving LICENSE lines from one license file to another, as this invalidates them.

The TCP/IP port number is the port which rlm attempts to use for communications. This number is not an input to the license key signature algorithm, so it can be changed to any available port.

For a description of the various hostids that RLM supports, see RLM hostids on page 110.

Example:

**HOST melody 80b918aa 2700**

In this example, the license servers run on host "melody" at TCP/IP port 2700.

Note: The keyword "SERVER" can be used instead of "HOST" – they are 100% equivalent.

## ISV line

Format (pre-RLM v9.0):

**ISV *isvname* [*isv-binary-pathname* [*options-file-filename* [*port-number*]]]**

Format (RLM v9.0+):

**ISV *isvname* [*isv-binary-pathname* [*options-file-filename* [*port-number*]]] [*binary=isv-binary-pathname*] [*options=options-file-filename*] [*port=port-number*] [*password=password-text*]**

The ISV line specifies an ISV's license server. There is one ISV line in the license file for every *isvname* which has licenses in that file. Note that if a license file contains only nodelocked-uncounted licenses for a particular *isv*, an ISV line is not required for that *isv*.

The *isvname* is the name assigned by Reprise Software to the ISV and does not change.

Beginning in RLM v6.0, the ISV server can be delivered as either an executable (as in all older versions of RLM) or as a small, platform-independent ISV server **settings** file (named *isvname.set* by default).

The *isv-binary-pathname* is the filesystem location of the ISV's license server binary. This can be any accessible location. The *isv-binary-pathname* is not an input to the license key signature algorithm, so you can change it to relocate the ISV server at any time. Starting in RLM v3.0, the ISV pathname can be omitted if the isv server is located in the same directory as the rlm binary. If omitted, RLM will first attempt to open an ISV server settings file (*isvname.set*), and if that fails, will attempt to open a license server binary (*isvname.exe* on windows, or *isvname* on unix).

The third (optional) parameter specifies whether an options file is to be used for this license server. If you would like to specify options (see The ISV Options File on page 65), either specify the location of the file containing these options here, or name the ISV options file *isvname.opt* and place it in the directory which contains the license file which the server reads.

The fourth (optional) parameter specifies the port # which the ISV server will use. This should normally be omitted, but can be used if you need to access the ISV server across a firewall and the firewall needs to be configured to allow access to the port. Note that you must specify an options file if you want to specify an ISV server port number.

The fifth (optional) parameter (new in RLM v9.2) specifies a license password to be applied to all LICENSE or FEATURE lines which **follow** the ISV line in the license file. If an individual LICENSE line has a password, the password from the LICENSE line is used.

In the old format, the parameters are strictly positional, and, for example, to specify a port #, the ISV server binary and options file must both be specified. However, in the new format, any of the optional parameters can be specified by themselves. Also note that any number of the positional parameters can be specified, and optional parameters can be added after the positional parameters.

Note that, in the new format, if you specify the same parameter both as a positional parameter and as a keyword=value parameter, the value of the keyword=value parameter will be used.

Examples:

**ISV reprise /home/reprise/reprise /home/reprise/reprise.opt (old format)**

**ISV reprise options=/home/reprise/reprise.opt binary=/home/reprise/reprise (new format)**

**ISV reprise /home/reprise/reprise port=8765 (new format)**

**ISV reprise /home/reprise/reprise binary=/a/b/reprise**

In these examples, the license server for ISV *reprise* is located at */home/reprise/reprise* and (in the first 2 examples) an options file is located at */home/reprise/reprise.opt*. In the 3rd example an ISV server port # is specified. In the fourth example, the ISV server binary name */a/b/reprise* will be used instead of */home/reprise/reprise*.

Note: The keyword "VENDOR" can be used instead of "ISV" – it is 100% equivalent.

## LICENSE line

Format:

**LICENSE** *isv product version exp-date count* [sig=]*license-key* [optional parameters]

The LICENSE line defines the usage rights to a *product*. All fields in the license line are case-insensitive (with the exception of short, ie, less than 62-character, license keys), and none may be modified by the License Administrator with the exception of optional parameters whose keywords begin with the underscore ('\_') character.

### Types of Licenses

While there is a single format for the LICENSE line, the licenses you receive from your software suppliers can have many different meanings. The following licensing attributes are present in all licenses, and define the major meaning of the license itself:

- **Locking: Node-locked** (counted or uncounted), **Username-locked** (counted or uncounted), or **Floating licenses**.

RLM can lock a license in a variety of ways:

1. A license can be *node-locked*. A node-locked license can only be used on a single node, as specified by the *hostid* of the license. For a description of the available hostids in RLM, see RLM hostids on page 110.
  - A node-locked license can be either *counted*, *uncounted*, or *single*. If it is *uncounted* or *single*, then the software only need verify that it is executing on the correct computer, and no license server is required. If it is counted, however, a *license server* is required to maintain a count of licenses currently in use. (Note that *single* licenses are checked locally to ensure that only one instance is running.)
  - To create a node-locked license, add the keyword **hostid=.** at the end of the license line. See the description of the LICENSE line for more information.
2. A license can be locked to a user. This is a special case of a *node-locked* license, and is accomplished using the hostid **user=...** Note that any white space in a username is converted to the underscore ('\_') character.
3. A license can be *floating*. This license will work anywhere on the network that can communicate with the *license server*. To specify a *floating* license, do not put a **hostid=** keyword on the license.

- **Expiration: Expiring or non-expiring licenses**

All licenses have a *expiration date*. If the license uses the special expiration

date of **permanent**, they never expire (any date with a year of 0 is also non-expiring, e.g. 1-jan-0).

- **Version: By version number or by product release date.**

Each RLM license has a version number, of the form "*major.minor*". The version in the *rlm\_checkout()* call must be less than or equal to the version in the license for the checkout to succeed. (Note: This comparison is done in the "normal" way, ie, 1.2 is greater than 1.10).

The version can be used in a number of ways:

- \* Your ISV could make all your software request version 1.0 with all your licenses issued for version 1.0, and the version would never be an issue, unless and until they wanted to obsolete all the old licenses on a new release.

- \* Or, your ISV could put the product's version number in the *rlm\_checkout()* call, then licenses for an older version of the product will not work with a newer version of the product.

- \* Or, your ISV can use a date-based version. To do this, they might put the year of release into the *rlm\_checkout()* call, then when you issue licenses, issue them either for this year, or some year in the future. This allows you, the customer, to use products released on or before the year in the license. Alternately, the ISV could make the version be "year.month".

- **License Count:** Each license has a count of available licenses. If this count is "0" or "uncounted", the license count is not enforced. Otherwise, only the specified number of license checkouts are allowed.

### **Fixed (positional) parameters**

The first 6 parameters are required on every license, and are present in the order shown above

#### ***isv***

*isv* is the name of the ISV granting the rights.

#### ***product***

*product* is the name of the product for which license rights are being granted.

#### ***version***

*version* is the highest-numbered product version supported by this license, in the form "N.M". For example, 1.0, 2.37, or 2006.12

### ***exp-date***

*exp-date* is the date the license expires, in the form dd-mmm-yyyy, for example, 1-jul-2007. Any license with either a year of "0" (ie, "1-jan-0"), or the word "permanent" does not expire.

### ***count***

*count* is the number of licenses granted. **0** or **uncounted** means an uncounted, node-locked license. **uncounted** and **0** are 100% equivalent.

**single** means a node-locked, single-use license. **single** is different from **1**. A license with a count of 1 is a regular counted license, and requires a license server. A license with the keyword **single** is a single-use, nodelocked license. This license does not require a license server, and in fact license servers will not process this license. **single** licenses are a convenient way for your Software Provider to issue you a single-use license without you, the License Administrator, having to configure a license server.

**token**, **token\_locked**, and **token\_unlocked** are used to specify a Token-Based License; this license must also have the **token=...** optional parameter (see Token-Based Licenses on page 78). The only optional parameter on a *token-based* license which is used by RLM is the start date. All other optional parameters are ignored.

### ***license-key***

*license-key* is a digital signature of all the license data, along with the hostid on the HOST line, if present. If a license has a non-zero count, it always requires a HOST line. An uncounted license does not require a HOST line, and even if there is a HOST line, the hostid of the license server is not used in computation of its *license-key*. The *license-key* will have "sig=" prepended after the license has been signed by the *rlmsign* utility.

Note that if the *license-key* is preceded by *sig=*, it can be present after any or all of the optional parameters.

### **Optional Parameters**

Optional parameters are sometimes present in a license, and can be present in any order. Optional parameters are allowed only once per license. Note that parameter names which begin with the underscore ('\_') character can be either added or modified by the License Administrator without invalidating the license signature.

### ***akey=activation-key***

The RLM Activation Pro license generator can include the *akey=* keyword with the activation key used to fulfill the license, if specified by your Software Publisher. This parameter is unused by RLM. *akey=* first appeared in RLM v11.0.

### ***disable="computing-environment-list"***

*disable=* specifies that clients running in the appropriate computing environment cannot use this license.

*computing-environment-list* is a list of different computing environment descriptions; if the application is

running in any of these environments, the license will not be usable.

*computing-environment-list* is a space-separated list of the following environments (note: the list must be in quotes if more than one item is specified):

- **TerminalServer** - disable use of Windows Terminal Server or Remote Desktop.
- **VM** - Disable use on Virtual Machines.

Example:

```
disable=TerminalServer
```

```
disable=vm
```

```
disable="vm TerminalServer"
```

*disable=* first appeared in RLM v4.0, with the single environment *TerminalServer*. *VM* was added in RLM v5.0.

### ***\_failover\_host=hostname***

This field is used only on an "rlm\_failover" or "rlm\_failover\_server" license, and is set by the License Administrator to the failover server's hostname. See Failover License Servers on page 86 for more information. This field has no meaning on any license other than an "rlm\_failover" or "rlm\_failover\_server" license. If the license is an "rlm\_failover\_server" license, the hostname must be a [port@host](#) specification prior to RLM v12.2. After v12.2, if the hostname is used alone, the default port (5053) is used.

### ***hold=n***

*hold* specifies that a license is to be "held" checked-out by the license server after the application performs a checkin call or exits. The license will remain checked-out for the number of seconds *n* specified after application checkin or exit. *hold* is typically used in the case of licenses that have a very short duty-cycle, in order to provide a "fairer" measure of concurrent usage.

*hold* and *min\_checkout* both perform this function in slightly different ways. *hold* always keeps the license checked out for the specified amount of time after the application checks it in, whereas *min\_checkout* keeps the license checked out for an additional time only if the license was checked back in by the application before the specified minimum time. See also *min\_checkout* on page 28.

### ***host\_based[=n]***

*host\_based* indicates that the specified number of licenses (or all licenses) must be reserved to hosts in the options file. Note that the special host "\*" does not count as being reserved. If fewer than the required number of licenses are reserved, the license server will log an error and refuse to serve the license. Also note that licenses reserved to a `HOST_GROUP` are not counted. Thus, all reservations must be to individual hosts.

### ***hostid=hostid-string***

The optional *hostid* at the end of the line specifies that the licenses can only be used on the specified host. Uncounted licenses always require a *hostid*. Counted licenses generally do not have a *hostid*, but it could be present, in which case we would call this license a "node-locked, counted" license. (For a description of the various *hostids* that RLM supports, see RLM *hostids* on page 110.

Starting in RLM v5.0, the *hostid* on a LICENSE line can be a *hostid list*. The *hostid list* is a space-separated list of valid hostids, enclosed in double-quotes. The license can be used on *any* of the hostids in the list. The list can contain at most 25 hostids, and can be no longer than 200 characters.

For example, this hostid list would allow the license to be used in any of the 4 specified hosts:

```
hostid="ip=172.16.7.200 12345678 rlmid1=83561095 user=joe"
```

## License ID

### ***\_id=nnn***

Any License Administrator can add *\_id=nnn* to a license. “nnn” is a positive integer, less than 2\*\*31, which is used to identify the license. If no *\_id=* keyword is present, the id of the license is 0. The id of a license can affect license pooling as follows:

Licenses will pool only if their ID #s match (assuming all the other attributes make them eligible to pool.) For the sake of matching ID numbers, a license with no ID matches licenses with an ID of 0.

In addition, beginning in RLM v12.0 licenses are sorted (within a license file) in the order of the *\_id* keyword. Licenses without *\_id* keywords will remain unsorted (in their original order) at the end of all the licenses with *\_id* keywords, which are sorted in increasing numerical order. This sort is done prior to REPLACE processing.

○

Other than license pooling, the id can be used to select which licenses to apply an option (such as RESERVE). The id is not used in the computation of the license signature, and as such can be added or changed by the License Administrator.

### ***issued=issue-date***

The optional *issued=issue-date* attribute is used in conjunction with the *replace* keyword. See the description of *replace* for a description of how the issue-date affects license replacement.

### ***max\_roam=days***

A Roaming license is a license that is checked out from the license server and used on a disconnected system. During this time, the license server holds the license checked-out just as if the system were still connected to the license server.

*max\_roam* is used to specify the maximum number of *days* which a license can be held by the server and used on a disconnected system.

If your Software Provider does not specify *max\_roam* in an individual license, RLM limits the maximum number of days that a license can roam to 30 days. If *max\_roam* is set to -1, roaming is disabled on that particular license.

Also note that if your ISV specifies *max\_roam* on the *rlm\_roam* license itself, this *max\_roam* specification will apply to all of your products which do not have *max\_roam* specifications.

### ***max\_roam\_count=count***

*max\_roam\_count* specifies the maximum number of licenses which can roam. If unspecified, all licenses are allowed to roam. If set to 0, no licenses are allowed to roam. If 2 licenses are pooled, their *max\_roam\_count* values are added. Finally, you can lower this value by using the `ROAM_MAX_COUNT` option, however `ROAM_MAX_COUNT` will never raise this value. *max\_roam\_count* is new in RLM v8.0.

***min\_checkout=n***

*min\_checkout* specifies that a license is to be "held" checked-out by the license server after the application performs a checkin call or exits if the license did not remain checked out for the minimum interval specified by *n*. The license will remain checked-out such that the total checkout time is *n* seconds. *min\_checkout* is typically used in the case of licenses that have a very short duty-cycle, in order to provide a "fairer" measure of concurrent usage.

*hold* and *min\_checkout* both perform this function in slightly different ways. *hold* always keeps the license checked out for the specified amount of time after the application checks it in, whereas *min\_checkout* keeps the license checked out for an additional time only if the license was checked back in by the application before the specified minimum time. See also *hold* on page 26.

Example 1:

```
hold=30
application checks license out for 5 minutes
application checks license in
at this point, the server keeps the license checked out for an additional 30 seconds.
```

Example 2:

```
min_checkout=30
application checks license out for 5 minutes
application checks license in
at this point, the license will be checked in by the server with no extra hold time.
```

Example 3:

```
min_checkout=400
application checks license out for 5 minutes
application checks license in
at this point, the server keeps the license checked out for an additional 100 seconds.
```

NOTE: The license server scans all held licenses once per minute, so the exact time of checkin can be rounded up to the next 60 seconds. So, in example 3 above, the checkin could happen any time between 100 seconds and 120 seconds after the `rlm_checkin()` call.

NOTE: The minimum checkout time specification will be ignored for any license which is roaming.

***min\_remove=n***

*min\_remove* specifies the lowest value, in seconds, a License Administrator can set the `MINREMOVE` value for a license. If not specified in the license, the RLM default of 120 seconds (2 minutes) is used. If *min\_remove* is set to -1, then `rlmremove` is disabled on this license.

***min\_timeout=n***

You can specify a TIMEOUT value for any idle license. If the license remains idle (i.e. does not communicate with the license server) for this amount of time, the license server performs an automatic checkin of the license and informs the application (if it is still running).

*min\_timeout* specifies the lowest value, in seconds, you can set the *TIMEOUT* or *TIMEOUTALL* value for a license. If not specified in the license, the RLM default of 3600 seconds (1 hour) is used. Note that licenses NEVER time out on their own, you must set a TIMEOUT or TIMEOUTALL option in the options file to have them time out.

***options=options-list***

The *options* specification is used to encode options for the product license. The options field is a string (up to 64 characters in length) which is completely defined by the ISV. The options are used to calculate the license signature, but otherwise are unused by RLM. Note that if the string contains embedded white space, it must be enclosed within double quotes.

***\_password=password-text***

The *\_password* specification limits who can use this license to users who know the password.

You can assign a password to a license in order to restrict the ability to check out, or even see the license.

To do this, specify:

```
_password = password-string
```

in the license.

If specified, a license password restricts access to this license to requests which have specified the same password-string. The password-string is specified with the RLM\_LICENSE\_PASSWORD environment variable, or in the RLM web interface for viewing licenses.

Note that the license password does not factor into the license signature, and hence can be changed at any time after the license is signed. Also note that license passwords only work with served licenses, not nodelocked, uncounted or single licenses in local license files.

Also note that if you do assign a password to a license, and the application fails to supply the correct password, the server will return a "License Server does not support this product" error (status -18) when a checkout is attempted.

Beginning in RLM v9.2, license passwords can be specified on the ISV line, with the new "password=password-text" option. When specified this way, the password on the ISV line applies to all LICENSE or FEATURE lines for the ISV which **follow** the ISV line in the license file. If an individual LICENSE line specifies a password, the password from the LICENSE line is used in place of a password on the ISV line.

***platforms=platform-list***

The *platforms* specification limits the types of computers which can use this license.

RLM allows your ISV to specify one or more platforms on which the application must be running. If a *platforms=platform-list* specification is contained in the license, the computer on which the application is running must be one of the specified platforms.

The *platform-list* consists of a list of RLM-defined platform names, which consist of a machine architecture and an operating system version/revision, as in the following table:

| Platform                    | RLM Platform name      | string in <i>platforms=</i> |
|-----------------------------|------------------------|-----------------------------|
| HP-UX on PA-Risc            | hp_h1                  | hp_h                        |
| HP-UX 64-bit on PA-Risc     | hp64_h1                | hp64_h                      |
| IBM AIX 32-bit              | ibm_a1                 | ibm_a                       |
| IBM AIX 64-bit              | ibm64_a1               | ibm64_a                     |
| Linux on Intel X86          | x86_l2                 | x86_l                       |
| Linux 64-bit on Intel       | x64_l1                 | x64_l                       |
| MAC on Intel X86            | x86_m1                 | x86_m                       |
| MAC on PPC                  | ppc_m1                 | ppc_m                       |
| Solaris 64-bit on Intel     | x64_s1                 | x64_s                       |
| Solaris on Sparc            | sun_s1                 | sun_s                       |
| Solaris (64-bit) on Sparc   | sun64_s1               | sun64_s                     |
| Windows on Intel X86        | x86_w2, x86_w3, x86_w4 | x86_w                       |
| Windows 64-bit on Intel X86 | x64_w2, x64_w3, x64_w4 | x64_w                       |

### ***replace=[product-list]***

The *replace* specification causes this license to replace other license(s).

In order to render ineffective one or more licenses which have already issued to you, the ISV uses the *replace=[product-list]* option in the new license. *replace=* causes RLM to ignore the "replaced" license(s).

Note: If your ISV uses *replace*, they must also have specified either *start=* or *issued=*.

### ***replace* operates as follows:**

- licenses from the *product-list* will be replaced. If *product-list* is not specified, then the product name of the license containing the *replace* keyword will be the only product to be replaced.
- if the license with the *replace* keyword specifies an *issued=* date, then this is the "*replacement date*".
- if the license with the *replace* keyword does not have an *issued* date, then the "*replacement date*" is the *start* date of the license.
- if the license contains neither an *issued* date nor a *start* date, no licenses will be replaced.
- Any license in the list of products with an *issued* date prior to the *replacement date* will be replaced.
- Any license in the list of products which does not have an issued date, but which has a *start* date prior to the *replacement date* will be replaced.
- Finally, any license in the list of products with neither an *issued* nor a *start* date will be replaced.

***share=UHI[:nnn]***

*share* specifies how a license is shared between separate clients (processes).

Licenses can be shared between separate running processes. To do so, your ISV will have put a *share=* specification in the license. A license can be shared between processes with the same username, hostname, or ISV-defined data, or any combination of these. Share is specified as *share=UHI* where the keywords 'U', 'H', and 'I' indicate that the Username, the Hostname, or the ISV-defined fields must match. If more than one is specified, all specified must match in order to share the license.

For example, if *share* is specified as *share=UH*, then both the username and the hostname of a request must match an existing checked-out license in order to share that existing checked-out license. If *share* is specified as *share=u*, then only the usernames must match on two processes in order for them to share the license.

The *share=* keyword accepts an optional maximum process count which can share the license:

```
share=U:nnn
```

where *nnn* is the number of processes which can share this license. The *nnn*+1st request will consume an additional license.

If the **:nnn** specification is omitted, any number of processes can share the license.

Note that once a shared license is in use, it will continue to be in use until *all* the processes sharing the license check it back in. In other words, if 2 processes are sharing one license, and a 3rd process consumes a 2nd license (in the case where *n=2*), 2 licenses will continue to be in use until either (a) the 3rd process checks in its license, or (b) BOTH the first and second processes check in their licenses. In other words, there is no dynamic re-combination of shared licenses done at license checkin time.

***soft\_limit=n***

A license can have a *soft\_limit* that is lower than its count of available licenses. Once usage exceeds the *soft\_limit*, checkout requests will return the RLM\_EL\_OVERSOFT status instead of a 0 status. The application's behavior in this case is entirely up to your ISV.

Note that when the license server pools separate licenses into a single license pool, the *soft\_limit* of each license is added to obtain the pool's *soft\_limit*. Also note that licenses which do not specify a *soft\_limit* use the license *count* as their *soft\_limit*.

***start=start-date***

*start=* specifies a *start-date*. This license cannot be used before the specified date. The format is the same as the expiration date.

***timezone=timezone-spec***

*timezone=* allows your ISV to specify a set of valid timezones for the client machine that performs the license checkout. If *timezone=* is present in the license, there is a timezone restriction. The *timezone-spec* is a 24-bit HEX number, with one bit set for each timezone your ISV wishes to be valid. Bit 0 represents GMT and each bit to the "left" of bit 0 represents one timezone (one hour) west of GMT. Thus bit 5 would be EST, bit 8 would be PST, bit 23 would be one hour east of GMT, etc. Note that RLM uses the current local time, so the timezones will move by one hour when Daylight Savings Time is in effect (ie, PST varies from 7 to 8 hours west of GMT).

So, for example, to allow the license to be used in PST only, the *timezone spec* would be as follows, specifying timezones 7 and 8 west of GMT:

```
timezone=180
```

***token="<product1 ver1 count1>[ <product2 ver2 count2> ... <productN verN countN>]"***

*token=* specifies the list of products which are checked out when a *token-based* license is requested. See Token-Based Licenses on page 78 for a complete description.

***user\_based[=n]***

*user\_based* indicates that the specified number of licenses (or all licenses) must be reserved to users in the options file. Note that the special user '\*' does not count as being reserved. If fewer than the required number of licenses are reserved, the license server will log an error and discard the license. Also note that licenses reserved to a GROUP are not counted. Thus, all reservations must be to individual users.

**The following fields are not used by RLM, but are present to identify licenses:**

***contract=contract-info***

*contract=* is meant to hold the customer's purchase order or software agreement number. This can be used to display to the user to validate a support contract, etc. It is not used by RLM.

***customer=who***

*customer=* is to identify the customer of the software. *customer* is not used by RLM.

***issuer=who***

*issuer=* is used to identify the organization which issued the license. It is not used by RLM.

***\_line\_item="descriptive text"***

The *\_line\_item* field is used to map a particular product to the item purchased. This field will be logged into the report log at the start when all products supported are logged, so that a report writer can generate reports based on purchased products, as opposed to product names used for

licensing purposes. If the descriptive text contains spaces, it should be enclosed in double-quote (") characters. The contents of the `_line_item` field can be modified (or the field can be added) without invalidating the license signature. `_line_item` first appeared in RLM v3.0.

***type=type-spec***

`type=` is used to identify the type of license. `type-spec` is a string containing one or more of the values:

- "beta"
- "demo"
- "eval"

For example, `type="beta eval"` or `type="eval"`. The contents of the license `type` field are retrieved by the `rlm_license_type()` call. `type` is not used by RLM.

The maximum length and types of license fields are as follows:

| field           | type   | max data length (excluding keyword=) or value range |
|-----------------|--|---|
| isv             | string   | 10 characters                                       |
| product         | string   | 40 characters                                       |
| version         | string, in the form nnn.mmm                    | 10 characters                                       |
| exp-date        | string, in the form dd-mmm-yyyy                | 11 characters                                       |
| count           | positive integer                               | 2**31 - 1   |
| hold            | positive integer - seconds                     | 2*31 - 1  |
| host_based      | int  | count of licenses which must be reserved            |
| hostid (single) | string   | 72 characters                                       |
| hostid (list)   | space-separated, quoted string                 | 200 characters, max of 25 hostids                   |
| issued          | string, in the form dd-mmm-yyyy                | 11 characters                                       |
| _line_item      | string, License Administrator defined          | 64 characters                                       |
| max_roam        | positive integer - days                        | 2**31 - 1   |
| max_roam_count  | positive integer - count                       | 2**31 - 1   |
| min_checkout    | positive integer - seconds                     | 2*31 - 1  |
| min_remove      | integer - seconds (-1 for no remove available) | 2**31   |
| min_timeout     | positive integer - seconds                     | 2**31 - 1   |
| password        | string   | 32 characters                                       |
| platforms       | string   | 80 characters                                       |
| share           | enumerated                                     | 3 ("uhi") + :integer                                |
| soft_limit      | integer  | 2**31 - 2   |
| start           | string of the form dd-mmm-yyyy                 | 11 characters                                       |
| timezone        | int  | bitmap with bits 0-23 set                           |
| user_based      | int  | count of licenses which must be reserved            |
| contract        | string - unused by RLM                         | 64 characters                                       |
| customer        | string - unused by RLM                         | 64 characters                                       |

|        |   |               |
|--------|---|---------------|
| issuer | string - unused by RLM                                | 64 characters |
| type   | string - consisting of "demo"<br>"eval" and/or "beta" | 14 characters |

**Examples:**

**LICENSE reprise write 1.0 permanent uncounted 987435978345973457349875397345  
hostid=IP=172.16.7.3**

**LICENSE reprise calc 1.0 1-aug-2008 5 987435978345973457349875398749587345987345**

In the first example, the *write* product is licensed to a host with an IP address of 172.16.7.3. This is a non-expiring, node-locked, uncounted license. The second example is for 5 licenses of product *calc* which expire on the first of August 2008. The first license would not require a HOST line, whereas the second one would.

Note: The keyword "FEATURE" can be used in place of "LICENSE".

Note: Licenses are always additive, in other words, the counts on 2 license lines of the same product/isv/version/hostid would be added together by the license server and the total number of licenses would be available, subject to the rules for combining licenses listed in How Licenses are Pooled by the ISV Server on page 17.

## UPGRADE line

**UPGRADE *isv product from-version to-version exp-date count [sig=]upgrade-key [optional parameters]***

The UPGRADE line defines an upgrade from an older version (*from-version* or higher) to a newer version (*to-version*) of an existing *product*. All fields in the upgrade line are case-insensitive (with the exception of short, ie, less than 62-character, license keys), and none may be modified by the License Administrator with the exception of the parameters whose names begin with an "\_" character.

We refer to the license specified by the UPGRADE line as the *upgrade license*, and the license it operates on as the *base license*.

An UPGRADE license will convert *count* licenses of *product* of version *from-version* or higher into *to-version*. Note that an UPGRADE license will never operate on a base license that is  $\geq$  *to-version*.

In order for the upgrade to be performed, certain parameters of the *upgrade license* must match the parameters of a *base license* in order for that license to be eligible to be **upgraded**.

Certain licenses can never be upgraded. In particular, token-based licenses (the token definitions themselves) will never be upgraded. Also, named-user licenses are not eligible for upgrades.

In order for a license to be upgraded, the *base license* and the *upgrade license* must be eligible to be pooled by the license server as described in How Licenses are Pooled by the ISV Server on page 17.

If the license is eligible for an upgrade, *count* licenses of the *base license* will be transformed into *to-version* licenses. An **upgrade** can be performed on multiple *base licenses*, until the *count* on the *upgrade license* is exhausted.

Note that license "replace" processing is done (both in client and server) before upgrade processing. This means that an upgrade license should not specify replacement of the *base license* which it is going to upgrade, because the *base license* will no longer exist when the upgrade is done.

There are 3 upgrade cases:

- fewer *base licenses* than *upgrade licenses* - in this case, the extra *upgrade licenses* are "wasted", and the license server issues a warning. All *base licenses* are upgraded.
- same number of *base licenses* and *upgrade licenses* - all *base licenses* are upgraded.
- fewer *upgrade licenses* than *base licenses* - in this case, *count* licenses are upgraded, and the remaining *base licenses* remain at their old version.

Note that the 3rd case above is the most useful - if your ISV wanted to upgrade all instances of an existing license, a *replace* option on a new license will do this just as well. The only advantage to the *upgrade license* in the first two cases is that the *base license* is required, ie, the *upgrade license*, by itself, grants no rights.

When a license is **upgraded** by the license server, the new licenses will have their parameters modified as follows:

| Field                                  | Result for served <i>counted</i> (or <i>uncounted</i> ) licenses   | Result for unserved <i>single</i> or <i>uncounted</i> licenses |
|--|--|--|
| exp-date                               | earlier date is used   | earlier date is used   |
| hold                                   | maximum of the 2 values  | - undefined -  |
| max_roam                               | minimum of the 2 values  | - undefined -  |
| max_roam_count                         | minimum of the 2 values  | - undefined -  |
| min_checkout                           | maximum of the 2 values  | - undefined -  |
| min_remove                             | maximum of the 2 values  | - undefined -  |
| min_timeout                            | maximum of the 2 values  | - undefined -  |
| soft_limit (upgrading all)             | larger of 2 deltas from license count is used  | - undefined -  |
| soft_limit (partial upgrade)           | upgrade soft limit is preserved for the new version, base license soft limit <i>delta</i> is preserved (minimum value 0) for the old version | - undefined -  |
| user_based, host_based (upgrading all) | If licenses have a specification, the value closest to the license count is used   | - undefined -  |
| user_based,                            | If licenses have a specification, upgrade spec is  | - undefined -  |

|                                 |   |   |
|---------------------------------|---|---|
| host_based<br>(partial upgrade) | preserved for the new version; base license spec <i>delta</i> (count-user_based) is preserved (minimum value 1) for the old version   |   |
| contract                        | if <i>base license</i> is empty, use <i>upgrade license</i> . On partial upgrade, if <i>upgrade license</i> is empty, use value from <i>base license</i> for the new version. | if <i>base license</i> is empty, use <i>upgrade license</i> . |
| customer                        | if <i>base license</i> is empty, use <i>upgrade license</i> On partial upgrade, if <i>upgrade license</i> is empty, use value from <i>base license</i> for the new version.   | if <i>base license</i> is empty, use <i>upgrade license</i> . |
| issuer                          | if <i>base license</i> is empty, use <i>upgrade license</i> On partial upgrade, if <i>upgrade license</i> is empty, use value from <i>base license</i> for the new version.   | if <i>base license</i> is empty, use <i>upgrade license</i> . |
| type                            | if <i>base license</i> is empty, use <i>upgrade license</i> On partial upgrade, if <i>upgrade license</i> is empty, use value from <i>base license</i> for the new version.   | if <i>base license</i> is empty, use <i>upgrade license</i> . |

### Fixed (positional) parameters

The first 7 parameters are required on every upgrade line, and are present in the order shown above. Note that these are the same as the 6 fixed parameters of the LICENSE line, with the version replaced by a pair of versions:

#### *isv*

*isv* is the name of the ISV granting the rights.

#### **product**

*product* is the name of the product for which license rights are being upgraded.

#### **from-version**

*from-version* is the lowest-numbered product version which is eligible for an **upgrade**, in the form "vN.M". For example, 1.0, 2.37, or 2006.12

#### **to-version**

*to-version* is the highest-numbered product version supported by the license once it is **upgraded**, in the form "vN.M". For example, 1.0, 2.37, or 2006.12

#### **exp-date**

*exp-date* is the date the upgrade expires, in the form dd-mmm-yyyy, for example, 1-jul-2007. A non-expiring upgrade can be specified with either a year of "0" (ie, "1-jan-0"), or simply the word "permanent".

#### **count**

*count* is the number of licenses to be upgraded. **0** or **uncounted** means an uncounted, node-locked license is to be upgraded. **uncounted** and **0** are 100% equivalent.

**single** means a node-locked, single-use license is to be upgraded. **single** is different from **1**. See the LICENSE line on page 23 for more information.

**token**, **token\_locked**, and **token\_unlocked** are not allowed in an UPGRADE license. All other optional parameters are ignored.

#### **upgrade-key**

*upgrade-key* is a digital signature of all the upgrade data, along with the hostid on the HOST line, if present. If an upgrade license has a non-zero count, it always requires a HOST line. An upgrade to an uncounted license does not require a HOST line, and even if there is a HOST line, the hostid of the license server is not used in computation of its *upgrade-key*. The *upgrade-key* will have "sig=" prepended after the license has been signed by the *rlmsign* utility.

Note that if the *upgrade-key* is preceded by *sig=*, it can be present after any or all of the optional parameters.

### **Optional Parameters**

Optional parameters are sometimes present in a license, and can be present in any order. Optional parameters are allowed only once in an UPGRADE line. The syntax and meaning of optional parameters for the UPGRADE line are identical to the same parameters for the LICENSE line. Note that **token** and **named\_user** are not allowed on an UPGRADE line. See the License Line for information on the optional parameters.

## **The License Environment**

All software that uses RLM attempts to read a license file or communicate with a license server. The specification of the license file or the license server is done with the license environment.

If the software is ISV-specific (eg, an application program), the first place that is checked is any license file or port@host specified in the environment variable *isv\_LICENSE* (if it is defined), where *isv* is name of the ISV (e.g. reprise\_LICENSE).

If *isv\_LICENSE* is not defined (in the case of ISV software), or for generic software (RLM utilities, the *rlm* server) the path specified by the environment variable *RLM\_LICENSE* is checked, if *RLM\_LICENSE* is defined.

If neither environment variable is defined, the program's default location for the license is checked next. In the case of the RLM utilities and the *rlm* server, this is any file ending in *.lic* in the current directory. Note that the RLM utilities will substitute the path specification from a *-c* option in place of the current directory.

Finally, any *.lic* file in the directory containing the binary will be checked.

The format of the environment variable (RLM\_LICENSE or *isv\_LICENSE*) is:

*license\_spec1*

or

*license\_spec1:license\_spec2:license\_spec3: ... :license\_specN* (UNIX)

*license\_spec1;license\_spec2;license\_spec3; ... ;license\_specN* (Windows)

where:

*license\_spec* is a license specification of the form:

port@host

- or -

license\_file\_pathname

- or -

directory pathname (containing license files, all of which are added to the list)

- or -

<actual text of license>

Note that the separator character is ':' for Unix systems and ';' for Windows systems.

Also note that the license file cannot be placed in a path where any component of the pathname contains the '@' character.

## Example

```
% setenv RLM_LICENSE 1700@myhost:/home/reprise/reprise.lic
```

In this example, the server at port 1700 on host "myhost" is checked first, then if the request is not satisfied, the license file at /home/reprise/reprise.lic is used. Note that this search order may be modified if the environment variable RLM\_PATH\_RANDOMIZE is set.

```
% setenv RLM_LICENSE 1700@myhost:<LICENSE isv prod1 1.0 1-jan-09 uncounted  
hostid=any key="1234...">
```

This example specifies the license for "prod1" directly in the environment variable, in addition to using the server at port 1700 at host "myhost".

Note: The ability to specify the license directly was added in RLM v3.0.

Note: The ability to add a directory to the RLM\_LICENSE environment variable was added in RLM v6.0.

# License Administration Tools

The rlm server is delivered with an embedded Web Server to perform normal administration tasks. For more information on the web server interface, see The RLM Web Server on page 46.

In addition, the RLM kit is delivered with several command-line administration tools to perform various administration tasks on the license servers as well as to retrieve information about licensing parameters. While the RLM web interface is the preferred method to administer RLM license servers, the command-line tools are provided as a convenience for use in administration scripts and programs. License Administrators can manage rlm by using the administration tools, as described in detail below: *rlmdebug*, *rlmdown*, *rlmhostid*, *rlmnewlog*, *rlmremove*, *rlmreread*, *rlmstat*, *rlmswitch*, and *rlmswitchr*. On UNIX platforms, *rlmutil* is an all-in-one utility which is installed with hard links to all the utility program names. On windows, separate .exe files are provided for each utility.

RLM has the ability to restrict usage of the **remove**, **reread**, **shutdown**, **status** and **option editing** requests. All restrictions are done via The RLM Options File. For a description of how to restrict command usage, see The RLM Options File on page 59.

All utilities take the following options:

| option             | meaning   |
|--------------------|---|
| -c<br>license_spec | use 'license_spec' instead of the current directory to find license files. 'license_spec' can be either a license file or a port@host specification. Note that prior to RLM v4.0 the RLM_LICENSE environment variable takes precedence over a -c license_spec specification. Starting in RLM v4.0, the -c option overrides RLM_LICENSE. |
| -dat               | use *.dat as the license file instead of *.lic (new in rlm v3.0)  |
| -h                 | print usage information and exit  |
| -q                 | don't prompt/quiet (for rlmdown/rlmremove/rlmswitch/rlmhostid). -q also turns off the verification of license checksums and corresponding error messages for all commands.  |
| -v                 | print version number and exit   |
| -z password        | use password as license password for command (enclose in quotes if password contains white space (new in RLM v9.4)  |

## rlmanon - change user and host names in report log file

Usage: **rlmanon** logfile

rlmanon reads the report log file *logfile*, and changes all the user and host names to the form **uNNN** and **hNNN**, where *NNN* is a sequence number. The result is written into file *logfile.anon*.

There is a one-to-one mapping from a particular user or host name to it's corresponding sequence number, so that reports generated from the log file will accurately reflect the number of unique users and hosts as well as the sharing of licenses. However, actual user and host information is removed from the output *logfile.anon*.

*rlmanon* creates a new authenticated report log file if the input log file is an unmodified authenticated log file. If the input file has incorrect authentication records, an error message is generated and no output file is written.

*rlmanon* first appeared in RLM v4.0.

## **rlmdebug - display debugging information about products**

Usage: **rlmdebug** [product]

**rlmdebug** prints information about the specified *product* (or all products if *product* is not specified). The debugging information is written to stdout (this requires running in a command window on Windows systems).

This capability is also built into every RLM v9.0 (or later) application. To use the debugging information directly from the application, set the *RLM\_DEBUG* environment variable to the product name (or to an empty string if you wish to debug all products). (Note: you do not need to use the *RLM\_DEBUG* environment variable with the **rlmdebug** utility.)

Sample rlmdebug output:

```
% setenv RLM_DEBUG
```

When the application is run the following (sample) output is displayed (in addition to any other output the application may produce):

```
RLM DEBUG for all products
In license file: ../rlm/z.lic (5555@paradise):
Product: test1, ISV: reprise, Floating
Product: test2, ISV: reprise, Floating
Product: test3, ISV: reprise, Floating
Product: rlm_roam, ISV: reprise, Uncounted
Product: testr1, ISV: reprise, Floating
Product: testr2, ISV: reprise, Floating
Checking server machine "paradise" ... server UP
Checking RLM server at port 5555 ... server UP

In license file: a.lic:
Product: test, ISV: reprise, Single

8 product instances found
```

## **rlmdown - shuts down the license server**

Usage: **rlmdown** [-q] [isv]

**rlmdown** shuts down the first license server in the license path *RLM\_LICENSE*. If the *-q* option is specified, the shutdown happens without a confirming prompt. If the optional *isv* is specified, only that ISV's server is shut down.

In order to shut down the rlm server itself, specify the isv name as **RLM**. (Note: RLM must be in capital letters).

Note that (on Unix systems only) the servers can also be shut down by sending a SIGTERM signal to the *rlm* process. SIGTERM shuts down all the servers, including *rlm*.

## **rlmhostid - print the hostid of this machine**

Usage: **rlmhostid** [[-]32|disksn|ether|gc|internet|ip|ipv6|uuid|host|user|rlmid1] [-q]

*rlmhostid* prints the hostid of the machine it is running on. If the *-q* flag is specified, the hostid is printed without any other output.

Hostid types described in RLM hostids on page 110.

Note: Beginning in RLM v4.0, if the *rlmhostid* command prints "(Virtual: some text)" after the hostid, this means that the command is run on a virtual system which is not supported for running an RLM license server. In the case of Solaris systems, license servers can only be run on zone 0 (the "Global" zone).

## **rlmnewlog - moves the old report log info to a new file**

Usage: **rlmnewlog** *isv* *new-log-file-name*

*rlmnewlog* causes the ISV server *isv* to move the current reportlog output to *new-log-file-name*, and continue logging to the original filename.

Note that the *new-log-file-name* must be on the same filesystem as the original reportlog, otherwise the command will fail. The ISV server renames the old reportlog, it does not copy the data. *rlmnewlog* will fail if the server is not currently writing a report log.

## **rlmremove - remove a checked-out license from a user**

Usage: **rlmremove** [-q] *server-host port isv handle*

*rlmremove* removes a checked-out license. If the *-q* option is specified, the license is removed without a confirming prompt. *server-host*, *port*, and *handle* are indicated in the *rlmstat* output.

In the following example *rlmstat* output, the *server-host* is **melody**, the *port* is **1215**, and the *handle* is **809f418** and the *isv* is **reprise**:

```
reprise license usage status on melody (port 1215)
test3 v1.000: tom@sun1(v1.0) (809f418) 1/0 at 02/06 09:59
```

## **rlmreread - Cause the license server(s) to reread their license and option file(s)**

Usage: **rlmreread** [*isv*]

rlmreread causes the specified ISV server *isv* to reread it's license file, and options file if specified in the license file (or if in the default location *isv.opt*). If *isv* is omitted, the reread command is sent to rlm and all ISV servers. If *isv* is specified as *rlm*, then only the rlm server rereads it's license file.

When *rlm* rereads its license file, it starts any new ISV servers that were not present before.

Note that *rlm* performs an automatic reread of the license file(s) every night at midnight.

Note also that (on Unix systems only) the servers will do a reread if a SIGHUP signal is sent to the *rlm* process.

## rlmstat - obtains status from the license servers

Usage: **rlmstat** [-a] [-i [*isv*]] [-l [-l [*isv*]]] [-n [*host*]] [-p [*product*]] [-u [*user*]] [-z *password*]

**rlmstat** retrieves status from the license servers and prints it. Control over the status retrieved from **rlmstat** is specified as follows:

| option | parameter (meaning if present)                | result   |
|--------|---|--|
| -a     | (no parameters)                               | Print all status from rlm and all ISV servers      |
| -avail | [-i <i>isv</i> ] [-p <i>product</i> ] -b      | Reports free license availability (see below)      |
| -i     | display this <i>isv</i> only                  | Display license checkout info from ISVs            |
| -l     | Display <i>isv</i> -defined checkout data     | “[I: <i>isv</i> -data]” appended to each user line |
| -l     | display this <i>isv</i> only                  | Display license pooling info from ISVs             |
| -n     | display licenses from this <i>host</i> only   | Display license checkout info from ISVs            |
| -p     | display licenses for this <i>product</i> only | Display license checkout info from ISVs            |
| -u     | display licenses from this <i>user</i> only   | Display license checkout info from ISVs            |
| -z     | license password                              | Supplies password to license server                |

### Example rlmstat output

```
% rlmstat -a
rlmstat v9.1
Copyright (C) 2006-2011, Reprise Software, Inc. All rights reserved.

rlm status on bigserver (port 5053), up 00:03:51
rlm software version v9.1 (build:3)
rlm comm version: v1.1
Startup time: Wed Jul 6 13:27:42 2011
Todays Statistics (00:03:50), init time: Wed Jul 6 13:27:43 2011
Recent Statistics (00:03:50), init time: Wed Jul 6 13:27:43 2011

          Recent Stats          Todays Stats          Total Stats
          00:03:50              00:03:50              00:03:51
Messages: 9 (0/sec)             9 (0/sec)             9 (0/sec)
Connections: 7 (0/sec)         7 (0/sec)             7 (0/sec)

----- ISV servers -----
      Name      Port Running Restarts
reprise      62503   Yes      0
```

```

-----
reprise ISV server status on bigserver (port 62503), up 00:03:49
reprise software version v9.1 (build: 3)
reprise comm version: v1.1
reprise Debug log filename: <stdout>
reprise Report log filename: <stdout>
Startup time: Wed Jul  6 13:27:44 2011
Todays Statistics (00:03:49), init time: Wed Jul  6 13:27:44 2011
Recent Statistics (00:03:49), init time: Wed Jul  6 13:27:44 2011

                Recent Stats          Todays Stats          Total Stats
                00:03:49              00:03:49              00:03:49
Messages:      17 (0/sec)              17 (0/sec)              17 (0/sec)
Connections:   6 (0/sec)                6 (0/sec)                6 (0/sec)
Checkouts:     2 (0/sec)                2 (0/sec)                2 (0/sec)
Denials:       0 (0/sec)                0 (0/sec)                0 (0/sec)
Removals:      0 (0/sec)                0 (0/sec)                0 (0/sec)

-----

reprise license pool status on bigserver (port 62503)

test v1.0
  count: 1, # reservations: 0, inuse: 1, exp: 1-jan-0
  obsolete: 0, min_remove: 20, total checkouts: 1
test2 v1.0
  count: 1, # reservations: 0, inuse: 1, exp: 1-jan-0
  obsolete: 0, min_remove: 20, total checkouts: 1
test3 v1.0
  count: 100, # reservations: 0, inuse: 0, exp: 1-jan-0
  obsolete: 0, min_remove: 20, total checkouts: 0

-----

reprise license usage status on bigserver (port 62503)

test v1.0: joe@library 1/0 at 07/06 13:27 (handle: 41)
test2 v1.0: sam@kitchen 1/0 at 07/06 13:28 (handle: 81)

```

In this output, the first section (before the line of dashed lines -----) is the status of the rlm server, the next section is the status of the ISV server *reprise* (there would actually be one section of status for each ISV server if there were more than one running). Next comes the *license pool* info for each ISV server (again, only one section for the *reprise* server), followed by the actual license usage information.

Also, please note that the expiration date shown in this output is the expiration date of the **first license to expire** out of all the licenses used to create the license pool in the license server. When more than one license is used to create a single license pool (licenses are combined when all relevant parameters of 2 different licenses match), then only the **earliest expiration date** is shown. The other license(s) may have any expiration date that has not yet expired. To determine the expiration date of all licenses used to make up a license pool the actual license file must be consulted. Also note that licenses from different license files could be combined to make a single license pool.

The meaning of the license usage line:

```
test v1.0: joe@library 1/0 at 07/06 13:27 (handle: 41)
```

is as follows:

**test** is the product name

**v1.0** is the license version (from the license file) for *test*

**joe** is the user who is using the license

**library** is the host on which tom is using the license

**(41)** is the *license handle* in the server. This handle is used by the *rlmremove* command.

**1/0** indicates that 1 unreserved and 0 reserved licenses are in use

**at 07/06 13:28** is the time the licenses were checked out

and if the optional “-I” switch is specified, the following will be appended to the line, if there is any isv-defined checkout data:

[I: isv-data]

where “isv\_data” is the isv-defined checkout data.

### **rlmstat -avail command**

The *rlmstat -avail* command reports on license availability for a specified license, a specified ISV, or all licenses from all ISVs.

Usage:

```
rlmstat -avail [-i isv] [-p product] [-b]
```

If *-i isv* is specified, only licenses from the selected isv are displayed.

If *-p product* is specified, only the selected product is displayed.

If *-b* is specified, license availability is combined across license servers.

Note that if you are looking for the availability of a license from a particular ISV, it is more efficient to specify the ISV name in the command. If you do not specify the ISV name, *rlmstat* must contact the *rlm* server to request a list of ISV servers, then request information from each ISV server. If you specify the ISV, then only that ISV server is contacted.

Note also that there are situations when you may not be able to check out a license that is listed as available. This can happen if, for example, you are on the EXCLUDE list for a particular product, not on the INCLUDE list, already exceeded your MAX usage, etc.

Also note that you might be able to check out one that is listed as not available. This could happen if that license is shared and you can share an existing checked-out license, or if one of the reservations for the license is for you (*rlmstat -avail* lists free available licenses; reservations are not generally available).

### **Example rlmstat -avail output**

```
% rlmstat -avail -i reprise
rlmstat v9.1
Copyright (C) 2006-2011, Reprise Software, Inc. All rights reserved.

License availability for all products from ISV "reprise"

server host: telecard (port 5053)
test1 v1.000 available: 15
test1 v1.000 hostid: a8c00301 available: 10
test5 v3.000 hostid: a8c00301 available: 2
```

```
test5 v3.000 available: 10
test v1.000 available: 10

server host: spinout (port 5053)
test1 v1.000 available: 15
test1 v1.000 hostid: a8c00301 available: 10
test5 v4.000 hostid: ip=172.16.7.28 available: unlimited
test5 v2.300 available: 15
test5 v3.000 hostid: a8c00301 available: unlimited
test5 v3.000 available: 73
```

### Example `rlmstat -avail -b` output (same situation as above)

```
% rlmstat -avail -i reprise -b
rlmstat v9.1
Copyright (C) 2006-2011, Reprise Software, Inc. All rights reserved.

License availability for all products from ISV "reprise"

ISV: reprise
test1 v1.000 available: 30
test1 v1.000 hostid: a8c00301 available: 20
test5 v3.000 hostid: a8c00301 available: unlimited
test5 v3.000 available: 83
test5 v4.000 hostid: ip=172.16.7.28 available: unlimited
test5 v2.300 available: 15
```

## **rlmswitch - switches the debug log info to a new file**

Usage: **rlmswitch** [*isv*] *new-log-file-name*

`rlmswitch` causes the server *isv* to close the current debug log file and begin output to *new-log-file-name*. If *isv* is not specified, or if specified as *rlm*, the rlm server's debug log is switched.

## **rlmswitchr - switches the report log info to a new file**

Usage: **rlmswitchr** *isv* *new-log-file-name*

`rlmswitchr` causes the ISV server *isv* to close the current reportlog file and begin output to *new-log-file-name*.

Beginning in RLM v9.1, `rlmswitchr` will fail if the server is not currently writing a report log.

# The RLM Web Server

The *rlm* server contains an embedded *Web Server* which can be used to perform most administration of the *rlm* server itself. The web server contains the functionality of all the *rlmutil*-based utilities except *rlmhostid*. The web server allows you to retrieve server and license status (similar to *rlmstat*), cause the servers to re-read the license files (*rlmreread*), switch debug (*rlmswitch*) or report log (*rlmswitchr*) files, move the current report log file to a new name (*rlmnewlog*), or shut down the license servers (*rlmdown*). Using this web-based interface, you can administer the license servers from any platform, and you do not need to install the *rlm* utilities - you only need a web browser.

In addition, the web server allows you to edit server option files (if you have access to the **edit\_options** capability - for ISV servers, or the **edit\_rlm\_options** capability - for *rlm* itself.) Also, the web interface allows you to view the recent debug log information from any of the servers if you have access to the **status** capability. Finally, access to the **status**, **reread**, and **shutdown** commands is controlled by the appropriate capability as specified in The RLM Options File on page 59 (or by the login credentials for RLM v10.0 or newer servers).

The web server is started automatically on port 5054 when *rlm* is started. To use the web server, simply point your browser to: *http://ServerHostName:5054* and select the operation you would like to perform. You will be prompted for any required information. (Note: RLM ran the web server on port 9000 prior to v6.0).

If you would like to run the web server on a different port, specify the *-ws NNNNN* command-line argument when starting *rlm*, where *NNNNN* is the desired port.

The RLM web server is 100% self-contained in the *rlm* binary; no additional html files are required for operation.

The remaining sections will describe some of the main functions of the web interface.

## Access Control to the RLM Web Interface

Beginning in RLM v10.0, it is possible to require users to log in to the RLM Web Interface.

The login capability is provided via the *rlm password file*, named *rlm.pw*. If this file exists in the directory with the *rlm* binary, then the RLM Web Interface will require users to log in before they can perform any actions. Reprise Software recommends that you protect access to this file so that ordinary users can't write it. The *RLM password file*, as well as the directory which contains it, must be read-write to the *rlm* process.

The *RLM password file* has one line for each user, formatted as follows:

```
username:password:list-of-permissions
```

The *username* must not contain a ':' character.

If the *password* field is blank, then the user can log in without supplying a password. To change their password, select the "Change Password" menu item once logged in as that user. The

*password* field is an encrypted hash of the actual password (similar to the Unix password file).

The *list-of-permissions* field is a comma-separated list of the various privileges which you can assign to this user. These names are the same names you would use in the RLM options file if you were controlling access without logins enabled, with the addition of the special "all" permission, which enables all operations. If you use the *RLM password file* to control access, you should not use the RLM options file to control access.

Beginning in rlm v10.0, you can control the appearance and defaults of the "Activate License" command with the rlm "-activate" options in the rlm options file.

## RLM privileges assignable in the RLM password file

| Privilege        | Meaning   | Notes  |
|------------------|---|--|
| all              | Special privilege name, enables all privileges                              |  |
| edit_meter       | Allows modifying count for meter counters                                   | Enables "status" privilege even if not present |
| edit_options     | Allows editing options files for ISV servers                                | Enables "status" privilege even if not present |
| edit_rlm_options | Allows editing license files and options files for the rlm server           | Enables "status" privilege even if not present |
| edit_xfer        | Allows editing server-server license transfer settings for ISV servers      | Enables "status" privilege even if not present |
| extend_roam      | Allows this user to extend roam duration for already-roaming licenses.      |  |
| logfiles         | Enables the functions which change log files - switch, switchr, newlog      |  |
| remove           | Allows the user to remove a license from a running process                  | Enables "status" privilege even if not present |
| reread           | Allows access to the functions which do reread commands on license servers  |  |
| shutdown         | Allows access to the functions which shut down license servers              | Enables "status" privilege even if not present |
| status           | Allows display of status and debug log information from the license servers |  |

A user with no privileges assigned will have access to the "Activate License", "Diagnostics", "RLM Manual...", "System Info", "About", "Change Password", and "Logout" commands.

A couple of example password line entries shown here:

```
tom:$5ukMApW1jixwcrGqRALO91:all
harry::edit_options,edit_rlm_options,reread
```

User "tom" has a password assigned, and can perform all actions with the web interface.  
User "harry" has no password (therefore no password is required to log in), and has the edit options, edit rlm options, and reread privileges assigned. He will also be able to view status.

## Intro Screen

The intro screen of the RLM web server is shown below. There are 3 sections to the rlm web interface:

- a top banner with the Reprise logo and title
- a command area on the lower left, and
- a general view area in the main lower-right hand side of the screen.

The top section of the view area displays some general information about rlm command options to run the web server. On the left-hand side is a list of administration commands which are discussed later.

Note that, beginning in RLM v10.0, every user will not see all the commands on the left-hand side of the menu, depending on the privileges assigned to that user in the password file or in the RLM options file.

**Reprise License Server Administration**  
Copyright (c) 2006-2012, Reprise Software, Inc. All Rights Reserved.

Logged in as: matt

**RLM Administration Commands**

Choose a command from the list below

- Status
- Shutdown
- Reread/Restart Servers
- Switch Reportlog
- New Reportlog
- Switch Debuglog
- Edit License Files
- Activate License
- Diagnostics
- RLM Manual...
- System Info
- About...
- Change Password
- Logout

**RLM License Server Administration, v10.0**

This web interface is an integral part of the *rlm* server.

If *rlm* is started without any parameters, the web interface runs on port 5054.  
*rlm* can also be started with the *-nnows* option to disable this web interface.  
*rlm* can be started with the *-ws port#* option to specify another port number.

This tool allows you to perform status and administration functions on the RLM server.  
Choose a command from the list on the left-hand side of the window.

Reprise Software, Inc.  
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[info@reprisesoftware.com](mailto:info@reprisesoftware.com)

RLM contains software developed by the OpenSSL Project  
for use in the OpenSSL Toolkit (<http://www.openssl.org>)  
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Webserver Copyright (c) 2006-2012 GoAhead Software, Inc. All Rights Reserved.  
<http://www.goahead.com/>

**goahead**  
**WEBSERVER**

## Main Status screen

If you select *Status* from the menu on the left, the main status screen is displayed in the view area as shown below.

The top section displays the host information where the rlm server is running - host name and port #.

Below this is status of the RLM server itself, followed by buttons to edit rlm options and display the last few lines of the rlm debug log.

Next is a table of ISV servers, one per line, with a number of buttons on the right-hand side of each line to retrieve ISV server status, license status, display the last few lines of the debug log, reread or restart the server, edit server options, or shut down the ISV server. Note that these buttons (and the corresponding columns) will only appear if the user running the web server has access to these functions, as specified in the rlm options file.

The status screen provides access to the shutdown and reread/restart commands for all the ISV servers, as well as option file editing and debug log viewing for both rlm and the ISV servers.

### Status for "rlm" on paradise (port 2700)

|                      |                |
|----------------------|----------------|
| RLM software version | v8.0 (build:3) |
| RLM comm version     | v1.1           |
| debug log file       | _stdout_       |
| license files        | a.lic          |

| rlm Statistics | Since Start    | Since Midnight | Recent         |
|----------------|----------------|----------------|----------------|
| Start time     | 01/21 16:43:38 | 01/21 16:43:39 | 01/21 16:43:39 |
| Messages       | 0 (0/sec)      | 0 (0/sec)      | 0 (0/sec)      |
| Connections    | 0 (0/sec)      | 0 (0/sec)      | 0 (0/sec)      |

EDIT rlm Options

SHOW rlm Debug Log

| ISV Servers |       |         |          |  |  |  |  |  |  |  |
|-------------|-------|---------|----------|--|--|--|--|--|--|--|
| Name        | port  | Running | Restarts | Server Status                          | License Usage                          | Debug Log                              | REREAD                                 | OPTIONS                                | TRANSFER                               | SHUTDOWN                               |
| reprise     | 39360 | Yes     | 0        | <input type="button" value="reprise"/> |

## Server Status

If you click on an ISV button in the *Server Status* column in the ISV server status display, you will see the detailed status display for this ISV server (shown below) in the view area. This display shows some server statistics in a table at the top, followed by a table of all the licenses which this ISV server is serving.

There are several columns in this table which will appear or not, depending on the particulars of the licenses which this server is serving. For example, there are columns for *hostid* (in the case of node-locked licenses), *roaming* (in the case where some licenses are roamed out to disconnected systems), and *named count* (named user count - in the case of named user licenses). In the example shown here, there are no node-locked licenses, and no licenses are roaming, so these 2 columns do not appear.

Also, please note that the expiration date shown in this table is the expiration date of the **first** license to expire out of all the licenses used to create the license pool. When more than one license is used to create a single license pool (licenses are combined when all relevant parameters of 2 different licenses match), then only the earliest expiration date is shown. The other license(s) may have any expiration date that has not yet expired. To determine the expiration date of all licenses used to make up a license pool the actual license file must be consulted. Also note that licenses from different license files could be combined to make a single license pool.

At the far right-hand side of each license line, there are 2 columns. The first column has buttons which, if pressed, will generate a list of users of that product. The second column has buttons which are used to maintain the named user list for named user licenses. Note that if this server is not serving any named user licenses, the 2nd column will not appear. Also, only named user licenses will have edit buttons in this column. In the example below, only the first license is a named user license.

### ISV reprise status on paradise (port 39360)

|                          |                              |
|--------------------------|------------------------------|
| reprise software version | v8.0 (build:3)               |
| reprise comm version     | v1.1                         |
| debug log file           | _stdout_                     |
| report log file          | /user/matt/rm/rm/reprise.rpt |

| reprise Statistics | Since Start    | Since Midnight | Recent         |
|--------------------|----------------|----------------|----------------|
| Start Time         | 01/21 16:43:40 | 01/21 16:43:40 | 01/21 16:43:40 |
| Messages           | 5 (0/sec)      | 5 (0/sec)      | 5 (0/sec)      |
| Connections        | 2 (0/sec)      | 2 (0/sec)      | 2 (0/sec)      |
| Checkouts          | 0 (0/sec)      | 0 (0/sec)      | 0 (0/sec)      |
| Denials            | 0 (0/sec)      | 0 (0/sec)      | 0 (0/sec)      |
| License Removals   | 0 (0/sec)      | 0 (0/sec)      | 0 (0/sec)      |

### License pool status

| Product  | Pool | Ver | Expires   | count     | soft lim | inuse | res | hostid | named count | timeout | share | transactions | Show License Usage       | Edit Named User List    |
|----------|------|-----|-----------|-----------|----------|-------|-----|--------|-------------|---------|-------|--------------|--------------------------|-------------------------|
| test     | 1    | 1.0 | permanent | Token     | 0        | 0     | 0   |        | 0           | 0       | None  | 0            | <a href="#">usage...</a> | n/a                     |
| a        | 2    | 1.0 | permanent | 10        | 10       | 0     | 0   |        | 0           | 0       | None  | 0            | <a href="#">usage...</a> | n/a                     |
| b        | 3    | 1.0 | permanent | 10        | 10       | 0     | 0   |        | 0           | 0       | None  | 0            | <a href="#">usage...</a> | n/a                     |
| rlm_roam | 4    | 1.1 | permanent | Uncounted | 0        | 0     | 0   | ANY    | 0           | 0       | None  | 0            | <a href="#">usage...</a> | n/a                     |
| named    | 5    | 1.1 | permanent | 10        | 10       | 0     | 0   |        | 15          | 0       | None  | 0            | <a href="#">usage...</a> | <a href="#">edit...</a> |

[Refresh](#)

[BACK](#)

## License Status

If you click on the **usage...** button in the "Show License Usage" column above, you will see the license status screen, as shown below.

### License status for ISV demo

| Product | Pool | Ver   | user  | host     | PID | ISV def | req prod | req ver | # lic | # res | Out time    | In (hold) time | Click to REMOVE        |
|---------|------|-------|-------|----------|-----|---------|----------|---------|-------|-------|-------------|----------------|------------------------|
| named   | 1    | 1.000 | harry | paradise | 979 |         |          | 1.0     | 1     | 0     | 12/10 10:48 | None           | <a href="#">Remove</a> |

[Back](#)

## Maintaining Named User Licenses

If you click on the **edit...** button in the "Edit Named User List" column above, you will see the "Edit Named User Definitions" screen, as shown below. This form contains a table of all the named users for this license, as well as a list of recently deleted named users. You can delete any named user from the list by pressing the **Delete** button to the right-hand side of their name. Pressing this button will present a confirmation screen, which then allows you to remove that user from the list. Note that the user cannot be removed from the list if he/she currently has any licenses checked out at the server (including roaming licenses).

Once deleted, a user must remain off the list for a minimum amount of time as specified in the license.

At the bottom of this screen are 2 buttons for adding named users to the list. The first button **Add Group...** brings up a form which has a choicelist of all GROUP definitions from this ISV server's options file. If you select a group to add, group members will be added to the named user list until the list is full, or the group is exhausted.

Below the **Add Group...** button is an **Add New User...** button, which is used to add an individual user to the named user list.

Press the **Back** button if you do not wish to make any changes to the named user list.

## Edit named user definitions

This form allows you to add and remove named users for this product.

Press the "Delete" button on the right to delete a user.  
Press "Add New User..." to add a user to the list.  
Press "Add Group..." to add a group of users to the list.

Named users for for ISV demo, product named

| User Name | Click to Remove                       |
|-----------|---------------------------------------|
| harry     | <input type="button" value="Delete"/> |

### Recently removed users

| User Name | # of minutes before this user can be re-added |
|-----------|---|
| tom       | 1437  |

1 named users (1 deleted recently)

## Server Shutdown

If you select *Shutdown* from the menu on the left (or from the Shutdown column in the ISV server status display), you will see the **Shutdown License Server** screen below in the view area. If you enter an ISV name that particular ISV server will be shut down. If you leave the ISV name blank or enter "all", all ISV servers will be shut down. Note that you cannot shut down rlm from the shutdown screen. The shutdown will happen when you click the **SHUT DOWN SERVER** button. If you do not wish to shut down any servers, use the browser **back** button, or select a different command from the list on the left.

## Shutdown License Server

If *ISV* is specified as "all" or blank, all ISV servers will be shutdown. Note that you cannot shut down *rlm* (the process running this webserver) with this command.

ISV:

SHUT DOWN SERVER

## Server Reread/Restart

If you select *//Reread/Restart* from the menu on the left (or from the *REREAD/RESTART//* column in the ISV server status display), you will see the **Reread/Restart Servers** screen below in the view area. If you enter an ISV name that particular ISV server will be restarted if it is not running, or it will be sent a reread command if it is running. If you leave the ISV name blank or enter "all", all ISV servers will be restarted or reread their license files, as appropriate. If you select *rlm*, the *rlm* server itself will reread its license and option files. The reread/restart will happen when you click the **REREAD LICENSES** button. If you do not wish to send the reread command to any servers, use the browser **back** button, or select a different command from the list on the left.

## Reread/Restart Servers

If *ISV* is specified as "all" or blank, all ISV servers will reread licenses

ISV:

REREAD/RESTART

## Switch ISV server Reportlog

If you select *Switch Reportlog* from the menu on the left, you will see the **Switch Reportlog For License Server** screen below in the view area. Enter an ISV name and a new filename for the reportlog, then that particular ISV server will begin writing its reportlog to the filename specified. The switch command will be sent when you click the **SWITCH REPORT LOG** button. If you do not wish to switch the report log, use the browser **back** button, or select a different command from the list on the left.

### Switch Reportlog For License Server

This command will close the current report log file for the specified ISV server (if one exists), and continue logging into the new file name specified.

ISV:    
File:

### New ISV server Reportlog

If you select *New Reportlog* from the menu on the left, you will see the **New Reportlog For License Server** screen below in the view area. Enter an ISV name and a new filename for the reportlog, then that particular ISV server will rename the current reportlog to the filename specified, and continue logging to the original reportlog filename. The command will be sent when you click the **MOVE DATA TO NEW LOGFILE** button. If you do not wish to rename the report log, use the browser **back** button, or select a different command from the list on the left.

### New Reportlog For License Server

This command will move the current report log file contents to the new file specified, and continue logging into the original file name. This command is useful for log file rotation.

ISV:    
File:

### Switch Debug Log for ISV Server or rlm

If you select *Switch Debuglog* from the menu on the left, you will see the **Switch Debug Log For License Server** screen below in the view area. Enter an ISV name (or *rlm*) and a new filename for the debug log, then that particular ISV server (or *rlm*) will begin writing it's debug log to the filename specified. The switch command will be sent when you click the **SWITCH DEBUG LOG** button. If you do not wish to switch the debug log, use the browser **back** button, or select a different command from the list on the left.

Note that on Unix systems, all servers (*rlm* plus all ISV servers) initially write their debug log to the same file (stdout of the *rlm* process). Once you switch any server to a different file, it is not possible to combine the debug log output again.

### Switch Debug Log For License Server

Both *rlm* and all the ISV servers begin logging debug information to standard output. This command will switch the debug log of *one* server to a new file. You should *not* attempt to send the output of multiple servers to the same file, as this will result in unpredictable behavior.

ISV:    
File:

### RLM System Info

If you select *System Info* from the menu on the left, you will see the RLM system information screen below in the view area. This information contains the platform type and hostid information for the system where the **rlm** process is running (NOTE: **not** where your browser is running). In addition, starting in RLM v9.3BL2, this screen will display a list of all *rlm* processes running on this computer (including processes which are not currently running but which have run in the prior 24 hours).

## RLM Info for System: *paradise*

---

### Platform type

*x64\_s1*

### RLM Version

*v9.4BL2*

### Hostids

32-bit: 1d8bbd06

IP Address: ip=127.0.0.1 ip=172.16.7.13

### RLM processes running on this machine (in the last 24 hours)

RLM Version: v9.4BL2

Command: *Jrlm*

Working Directory: */user/matt/rlm/testsuite*

PID: 12740

Main TCP/IP port: 62050

Web interface TCP/IP port: 5054

Alternate TCP/IP port(s): 62090 62080 62060

ISV servers: *reprise*

## Activate License

If you select *Activate License* from the menu on the left, you will be prompted for the information necessary to activate a license from an ISV server's internet site. The information is collected in several steps. The initial screen is shown below. Click on **BEGIN License Activation** to step through the screens which will collect the data required to activate a license.

### License Activation

RLM activates licenses by making a request on the internet to generate a license file for your machine. If you are activating a license, you should run "rlm" on the machine where your license is to be used (either where a nodelocked license is going to be used, or the machine you want to be the license server if it is a floating license). If you are not sure where this copy of "rlm" is running, click on "System Info" from the menu on the left. If rlm is running on the wrong machine, run rlm on the correct machine and do the activation using its web interface.

Note that not all application vendors support license activation, so please check with your vendor to see if this capability is available to you.

BEGIN License Activation

## **RLM Manual/About...**

These last two commands display RLM information. The **RLM Manual** button displays the latest version of this manual from the Reprise Software, Inc. website at [http://www.reprisesoftware.com/RLM\\_License\\_Administration.html](http://www.reprisesoftware.com/RLM_License_Administration.html)

The **About...** command displays the intro screen seen at the beginning of this section.

# The RLM Options File

The RLM options file allows control over access to the *status*, *reread*, *shutdown* administration commands as well as control over the editing of options files. Options are provided to either allow (INCLUDE or INCLUDEALL) or disallow (EXCLUDE or EXCLUDEALL) administration command usage. Additionally, options are provided to create groups of users (GROUP) or hosts (HOST\_GROUP) or IP addresses (INTERNET\_GROUP).

In addition, the RLM options file allows you to turn off logging of status requests (to the debug log) via the NOLOG option.

Finally, the RLM options file allows you to set the defaults for the "Activate License" command in the menu.

The RLM options file is called *rlm.opt*, and should be placed in the directory from which you run the rlm (or rlm.exe) binary.

If you would like to add comments to the options file, start the line with the '#' character.

There are 8 privileges which can be controlled in the RLM options file. Each privilege is specified with the appropriate privilege name in the rlm options file. Note that these privilege names are the same names that are used in the *RLM password file* if you are controlling access to the RLM web interface via user login. If you use the RLM password file, you should not use these lines in the RLM options file - in other words, you should use one mechanism or the other, but not both.

## RLM privileges controlled by the RLM options file

| Privilege        | Name to use in RLM options file | Meaning   |
|------------------|---------------------------------|---|
| edit_meter       | edit_meter                      | Allows modifying count for meter counters                                   |
| edit_options     | edit_options                    | Allows editing options files for ISV servers                                |
| edit_rlm_options | edit_rlm_options                | Allows editing options files for the rlm server and license files           |
| edit_xfer        | edit_xfer                       | Allows editing server-server license transfer settings for ISV servers      |
| logfiles         | logfiles                        | Enables the functions which change log files - switch, switchr, newlog      |
| manage_service   | manage_service                  | Allows editing windows service setup  |
| remove           | remove                          | Allows the user to remove a license from a running process                  |
| reread           | reread                          | Allows access to the functions which do reread commands on license servers  |
| shutdown         | shutdown                        | Allows access to the functions which shut down license servers              |
| status           | status                          | Allows display of status and debug log information from the license servers |

The RLM options file syntax is a subset of The ISV Options File syntax. The **privilege** names **status**, **reread**, **shutdown**, **logfiles**, **edit\_meter**, **edit\_options**, **edit\_rlm\_options**, **manage\_service** and **edit\_xfer** are used where a product name would be used in an ISV options file. By default, all privileges are granted to all users unless otherwise restricted in the rlm options file.

A user with no privileges assigned will have access to the "Activate License", "Diagnostics", "RLM Manual...", "System Info", and "About" commands.

Note that the RLM web interface does not have access to the username or hostname (the rlmutil utilities do pass the username and hostname), so, to be most effective, command restrictions should be done based on IP addresses. By default, all commands are enabled (unless disabled with the -x rlmrdown or -x rlmremove rlm startup options, in which case rlm options have no effect.).

## Legal characters in the RLM options file

In general, all options file fields are white-space delimited, meaning that no data item can contain embedded spaces, tabs, newlines or carriage returns. In addition, the following four characters are illegal in data items in the ISV or RLM options (and license) file: "<", ">", "&", and double-quote ("). Note: single quote (') and back-quote (`) were illegal prior to RLM v8.0. As of RLM v12.1, the characters "<", ">", and "&" are legal in comments (lines beginning with "#") but nowhere else.

Note that all lines in option files (RLM or ISV) as well as license files *must* be shorter than 1024 characters. Anything over 1024 characters will be truncated.

The ACTIVATE option controls whether the "Activate License" button is present, and, if present, the default activation URL and ISV name.

There is one additional option available in the ISV options file: NO\_OLD\_RLMUTIL. This option goes on a line by itself, with no parameters. If specified, the RLM command-line utilities prior to RLM v9.0 will not be able to perform an rlmrdown, rlmreread, or rlmremove on this server. By default, all versions of the RLM utilities are enabled unless NO\_OLD\_RLMUTIL is specified in both the RLM and the ISV options files.

Note that everything in the RLM options file is case-insensitive.

The RLM Options File first appeared in RLM v4.0. The remove privilege and NO\_OLD\_RLMUTIL were added in RLM v9.0. The logfile privilege was added in RLM v9.1. The EDIT\_METER privilege was added in RLM v9.3.

In the following example RLM options file, status commands are only allowed from hosts on subnet 172.16.7.\*, no one on host "excluded\_host" can do a reread command, and only users on IP address 172.16.7.93 can do a shutdown. Note that each command (INCLUDE, EXCLUDE, etc) must be on a separate line. Also, RLM will not process reread or shutdown requests from pre-v9 command-line utilities.

```
NO_OLD_RLMUTIL
INCLUDE status internet 172.16.7.*
EXCLUDE reread host excluded_host
INCLUDE shutdown internet 172.16.7.93
```

For a detailed description of each option, see the section below. Note that **privilege** should be one of "status", "shutdown", "reread", "edit\_options", or "edit\_rlm\_options":

## **ACTIVATE [off | url URL | isv ISVNAME]**

The ACTIVATE line allows you to disable the "Activate License" command, or to set the defaults for the URL and ISV name for activation.

The 3 forms of the ACTIVATE line are:

```
ACTIVATE off
ACTIVATE url URL
ACTIVATE url ISVNAME
```

In the first form, the "Activate License" menu item is disabled and will not appear in the menus.

In the second form "URL" is the default URL used for activation. For example:  
ACTIVATE url www.reprisesoftware.com

In the third form "ISVNAME" is the default ISV name used for activation. For example:  
ACTIVATE isv reprise

ACTIVATE is new in RLM v10.0

## **EXCLUDE *privilege* [user|host|group|host\_group|internet|project] *who* [id=nnn]**

The EXCLUDE line removes the specified *privilege* from a particular user, host, group, host\_group, IP address, or project. If you specify group or host\_group, it must be defined by a GROUP or HOST\_GROUP line in the RLM options file.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

If specified, the id applies this option to the license with an id of "nnn".

For a list of the *privileges* available, see the table at the beginning of this chapter.

## **EXCLUDEALL [user|host|group|host\_group|internet] *who***

The EXCLUDEALL line prevents usage of all capabilities defined by all *privileges* by a particular user, host, group, host\_group, IP address, or project. If you specify group or host\_group, it must be defined by a GROUP or HOST\_GROUP line in the RLM options file.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

For a list of the *privileges* available, see the table at the beginning of this chapter.

## **GROUP *name* list-of-username**

The GROUP line defines a group of users to be used in an EXCLUDE, EXCLUDEALL, INCLUDE, or INCLUDEALL line. Separate the usernames in the list by spaces. Prior to RLM v9.0, only the first definition of a particular group name is used. Starting in RLM v9.0, multiple lines that specify the same GROUP name will have their lists of usernames concatenated.

Example:

**GROUP engineers tom dick harry**

Example (rlm v9.0+). This example results in a group of 6 users:

**GROUP engineers tom dick harry**

**GROUP engineers larry curly moe**

## **HOST\_GROUP *name* list-of-hostnames**

The HOST\_GROUP line defines a group of hosts to be used in an EXCLUDE, EXCLUDEALL, INCLUDE or INCLUDEALL line. Separate the hostnames in the list by spaces. Prior to RLM v9.0, only the first definition of a particular group name is used. Starting in RLM v9.0, multiple lines that specify the same HOST\_GROUP name will have their lists of hostnames concatenated.

Example:

**HOST\_GROUP corporate node\_a node\_b node\_c**

Example (rlm v9.0+). This example results in a group of 6 hosts:

**HOST\_GROUP corporate node\_a node\_b node\_c**

**HOST\_GROUP corporate node\_d node\_e node\_f**

## **INTERNET\_GROUP *name* list-of-ip-addresses**

The INTERNET\_GROUP line defines a group of IP addresses to be used in an EXCLUDE, EXCLUDEALL, INCLUDE, INCLUDEALL, MAX or RESERVE line. Separate the ip addresses in the list by spaces. Multiple lines that specify the same INTERNET\_GROUP name will have their lists of ip addresses concatenated. IP addresses can contain the wildcard (\*) character.

Example:

**INTERNET\_GROUP corporate 1.2.3.4 2.\*.\*.7 172.16.7.\***

Example 2. This example results in a group of 6 IP addresses:

**INTERNET\_GROUP corporate 1.1.1.1 2.2.2.2 3.3.3.3**

**INTERNET\_GROUP corporate 4.4.4.4 5.5.5.5 6.6.6.6**

## **INCLUDE *privilege* [user|host|group|host\_group|internet] *who*[id=nnn]**

The INCLUDE line grants the specified *privilege* to a particular user, host, group, host\_group, IP address, or project. If you specify group or host\_group, it must be defined by a GROUP or HOST\_GROUP line in the RLM options file. Anyone not specified by the INCLUDE line is not allowed access to the capabilities defined *by privilege*.

If specified, the id applies this option to the license with an id of “nnn”.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

For a list of *the privileges* available, see the table at the beginning of this chapter.

## **INCLUDEALL [user|host|group|host\_group|internet] *who***

The INCLUDEALL line grants all *privileges* to a particular user, host, group, host\_group, IP address, or project. If you specify group or host\_group, it must be defined by a GROUP or HOST\_GROUP line in the RLM options file. Anyone not on the INCLUDEALL list is not allowed to use a capability controlled by any *privilege*.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

For a list of the *privileges* available, see the table at the beginning of this chapter.

## **NO\_OLD\_RLMUTIL**

The NO\_OLD\_RLMUTIL line prevents pre-RLM-v9 command-line utilities from performing a reread, remove, or shutdown operation. The pre-v4.0 RLM utilities do not respect the RLM permissions for the reread or shutdown commands, and the pre-v9.0 utilities do not respect the permissions for the remove command. Adding NO\_OLD\_RLMUTIL to your ISV options file will prevent these older utilities from performing these commands, and only a v9 (or newer) RLM command-line utility can be used for this purpose.

By default, all operations can be performed by all versions of the RLM command-line utilities.

In order for NO\_OLD\_RLMUTIL to be effective, it must be specified in *both* the rlm and the ISV server options files.

## **NOLOG status**

The NOLOG option instructs the rlm server to omit logging of status requests to the debug log.  
Example:

**NOLOG status**

This example causes the rlm server to omit the logging of status requests in the debug log.

# The ISV Options File

The ISV options file allows control of the use of licenses by various users and groups of users within your organization. Options are provided to reserve licenses (RESERVE), and to either allow (INCLUDE or INCLUDEALL) or disallow (EXCLUDE or EXCLUDEALL) license use. Additionally, options are provided to create groups of users (GROUP) or hosts (HOST\_GROUP), or IP addresses (INTERNET\_GROUP), and to control the maximum number of licenses a user or group can check out (MAX).

Logging of the license servers is controlled by the (DEBUGLOG) and (REPORTLOG) options. In addition, you can suppress debug logging of checkin/checkout/denied entries with the NOLOG option. Automatic report log file rotation is supported in ISV servers via the ROTATE option and automatic purging of old report logs is supported with the PURGE\_REPORTLOG option (new in v12.1).

Control over license roaming is provided with the INCLUDEALL\_ROAM, EXCLUDEALL\_ROAM, ROAM\_MAX\_DAYS, and ROAM\_MAX\_COUNT options.

License timeout is controlled via the TIMEOUT and TIMEOUTALL options.

License timezone restrictions are controlled with the TIMEZONE option.

Client license caching is controlled with the CLIENT\_CACHE option.

License queuing behavior can be modified with the EXPRESS and PRIORITY options.

There is one additional option available in the ISV options file: NO\_OLD\_RLMUTIL. This option goes on a line by itself, with no parameters. If specified, the RLM command-line utilities prior to RLM v9.0 will not be able to perform an rlm down, rlm read, or rlm remove on this server. By default, all versions of the RLM utilities are enabled unless NO\_OLD\_RLMUTIL is specified in both the RLM and the ISV options files.

The ISV options file is specified on the ISV line in The License File.

## How The ISV Options File is located

The ISV options file can be located in 3 ways:

- You can specify the ISV options file location on the ISV line in The License File.
- If no specification is on the ISV line, rlm will look for <ISV>.opt (where <ISV> is the name of the ISV) in the location with the first license file.
- If there is no options file in either of the first 2 locations, rlm will look for <ISV>.opt in the working directory where you started the rlm server.

## Legal characters in the ISV options file

In general, all options file fields are white-space delimited, meaning that no data item can contain embedded spaces, tabs, newlines or carriage returns. In addition, the following four characters are illegal in data items in the ISV or RLM options (and license) file: "<", ">", "&", and double-quote ("). Note: single quote (') and back-quote (`) were illegal prior to RLM v8.0. As of RLM v12.1, the characters "<", ">", and "&" are legal in comments (lines beginning with "#") but nowhere else.

Note that all lines in option files (RLM or ISV) as well as license files *must* be shorter than 1024 characters. Anything over 1024 characters will be truncated.

If you would like to add comments to the options file, start the line with the '#' character.

Note that everything in the ISV options file is case-insensitive with the exception of the file pathname in the DEBUGLOG and REPORTLOG lines (case-sensitive on Unix systems only).

For a detailed description of each option, see the section below.

## CLIENT\_CACHE *secs* [*product*]

The CLIENT\_CACHE line sets the cache time for a license to *secs* seconds for *product*. If the license for *product* does not have a "client\_cache" specification, the CLIENT\_CACHE option has no effect.

The cache value *secs* can be set to between 0 and 2 times the value in the license's *client\_cache* parameter. Attempting to set it to more than 2 times the license parameter will result in a log line similar to the following:

```
07/17 10:40 (reprise) foo: CLIENT_CACHE value (200) > 2x license value (120) , 120 used.
```

If *product* is not specified, the cache value applies to all products.

Examples:

```
CLIENT_CACHE 0
```

– disables client caching for all licenses

This is logged:

```
07/17 10:40 (reprise) Setting CLIENT_CACHE for all products to 0 secs.
```

```
CLIENT_CACHE 200 foo
```

sets client cache to 200 seconds for "foo". In this example, "foo" had a client\_cache value of 60 in the license, so it was limited to 120:

```
07/17 10:40 (reprise) Setting CLIENT_CACHE for foo to 200 secs.
```

```
07/17 10:40 (reprise) foo: CLIENT_CACHE value (200) > 2x license value (120), 120 used.
```

CLIENT\_CACHE first appeared in RLM v10.1

## **DEBUGLOG [+]*file\_path***

The DEBUGLOG option instructs the ISV server to write a debug log to the filename *file\_path*. If *file\_path* is preceded with a '+' sign, the new data is appended to the file, otherwise the file is overwritten. This may be useful if you have many ISV servers and want to isolate the debug output from one server in a separate file.

### **NOTE on the use of DEBUGLOG when running the server as a Windows Service:**

If no DEBUGLOG is specified in the ISV options file, rlm will write the ISV debug log in:

<location of rlm.exe>\<isv>.dlog

This file will be overwritten every time the ISV server starts, since there is no opportunity to specify that the file should be appended to in the default case. In fact, the ISV server logs a few lines to this file at startup time even if a DEBUGLOG is specified in the ISV options file. It is overwritten every time the ISV server starts, but its contents don't change startup to startup, so nothing important is lost.

Reprise Software Inc. recommends that the debug log path be specified in the ISV options file, and that the append behavior be enabled with '+<path>'. However, it is important not to specify the debug log name as <isv>.dlog, as this specific file is overwritten at each startup.

## **EXCLUDE *product* user|host|group|host\_group|internet|internet\_group|project *who***

or

## **EXCLUDE *product* noproject [id=nnn]**

The EXCLUDE line prevents usage of a product by a particular user, host, group, host\_group, IP address, or project. If you specify group, host\_group, or internet\_group, it must be defined by a GROUP or HOST\_GROUP or INTERNET\_GROUP line in the options file.

Alternately, with *noproject* specified, checkout requests for *product* from users who do not have the RLM\_PROJECT environment variable set will be rejected.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

In all cases, the status returned to the user will be RLM\_EL\_ON\_EXC - "User/Host on exclude list"

If specified, the id applies this option to the license with an id of "nnn".

Note: *internet* and *project* were added in RLM v2.0. *noproject* was added in RLM v5.0. *internet\_group* was added in RLM v10.0. The *id* option was added in RLM v11.1

## **EXCLUDEALL user|host|group|host\_group|internet|internet\_group|project who**

or

## **EXCLUDEALL noproject**

The EXCLUDEALL line prevents usage of all products by a particular user, host, group, host\_group, IP address, or project. If you specify group, host\_group, or internet\_group, it must be defined by a GROUP or HOST\_GROUP or INTERNET\_GROUP line in the options file.

Alternately, with *noproject* specified, all checkout requests from users who do not have the RLM\_PROJECT environment variable set will be rejected.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

In all cases, the status returned to the user will be RLM\_EL\_ON\_EXC\_ALL - "User/Host on excludeall list"

Note: *internet* and *project* were added in RLM v2.0. *noproject* was added in RLM v5.0.

## **EXCLUDEALL\_ROAM user|host|group|host\_group|internet|internet\_group| project who**

The EXCLUDEALL\_ROAM line prevents usage of roaming by a particular user, host, group, host\_group, IP address, or project. If you specify group, host\_group, or internet\_group, it must be defined by a GROUP or HOST\_GROUP or INTERNET\_GROUP line in the options file. Anyone on the EXCLUDEALL\_ROAM list is not allowed to set up roaming licenses.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

Note: *internet* and *project* were added in RLM v2.0. *internet\_group* was added in RLM v10.0

## **EXPRESS ON|OFF [*product*]**

The EXPRESS line controls queuing behavior for one or all *products*. If EXPRESS is turned on for a product, then queued requests which can be satisfied immediately are granted independent of whether other requests are ahead in the queue. If EXPRESS is turned off, then a queued request will always be placed at the end of the queue if it exists.

If the EXPRESS line does not specify a *product*, it applies to all products.

By default, EXPRESS is turned ON for all products in RLM.

## **GROUP *name* list-of-usernames**

The GROUP line defines a group of users to be used in an EXCLUDE, EXCLUDEALL, INCLUDE, INCLUDEALL, MAX or RESERVE line. Separate the usernames in the list by spaces. Prior to RLM v9.0, only the first definition of a particular group name is used. Starting in RLM v9.0, multiple lines that specify the same GROUP name will have their lists of usernames concatenated.

Example:

**GROUP engineers tom dick harry**

Example (rlm v9.0+). This example results in a group of 6 users:

**GROUP engineers tom dick harry**

**GROUP engineers larry curly moe**

## **HOST\_GROUP *name* list-of-hostnames**

The HOST\_GROUP line defines a group of hostnames to be used in an EXCLUDE, EXCLUDEALL, INCLUDE, INCLUDEALL, MAX or RESERVE line. Separate the hostnames in the list by spaces. Prior to RLM v9.0, only the first definition of a particular group name is used. Starting in RLM v9.0, multiple lines that specify the same HOST\_GROUP name will have their lists of hostnames concatenated.

Example:

**HOST\_GROUP corporate node\_a node\_b node\_c**

Example (rlm v9.0+). This example results in a group of 6 hosts:

**HOST\_GROUP corporate node\_a node\_b node\_c**

**HOST\_GROUP corporate node\_d node\_e node\_f**

## **INTERNET\_GROUP *name* list-of-ip-addresses**

The INTERNET\_GROUP line defines a group of IP addresses to be used in an EXCLUDE, EXCLUDEALL, INCLUDE, INCLUDEALL, MAX or RESERVE line. Separate the ip addresses in the list by spaces. Multiple lines that specify the same INTERNET\_GROUP name will have their lists of ip addresses concatenated. IP addresses can contain the wildcard ('\*') character.

Example:

```
INTERNET_GROUP corporate 1.2.3.4 2.*.*.7 172.16.7.*
```

Example 2. This example results in a group of 6 IP addresses:

```
INTERNET_GROUP corporate 1.1.1.1 2.2.2.2 3.3.3.3
```

```
INTERNET_GROUP corporate 4.4.4.4 5.5.5.5 6.6.6.6
```

## **INCLUDE *product* user|host|group|host\_group|internet|internet\_group|project *who* [id=nnn]**

The INCLUDE line allows usage of a product by a particular user, host, group, host\_group, IP address, or project. If you specify group, host\_group, or internet\_group, it must be defined by a GROUP or HOST\_GROUP or INTERNET\_GROUP line in the options file. Anyone not specified by the INCLUDE line is not allowed to use *product*.

INCLUDE has no effect on Named User licenses (the INCLUDE line will be ignored).

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

If specified, the id applies this option to the license with an id of "nnn".

Note: internet and project were added in RLM v2.0. *internet\_group* was added in RLM v10.0  
The id option was added in RLM v11.1

## **INCLUDEALL user|host|group|host\_group|internet|internet\_group|project *who***

The INCLUDEALL line allows usage of all products by a particular user, host, group, host\_group, IP address, or project. If you specify group, host\_group, or internet\_group, it must be defined by a GROUP or HOST\_GROUP or INTERNET\_GROUP line in the options file. Anyone not on the INCLUDEALL list is not allowed to use any product.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

Note: internet and project were added in RLM v2.0. *internet\_group* was added in RLM v10.0

## **INCLUDEALL\_ROAM user|host|group|host\_group|internet|internet\_group|project who**

The INCLUDEALL\_ROAM line allows usage of roaming by a particular user, host, group, host\_group, IP address, or project. If you specify group, host\_group, or internet\_group, it must be defined by a GROUP or HOST\_GROUP or INTERNET\_GROUP line in the options file. Anyone not on the INCLUDEALL\_ROAM list is not allowed to set up roaming for any license.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

Note: internet and project were added in RLM v2.0. *internet\_group* was added in RLM v10.0

## **MAX num product user|host|group|host\_group|internet|internet\_group|project who [id=nnn]**

The MAX line limits the specified user or group to *num* licenses of *product*. If you specify group, host\_group, or internet\_group, it must be defined by a GROUP or HOST\_GROUP or INTERNET\_GROUP line in the options file. If you specify **user**, the special name \* indicates that all users are subject to the maximum limit.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

If specified, the id applies this option to the license with an id of "nnn".

Note: internet and project were added in RLM v2.0. *internet\_group* was added in RLM v10.0  
The id option was added in RLM v11.1

## **NO\_OLD\_RLMUTIL**

The NO\_OLD\_RLMUTIL line prevents pre-RLM-v9 command-line utilities from performing a reread, remove, or shutdown operation. The pre-v4.0 RLM utilities do not respect the RLM permissions for the reread or shutdown commands, and the pre-v9.0 utilities do not respect the permissions for the remove command. Adding NO\_OLD\_RLMUTIL to your ISV options file will prevent these older utilities from performing these commands, and only a v9 (or newer) RLM command-line utility can be used for this purpose.

By default, all operations can be performed by all versions of the RLM command-line utilities.

In order for NO\_OLD\_RLMUTIL to be effective, it must be specified in *both* the rlm and the ISV server options files.

## **NOLOG in|out|denied**

The NOLOG option instructs the ISV server to omit logging to the debug log of either CHECKIN, CHECKOUT, or DENIED messages, as specified. You must specify one NOLOG line for each item which you do not want to be logged.

Example:

### **NOLOG denied**

This example causes the ISV server to omit the logging of DENIED events in the debug log.

## **PRIORITY *num product user|host|group|host\_group|internet|internet\_group|project who [id=nnn]***

The PRIORITY line causes the order of queued requests to be modified. Any user/host/etc. with an assigned priority will be placed ahead of others in the queue. A new request will go at the end of all equal-priority requests in the queue, but ahead of all requests with a higher-numbered priority. All requests with no specified priority will be last in the queue. PRIORITY can specify a particular user, host, group, host\_group, IP address, or project. If you specify group, host\_group, or internet\_group, it must be defined by a GROUP or HOST\_GROUP or INTERNET\_GROUP line in the options file.

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

Note that PRIORITY specifications are searched in order until a match is found, and the remainder are disregarded. Thus if a request comes in for user *plum* on host *conservatory*, the following 2 PRIORITY lines would assign this request a priority of 7, not 3:

```
PRIORITY 7 candlestick user plum
PRIORITY 3 candlestick host conservatory
```

In this case, user *plum* would have a lower priority for the product *candlestick* than other users from host *conservatory*, since a lower number represents a higher priority.

If specified, the id applies this option to the license with an id of "nnn".

Note: PRIORITY was added in RLM v2.0. *internet\_group* was added in RLM v10.0. The id option was added in RLM v11.1

## **PURGE\_REPORTLOG #days**

The PURGE\_REPORTLOG option instructs the ISV server to automatically remove report logs older than the specified number of days. PURGE\_REPORTLOG is supported on Unix servers

only (i.e. it is not supported on Windows servers).

Note that `PURGE_REPORTLOG` only affects the current report log name, and `PURGE_REPORTLOG` will have no effect if the server is not writing a report log, or if the report logs are not named according to the standard RLM rotation naming convention.

*report\_log\_file\_name.yyyy.mm.dd*

The purge operation is done at midnight, immediately following the renaming of the log, if applicable.

Example 1:

```
ROTATE daily
PURGE_REPORTLOG 3
```

In this case, after the reportlog rename on Feb 23, 2016, the following reports would remain:

```
reportlog
reportlog.2016.02.23
reportlog.2016.02.22
reportlog.2016.02.21
```

Example 2:

```
ROTATE weekly
PURGE_REPORTLOG 3
```

In this case, after the rename on Feb 23, the renamed reportlog (`reportlog.2016.02.23`) would remain until Feb 27, at which point it would be deleted, and only the current reportlog would remain until the next rotation.

The `PURGE_REPORTLOG` option first appeared in RLM v12.1.

## **REPORTLOG [+]*file\_path* [std | small | detailed] [auth]**

The `REPORTLOG` option instructs the ISV server to write a file suitable for usage reporting to the filename *file\_path*. If *file\_path* is preceded with a '+' sign, the new data is appended to the file, otherwise the file is overwritten.

The third (optional) argument specifies the format of the reportlog file. Valid values are:

- `std` - write the standard report log file (the default if this field is not present)
- `small` - a smaller report log file
- `detailed` - write a reportlog that logs checkin/checkout events down to the tenth of a millisecond

The fourth optional argument, if present, specifies that the reportlog is to be authenticated. This parameter should be the string **auth**, and if it is to be used, the third parameter (reportlog format) must be present as well. Note that this parameter is no longer required in RLM v4.0, as all reportlogs are authenticated.

If your server is writing a reportlog, it is important to shut the server down gracefully (ie, don't kill the server, shut it down with the RLM web interface or with an `rlmdown` command, or via the service controller if running as a Windows service). If you don't do this, the sever won't write the final authentication record to the report log, and you will not be able to verify the last section of

the report.

For details of the various output formats, see Appendix A - Reportlog File Format on page 99.

Note - the authentication parameter first appeared in RLM v3.0.

Note - the authentication parameter is no longer required in RLM v4.0 - all report logs are authenticated.

Note - prior to RLM v9.3, if a detailed reportlog was specified on Windows, the std format was used. In v9.3, rlm will produce a detailed reportlog, however, the fractional seconds field will always be 0 on Windows.

### **RESERVE *num product user|host|group|host\_group|internet|internet\_group|project who [id=nnn]***

The RESERVE line reserves *num* licenses of *product* for use by a particular user, host, group, host\_group, IP address, or project. If you specify group, host\_group, or internet\_group, it must be defined by a GROUP or HOST\_GROUP or INTERNET\_GROUP line in the options file. Note that reservations are subtracted from the number of floating licenses available, and can only be used by the specified user(s).

Portions of the INTERNET address can be specified with a '\*' which matches any address, e.g. 172.16.7.\*

If specified, the id applies this option to the license with an id of "nnn".

Note: internet and project were added in RLM v2.0. *internet\_group* was added in RLM v10.0. The id option was added in RLM v11.1.

### **ROAM\_MAX\_COUNT *num product [id=nnn]***

The ROAM\_MAX\_COUNT line limits the number of roaming licenses to *num* for *product*. Once *num* licenses of *product* are roaming, new roam requests will be denied.

If specified, the id applies this option to the license with an id of "nnn".

Note: The id option was added in RLM v11.1.

### **ROAM\_MAX\_DAYS *num product [id=nnn]***

The ROAM\_MAX\_DAYS line limits the number of days which a license can roam to *num* days for *product*. Note that if you specify ROAM\_MAX\_DAYS for the *rlm\_roam* license, this will limit roaming on all products to the number of days specified.

If specified, the id applies this option to the license with an id of "nnn".

Note: The id option was added in RLM v11.1.

## ROTATE [**daily** | **weekly** | **monthly** | **#days** ]

The ROTATE option instructs the ISV server to automatically close and rename the old reportlog file, and begin writing a new reportlog file, according to the time specification given.

Note that the ROTATE command will have no effect if the server is not writing a report log.

The (single) argument specifies the frequency of rotation of the reportlog file. Valid values are:

- *daily* - rotate the report log file every night at midnight.
- *weekly* - rotate the report log file every 7 days (at midnight) after it is opened.
- *monthly* - rotate the reportlog file at midnight on the first day of the month.
- *#days* - this is an integer specifying the number of days between rotations. The report log file will be rotated just after midnight after this # of days. Specifying *#days* as 7 is equivalent to "weekly".

When the ISV server rotates the report log, the old report log file will be named:  
*report\_log\_file\_name.yyyy.mm.dd*

And the new report log file will be named:  
*report\_log\_file\_name*

Where:

*report\_log\_file\_name* is the reportlog filename specified in the REPORTLOG option.

The yyyy.mm.dd is a decimal date, e.g. for September 13, 2007: 2007.09.13

(Note: if the file *report\_log\_file\_name.yyyy.mm.dd* already exists, the server will append a sequence number to the renamed report log, e.g. *report\_log\_file\_name.yyyy.mm.dd.N* where *N* is an integer that starts at 1 and increases until a unique filename is created. The server will make 1000 attempts to create a unique filename, then log an error.)

The ROTATE option first appeared in RLM v4.0.

## TIMEOUT *secs* [**product** [**id=nnn**]]

The TIMEOUT line sets the inactivity timeout for a license to *secs* seconds for *product*. If the application using *product* does not contact the license server for *secs* seconds, the license server will reclaim the license and notify the application that the license was timed out.

Note that a license could have a *min\_timeout* specification, in which case if you specify a TIMEOUT that is lower, the TIMEOUT will be set to the minimum. The default minimum TIMEOUT in RLM is 3600 seconds (1 hour).

If no TIMEOUT or TIMEOUTALL specification is present, the license will never time out.

If multiple TIMEOUT options are specified for the same product, the last one will be used. If TIMEOUTALL is specified after a TIMEOUT option, the TIMEOUTALL value will be used.

If *product* is not specified, the timeout applies to all products. This is equivalent to TIMEOUTALL.

If specified, the id applies this option to the license with an id of "nnn".

Note: The id option was added in RLM v11.1.

## **TIMEOUTALL *secs***

The TIMEOUTALL line sets the inactivity timeout for all licenses to *secs* seconds. If the application using a product does not contact the license server for *secs* seconds, the license server will reclaim the license and notify the application that the license was timed out.

Note that a license could have a *min\_timeout* specification, in which case if you specify a TIMEOUTALL value that is lower, the license's timeout will be set to the minimum. The default minimum timeout in RLM is 3600 seconds (1 hour).

If multiple TIMEOUTALL options are specified, the last one will be used. Any TIMEOUT option after the TIMEOUTALL option will be used for that specific product.

If no TIMEOUT or TIMEOUTALL specification is present, the license will never time out.

## **TIMEZONE *timezone-spec* [*product* [*id=nnn*]]**

The TIMEZONE option allows the specification of a set of valid timezones for the client machine that performs the license checkout. The *timezone-spec* is a 24-bit HEX number, with one bit set for each timezone you wish to be valid. Bit 0 represents GMT and each bit to the "left" of bit 0 represents one timezone (one hour) west of GMT. Thus bit 5 would be EST, bit 8 would be PST, bit 23 would be one hour east of GMT, etc. Note that RLM uses the current local time, so the timezones will move by one hour when Daylight Savings Time is in effect (ie, PST varies from 7 to 8 hours west of GMT), so for example, to enable use of a license in PST during both normal and Daylight Savings Time, specify bits 7 and 8 in the *timezone-spec* as follows:

```
TIMEZONE 180 [product-name]
```

If *product-name* is specified, the timezone restriction applies to all licenses for product *product-name*. If *product-name* is not specified, the timezone restriction applies to all licenses for this server.

The timezone restrictions specified in the TIMEZONE option are used to further restrict the license. If the combination of the timezone specified in the license and the timezone in the option would result in a license that has no valid timezones, then the TIMEZONE option is ignored. So, for example, if the license specified *timezone=fff000* and the option specified **TIMEZONE ff**, the result would be no valid timezones, and the license *timezone* (*fff000*) would be used. Note that this can also happen if you have more than one TIMEZONE option in your options file as well, eg:

```
TIMEZONE ff0000  
TIMEZONE 180 prod
```

would cause the second TIMEZONE option (for product *prod*) to be ignored.

If specified, the *id* applies this option to the license with an *id* of "nnn".

Note: The *id* option was added in RLM v11.1.

## **Section 3 – Advanced Topics**

This section of the manual contains topics that may be of use if you or your ISV are doing a more advanced implementation of licensing.

# Token-Based Licenses

Token-Based licenses are licenses that are defined in terms of another license. For example, an application could request a license for product **write**. If this were a *normal* license, the product **write** would appear in the license file (if the request succeeds) with a license count (or *uncounted*). On the other hand, if this were a *token-based* license, the product **write** would appear in the license file without a count, but with a specification of one or more other products which are used to satisfy the request. When the license server encounters a request for a *token-based* license, it uses the other products specified in the license to satisfy the request, rather than the originally-requested product. These other licenses are called the *primary* licenses.

There are two main uses for token-based licenses. The first use of token-based licenses allows a customer to mix-and-match different products as their needs change. If several products are all defined in terms of a single pool of *primary* licenses, the License Administrator can control license usage as needs demand. This can be a benefit to both ISVs and customers, since as new products are introduced, if they are licensed based on the same *primary* license, all customers instantly have access to the new products without having to go through a purchase-order cycle.

Another use of token-based licenses is to allow alternate licenses to satisfy a request for a product. To use the familiar example, if product **write** checks out a *write* license, the addition of a *token-based* license for *write*, mapping it to *office* would allow an *office* license to be used in the case where no *write* licenses are available. Even though the *office* license is a more expensive license, the customer is allowed to continue working by consuming the more expensive *office* license. Several *token-based* licenses can be used in this way, and the order of the licenses in the license file will determine the order that alternate checkouts are attempted.

A token-based license differs from a normal license in four ways:

- The count field contains one of the 3 token keywords (**token**, **token\_locked**, or **token\_unlocked**) rather than an integer, **uncounted**, or **single**.
- The license has a token spec: **token="<prod ver count> ... <prodN verN countN>"**
- The only optional parameter on a token-based license which is used by RLM is the start date. All other optional parameters are ignored.
- License option processing is different for *token-based* licenses. See below.

## Types of *token-based* Licenses

When a product is specified as a *token-based* license, requests for that product are turned into requests for the *primary* license(s) specified in the **token=** part of the license. For example, consider this license for product **test** (*primary* license **dollars**):

```
LICENSE reprise test 1.0 permanent token sig=xxxx token="<dollars 2.0 5>"
LICENSE reprise dollars 2.0 permanent 10 sig=xxxx
```

This license is called a *simple token-based* license. Any *token-based* license that maps a checkout of one product into a (single) *primary* license is a *simple token-based* license.

A *token-based* license can map one request into multiple checkouts, however. In this case, it is called a *compound token-based* license. Using our product **test** as an example again:

**LICENSE reprise test 1.0 permanent token sig=xxxx token="<dollars 2.0 5> <cents 3.4 53>"**

**LICENSE reprise dollars 2.0 permanent 100 sig=xxxx**

**LICENSE reprise cents 3.4 permanent 1000 sig=xxxx**

Now, a request for 1 license of **test** v1.0 would result in the license server checking out 5 v2.0 licenses of the product **dollars**, and 53 v3.4 licenses of the product **cents**. If **both** of these primary licenses are available, the checkout request for **test** succeeds, otherwise it fails. Note that when a *compound token-based* license is checked out, the RLM functions return information about the first license in the list only. In this example, RLM functions would return information about the *dollars* license.

## The License Count Keywords

In a *token-based* license, the count keyword is one of:

- token
- token\_locked
- token\_unlocked

*token* and *token\_unlocked* imply that the *token-based* license itself does not include the license server hostid in its license signature. This makes the license usable in *any* license file. Note that *token* and *token\_unlocked* are 100% equivalent.

*token\_locked* means that the *token-based* license includes the license server hostid in its signature, and is valid only in *this* license file.

## The *token=* keyword

In a *token-based* license, the *token=* keyword specifies the *primary* licenses which are checked out in response to a request for the *token-based* license itself. Specify one or more licenses to be checked out. These licenses can also be *token-based* licenses themselves (in which case the *primary* license(s) will be the ultimate expansion of all *token-based* licenses). The format is:

**token="<product1 ver1 count1>[ <product2 ver2 count2> .... <productN verN countN>]"**

The request for the one of the original license turns into checkouts of:

- *count1* of *product1*, *ver1*
- *count2* of *product2*, *ver2*
- ...
- *countN* or *productN*, *verN*

## Nesting *token-based* licenses.

The definition of a *token-based* license can include other licenses which are *token-based* licenses themselves. For example:

**LICENSE reprise test 1.0 permanent token sig=xxxx token="<t2 2.0 5>"**  
**LICENSE reprise t2 2.0 permanent token sig=xxxx token="<dollars 2.0 5>"**

In this example, a request for one test v1.0 license results in 25 dollar v2.0 licenses checked out.

Note that the license server uses nesting of greater than 20 levels to detect token "loops", so any licenses nested this deeply will be rejected. Also note that nesting has no effect on whether a *token-based* license is *simple* or *compound* - this is determined solely by whether a single request maps into a single checkout or not.

## Restrictions on *token-based* licenses

There are a few restrictions on *token-based* licenses:

- All *token-based* licenses are processed by the license server, so there can be no uncounted, node-locked *token-based* or *primary* licenses that operate without a license server. (However, a license server can serve a node-locked, uncounted *primary* license.)
- All individual checkouts for a *compound token-based* license are satisfied by a single license server. This means that if a license turns into checkouts of *primary* licenses a, b, and c, where only a and b are available on one server and only c is available on a second server, the request will fail.
- Queuing is not allowed for *compound token-based* licenses.

## rlmremove and *token-based* licenses

The *token-based* license itself cannot be removed. If any of the *primary* licenses are removed, the server will remove all *primary* licenses, and the application will notice a loss of license on the next heartbeat. In this sense, the *token-based* license works just like a regular, non *token-based* license.

## Report Log

When a *token-based* license is checked out, the name of the license requested (and its version) is logged in the checkout record for each resulting *primary* license checkout.

## License Administration Options

The only options that apply to the *token-based* license itself are the include and exclude keywords:

- INCLUDE
- INCLUDEALL
- INCLUDEALL\_ROAM
- EXCLUDE
- EXCLUDEALL
- EXCLUDEALL\_ROAM

All other License Administration options have no effect on the *token-based* license.

All options affect the *primary* licenses, however.

# How to Queue for Licenses

In RLM, queuing for licenses is under the software user's control for well-behaved applications.

Unlike older license managers, RLM will queue for a license at every available license pool on every server, meaning you will not be stuck in a queue when there are licenses available on a server elsewhere.

In order to enable your application to queue for a license, set the environment variable **RLM\_QUEUE** to any value. If **RLM\_QUEUE** is set, the application will queue for its license if it is not able to check the license out on any license server. Once the application recognizes that the license has been granted by a server, it automatically de-queues the requests at all the other servers. Note that this capability depends on your Software Provider having coded their application to handle the QUEUED status return from the license server. Note that if you have set **RLM\_ROAM**, the setting of **RLM\_QUEUE** is ignored.

## **EXPRESS License Pools**

RLM has the concept of an **EXPRESS** License Pool. If a license pool is marked as **EXPRESS** (the default), then queued requests which can be satisfied immediately are granted independent of whether other requests are ahead in the queue. If **EXPRESS** is turned off, then a queued request will always be placed at the end of the queue if there is a waiting request. For more information on how to set up license pools as **EXPRESS**, see the **EXPRESS** option in The ISV Options File.

Since RLM applications queue at all license servers, a request for, say, 5 licenses, might take a long time to grant. In the meantime, up to 4 licenses could be available which could be granted to other applications which need only one license each. By setting some license queues to **EXPRESS** and turning off **EXPRESS** on others, you can bias the operation of different license servers to handle single or multiple license requests more favorably.

# How to use Roaming Licenses

RLM has the ability to allow a floating license to roam to a system which will subsequently be disconnected from the network. The resulting license can be used for the number of days specified when the license was set to roam, and is checked back in automatically at the end of this time. In addition, you can return the roamed license back to the license pool early if this is desired.

## How to know if License Roaming is Available

Your ISV makes the decision to enable roaming licenses. If you have been issued an *rlm\_roam* license, then roaming is available to you with the restrictions specified in the *rlm\_roam* license.

Note that you must be able to check out an *rlm\_roam* license on any system that is disconnected. Practically speaking, this means that disconnected systems need a local license file with a node-locked *rlm\_roam* license in it.

## How to make a License Roam

If you have an *rlm\_roam* license, set the environment variable **RLM\_ROAM** to the number of days which you would like to use the license (this license will be available until midnight on the last day of the roam, so for example if you specify one day, the license is available until midnight tomorrow). Once **RLM\_ROAM** is set, run the product and let it check out its license(s). If the checkout succeeds, then the license is set up to roam. You can repeat this procedure for any other products that have roaming capability enabled. If you set **RLM\_ROAM**, the setting of **RLM\_QUEUE** is ignored.

Be sure your *rlm\_roam* license is contained in a license file that is local to this system, otherwise you will not be able to use these licenses.

Your Software Provider might have supplied a GUI to handle the setting of the **RLM\_ROAM** environment transparently to you. If this is the case, they will have documented this capability in their application's documentation.

Note: beginning in RLM v11.1, **RLM\_ROAM** can be set to the special value "today". If set to "today", the license will roam until the end of the day today. Please note that if you use a v11.1 client with an older (pre-11.1) server, the roam time will be *one day longer* than what you specified. Pre-11.1 clients will roam as expected with 11.1 and later servers, however they will not be able to take advantage of the "today" value of **RLM\_ROAM**.

## While your system is connected to the network

After the initial checkout of the roaming license, but during the time your system is connected to the network, the value of **RLM\_ROAM** will affect the behavior of the roaming license. If **RLM\_ROAM** remains set to the original value, the license will be "refreshed" each day to the total roam time. On the other hand, if **RLM\_ROAM** is set to 0, the original roam end date will remain, and no subsequent checkouts of the license will alter the final roam day.

What this means, for example, is that if you set **RLM\_ROAM** to 14 days, the license will always be available to you 14 days after the last time you checked it out on the network. If, however, you

first set **RLM\_ROAM** to 14 days, check out the license, then set **RLM\_ROAM** to 0, the license will be available on the disconnected system for 14 days from the date of the first checkout, no matter how many times you check it out while connected.

Again, your Software Provider may have taken care of this for you in their GUI.

## While your system is disconnected

During the time your system is disconnected, **RLM\_ROAM** must remain set to a non-negative value. This license will be available on this system for the number of days you requested, and you no longer need to be able to access the license server from which the license was granted.

On the network, the license server will show the license checked out to you.

Note: Starting in RLM v4.0, **RLM\_ROAM** no longer needs to be set on the disconnected system. Note that if you are connected to the network and do not set **RLM\_ROAM**, you may check out a license from the license server rather than using the roamed license. If this is not desired, you can set **RLM\_ROAM** to a positive number which will cause the roamed license to be used. Also note that if **RLM\_ROAM** is not set, the checkout of the "rlm\_roam" license must come from a local license file, not from the license server.

## If you want to return the Roamed License early

If your plans change and you would like to return the license before the roaming time has expired, reconnect the system to the network (so that it can contact the original license server), and set the environment variable **RLM\_ROAM** to -1. Now run the program and let it check out the license. Once the program exits (or does a checkin), the roamed license will be returned to the license pool on the server. Please note that if you change the server node name or port number after you roam the license, you *will not be able* to return the license early.

## If you want to extend the period of the Roamed License

If your plans change and you would like to keep the license until after the roaming time has expired, but cannot reconnect the system to the network, you can extend the roam by having someone on the network extend the roam in the RLM web interface. Note that this only works before your original roam period has expired, and only on a v12.3 or later server (and client).

Note that this capability must be explicitly enabled by your ISV; it does not appear automatically. If the "Extend Roam" column in the License Status screen (shown below) does not appear, this means your ISV does not support the ability to extend a roam remotely.

If your ISV does support this, to extend the roam, someone on the network views the license status and finds the license you have roaming. This user must have the "extend\_roam" privilege to see the last field. By selecting Status->License Usage for this license, they will see a screen similar to the following:

### License status for ISV reprise

| Product | Pool | Ver | user | host  | PID | req ver | # lic | # res | Out time    | In (hold) time | Click to REMOVE                       | Extend Roam   |
|---------|------|-----|------|-------|-----|---------|-------|-------|-------------|----------------|---------------------------------------|---|
| test    | 2    | 1.0 | matt | zippy | -1  | 1.0     | 1     | 0     | 08/28 15:30 | 09/03 00:00    | <input type="button" value="Remove"/> | <input type="button" value="Extend"/> <input type="text"/> days |

By entering the # of days to extend the roam in the text box on the right and pressing “Extend”, the process of extending the roam will start, and the following screen will appear:

### Extend license roam duration

Extend license from user matt for product test, isv reprise, handle 42, for 5 days - are you sure?

If “Yes – Extend user's license” is selected, the roam will be extended on the server side, and the screen will display the *roam extension code*:

Sending extend message for 5 days

#### Roam extended by 5 days

In order to complete this roam extension, set the environment variable RLM\_ROAM\_EXTEND on the machine running the application to:

`test:12-sep-2017:1234567890abcdef1234567890abcdef1234567890abcdef`

then start the application and let it check out the license. The roam will be extended.

Now, on the disconnected client, set the environment variable RLM\_ROAM\_EXTEND to the *roam extension code*:

```
setenv RLM_ROAM_EXTEND test:12-sep-2017:1234567890abcdef1234567890abcdef1234567890abcdef
```

and run the application which checks out the “test” product. Once the checkout happens, the roam period is extended.

If you do not record the *roam extension code* from the web interface, it is also recorded in the server's debug log as follows:

```
08/28 15:45 (reprise) ROAM EXTENDED: 5 days test v1.0 by matt@zippy
08/28 15:45 (reprise) Roam extended for product test by 5 days
08/28 15:45 (reprise) Roam extension code, place in RLM_ROAM_EXTEND
08/28 15:45 (reprise) and run client to check out license:
08/28 15:45 (reprise) test:12-sep-2017:1234567890abcdef1234567890abcdef1234567890abcdef
```

Note that if you extend the roam past a daylight-savings-time transition day, you may get one hour more or less than you might expect (when viewing the RLM web interface), but the roam actually ends at midnight.

### **Special note on roaming licenses from a broadcast-discovered server**

*Reprise Software strongly recommends* that you do not attempt to use the broadcast method to locate the server if a license is to be roamed. While this will often work, there are circumstances where RLM cannot re-locate the original server which supplied the licenses, and the roamed license cannot be returned early.

If the broadcast server is the only license server on the network, RLM will be able to return these licenses starting with v11.2, however, earlier versions of RLM could not return the roamed license. If there are multiple license servers on the network, there is no guarantee that the application will find the correct server to return the licenses, even if you manually set the port and host of the server before attempting to return the license. If you know the port and host of the ISV SERVER which roamed the licenses, you can then:

- make sure the ISV server is running on the same port# (set the port # on the ISV line, if necessary)
- set RLM\_LICENSE to this port and host (the ISV server, not rlm)
- set RLM\_ROAM to -1 and check out the license again.

(This technique will work for earlier versions of RLM as well).

# Failover License Servers

RLM provides the capability for a license server to take over the license compliment of another server which has gone down. This server which takes over the license load of the failed server is called the *failover license server*. The server whose licenses are being taken over is called the *primary server*. During the time that the *failover server* is serving the licenses, no roaming operations are permitted on the licenses.

**NOTE: When using failover servers, there cannot be a firewall between the two servers. This is an unsupported configuration.**

The ability for a server to take over the load of another server is selected on an ISV-by-ISV basis, and enabled by an *rlm\_failover* or *rlm\_failover\_server* license in the license file of the server that is to take over.

While the *failover license server* can be serving it's own compliment of licenses, Reprise Software recommends that it should have no licenses of it's own, but simply be standing by, waiting for one (or more) other server(s) to fail so that it can take over.

In order to enable a failover license server, the ISV issues you an *rlm\_failover* or *rlm\_failover\_server* license with the following characteristics:

- count=some non-zero value
- hostid=<hostid of the *primary server*>
- *\_primary\_server*=<hostname of the *primary server*> in the case of an *rlm\_failover* license, OR
- *\_primary\_server*=<host or port@host of the *primary server rlm process*> in the case of *rlm\_failover\_server* licenses (Note that in RLM v12.2 and later, a *failover\_server* license can specify just the hostname of the server, in that case, the default port (5053) is used. Prior to RLM v12.2, the full [port@host](#) is required)

(Note: beginning in RLM v9.2, the ***\_failover\_host*** keyword has been replaced with the ***\_primary\_server*** keyword. ***\_failover\_host*** will continue to work, but new software installations should use ***\_primary\_server*** instead.)

The difference between an *rlm\_failover* license and an *rlm\_failover\_server* license is whether rlm checks for the machine being down (*rlm\_failover*) or the rlm process on the machine being down (*rlm\_failover\_server*) before serving the licenses from the failed server.

Note: Reprise Software recommends that ISVs set *\_primary\_server* (*\_failover\_host*) to **localhost** (or **5053@localhost**) when issuing the *rlm\_failover* or *rlm\_failover\_server* license. This value would be changed by you, the License Administrator, to the name of the *primary server* upon installation. Setting this to **localhost** insures that the *failover license server* will not be activated by mistake if the license is not edited.

The *rlm\_failover* license must be a **counted** license; otherwise the server will not use it. (If it were not a counted license, the *rlm\_failover* or *rlm\_failover\_server* license can be used on any server, which could result in multiple servers taking over **at the same time** for the *failed server*.)

In order to enable the *failover license server*, the *rlm\_failover* (or *rlm\_failover\_server*) license needs to be in one of the license files it is using, and the license file(s) for the *failed server* also

need to be processed by the *failover license server*.

When a license server encounters a *rlm\_failover* or *rlm\_failover\_server* license, it does several things:

- Starts a separate thread in the license server to periodically monitor the health of the *failed server*. This is done by attempting TCP/IP connection(s) to ports on the *failed server* in order to determine whether the server is up or down. No attempt is made to determine whether the license server is up - if the computer is up, the *failover license server* will not take over serving licenses.
- If the *primary server* should go down, enables all licenses in license files for the *failed server* by performing the equivalent of an *rlmreread* command.
- When the *failed server* comes back up, disables all licenses in license files for the *failed server* by performing the equivalent of an *rlmremread* command.

## Configuring *Failover License Servers*

Reprise Software recommends configuring *failover license servers* as stand-alone servers that do not serve their own compliment of licenses. In other words, Reprise recommends configuring a license server that has only *rlm\_failover* (and/or *rlm\_failover\_server*) licenses for the other license servers on the network. In general, one license server configured in this way should be sufficient to support failover of all other license servers on the network.

The exception would be a case where each individual license server is serving thousands of clients, in which case we recommend that you configure a *failover license server* for each one or two of the normal license servers.

Note that failover license servers do not support license roaming operations. Actually, this is determined on a license pool by license pool basis - any license pool that contains any licenses from a failed primary server will not support any of the roaming operations.

## Example *Failover License Server* license file

The following license file would specify a license server that is acting as a failover server (on node "failover\_host", hostid 11111111) for the license server on hostid "12345678" (node "main\_server"):

```
HOST failover_host 11111111 1700
ISV reprise
LICENSE reprise rlm_failover 1.0 permanent 1 hostid=12345678
_primary_server=main_server sig="x"
```

Alternate LICENSE line:

```
LICENSE reprise rlm_failover_server 1.0 permanent 1 hostid=12345678
_primary_server=5053@main_server sig="x"
```

Note that the hostid in the LICENSE line for the *rlm\_failover* or *rlm\_failover\_server* license is the hostid of the server on the node **main\_server**).

## Installing *Failover License Servers*

When you receive the *rlm\_failover* license file, do the following to install your *failover license server*:

1. Install *rlm* and your *ISV server* on the *failover license server* node.
2. Install all license files from the *primary server* on the failover license server node.
3. Edit the license file with the *rlm\_failover* or *rlm\_failover\_server* license to put the hostname of the *primary server* in the *\_primary\_server=* (or *\_failover\_host=*) field, and the hostname of the *failover license server* on the HOST line. (Put the port@host of the *rlm* process on the *primary server* in the *\_primary\_server=* (or *\_failover\_host=*) field for the case of *rlm\_failover\_server* licenses).
4. Install any ISV options in an options file, and make it accessible to the *ISV server* either through its license file or by giving it the default options filename of *isv.opt*.
5. Insure that *rlm* will process all the license files above, and start *rlm*.
6. Modify your user's RLM\_LICENSE environment variables to include *port@host* of the *failover license server*. OR be sure to include the *failover license server's license file* where your application will find it. If you omit this step, the *failover license server* will take over, but your application will not be able to check out a license from the *failover server*.

# Transferring Licenses to Another Server

RLM has the ability to transfer a set of licenses from one license server to another. This is useful, for example, in situations where a temporary project involves a number of users who need access to the software and the primary license server is across a WAN with a high-latency connection. In this case, a number of licenses can be moved to a server on the part of the WAN with the users. Once the project is complete, the licenses can be returned to the primary server.

When licenses are transferred from the primary (**source**) license server, they are no longer available at the **source** server, and are then available at the **destination** server. The licenses are available at the **destination** server as long as the **source** server is up; in other words, if the source server goes down or the network loses connectivity, the **destination** server will lose its complement of transferred licenses.

License transfers are always initiated by the **destination** server - the server which is going to receive the licenses. The license transfer is specified in the RLM administration GUI on the **destination** server.

## Setting up a license transfer

Any platform which your ISV supports can be used as the destination for a license transfer. The particular machine does not need to have any RLM-licensed applications present - all you need is the rlm (or rlm.exe) binary as well as an ISV server binary or settings file.

License transfers are accomplished by creating a set of **transfer definitions**. Each **transfer definition** describes the **source** license server, the licenses you wish to transfer, and some parameters of those licenses.

To set up the license transfer, do the following:

- place the rlm and ISV servers into a directory, and create a license file that specifies the HOST and ISV lines:

```
HOST hostname any port
ISV isvname isvname
```

(Note that we used "any" as the hostid. The hostid is irrelevant, because this license server will act as a client of the **source** server and check out licenses from it - these transferred licenses are not ever going to be locked to the **destination** server.)

- Next, start rlm - rlm will start up, and start the ISV server.
- Next, point your browser to the rlm admin page (hostname:5054), and select **Status** from the menu on the left-hand side.
- Next, select **Transfer** from the right-hand side of the list of buttons for the ISV for which you wish to edit a transfer definition. This will bring up the **Edit License Transfer Definitions** page, which will indicate that no license transfers have been defined. Select **Add New Transfer Definition...** at the bottom of the page, and you will be able to specify the license transfer parameters:

## Add License Transfer Definition for ISV *isvname*

```
Transfer server type: Choicelist: {RLM | ISV-defined}
Source Server Hostname:
Source Server Port:
Backup Server Hostname:
Backup Server Port:
Product:
Minimum Version:
Count:
Days to hold license;
```

- Fill out this form as follows:
  - In the first section of this form, you select the type of license server on which the transferred licenses are served. "RLM" indicates an RLM license server. "ISV-defined" indicates another licensing system for which your ISV has added support, if applicable.
  - Next, you specify the **source** license server with a hostname and a port number. (Some other licensing systems will use a backup server name and port # - RLM does not use this).
  - Next, you specify the product name, minimum allowable version, and the number of licenses you would like to transfer to this (the **destination**) server.
  - Finally, if you have RLM v10.0 or later, you have the option to specify "Days to hold license". If you specify this as a non-zero value, the license transferred is a "disconnected (roamed)" license. This license can be used even when the destination license server is not in communications with the source license server. For this to work, your ISV must have provided you with an "rlm\_roam" license, or enabled this capability in their license server.
- Finally, click **Add Transfer** at the bottom of the form. The transfer specification will be saved.

If you would like these licenses to be transferred immediately, select **Reread/Restart Servers** on the left-hand side of the main form. This will cause the ISV server to reread its license files and transfer definitions, and process the license transfer. If you have already transferred licenses of this product to this destination server and you wish to change the number of licenses, you must delete the first transfer definition and re-create it with the new number of licenses, then perform a reread on the server. When you delete the old transfer definition, all clients using that license will receive an error on their next heartbeat (RLM\_EL\_SERVER\_LOST\_XFER, -51). In most cases, you will be able to delete the old transfer, create the new one, and perform a reread on the server within the time the client does its next heartbeat to the server.

Once transfer definitions are present, pressing the **Transfer** button on the status page will display a list of transfer definitions. Each of these can be independently enabled/disabled or deleted.

## Restrictions on License Transfer

Not all licenses can be transferred to another server. In particular, the following licenses cannot be transferred:

- user-based licenses
- host-based licenses
- named-user licenses

- token licenses

Note that any license to be transferred must be able to be checked-out on the destination license server. In particular, this means that most node-locked licenses cannot be transferred (unless you set up a separate destination server on each node-locked host to accept the licenses). Other license restrictions, such as platforms= will restrict licenses which can be transferred as well.

Transferred licenses cannot roam. If you attempt to roam a transferred license, you will receive a -31 (RLM\_EL\_TOOMANY\_ROAMING - "too many licenses roaming") error (pre RLM v10.0), or a -57 (RLM\_EL\_NONE\_CANROAM - "This license not allowed to roam") on RLM v10.0 or later.

When you disable a transfer, the licenses are returned to the source server immediately. All clients will be notified that the licenses are no longer available on their next heartbeat check. In this sense, disabling a transfer is identical to deleting the transfer, with the exception that the transfer can be reinstated by re-enabling it and doing a reread on the server.

## **Additional notes on disconnected (roamed) transfers**

If your Software Provider allows it, license transfers can happen onto a disconnected server node. For disconnected (roamed) transfers, the GUI also presents a "Refresh" option, if the transfer is enabled. If "Refresh" is pressed, the transferred license will be checked back in and then checked back out again, in order to refresh the roam time to the specified number of days. Note that the server performs this refresh action each time it is started (but not on a reread). The "Refresh" button allows you to reset the # of days of disconnected operation at any point that the server is running and the source license server is up.

Both "disable" and "delete" operations on disconnected (roamed) transfers cause the transferred license to be returned to the source server. You should always delete or disable a disconnected (roamed) transfer when the source server is up, so that the destination server can return the licenses cleanly. RLM makes every attempt to catch errors in the return of roamed license, but any error here will cause the transferred license to remain checked-out on the source server. Note that when RLM detects any error in returning the license, it keeps the transfer definition in place, so that you can return it when the source server is up. So the source server has to be up to return the license, anyway.

## **Additional notes on ISV-defined transfers**

For the ISV-defined transfer type, each individual ISV may impose other restrictions on what types of licenses can be transferred. This, of course, can vary for other license managers as well.

License Transfer is new in RLM v7.0. ISV-defined transfer types are new in RLM v7.0BL4. Disconnected (roamed) transfers are new in RLM v10.0.

## **Section 4 – Reference Material**

# RLM Environment Variables

RLM uses a number of environment variables to control licensing behavior. These variables are discussed in this section.

Note: To set an environment variable on Windows systems, bring up the Control Panel, select System, Click on the Advanced Tab, select Environment Variables, then select New or Edit in the User Section.

## RLM\_COMM\_TIMEOUT

RLM\_COMM\_TIMEOUT sets the application timeout for receipt of messages from the license server. If RLM\_COMM\_TIMEOUT is set, the read timeout will be set to the value of this environment variable. The default is 5 seconds, which should be sufficient in most, if not all, situations. (The default was 3 seconds prior to RLM v9.3)

Note that RLM\_COMM\_TIMEOUT is specified in milliseconds, so for a 7 second timeout, set RLM\_COMM\_TIMEOUT to 7000.

RLM\_COMM\_TIMEOUT first appeared in RLM v9.3.

## RLM\_CONNECT\_TIMEOUT

RLM\_CONNECT\_TIMEOUT sets the application timeout for a connection to an individual license server. If RLM\_CONNECT\_TIMEOUT is set, the connection timeout will be set to the value of this environment variable. The minimum connection timeout is 5 seconds, and the default is 10 seconds. If RLM\_CONNECT\_TIMEOUT is set to a negative value, the connect timeout will be the absolute value of RLM\_CONNECT\_TIMEOUT, and if any particular server connection times out, no further attempts will be made to that server again. If RLM\_CONNECT\_TIMEOUT is set to a positive value, a connection will be attempted to the server even if it timed out on the last attempt. This is the default behavior in RLM.

RLM\_CONNECT\_TIMEOUT is specified in seconds. Note also that the value you specify is divided by 5 (and truncated), then used 5 times, so the minimum resolution is 5 seconds. For example, if you set RLM\_CONNECT\_TIMEOUT to 8, the timeout will be 5 seconds. Setting it to 11 will yield a 10-second timeout, etc.

## RLM\_DEBUG

RLM\_DEBUG, if set to a product name, will cause any RLM-licensed application to output product debugging information about the specified product. If RLM\_DEBUG is set without a value, the debugging information will be output for all products which can be found.

RLM\_DEBUG was introduced in RLM v9.0.

## **RLM\_DIAGNOSTICS**

RLM\_DIAGNOSTICS, if set to a file name, will cause any RLM-licensed application to output diagnostic information to the specified file. If RLM\_DIAGNOSTICS is set without a value, the diagnostic information will be written to the standard output, which may or may not be desirable, depending on the application.

RLM\_DIAGNOSTICS was introduced in RLM v8.0.

## **RLM\_EXTENDED\_ERROR\_MESSAGES**

If RLM\_EXTENDED\_ERROR\_MESSAGES is set, the internal RLM functions which generate error messages will output more verbose messages (in certain cases) with suggestions for solving the problem. RLM\_EXTENDED\_ERROR\_MESSAGES first appeared in RLM v3.0.

## **RLM\_LICENSE**

The RLM\_LICENSE variable specifies the path to one or more license files and/or license servers. See The License Environment on page 37 for a complete description of how to use RLM\_LICENSE.

## **RLM\_LICENSE\_PASSWORD**

The RLM\_LICENSE\_PASSWORD variable specifies a password for access to particular licenses which have the `_password` attribute. See The License File on page 20 for a complete description of how to use RLM\_LICENSE\_PASSWORD.

## **isv\_LICENSE**

isv\_LICENSE (where "isv" is replaced with the ISV name) is used exactly like RLM\_LICENSE, however if isv\_LICENSE is present, it will be used instead of RLM\_LICENSE.

## **RLM\_PATH\_RANDOMIZE**

Setting RLM\_PATH\_RANDOMIZE (to any value) causes RLM to randomize the license path before any subsequent processing. This is useful in large installations to provide a rudimentary form of load balancing by causing different users with the same setting of *RLM\_LICENSE* or *isv\_LICENSE* to use different license servers. Note that RLM\_PATH\_RANDOMIZE has no effect on the *rlm* or *ISV* servers. RLM\_PATH\_RANDOMIZE operates by selecting a new starting point in the license list, and wrapping around from the last license spec to the first. Otherwise, the order of the license list is preserved. RLM\_PATH\_RANDOMIZE first appeared in RLM v2.0.

## **RLM\_PROJECT**

RLM\_PROJECT communicates project information to the license server. The value of a client's setting of RLM\_PROJECT (up to 32 characters) is logged in the report log file for later use.

## **RLM\_QUEUE**

RLM\_QUEUE informs an application that it should queue for a license if none are available. If RLM\_QUEUE is set, any subsequent application started will queue for its license if none are available. RLM\_QUEUE first appeared in RLM v1.1. If RLM\_ROAM is set, RLM\_QUEUE is ignored (starting in RLM v12.0).

## **RLM\_ROAM**

RLM\_ROAM controls license roaming operations. If RLM\_ROAM is set to a positive integer N, subsequent checkout requests will attempt to create roaming licenses for N days. If RLM\_ROAM is set to any negative integer, any subsequent license checkouts will cause a roaming license to be returned to the floating license pool. This last operation must be done when connected to the network such that the original license server can be contacted. Setting RLM\_ROAM disables RLM\_QUEUE (starting in RLM v12.0).

## **RLMSTAT**

RLMSTAT, if set, will cause the rlm checkout routine to print status as it attempts the checkout. This is sometimes useful to diagnose license checkout failures. The format of this output is:  
RLMSTAT(*location*): (*product\_name*) *license\_path*: *error*  
where:

- *location* is the letter 'N', 'C', or 'U', meaning:
  - N - attempt to check out a local nodelocked, uncounted (or single) license
  - C - attempt to checkout a license from a license server which is already connected
  - U - attempt to checkout a license from a license server with no prior connection
- *product\_name* is the product name being checked out
- *license\_path* is the path of license files or port@host specs
- *error* is the error status from the checkout

## **Obsolete Environment Variables**

### **RLM\_DISCONNECTED**

RLM\_DISCONNECTED informs an application that the system is not connected to the internet. If RLM\_DISCONNECTED is set, any subsequent application started will not attempt any internet operations outside the local firewall (unless the license server is specified to be outside the firewall). RLM\_DISCONNECTED first appeared in RLM v1.1. RLM\_DISCONNECTED was removed in v3.0, as it was no longer used.

# RLM Performance Testing

The RLM License Administration bundle includes several useful binaries as well as a copy of this manual. The License Administration bundle includes a performance test program called **rlmtests**.

To download the RLM License Administration bundle, go to the [Reprise Website Download area](#), select the License Administration bundle, click "I agree" to the license terms, then select the kit(s) you want to download. Save these on your system, then uncompress and (on unix) extract the binaries with the *tar xvf* command. On windows, the kit is in a winzip archive.

Each kit has a descriptive name on the website. The file names of the kits follow Reprise Software's platform naming conventions, with ".tar.gz" appended for Unix, or ".zip" for Windows:

| Platform                | OS Version  | Platform Name | Kit file name         |
|-------------------------|---|---------------|-----------------------|
| HP-UX on PA-Risc        | HP/UX 11.0 or later, 32-bit   | hp_h1         | hp_h1.admin.tar.gz    |
| HP Itanium              | HP/UX Itanium, 64-bit   | ia64_h1       | ia64_h1.admin.tar.gz  |
| IBM AIX                 | IBM AIX RS/6000   | ibm_a1        | ibm_a1.admin.tar.gz   |
| Linux on Intel X86      | Linux, 32-bit   | x86_l2        | x86_l2.admin.tar.gz   |
| Linux x64               | Linux, 64-bit   | x64_l1        | x64_l1.admin.tar.gz   |
| Linux Itanium           | Linux Itanium, 64-bit   | ia64_l2       | ia64_l2.admin.tar.gz  |
| Linux PPC               | Linux PPC, 64-bit   | ppc64_l1      | ppc64_l1.admin.tar.gz |
| Mac on Intel X86        | Mac OS 10.4.11 or later, 32-bit                                     | x86_m1        | x86_m1.admin.tar.gz   |
| Mac on PPC              | Mac OS 10.4 or later, 64-bit  | ppc_m1        | ppc_m1.admin.tar.gz   |
| NetBSD                  | NetBSD v4.0 or later, 32-bit  | x86_n1        | x86_n1.admin.tar.gz   |
| Solaris on Intel        | Solaris 10 or later, 64-bit   | x64_s1        | x64_s1.admin.tar.gz   |
| Solaris on Sparc        | Solaris 9 or later, 32-bit  | sun_s1        | sun_s1.admin.tar.gz   |
| Windows on Intel x86    | Windows 7, 8, 10, Vista, XP, Server 2003, 2008, 2012, 2016 (32-bit) | x86_w3        | rlm.vx.yBLz.admin.exe |
| Windows on Intel 64-bit | Windows 7, 8, 10, Vista, XP, Server 2003, 2008, 2012, 2016 (64-bit) | x64_w3        | rlm.vx.yBLz.admin.exe |

To unpack the License Administration bundle, follow these steps:

At the shell prompt on Unix:

```
% gunzip platform.tar.gz
% tar xvf platform.tar
```

That is all there is to it - the kit contains pre-built binaries and this manual.

On Windows, the kit is in winzip format. Extract the binary directory (x86\_w3 for 32-bit or x64\_w3 for 64-bit) to a convenient location.

The performance test can be run by typing the command **rlmtests** at the shell on Unix or in a command window on Windows. When run, **rlmtests** creates the licenses required and starts a license server, then it runs the tests, reporting the results on the screen.

## The Tests

**rlmtests** performs 2 categories of tests:

- checkout performance tests
- server capacity tests

The checkout performance tests consists of 6 separate tests, named "A" through "F". Each of these tests does performance measurements in different scenarios, as shown in the table below.

| Test | Server Environment              | Test Details  | Notes   |
|------|---------------------------------|---|---|
| A    | No clients connected            | One rlm_init() followed by a loop of rlm_checkout() calls               | The server must maintain the total number of checkout contexts over the course of this test   |
| B    | No clients connected            | One rlm_init() followed by a loop of rlm_checkout()/rlm_checkin() calls | This is the fastest test, because the server is only handling one checkout context at a time. |
| C    | No clients connected            | Loop of rlm_init()/rlm_checkout()/rlm_checkin()/rlm_close() calls       | Similar to test "B", with the overhead of initialization on each call.                        |
| D    | 300 (default) clients connected | Same as "A"   | Similar to "A" except that the server now has a number of clients that it is managing.        |
| E    | 300 (default) clients connected | Same as "B"   | Similar to "B" except that the server now has a number of clients that it is managing.        |
| F    | 300 (default) clients connected | Same as "C"   | Similar to "C" except that the server now has a number of clients that it is managing.        |

The server capacity test attempts to determine the total number of clients that the server can handle. This test starts up a number of sub-processes which each simulate 1000 clients connected to the server. Sub-processes are started until a checkout fails (or when 50 sub-processes all succeed.) During the course of this test, the checkout performance time is reported as each sub-process completes.

## The Test Environment

**rlmtests** runs the client and server on the same machine by default. However, you can run the server on a separate machine from the test client by specifying the "-s" option on the machine that is to run the server, and the "-a hostname" option on the client machine to specify the server machine name.

Note that **rlmtests** depends on having the rlm, isv server, rlmutil, and rlmsign binaries in the same directory as **rlmtests**. This will be the case when you install the License Administration bundle. If you wish to run **rlmtests** from another directory, be sure to copy the other binaries as well.

## rlmtests options

**rlmtests** usage is as follows:

```
rlmtests [-a host] [-c loopcount] [-d] [-h] [-l static#] [-p port#] [-s] [subprocess_client_count]
```

Where:

- -a *host* - run the client side only against the server on machine *host*. Note that the server must be already running on *host*.
- -c *loopcount* - controls the number of iterations for the loops for tests A-F. Default is 12000. (note that not all the loops use this count, but all are scaled in proportion to this number).
- -d - turn on debugging output.
- -h - print help text and exit.
- -l *static#* - use *static#* simulated clients for tests D-F (300 default).
- -p *port#* - use *port#* for the server port (should be specified on both server and client side if running on different machines). The default port # is 30000.
- -s - run as the server side only.
- *subprocess\_client\_count* is the number of simulated clients which each subprocess will run in the server capacity tests. The maximum value is 2000.

# Reportlog File Format

The RLM servers create a reportlog in three formats, selectable by the License Administrator. The 3 formats are "std", "small", and "detailed".

Note that prior to RLM v9.3 there was no "detailed" format on Windows; specifying "detailed" would produce a standard report output. Starting in RLM v9.3, the detailed report will be produced, but all fractional seconds fields will be 0.

The formats differ only in the contents of the checkout and checkin records, as described below. Common to all formats are the classes of data logged, and the data for all except checkin and checkout records.

The reportlog format has a version number in the start record. All data described applies to all versions of the reportlog, except where indicated.

The data is:

- authentication data (added in RLM v3.0)
- checkin
- checkout
- dequeue (added in RLM/reportlog v1.1)
- dynamic reservation created/removed (added in RLM v12.2)
- isv-specific data (added in RLM v2.0)
- license denial
- license in use (added in RLM/reportlog v10.0)
- log file start
- log file end (can correspond to a switch to a new logfile)
- meter transaction data (added in RLM v9.3)
- periodic timestamps
- queue (added in RLM/reportlog v1.1)
- roam extend
- server shutdown
- server time jumped
- server reread of license/option file
- support for a product (feature) - one for each *license pool* at log file start time

Note: in every reportlog entry which contains a username or a hostname, the field is presented without quotes. However, if the corresponding value is empty, a pair of double-quotes ("" ) will be placed in the reportlog where the username or hostname would be. This is new in RLM v9.0.

A reportlog consists of the following data:

- log file start records
- one PRODUCT support line for each supported product
- one license in use record for each currently-checked-out license
- all license activity data, including checkouts, checkins, AUTH records, etc.
- one license in use record for each currently-checked-out license
- optional SWITCH line
- END line
- final AUTH line

The format of the data logged is described in the following sections.

## Authentication data

### All formats:

- AUTH section *signature*

This line specifies the authentication signature (*signature*) for the preceding data in the file. If any of the data since the last AUTH line is modified, the authentication value will no longer be correct. This would typically be used by an ISV if they are using the report log data for post-use billing. The ISV can run a utility in order to verify the authentication records in a report log. Report writers can (and should) ignore this line.

- BADAUTH (x errors, y sessions, z authentication sections)

When rlmanon processes a reportlog with AUTH errors, it rewrites the file with all bad AUTH records, and places this line in each section. Prior to RLM v12.3, rlmanon simply stopped processing when a bad AUTH section was encountered. In v12.3, the entire report log will be processed, but all sections will have bad AUTH sections, allowing you to process the anonymized report log but not verify the integrity of the data in it.

## checkin

### "standard" format:

- IN *why product version user host "isv\_def" count cur\_use cur\_reuse server\_handle*  
mm/dd hh:mm:ss

### "detailed" format:

- IN *why product version user host "isv\_def" count cur\_use cur\_reuse server\_handle*  
mm/dd hh:mm:ss.tenths\_of\_msec

### "small" format:

- IN *why count server\_handle* hh:mm

The *server\_handle* parameter is a hex number. All other numbers are decimal.

The *isv\_def* field contains the value of the optional ISV-defined field. This field is new in reportlog v1.1

The *why* parameter is one of:

| why value | Reason                                       |
|-----------|--|
| 1         | "Normal" checkin by application              |
| 2         | Application exited, automatic checkin        |
| 3         | License removed by (rlmremove) utility       |
| 4         | License removed by server after timeout      |
| 5         | License hold/minimum checkout period expired |
| 6         | Client requested license dequeue             |

|    |  |
|----|--|
| 7  | Portable hostid removed                                    |
| 8  | Failed host back up  |
| 9  | Server lost it's transferred licenses                      |
| 10 | Meter ran out of count during a periodic decrement         |
| 11 | Client failed to send heartbeat within "promise" interval. |

Note: *why* values of 4, 5 and 6 are new in v1.1, value 7 is new in RLM v5.0, values 8 and 9 are new in RLM v7.0. 10 is new in RLM v9.3.

The *cur\_use* and *cur\_resuse* fields indicate the current number of free licenses in use and reservations in use after this checkin. These fields are new in reportlog v2.0.

The "ver" parameter will be the version requested, not the version of the license which satisfied the request. To find the version of the license that satisfied the request, check the version field in the matching checkout request referenced by "server\_handle".

On Windows, *tenths\_of\_msec* will always be 0.

## checkout

### "standard" format:

- OUT *product version pool# user host "isv\_def" count cur\_use cur\_resuse server\_handle share\_handle process\_id "project" "requested product" "requested version" mm/dd hh:mm:ss*

### "detailed" format:

- OUT *product version pool# user host "isv\_def" count cur\_use cur\_resuse server\_handle share\_handle process\_id "project" "requested product" "requested version" mm/dd hh:mm:ss.tenths\_of\_msec "client\_machine\_os\_info" "application argv0" roam\_days roam\_handle*

### "small" format:

- OUT *product version user host "isv\_def" count server\_handle share\_handle hh:mm*

Note: the *project* field will contain the contents, if any, of the *RLM\_PROJECT* environment variable of the application that checked out the license. This project name has a maximum of 32 characters.

The *isv\_def* field contains the value of the optional ISV-defined field. This field is new in reportlog v1.1

The *cur\_use* and *cur\_resuse* fields indicate the current number of free licenses in use and reservations in use after this checkout. These fields are new in reportlog v2.0.

The *server\_handle*, *share\_handle*, and *process\_id* parameters are hex numbers. All other numbers are decimal.

The *share\_handle* field contains the value of the handle of a shared license. This field is new in reportlog v1.1. Note that the *share\_handle* is the handle of the first license that was checked out in this group of shared licenses. It is possible (and perhaps even likely) that the handle associated with the group will change if the first license is checked in before other shared licenses are

checked in. In this case, new checkouts will specify a *share\_handle* of a different license in the group of shared licenses.

The *requested product* and *requested version* fields represent the requested product and version in the application's checkout call. In the case of a token-based license, the product (or products) actually checked out will differ, and *requested product* and *requested version* provide what the application actually requested. This data is new in reportlog v2.0 (RLM v2.0).

The *process\_id* field is the PID of the process requesting the license. This data is new in reportlog v2.0 (RLM v2.0). Note that the pid will be -1 (ffffff), when the server logs a roaming "checkout" at startup time.

The *client\_machine\_os\_info* field is a combination of the platform type and OS version running on the client machine. This string is a maximum of 41 bytes long, and is in the format:

"rlm\_platform\_name os\_version"

For example:

"x86\_w2 5.1" - a windows system running Windows XP.

This field is new in reportlog v8.0 (RLM v8.0).

The *application\_argv0* field is the argv[0] of the product requesting the license. This field is new in reportlog v8.0 (RLM v8.0).

The *roam\_days* field is the (hex) number of days for which the license will roam PLUS 1. This will appear on the initial checkout of a roaming license as well as on the subsequent checkout when the server checks out an already-roaming license. This field is new in reportlog v9.0 (RLM v9.0). Beginning in rlm v11.1, *roam\_days* is one greater than it had been in prior versions, so a value of 2 means a license roaming for 1 day (ie, RLM\_ROAM set to 1), meaning until the end of tomorrow.

On Windows, *tenths\_of\_msec* will always be 0.

The *roam\_handle* field is the server handle (in hex) of a roaming license re-checkout. This field will be non-zero when the server checks out an already-roaming license (as it does when starting up). This field is new in reportlog v9.0 (RLM v9.0)

## dequeue

### "standard" format:

- DEQUE *why product version user host "isv\_def" count server\_handle* mm/dd hh:mm:ss

### "detailed" format:

- DEQUE *why product version user host "isv\_def" count server\_handle* mm/dd hh:mm:ss.tenths\_of\_msec

### "small" format:

- DEQUE *why count server\_handle* hh:mm

The *server\_handle* parameter is a hex number. All other numbers are decimal.

The dequeue record is new in v1.1. Note that the dequeue record is identical to the checkin record

except the keyword is "DEQUE" rather than "IN". A dequeue record is generated on all other servers when a client is granted a license on one server.

On Windows, *tenths\_of\_msec* will always be 0.

## dynamic reservation

### All formats:

- DYNRES [create | remove] *user host license-pool count "string"* mm/dd hh:mm:ss

All numbers are decimal.

*string* is the identifier used to create the reservation.

The DYNRES record is new in v12.2.

## isv-specific data

### All formats:

- log mm/dd hh:mm:ss isv-specific-data-here

Individual ISVs can log unformatted data to the report log. This data appears in a "log" record.

## license denial

### "standard" and "small" formats:

- DENY *product version user host "isv\_def" count why last\_attempt pid* mm/dd hh:mm

### "detailed" format:

- DENY *product version user host "isv\_def" count why last\_attempt pid* mm/dd  
hh:mm:ss.tenths\_of\_msec

The *why* parameter is an RLM\_LICENSE error status return (RLM\_EL\_xxxx) as documented in RLM Status Values on page 117.

The *last\_attempt* parameter is 0 if the application will attempt another checkout, or non-zero if this is the last attempt it will make to check the license out. Thus, denials with *last\_attempt* set to 0 are not "true" denials of the license to the application, they are simply denials of the license at this license server. A report writer should only report application license denials when *last\_attempt* is set to a non-zero value.

The *pid* field is the process's PID, in hex.

The *isv\_def* field contains the value of the optional ISV-defined field. This field is new in reportlog v1.1

The detailed format is new in reportlog v4.0. Prior to v4.0, it was identical to the standard and small formats.

The *pid* field is new in reportlog v11.3.

On Windows, *tenths\_of\_msec* will always be 0.

## license in use

### All formats:

- INUSE product version pool# user host "isv\_def" count server\_handle share\_handle process\_id mm/dd hh:mm:ss

The *isv\_def* field contains the value of the optional ISV-defined field.

The *server\_handle* and *process\_id* parameters are hex numbers. All other numbers are decimal.

The *process\_id* field is the PID of the process requesting the license.

License in use records are new in RLM v10.0, and appear both at the beginning and the end of the report log if any licenses are in use at that time.

The *share\_handle* field contains the value of the handle of a shared license. This field is new in reportlog v12.2.

## log file start

### All formats:

- RLM Report Log Format *d*, version *x.y authentication flag*
- REPROCESSED with *rlmanon vx.y*
- ISV: <isvname>, RLM version a.b BLc
- <several lines of header text>
- START *hostname* mm/dd/yyyy hh:mm
- TIMEZONE minutes-west-of-UTC daylight rules # readable version of data
- LICENSE FILE *filename*

The *d* in the first line is the format: 0 for "std", 1 for "small", and 2 for "detailed"

*x.y* is the reportlog version. Reportlog v1.0 corresponds to RLM version 1.0. reportlog v1.1 corresponds to RLM v1.1. The *authentication flag* is either blank (no authentication) or the string "**authenticated**". (Note: Authentication first appeared in RLM v3.0, reportlog format 3.0. Starting in v4.0, all report logs are authenticated).

The second line will be present if the *rlmanon* utility was used to anonymize the reportlog data. The version of *rlmanon* corresponds to the RLM version. *rlmanon* first appeared in RLM v4.0, however while this was added in RLM v4.0, this line can appear in any reportlog version, since *rlmanon* can process any version of reportlog. Note that this line can be repeated if multiple runs of *rlmanon* were made on the same log file.

The third line displays the ISV name, and the RLM software version of the ISV server (a.b BLc,

BL means "Build").

In general, numeric data is in decimal format. The 3 exceptions to this are *server\_handle*, *share\_handle*, and *process\_id* parameters which are always hex numbers.

The TIMEZONE line is new in RLM v12.3. This represents the server's timezone data: the first number is the minutes west of UTC time; the second number indicates whether daylight savings rules ever apply in this timezone. The data after the # is a human-readable version of the timezone information.

The LICENSE FILE line(s) are new in reportlog v2.0. There will be one LICENSE FILE line for each license file which the server is processing.

## log file end

### All formats:

- SWITCH to *filename* (if an rlmswitch was done)
- END mm/dd/yyyy hh:mm

## meter decrement

### All formats:

- METER\_DEC *license\_handle meter\_counter amount\_decremented* mm/dd hh:mm:ss[.tenths\_of\_msec]

A *meter decrement* record will immediately follow a checkout record for a metered license. In addition, an additional *meter decrement* record will appear periodically when the meter is decremented for this product. The *license handle* is a hex value; both *meter counter* and *amount decremented* are decimal.

The format is the same for all reportlog types, with the exception of the time - in the detailed reportlog format, tenths of milliseconds are added.

*meter decrement* records are new in RLM v9.3.

## periodic timestamp

### All formats:

- mm/dd/yyyy hh:mm  
Timestamps are performed by the ISV servers every night just after midnight. Beginning in RLM v9.3, timestamps are added to the log file every 30 minutes

## queue

**"standard" format:**

- `QUE product version user host "isv_def" count server_handle "project" "requested product" "requested version" mm/dd hh:mm:ss`

**"detailed" format:**

- `QUE product version user host "isv_def" count server_handle "project" "requested product" "requested version" mm/dd hh:mm:ss.tenths_of_msec`

**"small" format:**

- `QUE product version user host "isv_def" count server_handle hh:mm`

The `server_handle` parameter is a hex number. All other numbers are decimal.

Note: the queue message is new in RLM v1.1 (reportlog v1.1).

Note: the "requested product" and "requested version" fields were added in RLM v5.0 (reportlog v5.0).

The `project` field will contain the contents, if any, of the `RLM_PROJECT` environment variable of the application that checked out the license. This project name has a maximum of 32 characters.

The `isv_def` field contains the value of the optional ISV-defined field.

On Windows, `tenths_of_msec` will always be 0.

If the queued license becomes available, a checkout record will be logged with the same handle. If the client abandons the checkout, however, no other records will be logged.

## roam extend

**The roam extend record has only a single format, for all 3 reportlog formats:**

- `ROAM_EXTEND product version pool# user host "isv_def" #days_extended server_handle process_id mm/dd hh:mm:ss`

The `isv_def` field contains the value of the optional ISV-defined field.

The `#days_extended` parameter is the # of days which the roam was extended. So, if a license was originally roaming for 6 days, then extended to 10 days, this parameter will be 4, independent of which day the extension was done.

The `server_handle and process_id` parameters are hex numbers. All other numbers are decimal.

The `process_id` field is the PID of the process requesting the license. Note that if the pid is -1 (ffffff), this means that the roam was extended by the RLM web interface when the client was no longer connected to the server.

Roam extend records are new in RLM v10.0.

## server shutdown

### All formats:

- SHUTDOWN *user host mm/dd hh:mm:ss*

## server time jump

### All formats:

- TIMEJUMP [+ | -]minutes *mm/dd hh:mm:ss*

The `isv` server logs this when the time changes by more than 15 minutes on subsequent passes thru its main loop. The main loop executes whenever there is a message to process, but not less frequently than once/minute.

## server reread of license/option file

### All formats:

- REREAD *user host mm/dd hh:mm:ss*

## support for a product

There will be one record per license pool for each product served. These lines come immediately after a START or REREAD record. Note that there is not a one-to-one correspondence between the **support** records and LICENSE lines in the license file.

### All formats:

- PRODUCT *name version pool# count #reservations soft\_limit "hostid" "contract" "customer" "issuer" "line\_item" "options" share max\_share type named\_user\_count meter\_type meter\_counter meter\_initial\_decrement meter\_period meter\_period\_decrement*

**NOTE:** The *soft\_limit*, *contract*, *customer*, and *issuer* fields are new in the v1.1 reportlog. The *hostid* and *pool#* fields are new in the v2.0 reportlog. The *line\_item* field is new in the v3.0 reportlog. The *options*, *share*, *max\_share*, *type*, and *named\_user\_count* are new in the RLM v5.0 reportlog. The five *meter\_* parameters are new in RLM v9.3.

*count* is the number of free licenses (ie, non-reserved licenses)

*#reservations* is the number of reserved licenses (not generally available).

*pool#* is an internal server pool identifier. This number appears in checkout records in some formats.

*line\_item* is the contents of the product's *\_line\_item* field, used for mapping license product names to actual purchased products.

*meter\_type* is always 0 in RLM v9.3. Other values may be defined in later versions. A non-zero value in *meter\_counter* indicates a metered license.

*meter\_counter* is the counter which is used for this product.  
*meter\_initial\_decrement* is the amount to be decremented from the meter when a license is checked out.  
*meter\_period* is the number of minutes before an additional decrement is performed (0 means no periodic decrements)  
*meter\_period\_dec* is the amount to be decremented from the meter each *meter\_period* minutes.

## Reportlog version change history

|  |
|--|
| <b>V12.3 reportlog changes</b>   |
| The TIMEZONE record is added to the header information.  |
| The BDAUTH record is added by rlmanon when processing logs with AUTH errors.   |
| <b>V12.2 reportlog changes</b>   |
| The share handle is added to INUSE records   |
| The DYNRES record is added.  |
| <b>V12.1 reportlog changes</b>   |
| The Server Time Jump (TIMEJUMP) record is added.   |
| <b>V11.3 reportlog changes</b>   |
| The DENY records now include the process's PID.  |
| <b>V11.1 reportlog changes</b>   |
| roam_days is now one greater than prior versions (and one greater than the value of RLM_ROAM). roam_days == 2 now means roaming until midnight tomorrow.   |
| <b>v10.0 reportlog changes</b>   |
| All logfiles will now log all licenses currently in use both at the start and the end of the reportlog, with the new "INUSE" record.   |
| The ROAM_EXTEND record is added.   |
| <b>v9.3 reportlog changes</b>  |
| Windows systems will now produce a detailed reportlog, however, all fractional seconds fields will be 0.   |
| <i>meter decrement</i> records added.  |
| metering parameters added to the <i>support</i> record   |
| The logfile is timestamped every 30 minutes  |
| <b>v9.0 reportlog changes</b>  |
| roam days and roam handle added to the OUT record for detailed format.   |
| All fields which have a username or a hostname will now contain only an empty pair of double-quotes ("" ) if the corresponding value is empty. This only happens when rlm cannot determine the username or hostname on the system using the standard system calls. |
| <b>v8.0 reportlog changes</b>  |

|   |
|---|
| client machine OS version added to the OUT record for detailed format.  |
| application argv[0] added to the OUT record for detailed format.  |
| <b>v5.0 reportlog changes</b>   |
| requested product and requested version added to QUE record for std and detailed formats.   |
| requested product and requested version will always be empty strings in OUT records that result from a de-queueing of a previously-queued request.  |
| options, share, max_share, type, and named_user_count added to PRODUCT support record   |
| Portable hostid removed - status 7 - added to checkin reasons.  |
| <b>v4.0 reportlog changes</b>   |
| REPROCESSED line added for <i>rlmanon</i> . Note that this line can appear in any version reportlog, since <i>rlmanon</i> can process all reportlog versions. Report writers can ignore this line, it is in the file for informational purposes only. |
| "detailed" format added to DENIAL records to add seconds and fractional seconds.  |
| REREAD END records were not generated prior to v4.0. This record is removed.  |
| New denial status -45 (RLM_EL_NOT_NAMED_USER) added   |
| All report logs are authenticated.  |
| <b>v3.0 reportlog changes</b>   |
| NOTE: the v3.0 reportlog is incorrectly logged as v2.0 in the "RLM Report Log" line. The version in the ISV line will correctly indicate that it is a v3.0 logfile.   |
| line_item added to PRODUCT records  |
| ", authenticated" added to the end of the 'RLM Report Log' (first) record if this reportlog is authenticated  |
| AUTH records added (for authenticated reportlogs)   |
| <b>v2.0 reportlog changes</b>   |
| LICENSE FILE line added in header section   |
| isv-specific data ("log" records) added   |
| cur_use and cur_reuse fields added to IN records (standard and detailed formats)  |
| process_id, requested_product, and requested_version added to OUT records (standard and detailed formats)   |
| hostid and pool# added to PRODUCT records   |

## RLM hostids

RLM supports several different kinds of identification for various computing environments, as well as some generic identification which are platform-independent.

RLM's host identification (hostid) types are:

| hostid type      | meaning  | example   | Notes   |
|------------------|--|---|---|
| ANY              | runs anywhere  | hostid=ANY  |   |
| DEMO             | runs anywhere for a demo license                       | hostid=DEMO   |   |
| serial number    | runs anywhere  | hostid=sn=123-456-789                                   | used to identify a license, any string up to 64 characters long     |
| disksn           | Hard Disk hardware serial number                       | hostid=disksn=WD-WX60AC946860                           | Windows only  |
| gc               | Google Compute Engine                                  | gc=3797742226458986650.k6qt9v5h38w2adwqgc9fdhdf3w0m761p | Linux only. Introduced in RLM v11.1 See note below.                 |
| 32               | 32-bit hostid, native on Unix, non X86 based platforms | hostid=10ac0307   | This is the volume serial number on windows, and is not recommended |
| ip (or internet) | TCP/IP address   | hostid=ip=192.156.1.3                                   | always printed as "ip="   |
| ether            | Ethernet MAC address                                   | hostid=ether=00801935f2b5                               | always printed without leading "ether="                             |
| rlmid1           | External key or dongle                                 | rlmid1=9a763f21   | External key or dongle  |
| uuid             | BIOS uuid  | uuid=699A4D56-58BF-1C83-D63C-27A8BEB8011A               | Windows only  |
| user             | User name  | hostid=USER=joe   |   |
| host             | Host name  | hostid=host=melody                                      |   |

To determine the hostid of a machine, use the hostid type from the table above as input to the *rlmhostid* command:

**rlmutil rlmhostid *hostid type***

For example:

**rlmutil rlmhostid 32**

or

**rlmutil rlmhostid internet**

Note: The RLMID series of hostids are optional products, and will often require other software to be installed on the system on which they are to be used. For these devices, see Optional hostid Installation Instructions on page 112.

Note: Beginning in RLM v3.0, IP address hostids can contain the wildcard (\*) character in any position to indicate that any value is accepted in that position.

The serial number (sn) and rlmid1 hostid types first appeared in RLM v5.0.

### **A note about Google Compute Engine, and the gc= hostid type**

#### ***license servers cannot serve nodelocked licenses that are locked to gc hostids***

The gc= hostid type is determined via a call to an http server. As such, RLM makes an effort to avoid the calls which could take a while to process if the application is not running on google compute engine (Note that RLM first attempts to determine that it is running on google compute engine before making the http calls, but this determination can yield a false positive). This means that RLM clients will not attempt to determine the gc hostid unless they are processing a nodelocked license that is locked to this hostid type. The practical result of this is that ***license servers cannot serve nodelocked licenses that are locked to gc hostids***, since the client will not transmit this hostid type to the server.

If the RLM algorithm to determine that it is running on google compute engine does not detect google compute engine for any reason, you can set the RLM\_GOOGLE\_CLOUD environment variable (to any value) to indicate to RLM that it is running on Google Compute Engine.

# Optional hostid Installation Instructions

Certain hostids in the RLMID family (RLMID1) require device-specific installation on the target computer.

## Installing RLMid1 Devices

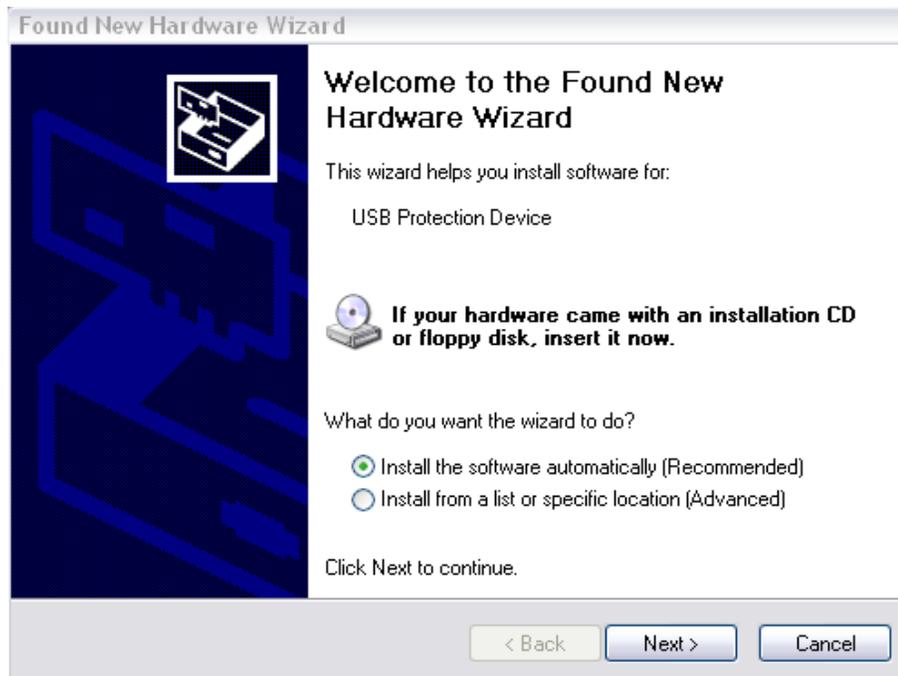
The RLMid1 device is a hardware key manufactured by Aladdin Knowledge Systems (now Safenet, Inc). Installation on a target system can be accomplished in two ways:

- use Windows "Found New Hardware" to automatically load the drivers (preferred), or
- use the RLMID1 driver installer (from the Reprise Software website) to do the driver installation

## Using Windows to automatically install drivers

In order to use Windows to automatically do the driver installation, simply plug the device into the computer, and Windows will detect the new device. If you first get a permissions screen asking if it is OK to use Windows Update to locate the driver, indicate that permission is granted.

You will get the "Found New Hardware" wizard which will install the drivers for the "USB Protection Device" for you. (Note: the device may alternately be called "HASP HL 3.xx" or "Aladdin USB Key" or "Safenet Inc. USB Key").



Select "Install the Software Automatically (recommended)", and click "Next". Windows will locate the driver and install it.

You will then get the "Completing the Found New Hardware Wizard", shown below; click "Finish".



That is all there is to it.

## Installing the drivers using the installation program.

If for some reason Windows fails to update the driver automatically, or if the target system is not connected to the internet, use the driver installer located at:

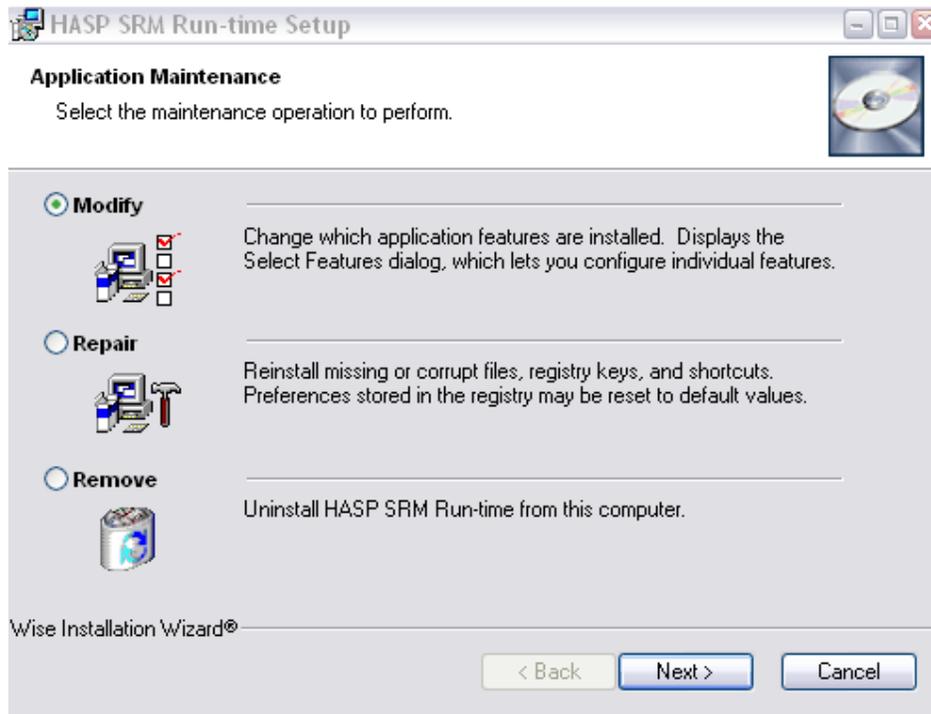
<http://www.reprisesoftware.com/drivers/rlmid1.zip>

Or you can download the driver directly from the SafeNet site at:

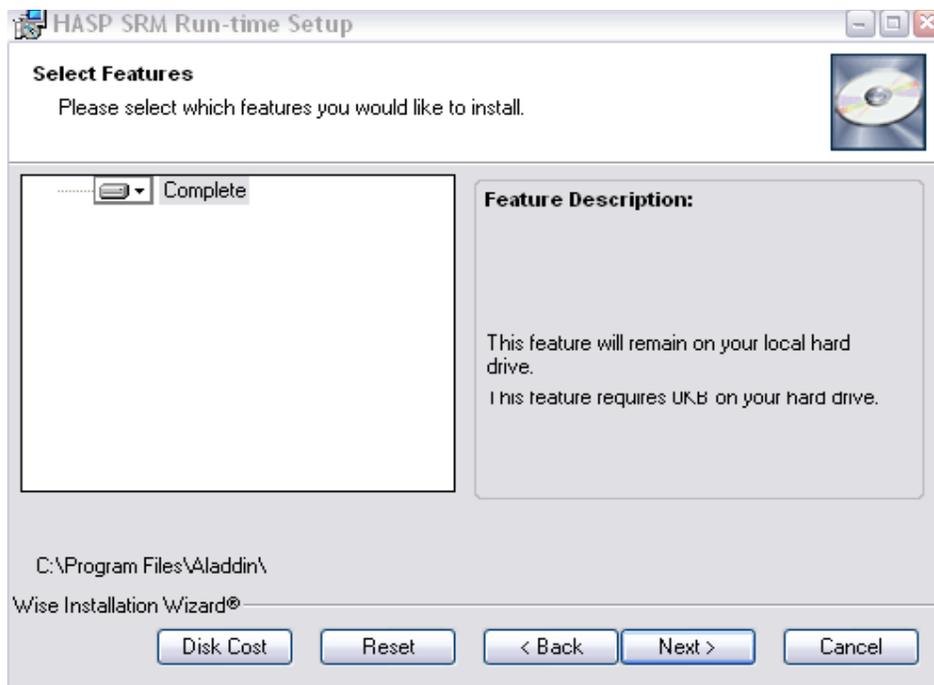
[ftp://ftp.aladdin.com/pub/hasp/Sentinel\\_HASP/Runtime\\_%28Drivers%29/Sentinel\\_HASP\\_Runtime\\_setup.zip](ftp://ftp.aladdin.com/pub/hasp/Sentinel_HASP/Runtime_%28Drivers%29/Sentinel_HASP_Runtime_setup.zip)

To run the installer:

- save the installer (rlmid1.zip) to disk
- extract the zip file
- navigate into the rlmid1 directory, and run the RLMID1 installer application
- when the installer comes up, leave "Modify" selected (or select it) and press "Next->"



- On the "Select Features" screen, click "Next->"



- On the "Ready to Modify the Application" screen, click "Next->"

You will now see the "HASP SRM Run-time has been installed" screen. Click "Finish".



The drivers are installed and you are ready to use the RLMID1 devices.

Note that an RLMID1 device can be used by any RLM-licensed application on the system, in other words, there is nothing ISV-specific about the device.

## Installing RLMid1 Devices on Linux

To install the necessary drivers for RLMid1 devices on linux, follow these steps:

1. Browse to <http://sentinelcustomer.safenet-inc.com/sentineldownloads/>. Look for the "Sentinal HASP/LDK Rutime Installer" for Linux. There are several options, depending on Linux variant and the style of installer you want (GUI, RPM, script).
2. Download the appropriate installer and install. Note that you will have to execute the installation as root.

The runtime installer sets up a daemon that is used to access the hardware key.

# IPv6 Considerations

Beginning in RLM v11.0, RLM supports IPv6 on Windows and Linux.

Linux support operates correctly on all RLM builds.

Windows support, however, is limited to the x86\_w3 and x64\_w3 kits, since earlier versions of the compiler do not support IPv6. This can lead to some inconsistent behavior if different RLM versions are used on IPv6 networks.

Let's assume that you have an IPv6 network, and both client and server are running on IPv6-capable machines. If your ISV's application is built with one of the \_w3 kits, it will attempt to communicate to an IPv6 address. However, if either rlm or the ISV server is built with the \_w1 or \_w2 kit, it will not be able to bind an IPv6 address, and the connection to the server will fail.

If this is the case, you can do one or 2 things:

1. Use an IPv4 address in the SERVER line in place of the hostname, or
2. Ensure that you are running \_w3 versions of rlm and the ISV server.

If you have received a \_w1 or \_w2 version of an ISV server, you must use technique #1 above, until your ISV can supply you an ISV server built with a \_w3 kit. If your ISV supplies a settings file, however, you only need to make sure that the version of the RLM binary you are running is a \_w3 version.

To determine the version of the RLM kit a server was built with, you can look at the "Server Architecture:" line in the first few lines of the debug log file, as in this example:

```
05/21 14:19 (rlm) RLM License Server Version 11.3BL1
          Copyright (C) 2006-2015, Reprise Software, Inc. All rights reserved.
05/21 14:19 (rlm) License server started on aztec
05/21 14:19 (rlm) Server architecture: x86_w3
```

This example is a copy of RLM built with the x86\_w3 kit, so it will operate correctly on IPv6 networks.

You can view the debug log from the ISV server to determine which RLM kit was used to build it as well.

# RLM Status Values

## General Licensing Errors:

|                          |      |   |
|--------------------------|------|---|
| 0                        | 0    | Success   |
| RLM_EH_NOHANDLE          | -101 | No handle supplied to call  |
| RLM_EH_READ_NOLICENSE    | -102 | Can't read license data   |
| RLM_EH_NET_INIT          | -103 | Network (msg_init()) error  |
| RLM_EH_NET_WERR          | -104 | Error writing to network  |
| RLM_EH_NET_RERR          | -105 | Error reading from network  |
| RLM_EH_NET_BADRESP       | -106 | Unexpected response   |
| RLM_EH_BADHELLO          | -107 | HELLO message for wrong server  |
| RLM_EH_BADPRIVKEY        | -108 | Error in private key  |
| RLM_EH_SIGERROR          | -109 | Error signing authorization   |
| RLM_EH_INTERNAL          | -110 | Internal error  |
| RLM_EH_CONN_REFUSED      | -111 | Connection refused at server  |
| RLM_EH_NOSERVER          | -112 | No server to connect to   |
| RLM_EH_BADHANDSHAKE      | -113 | Bad communications handshake  |
| RLM_EH_CANTGETETHER      | -114 | Can't get ethernet address  |
| RLM_EH_MALLOC            | -115 | malloc() error  |
| RLM_EH_BIND              | -116 | bind() error  |
| RLM_EH_SOCKET            | -117 | socket() error  |
| RLM_EH_BADPUBKEY         | -118 | Error in public key   |
| RLM_EH_AUTHFAIL          | -119 | Authentication failed   |
| RLM_EH_WRITE_LF          | -120 | Can't write new license file  |
| RLM_EH_DUP_ISV_HID       | -122 | ISV-defined hostid already registered   |
| RLM_EH_BADPARAM          | -123 | Bad parameter passed to RLM function  |
| RLM_EH_ROAMWRITEERR      | -124 | Roam File write error   |
| RLM_EH_ROAMREADERR       | -125 | Roam File read error  |
| RLM_EH_HANDLER_INSTALLED | -126 | Heartbeat handler already installed   |
| RLM_EH_CANTCREATELOCK    | -127 | Can't create 'single' lockfile  |
| RLM_EH_CANTOPENLOCK      | -128 | Can't open 'single' lockfile  |
| RLM_EH_CANTSETLOCK       | -129 | Can't set lock for 'single'   |
| RLM_EH_BADRLMLIC         | -130 | Bad/missing/expired RLM license   |
| RLM_EH_BADHOST           | -131 | bad hostname in license file or port@host   |
| RLM_EH_CANTCONNECTURL    | -132 | Can't connect to specified URL (activation)   |
| RLM_EH_OP_NOT_ALLOWED    | -133 | Operation not allowed on server. The status, reread, shutdown, or remove command has been disabled for this user. |
| RLM_EH_ACT_BADSTAT       | -134 | Bad status return from Activation server  |
| RLM_EH_ACT_BADLICKEY     | -135 | Activation server built with incorrect license key  |
| RLM_EH_ACT_BAD_HTTP      | -136 | Error in HTTP transaction with Activation server  |

|                              |      |  |
|------------------------------|------|--|
| RLM_EH_DEMO_EXISTS           | -137 | Demo already created on this system                              |
| RLM_EH_DEMO_WRITEERR         | -138 | Demo install file write error                                    |
| RLM_EH_NO_DEMO_LIC           | -139 | No "rlm_demo" license available                                  |
| RLM_EH_NO_RLM_PLATFORM       | -140 | RLM is unlicensed on this platform                               |
| RLM_EH_EVAL_EXPIRED          | -141 | The RLM evaluation license compiled into this binary has expired |
| RLM_EH_SERVER_REJECT         | -142 | Server rejected (too old)  |
| RLM_EH_UNLICENSED            | -143 | Unlicensed RLM option  |
| RLM_EH_SEMAPHORE_FAILURE     | -144 | Semaphore initialization failure                                 |
| RLM_EH_ACT_OLDSERVER         | -145 | Activation server too old (doesn't support encryption)           |
| RLM_EH_BAD_LIC_LINE          | -146 | Invalid license line in LF                                       |
| RLM_EH_BAD_SERVER_HOSTID     | -147 | Invalid hostid on SERVER line                                    |
| RLM_EH_NO_REHOST_TOP_DIR     | -148 | No rehostable hostid top-level dir                               |
| RLM_EH_CANT_GET_REHOST       | -149 | Cannot get rehostable hostid                                     |
| RLM_EH_CANT_DEL_REHOST       | -150 | Cannot delete rehostable hostid                                  |
| RLM_EH_CANT_CREATE_REHOST    | -151 | Cannot create rehostable hostid                                  |
| RLM_EH_REHOST_TOP_DIR_EXISTS | -152 | Rehostable top directory exists                                  |
| RLM_EH_REHOST_EXISTS         | -153 | Rehostable hostid exists   |
| RLM_EH_NO_FULFILLMENTS       | -154 | No fulfillments to revoke  |
| RLM_EH_METER_READERR         | -155 | Meter read error   |
| RLM_EH_METER_WRITEERR        | -156 | Meter write error  |
| RLM_EH_METER_BADINCREMENT    | -157 | Bad meter increment command                                      |
| RLM_EH_METER_NO_COUNTER      | -158 | Can't find counter in meter                                      |
| RLM_EH_ACT_UNLICENSED        | -159 | Activation Unlicensed  |
| RLM_EH_ACTPRO_UNLICENSED     | -160 | Activation Pro Unlicensed  |
| RLM_EH_SERVER_REQUIRED       | -161 | Counted license requires server                                  |
| RLM_EH_DATE_REQUIRED         | -162 | REPLACE license requires date                                    |
| RLM_EH_NO_METER_UPGRADE      | -163 | METERED licenses can't be UPGRADED                               |
| RLM_EH_NO_CLIENT             | -164 | Disconnected client data can't be found                          |
| RLM_EH_NO_DISCONN            | -165 | Operation not allowed on disconnected handle                     |
| RLM_EH_NO_FILES              | -166 | Too many open files  |
| RLM_EH_NO_BROADCAST_RESP     | -167 | No response to broadcast message                                 |
| RLM_EH_NO_BROADCAST_HOST     | -168 | Broadcast response didn't include hostname                       |
| RLM_EH_SERVER_TOO_OLD        | -169 | Server too old for disconnected operations                       |

**Internet Activation Errors:**

|                         |       |  |
|-------------------------|-------|--|
| RLM_ACT_BADPARAM        | -1001 | Unused – RLM_EH_BADPARAM returned instead. |
| RLM_ACT_NO_KEY          | -1002 | No activation key supplied                 |
| RLM_ACT_NO_PROD         | -1003 | No product definition exists               |
| RLM_ACT_CANT_WRITE_KEYS | -1004 | Can't write keyf table                     |
| RLM_ACT_KEY_USED        | -1005 | Activation key already used                |

|                                |       |  |
|--------------------------------|-------|--|
| RLM_ACT_BAD_HOSTID             | -1006 | Missing hostid   |
| RLM_ACT_BAD_HOSTID_TYPE        | -1007 | Invalid hostid type                                      |
| RLM_ACT_BAD_HTTP               | -1008 | Bad HTTP transaction. Note: unused after v3.0BL4         |
| RLM_ACT_CANTLOCK               | -1009 | Can't lock activation database                           |
| RLM_ACT_CANTREAD_DB            | -1010 | Can't read activation database                           |
| RLM_ACT_CANT_WRITE_FUFILL      | -1011 | Can't write licf table                                   |
| RLM_ACT_CLIENT_TIME_BAD        | -1012 | Clock bad on client system (not within 7 days of server) |
| RLM_ACT_BAD_REDIRECT           | -1013 | Can't write licf table                                   |
| RLM_ACT_TOOMANY_HOSTID_CHANGES | -1014 | Too many hostid changes for refresh-type activation      |
| RLM_ACT_BLACKLISTED            | -1015 | Domain on blacklist for activation                       |
| RLM_ACT_NOT_WHITELISTED        | -1016 | Domain not on activation key whitelist                   |
| RLM_ACT_KEY_EXPIRED            | -1017 | Activation key expired                                   |
| RLM_ACT_NO_PERMISSION          | -1018 | HTTP request denied (this is a setup problem)            |
| RLM_ACT_SERVER_ERROR           | -1019 | HTTP internal server error (usually a setup problem)     |
| RLM_ACT_BAD_GENERATOR          | -1020 | Bad/missing generator file (Activation Pro)              |
| RLM_ACT_NO_KEY_MATCH           | -1021 | No matching activation key in database                   |
| RLM_ACT_NO_AUTH_SUPPLIED       | -1022 | No proxy authorization supplied                          |
| RLM_ACT_PROXY_AUTH_FAILED      | -1023 | Proxy authentication failed                              |
| RLM_ACT_NO_BASIC_AUTH          | -1024 | No basic authentication supported by proxy               |
| RLM_ACT_GEN_UNLICENSED         | -1025 | Activation generator unlicensed (ISV_mklic)              |
| RLM_ACT_DB_READERR             | -1026 | Activation database read error (Activation Pro)          |
| RLM_ACT_GEN_PARAM_ERR          | -1027 | Generating license - bad parameter                       |
| RLM_ACT_UNSUPPORTED_CMD        | -1028 | Unsupported command to license generator                 |

**License Checkout Errors:**

| Status             | Value | Meaning                          | Full Description   |
|--------------------|-------|----------------------------------|--|
| 0                  | 0     | Success                          |  |
| RLM_EL_NOPRODUCT   | -1    | No authorization for product     | rlm_checkout() did not find a product to satisfy your request.   |
| RLM_EL_NOTME       | -2    | Authorization is for another ISV | The license you are requesting is in the license file, but it is for a different ISV.  |
| RLM_EL_EXPIRED     | -3    | Authorization has expired        | The only license available has expired. This error will only be returned for local license lines, never from a license server. |
| RLM_EL_NOTTHISHOST | -4    | Wrong host for authorization     | The hostid in the license doesn't match the hostid of the machine where the software is running.                               |
| RLM_EL_BADKEY      | -5    | Bad key in authorization         | The signature in the license line is not valid, i.e. it does not match the remainder of the data in the                        |

|                       |     |   |  |
|-----------------------|-----|---|--|
|                       |     |   | license.   |
| RLM_EL_BADVER         | -6  | Requested version not supported             | Your application tried to check out a license at a higher version than was available, e.g., you specified v5, but the available license is for v4.                                       |
| RLM_EL_BADDATE        | -7  | bad date format - not permanent or dd-mm-yy | The expiration, start, or issued date wasn't understood, eg, 316-mar-2010 or 31-jun-2010. You'd probably never see this in the field unless somebody had tampered with the license file. |
| RLM_EL_TOOMANY        | -8  | checkout request for too many licenses      | Your checkout request will never work, because you have asked for more licenses than are issued.   |
| RLM_EL_NOAUTH         | -9  | No license auth supplied to call            | This is an internal error.   |
| RLM_EL_ON_EXC_ALL     | -10 | On excludeall list                          | The license administrator has specified an EXCLUDEALL list for this product, and the user (host, etc) is on it.  |
| RLM_EL_ON_EXC         | -11 | On feature exclude list                     | The license administrator has specified an EXCLUDE list for this product, and the user (host, etc) is on it.   |
| RLM_EL_NOT_INC_ALL    | -12 | Not on the includeall list                  | The license administrator has specified an INCLUDEALL list for this product, and you are not on it.  |
| RLM_EL_NOT_INC        | -13 | Not on the feature include list             | The license administrator has specified an INCLUDE list for this product, and you are not on it.   |
| RLM_EL_OVER_MAX       | -14 | Request would go over license MAX           | The license administrator set a license MAX usage option for a user or group. This checkout request would put this user/group/host over that limit.                                      |
| RLM_EL_REMOVED        | -15 | License (rlm)removed by server              | A license administrator removed this license using the rlmremove command or the RLM web interface.   |
| RLM_EL_SERVER_BADRESP | -16 | Unexpected response from server             | The application received a response from the license server which it did not expect. This is an internal error.  |
| RLM_EL_COMM_ERROR     | -17 | Error communicating with server             | This indicates a basic communication error with the license server, either in a network initialization, read, or write call.   |
| RLM_EL_NO_SERV_SUPP   | -18 | License server doesn't support this         |  |
| RLM_EL_NOHANDLE       | -19 | No license handle                           | No license handle supplied to an rlm_get_attr_xxx() call or rlm_license_xxx() call.  |
| RLM_EL_SERVER_DOWN    | -20 | Server closed connection                    | The license server closed the connection to the application.   |
| RLM_EL_NO_HEARTBEAT   | -21 | No heartbeat response received              | Your application did not receive a response to a heartbeat message which it sent. This would happen when you call rlm_get_attr_health(), or  |

|                        |     |  |   |
|------------------------|-----|--|---|
|                        |     |  | automatically if you called <code>rlm_auto_hb()</code> .  |
| RLM_EL_ALLINUSE        | -22 | All licenses in use                      | All licenses are currently in use, and the user did not request to be queued. This request will succeed at some other time when some licenses are checked in.                     |
| RLM_EL_NOHOSTID        | -23 | No hostid on uncounted license           | Uncounted licenses always require a hostid.   |
| RLM_EL_TIMEOUT         | -24 | License timed out by server              | Your application did not send any heartbeats to the license server and the license administrator specified a TIMEOUT option in the ISV server options file.                       |
| RLM_EL_INQUEUE         | -25 | In queue for license                     | All licenses are in use, and the user requested queuing by setting the RLM_QUEUE environment variable.  |
| RLM_EL_SYNTAX          | -26 | License syntax error                     | This is an internal error.  |
| RLM_EL_ROAM_TOOLONG    | -27 | Roam time exceeds maximum                | The roam time specified in a checkout request is longer than either the license-specified maximum roaming time or the license administrator's ROAM_MAX_DAYS option specification. |
| RLM_EL_NO_SERV_HANDLE  | -28 | Server does not know this license handle | This is an internal server error. It will be returned usually when you are attempting to return a roaming license early.  |
| RLM_EL_ON_EXC_ROAM     | -29 | On roam exclude list                     | The license administrator has specified an EXCLUDE_ROAM list for this product, and the user (host, etc) is on it.   |
| RLM_EL_NOT_INC_ROAM    | -30 | Not on the roam include list             | The license administrator has specified an INCLUDE_ROAM list for this product, and you are not on it.   |
| RLM_EL_TOOMANY_ROAMING | -31 | Too many licenses roaming already        | A request was made to roam a license, but there are too many licenses roaming already (set by the license administrator ROAM_MAX_COUNT option).                                   |
| RLM_EL_WILL_EXPIRE     | -32 | License expires before roam period ends  | A roaming license was requested, but the only license which can fulfill the request will expire before the roam period ends.  |
| RLM_EL_ROAMFILEERR     | -33 | Problem with roam file                   | There was a problem writing the roam data file on the application's computer.   |
| RLM_EL_RLM_ROAM_ERR    | -34 | Cannot check out rlm_roam license        | A license was requested to roam, but the application cannot check out an rlm_roam license.  |
| RLM_EL_WRONG_PLATFORM  | -35 | Wrong platform for client                | The license specifies platforms=xxx, but the application is not running on one of these platforms.  |
| RLM_EL_WRONG_TZ        | -36 | Wrong timezone for client                | The license specifies an allowed timezone, but the application is running on a computer in a different timezone.  |
| RLM_EL_NOT_STARTED     | -37 | License start date                       | The start date in the license hasn't occurred yet,  |

|                         |     |  |   |
|-------------------------|-----|--|---|
|                         |     | in the future  | e.g., today you try to check out a license containing start=1-mar-2030.   |
| RLM_EL_CANT_GET_DATE    | -38 | time() call failure                                    | The <i>time()</i> system call failed  |
| RLM_EL_OVERSOFT         | -39 | Request goes over license soft_limit                   | This license checkout causes the license usage to go over it's soft limit. The checkout is successful, but usage is now in the overdraft mode.  |
| RLM_EL_WINDBACK         | -40 | Clock setback detected                                 | RLM has detected that the clock has been set back. This error will only happen on expiring licenses.  |
| RLM_EL_BADPARAM         | -41 | Bad parameter to rlm_checkout() call                   | This currently happens if a checkout request is made for < 0 licenses.  |
| RLM_EL_NOROAM_FAILOVER  | -42 | Roam operations not allowed on failover server         | A failover server has taken over for a primary server, and a roaming license was requested. Roaming licenses can only be obtained from primary servers. Re-try the request later when the primary server is up.                             |
| RLM_EL_BADHOST          | -43 | bad hostname in license file or port@host              | The hostname in the license file is not valid on this network.  |
| RLM_EL_APP_INACTIVE     | -44 | Application is inactive                                | Your application is set to the inactive state (with rlm_set_active(rh, 0), and you have called rlm_get_attr_health()).  |
| RLM_EL_NOT_NAMED_USER   | -45 | User is not on the named-user list                     | You are not on the named user list for this product.  |
| RLM_EL_TS_DISABLED      | -46 | Terminal server/remote desktop disabled                | The only available license has Terminal Server disabled, and the application is running on a Windows Terminal Server machine.   |
| RLM_EL_VM_DISABLED      | -47 | Running on Virtual Machines disabled                   | The only available license has virtual machines disabled, and the application is running on a virtual machine.  |
| RLM_EL_PORTABLE_REMOVED | -48 | Portable hostid removed                                | The license is locked to a portable hostid (dongle), and the hostid was removed after the license was acquired by the application.  |
| RLM_EL_DEMOEXP          | -49 | Demo license has expired                               | Detached Demo <sup>™</sup> license has expired.   |
| RLM_EL_FAILED_BACK_UP   | -50 | Failed host back up - failover server released license | If you application is holding a license from a failover server, when the main server comes back up, the failover server will drop all the licenses it is serving, and you will get this status.   |
| RLM_EL_SERVER_LOST_XFER | -51 | Server lost it's transferred license                   | Your license was served by a server which had received transferred licenses from another license server. The originating license server may have gone down, in which case, your server will lose the licenses which were transferred to it. |
| RLM_EL_BAD_PASSWORD     | -52 | Incorrect password for                                 | RLM_EL_BAD_PASSWORD is an internal error and won't ever be returned to the client - if  |

|                         |     |                                   |   |
|-------------------------|-----|-----------------------------------|---|
|                         |     | product                           | the license password is bad, the client will receive RLM_EL_NO_SERV_SUPP  |
| RLM_EL_METER_NO_SERVER  | -53 | Metered licenses require server   | Metered licenses only work with with a license server.  |
| RLM_EL_METER_NOCOUNT    | -54 | Not enough count for meter        | There is insufficient count in the meter for the requested operation.   |
| RLM_EL_NOROAM_TRANSIENT | -55 | Roaming not allowed               | Roaming is not allowed on servers with transient hostids, ie, dongles.  |
| RLM_EL_CANTRECONNECT    | -56 | Can't reconnect to server         | On a disconnected handle, the operation requested needed to reconnect to the server, and this operation failed.           |
| RLM_EL_NONE_CANROAM     | -57 | None of these licenses can roam   | The license max_roam_count is set to 0. This will always be the case for licenses that are transferred to another server. |
| RLM_EH_SERVER_TOO_OLD   | -58 | Server too old for this operation | In v10, this error means that disconnected operation (rlm_init_disconn()) was attempted on a pre-v10.0 license server.    |

# RLM Version History

## V12.2 - Feb, 2017

| Features Added  |
|---|
| primary_server spec in rlm_failover_server license can now omit port-number   |
| Illegal character restriction in customer= field relaxed                      |
| UUID hosids (windows)   |
| rlmstat now accepts the “-I” switch, to display ISV-defined data              |
| The report log INUSE records now include the share handle for shared licenses |

## V12.1 - April, 2016

| Features Added  |
|---|
| -l switch to only allow local command-line utilities                    |
| License transfers now use hostname-RLM-Transfer as user and isv strings |
| RLM comm protocol optimized   |
| ISV servers log “server time jump” message                              |
| RLM removes all white space from usernames and hostnames                |
| PURGE_REPORTLOG option added  |

## V12.0 - December, 2015

| Features Added  |
|---|
| The install windows service menu item in the rlm web interface is removed |
| Licenses sorted by _id  |
| Servers log expired licenses on startup                                   |
| Install service command takes -user and -password                         |

## V11.3 - April, 2015

| Features Added |
|----------------|
|----------------|

|  |
|--|
| Application PID added to DENY records in the reportlog   |
| In rlm web interface and rlmstat, the field previously labeled "transactions" is now labeled "checkouts" |

## V11.2 - November, 2014

| Features Added  |
|---|
| Version restrictions on roaming data have been relaxed to allow the “oldest compatible” roam file to be used. As of 11.2, the oldest compatible roam file is 11.0 |
| Client-cached licenses can now be roamed before the end of the cache period.  |

## V11.1 - June, 2014

| Features Added   |
|--|
| RLMid1 dongles now supported on linux (x86_12, x64_11)                                 |
| Setting RLM_ROAM=today causes a roam to end today at midnight                          |
| Licenses now have an optional _id= parameter to identify for options file use          |
| For metered licenses, the user can now decrement the counter in the rlm web interface. |
| RLM now supports Google Compute Engine hostids (gc=)                                   |

## V11.0 - February, 2014

| Features Added                            |
|---|
| Ipv6 support                              |
| akey= license attribute                   |
| Windows clients auto-detect proxy servers |

## V10.1 - July, 2013

| Features Added |
|----------------|
|----------------|

|   |
|---|
| CLIENT_CACHE license admin option added |
| Server logs unreadable license files    |

## V10.0 - Jan, 2013

| Features Added  |
|---|
| Disconnected server-server license transfer   |
| RLM will now broadcast to find a server on the local network.                           |
| Roaming is disabled if the license server uses a transient hostid                       |
| rlm web interface now supports user login, with access rights.                          |
| rlm web interface only displays commands which the user can execute.                    |
| rlm web interface doesn't display "Manage Windows Service" on non-Windows systems       |
| If rlm processes multiple license files, it will attempt to find a good ISV server path |
| Browsers connecting on rlm's main port are redirected to the webserver port             |
| Report log logs all licenses in use both at start and at the end.                       |
| Roamed license time extension logged in report log (and debug log)                      |
| RLM web interface allows editing license files  |
| RLM checks that the debug log is writable when installing service                       |
| INTERNET_GROUP option   |

## v9.4 - July, 2012

| Features Added  |
|---|
| Hostname hostid types now accept wildcards  |
| RLM utilities now accept the -z password option   |
| When installing RLM as a service on Windows, the installation now starts and stops the service to trigger firewall prompts. |

## v9.3 – February, 2012

| Features Added   |
|--|
| Client-side diagnostics now list all embedded string licenses in addition to other node-locked licenses. |
| Server-side diagnostics now output the rlm and isv server option file info.                              |

|   |
|---|
| RLM now enumerates the ethernet devices on linux rather than using eth0-7 |
|---|

## v9.2 - September, 2011

| Features Added   |
|--|
| disksn hostid (disk hardware serial number) added on Windows |
| License Passwords can now be specified on the ISV line       |
| “_primary_server” keyword added for rlm_failover licenses    |

## v9.1 - May, 2011

| Features Added  |
|---|
| Passwords on individual LICENSE lines                         |
| disable=TerminalServerAllowRD attribute                       |
| The LOGFILES privilege has been added to the RLM options file |

## v9.0 - December, 2010

| Features Added   |
|--|
| rlmstat reports on expiration dates  |
| New license checkout debugging capability/utility                                |
| Multiple GROUP lines now concatenate in OPTIONS files                            |
| Checkout records in the debug log now contain information on roaming licenses)   |
| RLM servers log information about which licenses were replaced (in the debug log |
| new ISV line format with optional keyword=value parameters                       |
| The REMOVE privilege has been added to the RLM options file.                     |
| rlm and ISV servers can now disable older versions of rlmutil                    |

## v8.0 - Jan, 2010

| Features Added   |
|--|
| Optimized license sharing  |
| client and server side diagnostics to aid solving problems                   |
| When running as a service, rlm changes working directory to binary directory |
| rlm logs the client machine's OS to the report log                           |
| rlm logs the client's argv[0] to the report log                              |

|   |
|---|
| rlm web interface shows all license file and log file paths                             |
| rlm web interface puts all activated license files into the directory specified with -c |
| single-quote and back-quote characters are now legal in license and option files        |
| max_roam_count license keyword  |

## v7.0 - June, 2009

| Features Added   |
|--|
| Server-Server license transfers                              |
| failover servers no longer pool licenses from failed servers |
| license line checksum (_ck=)                                 |
| RLM_EL_FAILED_BACK_UP status when failed server restarts     |

## v6.0 - January, 2009

| Features Added  |
|---|
| Platform-independent ISV server settings and the Generic ISV server |
| rlmid2 hardware key   |
| ISV servers increase their open file limit                          |
| ISV lockfile in C:\rlm removed                                      |
| port@host can be specified as host@port                             |
| RLM_LICENSE environment and the -c option can contain directories   |
| RLM default port # changed from 28000 to 5053                       |
| RLM admin port # changed from 9000 to 5054                          |
| UPGRADE licenses  |
| min_checkout  |

## v5.0 - May, 2008

| Features Added  |
|---|
| Serial Number hostid type   |
| rlmID1 hardware key   |
| hostid lists  |
| ISV servers don't exit on reread if no license file exists              |
| Virtual machine detection in ISV servers                                |
| disable= now accepts VM keyword to disable licenses on Virtual Machines |
| refresh buttons added to web interface                                  |
| options= license attribute  |
| multiple instances of a single ISV-defined hostid type allowed          |
| license administration NOPROJECT keyword for EXCLUDE and EXCLUDEALL     |
| At least 5 IP addresses now supported for hostids (previously only one) |

|  |
|--|
| The rlmver command-line utility has been removed |
|--|

#### v4.0 - December, 2007

| Features Added   |
|--|
| report log anonymizer (rlmanon) added                                  |
| rlm web interface allows editing option files                          |
| rlm web interface displays debug log                                   |
| report log detailed format adds seconds, tenths of seconds for Denials |
| Automatic report log rotation  |
| rlm options file controls access to administration functions           |
| RLM web interface displays recent debug log information                |
| RLM web interface allows editing server options file                   |
| RLM_ROAM no longer needs to be set on the disconnected system          |
| -c overrides RLM_LICENSE for rlmutil                                   |
| Named User licensing   |
| <b>disable=TerminalServer</b> license attribute                        |
| multiple ethernet device support on linux and mac                      |
| ethernet address is default hostid on linux and mac                    |
| Windows volume serial number hostid added                              |
| Windows volume serial number is default hostid                         |

#### v3.0 - June, 2007

| Features Added  |
|---|
| Internet Activation   |
| rlm -dat command-line option  |
| rlmtests performance tests  |
| rlm servers ignore hostnames in license file                              |
| The rlm web interface now reports the Process ID (PID) of licenses in use |
| rlm logs status requests in the debug log                                 |
| client node can access license server by any name                         |
| ISV server pathname optional on ISV line                                  |
| RLM_CONNECT_TIMEOUT environment variable                                  |
| RLM_EXTENDED_ERROR_MESSAGES environment variable                          |
| maximum license share count   |
| _line_item license keyword  |
| license in a string   |
| improved error messages in web interface and rlm sign                     |

|  |
|--|
| PID of process using license is displayed in web interface |
| Wildcards allowed in IP addresses used as a hostid         |

## v2.0 - Dec, 2006

| Features Added   |
|--|
| Failover License Servers                               |
| Token-based licensing                                  |
| user/host based licenses                               |
| Nodelocked, single-use licenses (no server)            |
| options to disable rlmdown and rlmremove               |
| RLM_PATH_RANDOMIZE environment variable                |
| ISV servers notify of licenses expiring within 14 days |
| rlm binds all TCP/IP ports in all license files        |
| rlm -c license_file command-line option                |
| rlm runs as a service on Windows                       |
| rlmstat -avail reports on license availability         |
| transient attribute on ISV-defined hostids             |
| System Info in rlm web interface                       |
| min_remove license keyword                             |
| rlm_products() API call                                |
| rlm_log(), rlm_dlog() API calls                        |
| PRIORITY license administration option                 |
| TIMEZONE license administration option                 |
| MAX accepts '*' for all users                          |
| license administration license management by PROJECT   |
| MINREMOVE license administration option                |

## v1.1 - July, 2006

| Features Added              |
|-----------------------------|
| Held licenses               |
| Shared licenses             |
| License Replacement         |
| License timeout             |
| Roaming licenses            |
| Intelligent license queuing |
| ISV-defined hostids         |
| contract= license attribute |

|                               |
|-------------------------------|
| customer= license attribute   |
| issued= license attribute     |
| issuer= license attribute     |
| platforms= license attribute  |
| soft_limit= license attribute |
| start_date= license attribute |
| timezone= license attribute   |
| type= license attribute       |

**v1.0 - May, 2006**

This version contains the basic RLM functionality:

| Features                                |
|---|
| Node-locked licenses                    |
| Floating licenses                       |
| Expiration dates                        |
| Transparent multiple server connections |
| Public-Key authentication               |

# Revision History

**v12.1 – June, 2016 – v12.1 release (BL2)**

**v12.0 – December, 2015 – v12.0 release (BL2)**

**v11.3 – April, 2015 – v11.3 release (BL1)**

**v11.2 – November, 2014 – v11.2 release (BL2)**

**v11.1 – June, 2014 – v11.1 release (BL2)**

**v11.0 – Feb, 2014 – v11.0 release (BL2)**

**v10.1 – July, 2013 – v10.1 release (BL2)**

**v10.0 – Jan 16, 2013 – v10.0 release (BL2)**

**v9.4 – July 24, 2012 – v9.4 release (BL2)**

**v9.3 – February 15, 2012 – v9.3 release (BL2)**

**v9.2 – 28-Sept-2011 - v9.2 release (BL2)**

**v9.1 – 2-May-2011 - v9.1 release (BL3)**

**v9.0 – 15 -Dec-2010 - v9.0 release (BL2)**

**v8.0 - 26-Jan-2010 - v8.0 release (BL3)**

**v7.0 - 11-Jun-2009 - v7.0 release (BL3)**

**v6.0 - Jan-2009 - v6.0 release (BL2)**

**v5.0 - 1-Jul-2008 - v5.0 release (BL2)**

**v4.0 - 18-Jan-2008 - v4.0 release (BL4)**

**v3.0 - 24-Jul-2007 - v3.0 release (BL3)**

**v2.0 - 13-Dec-2006 - v2.0 release (BL4)**

**v1.1 - 31-Jul-2006 - v1.1 release (BL4)**

**v1.0 - 8-May-2006 - v1.0 release**