FlexNet Publisher 2022 R3 (11.19.2) Release Notes

October 2022
Revision 01

Introduction

This Release Notes document summarizes the features, enhancements, and updates delivered with FlexNet Publisher 2022 R3 (11.19.2) 2022.10 in October 2022. The document includes the following information:

- Enhancements
- Security Updates
- Dongle Updates
- Platform Updates
- Resolved Issues
- Known Issues
- System Requirements
- Deprecated Features and Commands
- Legal Information

Enhancements

This release includes the following enhancements:

- New lc_dupuserlist API
- New Obfuscation Mechanism for Client and Server Communication

New lc_dupuserlist API

A new **lc_dupuserlist** API has been introduced which updates duplicate grouping information for a particular feature.

(Case 01755739, FNP-20097)

New Obfuscation Mechanism for Client and Server Communication

A new obfuscation mechanism has been introduced for the communication between the license server and clients. The FlexNet Publisher utilities also support the new obfuscation mechanism, with the exception of `lmadmin`. For seamless communication between `lmadmin` and the vendor daemon, the encryption level should not be greater than `permissive`.

The new obfuscation mechanism can be controlled using the following:

- lmgrd Command-Line Argument "-m"
- New Vendor Variable "ls_message_security"
- New Vendor Variable "ls_ignore_msg_encryption"

lmgrd Command-Line Argument "-m"

Use the command-line argument `-m` with one of the following values to activate/enforce obfuscation:

Value	Description
disabled	Message obfuscation is disabled. The license server ignores the obfuscation mechanism for the communication.
permissive	Message obfuscation is enforced only if it is supported by the client.
targeted	Message obfuscation is enforced only for the targeted messages that share the license file information with the clients. Requests sent by clients without message obfuscation are rejected. Communication with utilities must be obfuscated. For a list of APIs affected by the argument `targeted`, see the table in section New Vendor Variable "ls_ignore_msg_encryption".
enforcing	Message obfuscation is enforced on all new style messages.

If the argument `targeted` or `enforcing` is set, FlexNet Publisher clients or utilities prior to version 11.19.2 (2022 R3) can not communicate with the license server because they don't support the obfuscation mechanism.

For information about backward compatibility for older clients (prior to release 11.19.2), see New Vendor Variable "ls_ignore_msg_encryption".

New Vendor Variable "ls_message_security"

This variable sets the level for the message obfuscation on the vendor daemon side. This corresponds to the `lmgrd` command-line parameter `-m`.

Variable Setting	Description
none	The security level is set by `lmgrd` or, failing that, disabled.
disabled	No message body obfuscation and sequencing checks are performed (default).
permissive	Message body obfuscation is enforced if supported. No sequencing checks are performed.
targeted	Message body obfuscation and sequencing is enforced for certain messages.
enforcing	Message body obfuscation and sequencing is enforced.

At runtime, the vendor daemon sets the value equivalent to the `lmgrd` command line argument `-m`, if set for `lmgrd`. Otherwise, the variable is set to `disabled` (default value). The value `none` can be overwritten by the `-m` argument.

Example:

```
LM_MSG_SEC ls_message_security = LM_MSG_SEC_NONE;
```

New Vendor Variable "ls_ignore_msg_encryption"

Use `ls_ignore_msg_encryption` to disable message obfuscation for certain APIs and attributes (listed in the table below) that share license file contents. This vendor variable enables backward compatibility for older clients (before FlexNet Publisher 11.19.2) that do not support message obfuscation. It will be applied to all the clients, if set.

This variable is only applied if message obfuscation is set to `targeted` with the `lmgrd` command line argument `-m` or the vendor variable `ls_message_security`.

Variable Setting	Description
LM_IGNORE_MSG_ENCRYPT_DISABLED	Message obfuscation enabled for all messages (default)
LM_IGNORE_FEAT_LIST_API	Message obfuscation disabled for `lc_feat_list`
LM_IGNORE_NEXT_CONF_API	Message obfuscation disabled for `lc_next_conf`
LM_IGNORE_GET_CONFIG_API	Message obfuscation disabled for `lc_get_config`
LM_IGNORE_USERLIST_API	Message obfuscation disabled for `lc_userlist`
LM_IGNORE_CHECKOUTFILTER_ATTR	Message obfuscation disabled for `LM_A_CHECKOUTFILTER`
LM_IGNORE_CHECKOUTFILTER_EX_ATTR	Message obfuscation disabled for `LM_A_CHECKOUTFILTER_EX`
LM_IGNORE_CHECKOUTFILTERLAST_EX_ ATTR	Message obfuscation disabled for `LM_A_CHECKOUTFILTERLAST_EX`

Example

The following setting disables message obfuscation for `lc_feat_list` and `LM_A_CHECKOUTFILTER`:

```
ls_ignore_msg_encryption = (LM_IGNORE_FEAT_LIST_API | LM_IGNORE_CHECKOUTFILTER_ATTR) ;
```

(Case 02548612, FNP-26612)

Security Updates

This release includes the following security updates:

- Third-Party Library Updates
- Protection of Binaries

Third-Party Library Updates

OpenSSL

OpenSSL has been upgraded from v1.1.1n to v1.1.1q.

(FNP-26868)

libxml2

The libxml2 library has been upgraded from v2.9.13 to v2.9.14.

(FNP-26867)

Apache HTTP

Apache http has been upgraded from v2.4.52 to v2.4.54.

(Case 02572576, FNP-26891)

libexpat

libexpat has been upgraded to 2.4.9.

(FNP-27546)

Protection of Binaries

Modifications have been made to the FlexNet Publisher code-base to better protect binaries from hostile modifications of error return values.

(Case 02460311, FNP-25723)

Dongle Updates

This section lists the dongle drivers that have been updated in this release.

SafeNet Dongle Drivers

SafeNet dongle drivers have been upgraded to version 8.43.

Platform Updates

This section lists platform updates for the following releases:

- 11.19.2 Updates
- 11.19.1 Updates
- 11.19.0 Updates
- 11.18.3 Updates

11.19.2 Updates

Updates have been made in the following areas for FlexNet Publisher 11.19.2:

- Integrated Products and Tested Versions
- Windows OS
- macOS
- Linux OS
- Oracle Java
- Browsers

Integrated Products and Tested Versions

The following table lists the integrated products and tested versions for this release.

Product	Tested Version
FlexNet Operations	FlexNet Operations 2020.01 (20.1.0)
FlexNet Manager for Engineering Applications	FlexNet Manager for Engineering Applications 2021 R1 (15.12.0)
FlexNet Operations Cloud	FlexNet Operations Cloud 2022.09 (22.9.34)

Windows OS

End of Life Windows 7 ESU

FlexNet Publisher no longer supports the Windows 7 ESU platform from Flexnet Publisher release R3, 2022, onwards.

End of Life Windows Server 2016

FlexNet Publisher no longer supports the Windows Server 2016 platform from Flexnet Publisher release R3, 2022, onwards.

macOS

End of Life macOS 10.15

macOS 10.15 (x64_mac10-11.19.3.0_v6.tar.gz) is no longer supported.

Linux OS

Support for RHEL 9

In RHEL9, the LSB component is not offered as part of the supported distribution. Components in FlexNet Publisher, such as lmgrd, require the LSB-loader. If this is not present, lmgrd and other utilities will fail to run with a `No such file or directory` error.

As a workaround, specify a soft link to the native loader. The following symlinks have been verified on RHEL9:

32-bit Linux

```
sudo bash -c "if [ ! -e /lib/ld-lsb.so.3 ]; then ln -s ld-linux.so.2 /lib/ldlsb.so.3; fi"
```

64-bit Linux

```
sudo bash -c "if [ ! -e /lib64/ld-lsb-x86-64.so.3 ]; then ln -s ld-linux-x86-64.so.2 /
lib64/ld-lsb-x86-64.so.3; fi"
```

From 11.13.1.3, the `install_fnp.sh` script will issue a warning if LSB is not detected on the host.

Additionally, this script supports a new `-nolsb` parameter, which sets up the above symlinks.

Oracle Java

End of Support Oracle Java 8

FlexNet Publisher no longer supports Oracle Java 8 from Flexnet Publisher release R3, 2022, onwards.

Browsers

End of Life Microsoft Internet Explorer 11

FlexNet Publisher's `lmadmin` no longer supports the Windows Web browser Microsoft Internet Explorer 11 from Flexnet Publisher release R3, 2022, onwards.

11.19.1 Updates

Updates have been made in the following areas for FlexNet Publisher 11.19.1:

- Integrated Products and Tested Versions
- Windows OS
- Oracle
- lmadmin
- macOS

Integrated Products and Tested Versions

The following table lists the integrated products and tested versions for this release.

Product	Tested Version
FlexNet Operations	FlexNet Operations 2020.01 (20.1.0)
FlexNet Manager for Engineering Applications	FlexNet Manager for Engineering Applications 2021 R1 (15.12.0)
FlexNet Operations Cloud	FlexNet Operations Cloud 2022.4 (22.4.41)

Windows OS

End of Life Windows Server 2016

FlexNet Publisher no longer supports the Windows Server 2016 platform from Flexnet Publisher release R3, 2022, onwards.

New FlexNet Publisher Windows kit

A new 64-bit Windows FlexNet Publisher kit has been introduced with suffix _vc16. FlexNet Publisher still supports the default 32-bit & 64-bit Windows FlexNet Publisher kit without the suffix _vc16.

After FlexNet Publisher release R3, 2023, the 32-bit FlexNet Publisher Windows kit will not be packaged.

Oracle

End of Life Oracle 8 Support

FlexNet Publisher provides limited support for Oracle 8 in Flexnet Publisher release R2, 2022.

Oracle 8 is no longer supported from Flexnet Publisher release R3, 2022, onwards.

lmadmin

End of Life lmadmin 32-bit

The 32-bit Windows lmadmin will no longer supported from Flexnet Publisher release R2, 2022, onwards. After FlexNet Publisher release R3, 2023, lmadmin will only be available in 64-bit mode.

macOS

End of Life macOS 10.14

macOS 10.14 is no longer supported from Flexnet Publisher release R2, 2022, onwards.

11.19.0 Updates

Updates have been made in the following areas for FlexNet Publisher 11.19.0:

- Integrated Products and Tested Versions

- Windows OS

- macOS

Integrated Products and Tested Versions

The following table lists the integrated products and tested versions for this release.

Product	Tested Version
FlexNet Operations	FlexNet Operations 2020.01 (20.1.0)
FlexNet Manager for Engineering Applications	FlexNet Manager for Engineering Applications 2021 R1 (15.12.0)
FlexNet Operations Cloud	FlexNet Operations Cloud 2022.1 (22.1.29)

Windows OS

Support for Windows 11 OS

In this release, FlexNet Publisher supports Windows 11 (x64_n6, i86_n3).

Support for Visual Studio 2022

In this release, FlexNet Publisher supports Visual Studio 2022.

macOS

Support for macOS 12.0 Monterey

In this release, FlexNet Publisher supports Universal2 kit for macOS 12.0 Monterey (x86_64, ARM64).

(FNP-25505)

11.18.3 Updates

Updates have been made in the following areas for FlexNet Publisher 11.18.3:

- Integrated Products and Tested Versions
- Windows OS
- macOS

Integrated Products and Tested Versions

The following table lists the integrated products and tested versions for this release.

Product	Tested Version
FlexNet Operations	FlexNet Operations 2020.01 (20.1.0)
FlexNet Manager for Engineering Applications	FlexNet Manager for Engineering Applications 2020 R1 (15.11.0)
FlexNet Operations Cloud	FlexNet Operations Cloud 2021.11 (21.11.58)

Windows OS

Support for Windows Server 2022 OS

In this release, FlexNet Publisher supports Windows Server 2022 (x64_n6, i86_n3).

macOS

Support for macOS 12.0 beta Monterey

In this release, FlexNet Publisher supports Universal2 kit for macOS 12.0 beta Monterey (x86_64, ARM64).

(FNP-25505)

Resolved Issues

This release of the FlexNet Publisher Licensing Toolkit resolves the following issues. (Numbers in parentheses indicate the Revenera issue reference number as well as the Salesforce reference number, if applicable.)

- Resolved lmadmin, lmgrd, Vendor daemon, and Utility Issues
- Resolved Issues between Client and License Server
- Resolved Issues Specific to Secure Communication

Resolved lmadmin, lmgrd, Vendor daemon, and Utility Issues

The following issues related to lmadmin, lmgrd, the vendor daemon, and utilities were addressed in this release.

- Resolved License Checkout Issue
- Conflict with Windows Library libpthread.lib Linked with LIBCMT
- License Borrowing When Expiry Date is "0000"
- Checkout of Licenses With Future Start Date Now Behaving as Expected
- Server Log No Longer Lists Duplicate Hostids
- Improved Behavior for Reserving Licenses

Resolved License Checkout Issue

In previous releases, license checkout with borrow could potentially give unexpected results, especially when running multiple clients on the same host machine.

The problem has now been resolved by introducing locking to the borrow cache.

A new error code has been added, `LM_BORROW_CACHE_LOCK_FAILED`, which is returned if the locking mechanism fails.

Note ▪ *This fix has not yet been incorporated into the NOMT library.*

(Case 02454995, FNP-25705)

Conflict with Windows Library libpthread.lib Linked with LIBCMT

In earlier Windows kits, the "libpthread.lib" library was linked with the LIBCMT library. This issue has been rectified and the "libpthread.lib" library is not linked with any default runtime library now.

(Cases 02434636, 02441728; FNP-25352)

License Borrowing When Expiry Date is "0000"

Previously, it was not possible to borrow licenses for features where the expiry date had a "year" value of `0000` (for example, `1-jan-0000`).

In this release, license features can be borrowed if the year of the expiry date is 0, 00, 000, or 0000. In these cases, the license expiry period is the equivalent to using the keyword `permanent`.

(Case 02537172, FNP-26484)

Checkout of Licenses With Future Start Date Now Behaving as Expected

Licenses generated with `LM_BEHAVIOR_V5_1` crypt with a start date between 31-dec-2027 and 31-dec-2038 (inclusive) could be erroneously checked out, despite their start date being in the future.

This issue has now been fixed. In addition, the support for future start dates has been extended to 31-Dec-2099.

(Case 01987029, FNP-25634)

Server Log No Longer Lists Duplicate Hostids

On Windows platforms, the server log previously listed duplicate server hostid under `HostID of the License Server`. This issue has been resolved and the server log no longer includes duplicate hostids.

Also, the maximum number of hostids to be retrieved has been increased from 10 to 32 to ensure that all (or the maximum number of) possible valid hostids are identified and listed in the server log during the license server startup.

(Case 02572907, 02581133; FNP-25945)

Improved Behavior for Reserving Licenses

In previous versions, when some of the existing licenses were reserved for a particular user and another user tried to check out a count of licenses that exceeded the remaining available count, the latter user would be queued indefinitely.

This issue no longer occurs. Instead of queueing a user indefinitely, the license server now denies the request and the checkout fails with the error code `LM_MAXUSERS`.

(Case 01839677, FNP-20959)

Meaningful lmtools Error Messages

lmtools now displays more meaningful error descriptions for errors that occur during the startup of lmgrd.

(Case 02440344, FNP-27016)

Resolved Issues between Client and License Server

The following issue related to the client and license server was resolved in this release:

- No Interleaving of Log Messages

No Interleaving of Log Messages

The server debug log functionality has been enhanced to ensure that there is no interleaving of lmgrd and vendor daemon log messages during server shutdown (or in the other normal scenarios during server startup and server running stages).

(Case 02449314, FNP-25772)

Resolved Reconnection Issue

In specific scenarios, the heartbeat thread of the client was not working as expected and therefore the client did not check its connectivity to the server according to the configured intervals. This in turn resulted in the client not attempting to re-establish a connection to the server, even if the server went down.

This issue has now been fixed.

(FNP-27375)

Resolved Issues Specific to Secure Communication

The following issues related to secure communication was resolved in this release:

- Redundant Reconnections with Node-locked Features

- Max Connection

Redundant Reconnections with Node-locked Features

Previously, when the communication between the client and the vendor daemon was encrypted using secure communication (vendor daemon variable is `int ls_secure_comms = 1;`) and the client consumed a node-locked feature, the client subsequently re-established the connection with the license server every 4 minutes. This reconnection caused an interruption in the license usage for existing clients, because the license was checked in and out again.

In this release, such reconnections no longer occur. Licenses are only checked in when the client returns the license.

(FNP-26916)

Max Connection

Vendor daemon established extra connections than mandated with MAX_CONNECTIONS options file keyword. The issue was only observed when client established connection on the secure channel. This issue has been fixed.

Client using secure communication will consume an extra connection from MAX_CONNECTIONS count.

(FNP-26611)

Known Issues

This release includes known issues in the following categories:

- Known General Issues

- Known Dongle Issues

- Known lmadmin Issues

- Known Issue between Client and License Server

- Known Issues Specific to License File–Based Licensing

- Known Issues Specific to Trusted Storage–Based Licensing

- Known Java Issues

- Known Issues Specific to Secured Communication

Known General Issues

Build Failure in macOS 12.5 and 12.6 Kits

A build failure is observed when building the kit for `makefile.act` in macOS 12.5 and 12.6.

(FNP-27500)

Known Dongle Issues

Backward Compatibility Issue Due to the New Signer

As the dongle drivers are upgraded for Wibu from v6.51 to v6.60., the dll signature issuer name is changed from "Symantec" to "DigiCert" on Windows. The same is fixed in FlexNet Publisher's code to handle the new signer. Due to this change, backward compatibility is not possible. If you install latest drivers, old clients will not be able to retrieve the dongle ID.

(FNP-26594)

Flexid10 Dongle Driver Issue

FLEXID10 dongles may not work correctly with the latest v6.50 driver on VMware hypervisors. This issue has been identified on both Windows and Linux platforms with a dongle connected using a USB passthrough on VMware ESXi and on VMware Workstation. The problem has been reported to Wibu. As a temporary workaround, use the previous version v6.32 driver on VMware hypervisors.

(FNP-17284, FNP-16819)

Wibu Dongle Driver Issue

An error occurs on SUSE 11 SP4 Linux machine while installing a new Wibu dongle driver (V6.50). The problem has been reported to Wibu. As a temporary workaround, use the previous version v6.40 driver.

(FNP-20298)

Dongles in Universal2 Kit

Dongles are not supported in the Universal2 Kit.

(FNP-24876)

Known lmadmin Issues

Lmadmin Silent Installer not Displaying Required Error Message

When a non-root user attempts to install `lmadmin` in the default location, the installer may hang.

(FNP-6942)

Unable to Start Lmadmin Services Using CLI in Windows Server 2022

The lmadmin services created on Windows 2022 machine is unable to start using command prompt.

(FNP-26481)

Lmadmin Login Error Observed in Windows Server 2022

While logging in to lmadmin in Windows Server 2022 the error "Old password is incorrect" is seen.

(FNP-26482)

Known Issue between Client and License Server

Log File Created Only in Working Directory

On Linux, when the vendor daemon did not exist in working directory and the server was started by appending the path variable where the vendor daemon exists, the log file is created in the working directory rather than the directory specified in the path. The workaround has been provided for this issue and it will be fixed in the subsequent FlexNet Publisher release.

Workaround

For this issue, mention the location of the vendor daemon in the VENDOR line of the license file as VENDOR demo <directory name>/demo. If you have created sub directory, mention the vendor daemon location as VENDOR demo <directory name>/<sub directory name>/demo.

(FNP-25708)

Known Issues Specific to License File–Based Licensing

lmdiag Displaying Incorrect Output when Multiple Vendors are Served by a Single License Server Manager

If multiple vendor daemons are served by a single license server manager (such as lmgrd), lmdiag shows an incorrect error message "No such feature exists" for features that are served by one of the valid daemons.

(FNP-19617; Salesforce case 01202287)

"MAX_CONNECTIONS" Option File Keyword

If a software publisher upgrades only lmgrd and vendor daemon to version 11.16.3 or above, but not the client, the error code that would be received by an older version (version < 11.16.3) client, when MAX_CONNECTIONS limit is exceeded is as follows:

"LM_BADCOMMAND" Error code: "-140" - "A bad command was found in a message".

(FNP-20537)

Known Issues Specific to Trusted Storage–Based Licensing

Error Observation in macOS Big Sur ARM Platform

While building the FlexNet Publisher universal2 kit on macOS Big Sur ARM platform, the following error has been observed:

dyld: Library not loaded: `libresponsegen.dylib`

Referenced from: `/Users/nightly/<user>/universal2/unchanged/universal2_mac11/publisher/./responsegenapi`

Reason: unsafe use of relative `<user>` `libresponsegen.dylib` in `/Users/nightly/<user>/universal2/unchanged/universal2_mac11/publisher/./responsegenapi` with restricted binary

Abort trap: 6 running the responsegenapi, the error has been observed. Suggesting to rebuild the utility with the `makefile.act` provided in the kit on ARM platform for macOS Big Sur machine.

When you get this error on running the responsegenapi, rebuild the responsegenapi executable using the `makefile.act` provided in the FlexNet Publisher kit.

(FNP-23847)

Known Java Issues

Error Observation with JDK 17.0.1 During lmadmin Installation

Error is observed while installing lmadmin installer in Windows with and without "Run as service" option with JDK 17.0.1. This issue is observed on all windows OS's.

(FNP-26351)

Issue in lmadmin Installation with JDK 17.0.2 and OpenJDK 17.0.2

With JDK 17.0.2 and OpenJDK 17.0.2, lmadmin installer exits with error "This Application has Unexpectedly Quit". This issue is observed on Windows 11 and Windows Server 2022.

(FNP-26476)

Known Issues Specific to Secured Communication

The following issues observed when secure communication has been enabled in between FlexEnabled client and vendor daemon. These issues will be resolved in the future releases of FlexNet Publisher.

● On Windows, the triad configuration with secure communication enabled goes down, if any one of the servers in triad is shutdown/restarted.
(FNP-26640)

● When multiple vendors run with secure communication enabled under one lmgrd, the secure checkout is possible only for last secured vendor daemon.
(FNP-26989)

System Requirements

The System Requirements include the following:

- Tested Platforms
- System Requirements for lmadmin

Tested Platforms

The following sections describe the platforms tested with the FlexNet Publisher 2022 R3 (11.19.2) Licensing Toolkits.

- C/C++ Toolkits
- Java Toolkits
- Detailed Platform Information
- Toolkits that Support Prepped Trusted Configuration
- Virtualization
- Tested Cloud Environments

A list of supported platforms can be found here:
https://docs.revenera.com/eol/

C/C++ Toolkits

The following platforms are tested. See the Detailed Platform Information section for more information about each platform.

Table 1 ▪ Tested Platforms—C/C++ Toolkits

Platform Type	Hardware Type	Operating System
AIX 32-bit	PowerPC	AIX 7.1 and 7.2
AIX 64-bit	PowerPC	AIX 7.1 and 7.2
HP-UX 64-bit	Intel Itanium	HP-UX B.11.31 U ia64
Linux 32-bit	x64	RHEL 9
		RHEL 8
		RHEL 7
		SLES 12 SP5

Table 1 ▪ Tested Platforms—C/C++ Toolkits

Platform Type	Hardware Type	Operating System
Linux 64-bit	x64	RHEL 7, 8, and 9
		* SLES 12 SP4 and SLES 15 SP1, SLES 12 SP5, * SLES 15, SLES 15 SP1, SLES 15 SP2, and SLES 15 SP3
		Ubuntu 18.04, 20.4, and 22.04
Linux 64-bit	ARMv8-A (AArch64)	RHEL 8
		SLES 15
macOS/OS X 64-bit	x64	macOS 10.15
		macOS 11.1
		macOS 12.1
macOS ARM 64-bit	ARM-64	macOS 11.4
		macOS 12.1
Microsoft Windows 32-bit	x64	Windows Server 2019
		Windows Server 2022
		Windows 10
		Windrows 11
Microsoft Windows 64-bit	x64	Windows 10
		Windows 11
		Windows Server 2019
		Windows Server 2022
		It is a best practice to run license servers on a server-based OS.
Solaris 32-bit	SPARC 32-bit	Solaris 10 and 11
	x86	
Solaris 64-bit	SPARC 64-bit	Solaris 10 and 11
	x86-x64	

Note ▪ The asterisk (*) symbol indicates that the version of the operating system is supported and not tested in the current release.

Java Toolkits

The following platforms have been tested. See Java Standard Edition in Detailed Platform Information for more information about this platform.

Table 2 ▪ Tested Platforms—Java Toolkits

Platform Type	Hardware Type	Version
Oracle Java Development Kit	● Solaris SPARC 32-bit ● Solaris SPARC 64-bit ● Windows x86 ● Windows x64 ● Linux x86 ● Linux x64 ● macOS x64	Java Standard Edition 1.11 JDK 17

Detailed Platform Information

The following sections list the operating systems and their associated hardware platforms tested with FlexNet Publisher 2022 R3 (11.19.2). Each platform entry contains the following information:

● **Platform name**—The name that identifies this platform when used with the PLATFORMS keyword in a license file.

● **Package identifier**—The name of the toolkit package on Revenera's download site.

● **Tested compiler**—The compiler and version with which this package was tested. Choose a compiler for your development and build environment that is compatible with the one listed.

● **Notes**—Additional platform-specific notes that are useful for developing your FlexEnabled product.

● **Security functionality**—Denotes the level of security functionality your toolkit supports. This information is useful when you implement trusted storage-based licensing in your product. See *Programming Reference for Trusted Storage–Based Licensing* for details.

Click a link to access platform details:

● Microsoft Windows 32-bit

● Microsoft Windows 64-bit

● Linux 32-bit

● Linux 64-bit

● ARMv8-A (AArch64)

● macOS/OS X 64-bit

● macOS ARM 64-bit

- Solaris 32-bit

- Solaris 64-bit

- AIX 32-bit

- AIX 64-bit

- Java Standard Edition

- HP-UX 64-bit

Microsoft Windows 32-bit

The following table lists information about the Microsoft Windows 32-bit systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	i86_n
Package Identifier	i86_n3
Tested Compiler	- Visual Studio 2019 (16.8.3) - Visual Studio 2017 (15.9.36) - Visual Studio 2015 Update 3 - Visual Studio 2013 Update 5 - Visual Studio 2022 (17.1.5)

Item	Description
Notes	`lmadmin` is supported in this toolkit. - Multiple Ethernet hostids are supported. - Short-code transactions are supported. - Prepped Trusted Configuration is supported. - Tested virtual machine platforms include: VMware Workstation 16.1.2 VMware ESXi 6.5 and 6.7 Microsoft Windows Server 2019 Hyper-V Microsoft Windows 10 Hyper-V Citrix XenServer 8.2 Oracle Virtual Box 6.1 Parallels Desktop 18.0.2 for macOS 12.6 everRun 7.9.1 QEMU-KVM (Host OS: CentOS 8) - Hypervisor: qemu-kvm-ev-6.2.0 - Hypervisor Services: libvirt-daemon-kvm-8.0.0 - Virtual Machine Manager: vmm v3.2.0
Toolkit Functionality	Licensing based on license files or trusted storage.
Security Functionality	Support for tamper-resistant applications. The toolkit is labeled as *standard*.

Microsoft Windows 64-bit

The following table lists information about the Microsoft Windows 64-bit systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	x64_n
Package Identifier	x64_n6

Item	Description
Tested Compiler	• Visual Studio 2019 (16.8.3) • Visual Studio 2017 (15.9.36) • Visual Studio 2015 Update 3 • Visual Studio 2013 Update 5 • Visual Studio 2022 (17.1.5)

Notes	• `lmadmin` is supported using its 64-bit binary. While the 32-bit `lmadmin` binary (contained in the x86_n3 toolkit) continues to be supported on 64-bit systems, Revenera recommends using the 64-bit binary on 64-bit systems.
	
	• Multiple Ethernet hostids are supported.
	
	• Short-code transactions are supported.
	
	• Prepped Trusted Configuration is supported.
	
	• The `lmtools` utility cannot interact with the license server manager (`lmgrd`) when `lmgrd` is run as a service.
	
	• Tested virtual machine platforms include:
	
	VMware Workstation 16.1.2
	
	VMware ESXi 6.5 and 6.7
	
	Microsoft Windows Server 2019 Hyper-V
	
	Microsoft Windows 10 Hyper-V
	
	Citrix XenServer 8.2
	
	Oracle Virtual Box 6.1
	
	Parallels Desktop 18.0.2 for macOS 12.6
	
	everRun 7.9.1
	
	QEMU-KVM (Host OS: CentOS 8)
	
	  • Hypervisor: qemu-kvm-ev-6.2.0
	  • Hypervisor Services: libvirt-daemon-kvm-8.0.0
	  • Virtual Machine Manager: vmm v3.2.0

Toolkit Functionality	Licensing based on license files or trusted storage.
Security Functionality	Support for tamper-resistant applications. The toolkit is labeled as *standard*.

Linux 32-bit

The following table lists information about the Linux 32-bit systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	i86_lsb
Package Identifier	i86_lsb
Tested Compiler	For x86: • gcc 11.2.1 (RHEL 9) • gcc 8.2.1 (RHEL 8) • gcc 4.8.5 (RHEL 7)
GLIBC Version	v2.12

Notes	• Customers can use any GCC that meets FlexNet Publisher's GLIBC version requirement.
	• FlexNet Publisher qualifies the default GCC version that comes with the OS.
	• `lmadmin` is supported using its 32-bit binary.
	• Multiple Ethernet hostids are supported.
	• Short-code transactions are supported.
	• Prepped Trusted Configuration is supported.
	• Tested virtual machine platforms include:
	VMware ESXi 6.5 and 6.7
	VMware Workstation 16.1.2
	Microsoft Windows Server 2019 Hyper-V
	Microsoft Windows 10 Hyper-V
	Citrix XenServer 8.2
	Oracle Virtual Box 6.1
	Parallels Desktop 18.0.2 for macOS 12.6
	everRun 7.9.1
	QEMU-KVM (Host OS: CentOS 8)
	  • Hypervisor: qemu-kvm-ev-6.2.0
	  • Hypervisor Services: libvirt-daemon-kvm-8.0.0
	  • Virtual Machine Manager: vmm v3.2.0

Toolkit Functionality	Licensing based on license files or trusted storage.

Item	Description
Security Functionality	Support for tamper-resistant applications. The toolkit is labeled as *standard*.

Linux 64-bit

The following table lists information about the Linux 64-bit systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	x64_lsb
Package Identifier	x64_lsb
Tested Compiler	For x64: • gcc 4.8.5 (RHEL 7) • gcc 8.2.1 (RHEL 8) • gcc 11.2.1 (RHEL 9) • gcc 7.3.1 (SLES 15) • gcc 7.4.1 (SLES 15 SP1) • gcc 7.5.0 (SLES 15 SP2) • gcc 7.5.0 (SLES 15 SP3) • gcc 4.8.5 (SLES 12 SP4) • gcc 7.3.0 (Ubuntu 18.04) • gcc 9.3.0 (Ubuntu 20.04)
GLIBC Version	v2.12

Item	Description

Notes	• Customers can use any GCC that meets FlexNet Publisher's GLIBC version requirement.
	• `lmadmin` is supported using its 64-bit binary.
	• Multiple Ethernet hostids are supported.
	• Short-code transactions are supported.
	• Prepped Trusted Configuration is supported (x64_lsb only).
	• No dongle support on SLES 15
	• Tested virtual machine platforms include:
	  VMware ESXi 6.5 and 6.7
	  VMware Workstation 16.1.2
	  Microsoft Windows Server 2019 Hyper-V
	  Microsoft Windows 10 Hyper-V
	  Citrix XenServer 8.2
	  Oracle Virtual Box 6.1
	  Parallels Desktop 18.0.2 for macOS 12.6
	  everRun 7.9.1
	  QEMU-KVM (Host OS: CentOS 8)
	    • Hypervisor: qemu-kvm-ev-6.2.0
	    • Hypervisor Services: libvirt-daemon-kvm-8.0.0
	    • Virtual Machine Manager: vmm v3.2.0

Toolkit Functionality	Licensing based on license files or trusted storage.
Security Functionality	Support for tamper-resistant applications. The toolkit is labeled as *standard*.

ARMv8-A (AArch64)

The following table lists information about the ARMv8-A (AArch64) systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	arm64_linux
Package Identifier	arm64_linux
Tested Compiler	• gcc 8.2.1 (RHEL 8) • gcc 7.3.1 (SLES 15)

Item	Description
GLIBC Version	v2.17
Notes	• Customers can use any GCC that meets FlexNet Publisher's GLIBC version requirement. • lmadmin is not supported in this toolkit • No VM detection or VMID hostid support • No dongle support • No trusted storage support
Toolkit Functionality	Licensing based on license files.
Security Functionality	No support for tamper-resistant applications. The toolkit is labeled as *notr*.

macOS/OS X 64-bit

The following table lists information about the macOS/OS 64-bit system tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	• x64_mac
Package Identifier	• x64_mac10
Tested Compiler	• Xcode 12.3 • Xcode 11.0 • Xcode 10.3 • Apple clang version 12.0.0 (clang-1200.0.32.28) • Apple clang version 11.0.0 (clang-1100.0.33.5) • Apple LLVM version 10.0.1 (clang-1001.0.46.4)
Notes	• Multiple Ethernet hostids are not supported. • Short-code transactions are supported. • Prepped Trusted Configuration is supported. • For building requirements, see Requirements for Building the macOS/OS X Licensing Toolkit.
Toolkit Functionality	Licensing based on license files or trusted storage.
Security Functionality	Support for tamper-resistant applications. The toolkit is labeled as *standard*.

Requirements for Building the macOS/OS X Licensing Toolkit

When building the FlexNet Publisher Licensing Toolkit on macOS/OS X platforms, use an appropriate Apple development environment: The supplied makefiles build a universal Licensing Toolkit that can be used to produce FlexEnabled applications of the following types (all contained within a single FAT binary):

- For macOS 10.15, use Xcode 12.3

- For macOS 11.4, use Xcode 12.4

- For macOS 12.1, use Xcode 13.0

Required macOS/OS X SDKs

An SDK appropriate to the macOS/OS X version must be available on the machine where you are building the Licensing Toolkit:

- For macOS 10.15, use `xcode-select --print-path` to obtain the correct path and choose 10.15 SDK path.

macOS ARM 64-bit

The following table lists information about the macOS ARM64-bit system tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	- universal2_mac
Package Identifier	- universal2_mac11
Tested Compiler	- Xcode 13 - Apple clang version 13.0.0 (clang-1300.0.29.3)
Notes	- Prepped Trusted Configuration is supported. - For building requirements, see Requirements for Building the macOS/OS X Licensing Toolkit.
Toolkit Functionality	Licensing based on license files or trusted storage.
Security Functionality	Support for tamper-resistant applications.

Requirements for Building the macOS ARM64 Licensing Toolkit

When building the FlexNet Publisher Licensing Toolkit on macOS ARM64 platform, use an appropriate Apple development environment:

- For macOS 11.4, use Xcode 13.0

- For macOS 12.1, use Xcode 12.5.1

Required macOS ARM64 SDKs

An SDK appropriate to the macOS ARM64 version must be available on the machine where you are building the Licensing Toolkit:

- For macOS 11.4, use xcode-select --print-path to obtain the correct path and choose 11.4 SDK path.

- For macOS 12.1, use xcode-select --print-path to obtain the correct path and choose 12.0 SDK path.

Solaris 32-bit

The following table lists information about the Solaris 32-bit systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	- x86_sol (on x86) - sun4_u (on SPARC 32-bit)
Package Identifier	- x86_sol10 (on x86) - sun4_u10 (on SPARC 32-bit)
Tested Compiler	For x86: - cc (Sun C) 5.11 - cc (Sun C) 5.15 For SPARC 32-bit: - cc (Sun C) 5.14 - cc (Sun C) 5.15
Notes	`lmadmin` is supported in this toolkit. - Synchronous I/O multiplexing, via select, is supported for up to 65,535 file descriptors. - The number of system semaphore arrays can become exhausted. - Shared objects might not run when compiled with gcc on SPARC 32-bit. - Multiple Ethernet hostids are not supported. - Prepped Trusted Configuration is supported.
Toolkit Functionality	Licensing based on license files or trusted storage.
Security Functionality	Support for tamper-resistant applications. The toolkit is labeled as *standard*.

Solaris 64-bit

The following table lists information about the Solaris 64-bit systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	• x64_sun (on x64) • sun64_u (on SPARC 64-bit)
Package Identifier	• x64_sun10 (on x64) • sun64_u10 (on SPARC 64-bit)
Tested Compiler	For x64: • cc (Sun C) 5.11 • cc (Sun C) 5.15 For SPARC 64-bit: • cc (Sun C) 5.14 • cc (Sun C) 5.15
Notes	• `lmadmin` is supported using its 64-bit binary. While the 32-bit `lmadmin` binary (contained in the x86_sun and sun64_u toolkits) continues to be supported on 64-bit systems, Revenera recommends using the 64-bit binary on 64-bit systems. • Shared objects might not run when compiled with gcc on SPARC 64-bit. • Multiple Ethernet hostids are not supported. • Prepped Trusted Configuration is supported.
Toolkit Functionality	Licensing based on license files or trusted storage.
Security Functionality	Support for tamper-resistant applications. The toolkit is labeled as *standard*.

AIX 32-bit

The following table lists information about the AIX 32-bit systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	ppc_u
Package Identifier	ppc_u5 (on PowerPC™)

Item	Description
Tested Compiler	PowerPC cc (IBM XLC): 11.1 (AIX 7.1) and 13.1.3 (AIX 7.2)
Notes	• `lmadmin` is supported in this toolkit. • The AIX FlexNet Publisher client libraries are PIC by default; therefore, only one version of these libraries is provided in the toolkit. • Java SDK is not supported.
Toolkit Functionality	Licensing based on license files.
Security Functionality	No support for tamper-resistant applications. The toolkit is labeled as *notr*.

AIX 64-bit

The following table lists information about the AIX 64-bit systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	rs64_u
Package Identifier	rs64_u5 (on PowerPC™)
Tested Compiler	PowerPC cc (IBM XLC): 11.1 (AIX 7.1) and 13.1.3 (AIX 7.2)
Notes	• `lmadmin` is supported using its 64-bit binary. While the 32-bit `lmadmin` binary (contained in the ppc_u toolkit) continues to be supported on 64-bit systems, Revenera recommends using the 64-bit binary on 64-bit systems. • You must use ar -X64 and strip -X64 on this platform. • The AIX FlexNet Publisher client libraries are PIC by default; therefore only one version of these libraries is provided in the toolkit. • Java SDK is not supported.
Toolkit Functionality	Licensing based on license files.
Security Functionality	No support for tamper-resistant applications. The toolkit is labeled as *notr*.

Java Standard Edition

The following table lists information about the Java Standard Edition systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	java
Package Identifier	Not applicable
Tested Compiler	• JDK 11 (JDK 11 is not supported on Solaris x86 and x64) • JDK 17 (JDK 17 is not supported on Solaris x86 and x64) • OpenJDK 17 (in macOS lmadmin installer will not work as mentioned in FNP-24247)
Notes	• Implements the FlexNet Licensing for Java client library only. • Requires a C development environment. • Requires tamper-resistant licenses (TRL) to be enabled.
Toolkit Functionality	Licensing based on license files or trusted storage.
Security Functionality	No support for tamper-resistant applications. The toolkit is labeled as *notr*.

HP-UX 64-bit

The following table lists information about the HP-UX 64-bit systems tested with the FlexNet Publisher Licensing Toolkit:

Item	Description
Platform Name	it64_hp (on Intel Itanium)
Package Identifier	it64_hp11i (on Intel Itanium)
Tested Compiler	Intel Itanium HP C/aC++ B3910B A.06.12

Item	Description
Notes	• `lmadmin` has not been tested in this toolkit.

	• On Intel Itanium, use the `lmhostid` utility to determine the hostid. This returns the machine identification and is equivalent to the identification returned by the HP_UX command `getconf CS_PARTITION_IDENT`. For example:
	
	`>lmhostid`
	`>The FlexNet Licensing host ID of this machine is`
	`"ID_STRING=9c788319-db72-d411-af62-0060b05e4c05"`
	
	Older methods of obtaining the hostid that return the Ethernet address are still supported, but may fail on some systems. The older methods include:
	
	`>uname -i (returns decimal hostid)`
	`>lmhostid -long (returns hexidecimal hostid)`

	• Multi-threaded licensing libraries are available on Intel Itanium.
Toolkit Functionality	Licensing based on license files.

Toolkits that Support Prepped Trusted Configuration

Toolkit platforms that support prepped Trusted Configuration (and therefore server-side local trial ASRs) include the following:

- i86_lsb (32-bit Linux)
- x64_lsb (64-bit Linux)
- i86_n3 (32-bit Windows)
- x64_n6 (64-bit Windows)
- sun4_u10 (32-bit Solaris SPARC)
- sun64_u10 (64-bit Solaris SPARC)
- x86_sol10 (32-bit Solaris Intel)
- x64_sun10 (64-bit Solaris Intel)
- x64_mac10 (Universal macOS)
- universal2_mac11 (Universal macOS)

Virtualization

The following picture illustrates how the FlexNet licensing server or a FlexEnabled application operates within a Virtualization stack. The table below the picture lists the Virtualization stacks that have been tested with FlexNet Publisher.
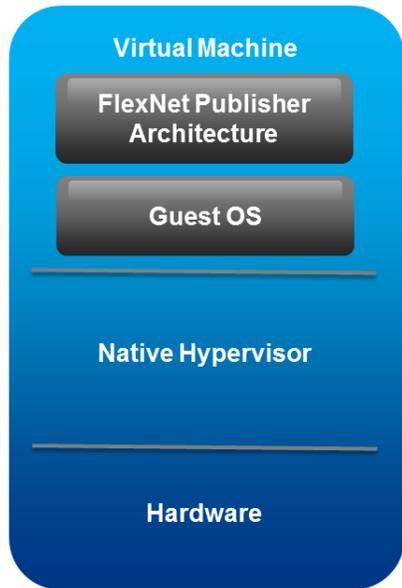
Use the following table to determine the tested Virtualization stacks.

Table 3 ▪ Tested Virtualization Stacks

FlexNet Publisher Architecture	Guest OS	Hypervisor
i86_n, x64_n	Windows 7 SP1 ESU	VMware ESXi 6.5 and 6.7
		VMware Workstation 16.1.2
		Oracle VirtualBox 6.1
	Windows 10	VMware ESXi 6.5 and 6.7
		Citrix XenServer 8.2
		VMware Workstation 16.1.2
		Oracle Virtual Box 6.1
		QEMU-KVM
		PARALLELS
		everRun 7.9

Table 3 ▪ Tested Virtualization Stacks

FlexNet Publisher Architecture	Guest OS	Hypervisor
i86_n, x64_n	Windows 10	Microsoft Hyper-V from Windows Server 2019
	Windows Server 2019	Microsoft Hyper-V from Windows 10 Pro
	Windows Server 2019	VMware ESXi 6.5 and 6.7
		Citrix XenServer 8.2
		QEMU-KVM
		PARALLELS
		everRun 7.9
	Windows Server 2022	VMware
		QEMU-KVM
		everRun 7.9
i86_lsb	RHEL 7, and 8	VMware ESXi 6.5 and 6.7
	SLES 15 SP3	VMware Workstation 16.1.2
		Citrix XenServer 8.2
		QEMU-KVM
		PARALLELS
		Microsoft Hyper-V from Windows Server 2019
		Microsoft Hyper-V from Windows 10 Pro
		Oracle Virtual Box 6.1
x64 _lsb	RHEL 7, and 8	VMware ESXi 6.5 and 6.7
	* SLES 12 SP3, SLES 12 SP4, * SLES 15, SLES 15 SP1, SLES 15 SP2, and SLES 15 SP3	VMware Workstation 16.1.2
		Citrix XenServer 8.2
		PARALLELS
		Microsoft Hyper-V from Windows 10 Pro
		Oracle Virtual Box 6.1
i86_lsb,x64_lsb	RHEL 8	everRun 7.9
		QEMU-KVM

Table 3 ▪ Tested Virtualization Stacks

FlexNet Publisher Architecture	Guest OS	Hypervisor

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Note ▪

- *Supported hostids in guest operating systems are ETHER (server and client) and, for all hypervisors other than Hyper-V, VM_UUID (server only). See the white paper, "Understanding Virtualization Features in FlexNet Publisher", for more information.*
- *It is a best practice to run license servers on a server-based OS.*
- *For Windows and Linux certificate applications, the FlexNet Licensing Service needs to be installed for VM_UUID hostid to be extracted.*
- *The asterisk (*) symbol indicates that the version of the operating system is supported and not tested in the current release.*

Tested Cloud Environments

Use the following table to determine guest operating systems and hostids that have been tested with FlexNet Publisher in the specified cloud environment.

Table 4 ▪ Tested Cloud Environments

FlexNet Publisher Architecture	Tested OS	Cloud Platform	Host ID
i86_n, x64_n	• Windows 10 • Windows Server 2019	Google Cloud Microsoft Azure	License servers: VM_UUID FlexEnabled clients: ETHER
i86_n, x64_n	• Windows Server 2019 • Windows Server 2022	Amazon EC2	License servers: VM_UUID (previously AMZN_IID) AMZN_EIP FlexEnabled clients: AMZN_IID ETHER

Table 4 ▪ Tested Cloud Environments

FlexNet Publisher Architecture	Tested OS	Cloud Platform	Host ID

i86_lsb, x64_lsb	● RHEL 7* and RHEL 8
	 ● SLES 15 SP2
		Google Cloud	License servers:
			 `VM_UUID`
			 FlexEnabled clients:
			 `AMZN_IID`
			 `ETHER`

i86_lsb, x64_lsb	● RHEL 8
	 ● SUSE 15 SP3
		Microsoft Azure	License servers:
			 `VM_UUID`
			 FlexEnabled clients:
			 `AMZN_IID`
			 `ETHER`

i86_lsb, x64_lsb	● RHEL 7* and 8
	 ● SUSE 15 SP3
		Amazon EC2	License servers:
			 `AMZN_EIP` or `VM_UUID`
			 FlexEnabled clients:
			 `AMZN_IID`
			 `ETHER`

Note ▪

- *Google Cloud, Amazon EC2 and Microsoft Azure can all use VM_UUID. VM_UUID is equivalent to AMZN_IID on EC2, Google Instance ID on Google and SMBIOS UUID on Azure*
- *AMZN_IID is superseded by VM_UUID for server-line hostid, but unlike VM_UUID is supported for feature-line hostid.*
- *For Windows and Linux certificate applications, the FlexNet Licensing Service needs to be installed for cloud hostids (VM_UUID, AMZN_EIP, AMZN_IID) to be extracted.*

System Requirements for lmadmin

The following sections describe tested platforms and requirements for `lmadmin`:

- Tested Platforms
- Additional System Requirements
- Tested Browsers

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Note ▪ lmadmin installers are no longer packaged within FlexNet Publisher kit archives, and must be downloaded separately.

Tested Platforms

lmadmin has been tested on the following platforms.

Table 5 ▪ Tested lmadmin Platforms

Platform Architecture	Processor Type	Operating System
AIX 32-bit	PowerPC	AIX 7.1 and 7.2
AIX 64-bit	PowerPC	AIX 7.1 and 7.2
Linux 32-bit	x64	RHEL 7, 8, and 9
Linux 64-bit	x64	RHEL 7, 8, and 9 * SLES 12 SP4, * SLES 15, SLES 15 SP1, SLES 15 SP2, and SLES 15 SP3 Ubuntu 18.04, 20.4, and 22.4
macOS/OS X 64-bit	x64	macOS 10.15 macOS 11.1 macOS 12.1
macOS ARM 64-bit	ARM-64	macOS 11.2 macOS 11.4 macOS 12.1
Microsoft Windows 32-bit	x64	Windows Server 2019 Windows Server 2022
Microsoft Windows 64-bit	x64	Windows 10 Windows 11 Windows Server 2019 Windows Server 2022 It is a best practice to run license servers on a server-based OS.
Solaris 32-bit	SPARC 32-bit x86	Solaris 10 and 11

Table 5 ▪ Tested `lmadmin` Platforms

Platform Architecture	Processor Type	Operating System
Solaris 64-bit	SPARC 64-bit x86-x64	Solaris 10 and 11

Note ▪

- *The FlexNet Publisher Licensing Toolkits for 64-bit platforms supply 64-bit lmadmin binaries. Revenera recommends their use on 64-bit platforms. Separate 32-bit lmadmin installers and binary archives are also available and can be used on 64-bit platforms if necessary.*
- *The asterisk (*) symbol indicates that the version of the operating system is supported and not tested in the current release.*

Additional System Requirements

`lmadmin` has these additional requirements:

- To use `lmadmin` on Windows platforms, the relevant Microsoft Visual C++ 2013 Redistributable Package must be installed.
- The `lmadmin` installer requires that JRE 1.6 or later (for macOS/OS X: JRE 1.7 or later) is installed. If the JRE is not already present on the machine, it must be installed separately, because it is not bundled with the `lmadmin` installer.

Tested Browsers

`lmadmin` is tested on the following Web browsers:

- **Red Hat Linux**—Mozilla Firefox 46.x, Google Chrome 106.x
- **Windows**—Microsoft Edge
- **macOS/OS X**—Apple Safari 6.x and 11

Deprecated Features and Commands

The following table lists deprecated features and commands.

Table 6 ▪ Deprecated Features and Commands

Deprecated Features and Commands	Comments
Console mode on `lmadmin` installation on macOS/OS X	On macOS/OS X, the `lmadmin` installer no longer supports Console mode.

Table 6 ▪ Deprecated Features and Commands

Deprecated Features and Commands	Comments
Non-multithreaded libraries	The following UNIX client libraries used with applications that do not use native multithreaded libraries have been deprecated: ● `liblmgr_nomt_pic.a` ● `liblmgr_nomt_pic_trl.a` ● `liblmgr_nomt.a` ● `liblmgr_nomt_trl.a`
License Generator toolkit	License Generator toolkit is end-of-life. Instead, the responsegen shared object API has been exposed; see the example `.\examples\activation\responsegen\ResponseGenApi.c`.
AMZN_IID, HPV_UUID, VMW_UUID	Replaced by VM_UUID
lmbind & LMB_* hostids	lmbind is no longer packaged with FlexNet Publisher archives. lmbind sections have been removed from documentation
VMW_* and HPV_* hostids	It is better to have a hostid that is effective in both physical and virtual systems. As an example, we would recommend ETHER instead of VMW_ETHER (on VMware guests) or HPV_ETHER (on Hyper-V guests)
Non trial-id trial ASRs	ASRs which do not use a trial-id are subject to an issue where deleting trusted storage means no further (non trial-id) ASRs can be loaded. Trial-id ASRs were invented to solve this issue.
License keys and default strength signatures	License keys have been documented as obsolete for several years. Signatures of type LM_STRENGTH_LICENSE_KEY and LM_STRENGTH_LICENSE_DEFAULT are easily cracked. Revenera strongly recommends that new license files use TRL-strength signatures and that updated clients link with the 'trl-only' (lmgr_trl.lib) library.
Decimal licenses and lc_convert API	Decimal licenses are deprecated. Consequently sections on decimal licenses and the **lc_convert** API have been removed from documentation.

Table 6 ▪ Deprecated Features and Commands

Deprecated Features and Commands	Comments
Trusted Storage on AIX	Trusted storage is no longer supported on AIX.
Three-Server Redundancy	Three-server redundancy is supported with license file–based licensing only. It is not supported with trusted storage–based licensing.

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