MarkLogic Server

Installation Guide for All Platforms

MarkLogic 9
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1.0 Requirements and Database Compatibility

This chapter introduces MarkLogic Server, lists the product requirements and supported platforms, and describes the database compatibility with previous releases. It includes the following sections:

- Introduction
- MarkLogic Server Assumptions
- Memory, Disk Space, and Swap Space Requirements
- Supported Platforms
- Supported Filesystems
- Java Virtual Machine Requirements
- Upgrades and Database Compatibility
- MarkLogic Converters Installation Changes Starting at Release 9.0-4

1.1 Introduction

MarkLogic Server is a powerful NoSQL database for harnessing your digital content base, complete with Enterprise features demanded by real world, mission-critical applications. MarkLogic enables you to build complex applications that interact with large volumes of content in JSON, XML, SGML, HTML, and other popular content formats, as well as binary formats. The unique architecture of MarkLogic ensures that your applications are both scalable and high-performance, delivering query results at search-engine speeds while providing transactional integrity over the underlying content repository. MarkLogic can be configured for a distributed environment, enabling you to scale your infrastructure through hardware expansion.

This installation guide explains the procedures needed to install MarkLogic on your system. It is intended for a technical audience. This document only explains how to install the software, not how to use the software. To learn how to get started using the software, see the rest of the MarkLogic documentation (available on docs.marklogic.com), including the following documents:

- *Getting Started With MarkLogic Server*
- *MarkLogic Server Release Notes*
- *MarkLogic Server Concepts Guide*
- *MarkLogic Server Administrator's Guide*
- *MarkLogic Server Application Developer's Guide*
- *MarkLogic Server Search Developer's Guide*
- *JavaScript Reference Guide*
- *MarkLogic XQuery and XSLT Function Reference*

1.2 MarkLogic Server Assumptions

When MarkLogic installs, it sets memory and other settings based on the characteristics of the computer in which it is running. MarkLogic is a scalable, multi-threaded server product, and as such it assumes it has the entire machine available to it, including the CPU and disk I/O capacity. It is important to follow the guidelines set up in this chapter. Furthermore, MarkLogic assumes there is only one MarkLogic Server process running on any given machine, so it is not recommended to run multiple instances of MarkLogic on a single machine.

MarkLogic Server expects the system clocks to be synchronized across all the nodes in a cluster. The clock skew should be less than 0.5 seconds. You should use a time service such as NTP to keep your system clocks synchronized. For more details, see the following Knowledge Base article:

> https://help.marklogic.com/knowledgebase/article/View/24/15/synchronizing-system-clocks-in-a-cluster

1.3 Memory, Disk Space, and Swap Space Requirements

Before installing the software, be sure that your system meets the following requirements:

- For a production deployment, MarkLogic recommends at least 8 vCPUs of hardware threads per host, with 8 GB of memory per vCPU. For example, for a production system with 16 virtual CPUs (hardware threads) per core, the recommended memory is at least 128G (2 “threads” x 8 cores x 8G). Use memory optimized cloud compute instances or virtual machines. Memory requirements may increase over time as projects evolve and databases grow with more content and more indexes. See comment [1] in the table below.
- For a prototyping or development deployment, MarkLogic requires a minimum of 4 GB of system memory and recommends at least 8 GB of memory. See comment [1] in the table below.
- For small forests that will never have a lot of content (such as Security and Schemas), the reserve size is simply two times the size of the forest.

  For data forests, we recommend that you target a size of 500 GB, where 400 GB is allocated to content, and 100 GB is left as reserved space to handle merges.

- On Linux systems, you need at least as much swap space as the amount of physical memory on the machine or 32 GB, whichever is lower. MarkLogic also recommends setting Linux Huge Pages on Red Hat Enterprise Linux 7 systems to 3/8 the size of your physical memory. For details on setting up Huge Pages, see https://access.redhat.com/solutions/1578873 on the Redhat website. (Note: This is Subscriber Exclusive Content.)

  If you have Huge Pages set up on a Linux system, your swap space on that machine must be at least the size of your physical memory minus the size of your Huge Page (because Linux Huge Pages are not swapped), or 32 GB, whichever is lower. For example, if you have 48 GB of physical memory, and if you have Huge Pages set to 18 GB, then you need swap space of 30 GB (48 - 18).

  At system startup on Linux machines, MarkLogic Server logs a message to the `ErrorLog.txt` file showing the Huge Page size, and the message indicates if the size is below the recommended level.

  If you are using Red Hat Enterprise Linux 7, you must turn off Transparent Huge Pages (Transparent Huge Pages are configured automatically by the operating system). For details on disabling Transparent Huge Pages, see https://kb.informatica.com/solution/23/PublishingImages/Disable%20Transparent%20Huehpages%20on%20Linux%207.pdf or see the Redhat instructions for how to disable transparent huge pages.

- On Windows systems twice the physical memory is also recommended for the swap (page) file. You configure this in the System Control Panel > Advanced system settings > Performance Settings > Advanced tab. Set the Virtual memory settings on that tab to twice your physical memory.

No.	Comment
[1]	MarkLogic automatically configures itself to reserve as much system memory as it can the first time it runs. If you need to change the default configuration, you can manually override these defaults at a later time using the Admin Interface.
[2]	For small forest that will not be growing in size, you only need to allocate 2 times the size of the forest. For content forests that are expected to grow over time, with the derfault merge settings, you need to reserve 100 GB of storage. Here is how it's calculated: You need at least 2 times the `merge max size` of free space per forest, regardless of the forest size. Therefore, with the default `merge max size` of 48 GB, you need at least 96 GB of free space. Additionally, if your journals are not yet created, you need 2 times the journal size of free disk space (if the journal space is not yet allocated). Therefore, to be safe, you need 100 GB of free space for each content forest.

1.4 Supported Platforms

MarkLogic Server is supported on the following platforms:

- Microsoft Windows Server 2012 (x64), Microsoft Windows Server 2016
- Windows 7 (x64) or later (see comment [1] in the table below)
- Red Hat Enterprise Linux 7 (x64) (see comments [2], [3], [4], [5] in the table below)
- Starting with MarkLogic Server version 9.0-11, Red Hat Enterprise Linux 8 (x64) (see comments [2], [3], [4], [5] in the following table)
- CentOS 7 (x64) (see comments [2], [3], [4] in the table below)
- Amazon Linux (x64) (see comments [2], [3] in the table below)
- Mac OS X 10.11 or later (see comment [6] in the table below)
- Docker (see comment [7] in the table below)
- Support for CentOS 7 (x64), Red Hat Enterprise Linux 7 (x64) and Windows Server 2012 on the Azure Platform

No.	Comment
[1]	Desktop Microsoft Windows 7 (x64) and later are supported for development only. Use Windows Server for Production.
[2]	Either `none`, `mq-deadline` or `kyber` I/O scheduler is required to ensure efficient disk I/O for MarkLogic Server on Linux. When configuring an I/O scheduler with SSDs in a virtualized environment (including any cloud-based virtual machines), the OS I/O scheduling should be set to `none` for 4.x kernels or `noop`/`none` for older 3.x kernels. For more details, see http://help.marklogic.com/Knowledgebase/Article/View/8/0/notes-on-io-schedulers, https://lonesysadmin.net/2013/12/06/use-elevator-noop-for-linux-virtual-machines/, and https://access.redhat.com/solutions/5427.
[3]	The `redhat-lsb-core`, `glibc`, `gdb`, and `cyrus-sasl-lib` packages are required on Red Hat Enterprise Linux. Additionally, on 64-bit Red Hat Enterprise Linux, both the 32-bit and the 64-bit `glibc` packages are required.
[4]	Red Hat Enterprise Linux 7 (x64) is also supported on VMware ESXi 6.0 (installed on bare metal).
[5]	The recommended Red Hat production configuration is one container per MarkLogic host. Running containers on Red Hat Enterprise Virtualization containers with the KVM Hypervisor is also supported.
[6]	Mac OS X is supported for development only. Conversion (Office and PDF) and entity enrichment are not available on Mac OS X. A 64-bit capable processor is required (http://support.apple.com/kb/HT3696).

No.	Comment
[7]	One Docker container per host.

Note: MarkLogic now supports the 1-Click AWS option in AWS Marketplace. Because of this, the published MarkLogic AMIs will have data volume predefined.

1.5 Supported Filesystems

MarkLogic relies on the operating system for filesystem operations. While any filesystem that works properly (including under heavy load) should work, the following table lists the operating systems along with the filesystems under which they are supported. Other filesystems may work but have not been thoroughly tested by MarkLogic.

Operating System	Supported Filesystems
Linux (all varieties)	XFS (recommended), EXT3, and EXT4 as well as the clustered filesystems for shared-disk failover mentioned in Requirements for Shared-Disk Failover in the *Scalability, Availability, and Failover Guide*. **Warning** Do not use `data=writeback` with EXT3 and EXT4 filesystems. NAS is supported on Red Hat Enterprise Linux 7 and NetAPP.
Windows	NTFS
Mac OS	HFS+
All	Hadoop HDFS, Amazon S3 (no journaling with S3)

Additionally, HDFS storage is supported with MarkLogic on the HDFS platforms described in HDFS Storage in the *Query Performance and Tuning Guide*.

Note: The Solaris OS is not certified for MarkLogic 9.

1.6 Java Virtual Machine Requirements

MarkLogic Server can function with or without a Java Virtual Machine (JVM). The only requirement needed for a JVM to be installed on MarkLogic Server would be if you use HDFS (Hadoop Distributed File System).

Our provided Amazon AMIs have a JDK pre-installed that is used during the MarkLogic bootstrap process to setup and configure MarkLogic in the Amazon environment. Therefore, you do not need to install a JVM on any EC2 instance.

The following MarkLogic products and features require a JVM to either run or install:

- Gradle (https://developer.marklogic.com/code/ml-gradle/)
- Ops Director (https://docs.marklogic.com/guide/opsdir/GettingStarted)
- DHF (https://marklogic.github.io/marklogic-data-hub/)

MarkLogic supports the Java 7, 8, 9, 10, and 11 versions of the following JVMs:

- Oracle/Sun
- OpenJDK

By default, MarkLogic looks for Java in the location specified via the `JAVA_HOME` environment variable or in a specific set of default locations. If `JAVA_HOME` is not set in the startup environment, MarkLogic uses the first JRE or JDK found in one of the following locations. These locations are searched in the order listed.

- `/usr/java/default`
- `/usr/java/latest`
- `/usr/java/jdk1.`*`N`*`*` where N is a supported Java version. For example, `/usr/java/jdk1.7.0_79` qualifies if Java 7 is a supported Java version.
- `/usr/lib/jvm/java`
- `/usr/lib/jvm/java-openjdk`
- `/usr/lib/jvm/jre-1.`*`N`*`.0-*.x86_64` where *N* is a supported Java version, such as Java 8.

If you have Java installed in a different location, you can communicate your `JAVA_HOME` to MarkLogic through the file `/etc/marklogic.conf`. For example:

```
cat > /etc/marklogic.conf
export JAVA_HOME=/path/to/your/jdk
```

1.7 Upgrades and Database Compatibility

MarkLogic 9 supports upgrades from MarkLogic 7 or from MarkLogic 8 or later databases. If you are upgrading from an earlier version of MarkLogic Server, you must first upgrade to 7 or 8 before moving to MarkLogic 9. For the procedure for upgrading, see “Upgrading from Previous Releases” on page 15.

During the upgrade, the Security database, the Schemas database, and the configuration files are automatically upgraded. The Security database is upgraded with the latest execute privileges and the Schemas database is upgraded with the latest version of the Schemas used by MarkLogic Server. The upgrade occurs as part of the installation procedure.

Databases that contain your own content are also upgraded to work with MarkLogic 9; once you upgrade to MarkLogic 9, you will no longer be able to use that database with previous versions of MarkLogic.

Note: MarkLogic Corporation strongly recommends performing a backup of your databases before upgrading to MarkLogic 9. Additionally, MarkLogic Corporation recommends that you first upgrade to the latest maintenance release of the major version of MarkLogic you are running before upgrading to MarkLogic 9.

For the procedure for upgrading to MarkLogic 9, see "Upgrading from Previous Releases" on page 15. For details about known incompatibilities between MarkLogic 7 or MarkLogic 8 and MarkLogic 9, see Known Incompatibilities with Previous Releases in the *Release Notes*.

This section contains database compatibility information between various releases, and includes the following sections.

- Prerequisites for Application Services Portion of the Upgrade
- Compatibility of MarkLogic 9 Databases With MarkLogic 7 and 8

1.7.1 Prerequisites for Application Services Portion of the Upgrade

When upgrading from releases prior to MarkLogic 7 to MarkLogic 9, the upgrade reconfigures the Docs and App Services App Servers, which by default are on port 8000 and port 8002 in older releases. In order for those App Servers to be upgraded, the following conditions must be met:

- Either no App Server is running on port 8000 or the App Server on port 8000 has a root of `Docs/`.
- Either no App Server is running on port 8002 or the App Server on port 8002 has a root of `Apps/` or `Apps/appbuilder`.

If the above conditions are met, then those App Servers are reconfigured during the MarkLogic 9 upgrade and the resulting configurations have the following settings:

App-Services:

App-Services App Server	
Port	`8000`
Name	`App-Services`
Root	`Apps/`
Error Handler	`error-handler.xqy`
URL Rewriter	`rewriter.xqy`
Database	`App-Services`

Manage:

Manage App Server	
Port	`8002`
Name	`Manage`
Root	`Apps/`
Error Handler	`manage/error-handler.xqy`
URL Rewriter	`manage/rewriter.xqy`
Database	`App-Services`
Privilege	`manage`

If the conditions are not met, then the upgrade logs an error to the `ErrorLog.txt` file and the Application Services portion of the upgrade is skipped. MarkLogic Server will still operate, but you will not be able to use Query Console, the Management API, and the rest of the Application Services features. To restore the Application Services functionality after a failed upgrade, create two App Servers with the preceding configurations. If you have any problems and you have an active maintenance contract, you can contact MarkLogic Technical Support for help.

1.7.2 Compatibility of MarkLogic 9 Databases With MarkLogic 7 and 8

MarkLogic 9 does not require a reindex from MarkLogic 7 or MarkLogic 8 databases. Therefore, if you are upgrading from MarkLogic 7 or MarkLogic 8, the database will not reindex, even if `reindex enable` is set to `true`.

1.8 MarkLogic Converters Installation Changes Starting at Release 9.0-4

MarkLogic converters are used to convert Microsoft Office Word, Excel, and PowerPoint documents, as well as Adobe PDF files, to XHTML. *MarkLogic filters* are used to filter a variety of document formats, extract metadata and text from them, and return XHTML. The following MarkLogic XQuery API functions, described in the *MarkLogic XQuery and XSLT Function Reference*, provide this functionality:

```
xdmp:word-convert
xdmp:excel-convert
xdmp:powerpoint-convert
xdmp:pdf-convert
xdmp:document-filter
```

Converters/filters are also used as part of *conversion pipeline* in Content Processing Framework. For more details, see The Default Conversion Option in the *Content Processing Framework Guide*.

Prior to MarkLogic release 9.0-4, converters/filters were bundled and automatically installed with MarkLogic Server. Starting at MarkLogic release 9.0-4, converters/filters are offered as a separate package, *MarkLogic Converters*.

This change provides better flexibility and enables you to install/uninstall MarkLogic converters/filters separately from MarkLogic Server.

With this change, MarkLogic Server does not include MarkLogic Converters. To use converters/filters, install both packages: MarkLogic Server and MarkLogic Converters. An `XDMP-CVTNOTFOUND` error will be thrown upon an attempt to use converters/filters on a MarkLogic node with no MarkLogic Converters installed.

The version of MarkLogic Converters is synchronized with the version of MarkLogic Server. For example, MarkLogic Converters 9.0-4 corresponds to MarkLogic Server 9.0-4 and may be installed with it.

You can obtain the version of MarkLogic Converters installed on a node by calling to MarkLogic server-side API function `xdmp:host-status` and examining the value of the `converters-version` element in the response. If the converters package is not installed on a node, the `converters-version` element will be empty.

MarkLogic Converters packages for all supported platforms are available for download at the same location where MarkLogic Server packages are available, namely at http://developer.marklogic.com.

If you want to use the converters package with MarkLogic 9.0-4 or later, you will have to perform a two-step installation: first install MarkLogic Server and then install MarkLogic Converters.

For details on MarkLogic Server and MarkLogic Converters installation for all supported platforms, see “Installing MarkLogic” on page 19.

If you want to uninstall MarkLogic 9.0-4 or later, and if the converters package was previously installed with it, you will have to perform a two-step uninstall: first uninstall MarkLogic Converters and then uninstall MarkLogic Server.

For details on MarkLogic Server and MarkLogic Converters uninstall for all supported platforms, see “Removing MarkLogic” on page 38.

2.0 Procedures

This section describes the following procedures to install MarkLogic on your system.

- Upgrading from Previous Releases
- Installing MarkLogic
- Starting MarkLogic Server
- Configuring the First and Subsequent Hosts
- Entering a License Key
- Checking for the Correct Software Version
- Configuring MarkLogic Server to Run as a Non-Daemon User
- Removing MarkLogic

2.1 Upgrading from Previous Releases

If you have previously installed MarkLogic on a machine, you must uninstall the old release before proceeding with the new installation. For information on removing the software, see “Removing MarkLogic” on page 38 or the *Installation Guide* from the previous release. This section describes the following information and upgrade paths:

- Windows Service Parameters
- Upgrading from Release 9.0-1 or Later
- Upgrading from MarkLogic 7 or MarkLogic 8
- Upgrading from Release 6.0 or earlier

If you are upgrading a cluster to a new release, see Upgrading a Cluster to a New Maintenance Release of MarkLogic Server in the *Scalability, Availability, and Failover Guide*. The Security database and the Schemas database must be on the same host, and that host should be the first host you upgrade when upgrading a cluster.

Warning MarkLogic Server does not support downgrades. Once you have upgraded to a later release, you cannot downgrade to your original release. To retain the option to restore to a previous version of MarkLogic Server, make a complete backup of your content and secuity databases before upgrading.

2.1.1 Windows Service Parameters

When upgrading MarkLogic on Windows as a different user from the user that installed the previous version, the MarkLogic service parameters in the Windows registry will be changed. When the old version of MarkLogic is uninstalled, the service is deleted from the registry, including any customizations to the service parameters. When the new version of MarkLogic is installed, the service is re-created in the registry, with the default service parameters.

Before starting the upgraded version of MarkLogic, make any customization to the service parameters. Otherwise the default service parameters will be set and MarkLogic will start up running as the local system user. Any MarkLogic configuration files saved as the local system user (such as those modified when making changes in the Admin Interface) will be created with the Windows file permissions for the local system user.

> **Note:** When you make changes the user in the service parameters, you should also change data directory file permissions because, if MarkLogic is running for any amount of time as the local system user, it is likely that is has written files as the local system user.

2.1.2 Upgrading from Release 9.0-1 or Later

To upgrade from release 9.0-1 or later to the current MarkLogic 9 release (for example, if you are installing a maintenance release of MarkLogic 9), perform the following basic steps:

1. Stop MarkLogic Server (as described in step 1 of “Removing MarkLogic” on page 38).

2. Uninstall the old MarkLogic 9 release (as described in “Removing MarkLogic” on page 38).

   > **Note:** If you want to uninstall MarkLogic 9.0-4 or later, and if the converters package was previously installed with it, you will have to perform a two-step uninstall: first uninstall MarkLogic Converters and then uninstall MarkLogic Server. For more detail, see “MarkLogic Converters Installation Changes Starting at Release 9.0-4” on page 12 and “Removing MarkLogic” on page 38.

3. Install the new MarkLogic 9 release (as described in “Installing MarkLogic” on page 19).

   > **Note:** If you want to install MarkLogic 9.0-4 or later, and you plan to use the converters package with it, you will have to perform a two-step installation: first install MarkLogic Server and then install MarkLogic Converters. For more detail, see “MarkLogic Converters Installation Changes Starting at Release 9.0-4” on page 12 and “Installing MarkLogic” on page 19.

4. Start MarkLogic Server (as described in “Starting MarkLogic Server” on page 26).

5. Open the Admin Interface in a browser (http://localhost:8001/).

6. When the Admin Interface prompts you to upgrade the databases and the configuration files, click the button to confirm the upgrade.

If you are upgrading a cluster to a new release, see Upgrading a Cluster to a New Maintenance Release of MarkLogic Server in the *Scalability, Availability, and Failover Guide*. The Security database and the Schemas database must be on the same host, and that host should be the first host you upgrade when upgrading a cluster.

If you are upgrading two clusters that make use of database replication to replicate the Security database on the master cluster, then you must enter the following to manually upgrade the Security database configuration files on the machine that hosts the replica Security database:

```
http://host:8001/security-upgrade-go.xqy?force=true
```

Warning There is no direct upgrade path from Early Access releases of MarkLogic 9 to this release. If you need to move any data from an Early Access release to this release, you must re-create the data in the current release.

2.1.3 Upgrading from MarkLogic 7 or MarkLogic 8

MarkLogic 9 installs in the same default directory as earlier versions of MarkLogic, so there is no need to move any old files around. The upgrade to MarkLogic 9 does incorporate an automatic update to the Security database and to the configuration files. The Security database upgrade occurs when you first access the Admin Interface after the MarkLogic 9 installation.

When upgrading to MarkLogic 9, you must first uninstall previous releases of MarkLogic Server. Uninstalling a previous release of MarkLogic does not remove or delete the user data files (the forests and configuration information).

Note: If you are upgrading a cluster of two or more servers, you must first upgrade the server in which the Security database is mounted. The Security database must be available before subsequent hosts can join the cluster.

The basic steps to upgrade from an earlier version to MarkLogic 9 are as follows:

1. As a precaution, perform database backups on your earlier versions of MarkLogic Server databases.

2. If you are upgrading from MarkLogic 7 and do not want to reindex a database, disable reindexing for that database before installing the new release (for example, set `reindexer enable` to `false` on the Database Configuration page of the Admin Interface in MarkLogic 7). The entire database will be reindexed after upgrading to MarkLogic 9 unless you disable reindexing. For details, see “Upgrades and Database Compatibility” on page 10. You can always reindex the database later by setting `reindexer enable` database configuration option to `true`.

3. Stop MarkLogic Server (as described in step 1 of “Removing MarkLogic” on page 38).

4. Uninstall the old MarkLogic release (as described in “Removing MarkLogic” on page 38).

5. Install the new MarkLogic 9 release (as described in “Installing MarkLogic” on page 19).

   Note: If you want to install MarkLogic 9.0-4 or later, and you plan to use the converters package with it, you will have to perform a two-step installation: first install MarkLogic Server and then install MarkLogic Converters. For more detail, see

"MarkLogic Converters Installation Changes Starting at Release 9.0-4" on page 12 and "Installing MarkLogic" on page 19.

6. Start MarkLogic Server (as described in "Starting MarkLogic Server" on page 26).

7. Open the Admin Interface in a browser (http://localhost:8001/).

8. When the Admin Interface prompts you to upgrade the Security database and the configuration files, click the button to confirm the upgrade.

9. If you have CPF installed in any database and you want to use any of the new pipelines in MarkLogic 9, then you must reinstall CPF for those databases. To reinstall CPF for a database, in the Admin Interface navigate to Databases -> *database-name* -> Content Processing, click the Install tab, and click the Reinstall button. This loads all of the new pipelines into the triggers database configured for that database.

There are some known application incompatibilities between MarkLogic 8 and MarkLogic 9, as well as some incompatibilities between MarkLogic 7 and MarkLogic 9. Some of the incompatibilities might require minor code changes to your applications. For details on these incompatibilities, see the Release Notes.

2.1.4 Upgrading from Release 6.0 or earlier

MarkLogic 9 only supports upgrading from Release 7.0 or later; it does not provide a direct upgrade path for previous releases of MarkLogic Server. If you are upgrading from a 6.0 or earlier release of MarkLogic Server, either install this release as a clean installation or upgrade your existing release to the latest Release 7.0 or 8.0 before installing this release. If you are upgrading from 6.0 and do not want to reindex your content, set the `reindexer enable` to `false` before upgrading. You can run MarkLogic 9 in either 7.0 or 8.0 compatibility mode, as described in "Upgrades and Database Compatibility" on page 10.

2.2 Installing MarkLogic

This section describes the procedure for installing MarkLogic Server on each platform. Perform the procedure corresponding to the platform to which you are installing.

Platform	Perform the following:
Windows x64	1. If you are upgrading from a previous MarkLogic release, review "Upgrading from Previous Releases" on page 15 and perform necessary steps from that section first. 2. Download the MarkLogic Server installation package to your desktop. The latest installation packages are available from http://developer.marklogic.com. 3. Double click the `MarkLogic-9.0-1-amd64.msi` icon to start the installer. **Note:** If you are installing a release other than 9.0-1, double-click on the appropriately named installer icon. 4. The Welcome page displays. Click Next. 5. Select Typical. 6. Click Install. 7. Click Finish. **Note:** If you are installing MarkLogic 9.0-4 or later, and you plan to use the converters package, perform also the following steps: 8. Download the MarkLogic Converters package for Windows platform (e.g. `MarkLogicConverters-9.0-4-amd64.msi`) from http://developer.marklogic.com to your desktop. 9. Double click the `MarkLogicConverters-9.0-4-amd64.msi` icon to start the converters' installer. 10. The welcome page displays: "Welcome to the MarkLogic Converters Setup Wizard". Click Next. 11. "Choose Setup Type" page displays. Select Typical. 12. "Ready to Install" page displays. Click Install to start the installation. 13. "Installing MarkLogic Converters" page displays. You may observe the progress there. 14. Then the final page displays: "Completing the MarkLogic Converters Setup Wizard". Click Finish.

Platform	Perform the following:

Red Hat Linux x64	1. If you are upgrading from a previous MarkLogic release, review "Upgrading from Previous Releases" on page 15 and perform necessary steps from that section first.
	
	2. Download the MarkLogic Server installation package to `/tmp` or another location using your web browser. The latest installation packages are available from http://developer.marklogic.com.
	
	Note: If you are using Firefox or another browser that is configured to associate `rpm` files, the browser will prompt you for the `root` password (if you are not already running as `root`) and you can follow the prompts to complete the installation. When the installation is complete, you can skip the next step. Otherwise, continue to the next step.
	
	3. As the `root` user, install the package with the following command:
	
	`rpm -i /tmp/MarkLogic-9.0-1.x86_64.rpm`
	
	Note: If you are installing a release other than 9.0-1, replace 9.0-1 with the appropriate release number.
	
	4. If you are using HDFS, make sure the server is configured to use HDFS with a Hadoop HDFS client and any needed environment variables set in the `/etc/sysconfig/MarkLogic` file. For details, see HDFS Storage in the *Query Performance and Tuning Guide* and "Java Virtual Machine Requirements" on page 9.
	
	Note: If you are installing MarkLogic 9.0-4 or later, and you plan to use the converters package, also perform the following steps:
	
	5. Download the MarkLogic Converters package for Linux platform (for example, `MarkLogicConverters-9.0-4.x86_64.rpm`) from http://developer.marklogic.com to `/tmp` or another location.
	
	6. As the `root` user, install the package with the following command:
	
	`rpm -i /tmp/MarkLogicConverters-9.0-4.x86_64.rpm`

Platform	Perform the following:

CentOS Linux	1. If you are upgrading from a previous MarkLogic release, review "Upgrading from Previous Releases" on page 15 and perform necessary steps from that section first.
	
	2. Download the MarkLogic Server installation package to `/tmp` or another location using your web browser. The latest installation packages are available from http://developer.marklogic.com.
	
	Note: If you are using Firefox or another browser that is configured to associate `rpm` files, the browser will prompt you for the `root` password (if you are not already running as `root`) and you can follow the prompts to complete the installation. When the installation is complete, you can skip the next step. Otherwise, continue to the next step.
	
	3. As the `root` user, install the package with the following command:
	
	`rpm -i /tmp/MarkLogic-9.0-5.x86_64.rpm`
	
	Note: If you are installing a release other than 9.0-5, replace 9.0-5 with the appropriate release number.
	
	4. If you are using HDFS, make sure the server is configured to use HDFS with a Hadoop HDFS client and any needed environment variables set in the `/etc/sysconfig/MarkLogic` file. For details, see HDFS Storage in the *Query Performance and Tuning Guide* and "Java Virtual Machine Requirements" on page 9.
	
	Note: If you are installing MarkLogic 9.0-4 or later, and you plan to use the converters package, also perform the following steps:
	
	5. Download the MarkLogic Converters package for Linux platform (for example, `MarkLogicConverters-9.0-5.x86_64.rpm`) from http://developer.marklogic.com to `/tmp` or another location.
	
	6. As the `root` user, to be able to run the `rpm` for MarkLogic, converters, install `yum` with the following command:
	
	`yum install libgcc libgcc.i686 libstdc++ libstdc++.i686`
	
	7. As the `root` user, install the package with the following command:
	
	`rpm -i /tmp/MarkLogicConverters-9.0-5.x86_64.rpm`

Platform	Perform the following:
Mac OS X	1. If you are upgrading from a previous MarkLogic release, review "Upgrading from Previous Releases" on page 15 and perform necessary steps from that section first. 2. Download the MarkLogic Server installation package to your desktop. The latest installation packages are available from http://developer.marklogic.com. 3. Double click the `MarkLogic-9.0-1-x86_64.dmg` icon to open the folder that contains the `MarkLogic-9.0-1-x86_64.pkg` installer. Double click on the installer to start. 4. The Welcome page displays. Click Continue. 5. In the Select a Destination window, select a destination to install MarkLogic Server or Continue to select the default destination. 6. In the Installation Type window, click Install. An Installation window appears that displays the progress of the installation. 7. When the installation Summary window appears, click Close. 8. A MarkLogic control window appears from which you can start/stop MarkLogic Server, open the Admin Interface, and view the Error Log. **Note:** If you are installing MarkLogic 9.0-4 or later, and you plan to use the converters package, perform also the following steps: 9. Download the MarkLogic Converters package for Mac OS platform (e.g. `MarkLogicConverters-9.0-4-x86_64.dmg`) from http://developer.marklogic.com to your desktop. 10. Double click the `MarkLogicConverters-9.0-4-x86_64.dmg` icon to open the folder that contains `MarkLogicConverters-9.0-4-x86_64.pkg` installer. Double click on the installer to start. 11. The Welcome page displays. Click Continue. 12. In the Select a Destination window, select the default destination. 13. In the Installation Type window, click Install. An Installation window appears that displays the progress of the installation. 14. When the installation Summary window appears, click Close.

If you are upgrading a cluster to a new release, see Upgrading a Cluster to a New Maintenance Release of MarkLogic Server in the *Scalability, Availability, and Failover Guide*. The Security database and the Schemas database must be on the same host, and that host should be the first host you upgrade when upgrading a cluster.

Note: It is not recommended to install the converters while MarkLogic Server is running. The reason for this is that the server checks the converters presence and version number only upon start-up. So the server will not have accurate information about the converters in this case. The recommended installation procedure is to stop the server if it is running, install or upgrade the server, install the converters, then start the server.

The following table shows the installation directory (`<marklogic-dir>`) and the default data directory for each platform:

Platform	Installation Directory	Default Data Directory (for configuration and log files)
Windows	`c:\Program Files\MarkLogic\`	`c:\Program Files\MarkLogic\Data`
Red Hat Linux	`/opt/MarkLogic`	`/var/opt/MarkLogic`
Mac OS X	`~/Library/MarkLogic`	`~/Library/Application Support/MarkLogic/Data`

The default forest directory is the same as the default data directory if the optional data directory is not specified during forest creation. On UNIX platforms, if you want MarkLogic Server to use another location for its default data directory, make your data directory (`/var/opt/MarkLogic` on Linux) a soft link to the alternate location.

In MarkLogic release 9.0-4 and later, MarkLogic Converters installation directory remains the same as in previous releases, namely:

Platform	Converters Installation Directory
Windows	`c:\Program Files\MarkLogic\Converters`
Red Hat Linux	`/opt/MarkLogic/Converters`
Mac OS X	`~/Library/MarkLogic/Converters`

Note: When a new node joins an existing cluster, the server does not try to figure out automatically whether the MarkLogic Converters package is needed or not. An

`XDMP-CVTNOTFOUND` error will be thrown if converters/filters built-in functions are called on nodes that do not have MarkLogic Converters installed.

2.3 Starting MarkLogic Server

MarkLogic Server will automatically start when the computer reboots. To start MarkLogic Server without rebooting, perform the following command for the corresponding platform:

Platform	Perform the following:
Windows	Select Start > Programs > MarkLogic Server > Start MarkLogic Server. **Note:** When you start MarkLogic Server from the Start menu, the Windows service configuration for MarkLogic Server is set to start automatically. Also, if you are using Windows Vista or Windows 7, to start the service you must right-click the Start MarkLogic Server link in the Start menu and choose Run as Administrator, then choose to allow the action.
Red Hat Linux	As the `root` user, enter the following command: `/sbin/service MarkLogic start`
Mac OS X	Select System Preferences > MarkLogic to open the MarkLogic control window. Click Start MarkLogic Server.

This starts all of the App Servers that are configured on your MarkLogic Server.

2.3.1 Verifying Converters Installation Starting at Release 9.0-4

In MarkLogic 9.0-4 or later, after starting MarkLogic Server, you may verify whether the converters package was installed with use of the XQuery API function `xdmp:host-status` or the JavaScript API function `xdmp.hostStatus`.

Suppose you want to verify whether converters are installed on a node with hostname `englab.marklogic.com`.

Open Query Console URL in a browser:

```
http://englab.marklogic.com:8000/qconsole/
```

Perform steps described in one of the following sub-sections, depending on your API of choice.

2.3.1.1 Obtaining Converters Version with XQuery API

In the Query Console, select XQuery as Query Type.

Execute the following code:

```
xquery version "1.0-ml";
xdmp:host-status(xdmp:host("englab.marklogic.com"))
```

In the response, look for the `converters-version` element, for example:

```
<converters-version>9.0-4</converters-version>
```

If converters are not installed, the above element will have an empty value.

2.3.1.2 Obtaining Converters Version with JavaScript API

In the Query Console, select JavaScript as Query Type.

Execute the following code:

```
'use strict';
xdmp.hostStatus(xdmp.host("englab.marklogic.com"))
```

In the response, look for the `convertersVersion` element, for example:

```
"convertersVersion" : "9.0-4"
```

If converters are not installed, the above element will have an empty string as its value.

2.4 Configuring the First and Subsequent Hosts

The following configuration procedures different depending on if you run MarkLogic Server in a cluster configuration or on a single host. The procedures are as follows:

- Configuring a Single Host or the First Host in a Cluster
- Configuring an Additional Host in a Cluster
- Leaving a Cluster and Becoming a Single Host

If you are configuring MarkLogic Server as a standalone host, or if this is the first host in a cluster configuration, follow the installation instructions in Section 2.4.1. Otherwise, follow the installation instructions in Section 2.4.2.

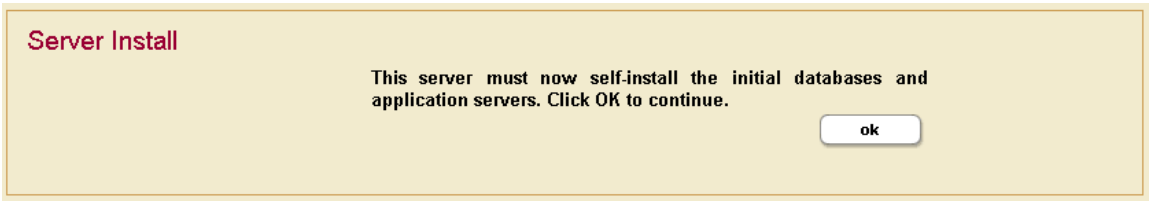
If you are upgrading a cluster to a new release, see Upgrading a Cluster to a New Maintenance Release of MarkLogic Server in the *Scalability, Availability, and Failover Guide*. The Security database and the Schemas database must be on the same host, and that host should be the first host you upgrade when upgrading a cluster.

2.4.1 Configuring a Single Host or the First Host in a Cluster

To configure this installation as a single host, or as the first host in a cluster, perform the following steps:

1. Install MarkLogic and start MarkLogic as described in “Installing MarkLogic” on page 19 and “Starting MarkLogic Server” on page 26.

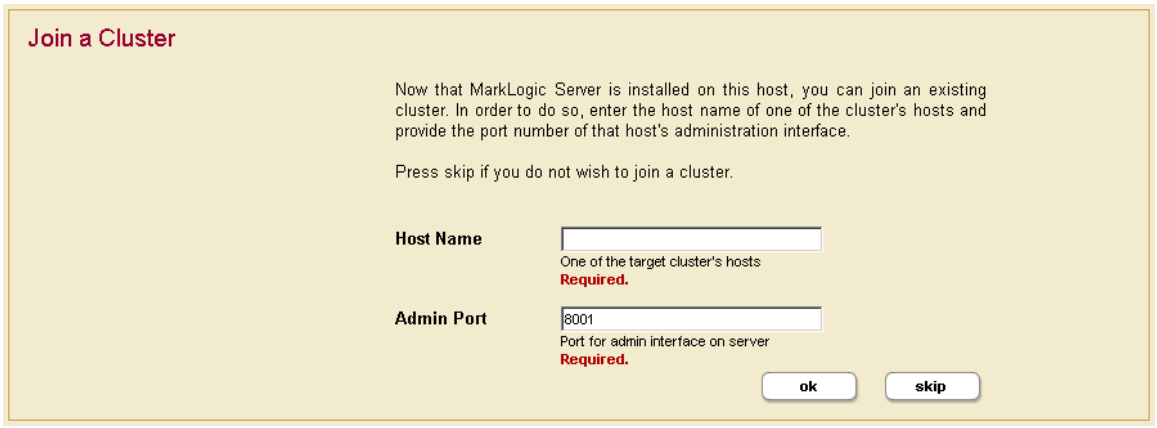
2. Log into the Admin Interface in a browser. It is on port 8001 of the host in which MarkLogic is running (for example, on the localhost, `http://localhost:8001`). The Server Install page appears.



3. Click OK to continue.

4. Wait for the server to restart.

5. After the server restarts, you will be prompted to join a cluster.



6. Click Skip.

7. You will be prompted to create an admin user and a PKCS#11 wallet password. Enter the login name and password for the admin user, and enter the wallet password.



8. Click OK.

9. You will be prompted to log in with your admin username and password.

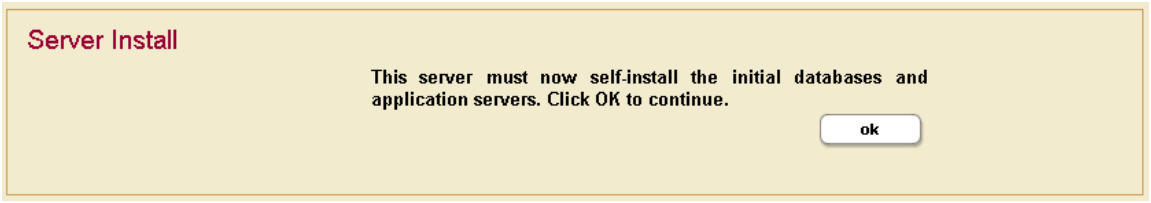
You will now see the Admin Interface. If you do not need to add any hosts at this time, skip to Section 2.6 on page 33.

2.4.2 Configuring an Additional Host in a Cluster

All hosts in a cluster have to be on the same platform. To configure this installation as an additional host in a cluster of the same platform, perform the following steps:

1. On the node you want to add to an existing cluster, install MarkLogic and start MarkLogic, as described in “Installing MarkLogic” on page 19 and “Starting MarkLogic Server” on page 26.

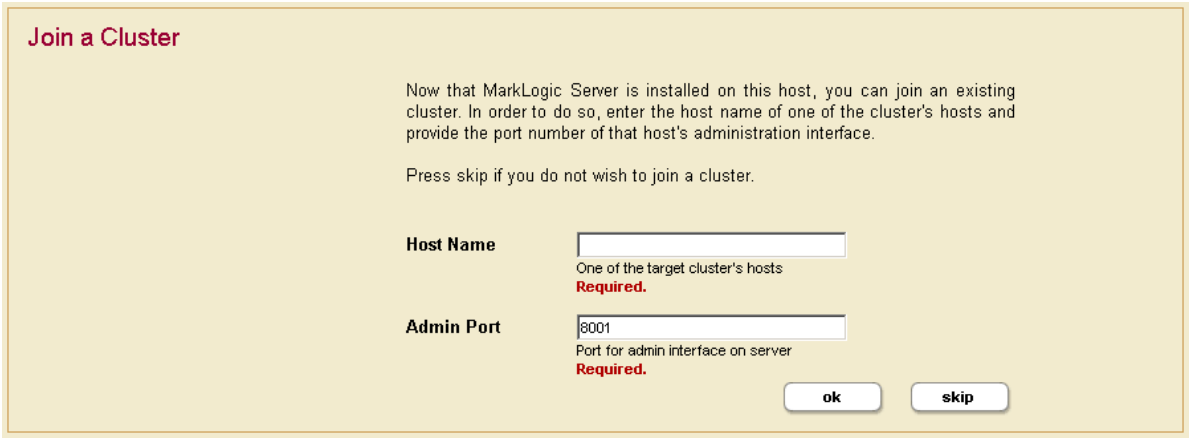
2. Log into the Admin Interface in a browser. It is on port 8001 of the host in which MarkLogic is running (for example, on the localhost, `http://localhost:8001`). The Server Install page appears.



3. Click OK to continue.

4. Wait for the server to restart.

5. After the server restarts, you will be prompted to join a cluster.

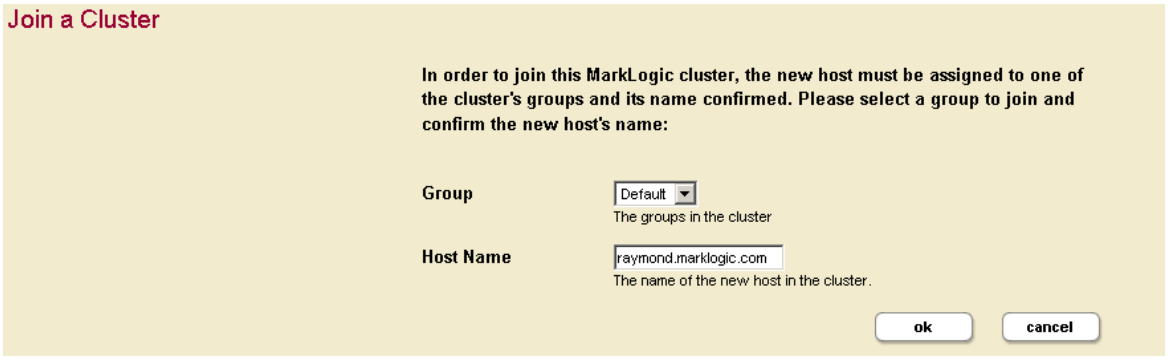


6. Enter the DNS name or the IP address of one of the machines in the cluster. For instance, if this is the second host you are installing, you can enter the DNS name of the first host you installed.

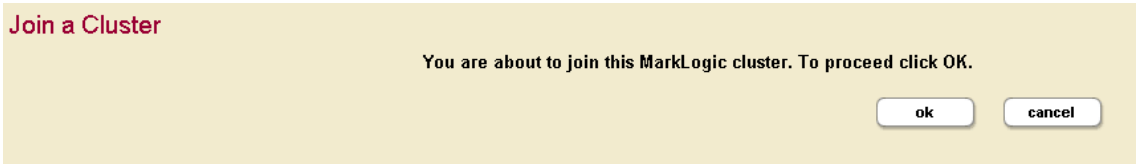
7. Click OK.

8. You will be prompted for an admin username and password. You can use the admin username and password you created when installing the first host. Click OK.

9. Select a Group to assign this host. Click OK.



10. Click OK to confirm that you are joining the cluster.



11. You have now joined the cluster.



12. Click OK to transfer the cluster configuration information.

You have completed the process to join a cluster and will now see the Admin Interface.

2.4.3 Leaving a Cluster and Becoming a Single Host

If your host is currently in a cluster of multiple hosts, and you would like to leave the cluster and switch to a single host environment, follow the steps in this section.

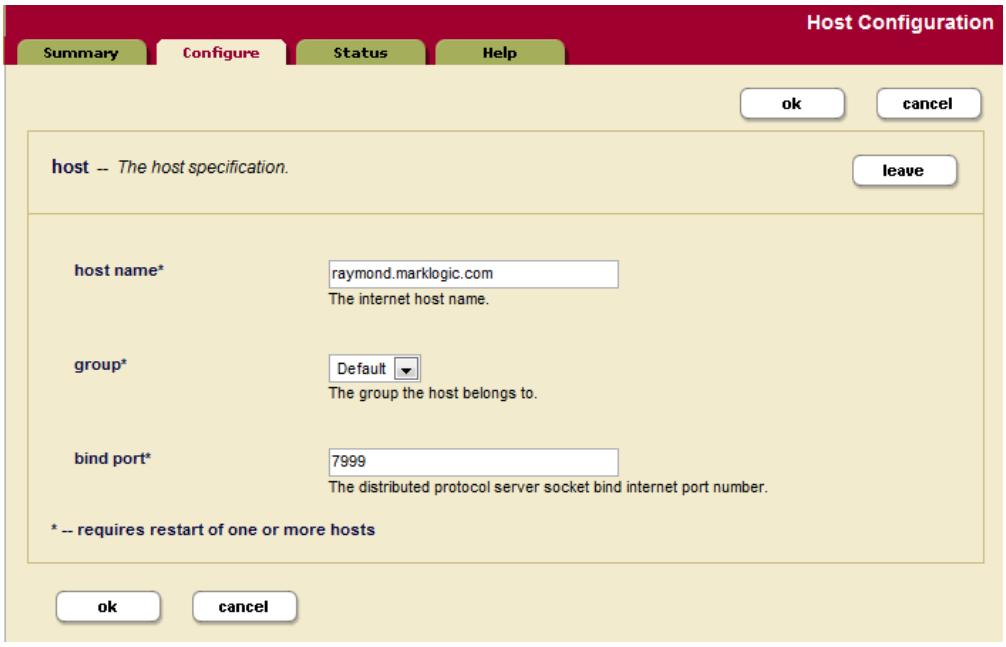
A host cannot leave a cluster if there are still forests assigned to it or if it has any foreign clusters associated with it. You must delete all forests assigned to the host and de-couple any clusters associated with a host before you can leave the cluster. However, you can delete the configuration only for a forest and the forest data will remain on the filesystem, allowing you to add the forest back to the host after changing the configuration. For instructions on adding a forest to a host, see the *Administrator's Guide*.

Perform the following steps to leave the cluster to which a host is connected:

1. Run the Admin Interface from the host you want to remove from the cluster.

2. Click the Hosts icon in the left menu tree. The Host Summary page appears.

3. Click the name of the host you want to remove from the cluster, either from the left menu tree or from the Host Summary page. The Host Configuration page appears:



Note: The Leave button only appears if the Admin Interface is running from this host.

4. Click the Leave button

5. Click OK to confirm leaving the cluster.

6. The host restarts to load the new configuration.

7. Follow the instructions in sections “Configuring a Single Host or the First Host in a Cluster” on page 28 or “Configuring an Additional Host in a Cluster” on page 29 as appropriate.

2.5 Entering a License Key

MarkLogic will run without a license key, but after installing MarkLogic you should enter a valid license key for the usage and features for which you are licensed. At any time, you can change the license key for a host from the Host Status page.

You might need to change the license key if your license key expires, if you need to use some features that are not covered in your existing license key, if you upgrade your hardware with more CPUs and/or more cores, if you need a license that covers a larger database, if you require different languages, or for various other reasons. Changing the license key sometimes results in an automatic restart of MarkLogic (for example, if your new license enables a new language).

To change the license key for a host, perform the following steps using the Admin Interface:

1. Click the Hosts icon on the left tree menu.

2. Click the name of the host for which you want to change the license key, either on the tree menu or the summary page. The Host Configuration page appears.

3. Click the Status tab. The Host Status page appears.

4. Click the License Key button. The License Key Entry page appears.

5. Enter your new license key information. For information about licensing of MarkLogic Server, contact your MarkLogic sales representative.

6. After entering valid information in the Licensee and License Key fields, click OK. If it needs to, MarkLogic will automatically restart, and the new license key will take effect.

2.6 Checking for the Correct Software Version

After logging in with your admin username and password, the Admin Interface appears. In the left corner of the Admin Interface, the version number and product edition are displayed.

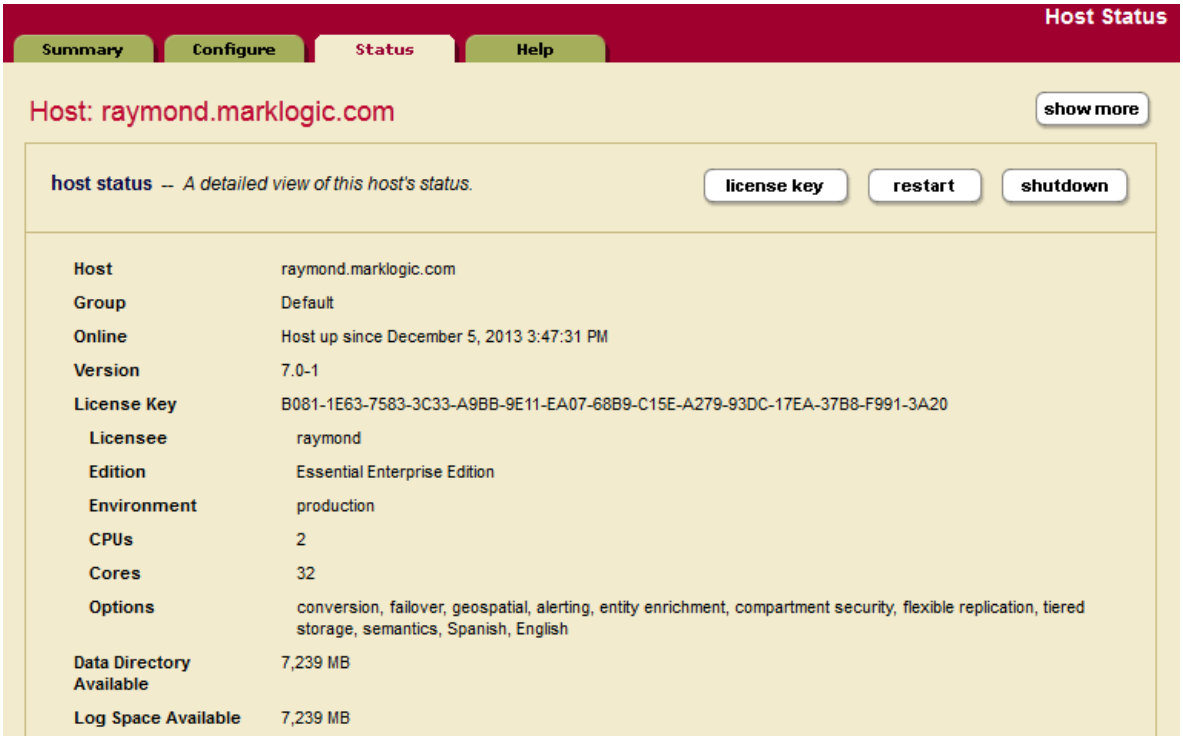
To view more details about the release of MarkLogic Server that is installed and licensed, complete the following steps:

1. Click the Hosts icon on the left tree menu.

2. Select the name of the host you just installed, either from the left menu tree or from the Host Summary page.

3. Click the Status tab. The Host Status page appears.

4. Check that <*version*> is correct.



To begin using MarkLogic Server, see the following document:

- *Getting Started With MarkLogic Server*

Otherwise, you are finished with the Admin Interface for now. You have successfully installed MarkLogic on your system.

2.7 Configuring MarkLogic Server to Run as a Non-Daemon User

On UNIX-based systems (Linux), MarkLogic runs as the UNIX user named `daemon`. This section describes how to change a configuration to run as a different named UNIX user. This procedure must be run by the `root` user. Additionally, the root user is still required for installing and uninstalling MarkLogic and for starting and stopping MarkLogic from the startup scripts.

To modify an installation to run as a user other than `daemon`, perform the following steps:

1. In a command window on the machine in which you installed MarkLogic, log in as the `root` user.

2. Make sure MarkLogic is stopped. If it is still running, stop it as follows:

Platform	Perform the following to stop MarkLogic:
Red Hat Linux	As the `root` user, enter the following command: `/sbin/service MarkLogic stop`

3. Edit the configuration file for your platform using a text editor such as `vi`.

Platform	Configuration File to Edit
Red Hat Linux	`/etc/marklogic.conf`

You must create the `/etc/marklogic.conf` file if it does not exist. This file is only read by the MarkLogic startup; it is never written to; therefore, it will survive an uninstallation of MarkLogic.

4. In the file, edit the `MARKLOGIC_USER` environment variable to point to the user in which you want MarkLogic Server to run. For example, if you want it to run as a user named `raymond`, change the following line:

```
export MARKLOGIC_USER=daemon
```

to the following:

```
export MARKLOGIC_USER=raymond
```

5. Save the changes to the `/etc/marklogic.conf` file.

6. If you have not yet started MarkLogic after performing a clean installation (that is, after installing into a directory where MarkLogic has never been installed), then you are done and you can skip the rest of the steps in this procedure. If you have an existing installation (for example, if you are upgrading to a maintenance release), then continue with the following steps.

7. For all of the MarkLogic files owned by `daemon`, you need to change the owner to the new user. This includes all forest data and all of the configuration files. By default, the forest data is in the following directories:

Platform	Default Data Directory (for configuration and log files, and default forest directory)
Red Hat Linux	`/var/opt/MarkLogic`

   For example, on a Linux system, perform a command similar to the following, which changes the owner to the user specified earlier in the `/etc/sysconfig/MarkLogic` file:

```
chown -R raymond /var/opt/MarkLogic
```

8. Make sure to change the owner for all forests in the system, otherwise forests will fail to mount upon startup. Note that the above command only changes the owner for forests installed in the default directory. You need to run a similar command on the data directory for each forest in which a data directory is specified.

9. When you have completed all the file and directory ownership changes, start MarkLogic as described in “Starting MarkLogic Server” on page 26.

Once you have performed this procedure, all new files created by MarkLogic are created with the new user ownership; there will be no need to change any ownership again.

Warning On Linux systems, use the `/etc/marklogic.conf` script to set environment variables. Any configuration changes you make to the MarkLogic-supplied startup script (for example, `/etc/sysconfig/MarkLogic`) will not survive an upgrade and need to be merged in during any upgrade of MarkLogic (because the installation installs a new version of the startup scripts). Under Linux, the unistallation process saves an old version of the scripts (for example, `/etc/sysconfig/MarkLogic.rpmsave`), so you can use that version to merge in your changes. If you perform a clean installation (not an upgrade installation), however, you will need to run this entire procedure again. If you use `/etc/marklogic.conf` for your environment variable changes, they will survive an upgrade and you will not need to merge your changes.

The following are default values of environment variables you can override in `/etc/marklogic.conf` on Linux-based systems (you will have to create the file if it does not exist):

```
export MARKLOGIC_INSTALL_DIR=/opt/MarkLogic
export MARKLOGIC_DATA_DIR=/var/opt/MarkLogic
export MARKLOGIC_FSTYPE=ext4
export MARKLOGIC_USER=daemon
export MARKLOGIC_PID_FILE=/var/run/MarkLogic.pid
export MARKLOGIC_UMASK=022
export MARKLOGIC_DISABLE_JVM=0
export MARKLOGIC_EC2_HOST
export TZ=:/etc/localtime
```

2.8 Removing MarkLogic

To remove MarkLogic from your system, complete the following steps for the corresponding platform:

Platform	Perform the following:
Windows	1. Stop MarkLogic: select Start > Programs > MarkLogic Server > Stop MarkLogic Server. **Note:** If you are using Windows Vista or Windows 7, to stop the service you must right-click the Stop MarkLogic Server link in the Start menu and choose Run as Administrator, then choose to allow the action. 2. If you are uninstalling MarkLogic 9.0-4 or later, and you previously had the converters package installed, you need to uninstall it prior to uninstalling MarkLogic Server: select MarkLogic Converters in Add/Remove Programs of Control Panel, right click on it, and select Uninstall. 3. Uninstall MarkLogic: select MarkLogic Server in Add/Remove Programs of Control Panel, right click on it, and select Uninstall.

Red Hat Linux	1. Stop MarkLogic: as the `root` user, enter the following command:
	
	`/sbin/service MarkLogic stop`
	
	2. If you are uninstalling MarkLogic 9.0-4 or later, and you previously had the converters package installed, you need to uninstall it prior to uninstalling MarkLogic Server: as the `root` user, enter the following command:
	
	`rpm -e MarkLogicConverters`
	
	3. Uninstall MarkLogic: as the `root` user, enter the following command:
	
	`rpm -e MarkLogic`

Platform	Perform the following:

Mac OS X	1. Stop MarkLogic: select System Preferences > MarkLogic to open the MarkLogic control window, and click Stop MarkLogic Server.
	
	2. If you are uninstalling MarkLogic 9.0-4 or later, and you previously had the converters package installed, you need to uninstall it prior to uninstalling MarkLogic Server, with use of the following commands:
	
	`sudo pkgutil --forget com.marklogic.converters`
	
	`rm ~/Library/MarkLogic/Converters`
	
	3. No action is necessary when upgrading. If you want to remove the user data and do a fresh install, then remove the following directory:
	
	`~/Library/Application Support/MarkLogic/Data`
	
	4. To entirely remove MarkLogic, remove the following directories:
	
	`~/Library/MarkLogic`
	`~/Library/Application Support/MarkLogic`
	`~/Library/StartupItems/MarkLogic`
	`~/Library/PreferencePanes/MarkLogic.prefPane`
	
	5. To make Mac OS X completely forget it ever had a MarkLogic installation, run the following command from a terminal window:
	
	`sudo pkgutil --forget com.marklogic.server`

Note: Using this procedure to remove MarkLogic from your system will not remove user data (configuration information, XQuery files used by HTTP or XDBC servers, or forest content). This data is left in place to simplify the software upgrade process. If you wish to remove the user data, you must do so manually using standard operating system commands.

In case you previously used converters/filters and want to remove this functionality:

- To remove MarkLogic Converters from a node that has MarkLogic 9.0-4 or later release installed, you can use package management tool, such as Control Panel on Windows or `rpm` on Linux, to uninstall MarkLogic Converters.
- To remove converters/filters from a node that has MarkLogic 9.0-3 or earlier release installed, you need to uninstall that release of MarkLogic, and then install MarkLogic Server from release 9.0-4 or later but do not install MarkLogic Converters.

3.0 Technical Support

MarkLogic provides technical support according to the terms detailed in your Software License Agreement or End User License Agreement.

We invite you to visit our support website at http://help.marklogic.com to access information on known and fixed issues, knowledge base articles, and more. For licensed customers with an active maintenance contract, see the Support Handbook for instructions on registering support contacts and on working with the MarkLogic Technical Support team.

Complete product documentation, the latest product release downloads, and other useful information is available for all developers at http://developer.marklogic.com. For technical questions, we encourage you to ask your question on Stack Overflow.

4.0 Copyright

MarkLogic Server 9.0 and supporting products.
Last updated: November 18, 2019

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This technology is protected by U.S. Patent No. 7,127,469B2, U.S. Patent No. 7,171,404B2, U.S. Patent No. 7,756,858 B2, and U.S. Patent No 7,962,474 B2, US 8,892,599, and US 8,935,267.

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