Release Notes for Red Hat Software Collections 1.2

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Abstract

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CHAPTER 1. RED HAT SOFTWARE COLLECTIONS 1.2

This chapter serves as an overview of the Red Hat Software Collections 1.2 content set. It sums up its main features, provides a list of components and their descriptions, compatibility information, and a list of known issues.

1.1. ABOUT RED HAT SOFTWARE COLLECTIONS

For certain applications, more recent versions of some software components are often needed in order to use their latest new features. Red Hat Software Collections is a Red Hat offering that provides a set of dynamic programming languages, database servers, and various related packages that are either more recent than their equivalent versions included in the base Red Hat Enterprise Linux system, or are available for this system for the first time. For a complete list of components that are distributed as part of Red Hat Software Collections and a brief summary of their features, see Section 1.2, “Main Features”.

Red Hat Software Collections does not replace the default system tools provided with Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 7. Instead, a parallel set of tools is installed in the /opt/ directory and can be optionally enabled per application by the user using the supplied scl utility. The default versions of Perl or PostgreSQL, for example, remain those provided by the base Red Hat Enterprise Linux system.

With the notable exception of Node.js, all Red Hat Software Collections components are fully supported under Red Hat Enterprise Linux Subscription Level Agreements, are functionally complete, and are intended for production use. Important bug fix and security errata are issued to Red Hat Software Collections subscribers in a similar manner to Red Hat Enterprise Linux for at least three years from the release of each major version. A new major version of Red Hat Software Collections is released approximately every 18 months, and in each major release stream, each version of a selected component remains backward compatible.

Red Hat Developer Toolset is now part of Red Hat Software Collections, included as a separate Software Collection. For more information about Red Hat Developer Toolset, refer to the Red Hat Developer Toolset Release Notes and the Red Hat Developer Toolset User Guide.

1.2. MAIN FEATURES

Red Hat Software Collections 1.2 provides recent stable versions of the tools listed in Table 1.1, “Red Hat Software Collections 1.2 Components”.

Table 1.1. Red Hat Software Collections 1.2 Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Software Collection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Developer Toolset 3.0</td>
<td>devtoolset-3</td>
<td>Red Hat Developer Toolset is designed for developers working on the Red Hat Enterprise Linux platform. It provides current versions of the GNU Compiler Collection, GNU Debugger, Eclipse development platform, and other development, debugging, and performance monitoring tools. For a complete list of components, see the Red Hat Developer Toolset Components table in the Red Hat Developer Toolset User Guide.</td>
</tr>
</tbody>
</table>
Perl 5.16.3
perl516
A release of Perl with a number of additional utilities, scripts, and database connectors for MySQL and PostgreSQL. This version provides a large number of new features and enhancements, including new debugging options, improved Unicode support, and better performance. Also, it adds perl-DateTime and mod_perl, which is supported only with the httpd24 Software Collection package.

PHP 5.4.16
php54
A release of PHP with PEAR 1.9.4 and a number of additional extensions. PHP 5.4 provides a number of language and interface improvements. The APC, memcache, and Zend OPcache extensions are also included.

PHP 5.5.6
php55
A release of PHP with enhanced language features including better exception handling, generators, and Zend OPcache. The memcache and mongodb extensions are also included.

Python 2.7.5
python27
A release of Python 2.7 with a number of additional utilities. This Python version provides various new features and enhancements, including a new ordered dictionary type, faster I/O operations, and improved forward compatibility with Python 3. The python27 Software Collections contains the Python 2.7.5 interpreter, a set of extension libraries useful for programming web applications and mod_wsgi (only supported with the httpd24 Software Collection), MySQL and PostgreSQL database connectors, and numpy and scipy.

Python 3.3.2
python33
A release of Python 3 with a number of additional utilities. This Software Collection gives developers on Red Hat Enterprise Linux access to Python 3 and allows them to benefit from various advantages and new features of this version. The python33 Software Collection contains Python 3.3.2 interpreter, a set of extension libraries useful for programming web applications and mod_wsgi (only supported with the httpd24 Software Collection), PostgreSQL database connector, and numpy and scipy.

Ruby 1.9.3[a]
ruby193
A release of Ruby 1.9.3 and Ruby on Rails 3.2.8 with a large collection of Ruby gems. This Software Collection gives developers on Red Hat Enterprise Linux access to Ruby 1.9, which provides a number of new features and enhancements, including improved Unicode support, enhanced threading, faster load times, and mod_passenger, which is supported only with the httpd24 Software Collection package.
<table>
<thead>
<tr>
<th>Component</th>
<th>Software Collection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruby 2.0.0</td>
<td>ruby200</td>
<td>A release of Ruby 2.0.0. This version provides substantial performance and reliability improvements and includes a number of new features and improved debugging capabilities, while maintaining source level backward compatibility with Ruby 1.9.3.</td>
</tr>
<tr>
<td>Ruby on Rails 4.0.2[a]</td>
<td>ror40</td>
<td>A release of Ruby on Rails 4.0, a web application development framework written in the Ruby language. This version provides a number of new features and improvements and adds live streaming for persistent connections. This Software Collection is supported together with the ruby200 collection.</td>
</tr>
<tr>
<td>MariaDB 5.5.37</td>
<td>mariadb55</td>
<td>A release of MariaDB, an alternative to MySQL for users of Red Hat Enterprise Linux. MySQL is binary compatible with MariaDB and can be replaced with it without any data conversions. This version adds the PAM authentication plugin to MariaDB.</td>
</tr>
<tr>
<td>MongoDB 2.4.9[b]</td>
<td>mongodb24</td>
<td>A release of MongoDB, a cross-platform document-oriented database system classified as a NoSQL database. This Software Collection includes the mongo-java-driver package.</td>
</tr>
<tr>
<td>MySQL 5.5.37</td>
<td>mysql55</td>
<td>A release of MySQL, which provides a number of new features and enhancements, including improved performance.</td>
</tr>
<tr>
<td>PostgreSQL 9.2.8</td>
<td>postgresql92</td>
<td>A release of PostgreSQL, which provides a number of new features and enhancements, including cascading replication, native JSON support, improved scalability, and better performance.</td>
</tr>
<tr>
<td>Node.js 0.10[b][c]</td>
<td>nodejs010</td>
<td>A release of Node.js with npm 1.3.24. This Software Collection gives users of Red Hat Enterprise Linux access to this programming platform.</td>
</tr>
<tr>
<td>nginx 1.6.1</td>
<td>nginx16</td>
<td>A release of nginx, a web and proxy server with a focus on high concurrency, performance and low memory usage. This version introduces a number of new features, including various SSL improvements, support for SPDY 3.1 (limited to Red Hat Enterprise Linux 7), cache revalidation with conditional requests, and authentication request module.</td>
</tr>
<tr>
<td>Apache httpd 2.4.6</td>
<td>httpd24</td>
<td>A release of the Apache HTTP Server (httpd), including a high performance event-based processing model, enhanced SSL module and FastCGI support. The mod_auth_kerb module is also included.</td>
</tr>
</tbody>
</table>
Thermostat 1.0.4

A release of Thermostat, a monitoring and instrumentation tool for the OpenJDK HotSpot JVM, with support for monitoring multiple JVM instances. This Software Collection depends on the mongodb24 component.

Git 1.9.4

A release of Git, a distributed revision control system with a decentralized architecture. As opposed to centralized version control systems with a client-server model, Git ensures that each working copy of a Git repository is its exact copy with complete revision history.

DevAssistant 0.9.1

A release of DevAssistant, a tool designed to assist developers with creating and setting up basic projects in various programming languages, installing dependencies, setting up a development environment, and working with source control. DevAssistant supports the C, C++, Java, and Python programming languages but it is able to support working with any other language, framework, or tool due to its modular architecture.

Maven 3.0.5

A release of Maven, a software project management and comprehension tool used primarily for Java projects. Based on the concept of a project object model (POM), Maven can manage a project's build, reporting, and documentation from a central piece of information.

A part of this Software Collection requires a JavaScript engine. The v8314 Software Collection included in Red Hat Software Collections 1.2 provides the V8 JavaScript engine and is supported only as the Software Collection's dependency.

This Software Collection also requires v8314. The v8314 Software Collection included in Red Hat Software Collections 1.2 provides the V8 JavaScript engine and is supported only as the Software Collection's dependency.

In Red Hat Software Collections 1.2, Node.js is included as a Technology Preview. For more information about Red Hat Technology Previews, see https://access.redhat.com/support/offerings/techpreview/.

1.3. CHANGES IN RED HAT SOFTWARE COLLECTIONS 1.2

1.3.1. New Components

Red Hat Software Collections 1.2 adds these new components:

- devtoolset-3 – see Section 4.1, “Red Hat Developer Toolset”
- git19 – see Section 4.5, “Git”
- devassist09 – see Section 4.6, “DevAssistant”
- maven30 – see Section 4.7, “Maven”
1.3.2. Changes in nginx

Red Hat Software Collections 1.2 brings a significant change to nginx: it has been upgraded to version 1.6.1 and it is now supported. In accordance with this change, the Software Collection has been renamed to nginx16. nginx 1.6.1 introduces a number of new features, including various SSL improvements, support for SPDY 3.1 (limited to Red Hat Enterprise Linux 7), cache revalidation with conditional requests, authentication request module, and more. For a complete list of changes, refer to http://nginx.org/en/CHANGES-1.6.

For information on migrating to the later version, see Section 5.3, “Migrating from nginx 1.4 to nginx 1.6”.

1.3.3. Changes in Ruby on Rails 4.0

In Red Hat Software Collections 1.2, the ror40-rubygem-jquery-rails package has been upgraded to version 3.1.0, which contains jQuery JavaScript framework version 1.11.0. For more information about the ror40 Software Collection, see Section 4.3, “Ruby on Rails 4.0”

1.3.4. Changes in Thermostat

The thermostat1 Software Collection has been upgraded to version 1.0.4, which provides a number of bug fixes over the previous version. For additional information about using this Software Collection, refer to Section 4.2, “Thermostat 1”

1.3.5. Dockerfiles

Red Hat Software Collections 1.2 is shipped with Dockerfiles for the following Software Collections:

- httpd24
- mariadb55
- mongodb24
- mysql55
- nginx16
- nodejs010
- perl516
- php54
- php55
- postgresql92
- python27
- python33
- ror40
- ruby193
For more information, see section Section 3.4, “Dockerfiles for Red Hat Software Collections”.

1.4. COMPATIBILITY INFORMATION

Red Hat Software Collections 1.2 is available for all supported releases of Red Hat Enterprise Linux 6 and Red Hat Enterprise Linux 7 on AMD64 and Intel 64 architectures.

1.5. KNOWN ISSUES

nodejs-hawk component

The nodejs-hawk package uses an implementation of the SHA-1 and SHA-256 algorithms adopted from the CryptoJS project. In this release, the client-side JavaScript is obfuscated. The future fix will involve using crypto features directly from the CryptoJS library.

postgresql component

The postgresql92 package for Red Hat Enterprise Linux 6 does not provide the sepgsql module as this feature requires installation of libselinux version 2.0.99, which is not available in Red Hat Enterprise Linux 6.

coreutils component

Some utilities, for example, su, login, or screen, do not export environment settings in all cases, which can lead to unexpected results. It is therefore recommended to use sudo instead of su and set the env_keep environment variable in the /etc/sudoers file. Alternatively, you can run commands in a reverse order; for example:

```
su -l postgres -c "scl enable postgresql92 psql"
```

instead of

```
scl enable postgresql92 bash
su -l postgres -c psql
```

When using tools like screen or login, you can use the following command to preserve the environment settings: `source /opt/rh/<collection_name>/enable`.

httpd, mariadb, mongodb, mysql, nodejs, perl, php55, python27, python33, ruby193, ror40, ruby200, thermostat, and v8314 components

When uninstalling the httpd24, mariadb55, mongodb24, mysql55, nodejs010, perl516, php55, python27, python33, ruby193, ror40, ruby200, thermostat1, or v8314 packages, the order of uninstalling can be relevant due to ownership of dependent packages. As a consequence, some directories and files might not be removed properly and might remain on the system.

mariadb, mysql, postgresql, mongodb components

Red Hat Software Collections contains the MySQL 5.5, MariaDB 5.5, PostgreSQL 9.2 and MongoDB 2.4 databases. The core Red Hat Enterprise Linux 6 provides earlier versions of the MySQL and PostgreSQL databases (client library and daemon). The core Red Hat Enterprise Linux 7 provides the same versions of the MariaDB and PostgreSQL databases (client library and daemon). Client libraries are also used in database connectors for dynamic languages, libraries, and so on.
The client library packaged in the Red Hat Software Collections database packages in the PostgreSQL component is not supposed to be used, as it is included only for purposes of server utilities and the daemon. Users are instead expected to use the system library and the database connectors provided with the core system.

A protocol, which is used between the client library and the daemon, is stable across database versions, so, for example, using the PostgreSQL 8.4 client library with the PostgreSQL 9.2 daemon works as expected.

The core Red Hat Enterprise Linux 6 and Red Hat Enterprise Linux 7 does not include the client library for MongoDB. In order to use this client library for your application, you should use the client library from Red Hat Software Collections and always use the `scl enable ...` call every time you run an application linked against this MongoDB client library.

### mariadb, mysql, mongodb components

MariaDB, MySQL, and MongoDB do not make use of the `/opt/<provider>/<collection>/root` prefix when creating log files. Note that log files are saved in the `/var/log/` directory, not `/opt/<provider>/<collection>/root/var/log/`.

### httpd component

Compiling external applications against the Apache Portable Runtime (APR) and APR-util libraries from the httpd24 Software Collection is not supported. The LD_LIBRARY_PATH is not set in httpd24 because it is not required by any application in this Software Collection.

### httpd, ruby193 components

In Red Hat Enterprise Linux 6.5 and earlier versions, httpd is unable to execute the binary files in the `mod_passenger` module, namely PassengerWatchdog, PassengerHelperAgent, PassengerLoggingAgent, and SpawnPreparer in the `/opt/rh/ruby193/root/usr/lib64/gems/exts/passenger-4.0.18/agents/` directory. To work around this problem, disable SELinux by running the following command as root:

```
setenforce 0
```

### nginx component

In Red Hat Enterprise Linux 6.5 and earlier versions, no SELinux policy is applied for the nginx daemon.

### mariadb component

The permissions for the `/var/log/mariadb55-mariadb/` directory, in which the log file is stored, are set incorrectly. Consequently, when the `/var/log/mariadb55-mariadb/mariadb.log` file is removed in Red Hat Enterprise Linux 7, the service fails to start because the `mysqld` daemon does not have permission to create log files. To work around this problem, either do not remove the log file or change the owner of the `/var/log/mariadb55-mariadb/` directory to `mysql:mysql`.

### mysql, mariadb components

In Red Hat Enterprise Linux 7, the `mariadb55-mariadb` and `mysql55-mysqld` services run under the `mysql` user account by default. When the `/var/lib/mysql/mysql.sock` UNIX socket file is created by a different user, the services have insufficient permissions to check whether a process is listening on the socket but the services have sufficient permissions to delete the socket file. Consequently, the `mariadb55-mariadb` and `mysql55-mysqld` services can delete the socket file.
while a process is still using it.

**perl component**

In Red Hat Enterprise Linux 7, the perl516 Software Collection tapset conflicts with the core system tapset. As a consequence, the `systemtap` utility does not work correctly for `perl516`. To work around this problem:

- Either copy the perl516 tapset to a file renamed by adding the Software Collection's prefix - to do so, use the following command:

  ```bash
  cp /opt/rh/perl516/root/usr/share/systemtap/tapset/libperl5.16.3-64.stp /opt/rh/perl516/root/usr/share/systemtap/tapset/perl516-libperl5.16.3-64.stp
  ```

- Or uninstall the core system perl-devel package.

**python27 component**

In Red Hat Enterprise Linux 7, when the user tries to install the `python27-python-debuginfo` package, the `/usr/src/debug/Python-2.7.5/Modules/socketmodule.c` file conflicts with the corresponding file from the python-debuginfo package installed on the core system. Consequently, installation of the python27-python-debuginfo fails. To work around this problem, uninstall the python-debuginfo package and then install the python27-python-debuginfo package.

**devassist component**

When the user tries to rebuild the devassist09-PyYAML package on Red Hat Enterprise Linux 6, the build fails due to a soft dependency, if the Pyrex or Cython programming languages are detected. To work around this problem, make sure the pyrex or cython packages are not installed on your system.

**Other Notes**

**php54 component**

Note that Alternative PHP Cache (APC) in Red Hat Software Collections 1.2 is provided for user data cache only. For opcode cache, Zend OPcache is provided.

**nodejs component**

The nodejs-tobi-cookie package has been renamed to nodejs-cookie-jar.

**ruby component**

Previously, in Red Hat Software Collections 1.0, the V8 JavaScript engine was part of the ruby193 Software Collection. Since Red Hat Software Collections 1.1, the v8 packages have been replaced by the v8314 Software Collection, which is installed as a dependency. In order to use therubyracer, it is necessary to enable the v8314 Software Collection as well.

**nodejs component**

Previously, in Red Hat Software Collections 1.0, the V8 JavaScript engine was part of the nodejs010 Software Collection. Since Red Hat Software Collections 1.1, the v8 packages have been replaced by the v8314 Software Collection, which is installed as a dependency.

**python component**
When the user tries to install both the python27-scldevel and python33-scldevel packages, a transaction check error message is returned. This is an expected behavior because the user can install only one set of the macro files provided by the packages (%scl_python, %scl_prefix_python).

**php component**

When the user tries to install both the php54-scldevel and php55-scldevel packages, a transaction check error message is returned. This is an expected behavior because the user can install only one set of the macro files provided by the packages (%scl_php, %scl_prefix_php).

**ruby component**

When the user tries to install both the ruby193-scldevel and ruby200-scldevel packages, a transaction check error message is returned. This is an expected behavior because the user can install only one set of the macro files provided by the packages (%scl_ruby, %scl_prefix_ruby).

**libyaml component**

A newer version of the libyaml package is provided with Red Hat Software Collections 1.2 for use by Red Hat Software Collections.

**nodejs component**

When installing the nodejs010 Software Collection, nodejs010 installs GCC in the base Red Hat Enterprise Linux system as a dependency, unless the gcc packages are already installed.

**mariadb component**

In Red Hat Software Collections for Red Hat Enterprise Linux 7, since version 1.1, the mariadb55-mysqld.service file has been renamed to mariadb55-mariadb.service and the /var/log/mariadb55-mysqld.log file has been moved to /var/log/mariadb55-mariadb/mariadb55-mariadb.log, for the sake of consistency with Red Hat Enterprise Linux 7.
CHAPTER 2. INSTALLATION

This chapter describes in detail how to get access to the content set, install Red Hat Software Collections 1.2 on the system, and rebuild Red Hat Software Collections.

2.1. GETTING ACCESS TO RED HAT SOFTWARE COLLECTIONS

Depending on the subscription management service with which you registered your Red Hat Enterprise Linux system, you can either enable Red Hat Software Collections by using Red Hat Subscription Management, or by using RHN Classic. For detailed instructions on how to enable Red Hat Software Collections using RHN Classic or Red Hat Subscription Management, see the respective section below. For information on how to register your system with one of these subscription management services, see Using and Configuring Red Hat Subscription Manager.

IMPORTANT

If you are running a version of Red Hat Enterprise Linux prior to 6.4, you will be unable to download Red Hat Software Collections through Red Hat Subscription Management. To obtain Red Hat Software Collections, either update to Red Hat Enterprise Linux 6.4, or register your system with RHN Classic. For more information, see https://access.redhat.com/solutions/129003.

2.1.1. Using Red Hat Subscription Management

If your system is registered with Red Hat Subscription Management, complete the following steps to attach the subscription that provides access to the repository for Red Hat Software Collections and enable the repository:

1. Display a list of all subscriptions that are available for your system and determine the pool ID of a subscription that provides Red Hat Software Collections. To do so, type the following at a shell prompt as root:

   ```
   subscription-manager list --available
   ```

   For each available subscription, this command displays its name, unique identifier, expiration date, and other details related to it. The pool ID is listed on a line beginning with Pool Id.

2. Attach the appropriate subscription to your system by running the following command as root:

   ```
   subscription-manager subscribe --pool=pool_id
   ```

   Replace pool_id with the pool ID you determined in the previous step. To verify the list of subscriptions your system has currently attached, type as root:

   ```
   subscription-manager list --consumed
   ```

3. Display the list of available Yum list repositories to retrieve repository metadata and determine the exact name of the Red Hat Software Collections repositories. As root, type:

   ```
   yum repolist all
   ```
The repository names depend on the specific version of Red Hat Enterprise Linux you are using and are in the following format:

```
rhel-variant-rhsc1-6-rpms
rhel-variant-rhsc1-6-debug-rpms
rhel-variant-rhsc1-6-source-rpms
rhel-server-rhsc1-6-eus-rpms
rhel-server-rhsc1-6-eus-source-rpms
rhel-server-rhsc1-6-eus-debug-rpms
rhel-variant-rhsc1-7-rpms
rhel-variant-rhsc1-7-debug-rpms
rhel-variant-rhsc1-7-source-rpms
```

Replace `variant` with the Red Hat Enterprise Linux system variant, that is, `server` or `workstation`. Note that Red Hat Software Collections is supported neither on the `Client` nor on the `ComputeNode` variant.

4. Enable the appropriate repository by running the following command as `root`:

```
yum-config-manager --enable repository
```

Once the subscription is attached to the system, you can install Red Hat Software Collections as described in Section 2.2, “Installing Red Hat Software Collections”. For more information on how to register your system using Red Hat Subscription Management and associate it with subscriptions, see Using and Configuring Red Hat Subscription Manager.

### 2.1.2. Using RHN Classic

If your system is registered with RHN Classic (applicable to Red Hat Enterprise Linux versions prior to 6.4), complete the following steps to subscribe to Red Hat Software Collections:

1. Display a list of all channels that are available to you and determine the exact name of the Red Hat Software Collections channel. To do so, type the following at a shell prompt as `root`:

```
rhn-channel --available-channels
```

The name of the channel depends on the specific version of Red Hat Enterprise Linux you are using and is in the following format, where `variant` is the Red Hat Enterprise Linux system variant (`server` or `workstation`):

```
rhel-x86_64-variant-6-rhsc1-1
rhel-x86_64-server-6.4.z-rhsc1-1
rhel-x86_64-server-6.5.z-rhsc1-1
rhel-x86_64-server-6.6.z-rhsc1-1
rhel-x86_64-variant-7-rhsc1-1
```

Note that Red Hat Enterprise Linux 7 channels are accessible only through Red Hat Satellite instances.
2. Subscribe the system to the Red Hat Software Collections channel by running the following command as root:

```
rhn-channel --add --channel=channel_name
```

Replace `channel_name` with the name you determined in the previous step.

3. Verify the list of channels you are subscribed to. As root, type:

```
rhn-channel --list
```

Once the system is subscribed, you can install Red Hat Software Collections as described in Section 2.2, “Installing Red Hat Software Collections”. For more information on how to register your system with RHN Classic, see Using and Configuring Red Hat Subscription Manager.

### 2.2. INSTALLING RED HAT SOFTWARE COLLECTIONS

Red Hat Software Collections is distributed as a collection of RPM packages that can be installed, updated, and uninstalled by using the standard package management tools included in Red Hat Enterprise Linux. Note that a valid subscription is required to install Red Hat Software Collections on your system. For detailed instructions on how to associate your system with an appropriate subscription and get access to Red Hat Software Collections, see Section 2.1, “Getting Access to Red Hat Software Collections”.
IMPORTANT

Some of the Red Hat Software Collections 1.2 packages require the Optional channel to be enabled in order to complete the full installation of these packages:

- The php54-php-imap and php55-php-imap packages require the libc-client package from the Optional channel.

- The php54-php-recode and php55-php-recode packages require the recode package from the Optional channel.

- The perl516-perl-devel package requires the gdbm-devel package from the Optional channel.

- The mariadb55-mariadb-bench package requires the perl-GD package from the Optional channel.

In Red Hat Enterprise Linux 7, the following packages available only in the Optional channel are required:

- The Node.js Software Collection depends on the nodejs010-nodejs-devel package, which requires the c-ares-devel package from the Optional channel (applicable to minimal install).

- The httpd24-mod_ldap package requires the apr-util-ldap package from the Optional channel.

- The php54-php-pspell and php55-php-pspell packages require the aspell package from the Optional channel.

- The python27-python-debug package requires the tix package from the Optional channel.

- The thermostat1-thermostat package requires the apache-commons-beanutils, jansi, hawtjni, jansi-native, and objectweb-asm packages from the Optional channel (applicable to minimal install).

- The thermostat1-thermostat-webapp package requires the felix-framework package from the Optional channel (applicable to minimal install).

- The thermostat1-netty package requires the jzlib package from the Optional channel (applicable to minimal install).

- The apache-commons-logging package requires the xerces-j2 package from the Optional channel (applicable to minimal install).

For detailed instructions on how to subscribe your system to this channel, see the relevant Knowledgebase article on the Customer Portal.
IMPORTANT

Use of Red Hat Software Collections 1.2 requires the removal of the pre-release versions. It is not possible to update to any Red Hat Software Collections 1.2 component from the Beta version. If you have previously installed any Red Hat Software Collections 1.2 component from the Beta version of Red Hat Software Collections, uninstall it from your system and install the new version as described in the Section 2.3, “Uninstalling Red Hat Software Collections” and Section 2.2.1, “Installing Individual Software Collections” sections.

IMPORTANT

The in-place upgrade from Red Hat Enterprise Linux 6 to Red Hat Enterprise Linux 7 is not supported by Red Hat Software Collections. As a consequence, the installed Software Collections might not work correctly after the upgrade. If you want to upgrade from Red Hat Enterprise Linux 6 to Red Hat Enterprise Linux 7, it is strongly recommended to remove all Red Hat Software Collections packages, perform the in-place upgrade, update the Red Hat Software Collections repository, and install the Software Collections packages again. It is advisable to back up all data before upgrading.

2.2.1. Installing Individual Software Collections

To install any of the Software Collections that are listed in Table 1.1, “Red Hat Software Collections 1.2 Components”, install the corresponding meta package by typing the following at a shell prompt as root:

```bash
yum install software_collection...
```

Replace `software_collection` with a space-separated list of Software Collections you want to install. For example, to install php54 and mariadb55, type as `root`:

```bash
~# yum install php54 mariadb55
```

This installs the main meta package for the selected Software Collection and a set of required packages as its dependencies. For information on how to install additional packages such as additional modules, see Section 2.2.2, “Installing Optional Packages”.

2.2.2. Installing Optional Packages

Each component of Red Hat Software Collections is distributed with a number of optional packages that are not installed by default. To list all packages that are part of a certain Software Collection but are not installed on your system, type the following at a shell prompt:

```bash
yum list available software_collection-\*
```

To install any of these optional packages, type as `root`:

```bash
yum install package_name...
```

Replace `package_name` with a space-separated list of packages that you want to install. For example, to install the perl516-perl-CPAN and perl516-perl-Archive-Tar, type:
2.2.3. Installing Debugging Information

To install debugging information for any of the Red Hat Software Collections packages, make sure that the `yum-utils` package is installed and type the following command as `root`:

```
$ debuginfo-install package_name
```

For example, to install debugging information for the `ruby193-ruby` package, type:

```
$ debuginfo-install ruby193-ruby
```

Note that in order to use this command, you need to have access to the repository with these packages. If your system is registered with Red Hat Subscription Management, enable the `rhel-variant-rhsc1-6-debug-rpms` or `rhel-variant-rhsc1-7-debug-rpms` repository as described in Section 2.1.1, “Using Red Hat Subscription Management”. If your system is registered with RHN Classic, subscribe the system to the `rhel-x86_64-variant-6-rhsc1-1-debuginfo` or `rhel-x86_64-variant-7-rhsc1-1-debuginfo` channel as described in Section 2.1.2, “Using RHN Classic”. For more information on how to get access to debuginfo packages, see https://access.redhat.com/solutions/9907.

2.3. UNINSTALLING RED HAT SOFTWARE COLLECTIONS

To uninstall any of the Software Collections components, type the following at a shell prompt as `root`:

```
$ yum remove software_collection\*
```

Replace `software_collection` with the Software Collection component you want to uninstall.

Note that uninstallation of the packages provided by Red Hat Software Collections does not affect the Red Hat Enterprise Linux system versions of these tools.

2.4. REBUILDING RED HAT SOFTWARE COLLECTIONS

<collection>-build packages are not provided by default. If you wish to rebuild a collection and do not want or cannot use the `rpmbuild --define 'scl foo'` command, you first need to rebuild the metapackage, which provides the <collection>-build package.

Note that existing collections should not be rebuilt with different content. To add new packages into an existing collection, you need to create a new collection containing the new packages and make it dependent on packages from the original collection. The original collection has to be used without changes.

For detailed information on building Software Collections, refer to the Red Hat Software Collections Packaging Guide.
CHAPTER 3. USAGE

This chapter describes the necessary steps for rebuilding and using Red Hat Software Collections 1.2 and deploying applications that use Red Hat Software Collections.

3.1. USING RED HAT SOFTWARE COLLECTIONS

3.1.1. Running an Executable from a Software Collection

To run an executable from a particular Software Collection, type the following command at a shell prompt:

    scl enable software_collection... 'command...'

Or, alternatively, use the following command:

    scl enable software_collection... --command...

Replace software_collection with a space-separated list of Software Collections you want to use and command with the command you want to run. For example, to execute a Perl program stored in a file named hello.pl with the Perl interpreter from the perl516 Software Collection, type:

    ~]$ scl enable perl516 'perl hello.pl'
    Hello, World!

You can execute any command using the scl utility, causing it to be run with the executables from a selected Software Collection in preference to their possible Red Hat Enterprise Linux system equivalents. For a complete list of Software Collections that are distributed with Red Hat Software Collections, see Table 1.1, “Red Hat Software Collections 1.2 Components”.

3.1.2. Running a Shell Session with a Software Collection as Default

To start a new shell session with executables from a selected Software Collection in preference to their Red Hat Enterprise Linux equivalents, type the following at a shell prompt:

    scl enable software_collection... bash

Replace software_collection with a space-separated list of Software Collections you want to use. For example, to start a new shell session with the python27 and postgresql92 Software Collections as default, type:

    ~]$ scl enable python27 postgresql92 bash

The list of Software Collections that are enabled in the current session is stored in the $X_SCLS environment variable, for instance:

    ~]$ echo $X_SCLS
    python27 postgresql92

For a complete list of Software Collections that are distributed with Red Hat Software Collections, see Table 1.1, “Red Hat Software Collections 1.2 Components”.
3.1.3. Running a System Service from a Software Collection

Software Collections that include system services install corresponding init scripts in the
/etc/rc.d/init.d/ directory. To start such a service in the current session, type the following at a
shell prompt as root:

```
service software_collection-service_name start
```

Replace `software_collection` with the name of the Software Collection and `service_name` with the name
of the service you want to start. To configure this service to start automatically at boot time, type the
following command as root:

```
chkconfig software_collection-service_name on
```

For example, to start the `postgresql` service from the `postgresql92` Software Collection and enable it
in runlevels 2, 3, 4, and 5, type as root:

```
~$]# service postgresql92-postgresql start
Starting postgresql92-postgresql service:                  [  OK  ]
~$]# chkconfig postgresql92-postgresql on
```

For more information on how to manage system services in Red Hat Enterprise Linux 6, refer to the
Red Hat Enterprise Linux 6 Deployment Guide. For a complete list of Software Collections that are
distributed with Red Hat Software Collections, see Table 1.1, “Red Hat Software Collections 1.2
Components”.

3.2. ACCESSING A MANUAL PAGE FROM A SOFTWARE COLLECTION

Every Software Collection contains a general manual page that describes the content of this
component. Each manual page has the same name as the component and it is located in the/opt/rh
directory.

To read a manual page for a Software Collection, type the following command:

```
scl enable software_collection 'man software_collection'
```

Replace `software_collection` with the particular Red Hat Software Collections component. For example,
to display the manual page for `mariadb55`, type:

```
~]$ scl enable mariadb55 "man mariadb55"
```

3.3. DEPLOYING APPLICATIONS THAT USE RED HAT SOFTWARE COLLECTIONS

In general, you can use one of the following two approaches to deploy an application that depends on a
component from Red Hat Software Collections in production:

- Install all required Software Collections and packages manually and then deploy your
  application, or
- Create a new Software Collection for your application and specify all required
  Software Collections and other packages as dependencies.
For more information on how to manually install individual Red Hat Software Collections components, see Section 2.2, “Installing Red Hat Software Collections”. For further details on how to use Red Hat Software Collections, see Section 3.1, “Using Red Hat Software Collections”. For a detailed explanation of how to create a custom Software Collection or extend an existing one, read the Red Hat Software Collections Packaging Guide.

3.4. DOCKERFILES FOR RED HAT SOFTWARE COLLECTIONS

Red Hat Software Collections 1.2 is shipped with Dockerfiles for the following Software Collections:

- httpd24
- mariadb55
- mongodb24
- mysql55
- nginx16
- nodejs010
- perl516
- php54
- php55
- postgresql92
- python27
- python33
- ror40
- ruby193
- ruby200

The Dockerfiles are included in the rhscl-dockerfiles package distributed with Red Hat Software Collections. Dockerfiles are text files that define how a Docker image is created.

Each Dockerfile creates a minimal Docker image from Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 7 plus the Software Collection. Each Dockerfile will create an image which:

- Installs the basic set of packages from each Software Collection,
- Exposes some TCP ports; for example, port 80 and 443 for the httpd24 collection.

The Dockerfiles are provided as examples, using which customers can build more complex containers.

3.4.1. Installation and usage

To install the rhscl-dockerfiles package, type the following command as root:
yum install rhscl-dockerfiles

Use these Dockerfiles to create Docker images for the covered Software Collections.

For more information about building an image from a Dockerfile, see https://access.redhat.com/articles/881893#build.

Usage of Dockerfiles is described in the Using Dockerfiles section in the Red Hat Enterprise Linux 7 Resource Management and Linux Containers Guide.

3.4.2. Deploying Software Collections dependent on the Red Hat Software Collections Docker images

You can use a Red Hat Software Collections Docker image as a base image and create your own containerized Software Collection on top of it as a separate image.

For more information about creating a new Docker image, see https://access.redhat.com/articles/881893#create.
CHAPTER 4. SPECIFICS OF INDIVIDUAL SOFTWARE COLLECTIONS

This chapter is focused on the specifics of certain Software Collections and provides additional details concerning these components.

4.1. RED HAT DEVELOPER TOOLSET

Red Hat Developer Toolset is designed for developers working on the Red Hat Enterprise Linux platform. Red Hat Developer Toolset provides current versions of the GNU Compiler Collection, GNU Debugger, Eclipse development platform, and other development, debugging, and performance monitoring tools. Similarly to other Software Collections, an additional set of tools is installed into the /opt/ directory. These tools are enabled by the user on demand using the supplied scl utility. Similarly to other Software Collections, these do not replace the Red Hat Enterprise Linux system versions of these tools, nor will they be used in preference to those system versions unless explicitly invoked using the scl utility.

For a list of features, refer to the Main Features section of the Red Hat Developer Toolset Release Notes.

For a complete list of components, see the Red Hat Developer Toolset Components table in the Red Hat Developer Toolset User Guide.

4.2. THERMOSTAT 1

The Thermostat Software Collection provides a monitoring and instrumentation tool for the OpenJDK HotSpot JVM, with support for monitoring multiple JVM instances. The system is made up of two components: an Agent, which collects data, and a Client, which allows users to visualize collected data. These components communicate via a storage layer: either directly via MongoDB or indirectly via a Web layer for increased security. A pluggable agent and GUI framework allows for collection and visualization of performance data beyond what is included out of the box.

To install the thermostat1 collection, type the following command as root:

```
yum install thermostat1
```

To enable this collection, type the following command at a shell prompt:

```
scl enable thermostat1 bash
```

To deploy the thermostat1-thermostat-webapp, start the web storage endpoint in Red Hat Software Collections by typing the following command as root:

```
service thermostat1-thermostat-tomcat start
```

For more information, please refer to the Thermostat User Guide. In order to deploy Thermostat securely, see the Configuration and Administration Guide.

4.3. RUBY ON RAILS 4.0

This Software Collection adds the ruby200 package together with the ror40 package. The Ruby on Rails collection can be enabled by the following command, which will automatically enable ruby200:
4.4. MONGODB 2.4.9

To install the mongodb24 collection, type the following command as root:

```bash
yum install mongodb24
```

To run the MongoDB shell utility, type the following command:

```bash
scl enable mongodb24 'mongo'
```

4.4.1. MongoDB 2.4.9 on Red Hat Enterprise Linux 6

If you are using Red Hat Enterprise Linux 6, the following instructions apply to your system.

To start the MongoDB daemon, type the following command as root:

```bash
service mongodb24-mongodb start
```

To start the MongoDB daemon on boot, type this command as root:

```bash
chkconfig mongodb24-mongodb on
```

To start the MongoDB sharding server, type this command as root:

```bash
service mongodb24-mongodb-shard start
```

To start the MongoDB sharding server on boot, type the following command as root:

```bash
chkconfig mongodb24-mongodb-shard on
```

4.4.2. MongoDB 2.4.9 on Red Hat Enterprise Linux 7

When using Red Hat Enterprise Linux 7, the following commands are applicable.

To start the MongoDB daemon, type the following command as root:

```bash
systemctl start mongodb24-mongodb.service
```

To start the MongoDB daemon on boot, type this command as root:

```bash
systemctl enable mongodb24-mongodb.service
```

To start the MongoDB sharding server, type the following command as root:

```bash
systemctl start mongodb24-mongodb-shard.service
```
To start the MongoDB sharding server on boot, type this command as `root`:

```
systemctl enable mongodb24-mongodb-shard.service
```

### 4.5. GIT

Git is a distributed revision control system with a decentralized architecture. As opposed to centralized version control systems with a client-server model, Git ensures that each working copy of a Git repository is an exact copy with complete revision history. This not only allows you to work on and contribute to projects without the need to have permission to push your changes to their official repositories, but also makes it possible for you to work with no network connection. For detailed information, see the Git chapter in the Red Hat Enterprise Linux 6 Developer Guide.

### 4.6. DEVASSISTANT

DevAssistant is a tool designed to assist developers with creating and setting up basic projects in various programming languages, installing dependencies, setting up a development environment, and working with source control. The devassist09 Software Collection supports several programming languages, namely C, C++, Java, and Python. Additionally, DevAssistant is able to support working with any other language, framework, or tool due to its modular architecture.

DevAssistant is a framework that runs plug-ins called assistants. Each assistant can have several subassistants.

#### 4.6.1. Getting Started with DevAssistant

To install the devassist09 Software Collection, type the following command as `root`:

```
yum install devassist09
```

To enable this collection, type the following command at a shell prompt:

```
scl enable devassist09 bash
```

To get help for DevAssistant, use the following command:

```
devassistant --help
```

or the shorter variant of the same command:

```
da -h
```

It is advisable to use the `--help` option on each level to list your possible next steps, until you reach the level of an executable subassistant (see Example 4.1, “Creating a New Python Library Project” ).

To access the graphical user interface, type this command at a shell prompt:

```
devassistant-gui
```

or the shortened variant:

```
da-gui
```
Please note that the GUI is available only if you install the devassist09 Software Collection on Red Hat Enterprise Linux 7. The functionalities and procedures are the same as when using the command line interface.

Note that the devassistant and da commands are equal. Further in the text, we will use only the shorter variant, the da command.

### 4.6.2. Running Assistants

DevAssistant provides the following functionalities: create, modify, prepare, and task. To run an assistant, use the following command:

```bash
da [--debug] {create,modify,prepare,task} [assistant [arguments]] ...
```

The four basic commands and descriptions related to these functionalities are listed in the following table:

**Table 4.1. Functionalities of DevAssistant**

<table>
<thead>
<tr>
<th>Command</th>
<th>Shortened Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>da create</td>
<td>da crt</td>
<td>Creating a new project from scratch</td>
</tr>
<tr>
<td>da modify</td>
<td>da mod</td>
<td>Working with an existing project</td>
</tr>
<tr>
<td>da prepare</td>
<td>da prep</td>
<td>Preparing a development environment for an upstream project</td>
</tr>
<tr>
<td>da task</td>
<td></td>
<td>Performing a custom task not related to a specific project</td>
</tr>
</tbody>
</table>

The devassist09 Software Collection does not include any assistants for the modify, prepare, and task functionalities. These categories are available for users who want to create their own assistants.

### 4.6.3. Creating Projects with DevAssistant

The devassist09 Software Collection includes the following assistants for creating projects:

**Table 4.2. Assistants for Creating Projects**

<table>
<thead>
<tr>
<th>Assistant</th>
<th>Subassistant</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td>app</td>
<td>An application in C</td>
</tr>
<tr>
<td></td>
<td>lib</td>
<td>A dynamically linked library in C</td>
</tr>
<tr>
<td>cpp</td>
<td>app</td>
<td>An application in C++</td>
</tr>
<tr>
<td></td>
<td>lib</td>
<td>A dynamically linked library in C++</td>
</tr>
</tbody>
</table>
### Example 4.1. Creating a New Python Library Project

To create a new Python library project, complete the following steps:

1. Enable the devassist09 Software Collection by running this command:

   ```
   $ scl enable devassist09 bash
   ```

2. Display help about DevAssistant by using the `--help` option:

   ```
   $ da --help
   ```

   You can either run assistants with:
   ```
   da [--debug] {create,modify,prepare,task} [ASSISTANT [ARGUMENTS]] ...
   ```

   Where:
   - `create` used for creating new projects
   - `modify` used for working with existing projects
   - `prepare` used for preparing environment for upstream projects
   - `task` used for performing custom tasks not related to a specific project

   You can shorten "create" to "crt", "modify" to "mod" and "prepare" to "prep".

   Or you can run a custom action:
   ```
   da [--debug] [ACTION] [ARGUMENTS]
   ```

   Available actions:
   - `help` Print detailed help
   - `version` Print version

3. List the possible next steps for creating a project by typing:

   ```
   $ da create --help
   ```

   Kickstart new projects easily with DevAssistant.

   ```
   usage: create [-h] [--deps-only] {c,cpp,java,python} ...
   ```

   Optional arguments:
   ```
   -h, --help     show this help message and exit
   --deps-only    Only install dependencies
   ```

### Assistant and Subassistant Table

<table>
<thead>
<tr>
<th>Assistant</th>
<th>Subassistant</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>java</td>
<td>maven</td>
<td>A simple project using Maven</td>
</tr>
<tr>
<td>python</td>
<td>lib</td>
<td>A simple library for Python</td>
</tr>
</tbody>
</table>
Following subassistants will help you with setting up your project:

{c,cpp,java,python}

4. Display help on the python assistant by typing at a shell prompt:

```bash
~]$ da create python --help
usage: create python [-h] {lib} ...

This is a base Python assistant, you have to select a subassistant.

optional arguments:
  -h, --help  show this help message and exit

subassistants:
  Following subassistants will help you with setting up your project.
  {lib}
```

5. List your choices for the only python subassistant, lib, by running this command:

```bash
~]$ da create python lib --help
usage: create python lib [-h] [-e [ECLIPSE]] -n NAME

Scaffolds a simple Python library project.

optional arguments:
  -h, --help            show this help message and exit
  -e [ECLIPSE], --eclipse [ECLIPSE]
                        Configure as Eclipse project (uses ~/workspace or specified directory)
  -n NAME, --name NAME  Name of project to create
```

6. Run the assistant to create your new Python library project named mypythonlib by using the following command:

```bash
~]$ da create python lib -n mypythonlib
```

To get more information about the upstream version of DevAssistant, refer to the DevAssistant User Documentation. Please note that though the basic concept of the upstream application is the same as in the devassist09 Software Collection, individual plug-ins and their functionalities might differ.

4.7. MAVEN

The maven30 Software Collection provides a software project management and comprehension tool. Based on the concept of a project object model (POM), Maven can manage a project’s build, reporting, and documentation from a central piece of information.
To install the maven30 collection, type the following command as **root**:

```bash
yum install maven30
```

To enable this collection, type the following command at a shell prompt:

```bash
scl enable maven30 bash
```

Global Maven settings, such as remote repositories or mirrors, can be customized by editing the `/opt/rh/maven30/root/etc/maven/settings.xml` file.

For more information about using Maven, refer to the [Maven documentation](#). To find documentation regarding individual plug-ins, please see the [index of plug-ins](#).
CHAPTER 5. MIGRATION

This chapter provides information on migration from one version to another for specific components of Red Hat Software Collections 1.2.

5.1. MIGRATING FROM MYSQL 5.1 TO MYSQL 5.5

5.1.1. Notable Differences Between MySQL 5.1 and MySQL 5.5

The following is a list of the most important changes between MySQL 5.1 and MySQL 5.5:

- Starting with MySQL 5.5, the InnoDB storage engine (formerly known as InnoDB Plugin) is the default storage engine.

- InnoDB and some other plug-ins (for example, archive, blackhole and federated) were installable plug-ins in MySQL 5.1. Starting with MySQL 5.5, these plug-ins became compiled-in storage engines, that is, they cannot be installed or uninstalled by default.

- If you used InnoDB Plugin and it was loaded using the plugin-load=innodb=ha_innodb_plugin.so configuration option, you need to remove this configuration option as it does not work in MySQL 5.5.

- In MySQL 5.1, InnoDB Plugin included a configuration variable innodb_file_io_threads. However, this variable does not exist in MySQL 5.5; new variables, innodb_read_io_threads and innodb_write_io_threads, are used instead. To ensure proper functionality, either remove the former variable from the configuration file or replace it with the current variables.

- When upgrading from MySQL 5.1 to MySQL 5.5 using the in-place upgrading method, the mysql.proxies_priv table will not exist. To create the missing table, the mysql_upgrade utility has to be run as soon as the new daemon is started.

- MySQL 5.5 uses latin1 for the stopword file if the character_set_server variable is ucs2, utf16 or utf32. Thus, if the table uses FULLTEXT indexes in these cases, users should repair the table using the REPAIR TABLE table_name QUICK.

- MySQL 5.1 used the language variable for specifying the directory which included the error message file. This option is now deprecated and has been replaced by the lc_messages_dir and lc_messages options. This also applies for configuration options. Also, error messages no longer contain mixed set of character sets and error messages are returned in the set following the character_set_results system variable instead. That is, some error messages can be different in MySQL 5.5.

Please note that the EXAMPLE plug-in is no longer distributed in Red Hat Software Collections packages.


IMPORTANT

MariaDB is a community-developed drop-in replacement for MySQL. The differences between MySQL 5.1 and MySQL 5.5 are valid also for MySQL 5.1 and MariaDB 5.5.
5.1.2. Upgrading from MySQL 5.1 to MySQL 5.5

Before migrating from MySQL 5.1 to MySQL 5.5, back up all your data, including any MySQL databases. Because the mysql55 Software Collection does not conflict with the mysql packages from the core systems, it is possible to install the mysql55 Software Collection together with the mysql packages. It is also possible to run both versions at the same time, however, the port number and the socket in the my.cnf files need to be changed to prevent these specific resources from conflicting.

Upgrading can be performed either by using the mysqldump and mysqlimport utilities or using in-place upgrade:

- In the first scenario, the whole dump of all databases from one database is generated, mysql is run with the dump file as an input, using mysqlimport or the LOAD DATA INFILE SQL command within the other database. At the same time, the appropriate daemons have to be running during both dumping and restoring. You can use the --all-databases option in the mysqldump call to include all databases in the dump. The --routines, --triggers and --events options can also be used if needed.

- During the in-place upgrade, the data files are copied from one database directory to another database directory. The daemons should not be running at the time of copying. Set the appropriate permissions and SELinux context for copied files.

After upgrading, start the server and run the mysql_upgrade command. Running mysql_upgrade is necessary to check and repair internal tables.

**IMPORTANT**

All scripts that work with a server form Software Collection, especially the mysql_upgrade script, should be run inside the scl enable environment.

In case the root user has a non-empty password defined (it should have it defined), it is necessary to call the mysql_upgrade utility with the -p option and specify the password.

The dump and restore upgrade method is recommended. The in-place upgrade method is usually faster, however, there are certain risks and known problems. For more information, refer to the MySQL 5.5 Release Notes.

In addition, once the upgrade is complete, consider changing the appropriate settings in the my.cnf file to reflect the environment.

**Example 5.1. Dump and Restore Upgrade**

```
~]# service mysqld start
Starting mysqld:                                           [ OK ]
~]# mysqldump --all-databases --routines --events > dump.sql
~]# service mysqld stop
Stopping mysqld:                                           [ OK ]
~]# service mysql55-mysqld start
Starting mysql55-mysqld:                                   [ OK ]
~]# scl enable mysql55 'mysql' < dump.sql
~]# scl enable mysql55 'mysql_upgrade -u root -p'
Enter password:
Looking for 'mysql' as: mysql
Looking for 'mysqlcheck' as: mysqlcheck
Running 'mysqlcheck with default connection arguments
```
Example 5.2. In-place Upgrade

~# service mysqld stop
Stopping mysqld: [ OK ]
~# service mysql55-mysqld stop
Stopping mysql55-mysqld: [ OK ]
~# rm -rf /opt/rh/mysql55/root/var/lib/mysql/
~# cp -r /var/lib/mysql/ /opt/rh/mysql55/root/var/lib/
~# chown -R mysql:mysql /opt/rh/mysql55/root/var/lib/
~# restorecon -R /opt/rh/mysql55/root/var/lib/
~# service mysql55-mysqld start
Starting mysql55-mysqld: [ OK ]
~# scl enable mysql55 'mysql_upgrade -u root -p'
Enter password:
Looking for 'mysql' as: mysql
Looking for 'mysqlcheck' as: mysqlcheck
Running 'mysqlcheck with default connection arguments
a.t1 OK
mysql.columns_priv OK
<skipped tables list>
mysql.user OK
Running 'mysql_fix_privilege_tables'...
OK

For more information about the upgrading process, refer to MySQL 5.5 Reference Manual.

IMPORTANT

MariaDB is a community-developed drop-in replacement for MySQL. The steps for upgrading from MySQL 5.1 to MySQL 5.5 are valid also for upgrading from MySQL 5.1 to MariaDB 5.5, with the exception of the following differences:

- The mariadb55 component name should be used instead of the mysql55, so replace all occurrences of mysql55 with mariadb55.

- The systemd unit name for MariaDB 5.5 is mariadb55-mariadb in Red Hat Enterprise Linux 7, while the SysV unit script for MariaDB 5.5 is called mariadb55-mysqld in Red Hat Enterprise Linux 6.

5.1.3. Using the mysql55-mysql-devel Package

Red Hat Software Collections contains the server part of MySQL 5.5 database. Red Hat Enterprise Linux 6 provides version 5.1 of this database (client library and server daemon). A protocol
which is used between the client library and the daemon is stable across database versions, so using, for example, the MySQL 5.1 client library with the MySQL 5.5 daemon works as expected.

5.1.3.1. Using Database Connectors for Dynamic Languages

**IMPORTANT**

When a MariaDB or MySQL database contains old users created using old authentication schema, PHP using the mysqlnd driver will not be able to connect to the database. This is because the old_password setting in the /etc/my.cnf file is turned off by default on Red Hat Enterprise Linux 6 while it is enabled on Red Hat Enterprise Linux 5. To work around this problem, set old_password to 0, restart the MariaDB or MySQL service and set a new password for each user.

5.1.3.2. Building Applications for MySQL 5.5 from Red Hat Software Collections

MySQL 5.5 from Red Hat Software Collections does not include database connectors; client libraries packaged in the MySQL 5.5 Red Hat Software Collections database packages are not supposed to be used as they are included only for purposes of server utilities and the daemon. Users are instead expected to use the system libraries and database connectors provided with the core system.

It means that users who would like to link their application against the MySQL client library should compile it and link it to the core Red Hat Enterprise Linux 6 environment, not to the MySQL 5.5 Red Hat Software Collections environment.

The only exception to this are server-side plug-ins, which are expected to be built under the MySQL 5.5 Red Hat Software Collections environment. This means the build process should be run inside the scl enable mysql55 '...' call.

5.2. MIGRATING FROM POSTGRESQL 8.4 TO POSTGRESQL 9.2

Red Hat Software Collections 1.2 is distributed with PostgreSQL 9.2, which can be safely installed on the same machine in parallel with PostgreSQL 8.4 from Red Hat Enterprise Linux 6. It is also possible to run both versions of PostgreSQL on one machine at the same time, but you need to use different ports or IP addresses and adjust SELinux policy.

5.2.1. Notable Differences Between PostgreSQL 8.4 and PostgreSQL 9.2

The following is a list of the most important changes between PostgreSQL 8.4 and PostgreSQL 9.2:

- The following server configuration parameters have been removed and are no longer supported: add_missing_from, regex_flavor, silent_mode, wal_sender_delay, and custom_variable_classes. Do not use any of these parameters in the new configuration file.

- The unix_socket_directory parameter has been renamed to unix_socket_directories and can now be used to specify more than one UNIX socket to listen on. To do so, provide a list of comma-separated directories as the value of this option. The default value remains unchanged and is /tmp.

- New configuration parameters ssl_ca_file, ssl_cert_file, ssl_crl_file, and ssl_key_file have been added. These configuration parameters can be used to specify the locations of server-side SSL files that were previously hard-coded as relative paths to the root.crt, server.crt, root.crl, and server.key files in the data directory.
Note that the PostgreSQL server no longer reads the `root.crt` and `root.crl` files by default. To load these files, change the corresponding parameters to non-default values.

- The `=>` operator has been removed and users are now advised to use the `hstore(text, text)` function.

- The default value of the `standard_conforming_strings` configuration parameter is now on. This configuration parameter controls if ordinary string literals (strings enclosed in single quotes) treat backslashes literally as specified in the SQL standard.

- A new configuration parameter, `backslash_quote`, has been added. This configuration parameter can be used to control whether a single quotation mark can be represented by `\'` in string literals. The default value is `safe_encoding`, which permits the use of `\'` only when the client encoding does not allow ASCII backslashes in multi-byte characters. As a consequence, `\'` can now be interpreted differently only in specific cases and only in string literals that do not conform to standards, including escape string syntax, `E'value'`.

- PostgreSQL 9.0 introduced access privileges for large objects. Consequently, a new configuration parameter, `lo_compat_privileges`, has been added to allow you to disable security checks related to the large objects affected by this change. To disable these security checks, change the value of this configuration parameter to `on`. The default value is `off`.

For a detailed list of known compatibility issues with earlier versions, see the official notes for PostgreSQL 9.0, PostgreSQL 9.1, and PostgreSQL 9.2. For an in-depth list of changes in behavior, see the upstream Release Notes.

### 5.2.2. Upgrading from PostgreSQL 8.4 to PostgreSQL 9.2

To migrate your data from PostgreSQL 8.4 that is distributed with Red Hat Enterprise Linux 6 to PostgreSQL 9.2 that is included in Red Hat Software Collections 1.2, you can either perform an in-place upgrade (recommended), or dump the database data into a text file with SQL commands and import it in the new database. Note that the second method is usually significantly slower and may require manual fixes; see the official documentation for more information about this upgrade method. If you need to migrate PostgreSQL databases to Red Hat Enterprise Linux 7, see https://access.redhat.com/articles/541873 and https://access.redhat.com/articles/694413.

**IMPORTANT**

Before migrating your data from PostgreSQL 8.4 to PostgreSQL 9.2, make sure that you back up all your data, including the PostgreSQL database files that are by default located in the `/var/lib/pgsql/data/` directory.

**Procedure 5.1. Performing In-place Upgrade**

To perform an in-place upgrade of your PostgreSQL server, complete the following steps:

1. Stop the old PostgreSQL server to ensure that the data is not in an inconsistent state. To do so, type the following at a shell prompt as `root`:

   ```
   service postgresql stop
   ```

   To verify that the server is not running, type:
2. Verify that the new data directory located in 
   /opt/rh/postgresql92/root/var/lib/pgsql/data/ does not exist:

   file /opt/rh/postgresql92/root/var/lib/pgsql/data/

   If you are running a fresh installation of PostgreSQL 9.2, this directory should not be present in your system. If it is, back it up by running the following command as root:

   mv /opt/rh/postgresql92/root/var/lib/pgsql/data{,-scl-backup}

3. Copy the old database data to the new location by typing the following at a shell prompt as root:

   cp -ra /var/lib/pgsql/data/ /opt/rh/postgresql92/root/var/lib/pgsql/

4. Open the /opt/rh/postgresql92/root/var/lib/pgsql/data/pg_hba.conf configuration file and verify that the postgres user is allowed to connect to the PostgreSQL server from localhost without a password. If not, you can edit this file and temporarily set the authentication method for the postgres user to trust or ident. For a detailed description of the pg_hba.conf file and a complete list of available configuration options, see the official documentation.

5. Upgrade the database data for the new server by running the following command as root:

   service postgresql92-postgresql upgrade

   It is recommended that you read the resulting /opt/rh/postgresql92/root/var/lib/pgsql/pgupgrade.log log file to see if there were any problems with the upgrade.

6. Start the new server as root:

   service postgresql92-postgresql start

   It is also advised that you run the analyze_new_cluster.sh script as follows:

   su - postgres -c 'scl enable postgresql92 ~/analyze_new_cluster.sh'

7. Optionally, you can configure the PostgreSQL 9.2 server to start automatically at boot time. To disable the old PostgreSQL 8.4 server, type the following command as root:

   chkconfig postgresql off

   To enable the PostgreSQL 9.2 server, type as root:

   chkconfig postgresql92-postgresql on

Procedure 5.2. Performing a Dump and Restore Upgrade
To perform a dump and restore upgrade of your PostgreSQL server, complete the following steps:

1. Ensure that the old PostgreSQL server is running by typing the following at a shell prompt as root:
   
   ```bash
   service postgresql start
   ```

2. Dump all data in the PostgreSQL database into a script file. As root, type:
   
   ```bash
   su - postgres -c 'pg_dumpall > ~/pgdump_file.sql'
   ```

3. Stop the old server by running the following command as root:
   
   ```bash
   service postgresql stop
   ```

4. Initialize the data directory for the new server as root:
   
   ```bash
   service postgresql92-postgresql initdb
   ```

5. Start the new server as root:
   
   ```bash
   service postgresql92-postgresql start
   ```

6. Import data from the previously created SQL file:
   
   ```bash
   su - postgres -c 'scl enable postgresql92 "psql -f ~/pgdump_file.sql postgres"
   ```

7. Optionally, you can configure the PostgreSQL 9.2 server to start automatically at boot time. To disable the old PostgreSQL 8.4 server, type the following command as root:
   
   ```bash
   chkconfig postgresql off
   ```

   To enable the PostgreSQL 9.2 server, type as root:
   
   ```bash
   chkconfig postgresql92-postgresql on
   ```

8. If your configuration differs from the default one, make sure to update configuration files, especially the `/opt/rh/postgresql92/root/var/lib/pgsql/data/pg_hba.conf` configuration file. Otherwise only the `postgres` user will be allowed to access the database.

5.3. MIGRATING FROM NGINX 1.4 TO NGINX 1.6

In Red Hat Software Collections 1.2, nginx has been upgraded from version 1.4.4 to 1.6.1. The Software Collection has been renamed to nginx16 and it is now supported.

The nginx16 Software Collection uses a new prefix in accordance with the name of the collection and a different path to the root directory, which is now located in `/opt/rh/nginx16/root/`. The error log is now stored in `/var/log/nginx16/error.log` by default, and the initscript is called `nginx16-nginx`. 
Configuration files in nginx 1.6 have the same format as in the previous version and they are compatible between version 1.4 and 1.6.

**IMPORTANT**

Before upgrading from nginx 1.4 to nginx 1.6, back up all your data, including web pages and configuration files located in the `/opt/rh/nginx14/root/` tree.

If you have made any specific changes, such as changing configuration files or setting up web applications, in the `/opt/rh/nginx14/root/` tree, replicate those changes in the new `/opt/rh/nginx16/root/` directory, too.

CHAPTER 6. ADDITIONAL RESOURCES

For more information about Red Hat Software Collections 1.2 and Red Hat Enterprise Linux, refer to the resources listed below.

6.1. RED HAT ENTERPRISE LINUX DEVELOPER PROGRAM GROUP

Users of Red Hat Software Collections can access the Red Hat Enterprise Linux Developer Program Group in the Red Hat Customer Portal to get developer related information for the development tools available for Red Hat Enterprise Linux. In addition, users can find developer related papers and videos on topics that are of interest to developers, for example RPM building, threaded programming, performance tuning, debugging, and so on.

To visit the Red Hat Enterprise Linux Developer Program Group, log in to the Customer Portal, click Products at the top of the page, choose Services, and then Red Hat Enterprise Linux Developer Program from the list.

6.2. RED HAT PRODUCT DOCUMENTATION

The following documents are directly or indirectly relevant to this book:

- **Red Hat Software Collections 1.2 Packaging Guide** — The Packaging Guide for Red Hat Software Collections explains the concept of Software Collections, documents the scl utility, and provides a detailed explanation of how to create a custom Software Collection or extend an existing one.

- **Red Hat Developer Toolset 3.0 Release Notes** — The Release Notes for Red Hat Developer Toolset document known problems, possible issues, changes, and other important information about this Software Collection.


- **Using and Configuring Red Hat Subscription Manager** — The Using and Configuring Red Hat Subscription Manager book provides detailed information on how to register Red Hat Enterprise Linux systems, manage subscriptions, and view notifications for the registered systems.


- **Red Hat Enterprise Linux 6 Deployment Guide** — The Deployment Guide for Red Hat Enterprise Linux 6 provides relevant information regarding the deployment, configuration, and administration of this system.

- **Red Hat Enterprise Linux 7 System Administrator’s Guide** — The System Administrator’s Guide for Red Hat Enterprise Linux 7 provides information on deployment, configuration, and administration of this system.
6.3. RED HAT DEVELOPER BLOG

Red Hat Developer Blog content is directed to designers and developers of applications based on Red Hat technologies. It contains links to product team blogs and other relevant internal and external resources. Its goal is to inform and engage the developer community with up-to-date information, best practices, opinion, product and program announcements as well as pointers to sample code and other resources.
## APPENDIX A. REVISION HISTORY

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<th>Revision 1.1-27</th>
<th>Thu 09 Jun 2016</th>
<th>Lenka Špačková</th>
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<td>Fixed a path in the MySQL in-place upgrade example.</td>
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<td>Added information about Dockerfiles.</td>
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