Single-Step Deployment of
Veritas™ Storage Foundation
and High Availability 6.0.3 on
RHEL 6.4/6.5 Using Yum

Author: Patric Uebele
Technical Product Manager

Version: March, 2014

Contents

Introduction

This deployment guide explains how to install and configure Veritas Storage Foundation and High Availability products on Red Hat Enterprise Linux (RHEL) systems using the Yum package manager. Special focus is on the RHEL 6.4/6.5 versions, as these require a multi-step installation process using Symantec's Common Product Installer (CPI). Both RHEL 6.4 and RHEL 6.5 require an upgrade to the Storage Foundation 6.0.3 maintenance release and the installation of Veritas File System (VxFS) hot fix 6.0.300.300. (See TechNote 203099 and TechNote 214270.)

For details about supported platforms, see the Products and Platform Platforms Matrix on the Symantec Operations Readiness Tools (SORT) website.

Using YUM as described in this guide lets you install the Veritas Storage Foundation base product packages as well as all the necessary updates and patches from a central Yum repository in one step, without the need for multiple calls to the product installer.

Note that the method described below is only suitable for fresh installations of Storage Foundation products, not for upgrades or patch installations.

Details about using native installation methods like Yum can be found in the Storage Foundation Installation Guide 6.0.1 and later.

Beginning with Storage Foundation version 6.1, CPI offers you a method to easily install or upgrade your systems directly to a base, maintenance, or hot fix level in one step using Install Bundles.

For more information on Install Bundles, see the SFHA 6.1 Installation Guide.

Tested scenarios

The following product versions and architecture are used in this guide:

- Red Hat Enterprise Linux Server 6.5

- Storage Foundation 6.0.3

- VxFS hot fix 6.0.300.300

A server running RHEL 6.5 (hostname `server101`) will be configured as a Yum server hosting the installation packages for the Storage Foundation 6.0.3 product family. Yum package groups will be defined for easier installation of Storage Foundation products, like SFHA, Veritas Cluster Server (VCS), and Veritas Dynamic Multi-Pathing (DMP).

On a second RHEL 6.5 server (hostname `server102`), the Yum client will be configured to make use of the Yum repository on `server101` and Storage Foundation 6.0.3, plus the hot fix will be installed using Yum in a single step.

Configuring the Yum server

Before you configure the Yum server, keep in mind the following:

- You can use the `createrepo` command to create repositories from a set of RPMs on RHEL 6. If the command is not installed, you can install it from the RHEL repository:

  ```
  [root@server101 ~]# yum install createrepo
  ```

- Yum clients must be able to access the repository directory containing the RPMs with the HTTP, File Transfer Protocol (FTP), or Network File System (NFS) file protocols. We use anonymous FTP in the remainder of the document. For details on how to configure anonymous FTP, see Appendix A: Setting up an anonymous FTP server.

To configure the Yum server

1. Create the repository directory. In this example, the repository directory is `/export/yum/repo/SFHA/rhel6/6.0.3`, and it is FTP accessible.

   ```
   [root@server101 storage_foundation]# mkdir -p /export/yum/repo/SFHA/rhel6/6.0.3
   ```

2. Copy all Storage Foundation RPMs (from the 6.0.1 base installation release, the 6.0.3 maintenance release, and the hot fixes) into the repository directory on the Yum server.

   From the 6.0.1 installation media, which is available on Symantec FileConnect and requires a serial number to access, enter the following:

   ```
   [root@server101 storage_foundation]# cd ../rpms/
   [root@server101 rpms]# cp *.rpm /export/yum/repo/SFHA/rhel6/6.0.3
   ```

3. Use the hyperlinks in this step to download the `sfha-rhel6_x86_64-6.0.3` maintenance release and the `fs-rhel6_x86_64-6.0.3.300` VxFS hot fix from the SORT website. (You can also go to SORT and download any other available hot fixes). Copy the RPMs into the repository.

   ```
   [root@server101 tmp]# tar xvzf ../sfha-rhel6_x86_64-6.0.3-patches.tar.gz
   [root@server101 tmp]# cd rhel6_x86_64/rpms
   [root@server101 rpms]# cp VRTSperl* VRTSvlic* VRTSspt* VRTSvxvm* VRTSaslapm*\
   VRTSob* VRTSlvmconv* VRTSvxfs* VRTSfsadv* VRTSfssdk* VRTSdbed* VRTSodm*\
   /export/yum/repo/SFHA/rhel6/6.0.3
   [root@server101 rpms]# cd /tmp
   [root@server101 tmp]# tar xvzf fs-rhel6_x86_64-6.0.3.300-rpms.tar.gz
   rpms/
   rpms/VRTSvxfs-6.0.300.300-RHEL6.x86_64.rpm
   rpms/VRTSodm-6.0.300.300-RHEL6.x86_64.rpm
   rpms/README_SYMC.VRTSodm
   rpms/README_SYMC.VRTSvxfs
   rpms/patch-meta.json
   README
   [root@server101 tmp]# cd rpms
   [root@server101 rpms]# cp *.rpm /export/yum/repo/SFHA/rhel6/6.0.3
   ```

   All the necessary RPMs are now in the repository directory. For a full listing, see Appendix B: List of packages in the repository.

   Note: If you want, you can remove the superseded RPMs.

4. Organize your RPM packages into Yum groups than can be managed or installed together. In this example, we group all the SFHA packages. To define Yum groups, use the Storage Foundation CPI installer with the `-yumgroupxml` switch, which creates the necessary XML configuration file.

   Using the 6.0.3 installer, enter the following:

   ```
   [root@server101 tmp]# ./rhel6_x86_64/installmr -yumgroupxml /tmp

   Storage Foundation and High Availability Solutions 6.0.3 Install Program

       1)  Veritas Dynamic Multi-Pathing (DMP)
       2)  Veritas Cluster Server (VCS)
       3)  Veritas Storage Foundation (SF)
       4)  Veritas Storage Foundation and High Availability (SFHA)
       5)  Veritas Storage Foundation Cluster File System HA (SFCFSHA)
       6)  Symantec VirtualStore (SVS)
       7)  Veritas Storage Foundation for Sybase ASE CE (SFSYBASECE)
       8)  Veritas Storage Foundation for Oracle RAC (SF Oracle RAC)
       b)  Back to previous menu

   Select a product: [1-8,b,q] 4

   The Yum group XML file for SFHA is generated at /tmp/comps_sfha601.xml.
   ```

5. Repeat step 5 for all product bundles such as VCS, SFCFSHA, and so on.

6. Merge the created XML files into a single XML file called `/tmp/VRTS_comps.xml`. See Appendix C: Example of a Yum group definition file.

   Note: The ID and name of the package groups were changed to `VRTS_SFHA603` to separate the names created by the CPI installer.

7. Create the Yum repository with Yum groups using the `createrepo` command.

   ```
   [root@server101 tmp]# createrepo -g /tmp/VRTS_comps.xml\
   /export/yum/repo/SFHA/rhel6/6.0.3/

   Saving Primary metadata
   Saving file lists metadata
   Saving other metadata
   Generating sqlite DBs
   Sqlite DBs complete
   ```

   Note: If you add packages into an existing repository, or update the repository's content (for example, by adding new hot fixes), use the `creatrepo` command with the `--update` switch.

   ```
   [root@server101 tmp]# createrepo -g /tmp/VRTS_comps.xml --update\
   /export/yum/repo/SFHA/rhel6/6.0.3/
   ```

Configuring the Yum clients

The Yum repository on `server101` must now be configured on the RHEL systems where we want to install Storage Foundation (`server102` in our example).

To configure the Yum clients

1. In the `.repo` configuration files in `/etc/yum.repos.d`, update the `baseurl` attribute value. This value is relative to the exported directory of the Yum server (in our example, `/export/yum/repo`). See Appendix A: Setting up an anonymous FTP server.

2. Use the `cat` command to verify the contents of the updated file.

```
[root@server102 yum.repos.d]# cat /etc/yum.repos.d/SF603.repo
[repo-SF603_RHEL6]
name=Repository for VRTS SFHA 6.0.3 + HFs on RHEL 6
baseurl=ftp://server101/SFHA/rhel6/6.0.3
enabled=1
gpgcheck=0
```

3. The repository can now be used on the client system `server102`.

```
[root@server102 ~]# yum repolist
Loaded plugins: product-id, refresh-packagekit, security, subscription-manager
This system is not registered to Red Hat Subscription Management. You can use
subscription-manager to register.
repo id              repo name                                      status
repo-SF603_RHEL6     Repository for VRTS SFHA 6.0.3 + HFs on RHEL 6 47
rhel64               rhel64 repo                                    3,690
rhel65               rhel65                                         3,690
repolist: 7,427
```

4. Verify that the VRTS Yum groups are available.

```
[root@server102 yum.repos.d]# yum grouplist VRTS*
Loaded plugins: product-id, refresh-packagekit, security, subscription-manager
This system is not registered to Red Hat Subscription Management. You can use
subscription-manager to register.
Setting up Group Process
Available Groups:
   VRTS_DMP603
   VRTS_SF603
   VRTS_SFCFSHA603
   VRTS_SFHA603
   VRTS_SFRAC603
   VRTS_SFSYBASECE603
   VRTS_VCS603
Done
```

5. Optionally, you can view details about a specific Yum group with the `yum groupinfo` command.

```
[root@server102 yum.repos.d]# yum groupinfo VRTS_DMP603
Loaded plugins: product-id, refresh-packagekit, security, subscription-manager
This system is not registered to Red Hat Subscription Management. You can use
subscription-manager to register.
Setting up Group Process

Group: VRTS_DMP603
 Description: RPMs of Veritas Dynamic Multi-Pathing 6.0.300.000
 Default Packages:
   VRTSaslapm
   VRTSperl
   VRTSsfcpi601
   VRTSsfmh
   VRTSspt
   VRTSvlic
   VRTSvxvm
```

Installing Storage Foundation with Yum

We can now use the Yum groups to install SFHA products on our RHEL 6.5 system in one step, including the hot fix necessary for RHEL 6.5 platform support.

To install Storage Foundation with Yum

1. To install Storage Foundation 6.0.3 on RHEL 6.5 system `server102`, use the `yum groupinstall` command.

   ```
   root@server102 yum.repos.d]# yum groupinstall VRTS_SF603
   Loaded plugins: product-id, refresh-packagekit, security, subscription-manager
   This system is not registered to Red Hat Subscription Management. You can use
   subscription-manager to register.
   Setting up Install Process
   Resolving Dependencies
   ```

   (For clarity, the command output has been shortened.)

   ```
   Dependency Installed:
     audit-libs.i686 0:2.2-2.el6      cracklib.i686 0:2.8.16-4.el6
   db4.i686 0:4.7.25-18.el6_4
     glibc.i686 0:2.12-1.132.el6      libgcc.i686 0:4.4.7-4.el6
   libselinux.i686 0:2.0.94-5.3.el6_4.1
     libstdc++.i686 0:4.4.7-4.el6     nss-softokn-freebl.i686 0:3.14.3-9.el6
   pam.i686 0:1.1.1-17.el6

   Complete!
   ```

Note that missing required operating system packages are automatically installed from the standard RHEL repository, if the repository has been configured.

Configuring the installed Storage Foundation product

To configure the installed Storage Foundation product

1. Using the CPI installer on the Storage Foundation 6.0.1 installation media, enter the following:

   ```
   [root@server102 storage_foundation]# /opt/VRTS/install/installsf601 -configure
   ...
   Would you like to view the summary file? [y,n,q] (n) y

   installsf Summary

   System verification checks completed successfully

   Veritas Storage Foundation Startup completed successfully

   The following processes were started on server102:

           vxdmp
           vxio
           vxspec
           vxconfigd
           vxesd
           vxrelocd
           vxcached
           vxconfigbackupd
           vxattachd
   ```

```
              vxportal
              fdd
              vxdbd
              vxodm
```

Note: You can run the CPI installer locally or remotely.

2. Verify that the Storage Foundation kernel modules are now loaded without the need for additional patch installation, and the product is ready for use.

```
[root@server102 yum.repos.d]# lsmod | grep vx
vxportal                 6474  0
vxfs                  3346106  2 vxportal,fdd
vxspec                   3366  0
vxio                  3766106  1 vxspec
vxdmp                  409520  2 vxspec,vxio
```

Note: You can automate the product configuration step by using response files. For more information on response files, see the [Storage Foundation Installation Guide 6.0.1](#).

3. Optionally, you can check the installed products and version with the /opt/VRTS/install/showversion command. (If the server has an Internet connection to the SORT website, the command also checks for newly available updates and product versions.)

```
[root@server102 tmp]# /opt/VRTS/install/showversion

Enter the system names for version check:  (server102)

Installed product(s) on server102:
        Veritas Storage Foundation - 6.0.3

Product:
        Veritas Storage Foundation - 6.0.3

Packages:
        Installed Required packages for Veritas Storage Foundation 6.0.3:
          #PACKAGE      #VERSION
          VRTSaslapm    6.0.100.000
          VRTSfsadv     6.0.100.000
          VRTSperl      5.14.2.8
          VRTSsfcpi601 6.0.300.000
          VRTSvlic      3.02.61.004
          VRTSvxfs      6.0.300.300
          VRTSvxvm      6.0.300.200

        Installed Optional packages for Veritas Storage Foundation 6.0.3:
          #PACKAGE      #VERSION
          VRTSdbed      6.0.300.000
          VRTSob        3.4.553
          VRTSodm       6.0.300.300
          VRTSsfmh      5.0.196.0
          VRTSspt       6.0.300.000

        Missing Optional packages for Veritas Storage Foundation 6.0.3:
          #PACKAGE
          VRTSfssdk
          VRTSlvmconv

Summary:

Packages:
```

```
                7   of 7   required Veritas Storage Foundation 6.0.3 packages installed
                5   of 7   optional Veritas Storage Foundation 6.0.3 packages installed

         Installed updates for Veritas Storage Foundation 6.0.3:
                fs-rhel6_x86_64-6.0.3.300:
                        VRTSvxfs 6.0.300.300
                        VRTSodm 6.0.300.300
                vm-rhel6_x86_64-6.0.3.200:
                        VRTSvxvm 6.0.300.200

         Available updates for Veritas Storage Foundation 6.0.3:
                (Installer) cpi-6.0.3.900

         The latest version of Veritas Storage Foundation is: 6.1
                Available updates for Veritas Storage Foundation 6.1:
                   fs-rhel6_x86_64-6.1.0.100

         Please visit https://sort.symantec.com for more information.
```

4. Optionally, you can use Yum to install a package that has not been installed yet. This example installs the VRTSlvmconv package which converts offline Linux Logical Volume Manager (LVM) managed volumes to VxVM managed volumes by rearranging media contents.

```
[root@server102 tmp]# yum list VRTSlvmconv
Loaded plugins: product-id, refresh-packagekit, security, subscription-manager
This system is not registered to Red Hat Subscription Management. You can use
subscription-manager to register.
Available Packages
VRTSlvmconv.i686                              6.0.100.000-GA_RHEL6
repo-SF603_RHEL6
[root@server102 tmp]# yum install VRTSlvmconv
Loaded plugins: product-id, refresh-packagekit, security, subscription-manager
This system is not registered to Red Hat Subscription Management. You can use
subscription-manager to register.
Setting up Install Process
Resolving Dependencies
--> Running transaction check
---> Package VRTSlvmconv.i686 0:6.0.100.000-GA_RHEL6 will be installed
--> Finished Dependency Resolution


Dependencies Resolved


================================================================================
 Package         Arch        Version                   Repository      Size
================================================================================
Installing:
 VRTSlvmconv     i686        6.0.100.000-GA_RHEL6  repo-SF603_RHEL6  64 k

Transaction Summary
================================================================================
Install      1 Package(s)

Total download size: 64 k
Installed size: 248 k
Is this ok [y/N]: y
Downloading Packages:
VRTSlvmconv-6.0.100.000-GA_RHEL6.i686.rpm
|  64 kB     00:00
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
```

```
  Installing : VRTSlvmconv-6.0.100.000-GA_RHEL6.i686
1/1
  Verifying  : VRTSlvmconv-6.0.100.000-GA_RHEL6.i686
1/1

Installed:
  VRTSlvmconv.i686 0:6.0.100.000-GA_RHEL6

Complete!
```

Appendix A: Setting up an anonymous FTP server

This appendix shows how to set up anonymous FTP sharing of the repository base directory on our Yum server, `server101`. We use `/export/yum/repo` as the base directory.

To set up an anonymous FTP sharing of the base directory

1. In the `/etc/vsftpd/vsftpd.conf` file, add the `anon_root` attribute and specify the path to the repository base directory.

    ```
    anon_root=/export/yum/repo
    ```

2. Start the `vsftpd` service.

    ```
    [root@server101 6.0.3]# service vsftpd start
    ```

3. Make sure the `vsftpd` service starts at every system start.

    ```
    [root@server101 6.0.3]# chkconfig vsftpd on
    [root@server101 6.0.3]# chkconfig --list vsftpd
    vsftpd            0:off  1:off  2:on   3:on   4:on   5:on   6:off
    ```

Appendix B: List of packages in the repository

The repository contains the following RPMs:

```
[root@server101 6.0.3]# ls -l /export/yum/repo/SFHA/rhel6/6.0.3
total 538716
-rwxr-xr-x 1 root root  1030424 Feb 20 01:34 VRTSamf-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root  1030388 Feb 20 01:36 VRTSamf-6.0.300.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root  1031908 Feb 19 05:46 VRTSamf-6.0.300.300-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root   145532 Feb 19 05:32 VRTSaslapm-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root   179220 Feb 20 01:34 VRTScavf-6.0.100.000-
GA_RHEL6.i386.rpm
-rwxr-xr-x 1 root root   179464 Feb 19 05:34 VRTScavf-6.0.300.000-
RHEL6.i386.rpm
-rwxr-xr-x 1 root root  5921568 Feb 19 05:32 VRTScps-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root   779000 Feb 19 05:32 VRTSdbac-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root 36565741 Feb 20 01:34 VRTSdbed-6.0.100.000-
GA_RHEL.x86_64.rpm
```

```
-rwxr-xr-x 1 root root 36606448 Feb 19 05:34 VRTSdbed-6.0.300.000-
GA_RHEL.x86_64.rpm
-rwxr-xr-x 1 root root  3889212 Feb 19 05:32 VRTSfsadv-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root   293788 Feb 19 05:32 VRTSfssdk-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root   832640 Feb 19 05:32 VRTSgab-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root   113220 Feb 19 05:32 VRTSglm-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root    26724 Feb 19 05:32 VRTSgms-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root   772316 Feb 19 05:32 VRTSllt-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root    65764 Feb 19 05:32 VRTSlvmconv-6.0.100.000-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root 32483930 Feb 19 05:32 VRTSob-3.4.553-0.i686.rpm
-rwxr-xr-x 1 root root   264196 Feb 20 01:34 VRTSodm-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root   284336 Feb 19 05:35 VRTSodm-6.0.300.300-
RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root 23080316 Feb 20 01:34 VRTSperl-5.14.2.6-
RHEL6.1.x86_64.rpm
-rwxr-xr-x 1 root root 14331096 Feb 19 05:34 VRTSperl-5.14.2.8-
RHEL6.1.x86_64.rpm
-rwxr-xr-x 1 root root   786588 Feb 20 01:34 VRTSsfcpi601-6.0.100.000-
GA_GENERIC.noarch.rpm
-rwxr-xr-x 1 root root   810265 Feb 19 05:34 VRTSsfcpi601-6.0.300.000-
GA_GENERIC.noarch.rpm
-rwxr-xr-x 1 root root 27695744 Feb 19 05:32 VRTSsfmh-5.0.196.0_Linux.rpm
-rwxr-xr-x 1 root root 21099709 Feb 20 01:34 VRTSspt-6.0.100.000-GA.noarch.rpm
-rwxr-xr-x 1 root root 21716879 Feb 19 05:34 VRTSspt-6.0.300.000-GA.noarch.rpm
-rwxr-xr-x 1 root root 66389595 Feb 19 05:32 VRTSsvs-6.0.100.000-
GA_GENERIC.x86_64.rpm
-rwxr-xr-x 1 root root 18310511 Feb 19 05:32 VRTSvbs-6.0.100.000-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root 48757692 Feb 20 01:34 VRTSvcs-6.0.100.000-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root 48763888 Feb 19 05:34 VRTSvcs-6.0.300.000-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root   611304 Feb 20 01:34 VRTSvcsag-6.0.100.000-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root 12401472 Feb 20 01:36 VRTSvcsag-6.0.300.000-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root 12401660 Feb 19 05:46 VRTSvcsag-6.0.300.200-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root   225652 Feb 19 05:32 VRTSvcsdr-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root  3431724 Feb 20 01:34 VRTSvcsea-6.0.100.000-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root  3431808 Feb 19 05:34 VRTSvcsea-6.0.300.000-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root  9491728 Feb 19 05:34 VRTSvcsvmw-6.0.300.000-
GA_RHEL6.i686.rpm
-rwxr-xr-x 1 root root   236272 Feb 19 05:32 VRTSvlic-3.02.61.004-0.x86_64.rpm
-rwxr-xr-x 1 root root   966804 Feb 20 01:34 VRTSvxfen-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root   967468 Feb 19 05:34 VRTSvxfen-6.0.300.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root  7821292 Feb 20 01:34 VRTSvxfs-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root  7832224 Feb 20 01:36 VRTSvxfs-6.0.300.000-
RHEL6.x86_64.rpm
```

```
-rwxr-xr-x 1 root root 10407220 Feb 19 05:35 VRTSvxfs-6.0.300.300-
RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root 21938228 Feb 20 01:34 VRTSvxvm-6.0.100.000-
GA_RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root 22186248 Feb 20 01:36 VRTSvxvm-6.0.300.000-
RHEL6.x86_64.rpm
-rwxr-xr-x 1 root root 22211172 Feb 19 05:46 VRTSvxvm-6.0.300.200-
RHEL6.x86_64.rpm
```

Appendix C: Example of a Yum group definition file

The CPI installer creates Yum group definition files like the following:

```
<comps>
      <group>
            <id>VRTS_DMP603</id>
            <name>VRTS_DMP603</name>
            <default>true</default>
            <description>RPMs of Veritas Dynamic Multi-Pathing
6.0.300.000</description>
            <uservisible>true</uservisible>
            <packagelist>
                  <packagereq type="default">VRTSaslapm</packagereq>
                  <packagereq type="default">VRTSperl</packagereq>
                  <packagereq type="default">VRTSsfcpi601</packagereq>
                  <packagereq type="default">VRTSsfmh</packagereq>
                  <packagereq type="default">VRTSspt</packagereq>
                  <packagereq type="default">VRTSvlic</packagereq>
                  <packagereq type="default">VRTSvxvm</packagereq>
            </packagelist>
      </group>
</comps>
```

In this guide, the group definition files were merged into one XML file by removing the `<comps>` and `</comps>` statements in the middle of the merged file.

The merged Yum group definition file used in this guide is as follows:

```
<comps>
      <group>
            <id>VRTS_DMP603</id>
            <name>VRTS_DMP603</name>
            <default>true</default>
            <description>RPMs of Veritas Dynamic Multi-Pathing
6.0.300.000</description>
            <uservisible>true</uservisible>
            <packagelist>
                  <packagereq type="default">VRTSaslapm</packagereq>
                  <packagereq type="default">VRTSperl</packagereq>
                  <packagereq type="default">VRTSsfcpi601</packagereq>
                  <packagereq type="default">VRTSsfmh</packagereq>
                  <packagereq type="default">VRTSspt</packagereq>
                  <packagereq type="default">VRTSvlic</packagereq>
                  <packagereq type="default">VRTSvxvm</packagereq>
            </packagelist>
      </group>
      <group>
            <id>VRTS_SF603</id>
            <name>VRTS_SF603</name>
            <default>true</default>
```

```xml
                <description>RPMs of Veritas Storage Foundation
6.0.300.000</description>
                <uservisible>true</uservisible>
                <packagelist>
                        <packagereq type="default">VRTSaslapm</packagereq>
                        <packagereq type="default">VRTSdbed</packagereq>
                        <packagereq type="default">VRTSfsadv</packagereq>
                        <packagereq type="default">VRTSfssdk</packagereq>
                        <packagereq type="default">VRTSlvmconv</packagereq>
                        <packagereq type="default">VRTSob</packagereq>
                        <packagereq type="default">VRTSodm</packagereq>
                        <packagereq type="default">VRTSperl</packagereq>
                        <packagereq type="default">VRTSsfcpi601</packagereq>
                        <packagereq type="default">VRTSsfmh</packagereq>
                        <packagereq type="default">VRTSspt</packagereq>
                        <packagereq type="default">VRTSvlic</packagereq>
                        <packagereq type="default">VRTSvxfs</packagereq>
                        <packagereq type="default">VRTSvxvm</packagereq>
                </packagelist>
        </group>
        <group>
                <id>VRTS_SFCFSHA603</id>
                <name>VRTS_SFCFSHA603</name>
                <default>true</default>
                <description>RPMs of Veritas Storage Foundation Cluster File
System HA 6.0.300.000</description>
                <uservisible>true</uservisible>
                <packagelist>
                        <packagereq type="default">VRTSamf</packagereq>
                        <packagereq type="default">VRTSaslapm</packagereq>
                        <packagereq type="default">VRTScavf</packagereq>
                        <packagereq type="default">VRTScps</packagereq>
                        <packagereq type="default">VRTSdbed</packagereq>
                        <packagereq type="default">VRTSfsadv</packagereq>
                        <packagereq type="default">VRTSfssdk</packagereq>
                        <packagereq type="default">VRTSgab</packagereq>
                        <packagereq type="default">VRTSglm</packagereq>
                        <packagereq type="default">VRTSgms</packagereq>
                        <packagereq type="default">VRTSllt</packagereq>
                        <packagereq type="default">VRTSlvmconv</packagereq>
                        <packagereq type="default">VRTSob</packagereq>
                        <packagereq type="default">VRTSodm</packagereq>
                        <packagereq type="default">VRTSperl</packagereq>
                        <packagereq type="default">VRTSsfcpi601</packagereq>
                        <packagereq type="default">VRTSsfmh</packagereq>
                        <packagereq type="default">VRTSspt</packagereq>
                        <packagereq type="default">VRTSvbs</packagereq>
                        <packagereq type="default">VRTSvcs</packagereq>
                        <packagereq type="default">VRTSvcsag</packagereq>
                        <packagereq type="default">VRTSvcsdr</packagereq>
                        <packagereq type="default">VRTSvcsea</packagereq>
                        <packagereq type="default">VRTSvlic</packagereq>
                        <packagereq type="default">VRTSvxfen</packagereq>
                        <packagereq type="default">VRTSvxfs</packagereq>
                        <packagereq type="default">VRTSvxvm</packagereq>
                </packagelist>
        </group>
        <group>
                <id>VRTS_SFHA603</id>
                <name>VRTS_SFHA603</name>
                <default>true</default>
                <description>RPMs of Veritas Storage Foundation and High
Availability 6.0.300.000</description>
```

```xml
                <uservisible>true</uservisible>
                <packagelist>
                        <packagereq type="default">VRTSacclib</packagereq>
                        <packagereq type="default">VRTSamf</packagereq>
                        <packagereq type="default">VRTSaslapm</packagereq>
                        <packagereq type="default">VRTScps</packagereq>
                        <packagereq type="default">VRTSdbed</packagereq>
                        <packagereq type="default">VRTSfsadv</packagereq>
                        <packagereq type="default">VRTSfssdk</packagereq>
                        <packagereq type="default">VRTSgab</packagereq>
                        <packagereq type="default">VRTSllt</packagereq>
                        <packagereq type="default">VRTSlvmconv</packagereq>
                        <packagereq type="default">VRTSmq6</packagereq>
                        <packagereq type="default">VRTSob</packagereq>
                        <packagereq type="default">VRTSodm</packagereq>
                        <packagereq type="default">VRTSperl</packagereq>
                        <packagereq type="default">VRTSsapwebas71</packagereq>
                        <packagereq type="default">VRTSsfcpi601</packagereq>
                        <packagereq type="default">VRTSsfmh</packagereq>
                        <packagereq type="default">VRTSspt</packagereq>
                        <packagereq type="default">VRTSvbs</packagereq>
                        <packagereq type="default">VRTSvcs</packagereq>
                        <packagereq type="default">VRTSvcsag</packagereq>
                        <packagereq type="default">VRTSvcsdr</packagereq>
                        <packagereq type="default">VRTSvcsea</packagereq>
                        <packagereq type="default">VRTSvcsvmw</packagereq>
                        <packagereq type="default">VRTSvlic</packagereq>
                        <packagereq type="default">VRTSvxfen</packagereq>
                        <packagereq type="default">VRTSvxfs</packagereq>
                        <packagereq type="default">VRTSvxvm</packagereq>
                </packagelist>
        </group>
        <group>
                <id>VRTS_SFRAC603</id>
                <name>VRTS_SFRAC603</name>
                <default>true</default>
                <description>RPMs of Veritas Storage Foundation for Oracle RAC
6.0.300.000</description>
                <uservisible>true</uservisible>
                <packagelist>
                        <packagereq type="default">VRTSamf</packagereq>
                        <packagereq type="default">VRTSaslapm</packagereq>
                        <packagereq type="default">VRTScavf</packagereq>
                        <packagereq type="default">VRTScps</packagereq>
                        <packagereq type="default">VRTSdbac</packagereq>
                        <packagereq type="default">VRTSdbed</packagereq>
                        <packagereq type="default">VRTSfsadv</packagereq>
                        <packagereq type="default">VRTSfssdk</packagereq>
                        <packagereq type="default">VRTSgab</packagereq>
                        <packagereq type="default">VRTSglm</packagereq>
                        <packagereq type="default">VRTSgms</packagereq>
                        <packagereq type="default">VRTSllt</packagereq>
                        <packagereq type="default">VRTSlvmconv</packagereq>
                        <packagereq type="default">VRTSob</packagereq>
                        <packagereq type="default">VRTSodm</packagereq>
                        <packagereq type="default">VRTSperl</packagereq>
                        <packagereq type="default">VRTSsfcpi601</packagereq>
                        <packagereq type="default">VRTSsfmh</packagereq>
                        <packagereq type="default">VRTSspt</packagereq>
                        <packagereq type="default">VRTSvbs</packagereq>
                        <packagereq type="default">VRTSvcs</packagereq>
                        <packagereq type="default">VRTSvcsag</packagereq>
                        <packagereq type="default">VRTSvcsdr</packagereq>
```

```xml
                    <packagereq type="default">VRTSvcsea</packagereq>
                    <packagereq type="default">VRTSvlic</packagereq>
                    <packagereq type="default">VRTSvxfen</packagereq>
                    <packagereq type="default">VRTSvxfs</packagereq>
                    <packagereq type="default">VRTSvxvm</packagereq>
                </packagelist>
        </group>
        <group>
                <id>VRTS_SFSYBASECE603</id>
                <name>VRTS_SFSYBASECE603</name>
                <default>true</default>
                <description>RPMs of Veritas Storage Foundation for Sybase ASE CE
6.0.300.000</description>
                <uservisible>true</uservisible>
                <packagelist>
                    <packagereq type="default">VRTSamf</packagereq>
                    <packagereq type="default">VRTSaslapm</packagereq>
                    <packagereq type="default">VRTScavf</packagereq>
                    <packagereq type="default">VRTSfsadv</packagereq>
                    <packagereq type="default">VRTSfssdk</packagereq>
                    <packagereq type="default">VRTSgab</packagereq>
                    <packagereq type="default">VRTSglm</packagereq>
                    <packagereq type="default">VRTSllt</packagereq>
                    <packagereq type="default">VRTSlvmconv</packagereq>
                    <packagereq type="default">VRTSob</packagereq>
                    <packagereq type="default">VRTSperl</packagereq>
                    <packagereq type="default">VRTSsfcpi601</packagereq>
                    <packagereq type="default">VRTSsfmh</packagereq>
                    <packagereq type="default">VRTSspt</packagereq>
                    <packagereq type="default">VRTSvbs</packagereq>
                    <packagereq type="default">VRTSvcs</packagereq>
                    <packagereq type="default">VRTSvcsag</packagereq>
                    <packagereq type="default">VRTSvcsdr</packagereq>
                    <packagereq type="default">VRTSvcsea</packagereq>
                    <packagereq type="default">VRTSvlic</packagereq>
                    <packagereq type="default">VRTSvxfen</packagereq>
                    <packagereq type="default">VRTSvxfs</packagereq>
                    <packagereq type="default">VRTSvxvm</packagereq>
                </packagelist>
        </group>
        <group>
                <id>VRTS_VCS603</id>
                <name>VRTS_VCS603</name>
                <default>true</default>
                <description>RPMs of Veritas Cluster Server
6.0.300.000</description>
                <uservisible>true</uservisible>
                <packagelist>
                    <packagereq type="default">VRTSacclib</packagereq>
                    <packagereq type="default">VRTSamf</packagereq>
                    <packagereq type="default">VRTScps</packagereq>
                    <packagereq type="default">VRTSgab</packagereq>
                    <packagereq type="default">VRTSllt</packagereq>
                    <packagereq type="default">VRTSmq6</packagereq>
                    <packagereq type="default">VRTSperl</packagereq>
                    <packagereq type="default">VRTSsapwebas71</packagereq>
                    <packagereq type="default">VRTSsfcpi601</packagereq>
                    <packagereq type="default">VRTSsfmh</packagereq>
                    <packagereq type="default">VRTSspt</packagereq>
                    <packagereq type="default">VRTSvbs</packagereq>
                    <packagereq type="default">VRTSvcs</packagereq>
                    <packagereq type="default">VRTSvcsag</packagereq>
                    <packagereq type="default">VRTSvcsdr</packagereq>
```

```
                <packagereq type="default">VRTSvcsea</packagereq>
                <packagereq type="default">VRTSvcsvmw</packagereq>
                <packagereq type="default">VRTSvlic</packagereq>
                <packagereq type="default">VRTSvxfen</packagereq>
            </packagelist>
        </group>
    </comps>
```

Appendix D: Known issues and limitations

The method described here is only suitable for fresh installations of Storage Foundation products on RHEL servers. For upgrading or patching Storage Foundation, use the install scripts shipped with the maintenance releases or patches.