
*WANdisco Subversion MultiSite
Installation Guide*



Revision History

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1 Recommended Deployment Practices

It is assumed you have read and understand the material covered in [About Subversion MultiSite](#).

1.1 MultiSite Administrator Pre-requisites

This guide is intended for an Subversion administrator or a user who is reasonably comfortable with:

- Setting up a Subversion based repository
- Configuring inetd/xinetd service on Unix/Cygwin or Windows service
- Installing Perl
- Installing Java
- Installing Apache plus server
- Unix or Windows system administration

If you don't meet the above pre-requisites, you may want to contact your Subversion administrator or request that WANdisco perform a professional install for you.

You can have one MultiSite administrator for your replication group; one person can administer all nodes through the Admin Console. The initial username and password is identical for all nodes, which makes it easier for an admin to work between the various node's Admin Consoles.

There should be at least one person at each node who is familiar with WANdisco, as nodes distributed throughout the world could need attention if a problem arises.

1.2 Physical Environment

WANdisco strongly recommends that you follow these guidelines to ensure the successful installation and use of Subversion MultiSite:

- The contents of `svnroot` directories on all the replicas match. Make sure the initial contents are exactly the same, including the repository UUID.
- The Subversion user/passwords on all repository hosts should match.
- running servers for each node in the replication group, pre-configured with
 - ◆ the same operating system
 - ◆ the same version of Subversion server
 - ◆ the same Apache major/minor version, and `mod_dav` and `mod_svn_dav` versions
 - ◆ matching file and directory level permissions on Subversion repositories
 - ◆ a command line compression utility
 - ◆ Java (see [Installing Java and Perl](#))

- ◆ Perl (see [Installing Java and Perl](#))
- ◆ browser with network access to all servers

- have a dedicated server for the Failover Agent of each High Availability sub group
- We highly recommend that WANdisco and Subversion be deployed on the same server. In such a configuration, the WANdisco installer can package a copy of the repository when setting up nodes other than the first node, manage the Subversion password file, and support pre-replication hooks
- e-mail from WANdisco containing the tar file link and attached production licence key file

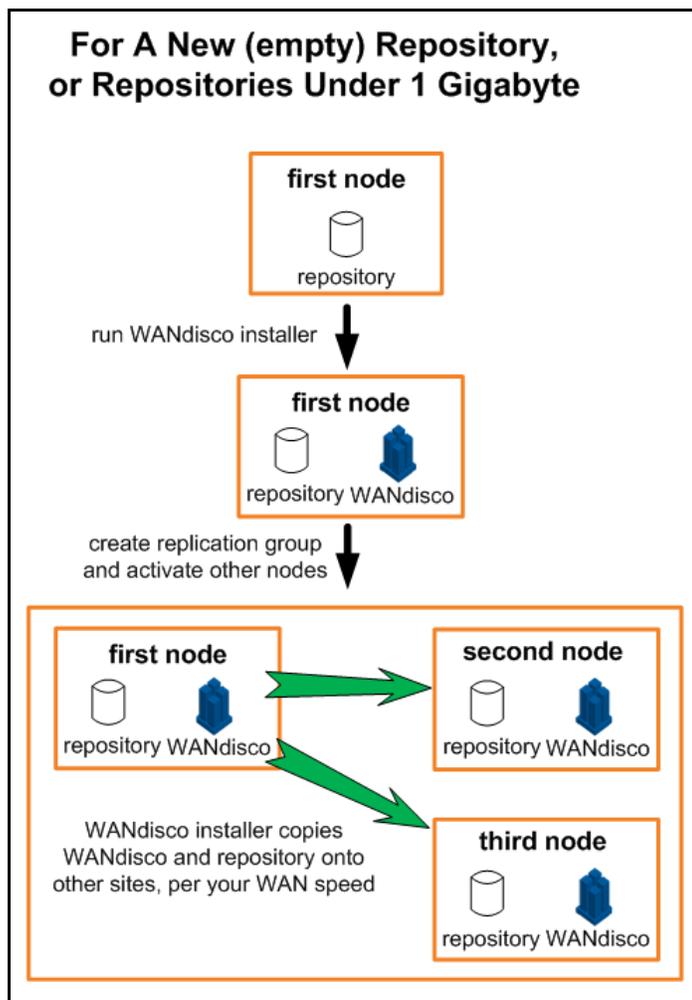
1.3 Strategies for Achieving Identical Repositories at All Nodes

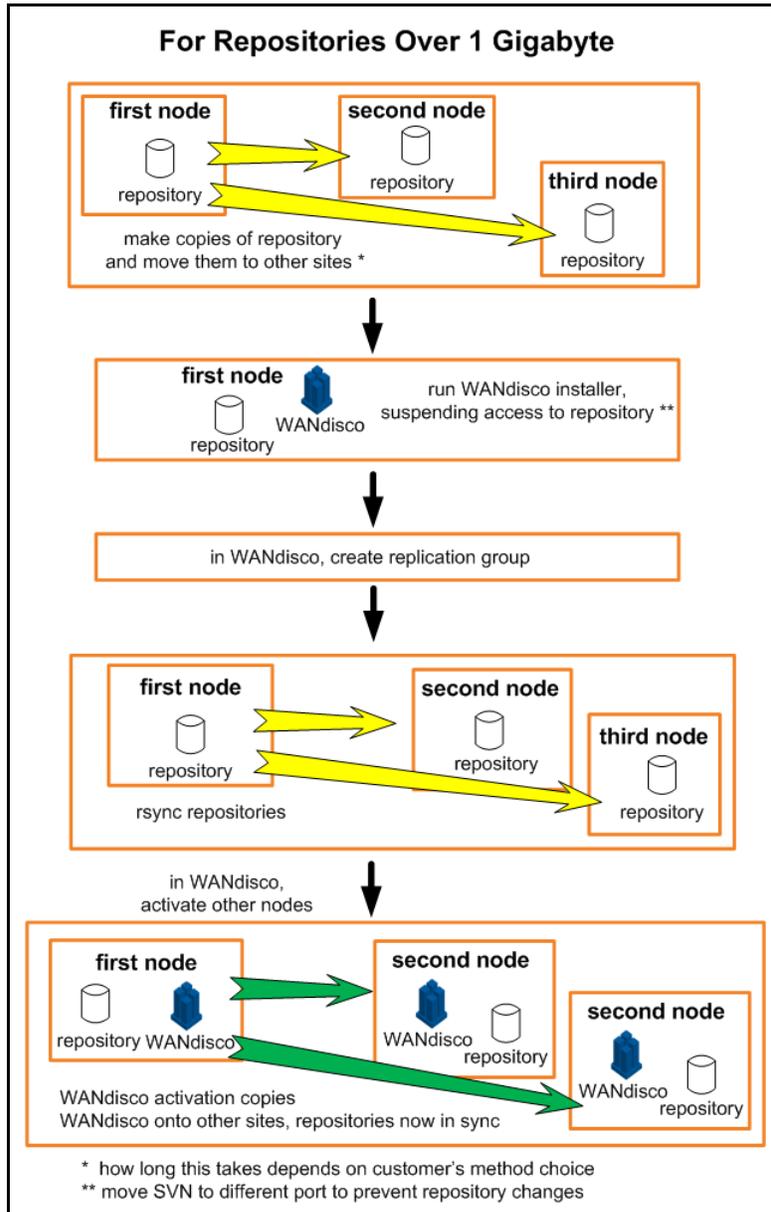
All repositories must start out identical, and WANdisco ensures they stay in sync. All repositories on all nodes must be identical, with identical paths and file structures.

During installation, WANdisco can bundle smaller repositories, for example, repositories under one gigabyte, for addition to the installer packages to send to other nodes. These packages then get sent over your WAN from the first node to the other nodes.

If your repositories are larger than one gigabyte, you want to have them already copied to the other nodes and available when the WANdisco installer packages arrive via your WAN. That way, WANdisco can be up and running at the end of installation, instead of waiting for repositories to arrive via whatever means they were transferred. The exact process for this would vary from company to company, and must be thought out beforehand, so that installation goes as quickly as possible. The following two flowcharts offer a more in-depth view of what occurs.

If you are copying the repositories manually to the other nodes, please double-check that the repository files have the same file ownerships and permissions at all nodes.





1.4 Strategies for Having Two or More Repositories

WANdisco supports replication of multiple repositories. Multiple repositories can be configured using multiple SVNPath location directives or with the use of SVNParentPath.

1.4.1 Subversion Location Directive

Individual subversion repository can be added with the **Add Repository** command on the SVN Settings page.

```
<Location /repo>
DAV svn
SVNPath /home/scm/repositories/svn-repo
AuthType Basic
AuthName wandisco
AuthUserFile /home/scm/htpasswd
Require valid-user
</Location>
```

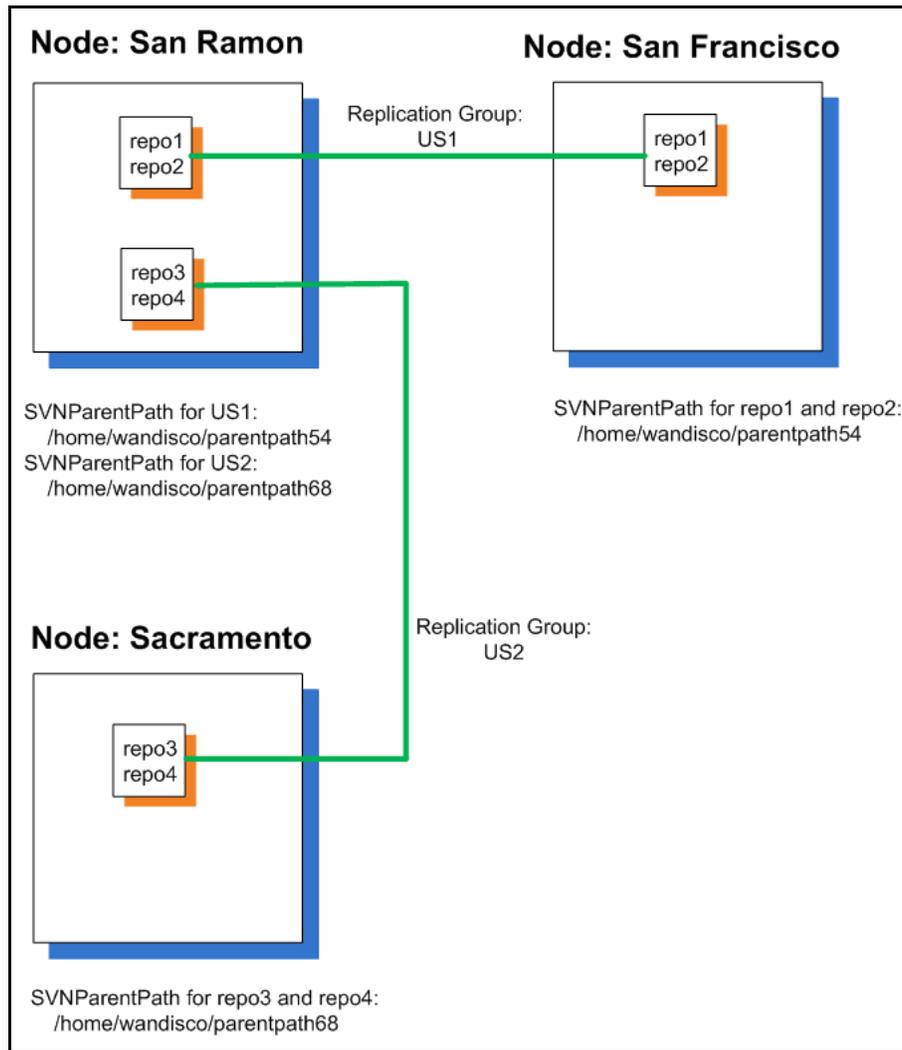
```
<Location /xyz>
DAV svn
SVNPath /home/scm/repositories/xyz
AuthType Basic
AuthName wandisco
AuthUserFile /home/scm/htpasswd
Require valid-user
</Location>
```

1.4.2 About Subversion ParentPath

To explain Subversion ParentPath, let us set up an example of three nodes, each with two replication groups.

| Replication Group | Nodes |
|-------------------|---------------|
| US1 | San Ramon |
| | San Francisco |
| US2 | San Ramon |
| | Sacramento |

Each replication group contains two repositories.



NOTE:

A repository can belong to only one replication group at a time.

To use ParentPath, configure mod_dav_svn to use SVNParentPath. Each replication group has its own ParentPath. For our example, here are the SVNParentPaths.

Apache config for San Francisco Node

```
<Location /repofirst>
DAV svn
SVNParentPath /home/wandisco/parent54
SVNAutoVersioning on
AuthType Basic
AuthName "SVN Repo"
AuthUserFile /home/wandisco/parent54/dav-auth
Require valid-user
</Location>
```

Apache config for Sacramento Node

```
<Location /reposecond>
DAV svn
SVNParentPath /home/wandisco/parent68
SVNAutoVersioning on
AuthType Basic
AuthName "SVN Repo"
AuthUserFile /home/wandisco/parent68/dav-auth
Require valid-user
</Location>
```

Apache Config for San Ramon Node

```
<Location /repofirst>
DAV svn
SVNParentPath /home/wandisco/parent54
SVNAutoVersioning on
AuthType Basic
AuthName "SVN Repo"
AuthUserFile /home/wandisco/parent54/dav-auth
Require valid-user
</Location>
```

```
<Location /reposecond>
DAV svn
SVNParentPath /home/wandisco/parent68
SVNAutoVersioning on
AuthType Basic
AuthName "SVN Repo"
AuthUserFile /home/wandisco/parent68/dav-auth
Require valid-user
</Location>
```

Subversion Repository Location

Place your Subversion repositories in a location that is not directly referenced by the DAV location directive.

Example:

```
/home/wandisco/grouprepos/repo1
/home/wandisco/grouprepos/repo2
/home/wandisco/grouprepos/repo3
/home/wandisco/grouprepos/repo4
```

In our example, all Subversion repositories are stored in the `/home/wandisco/grouprepos` directory.

Using Symbolic Links

You can create symbolic links from each `SVNParentPath` to each repository required in that replication group. The links must be created at each node in the replication group.

For example:

Created symlinks for replication group US1, under `SVNParentPath` in the `Location` directive.

- `repo1` (linked to `/home/wandisco/grouprepos/repo1`)
- `repo2` (linked to `/home/wandisco/grouprepos/repo2`)

Created symlinks for replication group US2, under `SVNParentPath` in the `Location` directive.

- `repo3` (linked to `/home/wandisco/grouprepos/repo3`)
- `repo4` (linked to `/home/wandisco/grouprepos/repo4`)

1.5 Access Control — Using the AuthZ Module

WANdisco recommends using the Apache AuthZ module in combination with Access Control for a very complete and robust solution.

AuthZ is a fairly simple module to implement. At the install node, create an empty file, `svn.authz`. WANdisco packages the file up for distribution to the other nodes. Also at each node, add the following line to the `Location` directive in your Apache `conf` file.

```
###
# AuthZ module for authorization configuration
###
AuthzSVNAccessFile /path/to/file/svn.authz
```

Make sure WANdisco has permission to read and write to the file. Create an entry in the `authz` file for the admin user at each repository: e.g. for repository mapped to `/svn` add the following:

```
[svn:/]
<admin username> = rw
```

or for a repo mapped to /myrepo:

```
[myrepo:/]  
<admin username> = rw
```

where <admin username> is the username that the user enters when adding a repository.

During installation, you are asked if you want to use this module, and then you provide the path to this file.

1.6 WANdisco and Subversion Password Files

WANdisco offers to control the Subversion password files. If WANdisco controls the password files, any user you set up in WANdisco is also set up in Subversion. (WANdisco and Subversion must be running on the same servers at all nodes.)

The majority of WANdisco customers elect to have WANdisco handle the passwords. The Admin Console offers an easy way to manage users and passwords.

During installation, you identify the Subversion password file's location, and WANdisco incorporates it into the replication group. If you have a lot of Subversion users, you can bulk import your users into WANdisco. This is discussed in section [2.5, Importing Users in Using Subversion MultiSite](#).

All replicas should have user information for all the users. The best way to ensure this is to have WANdisco control the Subversion password files.

1.7 Quorum Recommendations

Armed with an understanding of quorum types as described in [About Subversion MultiSite](#), you can select the best solution for your configuration.

1.7.1 For MultiSite with No High Availability Sub Groups

WANdisco recommends selecting either Singleton Response or Majority Response quorum, balancing performance versus availability.

1.7.2 For MultiSite with High Availability Sub Groups

WANdisco recommends Majority Response quorum. If you select Singleton Response quorum, the distinguished node represents a single point of failure.

1.7.3 For A Stand-Alone High Availability Group at One Location

WANdisco recommends having a group of at least three nodes, which automatically handles the failure of any single replicator node and its subsequent recovery.

For customers with a two node group, WANdisco recommends either Singleton or Majority Response quorum, and the second node must be the distinguished node.

1.8 Firewalls and Virus Scanners

You must determine if your replication group sits inside a firewall or outside of one. If the replication group is inside a firewall, the replication group ports are untouched by the firewall and you need take no action.

However, if any part of your replication group sits outside a firewall, you must configure the firewall so that the port numbers you specify during installation are not blocked or filtered.

If you have a virus scanner running on your network, you must configure it to not filter traffic on the ports you specify during installation.

1.9 Deployment Checklist

You may be familiar with this checklist from an evaluation copy of Subversion MultiSite. It is included here as reference..

| System Setup ❖ All nodes must share the same operating system | |
|--|--|
| Supported Operating Systems | Fedora (32 or 64 bit): 6, 7, 8, 9 Red Hat Linux Enterprise Server (32 or 64 bit): 4 Sun Solaris (32 or 64 bit): 9, 10 Linux: Linux kernel 2.6 or higher CentOS-4 Windows Server, (32 or 64 bit) 2003 Ensure that the replicator is installed to /svn-replicator/ with no white spaces in the path. Read this for more information on NPTL. Note: VMware has a tendency to become unresponsive due to memory paging issues even without WANdisco present. Extra tuning may be needed to ensure optimal performance. |
| Subversion Server Version | 1.4 and above (through 1.6.9).Run with a version of Apache Portable Runtime that matches your subversion version. |
| Subversion Client Version | compatible with local Subversion servers |
| triggers | Pre-commit triggers are not recommended. Use pre-replication hooks instead. Any pre-replication hooks must be deterministic, i.e. have the same exact behavior and outcome at every node. post-commit triggers can be tested at only one node. |
| System Memory | Ensure RAM and swapping containers are at least three or four times the largest Subversion file you have. Recommended: 2 GB RAM; 4 GB swapping container |
| Disk Space | <ul style="list-style-type: none"> Subversion: depends on the number of projects and issues MultiSite Transaction Journal: Recommended - equivalent of seven days of changes |
| File Descriptor limit | Ensure hard and soft limits are set to 64000 or higher. Check with the <code>ulimit</code> or <code>limit</code> command. |
| Journaling File System | Replicator logs should be on a journaling file system, for example, ext3 on Linux or VXFS from Veritas. Notes: NTFS is not a journaling file system: ext4 is a journaling file system, however WANdisco does not support its use because of its deferred writes. |
| Maximum User Process Limit | At least three times the number of Subversion users. |
| Java | Install JDK 1.6 or higher. Note: There should not be any spaces or control characters in the path where Java is installed. For example, <code>c:\Program Files\java</code> does not work with WANdisco as a JAVA install directory. See Installing Java and Perl . |

| | |
|--|--|
| Perl | <p>Install version 5.6.1 or later. See Installing Java and Perl.</p> <p>For Access Control: Perl::DBI module for Audit Reports other than Users and Groups</p> |
| Network Setup | |
| Reserved Ports | <p>WANdisco needs a dedicated port for DConENet (replication protocol) as well as HTTP protocol (for the Admin Console). WANdisco also recommends having a port available in case you have to copy (rsync) the repository from one node to another. If your network has a firewall, notify the firewall of the port numbers.</p> |
| Firewall or virus scanner | <p>Notify the firewall and any virus scanners of the Subversion MultiSite port numbers.</p> |
| VPN | <p>Set up IPsec tunnel, and ensure WAN connectivity.</p> |
| Persistent Connection Keep Alive | <p>Ensure VPN doesn't reset persistent connections for WANdisco</p> |
| Bandwidth | <p>Understand the available bandwidth for testing, and set user expectations.</p> |
| DNS Setup | <p>Use IP addresses instead of DNS hostnames, due to performance and DNS server unavailability issues. If using DNS hostname is the only option, then ensure DNS availability.</p> |
| Apache 2 Setup (for http:// access) | |
| Apache version | <p>All nodes have the same version, 2.2.3 or above.</p> |
| Apache modules version | <p>All nodes have the same version of mod_dav and mod_svn_dav</p> |
| Turn KeepAlive On | <p>Keep-alive must be set to ON. See Using HTTP with Apache, Apache and SVNKit, and http://httpd.apache.org/docs/2.2/mod/core.html.</p> |
| mod_deflate.c for SVN_DAV | <p>DO NOT USE mod_deflate.</p> |
| Location URI | <p>Ensure that all nodes' apache conf files have the same location URI for Subversion repository access</p> |
| Require valid user for write methods | <p>Ensure that all WebDAV methods require authentication for SVN-DAV protocol</p> |
| Use port 80 for WANdisco | <p>Standard Port 80 avoids confusion, change default Apache port if using 80.</p> |
| Apache server port | <p>Use non-standard Apache server port to avoid conflict with replicator port. See Dedicated Apache - Changing Subversion Port On Unix Flavor and Sharing Apache, and Using HTTPS.</p> |
| File Permissions in svnroot | <p>See this article (http://www.reallylongword.org/articles/svn/)</p> |
| WANdisco Setup | |

| | |
|--|--|
| Quorum | Default is singleton. Trade off availability with performance. |
| Rotating Quorum Schedule | Ensure the distinguished node is in the active time zone. |
| Agreement Threads | Tune based on number of concurrent Subversion writers |
| Reader/Writer Network IO Thread Pool | Tune based on Subversion client connection rate, file transfer rate |
| ConnectionKeepAlive timeout | Tune inactivity timeout for persistent DConENet/DFTP connections based on VPN/WAN router set up |
| Message Queue Max Thread Pool Size | Tune based on Subversion write concurrency |
| Maximum connections per IO thread | Tune if active Subversion user population is large (greater than 100) |
| Disk space for recovery journal | Provision large disk for <code>svn-replicator/systemdb</code> , at least number of commits within a two to four hour window |
| Batch Processing | If there are any batch processes that interact with WANdisco, turn the <code>deferred-writes</code> to false. |
| For High Availability Groups | |
| HeartBeatInterval | Tune based on WAN latency, ensure interval is \gg max ping time between Failover agent machine and replicator |
| MissingHeartBeat Count | Default is four. If you see too many false alarms (spurious failover events) increase |
| Admin Email Address | To generate email notifications from the failover agent. |
| For Access Control | |
| Audit Reports | For reports other than Users and Groups, you'll need to use a database such as MySQL, and php. |
| mod_authz_svn | Optional but recommended. See Access Control — Using the AuthZ Module . Module may be bundled with your version of Apache. |
| Notify all users that they must flush their client cache. | |

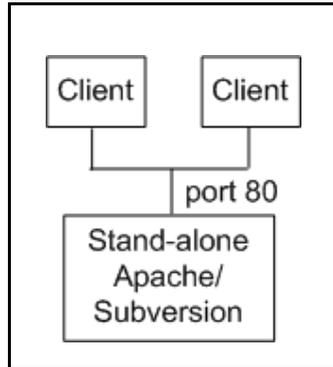
1.10 Creating a New Subversion Repository?

If you are creating a new Subversion repository, please follow the Subversion documentation at <http://svnbook.red-bean.com>.

1.11 Configuring Apache

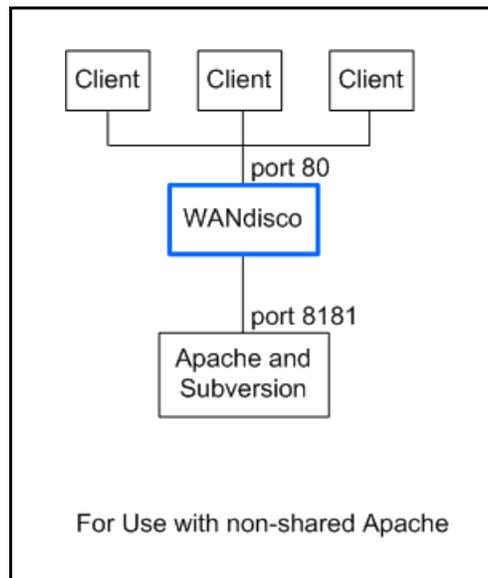
Carefully consider your environment when setting up Apache. You can either dedicate Apache to WANdisco, or share Apache with other locating or applications. WANdisco also supports using HTTPS.

Here is an example of a simple configuration without WANdisco.



1.11.1 Dedicated Apache - Changing Subversion Port On Unix Flavor

You can configure Apache to be dedicated to WANdisco, as shown in the following illustration.



Change the port number in the `httpd.conf` configuration file in the Apache server. Please see the `Listen` directive, discussed in the article at <http://httpd.apache.org/docs/2.2/bind.html>.

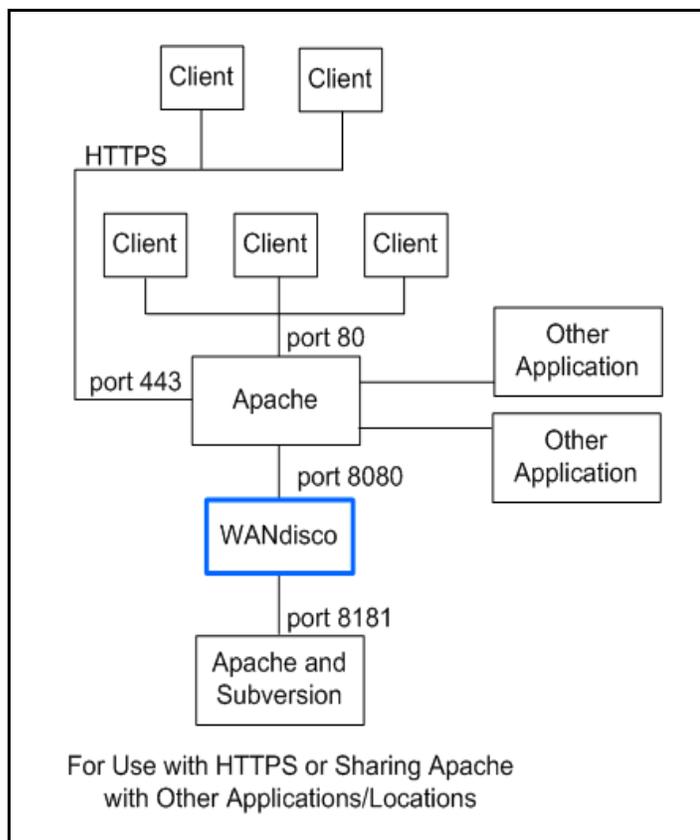
Here is a snippet of an `httpd.conf` file:

```
#
# Listen: Allows you to bind Apache to specific IP addresses and/or
# ports, instead of the default. See also the <VirtualHost>
# directive.
#
# Change this to Listen on specific IP addresses as shown below to
# prevent Apache from glomming onto all bound IP addresses (0.0.0.0)
#
#Listen 12.34.56.78:80
Listen 8080
```

With this configuration, Apache server listens on port 8080 instead of default port 80.

1.11.2 Sharing Apache, and Using HTTPS

Alternately, you can configure Apache to use HTTPS, and you can share Apache with other locations or applications, as shown in the following illustration.



You can use this configuration if you enable a proxy pass.

The following ports are assumed for this example configuration:

- Apache server is running on port 80
- Apache web-dav module is running on port 8181
- WANdisco Subversion replicator is configured to listen on port 8080, and it forwards the requests to apache web-dav module on port 8181
- WANdisco port is listening on port 6444
- Apache SSL is running on port 443 to handle HTTPS requests (if this is set up, the stunnel package is not required)
- All the processes are running on the same machine
- Apache is compiled with `mod-proxy` and `mod-ssl` modules
- The Subversion URL is `/svnrepos`

When you perform the WANdisco installation, specify these ports for each replicator:

- WANdisco port 6444
- Proxy port 8080
- Apache web-dav port 8181 on localhost

In the `httpd.conf` file, specify the following parameters:

```
#
# Define apache port and pass anything that matches location /svnrepos to
# WANdisco SVN Replicator
#
NameVirtualHost *:80
<VirtualHost *:80>
ProxyPass /svnrepos http://127.0.0.1:8080/svnrepos
ProxyPassReverse /svnrepos http://127.0.0.1:8080/svnrepos
RequestHeader edit Destination ^https: http: early
</VirtualHost>

Listen 8181
NameVirtualHost *:8181

<VirtualHost *:8181>
<Location /svnrepos>
AllowOverride None
Order allow,deny
Allow from 127.0.0.1
DAV svn
SVNParentPath /tmp/dav
AuthType Basic
AuthName wandisco
AuthUserFile /etc/httpd/conf/htpasswd
Require valid-user
</Location>
</VirtualHost>
```

```
# For the SSL option

Listen 443
<VirtualHost *:443>
ProxyPass /svnrepos http://127.0.0.1:8080/svnrepos
ProxyPass /!svn http://127.0.0.1:8080/svnrepos/!svn
ProxyPassReverse /svnrepos http://127.0.0.1:8080/svnrepos
ProxyPassReverse /!svn http://127.0.0.1:8080/svnrepos/!svn
RequestHeader edit Destination ^https: http: early
SSLEngine on
SSLCertificateFile /etc/httpd/conf/ssl.crt/server.crt
SSLCertificateKeyFile /etc/httpd/conf/ssl.key/server.key
SSLCACertificateFile /etc/httpd/conf/ssl.crt/ca-bundle.crt
</VirtualHost>
```

1.11.3 Using HTTP with Apache

This section applies for any Apache configuration.

In order to make a Subversion repository function in a distributed environment, Subversion Multi-Site requires exactly the same Apache/Subversion setup at all the nodes. In addition, Apache's configuration needs to be modified to work in a performant manner with Subversion (this is independent of Subversion MultiSite). Perform the following steps.

- Step 1** Change Apache's connection keep-alive settings to allow long lived HTTP connections. Add this to the Apache configuration file `conf/httpd.conf` or included `conf/extra/httpd-defaults.conf`. For instance,

```
$ vi conf/httpd.conf
...
# Various default settings
Include conf/extra/httpd-default.conf
...
$ vi conf/extra/httpd-default.conf
...
#
# Timeout: The number of seconds before receives and sends time out.
#
Timeout 30000
# KeepAlive: Whether or not to allow persistent connections (more than
# one request per connection).
#
KeepAlive On
# MaxKeepAliveRequests: The maximum number of requests to allow
# during a persistent connection. Set to 0 to allow an unlimited amount.
#
MaxKeepAliveRequests 0
#
```

```
# KeepAliveTimeout: Number of seconds to wait for the next request from
the
# same client on the same connection.
#
KeepAliveTimeout 500
...
```

- Step 2** Ensure the SVN DAV settings in Apache's configuration files are exactly the same at all nodes. The top level location URI prefix should be the same. We recommend copying the current `conf` file, and then changing the host:port settings. For instance, here is a `conf` file snippet with Apache virtual hosts (you do not have to use Apache virtual hosts, this is only an illustration):

```
# Site A
$ cat conf/extra/httpd-svn-dav.conf
...
NameVirtualHost site-a:8181
<VirtualHost site-a:8181>
<Location /dir0>
DAV svn
SVNPath /home/site-a/svnroot
AuthType Basic
AuthName wandisco
AuthUserFile /home/site-a/apache2/dist/conf/htpasswd
Require valid-user
</Location>
</VirtualHost>
...
# Site B
$ cat conf/extra/httpd-svn-dav.conf
...
NameVirtualHost site-b:9191
<VirtualHost site-b:9191>
<Location /dir0>
DAV svn
SVNPath /home/site-b/svnroot
AuthType Basic
AuthName wandisco
AuthUserFile /home/site-b/apache2/dist/conf/htpasswd
Require valid-user
</Location>
</VirtualHost>
...
```

- Step 3** The Apache user names and passwords should match at all nodes. Subversion MultiSite requires a valid username inside the HTTP authorization header to be passed for all DAV commands.

1.11.4 Apache and SVNKit

There are some known behaviors with connection pooling when using Apache and SVNKit. Adding a WANdisco product does not change the behavior of these issues, but you may need to revisit them after adding WANdisco.

WANdisco recommends using JavaHL with Eclipse IDE, which does not use connection pooling, and thereby eliminates any problems.

1.11.4.1 SVNKit and Connection Pooling

SVNKit uses connection pooling. For a given client, SVNKit opens two connections and keeps them open for later use. On a system with a heavy load and numerous clients, this can cause performance degradation. An open connection consumes an Apache worker thread, and with many clients and connection pooling, Apache may run out of worker threads. Apache provides various tuning parameters to optimize connection pooling but still release the unused connections. The tunable parameters are Timeout, KeepAliveTimeout, MaxKeepAliveRequests, and KeepAlive. Please refer to the Apache configuration documentation for further details at <http://httpd.apache.org/docs/2.2/mod/core.html>.

1.11.4.2 Tuning Values to Optimize Your Configuration

Apache has two timeout configurations: Timeout and KeepAliveTimeout. In general, the Timeout value should be higher than the value for KeepAliveTimeout.

With KeepAlive set to `true`, command line SVN clients are very diligent in closing connections. However, SVNKit keeps connections open. As Apache documentation states, if KeepAlive is set to `true`, the client should use an existing connection, and close it when done. Giving a somewhat conflicting command, SVNKit opens a connection and keeps it open. On issuance of a subsequent command, SVNKit may open a new connection, regardless of how many established connections are still open.

To force a connection closure upon command completion, set the KeepAliveTimeout to a smaller value than the value for Timeout.

Generally, a KeepAliveTimeout value of 15 seconds works for WANdisco products. If your application ends up dropping and then establishing the connection because of this low value, you may have to increase the KeepAliveTimeout value. (For example, you may notice a larger number of pending transactions on the Admin Console's Dashboard page.)

Under a normal load, a client follows a request within 15 seconds, but under a heavy load or no load, the number of seconds could vary widely, depending on your specific configuration.

The server sends the Timeout value to the client as a part of the response header, and the client uses this value to reset or resend the command if the server does not reply within that time. With a low value for Timeout (for example, 120 seconds), if the server for some reason does not complete the action and does not reply back, the client sends the command again on a different,

newly established connection. If this happens with WANdisco, WANdisco ends up replicating an unnecessary transaction, and may not parse correctly with an invalid response.

WANdisco also requires some extra time for transaction coordination. In a singleton quorum, with a client connecting to the distinguished node, the transaction overhead is about 300 milliseconds.

To be on the safe side, WANdisco recommends you set the `KeepAliveTimeout` value much higher than 300 milliseconds. With `KeepAlive` set to `true`, and an appropriate value for `KeepAliveTimeout`, any Apache worker threads and lingering connections should be taken care of.

NOTE:

WANdisco does not recommend setting `KeepAlive` to `false`. If you set `KeepAlive` to `false`, a client's transactions have an enormous overhead of establishing and destroying the connection. This overhead exists regardless of WANdisco.

1.11.5 Apache 2.2 with SVN-DAV on Windows

Follow the standard Subversion documentation for installing Subversion on Windows. Below is an example of configuring Apache 2.2 with svn-dav.

- Step 1 Install Apache 2.2.x.
- Step 2 Install subversion. Make sure it's Subversion for Apache 2.2.x. For the rest of the example, assume subversion is installed in c:\Subversion and apache is installed in c:\Apache.
- Step 3 Copy c:\Subversion\bin\int13_svn.dll to c:\Apache\bin.
- Step 4 Copy c:\Subversion\bin\libdb44.dll to c:\Apache\bin.
- Step 5 Copy c:\Subversion\bin\mod_authz_svn.so to c:\Apache\modules.
- Step 6 Copy c:\Subversion\bin\mod_dav_svn.so to c:\Apache\modules.
- Step 7 Uncomment these lines in `apache/conf/httpd.conf`:
- ```
LoadModule dav_module modules/mod_dav.so
LoadModule dav_fs_module modules/mod_dav_fs.so
```
- Step 8 Add these lines to `apache/conf/httpd.conf`:
- ```
LoadModule dav_svn_module modules/mod_dav_svn.so
LoadModule authz_svn_module modules/mod_authz_svn.so

<Location /myDavLocation>
DAV svn
SVNPath C:\repo
SVNAutoversioning on
AuthType Basic
AuthName "SVN Repo"
AuthUserFile C:\repo\dav-auth
Require valid-user
</Location>
```
- Step 9 Check that the users have been added to the `C:\repo\dav-auth` file. To add new users or change passwords, use `apache/bin/htpasswd.exe`.
- Step 10 Restart Apache.
- Step 11 Point a web browser to
- ```
http://server:port/<Your Dav Location>.
```

## 2 Installing Java and Perl

---

You should have already installed Java and Perl at all the nodes in your replication group for your trial evaluation. Any new node you add to the replication group needs Java and Perl installed as well.

### 2.1 Installing Java

Step 1 Install JDK 1.6 and define the `JAVA_HOME` environment variable to point to the directory where the JDK is installed. You can download JDK 1.6. from <http://java.sun.com/>.

Step 2 Add `$JAVA_HOME/bin` to the path and ensure that no other java (JDK or JRE) is on the path.

```
$ which java
/usr/bin/java
```

```
$export JAVA_HOME="/usr"
```

or

```
$which java
/export/share/apps/jdk/1.6.0/bin/java
```

```
$export JAVA_HOME="/export/share/apps/jdk/1.6.0"
```

Step 3 Ensure the full JDK is installed, not just the JRE. This can be confirmed by running `java -server -version`. If it generates a **not found** error, repeat Steps 1 and 2.

If you find package management problems or conflicts with the JDK version you are downloading (for example, rpm download for Linux), you may want to use the self-extracting download file instead of the rpm (on Linux) package. The self-extracting download easily installs in any directory without any dependency checks.

## 2.2 Installing Perl

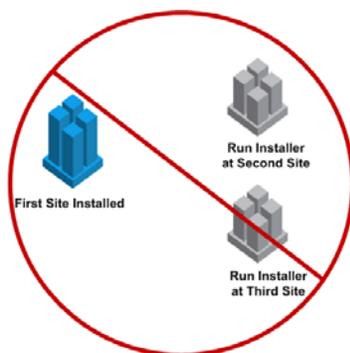
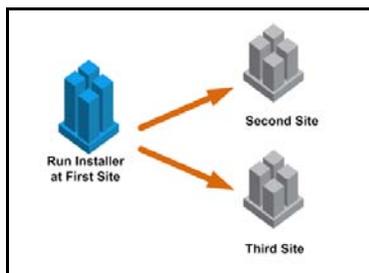
- Step 1 On UNIX or Cygwin, install perl version 5.6 or greater and ensure that the perl executable is on the system path.
- Step 2 On Windows, install ActivePerl version 5.8 or greater and ensure that the perl executable is on the system path. You can download the MSI installer for ActivePerl from the URL below.

<http://www.activestate.com/activeperl/downloads/>

## 3 Installation

---

You are going to run the installer at the first node, which creates packages for the other nodes. Do not run the installer at any other node.



### **WARNING:**

---

Once WANdisco is installed and you have synchronized repositories, do not ever bypass WANdisco and alter a repository. This causes the repositories to be out-of-sync.

---

### 3.1 First Time Installation of First Site

Make sure that Apache is running.

If you are going to set up a stand-alone High Availability group, the first node you set up here is the first node in the High Availability group.

- Step 1 Save the `svnrep.tar.gz` file.
- Step 2 For Windows, create a directory, and uncompress the file in that directory. For other platforms, uncompress the file.

The uncompressed file produces a directory, `svn-replicator` that contains the following directories:

| DIRECTORY | CONTENTS                                                                                                                                                                 |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| audit     | For Access Control. Contains the audit trail logs.                                                                                                                       |
| bin       | Contains scripts like <code>svnreplicator</code> , <code>shutdown</code>                                                                                                 |
| config    | Contains the <code>svn-replicator/config/prefs.xml</code> file used to configure Multi-Site.                                                                             |
| lib       | Contains the <code>jar</code> files required to run the product.                                                                                                         |
| logs      | Contains the <code>pid</code> file, log files and other temporary files. WANdisco Multi-Site's log file is named <code>SVNProxyServer-prefs.log</code> .                 |
| systemdb  | Contains the system database with its transaction journal. <b>Warning:</b> Deleting or modifying files from <code>systemdb</code> will likely corrupt your installation. |

Step 3 Copy the license evaluation key file to the `svn-replicator/config` directory.

Step 4 At the command prompt (or editor), go to `svn-replicator/bin`. Type

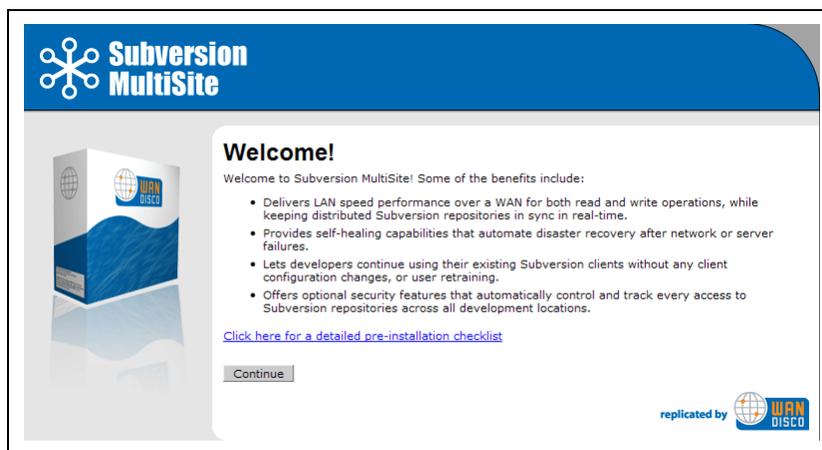
```
perl setup
```

To use a port other than the default 6444, type

```
perl setup <port number>
```

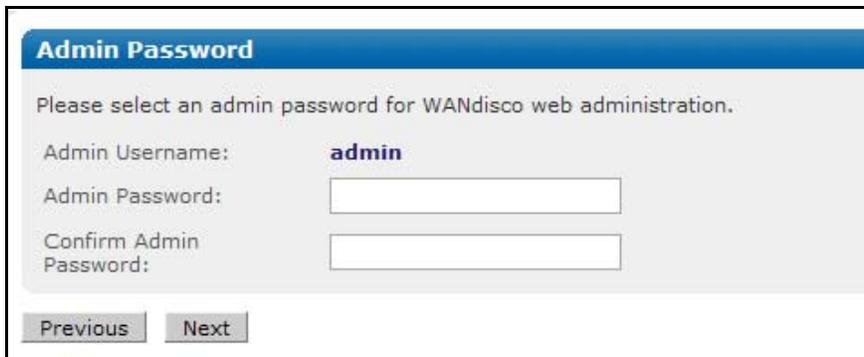
The last line of text returned contains a WANdisco URL.

Step 5 Copy the URL returned in the last step and paste it into a browser. The MultiSite Welcome page appears.

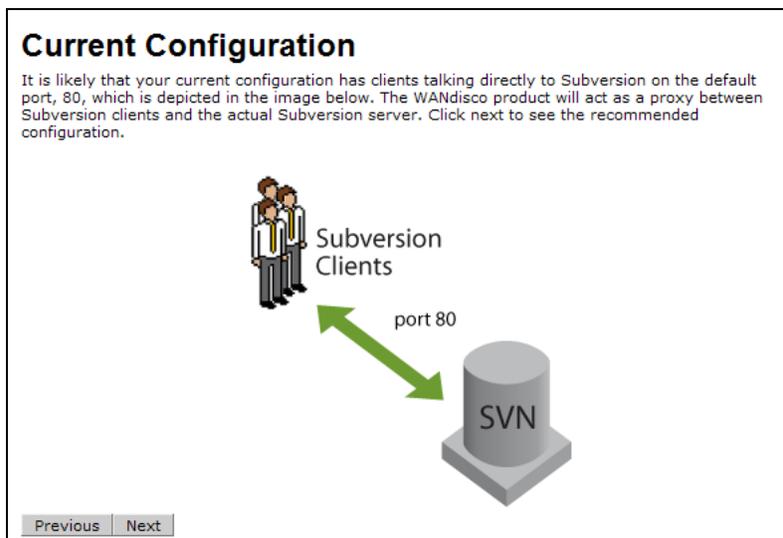


- Step 6 Click **Continue** at the Welcome text.
- Step 7 Read the User Licence Agreement. You must agree to the terms to continue.
- Step 8 Enter a password for WANdisco. The username is **admin**. You can change the username after the installation. See [Changing WANdisco's admin Login](#) in *Procedures and Troubleshooting*.

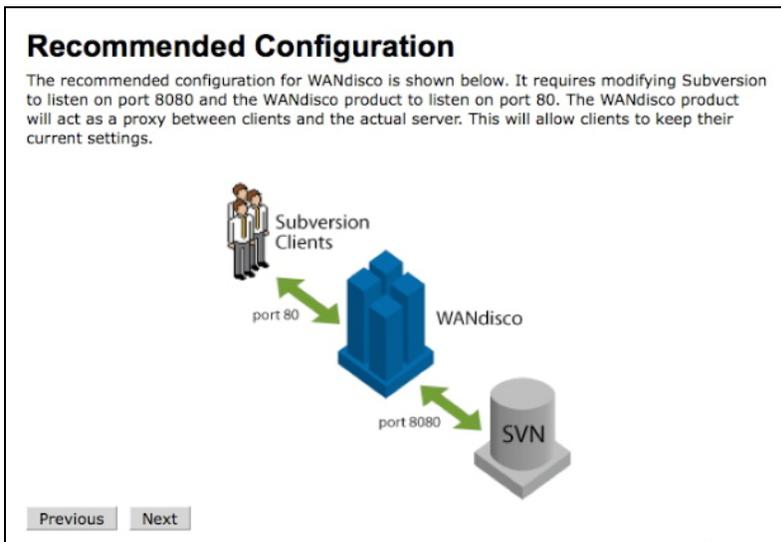
Click **Next**.



- Step 9 The Current Configuration page appears. After reading it, click **Next**.



- Step 10 Read about the recommended configuration. See [Deployment Checklist](#). Click **Next**.



The Subversion MultiSite Settings page appears.

### 3.1.1 Specifying MultiSite Settings

**SVN MultiSite Proxy Settings**

Node Name:  ?

Node IP:  ?

Bind Host:  ?

Client Port:  ?

Admin Console Port: **6444**

 To use a different port start setup with a port specified. For example: setup 6555

Previous Next

- Step 11 In the Node Name field, enter a name for this first node in the replication group. Spaces are not allowed.
- Step 12 Enter the node's IP address.
- Step 13 Enter the node's bind host. Unless you wish to bind to a specific address, use 0.0.0.0.

- Step 14 In the Client Port field, enter a port number. WANdisco recommends using 80 as the port number if you are using Apache/HTTP. WANdisco is transparent to Subversion client users.

**NOTE:**

---

In order to use port 80, WANdisco must be run by a privileged user like `root`.

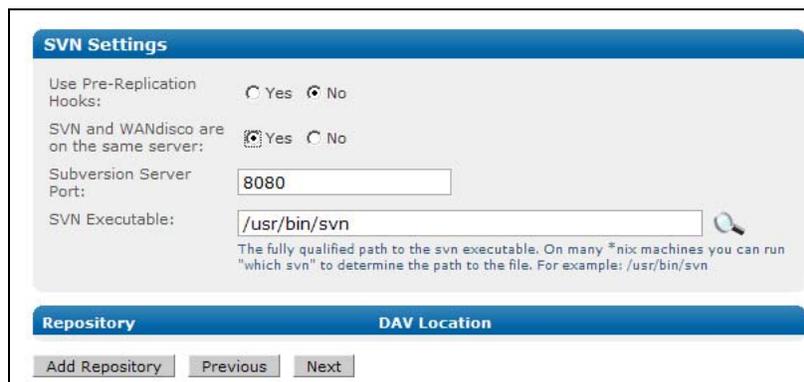
---

- Step 15 WANdisco always sets the Admin Console port to 6444, unless you specified a different port in step 4. Click **Next**.

### 3.1.2 Specifying Subversion Settings

If WANdisco is to manage the Subversion password file, WANdisco and Subversion must reside on the same server.

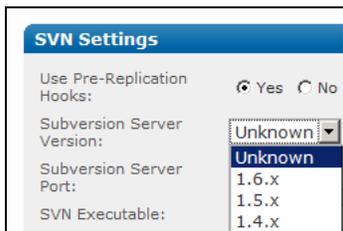
If you plan on using pre-replication hooks, WANdisco and Subversion must reside on the same server.



- Step 16 Specify whether you are using pre-replication hooks.

Pre-replication hooks require that Subversion and WANdisco share the same server, so the answer guides the installation.

- Step 17 If you answered **Yes** in the previous step, specify the Subversion version you are using.



WANdisco needs the version in order for pre-replication hooks to work, but you can select `unknown` during installation, and then specify it post installation with the **Subversion Settings** command on the Proxy page.

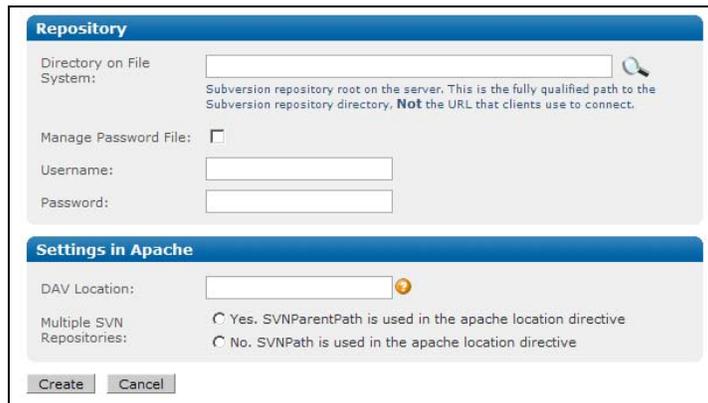
- Step 18 If you answered **No** in step 16 for pre-replication hooks, answer **Yes** or **No** to whether Subversion and WANdisco are on the same server. If you want WANdisco to manage the Subversion password file, select **Yes**.
- Step 19 If you answered **No** in the previous step, enter the Subversion host's IP address.
- Step 20 Enter the Subversion port number. WANdisco connects to Subversion through this port.
- Step 21 Browse to the Subversion executable file.
- Step 22 For Access Control, check the checkbox if you are using the recommended AuthZ module. For more information, see [Access Control — Using the AuthZ Module](#).

If you checked the AuthZ checkbox, browse to the location of your `svn.authz` file. This file must exist at all nodes.

### 3.1.3 Specifying Subversion Repository Settings

You can specify more than one repository, but you set them up one at a time.

Step 23 Click **Add Repository**. The Repository page appears.



Step 24 Browse to the repository location.

Step 25 Check the Manage Password File checkbox if you want WANdisco to manage the password file. If you do want WANdisco to manage the password file, WANdisco must be on the same server as Subversion.

Step 26 If you checked the Manage Password File checkbox, browse to the password file location.

Step 27 Enter a username and password for the repository. WANdisco uses this Subversion user to browse the repository, so this user must have read access to the entire repository.

Step 28 Specify the DAV location.

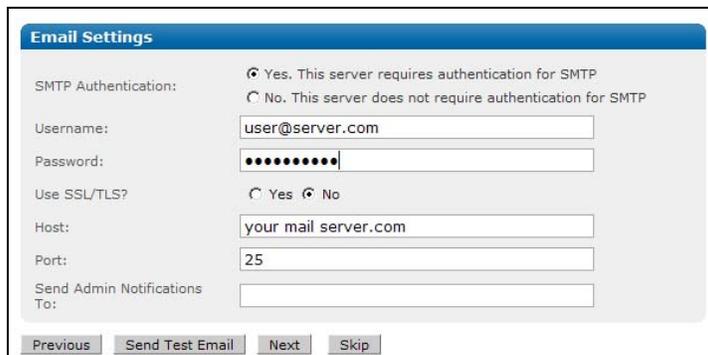
Step 29 Answer **Yes** if you are using SVNParentPath for multiple repositories, or **No** if using SVNPath.

Step 30 Click **Create**. The SVN Settings page appears, with the repository you just specified listed under **Repository**.

Step 31 To specify more repositories, click **Add Repository** and repeat steps 23 through 30. If you have set up all repositories, click **Next**.

### 3.1.4 Optional — Setting Up Email Settings

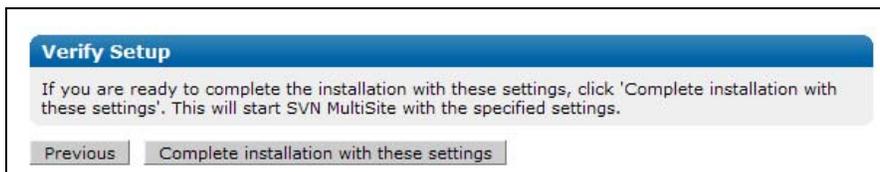
You can set email settings now, or you can skip this section and set up email later. WANdisco recommends you set up email to receive watchdog messages. See [About Watchdog Mode](#).



- Step 32 Check **Yes** or **No** if your mail server needs SMTP authorization.
- Step 33 Enter the email server's username and password for authentication.
- Step 34 Check **Yes** or **No** if SSL or TLS is needed.
- Step 35 Enter the IP or URL of your email server.
- Step 36 Enter the port number to connect to the email server: 25 is the default.
- Step 37 In the field **Send Admin Notifications To**, enter in the email address of the person to send email to. Enter in only one email address.
- Step 38 To test the email settings, click **Send Test Email**. Click **Next**.

### 3.1.5 Verify Setup

- Step 39 The Verify Setup page appears.



- Step 40 Click **Complete installation with these settings**. The installer configures and starts Subversion MultiSite.

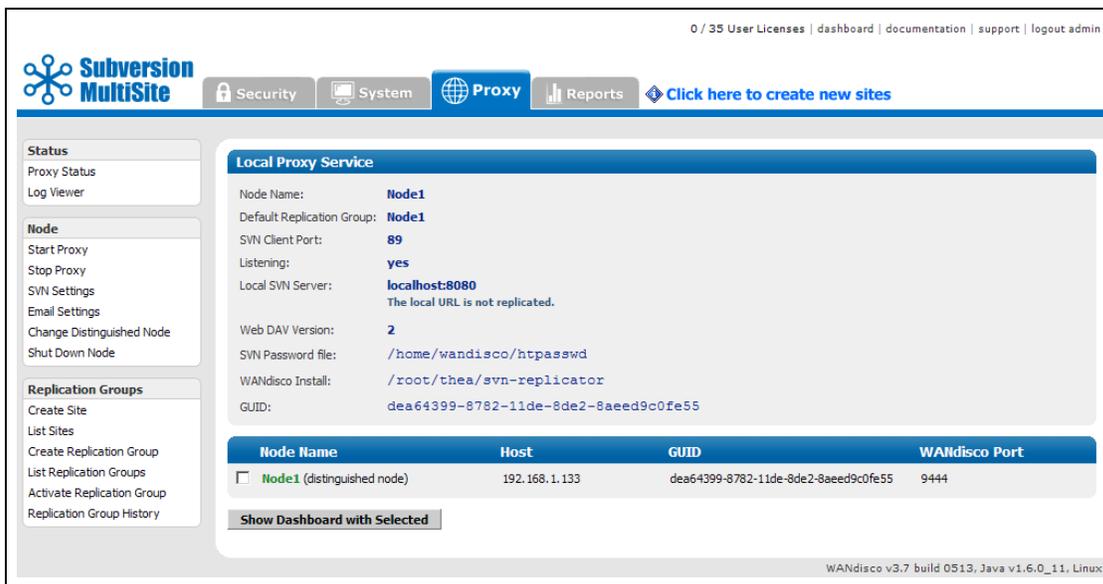


### 3.1.6 Verifying the Installation

Step 41 Log in as admin. You now have MultiSite's Admin Console running in your browser.



**MultiSite and High Availability**



**MultiSite with Access Control**

You must perform a few steps to ensure WANdisco is properly installed and communicating with Subversion.

Step 42 Create a user in WANdisco. If you previously chose not to have WANdisco update the password file, you must update it for the new user.

Step 43 From a client, log in to Subversion as that user.

**NOTE:**

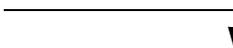
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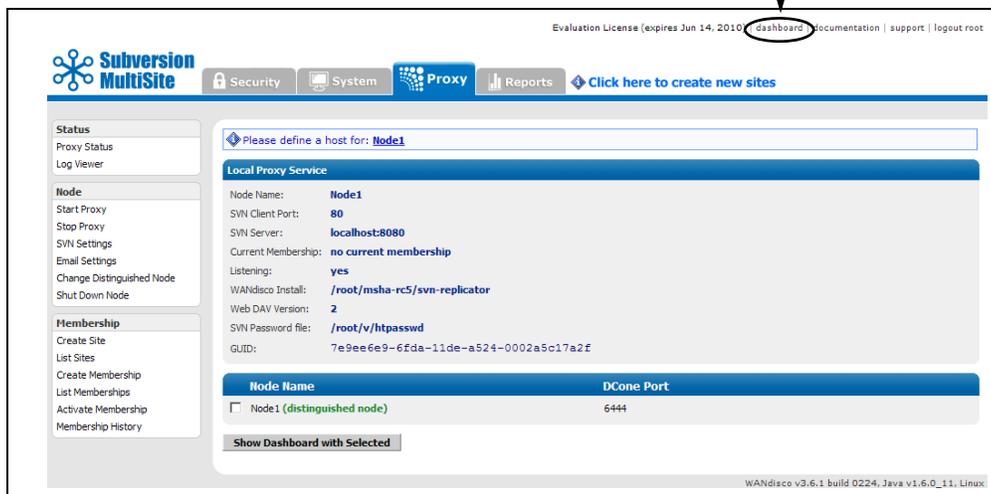
Do not log in from the server where you installed WANdisco.

---

Step 44 Check out a file, modify it, and check it back in.

Step 45 Go to the WANdisco Admin Console's Dashboard to view the transaction.

click on **dashboard** 



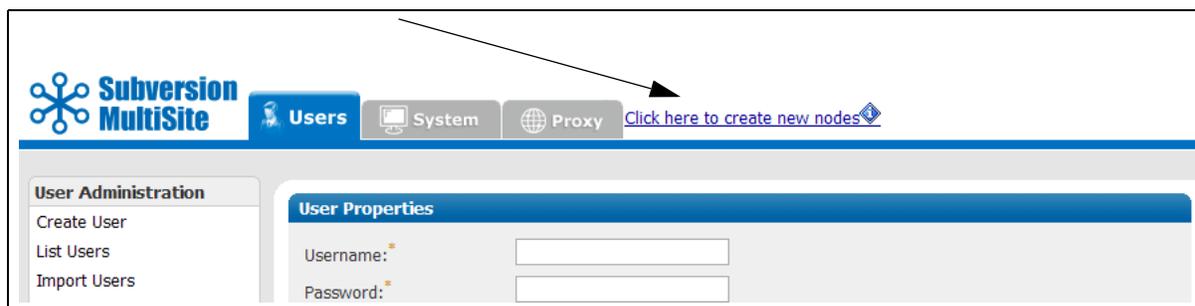
## 3.2 Specifying Subsequent Sites

Now that you have verified the first node’s installation, you can continue to distribute MultiSite to other nodes. You first have to create each node in your replication group, including any High Availability nodes. Each High Availability sub group needs its own Failover Agent.

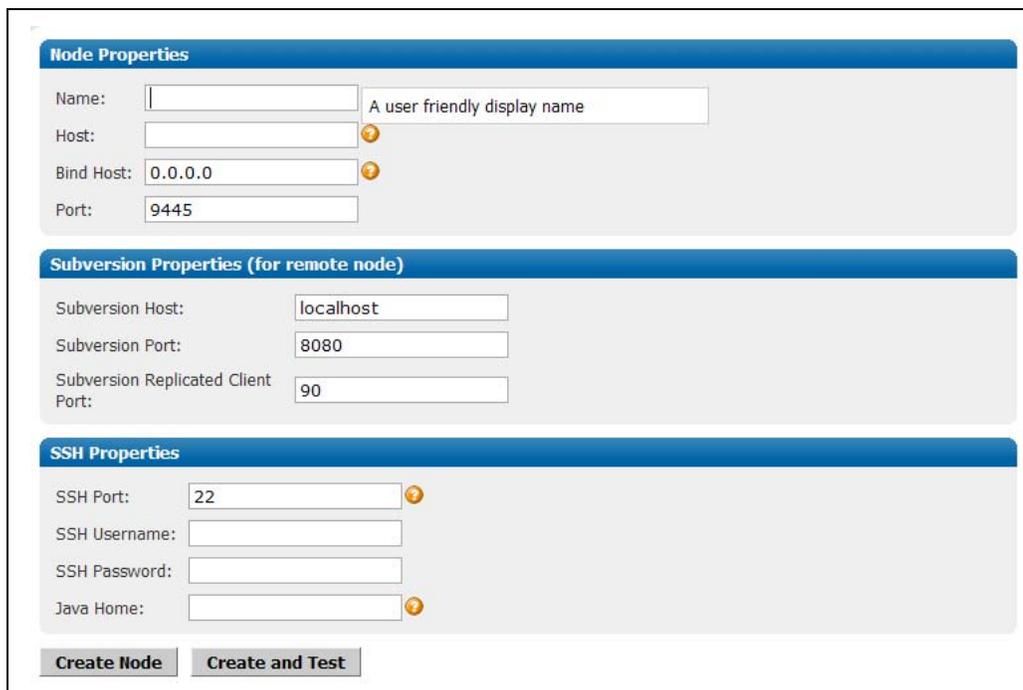
For clarification, here is the task flow for three possible customer scenarios.

| Action                     | MultiSite | MultiSite and HA | HA | MultiSite and AC |
|----------------------------|-----------|------------------|----|------------------|
| create other nodes         | ✓         | ✓                | ✓  | ✓                |
| create Replication Group   | ✓         | ✓                | ✓  | ✓                |
| create HA Sub groups       |           | ✓                | ✓  |                  |
| prepare Activation         | ✓         | ✓                | ✓  | ✓                |
| activate Replication Group | ✓         | ✓                | ✓  | ✓                |
| add users                  | ✓         | ✓                | ✓  | ✓ with roles     |
| add groups                 |           |                  |    | ✓                |
| add ACLs                   |           |                  |    | ✓                |

The procedure steps you through all the scenarios. The screen shot illustrations are based on a sample installation group of six nodes, with two High Availability sub groups of two nodes each. (That means a total of eight nodes are defined for this group, including the two Failover Agents.)



Step 46 Click on the link **Click here to create new nodes**. The Node Properties page appears.



**Node Properties**

Name:  A user friendly display name

Host:

Bind Host:

Port:

---

**Subversion Properties (for remote node)**

Subversion Host:

Subversion Port:

Subversion Replicated Client Port:

---

**SSH Properties**

SSH Port:

SSH Username:

SSH Password:

Java Home:

**Create Node**   **Create and Test**

Step 47 Enter a name, host name (usually the IP address), bind host and WAN-disco port number for the node.

Step 48 The Subversion Properties are populated with the first node's settings. Change them if required.

Step 49 Fill out the SSH Properties if you are using SSH to copy installation files to the other nodes. Make sure to run a test for the SSH credentials.

The test also checks for the correct Java version. If you get an error, see [Installing Java and Perl](#).

Step 50 Click **Create Node**. A page appears containing information for the first node and the node you just created.

Create all the nodes in your replication group, including any that will be in an HA sub group. For HA: you'll create the Failover Agent in another step.

The following illustration shows three nodes.

| Name                           | Host       | Port | Bind IP | ID                                   |                                                      |
|--------------------------------|------------|------|---------|--------------------------------------|------------------------------------------------------|
| <input type="checkbox"/> Node1 | 172.1.5.27 | 9445 | 0.0.0.0 | d7826929-9d61-11de-8880-98acc59a0251 | <a href="#">Edit Node</a>   <a href="#">Test SSH</a> |
| <input type="checkbox"/> Node2 | 172.1.5.11 | 9445 | 0.0.0.0 | 94ba4121-9d67-11de-88b6-03c6223a9e5b | <a href="#">Edit Node</a>   <a href="#">Test SSH</a> |
| <input type="checkbox"/> Node3 | 172.1.5.12 | 9445 | 0.0.0.0 | a10a9be2-9d68-11de-88b6-3fc000a66e8c | <a href="#">Edit Node</a>   <a href="#">Test SSH</a> |

Step 51 Create the replication group. Click **Replication Groups**. Click **Create Replication Group**. The Replication Group Properties page appears.

**Replication Group Properties**

Replication Group Name:


 For detailed information on the benefits of different quorum configurations read the administration guide at <http://docs.wandisco.com>

Quorum Configuration:

Distinguished Node:

Nodes:

Node2

Node1

Node3

Step a Enter a name for the Replication Group.

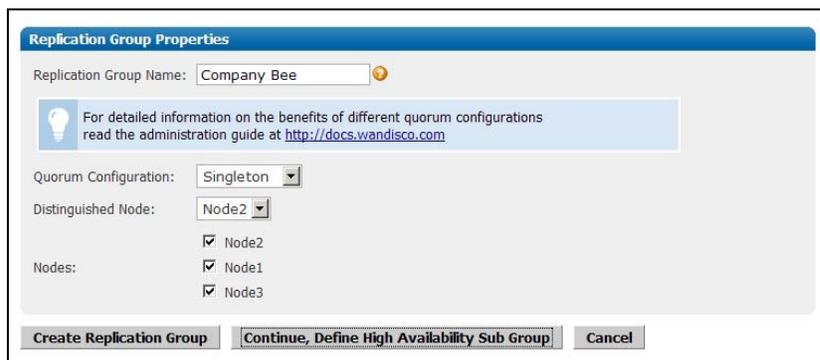
Step b Select a quorum. For a discussion of quorum, see [Replication Example](#) in [About WANdisco Subversion MultiSite](#). Note that evaluation licenses for MultiSite with no High Availability only allow singleton quorum.

Step c Select a distinguished node for the replication group. For MultiSite installations without HA, the first node is the distinguished node. For MultiSite HA, you can select any node. For two-node MultiSite HA groups with no other nodes, make the distinguished node the back up node. See [Stand-Alone Failover Group of Two Replicators](#) in [About WANdisco Subversion MultiSite](#).

Step d Check all the nodes that you want in this replication group.

Step e For non-HA deployments, click **Create Replication Group** and go on to step [54](#).

For HA deployments, click **Continue, Define High Availability Sub Group**.



Step 52 Define the HA Sub Group.

Step a Enter a name for the Failover Agent. The Failover Agent is now a stateless, non-voting node in the membership.

Step b Enter the Failover Agent's IP address.

Step c WANdisco Port is the port that WANdisco uses for its communications. (Protocols are replication, HTTP and heartbeat.) Make sure no other process shares this port.

Step d The Bind Host is the IP address/host name that WANdisco listens on for incoming connections. Unless there are multiple network cards on the Failover Agent, this is typically set to 0.0.0.0.

Step e The SVN Client Port is for Subversion client communication.

Step f If you will use the SSH method to complete installation, fill in the SSH fields.

Step g Select the nodes for this sub group. Use the arrow keys.

Step h Specify priority order, using the up and down arrow keys. See [Priority Order](#) in [About WANdisco Subversion MultiSite](#). For two-node stand-alone MultiSite HA groups, the backup node must be the distinguished node.

Step i Click **Create High Availability Group**.

Step j Create all the HA sub groups you planned for.

Create High Availability Sub Group

Parent Membership: Company Cee  
 Distinguished Node: Node2  
 Failover Agent Name:    
 IP Address:    
 WANdisco Port: 9445   
 Bind Host: 0.0.0.0   
 SVN Client Port: 80

Use the arrow buttons below to select the nodes in the High Availability sub group. The priority 1 node will get all client traffic by default. If the 1st node is not available, it will failover to the 2nd priority node. You should not have an unreliable or high latency network between nodes in a High Availability sub group.

SSH Properties

SSH Port: -1   
 SSH Username:   
 SSH Password:   
 Java Home:

| Priority | Node(s) in Sub Group | Node(s) not in Sub Group               |
|----------|----------------------|----------------------------------------|
| 1        | Node2 (primary, DN)  | Node3 (not in sub group, click to add) |
| 2        | Node1 (backup)       |                                        |

### 3.2.1 Activate the Replication Group

If your repository is less that one gigabyte, you may want WANdisco to add it to the packages for the other nodes. Repositories over one gigabyte more than likely will make the packages too large to copy over networks.

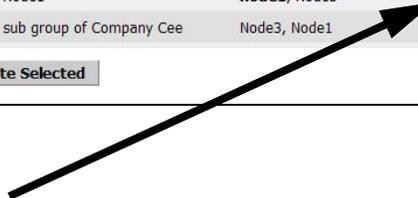
Step 53 Select the desired activation option. Specify **Yes** to use SSH to push the packages, or **No** to copy the files manually.

Activation Options

Activate Nodes via SSH?  Yes. Activate the nodes automatically via ssh  
 No. I will copy the archives manually

Step 54 Activate the replication group. Go to **Replication Groups**, and click **activate** on the desired replication group.

| Name                                            | Quorum    | Distinguished Node       | Nodes                       | Actions                                                                                      |
|-------------------------------------------------|-----------|--------------------------|-----------------------------|----------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Company Bee            | Singleton | Node2                    | <b>Node2</b> , Node1, Node3 | <a href="#">Activate</a>   <a href="#">Create HA Sub-Group</a>   <a href="#">DN Rotation</a> |
| <input type="checkbox"/> FailoverAgent          | -         | sub group of Company Bee | Node1, Node2                | <a href="#">Edit Failover Agent</a>   <a href="#">Define SSH Credentials</a>                 |
| <input checked="" type="checkbox"/> Company Cee | Singleton | Node1                    | <b>Node1</b> , Node3        | <a href="#">Activate</a>   <a href="#">Create HA Sub-Group</a>   <a href="#">DN Rotation</a> |
| <input type="checkbox"/> FailoverAgent2         | -         | sub group of Company Cee | Node3, Node1                | <a href="#">Edit Failover Agent</a>   <a href="#">Test SSH</a>                               |



Step 55 Verify that the Activate Information is accurate.

Step 56 Specify whether WANdisco is packaging the repository, or you are copying it manually. See [Strategies for Achieving Identical Repositories at All Nodes](#).

⚠ Activating a replication group will stop all nodes and temporarily prevent write transactions

**Activate Information**

Activating a replication group will cause the current replication group to become inactive (including all the nodes that are in the replication group). It will be replaced with nodes defined in the selected replication group.

WANdisco Directory:

Automatically Activate Nodes with SSH:  true (see [Activation Options](#))

---

**Packaging Options**

Package Repository:  Yes, create an archive of the repositories  
 No, I will synchronize the repositories manually

Delete Packaging Dir?  Yes. Delete the packaging directory  
 No. Warn me if the packaging directory already exists

Packaging Dir:

The directory to create the archives for the other node(s). A pre-configured archive will be created for each node that needs to be extracted and started at the other node(s).

Activate Replication Group:

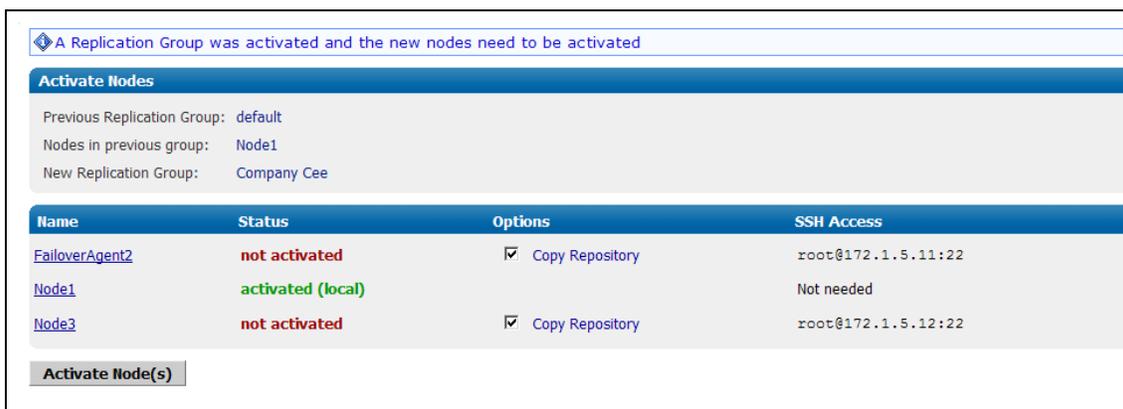
Step 57 If you want to change the packaging directory from the default, do so in the Packaging Dir field. Do not make the packaging directory a child or parent of the product installation.

Step 58 Verify that the displayed replication group (in the Activate Replication Group field) is the one you want to activate.

Step 59 Click **Continue**. The status displays,



and then the replication group displays. Note that only the first node is activated at this time.



Step 60 Activate the other nodes by clicking **Activate Node(s)**.

Note that the time it takes for the other nodes to activate depends on your WAN latency. If you have singleton quorum and the distinguished node is the local node, you can release the local node to users. When the other nodes come up, WANdisco replays any missing transactions for the nodes, so the repositories remain in sync .

### 3.2.2 Copying the Installation Files Manually

WANdisco creates a [node name].zip file for each of the nodes in a replication group. The first node is installed, so perform the following for all new nodes in the group:

- Step 1 Copy the [node name].zip to the new node
- Step 2 At the new node, extract the [node name].zip file to a temporary location to create a wandisco directory.

Step 3 From a command prompt type:

```
cd wandisco
perl unpackage
```

Step 4 Follow the directions provided by the `unpackage` script.

### 3.2.2.1 Activating a Failover Agent

If your replication group has a Failover Agent, follow these steps to activate it.

Step 1 If you have not done so already, move the compressed file (`failover-<sitename>.zip`) to the Failover Agent node.

Step 2 Extract the file to create a `svn-failover` directory.

Step 3 At `svn-failover/bin`, type

```
perl failoveragent
```

Step 4 The Failover Agent Admin Console is now available to view in a browser. You can also see it through any node's Admin Console.

You now have successfully installed Subversion MultiSite.

## 3.2.3 Post Installation Configuration

There are a few issues you may want to address pretty quickly after installation, and are described here. Any action you take is through the Admin Console, described in [Using the Admin Console](#) in [Using Subversion MultiSite](#).

### 3.2.3.1 Using Pre-Commit Hooks?

If you are going to be using pre-commit hooks, these become WANdisco pre-replication hooks. Read [Setting Up Hooks](#) in [Procedures and Troubleshooting](#).

### 3.2.3.2 High Availability — Configuring Node Start Up Commands

The WANdisco Failover Agent is capable of starting and stopping its sub group nodes from the Admin Console directly, provided you enter the startup commands in the Admin Console.

To configure start up commands, see the [Start Command](#) definition in [Using the Admin Console](#) in [Using Subversion MultiSite](#).

### 3.2.3.3 High Availability — Email Alerts for Failover Events

The WANdisco Failover Agent can generate email alerts whenever it detects an event related to failover. Examples of such events are:

- unable to transition to unilateral mode
- when transitioned to unilateral mode
- when unilateral mode starts
- when failed to backup
- when the primary is not available when the failover agent starts

To set up email alerts, see the [Admin email](#) definition in [Using the Admin Console](#) in [Using Subversion MultiSite](#). Since HA groups are on a LAN, in all likelihood, the Failover Agent email settings would be the same as you configured for the HA nodes watchdog email alerts.

## 3.3 Installing Upgrades

### NOTES:

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This procedure involves taking Subversion offline. Please follow your company procedures about notifying Subversion users of down time.

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### 3.3.1 Stop WANdisco

- Step 1 After notifying Subversion users of the downtime, stop Subversion Multi-Site. Perform a synchronized stop of all nodes. See [Performing a Synchronized Stop](#) in *Procedures and Troubleshooting*.
- Step 2 Shut down each node. Go to each node's Proxy tab, and click **Shut Down Node**.

### 3.3.2 Export WANdisco Data

- Step 3 On the System tab, select **Export Settings**. These settings include user information. You only need to do this at one node, since the files at other nodes are identical.

### 3.3.3 Preparing the Sites

At each node:

- Step 4 Copy the entire `svn-replicator` directory to a backup location.
- Step 5 On the original install node, zip the `config` directory.
- Step 6 Delete the `systemdb` directory.
- Step 7 In the `svn-replicator/config` directory, delete these directories:
- `membership`
  - `security`
  - `passwd`

### 3.3.4 At the Install Site

- Step 8 Save the `svnrep.tar.gz` file and extract it to a new directory, for example `new/svn-replicator`.
- Step 9 Unzip or untar the file.
- Step 10 Verify the md5 checksum. For Unix, type
- ```
md5sum <filename>
```
- Step 11 Copy the file `new/svn-replicator/lib/svn-replicator.jar` to the `svn-replicator/lib` directory.

3.3.5 Running the Install Program

- Step 12 Run this command on the original install node. The install program automatically populates all previous configuration information.
- ```
cd svn-replicator
```
- ```
perl bin/setup
```
- The Setup page appears.
- Step 13 Click **Next** to continue.
- Step 14 Make changes as needed. The Admin Console appears.

3.3.6 Importing WANdisco Data

- Step 15 Import WANdisco data. On the System tab, select **Import Settings**. Import the file you exported in step 3.
- Step 16 Perform a synchronized stop.
- Step 17 For additional nodes, refer to [Specifying Subsequent Sites](#).

You have successfully installed a Subversion MultiSite upgrade.