WANdisco Subversion MultiSite Software Appliance Administration Guide

Revision History

REVISION	DATE
1.0	February 2009
1.1	15 April 2009
1.2	24 April 2009
1.3	21 July 2009

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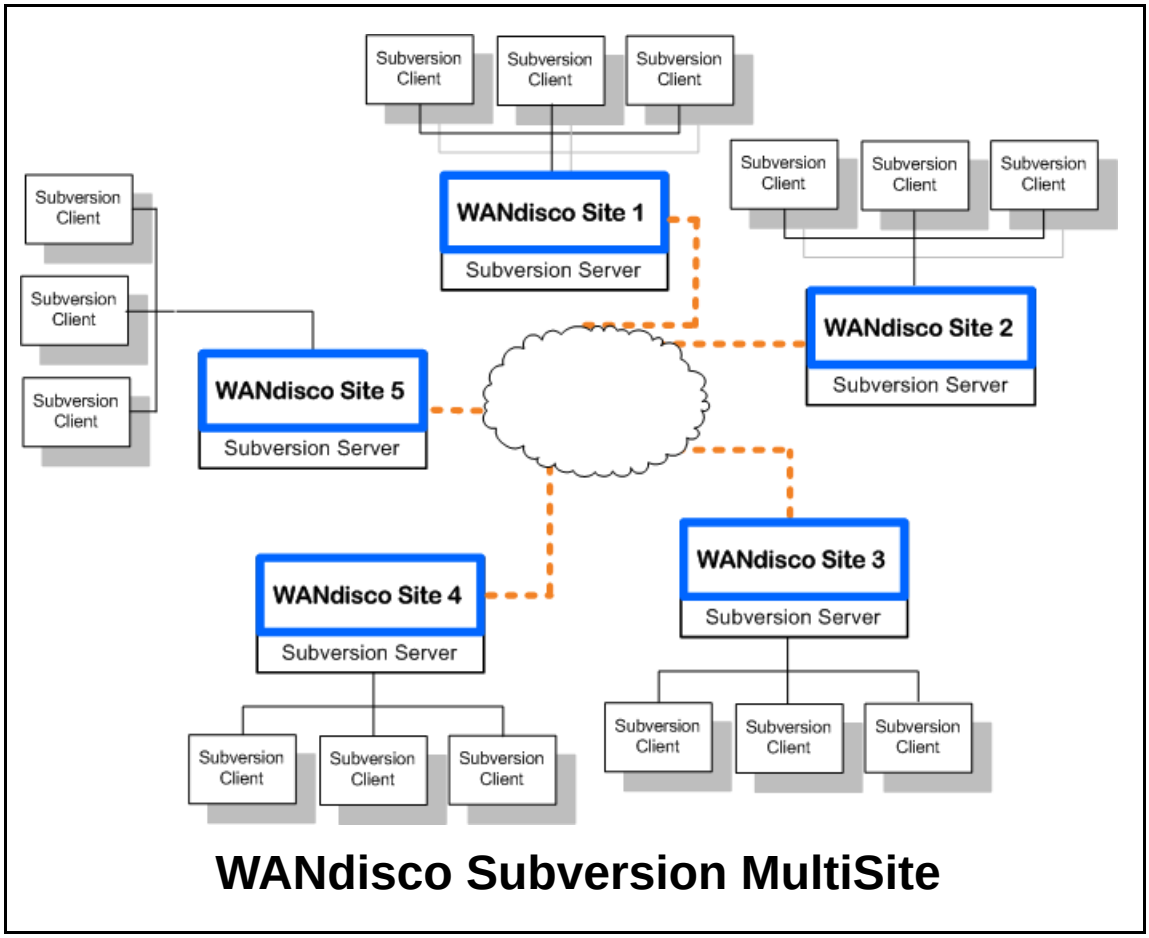
1 Introduction

1.1 WANdisco Replication

Welcome to the WANdisco world of replication. Subversion is designed to run as a central server to which multiple Subversion clients connect. WANdisco's replication technology makes it possible to have multiple active replicas of a Subversion repository that are in synch. The Subversion replicas can be anywhere on a WAN - distributed throughout a company's campus or throughout the world. WANdisco users experience the performance of a local Subversion repository, with the semantics of a single shared Subversion repository. We call this "active replication with one-copy-equivalence."

Replication implicitly ensures that each replica acts as a hot backup to every other replica. If a local server does experience a problem that takes it offline, local users experience a disruption in service, while the rest of the replication group continues unaffected.

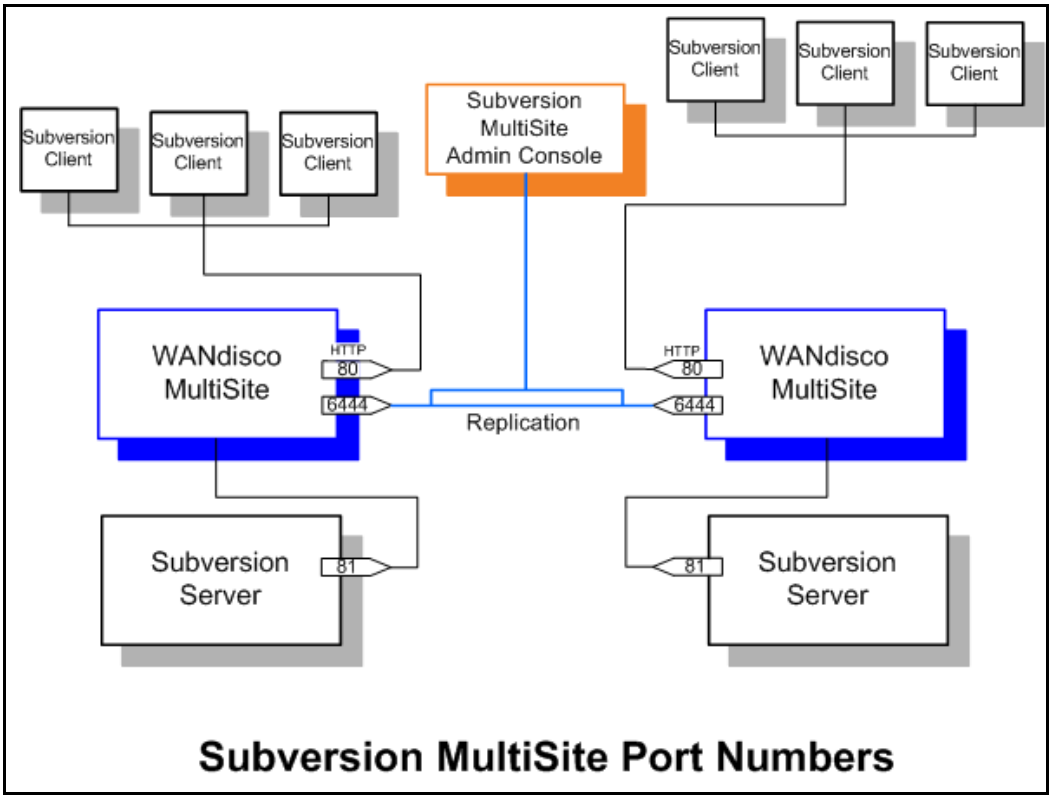
The following illustration shows a replication group with five Subversion severs.



WANdisco Subversion MultiSite

WANdisco MultiSite has the Admin Console, a web-based user interface, to administer and monitor the replication group, including Subversion user management.

WANdisco Subversion MultiSite functions as a proxy to the Subversion server. An instance of the proxy operates at each replica. All the communication paths involved in the operation of the product are illustrated in the diagram below.



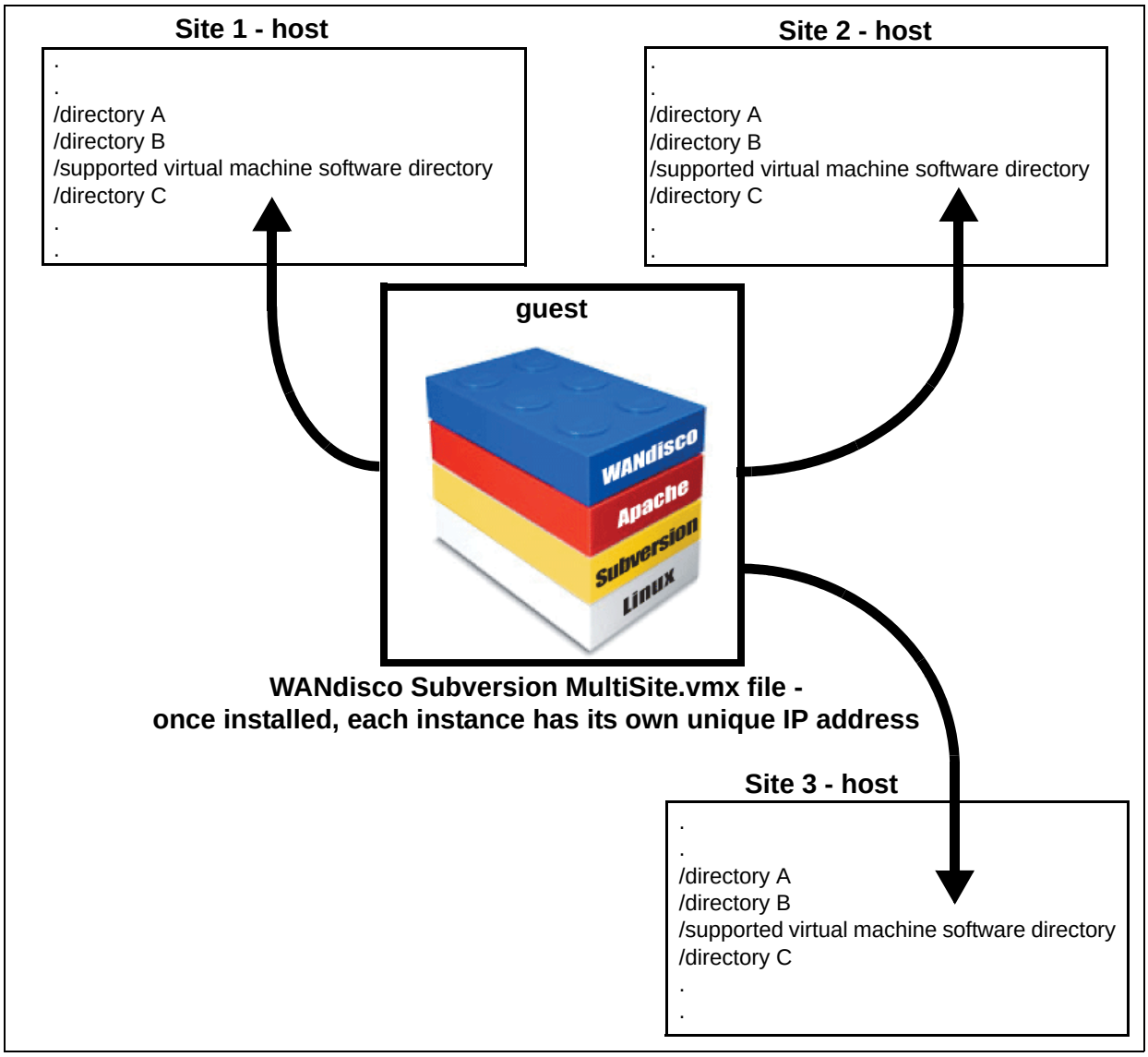
1.2 About the Virtual Software Appliance

The WANdisco virtual appliance package contains the WANdisco Subversion MultiSite software and all the other software required for its operation, including:

- Subversion 1.4 or 1.5
- Apache 2.2
- Perl 5.8
- Java 1.6
- Linux JeOS (Just enough of the Linux Operating System) 2.6 kernel

The virtual appliance comes pre-configured with an empty Subversion repository for your convenience. The software appliance becomes a guest operating system at each site, or host.

If you have an existing Subversion repository, please see 6.13, Using an Existing Repository.



1.3 WANdisco MultiSite Concepts

All MultiSite sites are synchronized at all times: each Subversion repository is a functional replica of the others. WANdisco replication technology is the concept of one repository, multiplied. Because there are multiple synchronized repositories, each replicated site is effectively a current hot backup, which makes disaster recovery easy to plan and implement.

The Subversion usernames and passwords on all repository hosts must match. This is required because WANdisco creates a peer-to-peer replication system. Any replica of the Subversion repository is accessible by every valid Subversion user.

1.3.1 How Replication Works

The sites in the replication group are continuously coordinating the Subversion write transactions users are making. The group establishes transaction ordering through the agreement of a quorum of replicas. By default, Subversion MultiSite uses a Singleton Response quorum, which means that only one of the sites decides on the transaction order. The site that decides transaction ordering is called the distinguished node. So, with a Singleton Response quorum, if the replication group has five sites adding transactions to the transaction queue, only one site determines the position of each transaction in the transaction sequence.

1.3.1.1 Singleton Quorum

The Singleton quorum offers the fastest response time for those users working at the distinguished node, because as soon as the distinguished node determines that a transaction can be processed in the correct order, WANdisco sends that transaction to the Subversion server. Any replicator except the distinguished node can go down, but the replication group continues. However, the Singleton quorum also represents a single point of failure, since replication halts if the distinguished node fails.

You can schedule the distinguished node to rotate to different sites around the world, to “follow the sun.” Rotating the distinguished node allows other sites to take advantage of the quickest response time when they are most active. See 7.3, Rotating the Distinguished Node.

1.3.1.2 Majority Quorum

Majority Response is another quorum option, whereby you specify that a majority of the sites must agree on transaction order before any transaction is committed.

Having a majority quorum ensures that if one site goes down in a replication group, even the distinguished node, the other sites can continue uninterrupted, as long as a majority of the sites remain available. The replication group replays the missing transactions when that site rejoins the group.

In a majority quorum with an even number of sites, the distinguished node’s role is a tie-breaker. For example, in a five site replication group, three sites make the quorum (three sites must agree about transaction ordering). If one of those sites is down, leaving four sites, and two sites want

one transaction first, and the other two want another transaction first, then the site that is the distinguished node gets a weighted vote. The group with the distinguished node determines the transaction ordering.

1.3.1.3 Unanimous Quorum

The last quorum option is unanimous response, which requires that all replicators must be reachable to assist in transaction ordering.

1.3.2 Replication Example

Here is an overview of what occurs when a write transaction is received by any replicator in the replication group.

Step 1 The originating client sends the transaction to Subversion MultiSite, which passes it along throughout the replication group.

Step 2 Transaction data is successfully received by the quorum (the distinguished node for Singleton quorum, or a majority of sites for Majority quorum). The quorum assigns the transaction a Global Sequence Number (GSN).

Step 3 After receiving the transaction, each Subversion MultiSite passes the transaction data to its local Subversion server.

Step 4 Each local Subversion server processes the transaction.

Step 5 Subversion MultiSite waits for Subversion to complete the transaction. Subversion MultiSite only marks the transaction complete when Subversion returns a completion status. If for some reason replication goes down during this process (the replicator crashes or is stopped by an administrator), Subversion MultiSite marks the transaction as not complete, and it gets reprocessed upon replication restart. This allows the recovery logic to work properly.

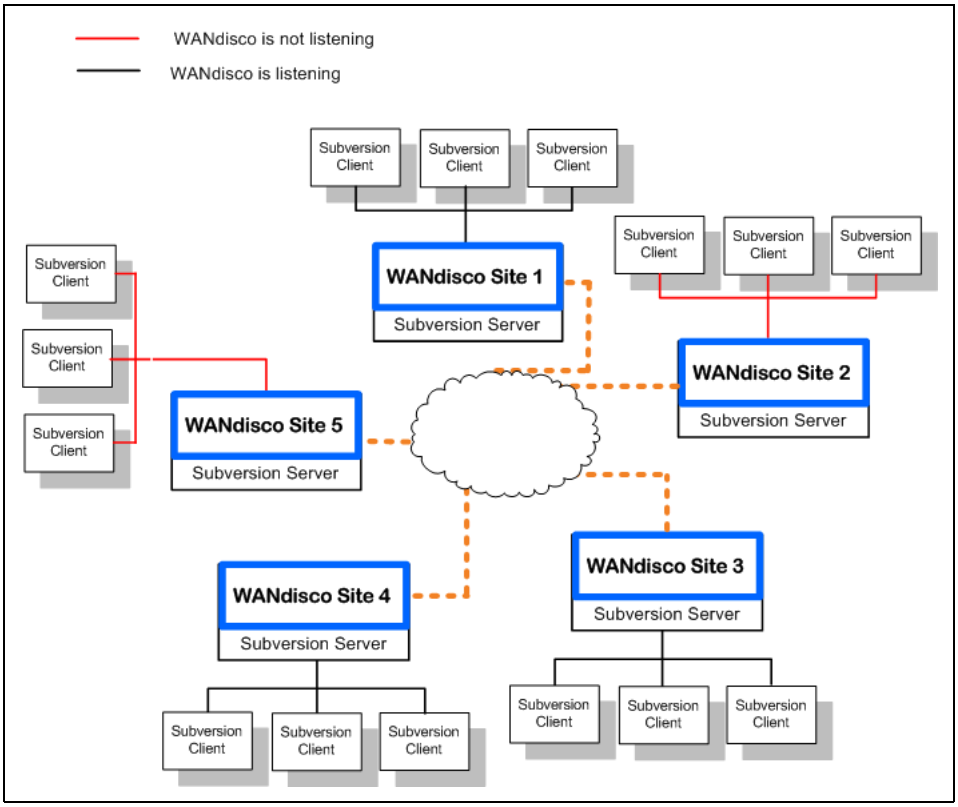
1.3.3 WANdisco is Listening

There is a field in the Admin Console that tells you whether WANdisco is listening or not. This represents whether WANdisco is accepting any incoming Subversion client requests. Replication still continues among the WANdisco sites, whether WANdisco is listening or not at one or more sites.

You can turn the listening on and off through the Admin Console (through the **Start Proxy** and **Stop Proxy** commands). The Admin Console is described in Chapter 4, Navigating the Interfaces. For the Subversion user, stopping the proxy has the same effect as if the Subversion server were down.

The following illustration shows Sites 2 and 5 are not listening. (An administrator executed the **Stop Proxy** command for those sites.) Replication continues, and Sites 2 and 5 are still receiving and processing replicated transactions originating from the other sites. However, Subversion users at Sites 2 and 5 cannot make any transactions.

Once an administrator issues the **Start Proxy** command for Sites 2 and 5, the local Subversion users can again issue Subversion commands.

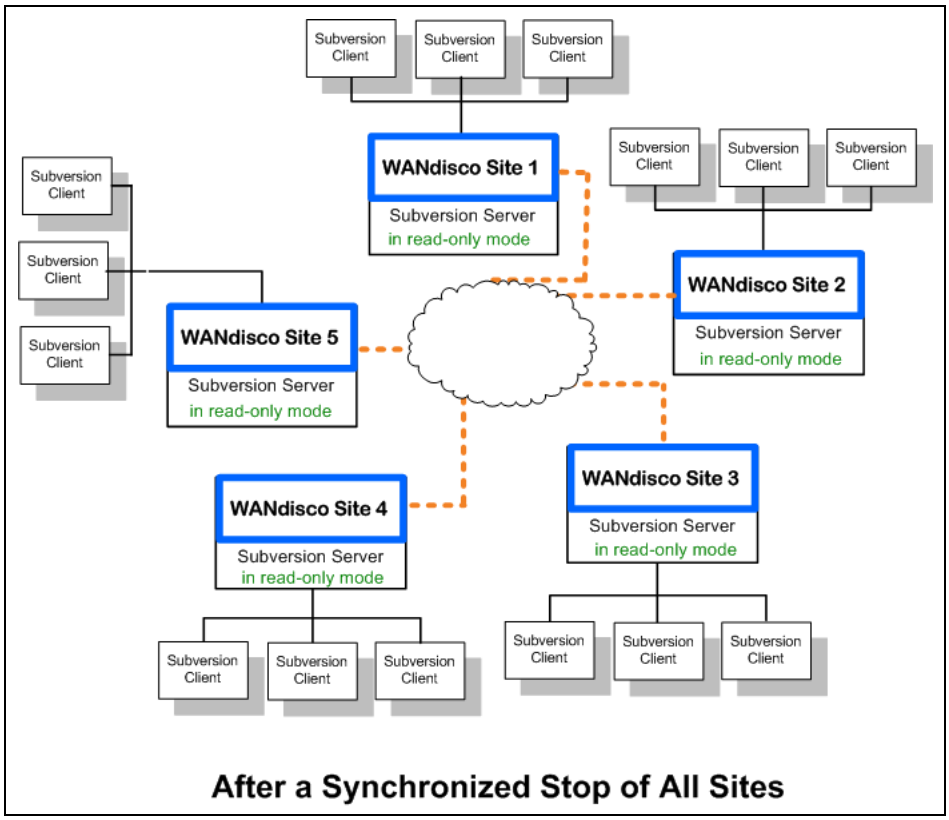


Please follow your company guidelines in regards to notifying Subversion users of any down time.

1.3.4 Synchronized Stop of All Sites

When an administrator issues a **synchronized stop** command, the Subversion servers go into read-only mode. Any pending transactions are suspended. Subversion users continue to have read access to the repository, but cannot perform write operations, such as **commit** or **lock**.

When an administrator issues a **resume** command, the WANdisco proxies go out of read-only mode and begin accepting write transactions.



After a Synchronized Stop of All Sites

1.4 Replication and Site or Network Failures

MultiSite defaults to singleton quorum, which ensures continuous operation of the replication group, as long as the distinguished node is up. That is, if there are five nodes in a replication group, and three go down or are unreachable, then replication continues for the other two nodes, as long as the distinguished node has not gone down. For the other three sites, replication is suspended until the errored site re-establishes contact with the quorum. Replication then replays the missing transactions at that site.

1.4.1 Site Failures

Say you have a five site replication group. One of the sites goes down. Replication continues at the remaining sites, as long as the quorum is reached, although users connecting to the downed site are offline until the site comes back up.

As soon as a site comes back up, the replication group catches up the site on its missing transactions, so that all sites are again synchronized.

1.4.2 Network Failures

If a network link goes down and outside connectivity is completely lost, then replication halts and Subversion users are prevented from performing a write operation (tag, commit, etc.) that requires a quorum. Read operations (like up, co, log, etc.) continue to work with the stale data.

When connectivity is restored or the errored server comes back online, the local replicator syncs up with the replication group automatically. First, the local replicator consults its local recovery journal (similar to a database redo log), and then, if necessary, attempts recovery from any of the quorum sites.

The recovery infrastructure and details of WANdisco fault-tolerance can be found at http://www.wandisco.com/pdf/dcone-whitepaper.pdf.

1.5 Establishing a Replication Baseline

WANdisco ships with an empty Subversion repository. If you have an existing repository that you want to replicate, please see 6.13, Using an Existing Repository.

When you deploy Subversion MultiSite, you must ensure that all the repositories start out in sync, meaning that all of them are identical. Once Subversion MultiSite is deployed, WANdisco's replication technology ensures they remain in sync.

You start with one Subversion repository, referred to as a replication baseline. To create this baseline, follow the procedure in 6.14, Establishing a Baseline for Replication.

1.6 Terms

You should familiarize yourself with these terms.

TERM	DEFINITION
replica	a Subversion instance that is an exact equivalent or copy of another Subversion instance. In WANdisco MultiSite, a replica is also called a site.
replicator	It is the intermediary that acts as an application proxy/gateway between Subversion clients and a given Subversion server. Each *Replica* has an associated *Replicator*. It coordinates with other peer replicators to ensure that all replicas of the SCM repositories stay in sync with each other.
replication group	a collection of replicators that work together to keep Subversion repositories in sync.
one copy equivalence	all replicas are functionally equivalent copies of each other
GUID	Globally Unique Identifier. WANdisco Subversion MultiSite assigns each node a GUID on installation. The nodes identify each other by their GUIDs.
site	an instance on a virtual machine on which is installed a replicator and a replica. The sites comprise the replication group.
distinguished node	The distinguished node acts as a tie breaker for a majority quorum when there are an even number of nodes, making the final decision on replicator operations.
Quorum	A set of nodes that can reach agreement to determine transaction order. In the case of an even number of nodes, the distinguished node settles a conflict. Quorum is defined in the prefs.xml file. MultiSite by default has Singleton Response quorum.
prefs.xml	The preferences files contain information on the replication group. Each site contains all preference files for the entire replication group. The files are specific to each site. The preference files are located in `svn-replicator/config`.
SCM Repository	Software Configuration Management repository like Subversion
SCM Server	A network server that provides remote access to an SCM Repository
installDir	this is the installation directory for WANdisco MultiSite
DConE	WANdisco's Distributed Coordinated Engine, the software engine underlying replication
Install node	The node where you run the Subversion MultiSite install program. This is the first site, Node1 by default, in your replication group. It is the distinguished node.

2 Recommended Deployment Practices

If you are not a Subversion administrator, you should become more familiar with it through reading this *Administration Guide*.

2.1 MultiSite Administrator Pre-requisites

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

There should be at least one person physically at any remote site who is familiar with WANdisco, as sites distributed throughout the world could need attention if a problem arises.

2.2 Physical Environment

WANdisco strongly recommends that you follow these guidelines to ensure the successful installation and use of Subversion MultiSite. Each site should have:

- the same virtualization layer (WANdisco recommends VMware Player: http://www.vmware.com/download/player/; VMware ESX, Citrix Xen, and Windows with Hyper-V)
- the same host operating system
- a file compression utility
- browser with network access to all servers

All sites can share:

- e-mail from WANdisco containing the attached production licence key file
- link to the WANdisco file download page

2.2.1 Firewalls and Virus Scanners

2.2.1.1 Firewalls

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 communicates through a firewall, you must configure the firewall so that the WANdisco port numbers are not blocked or filtered.

2.2.1.2 Virus Scanners

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

2.3 Deployment Checklist

System Setup ❖ All sites must share the same operating system	
Supported Virtualization Layer	VMware Player http://www.vmware.com/download/player VMware ESX Citrix Xen Windows with Hyper-V
Subversion Client Version	compatible with Subversion server version 1.4 and above
hooks	pre-commit hooks have to be deterministic, meaning they have the same outcome at every site. post-commit hooks can be tested at only one site.
System Memory	By default, the virtual machine is configured to have 512 megabytes of RAM. Depending on Subversion server load, you may need to increase this number.
Disk Space	One gigabyte, plus the size of your repository
Disk space for WANdisco recovery journal	Provision large disk for `svn-replicator/systemdb`, at least the number of commits within a two to four hour window
IP Address For Virtual Machine	Needs to be static. For initial evaluation installation, a DHCP address is fine.
Network Setup	
Reserved Port (default 6444, 8004, 22, another for repo synchronizing)	WANdisco needs a dedicated port for replication (default 6444), a port for Subversion clients (8004), a port to test the other sites (22) and possibly another port, in case you have to synchronize your repositories.
Firewall virus scanner	Notify the firewall virus scanner of the Subversion MultiSite port numbers.
VPN	Set up IPsec tunnel, and ensure WAN connectivity.
Persistent Connection Keep Alive	Ensure VPN doesn't reset persistent connections for WANdisco, or else ensure there are no RST bugs
Bandwidth	Understand the available bandwidth for testing, and set user expectations.

DNS Setup	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.
WANdisco Setup	
Quorum	Default is singleton. Trade off availability with performance.
Rotating Quorum Schedule	Ensure the distinguished node is in the active time zone. See 7.3, Rotating the Distinguished Node.
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 time-out	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)
Batch Processing	If there are any batch processes that interact with WANdisco, turn the deferred-writes to false.
Notify all users that they must flush their client cache.	

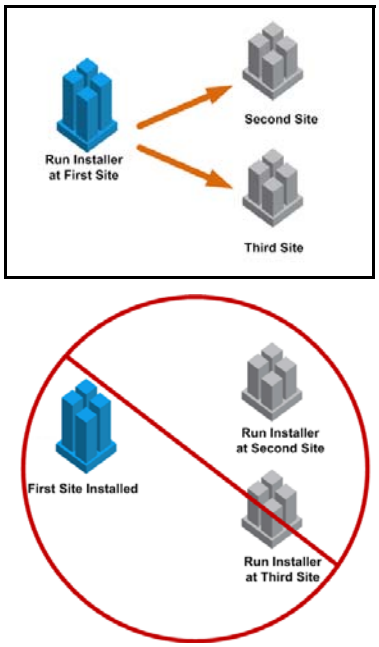
2.4 New to Subversion and Its Repository?

Subversion MultiSite Software Appliance comes configured with an empty Subversion repository. If you are new to Subversion repository concepts and would like to know more about the subject, please see the Subversion documentation at http://svnbook.red-bean.com.

Every Subversion user in your organization needs a Subversion client installed on their desktop. If you are new to Subversion, and do not have any clients installed, consider Tortoise SVN, a freeware client. You can find it at http://tortoisesvn.net/downloads.

3 Installation

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



3.1 A Note About Interfaces

You are going to use three interfaces during this installation: two briefly, and then WANdisco's Admin Console for the most part. Note that this *Administration Guide* describes the VMware Player, Citrix Xen, Hyper-V and VMware ESX interfaces. All these interfaces are described in Chapter 4, Navigating the Interfaces.

NOTE:

> VMware's interface has a tab where the software appliance runs. To activate the window, click inside the view. This locks the cursor in the window. To exit the window and release the cursor, press **ctrl-alt**.

For instructions for VMware, see 3.2, Loading WANdisco onto VMware at First Site.

For instructions for Xen, see 3.3, Loading WANdisco onto Xen at First Site.

For instructions for Hyper-V, see 3.4, Loading WANdisco onto Hyper-V at First Site.

For instructions for VMware ESX, see .

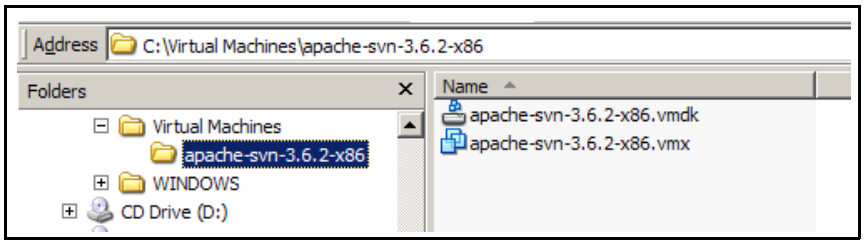
3.2 Loading WANdisco onto VMware at First Site

Pre-requisites:

- VMware Player installed on each site
- email from WANdisco containing license file and link to downloadable `apache-svn-3.6.2.x` file

The first site is by default Node1 and is the distinguished node. You can change this once a replication group is up and running. For this chapter, Node1 is the install site.

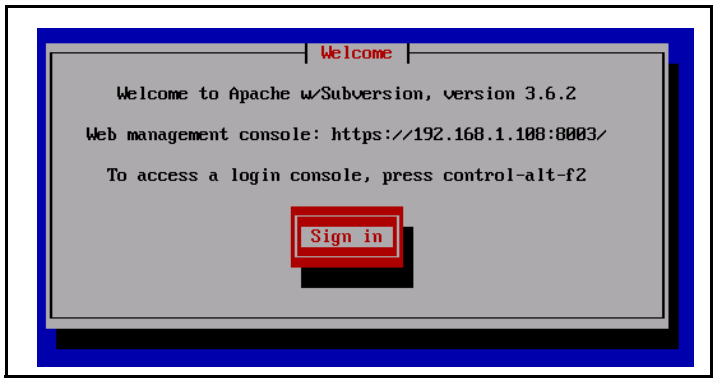
Step 1 Extract the `apache-svn-3.6.2.x` file to the Virtual Machine directory.



Step 2 Open the WANdisco virtual machine. Click **Open**.

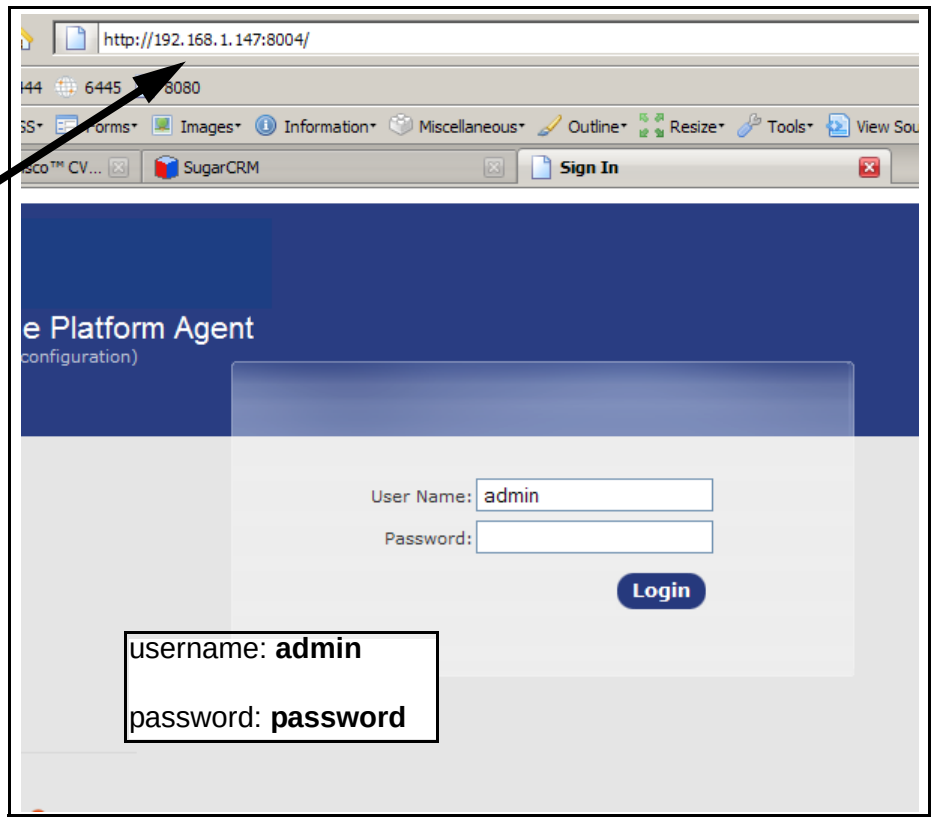
Step 3 Select the `apache-svn-3.6.2.x` file. Starting takes a moment or two.

Step 4 Copy the IP address that appears above the login prompt



and paste it into a web browser. Delete the **s** designation in the address; use the **http:** site. Also, change the port from **8003** to **8004**.

The rPath Appliance Platform Agent window appears.



for address, use **http** and port **8004**

Step 5 Continue on with the installation. See 3.6, Setting Up WANdisco MultiSite at First Site.

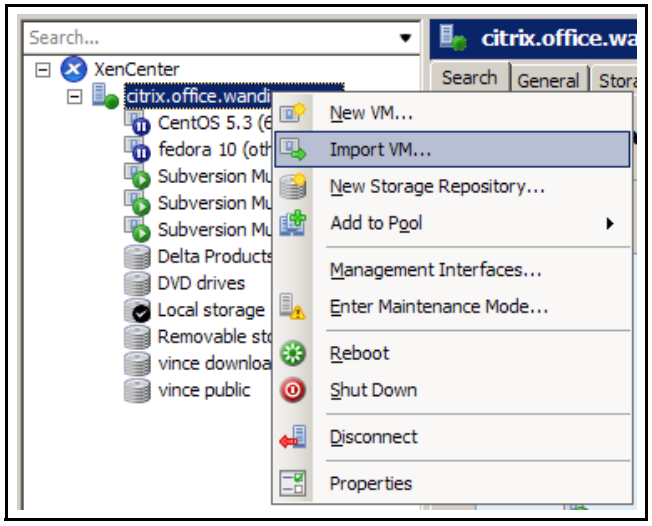
3.3 Loading WANdisco onto Xen at First Site

Pre-requisites:

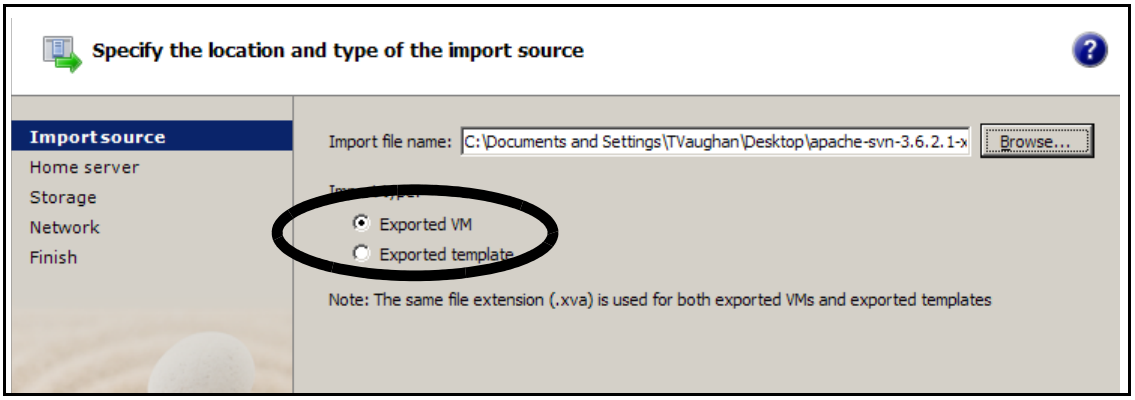
- Citrix XenServer installed on each site
- XenCenter installed on the first site
- email from WANdisco containing license file and link to downloadable `apache-svn-3.6.2.x` file

The first site is by default Node1 and is the distinguished node. You can change this once a replication group is up and running. For this chapter, Node1 is the install site.

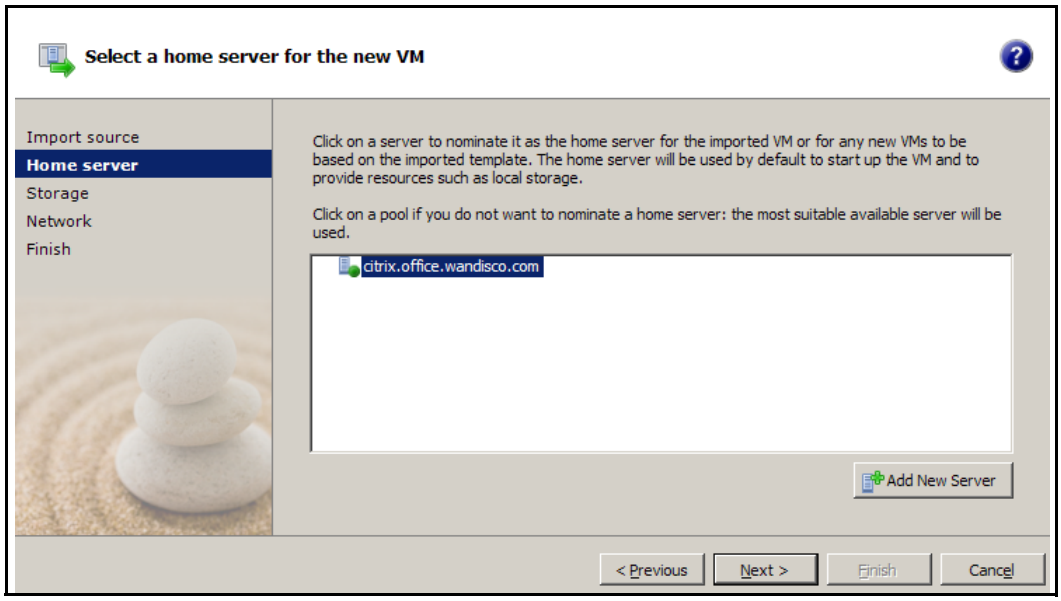
Step 1 Import the WANdisco virtual machine. Select the appropriate XenServer, right-click, and select **Import VM...**.



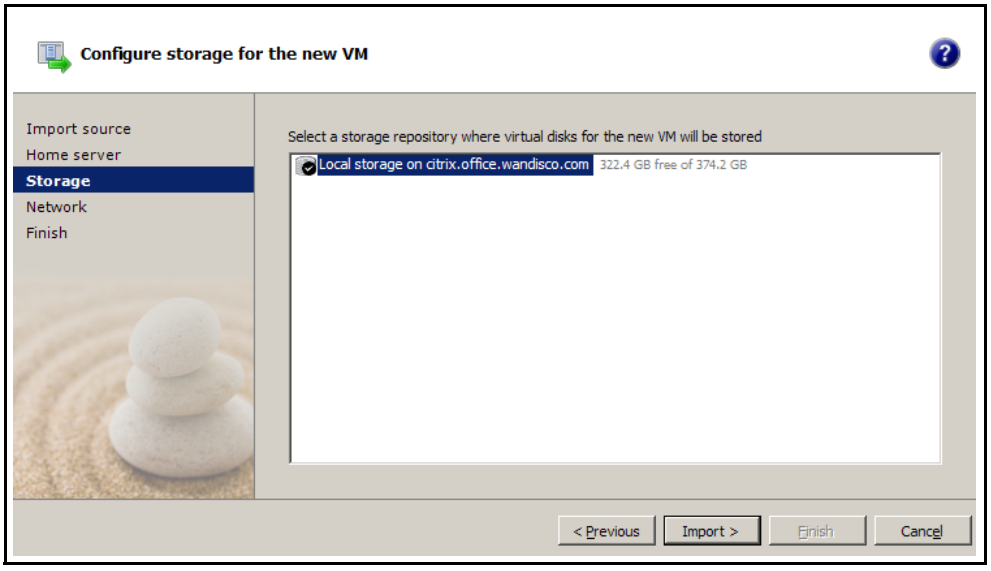
Step 2 Import the WANdisco file by browsing to its location. Make sure the **Exported VM** checkbox is checked.



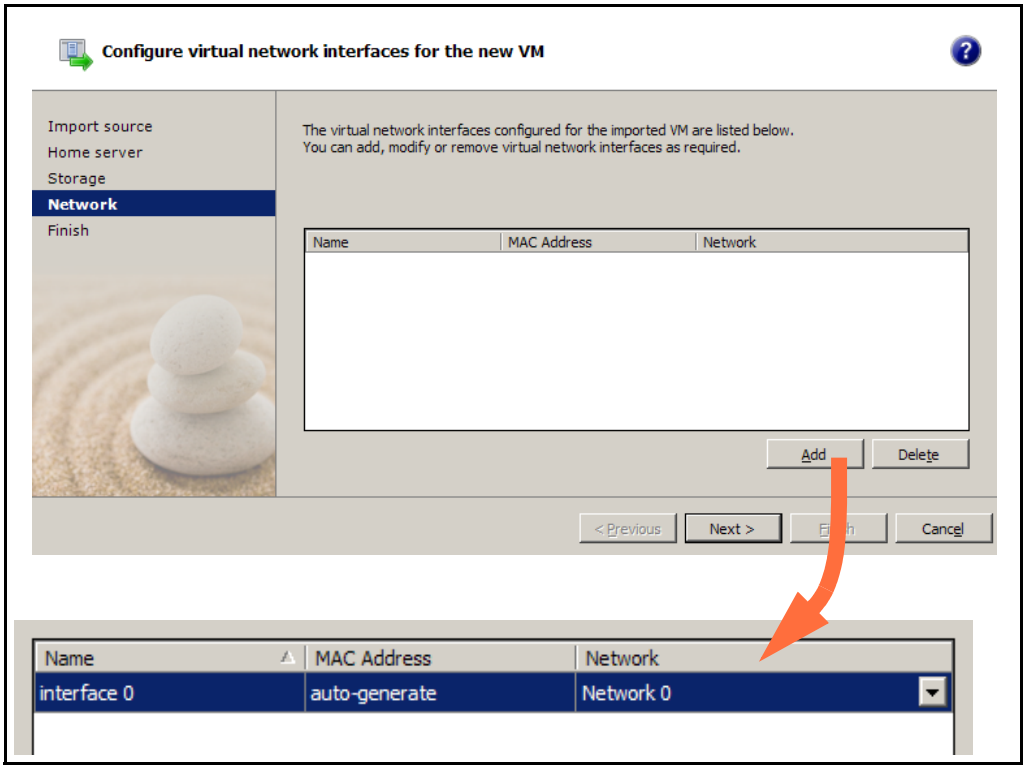
Step 3 Select the appropriate server as the home server. Click **Next**.



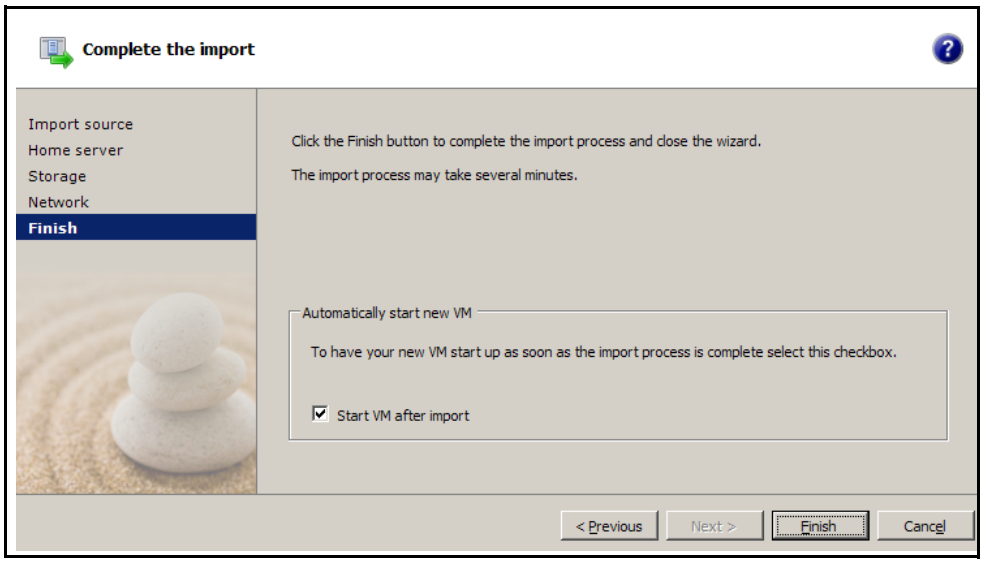
Step 4 Accept the highlighted storage repository. Click **Import**.



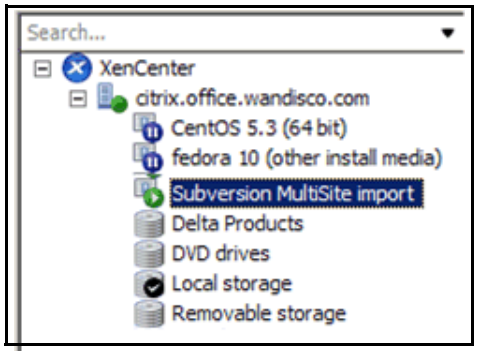
Step 5 Add a virtual network interface. Click **Add**. `Interface 0` appears. Click **Next**.



Step 6 Click **Finish**. There is a checkbox for starting the VM after the importation.

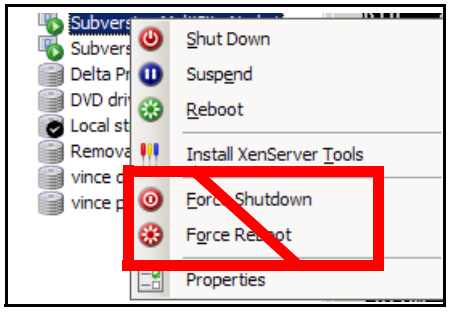


Note that **Subversion MultiSite** now appears in the XenCenter menu.

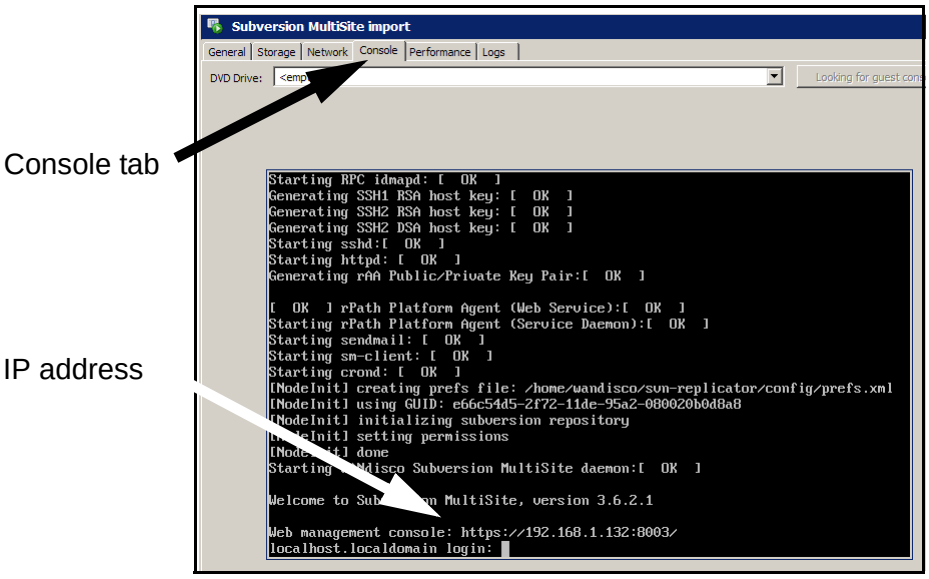


WARNING:

Do not use the **Force Shutdown** or **Force Reboot** options in XenCenter. This may lead to undesirable results.

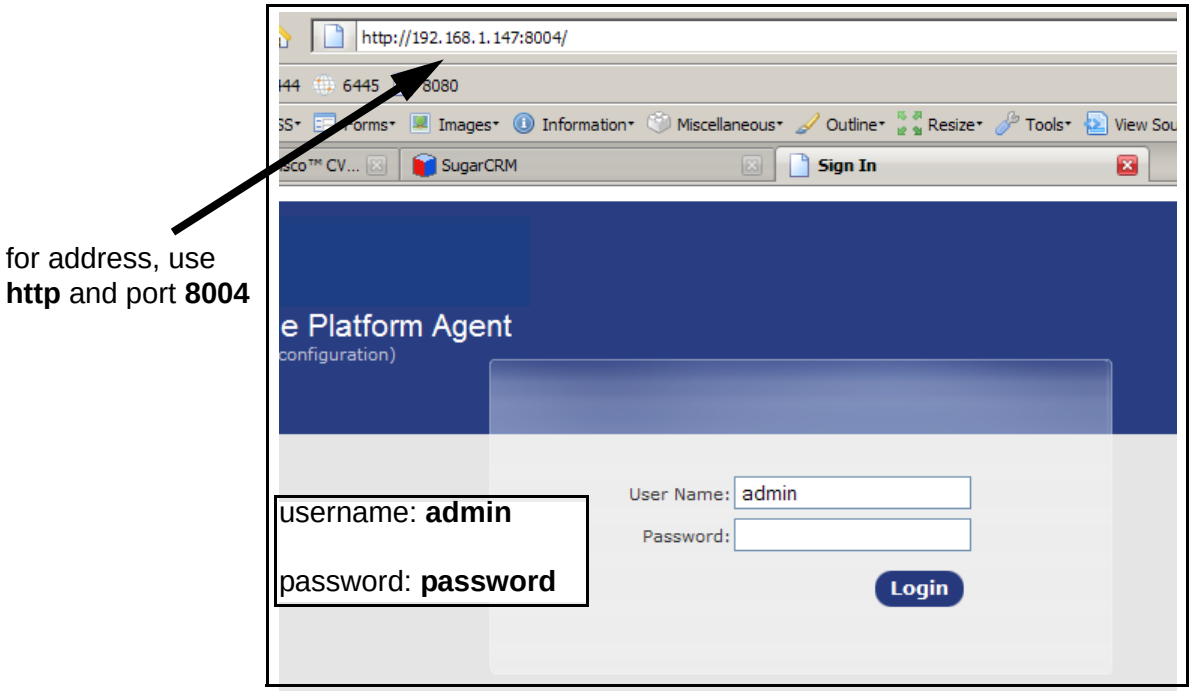


Step 7 Get the virtual machine's IP address. Go to the XenCenter's Console tab and wait for the display to show the IP address.



Copy the URL and paste it into a web browser. Delete the **s** designation in the address; use the **http:** site. Also, change the port from **8003** to **8004**.

The rPath Appliance Platform Agent window appears.



Step 8 Continue on with the installation. See the next section 3.6, Setting Up WANdisco MultiSite at First Site.

3.4 Loading WANdisco onto Hyper-V at First Site

Pre-requisites:

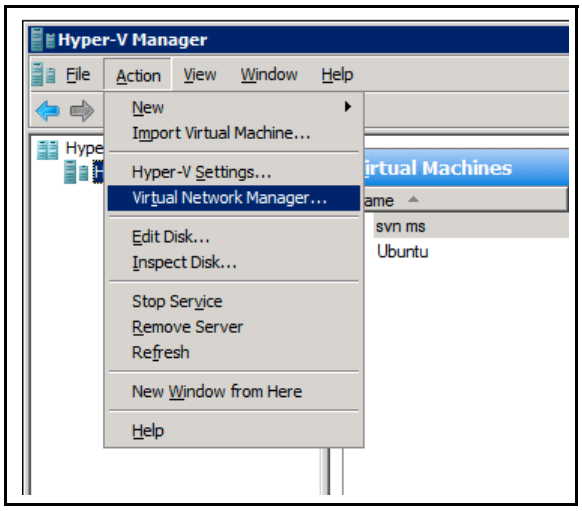
- Hyper-V installed on each site
- email from WANdisco containing license file and link to downloadable `apache-svn-3.6.2.x` file

The first site is by default Node1 and is the distinguished node. You can change this once a replication group is up and running. For this chapter, Node1 is the install site.

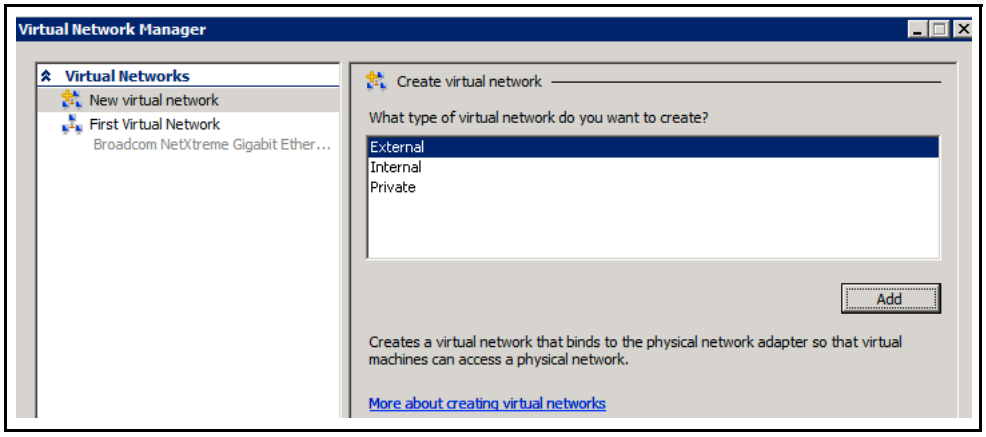
3.4.1 Configuring a Virtual Network

If you don't already have a network configured for this installation, use this procedure to set one up.

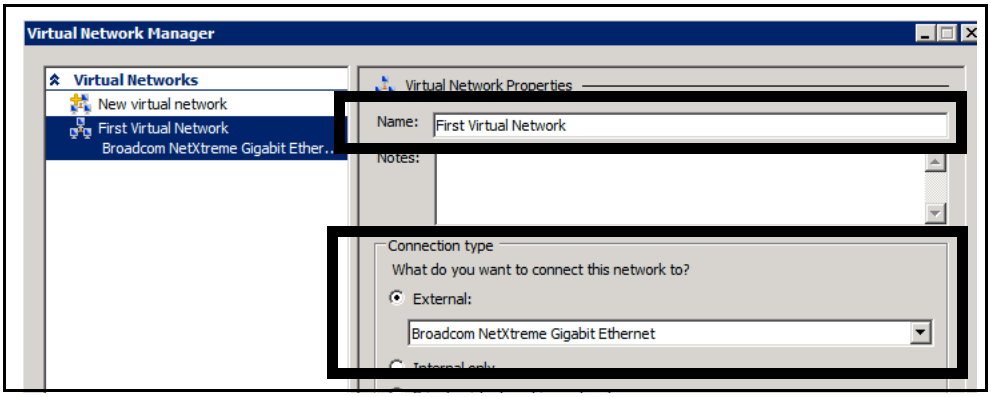
Step 1 In the Hyper-V Manager, go to **Action > Virtual Network Manager**.



Step 2 Add a new external network.



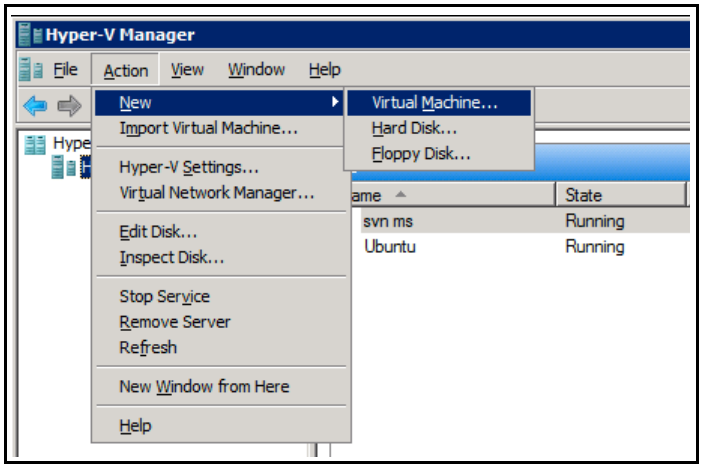
Step 3 Name the new network, and select the external network to connect to from the pull down menu.



3.4.2 Configuring the Virtual Machine

Step 1 Download the WANdisco file and uncompress it on the virtual machine host.

Step 1 Define the new Subversion MultiSite virtual machine. Go to **Action > New > Virtual Machine**.

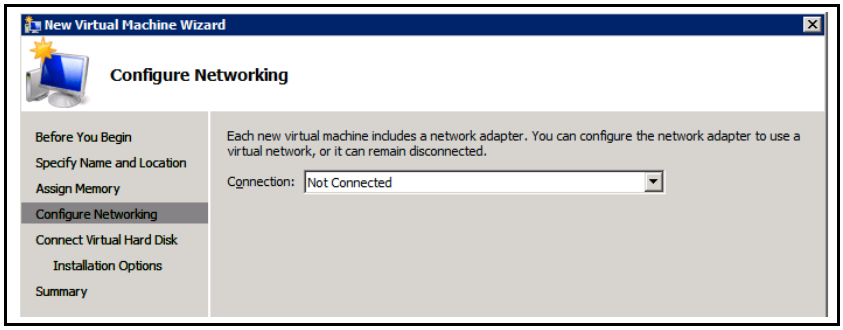


Step 2 Click **Next** at the New Virtual Machine Wizard introductory page to create a virtual machine with custom values.

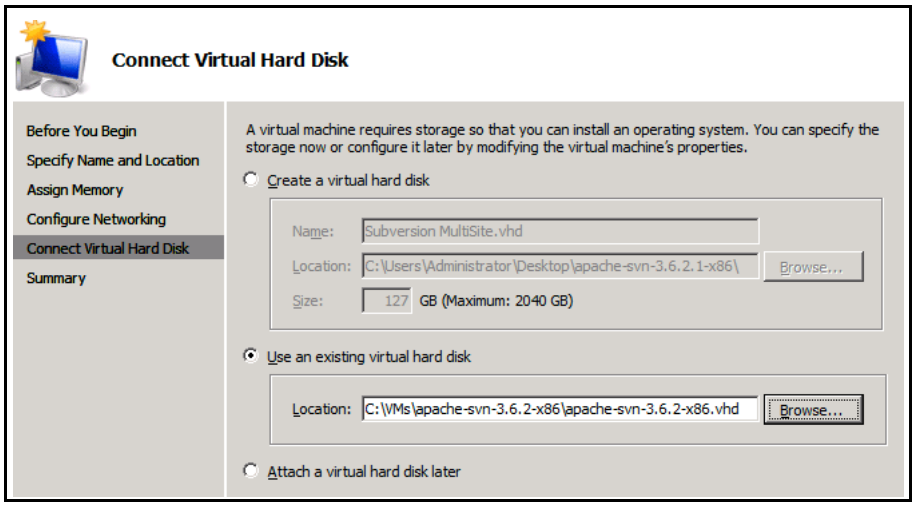
Step 3 In the Name and Location panel, enter a name for the virtual machine, for example Subversion MultiSite. Click **Next**.

Step 4 In the Assign Memory panel, enter a value for the RAM. The default is 512. If your Subversion repository is large and you have a large number of users, you may want to increase this number. If you have an existing Subversion server, use the same value for its RAM.

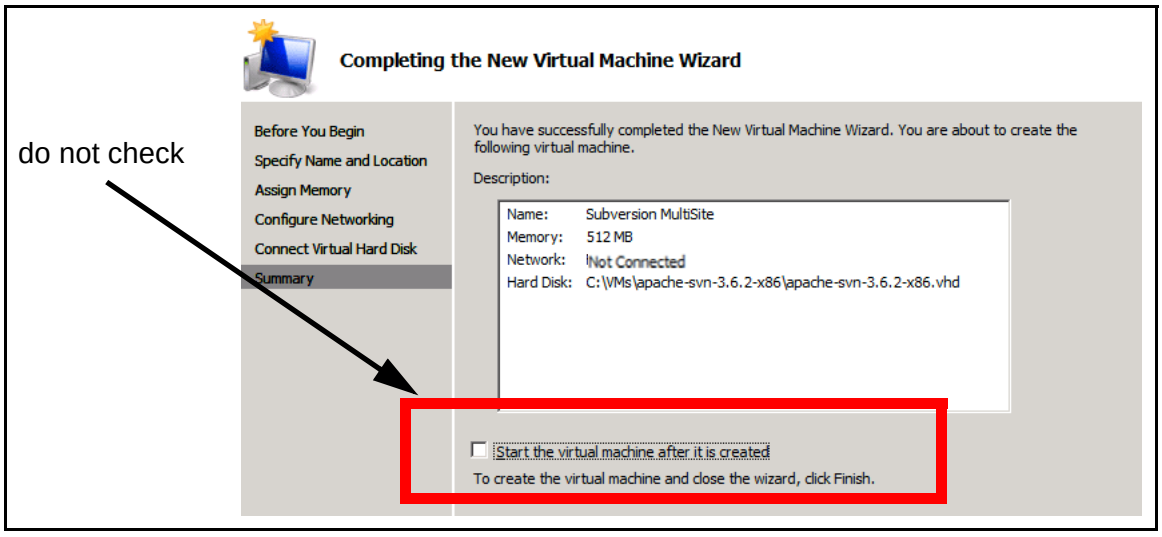
Step 5 In the Configure Networking panel, select **Not Connected**.



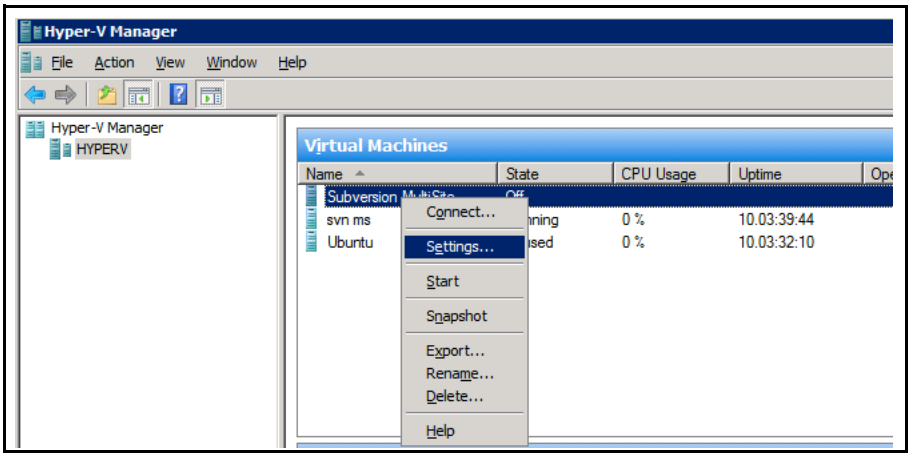
Step 6 In the Connect Virtual Hard Disk panel, check the **Use an existing virtual hard disk** radio button, and browse to the WANdisco file.



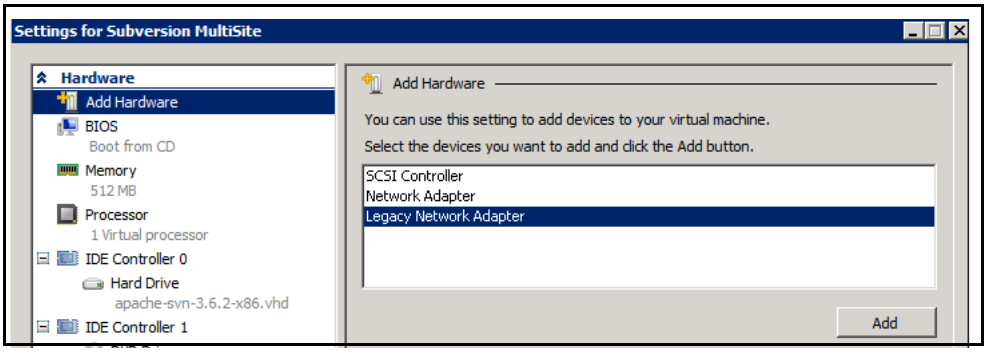
Step 7 In the Summary panel, **do not** start the virtual machine after its created.



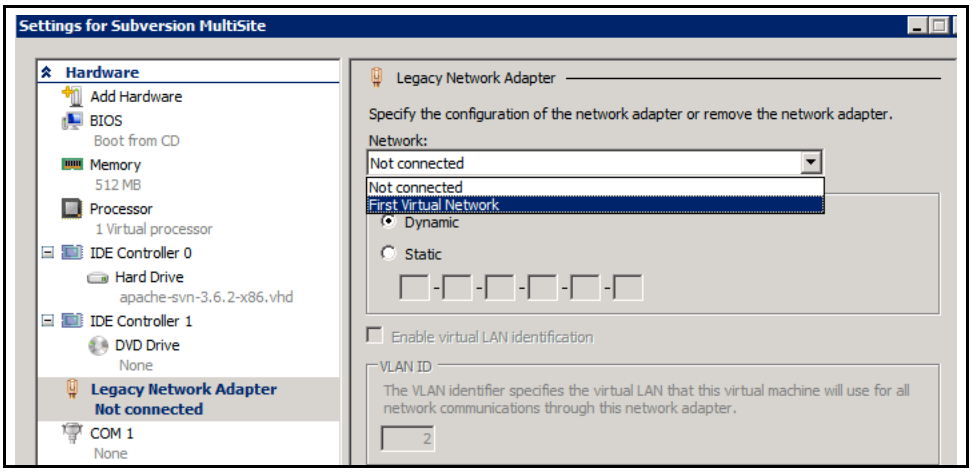
Step 8 On the newly created virtual machine, select **Settings** .



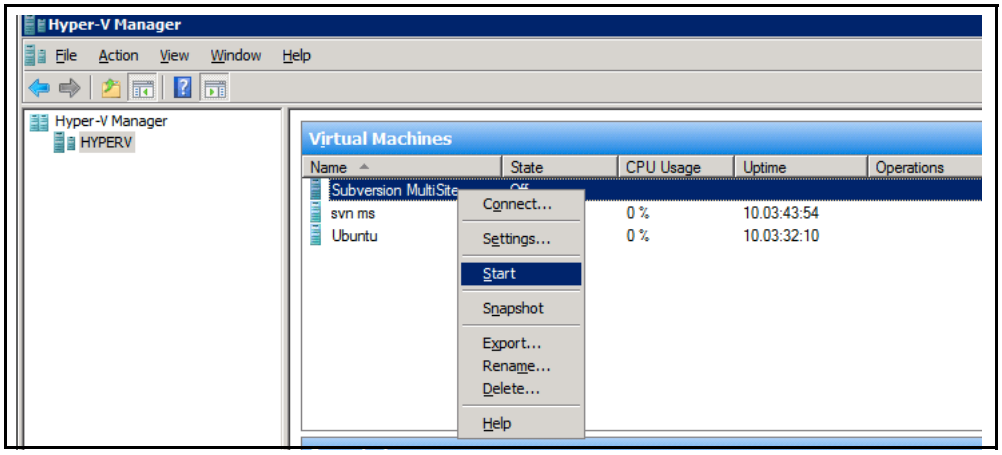
Step 9 Add the network adapter. Go to **Hardware > Add Hardware**, and select **Legacy Network Adapter**. Click **Add**.



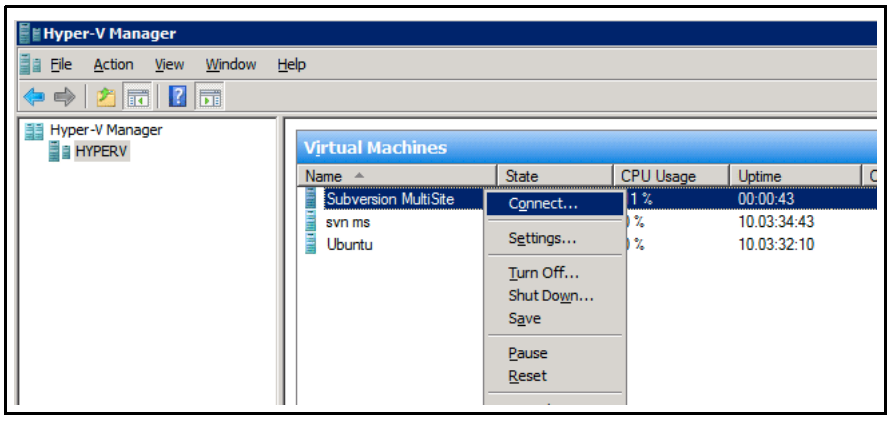
Step 10 Connect the Legacy Network Adapter. Go to **Legacy Network Adapter** and select the network you created in step 1.



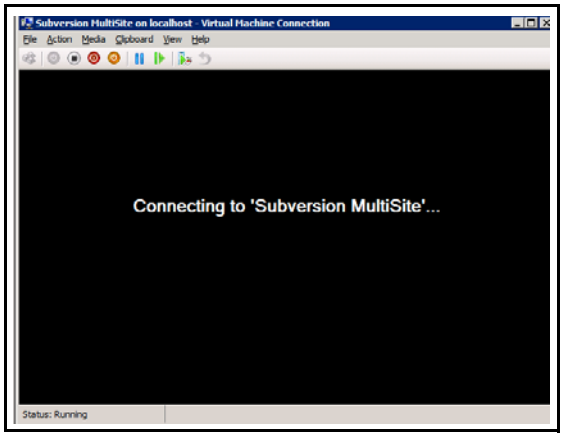
Step 11 Start the virtual machine. On the newly created virtual machine, right click and select **Start**.



Step 12 Connect to the virtual machine. On the newly created virtual machine, right click and select **Connect**.

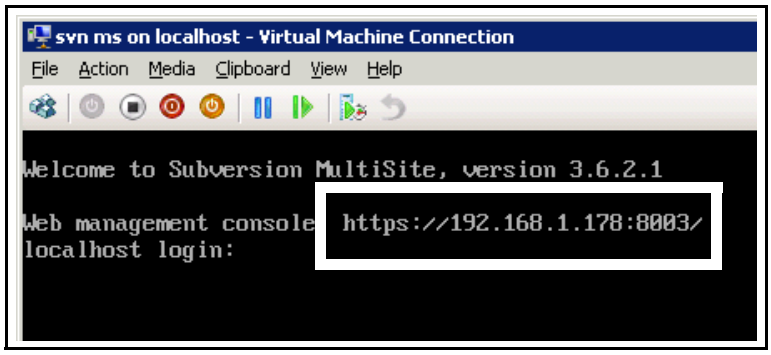


The connecting sreen displays,

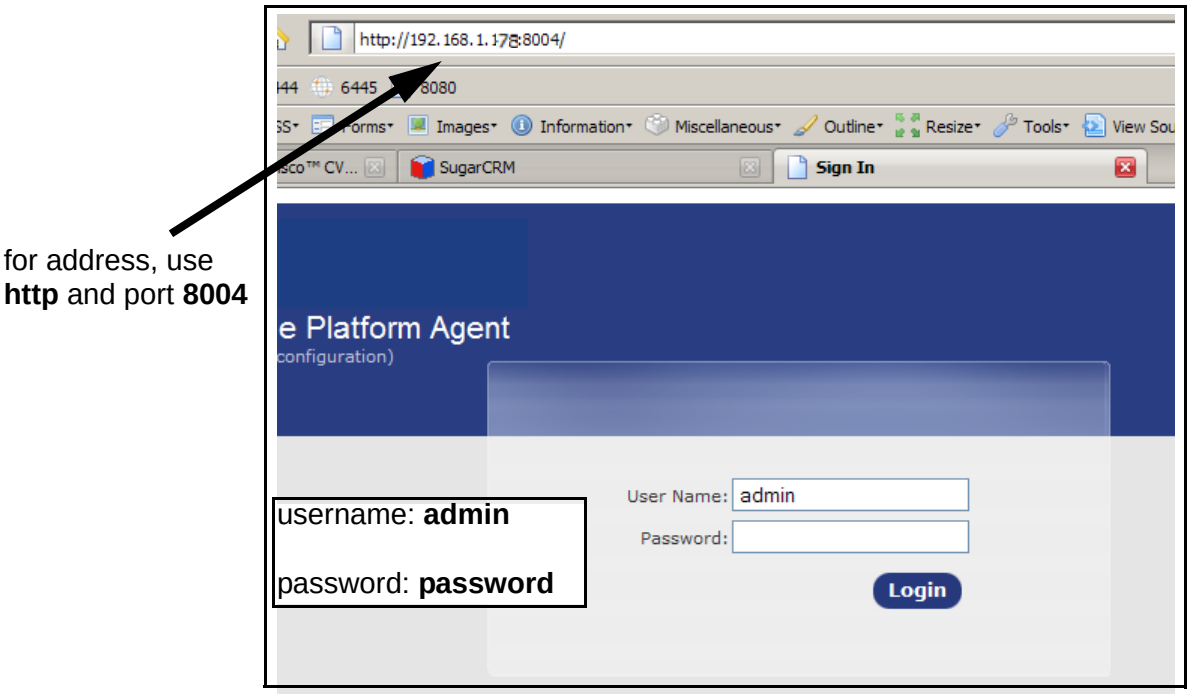


then you see Subversion MultiSite Software Appliance starting. This may take a few moments.

Step 13 Get the virtual machine's IP address. Copy the URL and paste it into a web browser. Delete the **s** designation in the address; use the **http:** site. Also, change the port from **8003** to **8004**.



Step 14 Log in to the rPath Appliance Platform Agent as **admin**, and the password is **password**.



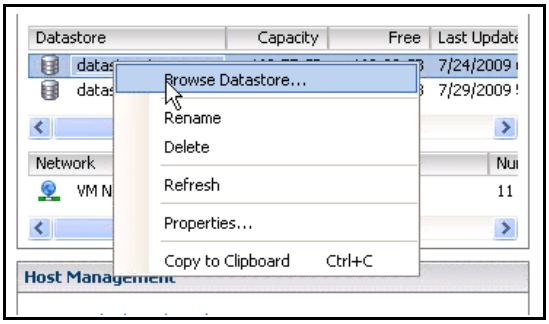
Step 15 Continue on with the installation. See the next section 3.6, Setting Up WANdisco MultiSite at First Site.

3.5 Loading WANdisco onto VMware ESX at First Site

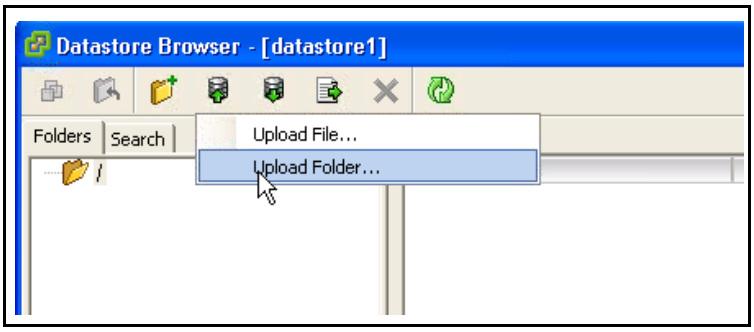
Step 1 Download the WANdisco file and uncompress it on a machine other than the ESX server.

Step 2 Go to the VSphere client.

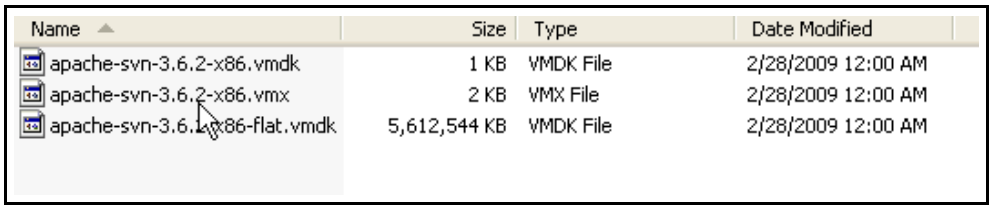
Step 3 Copy the folder with the three files to the ESX machine. Using the Datastore browser,



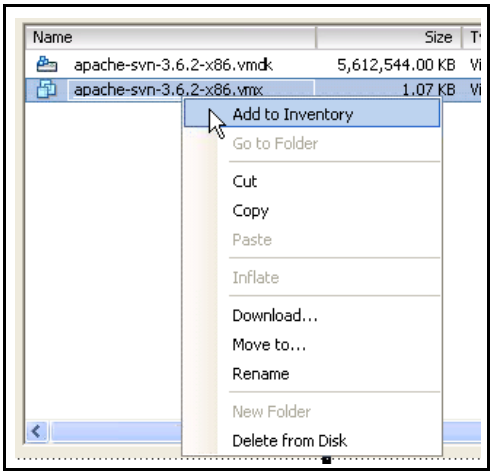
upload the folder to the datastore.



The folder's three files are listed here.



Step 4 Add the `.vmx` file to the inventory. Select the file and right click on **Add Inventory**.

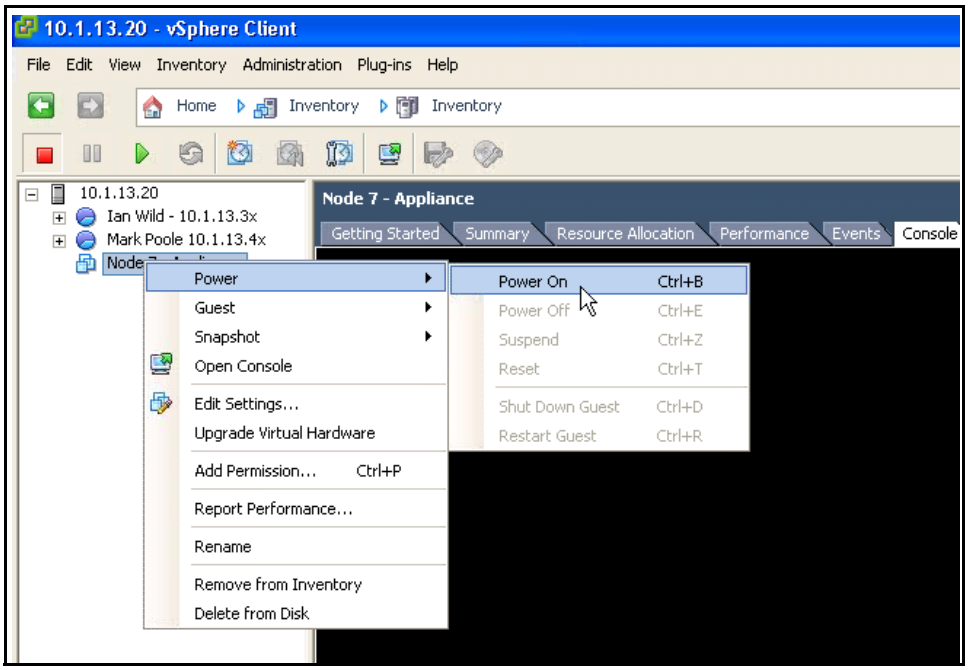


Step 5 In the wizard, name the virtual machine.

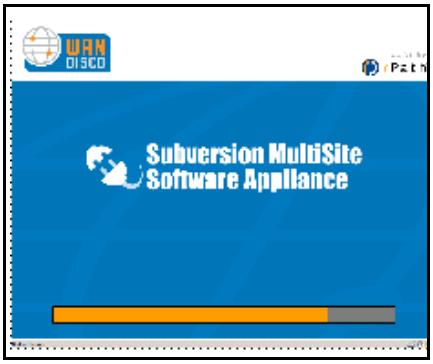
Step 6 For the Resource pool page, configure it as you would normally do for your organization.

Step 7 Finish the wizard. Click **Finish**. Your virtual machine is now listed on the inventory list, showing on the left side of the VSphere client browser.

Step 8 Power on the new virtual machine. Right click on **Power on**.

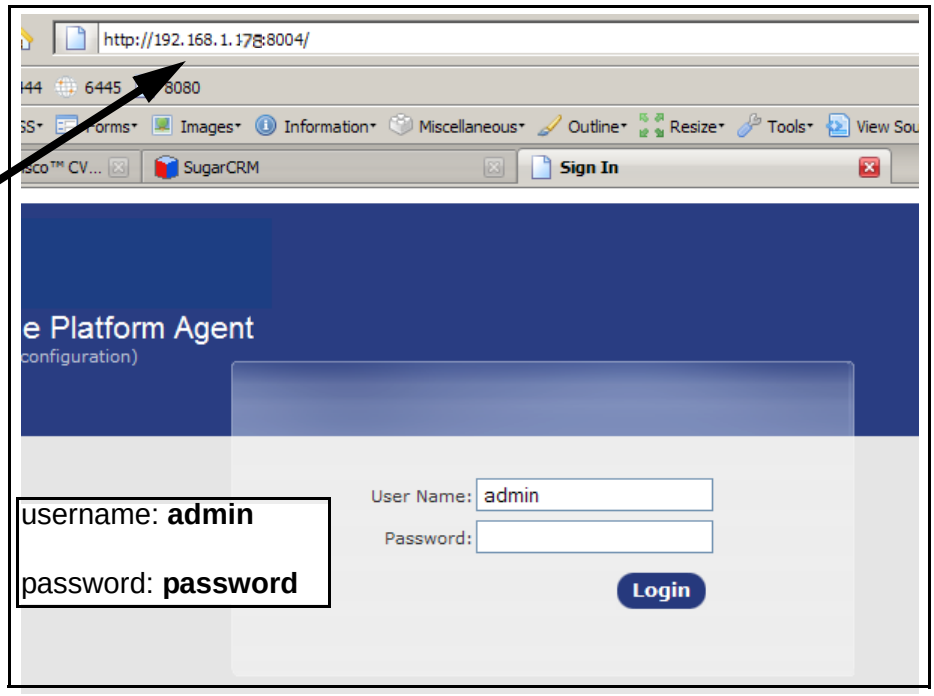


Step 9 Go to the console tab. You see the WANdisco page loading.



Step 10 Get the virtual machine's IP address. Copy the URL and paste it into a web browser. Delete the **s** designation in the address; use the **http:** site. Also, change the port from **8003** to **8004**.

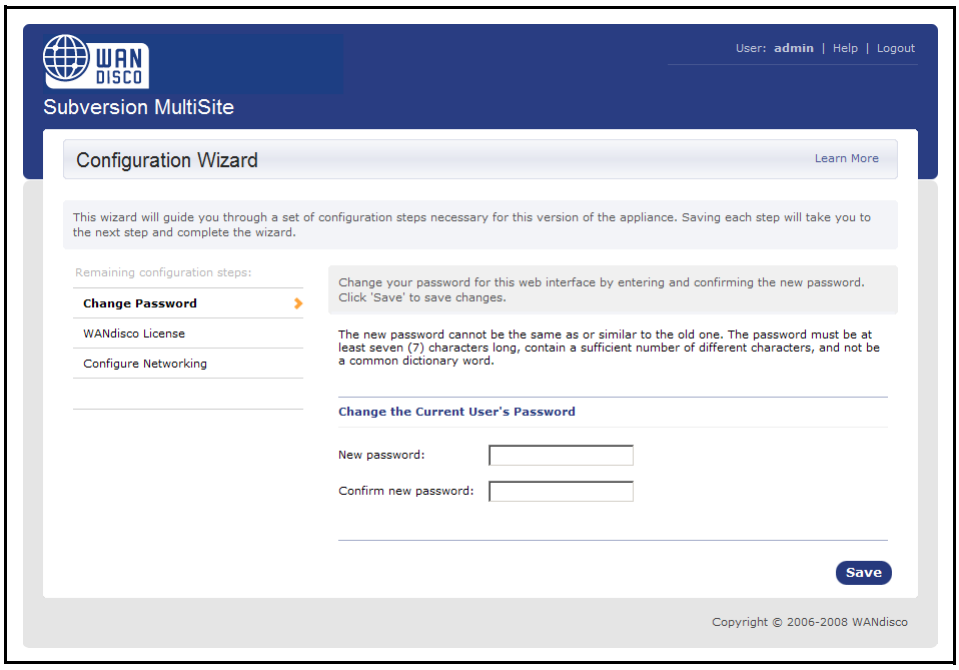
Step 11 Log in to the rPath Appliance Platform Agent as **admin**, and the password is **password**.



Step 12 Continue on with the installation. See the next section 3.6, Setting Up WANdisco MultiSite at First Site.

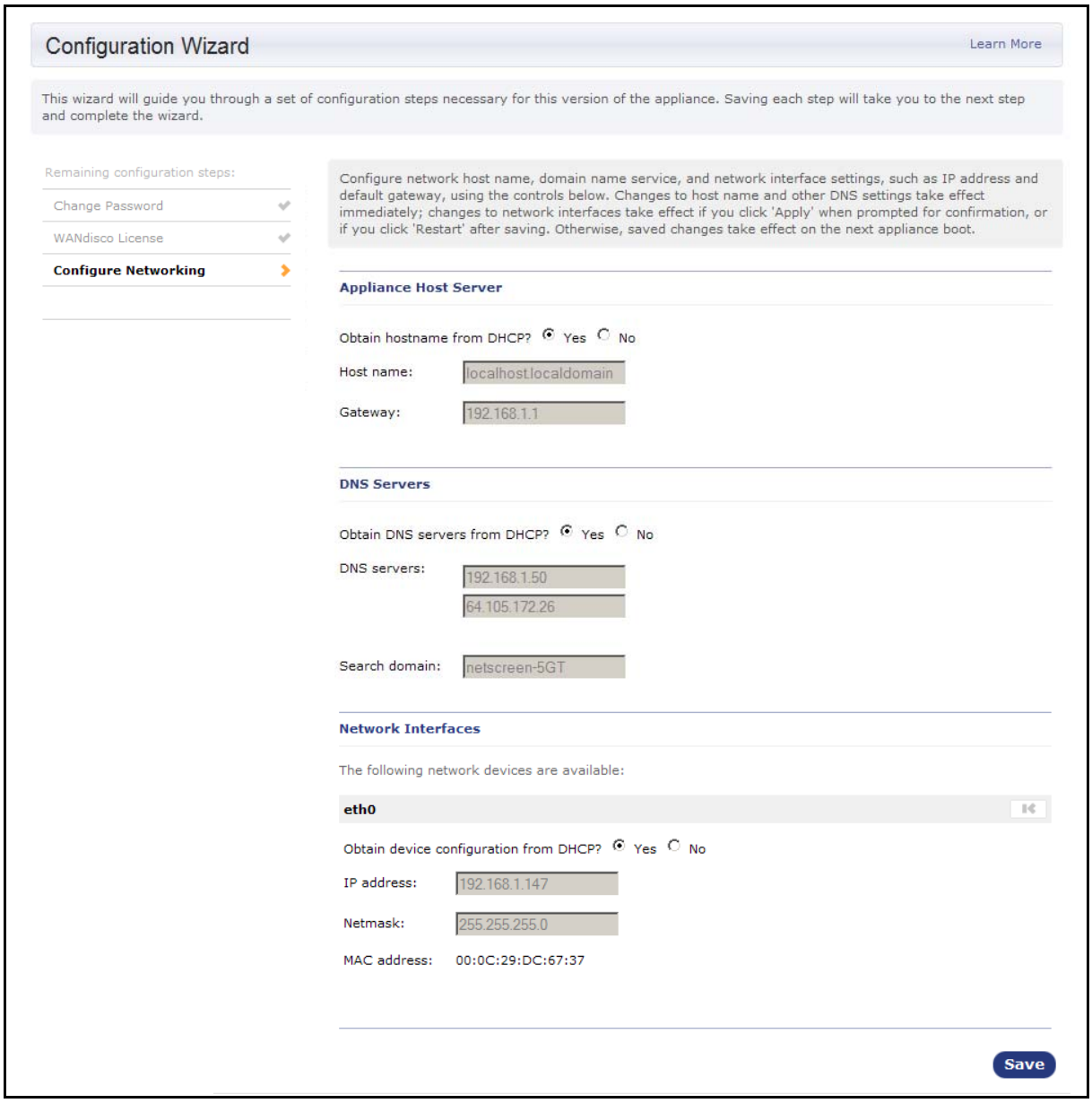
3.6 Setting Up WANdisco MultiSite at First Site

Step 1 Enter `admin` for the **User Name** field and `password` for the **Password** field, and click **Login**. The Configuration Wizard - Change Password window appears.



Step 2 Enter a new password and confirm it. Click **Save**. The WANdisco License window appears.

Step 3 Browse to the location where you saved the WANdisco license file (received in an email from WANdisco). Click **Upload**. The Configure Networking window displays.



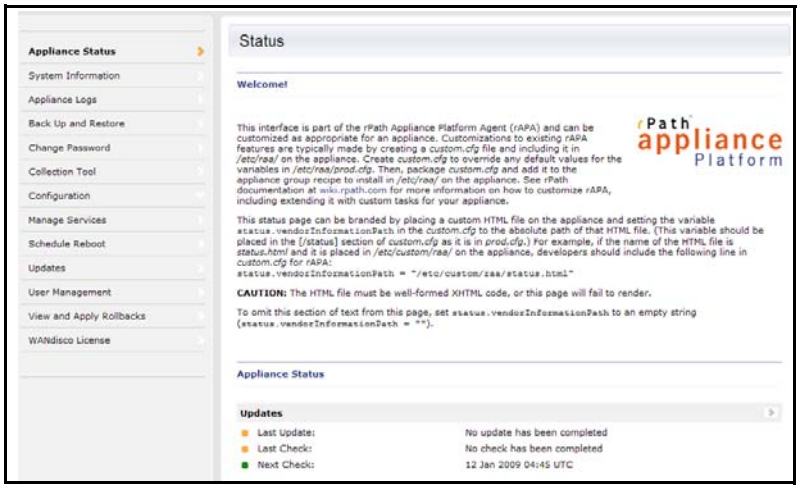
Step 4 Accept the default settings, or make adjustments as necessary, according to your network architecture. Click **Save**.

Step 5 To proceed now, click **Restart**.

All WANdisco files are in the svn-replicator directory. The WANdisco file structure is shown in the following table.

DIRECTORY	CONTENTS
bin	Contains scripts like `svnreplicator`, `shutdown`
config	Contains the [replicator]/config/prefs.xml file used to configure MultiSite.
lib	Contains the `jar` files and DLLs that are required to run the product.
docs	Contains this *Administration Guide* in PDF format.
logs	Contains the pid file, log files and other temporary files. WANdisco Multi-Site's log file is named `SVNProxyServer-prefs.log`.
systemdb	Contains the system database with its transaction journal. **Warning**: Deleting or modifying files from systemdb will likely corrupt your installation.

Upon Restart, WANdisco has started and the Status page appears.

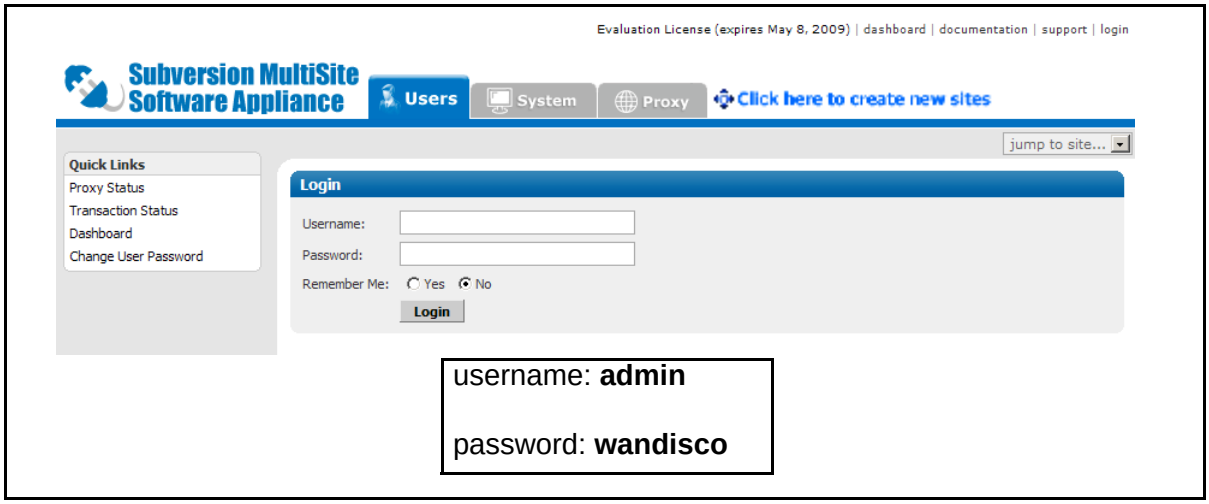


3.6.1 Logging in to WANdisco

Step 6 Display the WANdisco Admin Console. Enter the virtual machine's IP address and port number 6444 in a browser. For example, type

```
http://194:178.34.134:6444
```

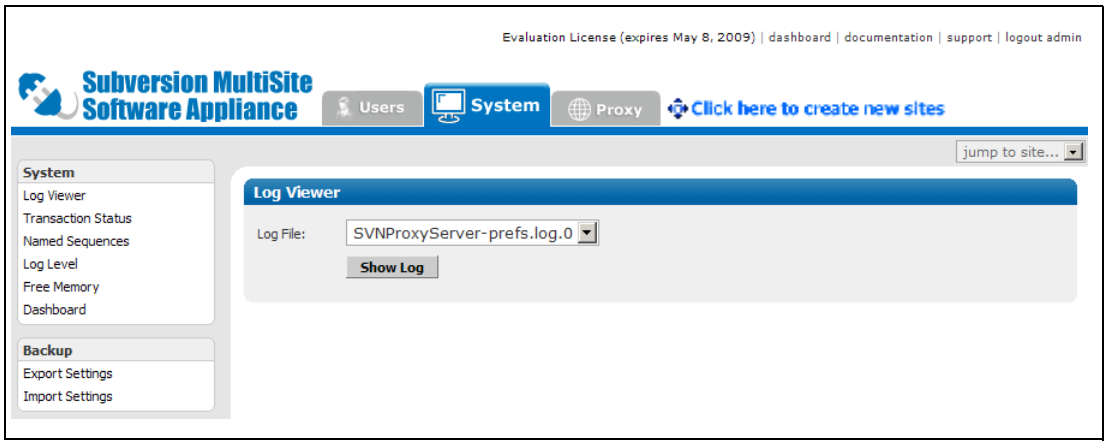
The Admin Console appears.



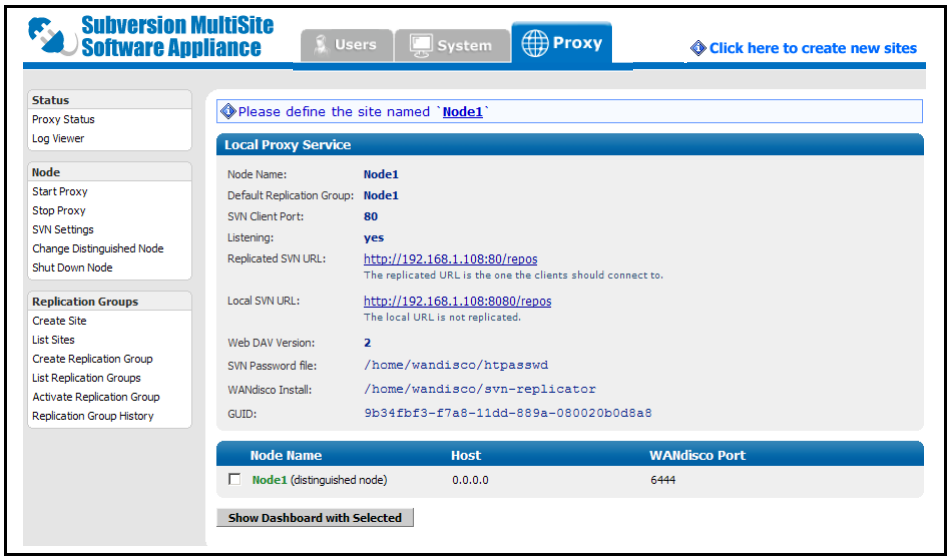
Step 7 Log in. The username is `admin`, the password is `wandisco`.

3.6.2 Verifying the Installation

You now have MultiSite's Admin Console running in your browser.

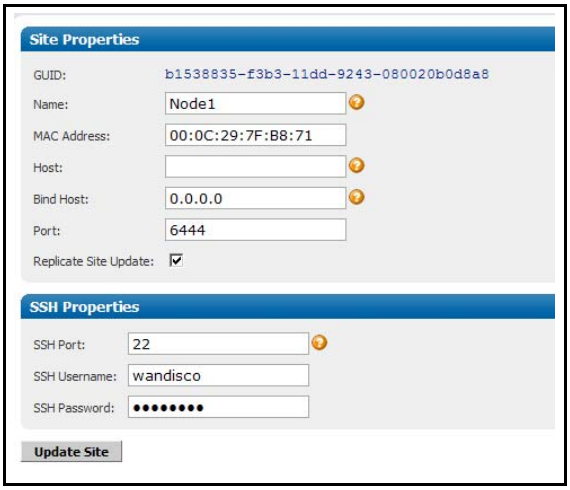


Step 8 Go to the Proxy tab. Define this site for WANdisco. Click **Node1**.



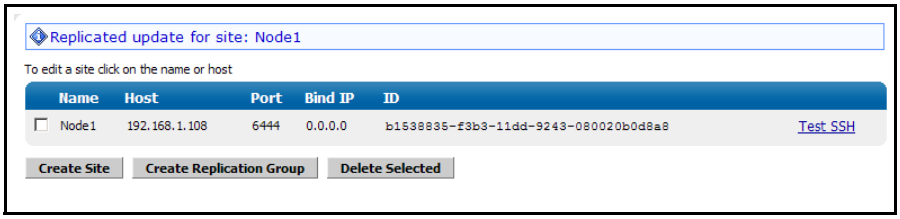
Step 9 Enter this site's IP address in the **Host** field. If you want to change the name of this site from Node1, you can do so in the **Name** field.

The SSH port is reserved for installing WANdisco onto any other sites you may add.



Step 10 Enter in a MAC address. It does not have to be valid, it just has to be unique for each site. It has to have the form of a MAC address. For example, for the first site, enter 00:00:00:00:00:01. When you have the subsequent sites up, just increment that number. Node2 would be 00:00:00:00:00:02, Node3 00:00:00:00:00:03, etc.

Step 11 Click **Update Site**. A message appears verifying the changes.



Step 12 Verify the SSH credentials function for this site (even though this site is not yet connected with any other sites). Click **Test SSH**. You should get a message back verifying a successful test.

3.6.3 Verify Subversion Functionality

Now that you have WANdisco running and the repository on the virtual machine, you need to test Subversion functionality, which includes identifying the repository for the Subversion client.

If you already know how to perform such a test, do so now. Don't forget to create a user in WANdisco: if you have an Access Control license, the user must be in the Admin group. Notify Subversion users of the **Replicated SVN URL** from the Proxy page. Continue on with section 3.7, Specifying Subsequent Sites.

If you are new to Subversion, continue on with this section, which gives detailed instructions. The repository exists in the virtual machine, but you'll create and use a working copy on your desktop. From this local working copy of the repository, you perform Subversion commands, such as check outs and check ins.

Step 13 Create a user in WANdisco. Go to the Security tab and select **Create User**. Enter in a user. (If you have an Access Control license, put the user in the Admin group.)

3.6.3.1 Identifying the Repository for the Subversion Client

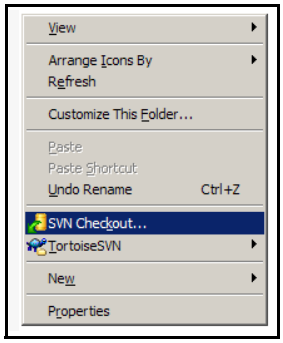
You should have a Subversion client already installed on your desktop. You must tell the client that the repository is located on the virtual machine.

Step 14 Make a local working directory on your desktop named **Sandbox**.

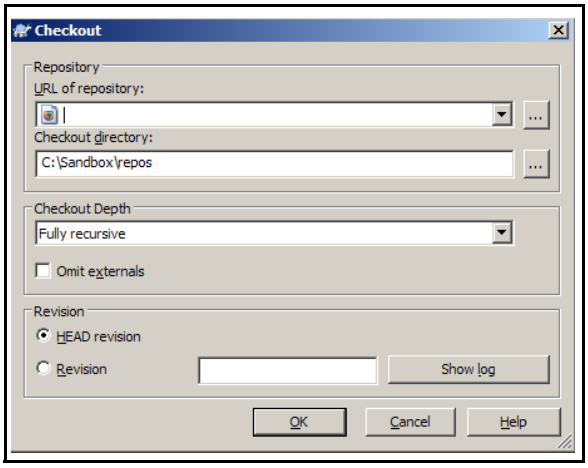
Step 15 Make another directory called **repos** in the Sandbox directory.

Step 16 Go to the repos directory.

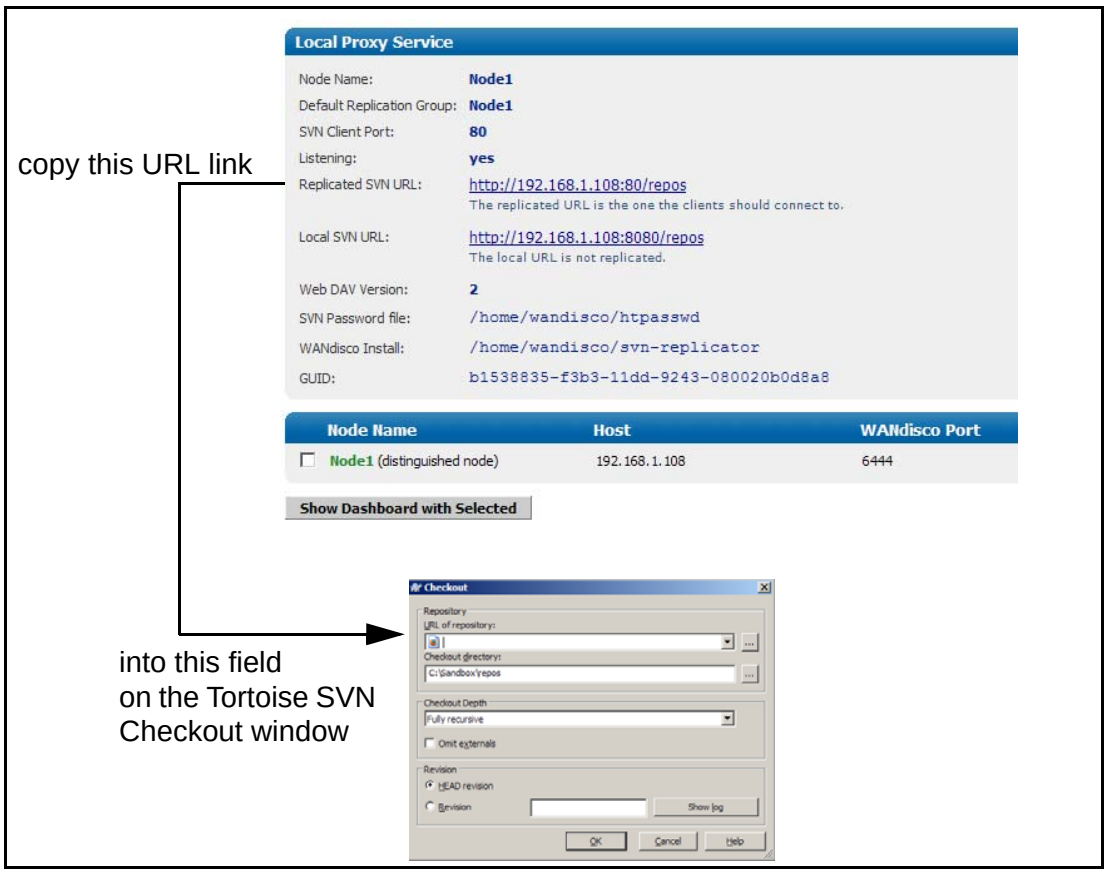
Step 17 Check out a copy of the WANdisco software appliance repository to Sandbox. Right click and select **SVN Checkout**.



The Tortoise checkout window appears.

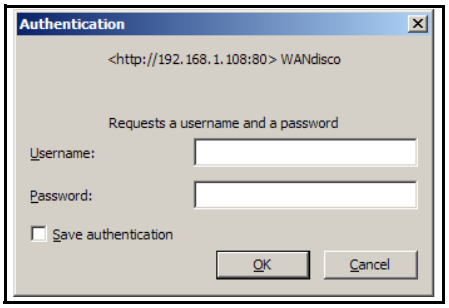


Step 18 Enter in the location of the repository. Go to the WANdisco Proxy page and copy the **Replicated SVN URL** into the **URL of Repository** field.



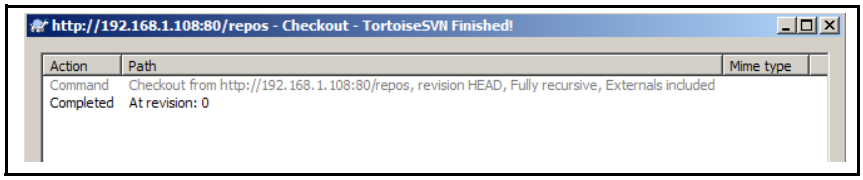
Step 19 Click **OK** on the Tortoise SVN Checkout window. The Authentication window appears.

Step 20 Enter in the user you just created in step 13.



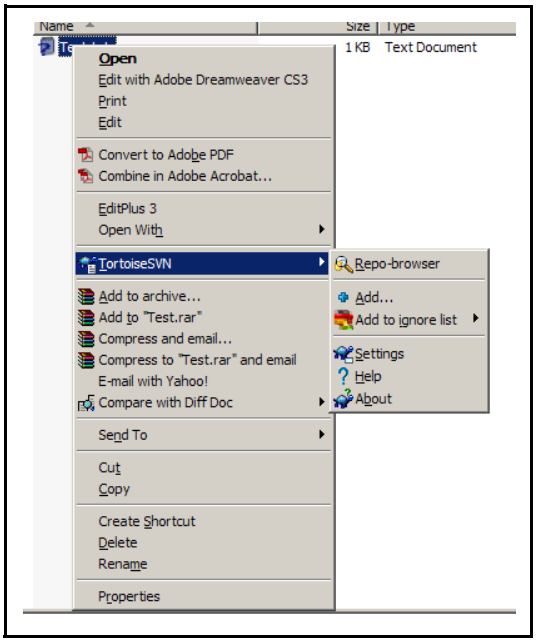
The TortoiseSVN window displays the successful results.

Step 21 Click **OK**.

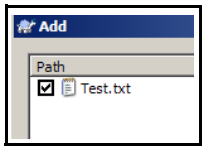


Step 22 Now that you have a working (empty) repository on your desktop, create a file in the **repos** directory. The file can be any type and any size.

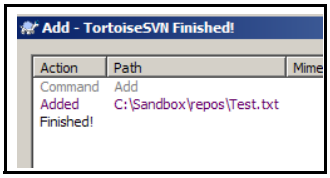
Step 23 Check in the newly created file. Right click on the file name and go to **TortoiseSVN**.

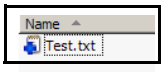


Step 24 Select **Add**. The Add window appears, listing the file.



Step 25 Click OK. The results display.

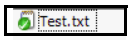


The file now displays with a plus sign. 

Step 26 Right click on the file again.

Step 27 Select **SVN Commit**.

Step 28 Click **OK**. You may have to supply the username and password you supplied in step 20.

When the file has successfully been checked in to the repository, the file displays with a green check. 

Step 29 Modify the file, and check it back in.

Step 30 Verify the changes were captured in the file.

Step 31 Verify WANdisco saw the changes. Go to the WANdisco Admin Console's Dashboard to view the transaction.

click on **dashboard**

3.6.3.2 Notify Subversion Client Users of Repository Location

Step 32 Follow your company guidelines in notifying Subversion client users of the repository location.

3.7 Specifying Subsequent Sites

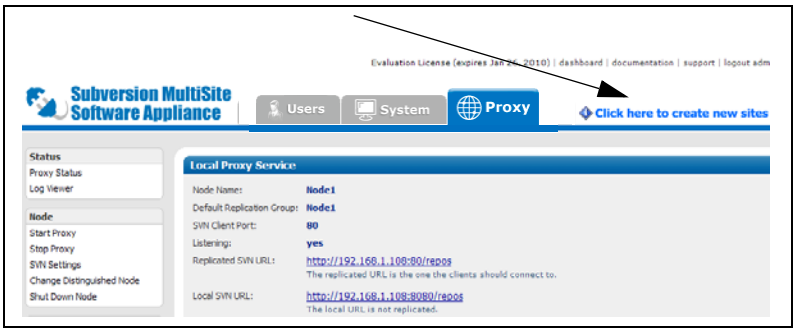
Now that you have verified the first site's installation, you can continue to distribute MultiSite to other sites. At the first site, you specify the other sites, create a replication group, and then activate it. Do not run the installer again at any site.

NOTE:

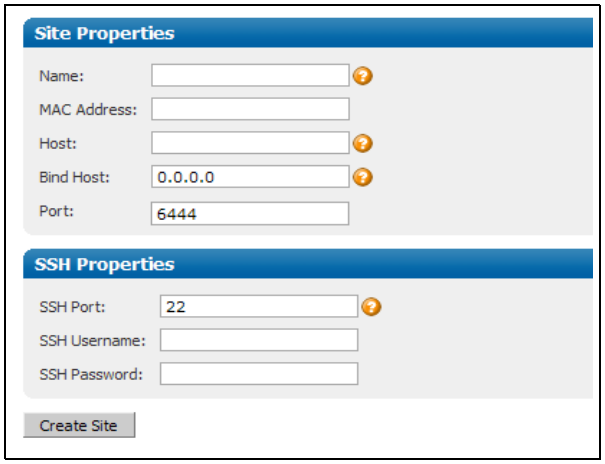
The installer packages whatever users are in the first site for distribution to the other sites. You can also package the repository, or manually synchronize the repositories. For first time Subversion users, WANdisco recommends you package the repositories for the other sites.

Step 33 Repeat all the steps in the section, **Loading WANdisco onto <Your Platform>**, for each site to be included in this replication group. This gives you their virtual machines' IP addresses.

Step 34 On Node1, click on the link **Click here to create new sites**.



The Site Properties page appears.

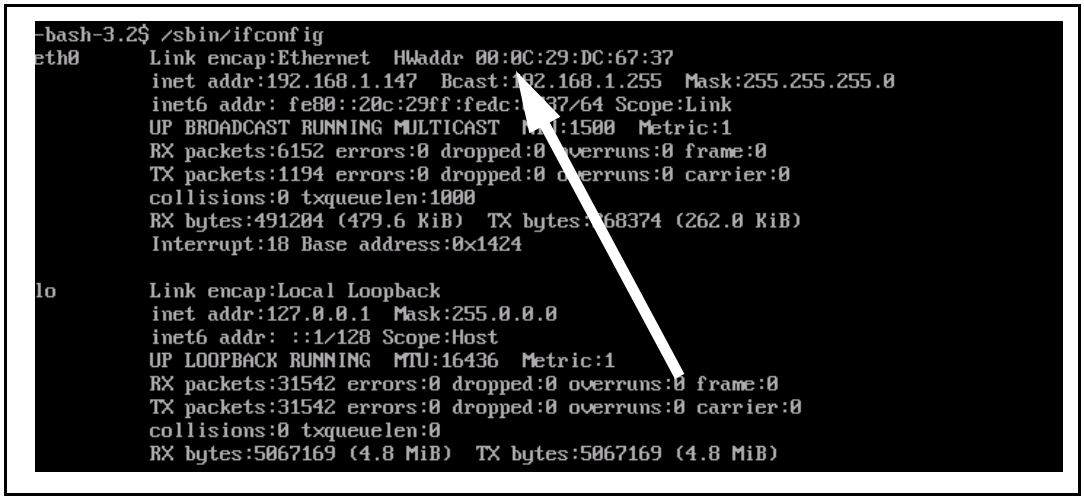


Step 35 Enter a name for the new site. **Spaces are not allowed**. For the purpose of this example, we'll call the new site Node2.

Step 36 Enter the MAC address for the virtual machine on Node2. The MAC address does not need to be valid, it just needs to be unique to this site. See the explanation in step 10.

If you'd like to use the valid MAC address for VMware Player: go to Node2's VMware Player's command line, (click in the window to activate the cursor) and type

```
/sbin/ifconfig
```



The MAC address is returned in the first line, as the value after `HWaddr`.

Step 37 In the Host field, enter the virtual machine's IP address.

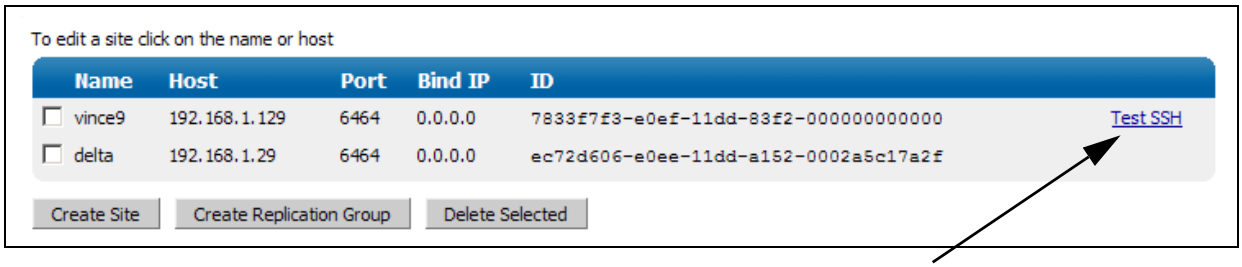
Step 38 In the bind host field, accept the default.

Step 39 In the port field, use the default WANdisco port number, 6444.

Step 40 In the SSH port field, use the default port number, 22.

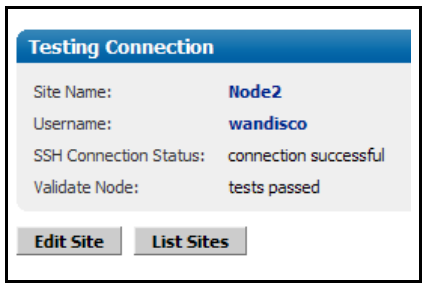
Step 41 In the SSH Username and Password, accept the default: username `wandisco`, password `wandisco`. These are the credentials for the virtual machine's operating system.

Step 42 Click **Create Site**. A page appears containing information for the first site and the site you just created.



Step 43 Test the SSH connection. Click **Test SSH**.

Step 44 Verify the test was successful.

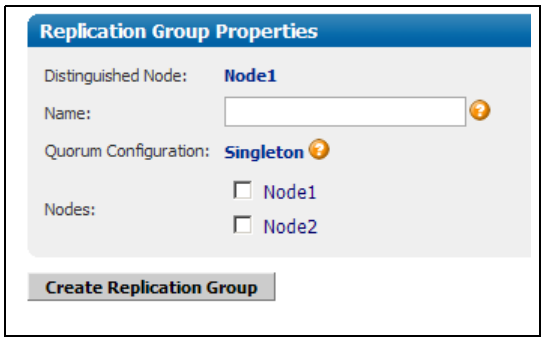


Step 45 Repeat steps 34 through 44 for each site you wish to add.

3.7.1 Creating the Replication Group

Now that you have identified the sites you want in a replication group, you now define the replication group. You can create as many replication groups as you want, but only one replication group is active at a time.

Step 46 To create a replication group, click **Create Replication Group**. The Replication Group Properties page appears.

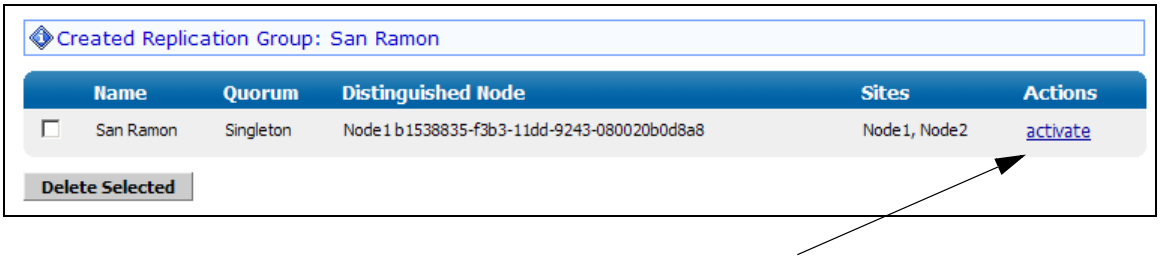


Step 47 Enter a name for the replication group.

Step 48 The default quorum is Singleton. For a discussion of quorum, see section 1.3.2, Replication Example. Once the replication group is up and running, you can change the quorum.

Step 49 Check the sites you wish to include in the membership.

Step 50 Click **Create Replication Group**. A page appears, listing each replication group name and the sites belonging to that relication group.



3.7.2 Activating the Replication Group

During replication group activation, WANdisco creates packages for each of the other sites in the group, which may include the repository if you have WANdisco copy the repository. Once WANdisco takes a snapshot of the repository at the initial site, the initial site becomes available to Subversion users while it is also copying the installation packages to the other sites.

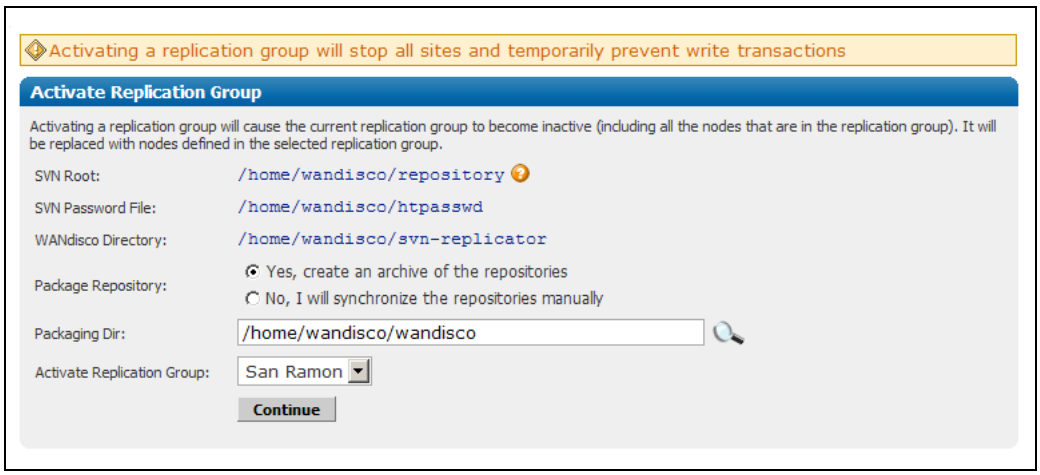
Copying the repository to new sites can take a varying amount of time. For extremely large repositories, WANdisco estimates that it could take from a few hours to several days to copy large repositories around the world.

NOTE FOR ADDING SITES TO AN EXISTING GROUP:

Say you have an existing replication group of, for example, three sites, and you want to add two more. You create a new replication group of five sites. When you click **activate**, the three sites go into read-only mode while their repositories quiesce. When they quiesce, the install site takes a snapshot of the repository. The three original members reboot and become available to Subversion users, since they are in synch. The two new sites receive the installation packages, and restart when their repositories have copied successfully. At that point, replication catches up the new sites on any pending transactions.

Step 51 Click **activate**. The Activate Replication Group page appears.

You can tell the packager to not include the repository, in case you are moving it manually.

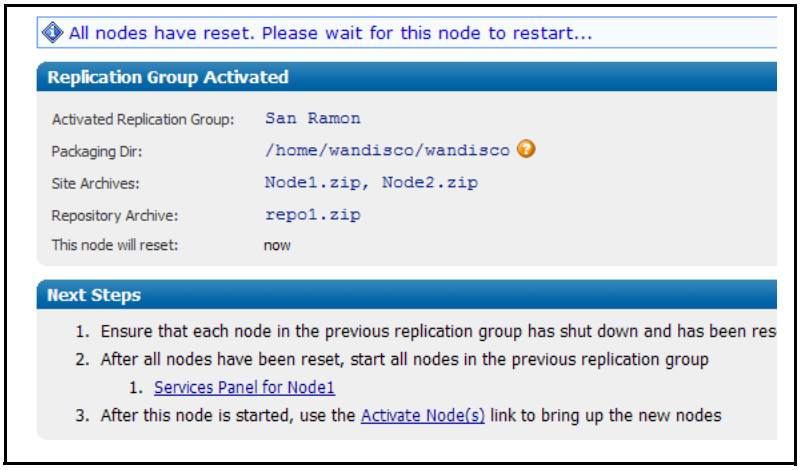


Step 52 Click **Continue**. A status page appears for a few moments, letting you know that WANdisco is creating packages for the sites.

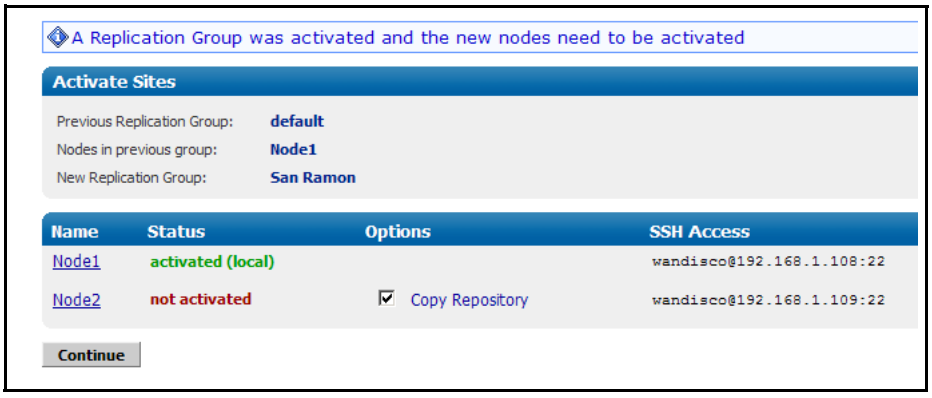
Then another status page appears. At this time, there are two types of replication groups. The previous replication group (of just the first node), and the new one you have defined.

On a brand new installation, the previous replication group has just the first site it in. In another case, you could have a group of three sites, and you've specified another two sites. So the previous replication group would be the three existing sites.

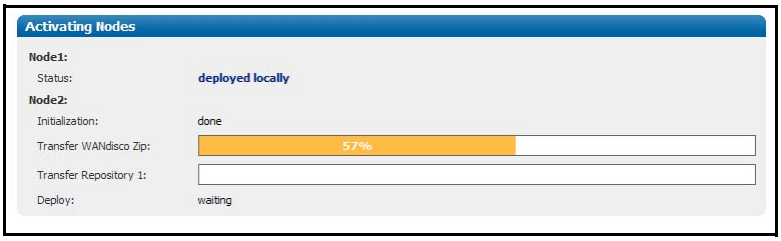
Whatever the makeup of the previous replication group, even if it is just the initial site, the sites automatically shut down and reset. For sites that are separated by great physical distances, this could take quite a while.



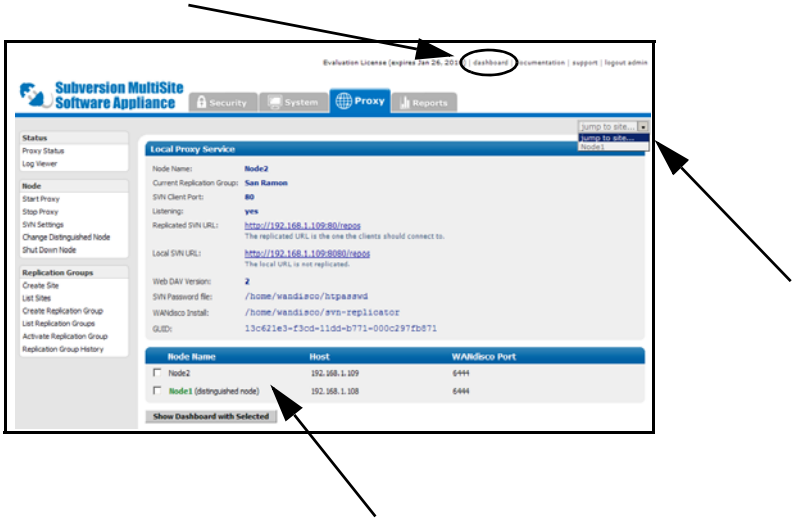
Step 53 At the next screen, click **Continue**.



Click **Continue** to activate Node2 (or any new sites). WANdisco now deploys the installation packages to any new site, and starts those sites.



Step 54 In the Admin Console, you can see that all sites are up and running. Go to the Dashboard or the **jump to site** pull-down.



if a site is unavailable, it displays **unavailable** here

Step 55 At each new site, test Subversion functionality. See 3.6.3, Verify Subversion Functionality.

All sites are now up and running.

4 Navigating the Interfaces

The three operating systems are the virtual machine, the appliance platform agent, and WAN-disco's Admin Console. This section describes three virtual operating systems: VMware Player, Citrix Xen, and Hyper-V. Your virtual operating system may be VMware ESX.

4.1 VMware Player Virtual Operating System

To get to the virtual operating system, open the VMware Player. For example, in Windows, perform these steps:

Step 1 Open the VMware Player. Go to **All Programs > VMware > VMware Player**.

The VMware Player window appears.

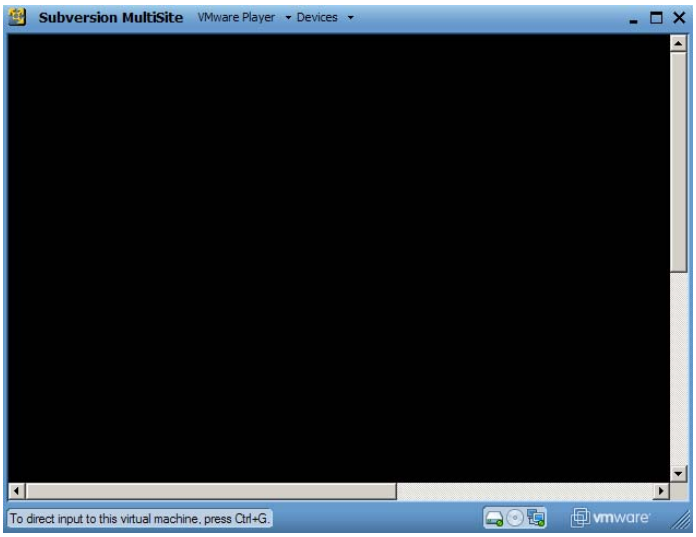
Step 2 Click **Open**. The Subversion MultiSite VMware Player window appears.

NOTE:

To access the prompt, click inside the window. When you are finished with the command line, press **Ctrl+At** to release the cursor.

login: **wandisco**

password: **wandisco**



Step 3 Type in `wandisco` for both the login and password. The prompt appears.

Step 4 You can list the contents of the wandisco directory on the virtual machine. Type

```
ll
```

The virtual machine returns with

```
htpasswd
repository
svn-replicator
```

Step 5 List the contents of svn-replicator. Type

```
cd svn-replicator
ls
```

The contents are as follows:

DIRECTORY	CONTENTS
bin	Contains scripts like `svnreplicator`, `shutdown`
config	Contains the [replicator]/config/prefs.xml file used to configure MultiSite.
lib	Contains the `jar` files and DLLs that are required to run the product.
docs	Contains this *Administration Guide* in PDF format.
logs	Contains the pid file, log files and other temporary files. WANdisco MultiSite's log file is named `SVNProxyServer-prefs.log`.
systemdb	Contains the system database with its transaction journal. **Warning**: Deleting or modifying files from systemdb will likely corrupt your installation.

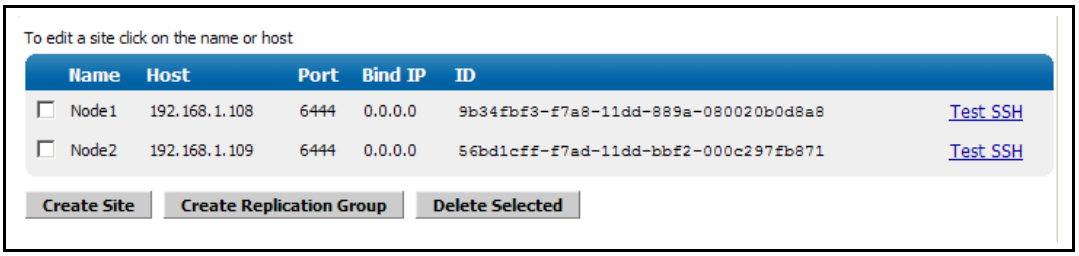
4.1.1 Changing the VMware Player Username and Password

WANdisco does not recommend you change the username and password. If you do change the username and password from the default (`wandisco`, `wandisco`), make sure you change the SSH credentials for that site.

4.1.1.1 Changing the SSH Username and Password

Step 1 Go to that site's WANdisco Admin Console.

Step 2 Select **List Sites** on the Proxy page.

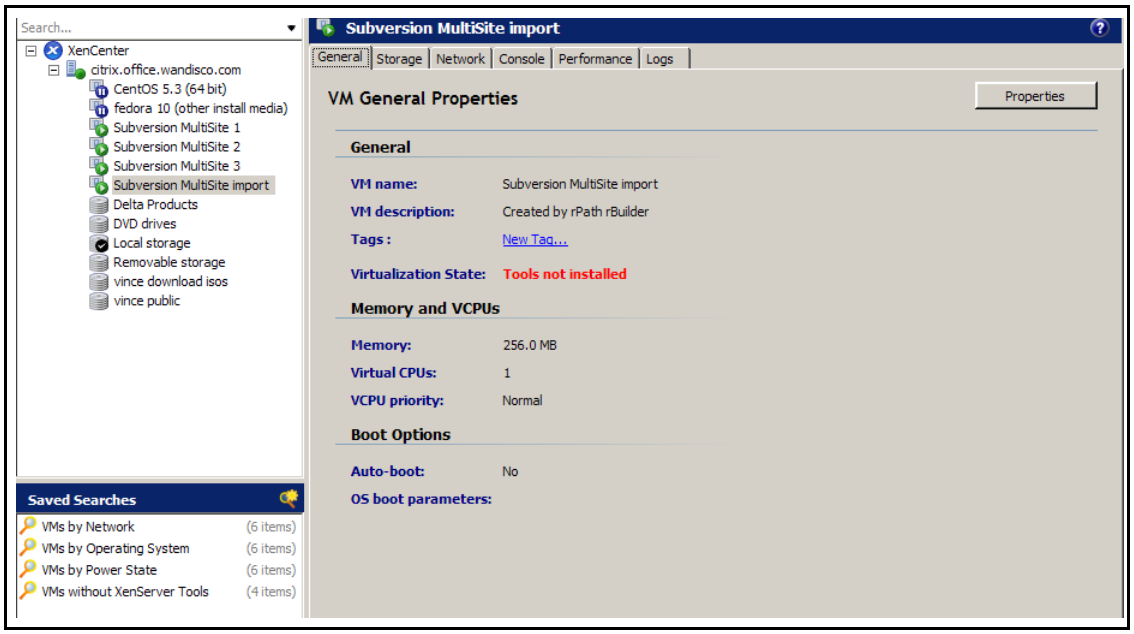


Step 3 Click on the site name. The Site Properties page appears, where you can edit the SSH credentials. Make sure the credentials match what you used for the virtual machine's operating system. See 4.1.1, Changing the VMware Player Username and Password.

Step 4 Select **Update** Site. The changes are now in effect.

4.2 Citrix Xen Virtual Operating System

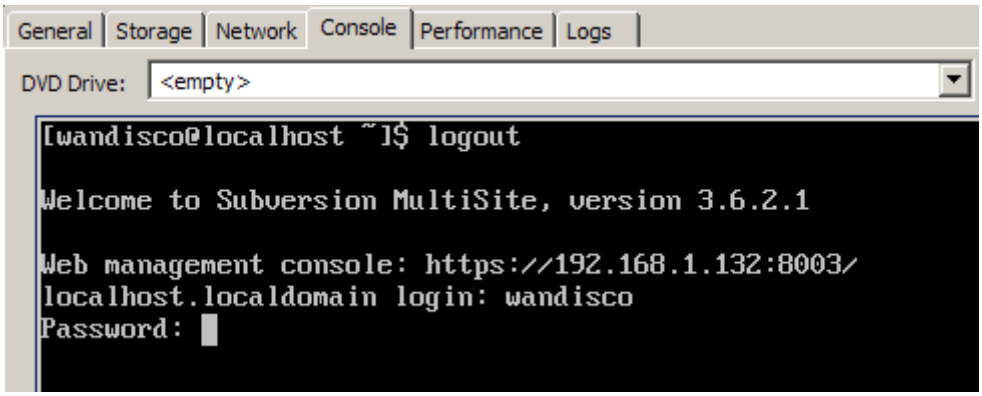
Step 1 Open Citrix Xen. If it is not already up, go to **All Programs > XenCenter**. The XenCenter window appears.



Step 2 Click the **Console** tab. The Subversion MultiSite XenCenter window appears.

NOTE:

To access the prompt, click inside the window.



login: **wandisco**

password: **wandisco**

Step 3 Type in `wandisco` for both the login and password.

Step 4 You can list the contents of the wandisco directory on the virtual machine. Type

```
ll
```

The virtual machine returns with

```
htpasswd
repository
svn-replicator
```

Step 5 List the contents of svn-replicator. Type

```
cd svn-replicator
ls
```

The contents are as follows:

DIRECTORY	CONTENTS
bin	Contains scripts like `svnreplicator`, `shutdown`
config	Contains the [replicator]/config/prefs.xml file used to configure MultiSite.
lib	Contains the `jar` files and DLLs that are required to run the product.
docs	Contains this *Administration Guide* in PDF format.
logs	Contains the pid file, log files and other temporary files. WANdisco Multi-Site's log file is named `SVNProxyServer-prefs.log`.
systemdb	Contains the system database with its transaction journal. **Warning**: Deleting or modifying files from systemdb will likely corrupt your installation.

Step 6 Use any of the other Xen tabs to monitor the virtual machine.

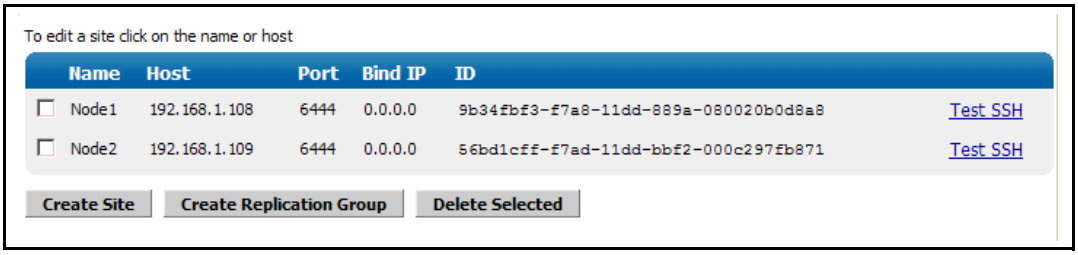
4.2.1 Changing the Xen Username and Password

WANdisco does not recommend you change the username and password. If you do change the username and password from the default (`wandisco`, `wandisco`), make sure you change the SSH credentials for that site.

4.2.1.1 Changing the SSH Username and Password

Step 1 Go to that site's WANdisco Admin Console.

Step 2 Select **List Sites** on the Proxy page.

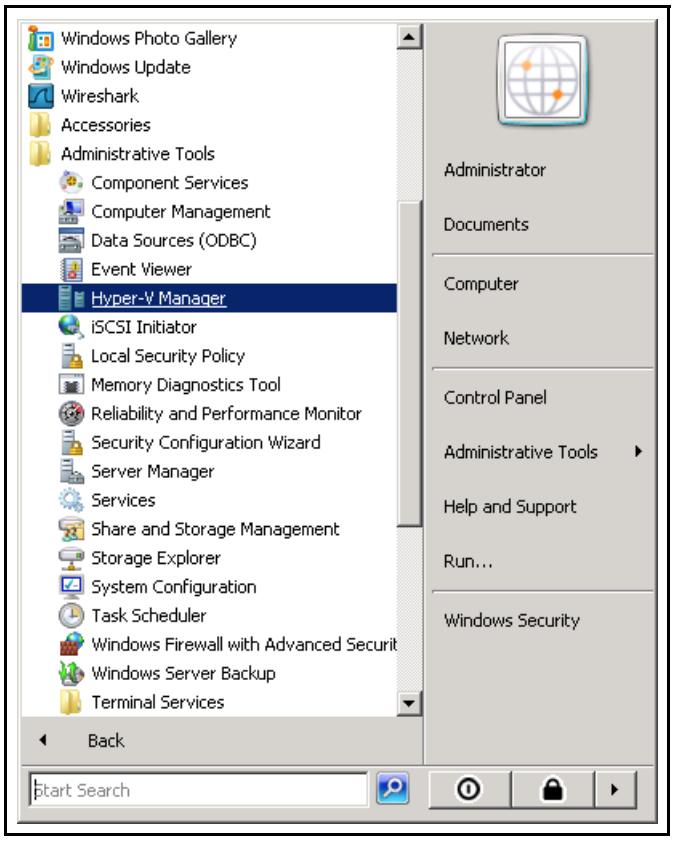


Step 3 Click on the site name. The Site Properties page appears, where you can edit the SSH credentials. Make sure the credentials match what you used for the virtual machine's operating system. See 4.2.1, Changing the Xen Username and Password.

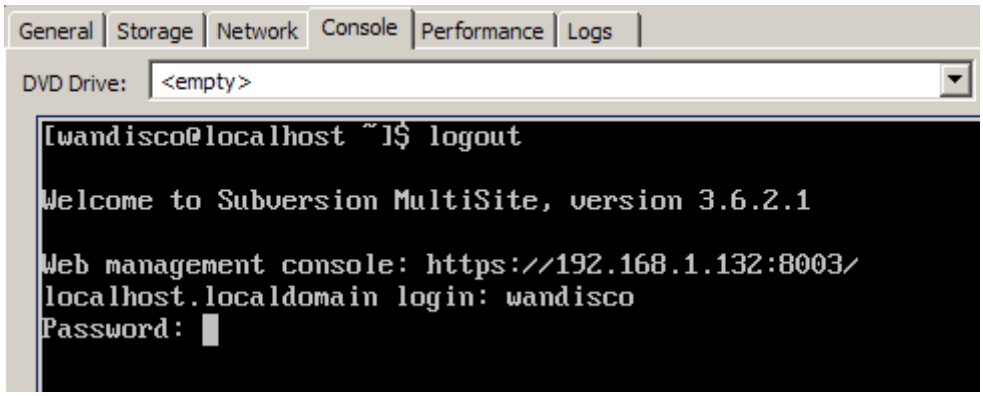
Step 4 Select **Update and Test**. The changes are now in effect.

4.3 Hyper-V Virtual Operating System

Step 1 Open Hyper-V. If it is not already up, go to **All Programs > Administrative Tools > Hyper-V Manager**. The Hyper-V window appears.



Step 2 Connect to the console. The Subversion MultiSite window appears.



login: **wandisco**

password: **wandisco**

Step 3 Type in `wandisco` for both the login and password.

Step 4 You can list the contents of the wandisco directory on the virtual machine. Type

```
ll
```

The virtual machine returns with

```
htpasswd
repository
svn-replicator
```

Step 5 List the contents of svn-replicator. Type

```
cd svn-replicator
```

```
ls
```

The contents are as follows:

DIRECTORY	CONTENTS
bin	Contains scripts like `svnreplicator`, `shutdown`
config	Contains the [replicator]/config/prefs.xml file used to configure MultiSite.
lib	Contains the `jar` files and DLLs that are required to run the product.
docs	Contains this *Administration Guide* in PDF format.

DIRECTORY	CONTENTS
logs	Contains the pid file, log files and other temporary files. WANdisco MultiSite's log file is named `SVNProxyServer-prefs.log`.
systemdb	Contains the system database with its transaction journal. **Warning**: Deleting or modifying files from systemdb will likely corrupt your installation.

Step 6 Use any of the other Hyper-V Manager menus to monitor the virtual machine.

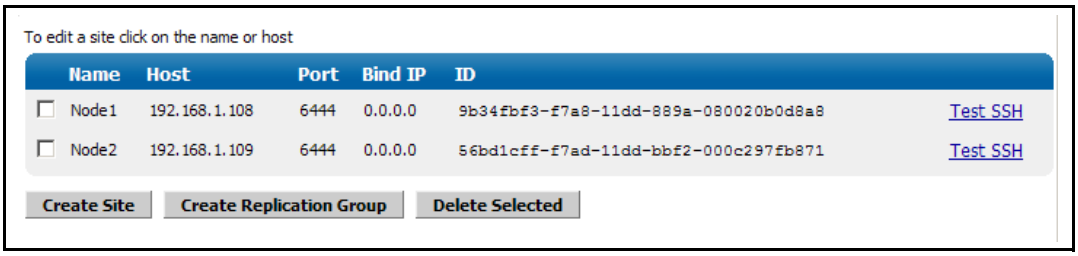
4.3.1 Changing the Hyper-V Username and Password

WANdisco does not recommend you change the username and password. If you do change the username and password from the default (`wandisco`, `wandisco`), make sure you change the SSH credentials for that site.

4.3.1.1 Changing the SSH Username and Password

Step 1 Go to that site's WANdisco Admin Console.

Step 2 Select **List Sites** on the Proxy page.



Step 3 Click on the site name. The Site Properties page appears, where you can edit the SSH credentials. Make sure the credentials match what you used for the virtual machine's operating system. See 4.3.1, Changing the Hyper-V Username and Password.

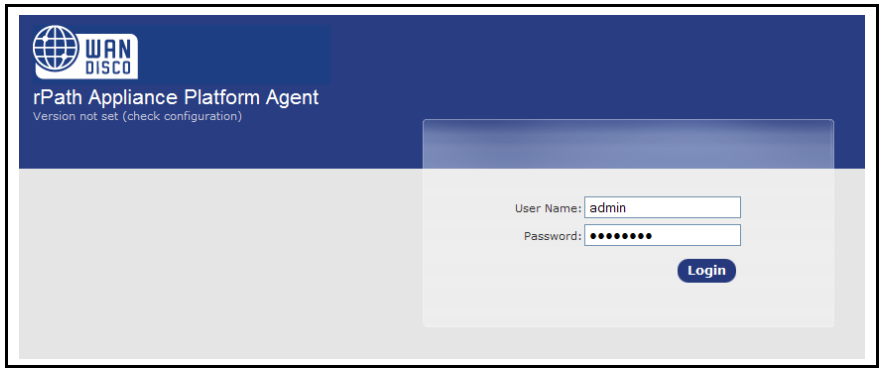
Step 4 Select **Update and Test**. The changes are now in effect.

4.4 Appliance Platform Agent

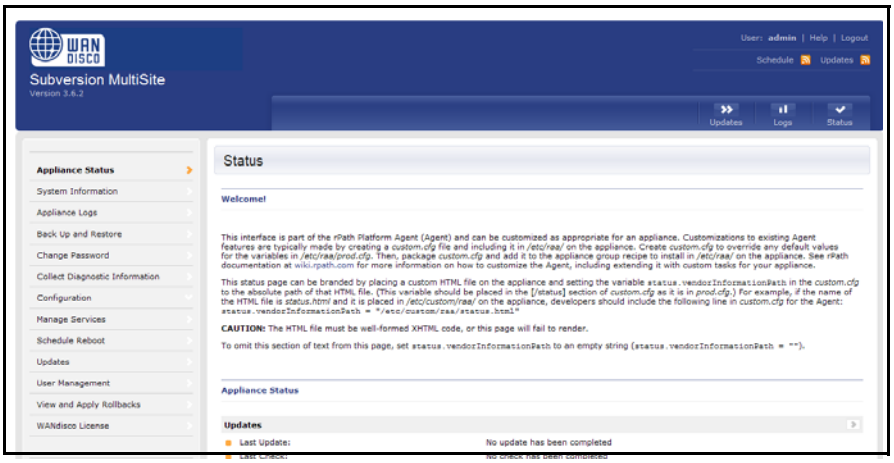
To access the Platform Agent, type in the virtual appliance's IP address and port number 8004 in a browser window. For example, type

```
http://194:178.34.134:8004
```

The username is `admin`, and the password was changed in step 2 of section 3.2, Loading WANdisco onto VMware at First Site.



The Platform Agent window appears.



You can start the WANdisco service from the Manage Services page. See 6.2, Restarting the WANdisco Service.

4.5 WANdisco Admin Console

The Admin Console is a simple interface that allows you to monitor and perform administrative tasks for Subversion MultiSite.

You can run the Admin Console from any site. The login is `admin`, the password is `wandisco`. Passwords are the same for all sites.

4.5.1 Starting the Admin Console

To access the Admin console, all you need is the IP address of any site and the WANdisco port number. To start the Admin Console, in a browser's address bar, type

http://<virtual machine's IP address>:<WANdisco port number>

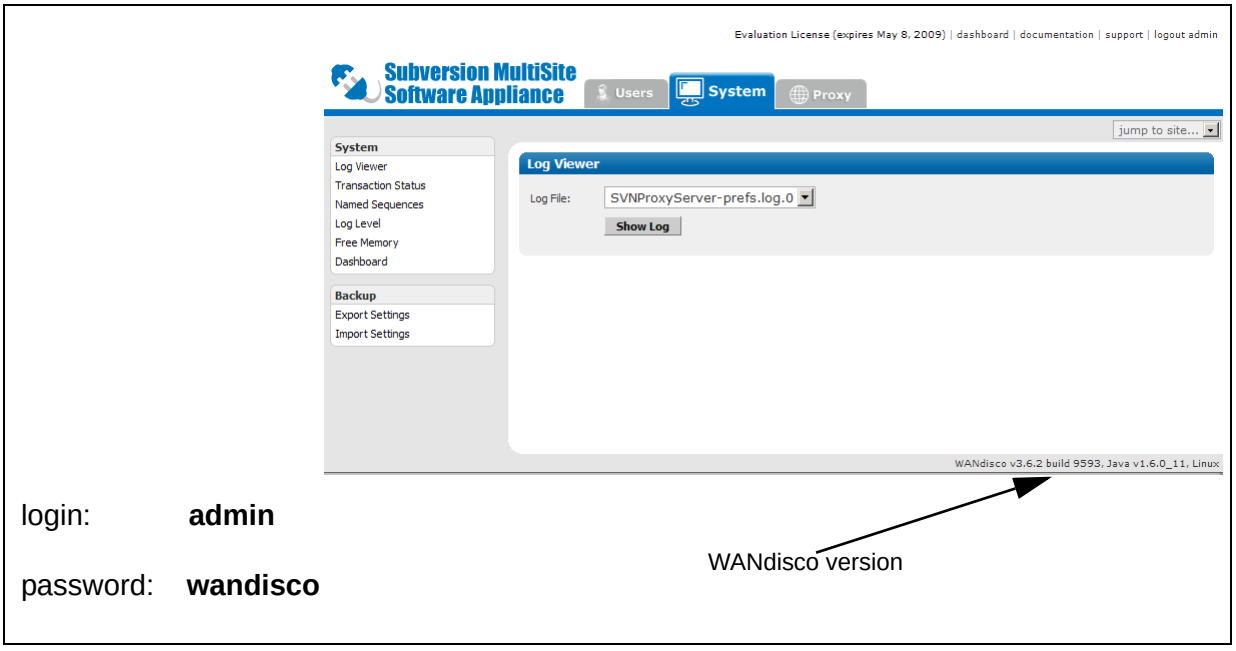
The WANdisco username is

`admin`

You set the password during installation.

The Admin Console's Home page appears.

MultiSite's Admin Console has three pages, identified by their tabs: the Users, System, and Proxy pages.



4.5.2 The User Page

4.5.2.1 Left Side Menu

Create User Create any Subversion user.
- Username — Enter in the Subversion user's username.
- Password — Enter the user's password.
- Confirm Password — Confirm the password.
- First Name — Enter the user's first name.
- Last Name — Enter the user's last name.
- Email — Enter the users email address.

List Users This command displays all users.

Import Users You can import an existing list of users. The import file must be a comma delimited text file, of the format `userid,lastname,firstname,email`**.**

Change Admin Password You can change the WANdisco Admin password for this site only with this command. See 6.10, Changing the WANdisco Password**.**

4.5.3 The System Page

The System page offers several commands and utilities for the MultiSite replication group.

4.5.3.1 Left Side Menu

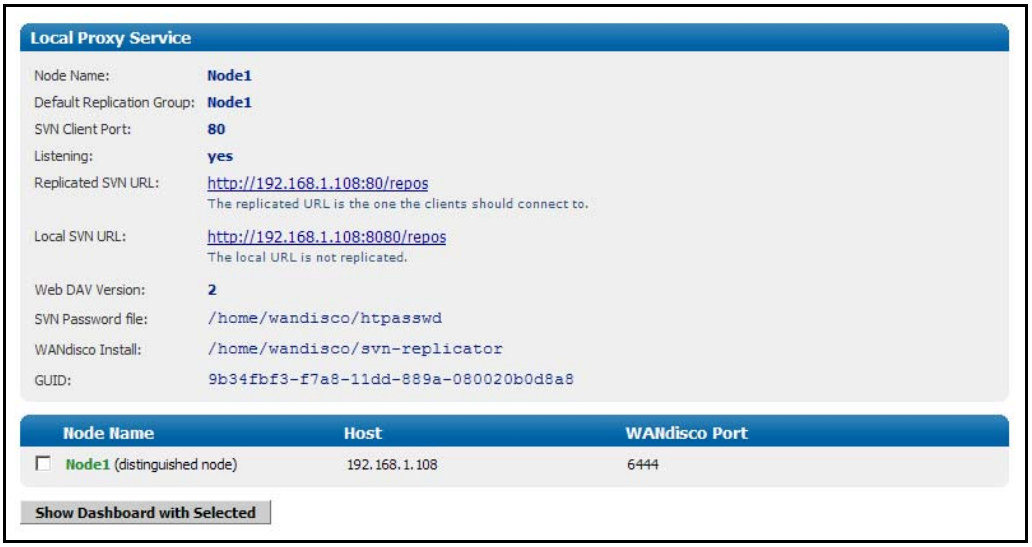
System
- Log Viewer
  - SVNProxyServer-prefs.log.The WANdisco log file.
  - web proxy.log — A log from the installation.
  - **Show Log** — Click this to display a log in the Dashboard.
- Transaction Status — You can search for a specific transaction.
  - Transaction Number — Enter in the transaction number.
  - Site Submitted From — Select the site where the transaction originated.
  - **Show Status** — Click this after entering the data in the above fields.
- Named Sequences — Used internally.
- Log Level — WANdisco uses one log, and the default level is **info**. The levels vary from **severe**, where you get only the most severe warnings, to **finest**, which logs every action.
- Free Memory — This command frees the memory (GB stands for garbage collection) for the current site. The command executes when you click on this menu selection. The display shows information on the command that was just performed.
  - max mem used by JVM — the maximum memory that can be used on the current site
  - free memory before GC — the amount of free memory before you ran this command
  - free memory after GC — the amount of free memory after you ran this command
  - memory freed — the total amount of memory freed at the command's completion

Dashboard — offers another way to get to the Dashboard. The Dashboard is discussed in detail in section 4.5.5, The Dashboard.

Backup

- Import Settings — This command allows you to import WANdisco settings, including all users.
- Export Settings — This command allows you to export WANdisco settings, including all users, for later importation into a WANdisco product.

4.5.4 The Proxy Page



4.5.4.1 Left Side Menu

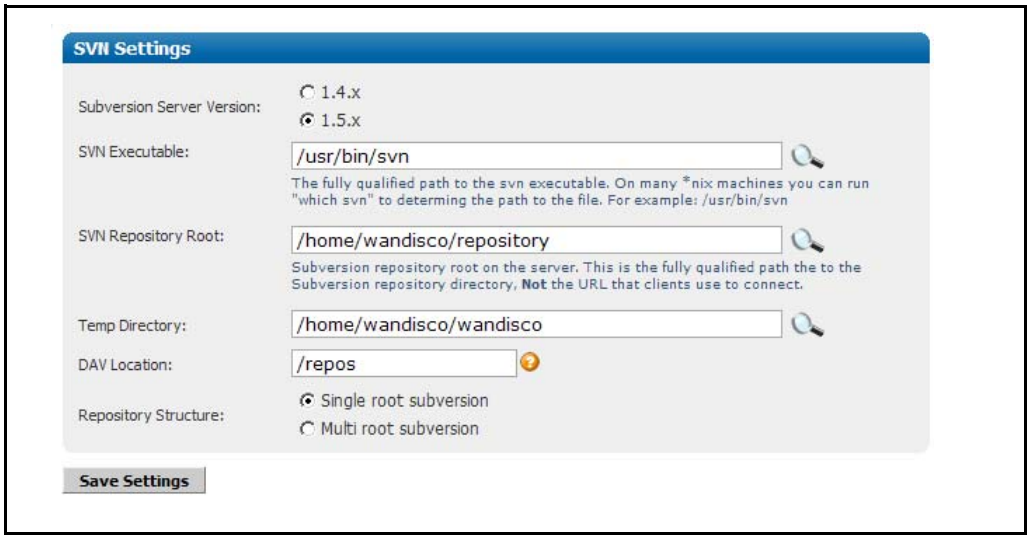
Status

- Proxy Status — This command displays the site's status in the page's main area.
- Log Viewer — You can view the `SVNProxyServer-prefs.log` file in the Dashboard.

Node

- Start Proxy — This starts WANdisco at this site.
- Stop Proxy
  - Stop this proxy only — This stops WANdisco at this site. See 6.1.1, Temporarily Disabling Subversion Access At Selected Sites.
  - Synchronized stop of all proxies — A synchronized stop stops WANdisco at all sites, and replication is suspended. See 6.5, Performing a Synchronized Stop.

SVN Settings



Subversion Server Version
: The Subversion server version is checked.

svn executable
: The path to the Subversion executable file is displayed.

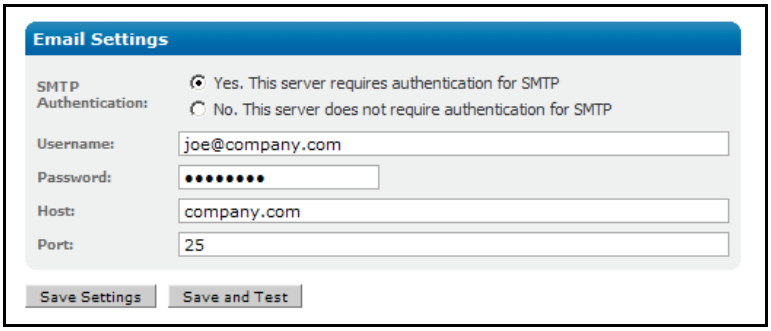
SVN Repository Root
: The path to the Subversion root on the server (where the directories are stored) is displayed.

Temp Directory
: The installation directory is displayed.

DAV Location
: The DAV location is displayed.

Repository Structure
: Specify if the Subversion structure is either multi-root or single-root.

Save Settings
: Save any changes.



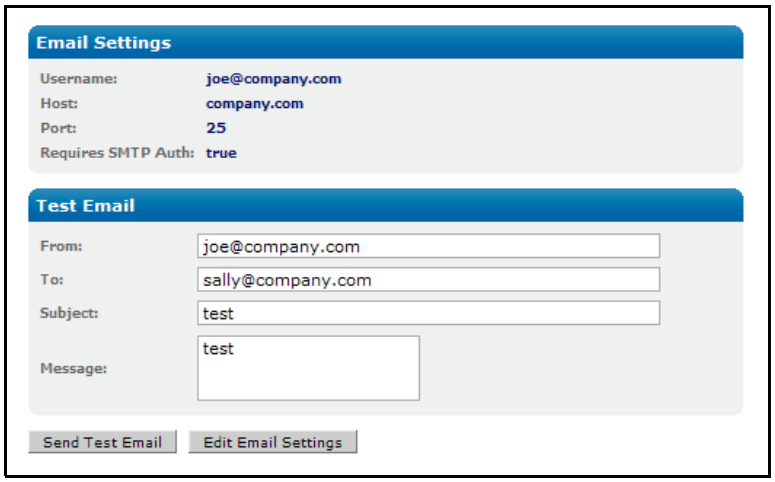
Email Settings
: Set the email settings for the watchdog contact. You have to set the email in watchdog also. See 7.5, About the Watchdog Mode.

SMTP Authentication
: Select whether you need SMTP Authorization.

Username
: For authentication, enter a valid username.

Password
: For authentication: enter a valid password.

Host	Enter the email host.
Port	Enter the email port number.
Save Settings	Save any changes.
Save and Test	Save any changes, and run an email test. Selecting this displays the test page.



Test Email

From	Enter the sender address.
To	Enter in another address to send a test email.
Subject	Name a subject.
Message	Enter test text.
Send Test Email	Click to send the test email.
Edit Email Settings	Click to edit the email settings.

Change Distinguished Node

Change distinguished node.	See section 1.3.1, How Replication Works.
Current Distinguished Node	This names the current distinguished node.
New Distinguished Node	Select another site from the replication group.
Assign Selected Node	Click this after selecting another distinguished node.
Shut Down Node	This command shuts down WANdisco at this site.

Replication Groups

NOTE:

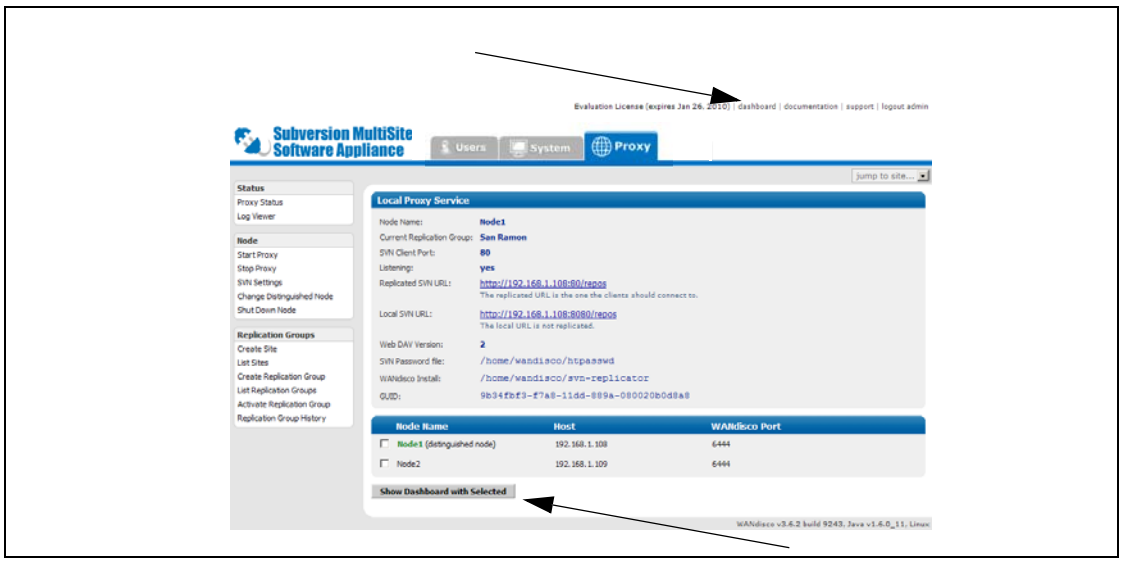
Creating and activating replication groups has a specific flow. Please follow the flow described in 3.7, Specifying Subsequent Sites.

Create Site	Creates another site. See 3.7, Specifying Subsequent Sites.
List Sites	Displays all sites in all replication groups.
Create Replication Group	See 3.7, Specifying Subsequent Sites.
List Replication Groups	Lists defined replication groups.

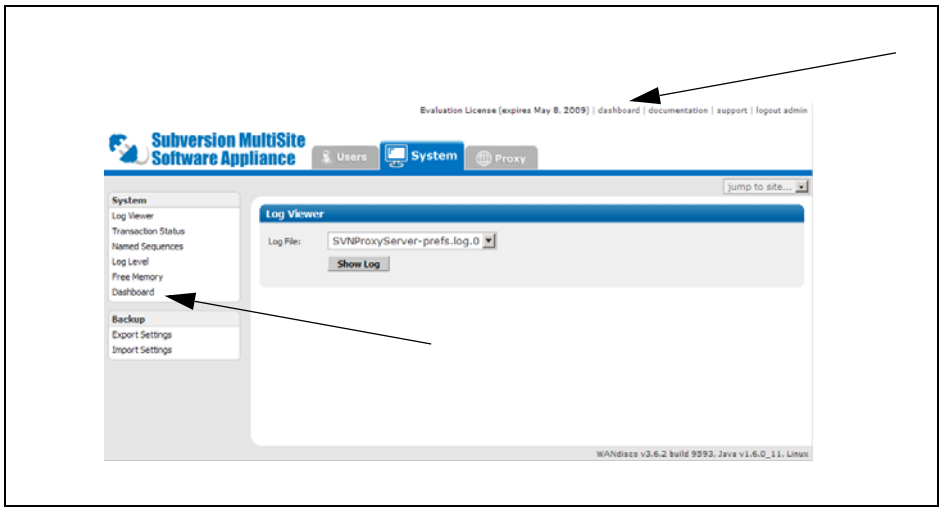
Activate Replication Group	See 3.7, Specifying Subsequent Sites.
Replication Group History	gives a table of past replication group activity

4.5.5 The Dashboard

There are two ways to get to the Dashboard from the Proxy page.

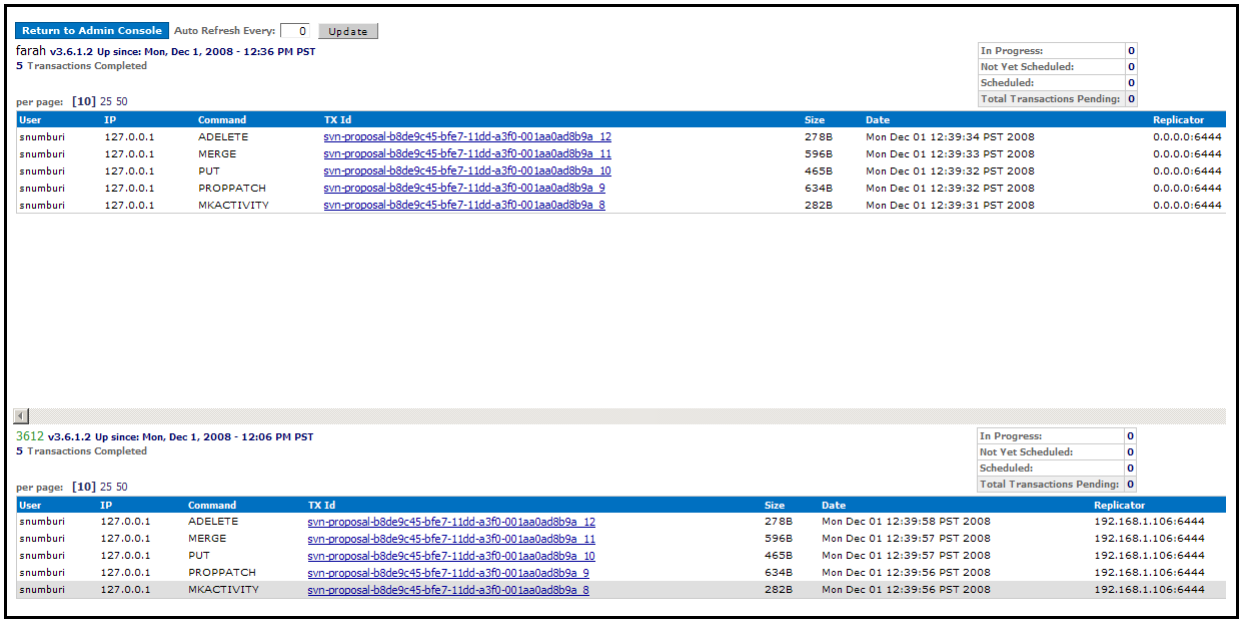


And there are two ways to get to the Dashboard from the System page.



The Dashboard shows each site's transactions. As soon as MultiSite receives a Subversion transaction request, that transaction joins the replication group's queue. (There is one queue for

the replication group.) MultiSite keeps track of which site it originated from, but otherwise, the transaction joins the queue for the replication group.



4.5.5.1 Pending Transactions

There are three statuses of replicated transactions before they are committed to Subversion.

- **Not Yet Scheduled** - these transactions are in the queue
- **Scheduled** - these transactions are approved by the quorum and are waiting to be executed
- **In Progress** - these transactions are in the process of being completed

The **Total Transactions Pending** lists the total number of transactions in all statuses.

4.5.5.2 Completed Transactions

Once a transaction is completed, the Dashboard lists it in the transaction list, and that transaction is no longer considered in the **In Progress** count. The completed transaction joins the count in the **Transaction Completed** display. This display keeps count of transactions since replication began.

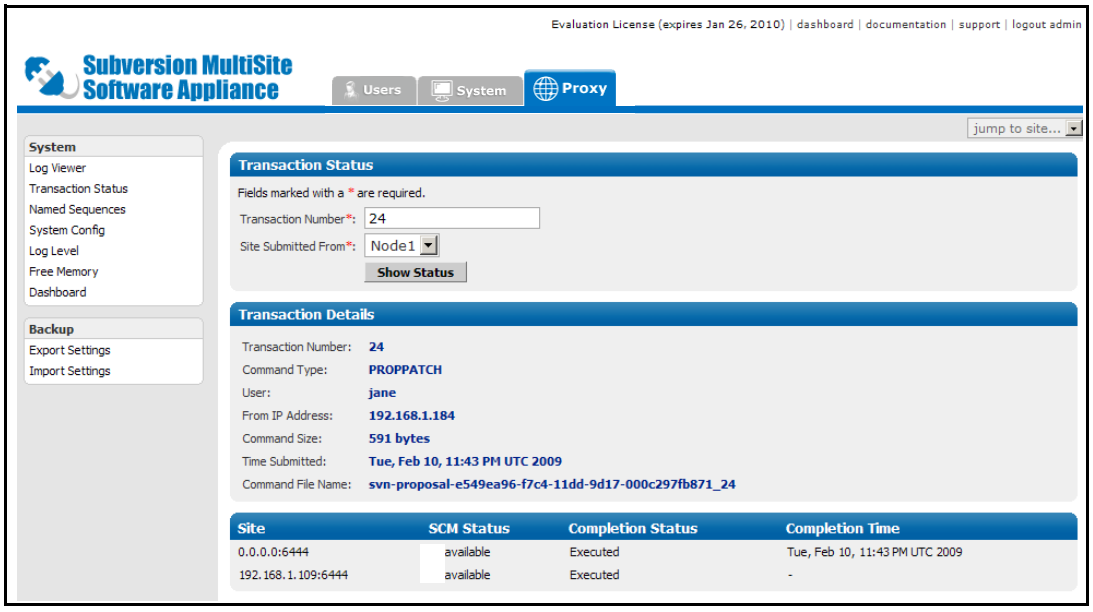
4.5.5.3 Refreshing the Dashboard Display

The Dashboard by default does not refresh. As MultiSite is completing many transactions, a display that refreshes often would be very confusing to read. While the order of completed transactions is the same at all nodes, the real time of when a transaction is posted may vary from node to node. To refresh the Dashboard, click **Update**. You can also set the Dashboard to refresh automatically by entering a number in seconds in the field.

4.5.5.4 Transaction Status

To see details on a transaction's status, click on the transaction in the **Tx Id** column.

That transaction appears in the Transaction Status page (on the System tab). You can see information about that transaction, including which site it originated from and its completion status.

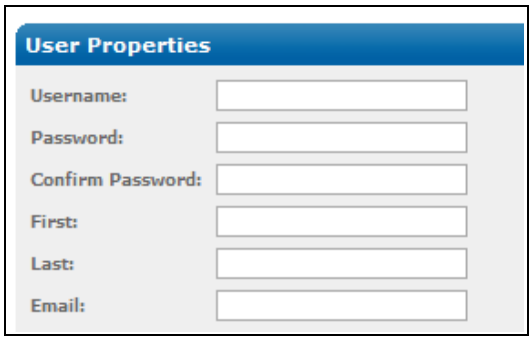


5 Managing Users

This chapter provides information on setting up users for MultiSite. You can create users, delete users, and search users by several criteria. You should be familiar with the Admin Console, described in Chapter 4, Navigating the Interfaces.

5.1 Creating or Deleting Users

To add a new user, click on **Create User** in the Security tab. Specify a (Subversion) username.



Enter the password, and the user's name. The email address is optional.

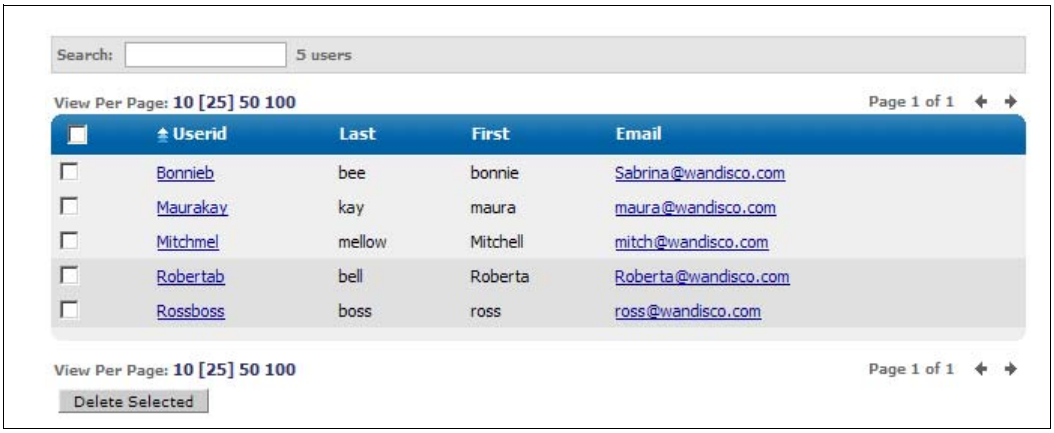
To remove users, click **List Users**. Select the users you want to delete with the checkbox on the left and click **Delete Selected**.

5.2 Listing and Searching for Users

To get a list of all the registered users, click on the **List Users** command. The User List page shows all users by default. The page size is set to show 25 users per page, but you can change that by selecting **View Per Page** on top of the user list. Arrows at the right corner allow you to scroll to the next or previous page.

Use the **Search** box to find users. Begin typing a user's first or last name, and an incremental search starts. Return to the full list by clearing the **Search** box.

All the columns in the user list are enabled for sorting. Clicking on the column header lets you sort in ascending or descending order. The sortable columns include: Userid, last name, first name, and email.



You can click on the user id hyper link to edit the user. You can also delete as many users as you like. Delete all users by checking the checkbox in the table header, and then click the **Delete Selected** button.

5.3 Importing Users

You can import an existing list of users with the **Import Users** command. The import file must be a comma delimited text file, of the format `userid,lastname,firstname,email`, and reside on the virtual machine.

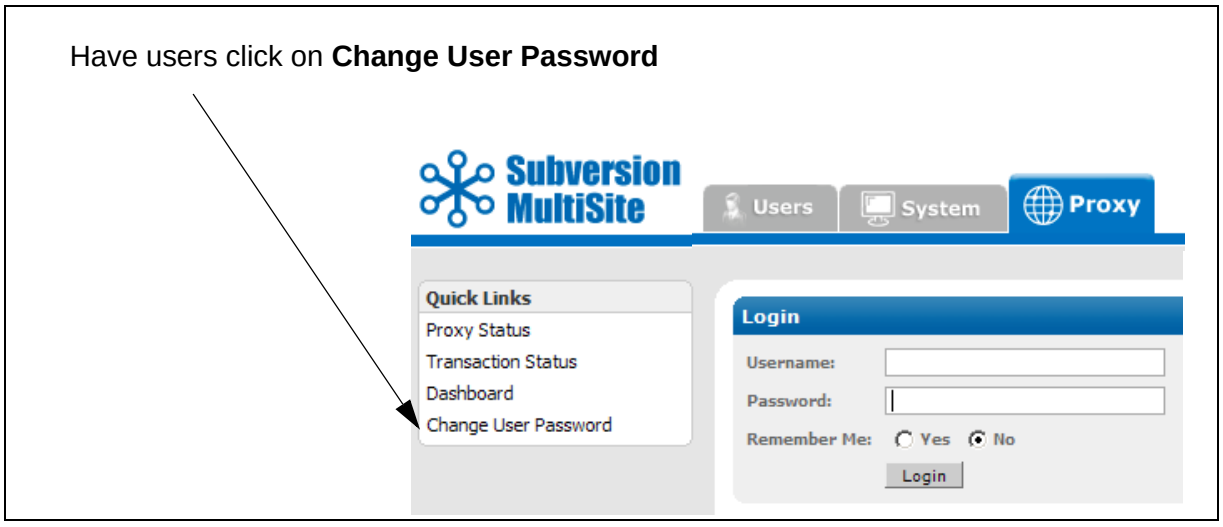
User passwords are changed to user email addresses upon importation. WANdisco recommends notifying users to change their Subversion password, as described in the next section.

5.3.1 Having Subversion Users Change Their Passwords

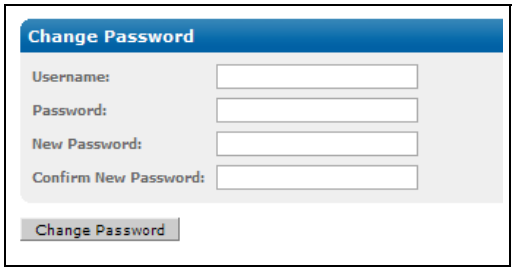
Use this only for users imported with the Import Users command. Importation changes user passwords to email addresses. Users can change Subversion passwords in WANdisco without logging in to WANdisco. Have the users type in the virtual appliance's IP address and the WANdisco port number. For example,

```
http://194:178.34.134:6444/
```

The Admin Console appears. Have the users click on **Change User Password**.



The Change Password box appears. Users can enter their Subversion username, and their password (which is now their email address). Have them enter a new password and confirm it, then click **Change Password**. The users have successfully changed their passwords.



6 Procedures

6.1 Temporarily Disabling User Access to Subversion

NOTE:

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

6.1.1 Temporarily Disabling Subversion Access At Selected Sites

You can stop transactions at one or more sites. For a discussion of stopping one, but not all, sites, see 1.3.3, WANdisco is Listening.

NOTE:

Do not use this procedure if you want to do a synchronized stop. For a synchronized stop, see 6.1.2, Temporarily Disabling Subversion Access At All Sites.

Step 1 After notifying your users of the downtime, navigate to the Dashboard.

Step 2 On the Proxy tab, click **Stop Proxy**.

Step 3 Select **Stop this proxy only**.

Step 4 Repeat steps 2 and 3 for each site you want to stop.

Step 5 To start a site, click **Start Proxy**. The replication group catches up the restarted site on any transactions that occurred at the sites that remained up.

Step 6 Remember to repeat step 5 for each site that you stopped.

6.1.2 Temporarily Disabling Subversion Access At All Sites

To stop all sites at once, you do a synchronized stop. See 6.5, Performing a Synchronized Stop.

6.2 Restarting the WANdisco Service

You can stop WANdisco from within the WANdisco Admin Console (see the previous procedure), but to restart WANdisco, you need to use either the Appliance Platform Agent or the Virtual Operating System's command prompt.

6.2.1 Restarting With the Appliance Platform Agent

Go to the Manage Services page. WANdisco is listed as one of the services. Click the Start icon.

WANdisco has been restarted.

6.2.2 Restarting With the Virtual Operating System

Go to the virtual operating system's console. At the prompt, type

```
sudo /sbin/service wandisco start
```

WANdisco has been restarted.

6.3 Finding the Last Committed Transaction

Even though committed transactions are always in the same order for each site, the timing of the commits usually varies from site to site. So unless there are no Subversion users logged in, you probably are going to have variations per site for committed transactions.

Go to any site's Dashboard. Type

```
http://<IP address>:<WANdisco port number>/dashboard2
```

You see all the sites on the Dashboard to compare the listed transactions.

6.4 Changing a prefs.xml File

The prefs.xml files for sites are located in `svn-replicator/config`. Each file contains all preference information for the sites in the group.

If you make changes that affect more than one site, you must change each site's specific file. But if your change affects just one site, you can change just that site's prefs.xml file.

6.4.1 Changing One Site's prefs.xml File

Step 1 Shut down the site or sites where you changed the prefs.xml file. Go to the Proxy page and click **Shut Down Node**.

Step 2 Make the desired changes to one or more prefs.xml file.

Step 3 Restart the site or sites you stopped. Go to the Platform Agent and select Manage Services. For the wandisco service, click the start arrow. It takes a few moments. (Do not click the browser's **Refresh** button on the WANdisco window; that would reload the last command, which was **Shutdown**.) The changes you made in the prefs.xml file are now in effect.

6.4.2 Changing All Sites' prefs.xml File

Step 1 Perform a synchronized stop. See 6.5, Performing a Synchronized Stop. That procedure includes resuming WANdisco.

Step 2 Make the desired changes to each site's prefs.xml file.

Step 3 Restart WANdisco at all servers. Click **Resume**.

6.5 Performing a Synchronized Stop

NOTES:

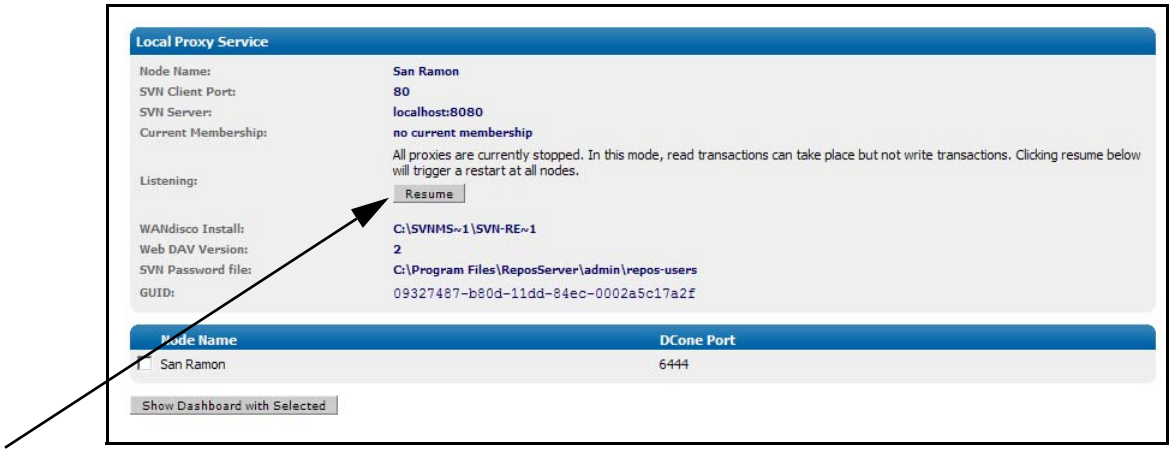
A synchronized stop completes only when all sites are available. If one or more sites are unavailable, the process suspends until they are available.

This procedure involves taking Subversion offline. Please follow your company guidelines on notifying Subversion users of downtime.

Step 1 Click on **Stop Proxy**. Go to the Proxy tab on the Admin Console. **Stop Proxy** is listed on the left.

Step 2 Check the **Synchronized stop of all proxies** radio button. All sites stop. Pending transactions get completed, but WANdisco accepts no further client transactions. The Subversion servers go into read-only mode.

Step 3 To restart WANdisco at all the sites, refresh the Proxy page. Click **Resume**. WANdisco goes down and then restarts at all sites.



The page refreshes, and you can see the Listening field display is now **yes**.

6.6 Verifying That the Replicator is Working

There are two ways you can check. You can make a minor change in Subversion on one client, wait a minute, and go to another client to ensure the change is reflected.

Another way to check if Subversion MultiSite is replicating, is to verify there are commit transactions posted to the log file `svn-replicator/logs/SVNProxyServer-prefs.log`.

```
INFO: [listen-1] Listening on port : 0.0.0.0/0.0.0.0:6445
1219077847375 org.nirala.communication.transport.DConeNet.AsyncConnector
makeConnection
INFO:  [main] Connection request to Node Id = c66b6db9-6a50-11dd-8675-
001aa036534c, host = 192.168.1.15, port = 6666, timed out in 500ms
1219077847875 org.nirala.communication.transport.DConeNet.AsyncConnector
makeConnection
INFO:  [main] Connection request to DFTPEndpoint - Node Id =
192.168.1.156666, host = 192.168.1.15, port = 6666, timed out in 500ms
1219077848578 org.nirala.admin.DiskMon start
INFO:  [main] Diskmon is monitoring C:\Thursday\svn-ha\systemdb every
15min
1219077849000 org.nirala.communication.transport.DConeNet.ListenReactor
setupListener
INFO:  [listen-1] Listening on port : 0.0.0.0/0.0.0.0:2403
1219077849000 org.nirala.communication.transport.svnproxy.ProxyServer
onStartedProxyListen
INFO:  [main] SVN Proxy listener is now turned ON at port :2403
1219077853765 org.nirala.communication.transport.DConeNet.Listen-
Stage$TCPStopListening onStop
INFO:  [listen-1] Host: 0.0.0.0, Port: 2403 Stopped Listening.
1219077853765 org.nirala.communication.transport.svnproxy.ProxyServer
onStopProxyListener
INFO:  [p-queue-1] SVN Proxy listener is now turned OFF at port :2403
1219077872328 org.nirala.communication.transport.DConeNet.ListenReactor
setupListener
INFO:  [listen-1] Listening on port : 0.0.0.0/0.0.0.0:2403
1219077872328 org.nirala.communication.transport.svnproxy.ProxyServer
onStartedProxyListen
INFO:  [mqueue-1] SVN Proxy listener is now turned ON at port :2403
```

6.7 Using Subversion Triggers for Sending E-mails

Many administrators like to set up Subversion backend triggers that fire whenever a Subversion user commits a set of file changes. With a single/master Subversion server setup, e-mails can be initiated once when the `post-commit` trigger fires.

However, with the addition of WANdisco replicator, unless some safeguards are put in place, all your Subversion replicas may fire the `post-commit` trigger. This could potentially cause multiple e-mail notifications. Most likely, developers do not want several e-mails for the same transaction.

The easiest way to remedy this is to designate any one node as the “e-mail hub.” Just enable the `post-commit` trigger to fire from a single site within the replication group. Alternatively, you could use the time of day to fire the e-mail alerts from a specific site. For example, you could modify the `post-commit` trigger to send e-mails from India during 9:00 a.m. to 5:00 p.m. IST, and from the US during 9:00 a.m. to 5:00 p.m. PST.

It is allowable to have asymmetry in the e-mail triggers, but make sure not to disable the `pre-commit` trigger on any node. That may cause a Subversion commit transaction to abort at some

sites but commit at other sites. The `pre-commit` trigger behavior at each site should be deterministic and should not cause the replicas to go out of sync.

When sending e-mail, it is important to set up the e-mail configuration to avoid long blockages or delays. Many times, an administrator uses the default SMTP settings on the Subversion host. These settings by default try to use the organization domain specific e-mail server to send e-mails (by looking up the MX records corresponding to the organization's domain).

The organization-wide SMTP server may be located on a remote WAN, or it may have throttling policies for e-mails originating from the same IP address to cut down on spam. This can cause it to block or reject e-mails, which may in turn cause scripts (like the `post-commit` script) to hang or terminate. To avoid such problems with e-mail triggers, WANdisco recommends that you set up a local e-mail hub or a local SMTP agent/server. The local SMTP server should preferably be on the same host as the Subversion server. It should be set up to forward/relay e-mails to the organization-wide SMTP server. This ensures the e-mail triggers are a lot faster and just need to enqueue the e-mails to the local SMTP server.

6.8 Toggling the Quorum Check

The replicator by default verifies if a network quorum is reachable when a write command is submitted. If the quorum is un-reachable, by default the write command is aborted and the following message appears on the Subversion client console:

```
Check the Network connectivity, failed to reach a
minimum quorum of nodes. Aborting the svn write operation.
```

To turn off the quorum check, set the parameter, `AlwaysVerifyQuorum` to `false` in the `svn-replicator/config/prefs.xml` file. For instance,

```
<SVNProxy>
    <AlwaysVerifyQuorum>false</AlwaysVerifyQuorum>
    ....
</SVNProxy>
```

If the check is turned off and quorum is un-reachable, the write transaction will be applied to the WANdisco Subversion replicator's transaction journal and stay in a pending state till network connectivity and quorum is restored. Note: With singleton quorum, if the current site is also the distinguished node, the quorum check will always succeed irrespective of network connectivity to other sites.

6.9 Changing WANdisco's Admin Login

By default, the login for the Admin Console is `admin`, and the password is user-defined during installation. That way, all sites initially have the same login and password.

You can change the login for any site. Each site can have its own login, however if you do change it, ensure that all site administrators throughout all sites know it. If four sites each had their own logins, then each administrator would see the other sites in the Dashboard, and could not access the other sites' Admin Consoles without entering those sites' passwords.

NOTE:

You can have different passwords for different sites, however WANdisco recommends you keep administration simple, and have the same login and password for all sites.

To change the login at a particular site, enter the following in `prefs.xml`.

```
<Security>
   <Admin>
      <user>newlogin</user>
   </Admin>
</Security>
```

See the procedure 6.4, Changing a prefs.xml File.

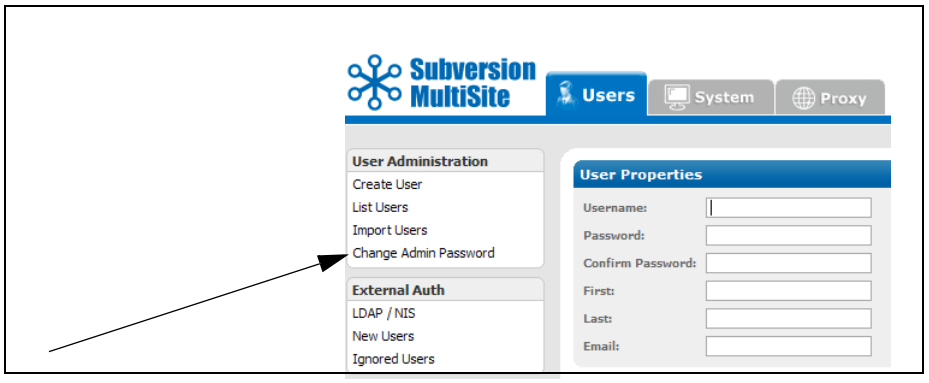
6.10 Changing the WANdisco Password

The WANdisco admin password is `wandisco`. You can change the WANdisco password at any time by using the Change Admin Password command on the Users tab.

NOTE:

This changes the password for this site only. The password does not get replicated.

Ensure that all site administrators throughout the replication group know the new password.



6.11 Resetting or Recovering the WANdisco Password

The default password is `wandisco`. If you change the password from the Admin Console, that change affects only the current site. The password change is not replicated.

Once a site's password is changed, the new password's md5-hash is securely stored under the `/config/passwd` directory. This directory does not exists initially, but gets created when the password is changed the first time.

Since WANdisco never stores the actual password, if you loose the changed password, there is no way to recover it. However, you can reset the password using one of two methods.

6.11.1 Restoring a Password From a Known Site

Step 1 Compress the `/config/passwd` directory at a site where you know the password.

Step 2 Copy and uncompress the file from the previous step into current site's (lost password) `/config` directory. You are over-writing the existing config/passwd directory.

6.11.2 Reset Password To wandisco

Step 1 Deleting the `/config/passwd` directory at the current site.

Step 2 Restart WANdisco at the current site.

The password is now `wandisco`.

6.12 Setting Up a Pre-Replication Hook

The pre-replication hook currently implemented is the equivalent of the SVN DAV pre-commit hook. WANdisco invokes this hook before forming a proposal.

Per the SVN DAV specification, if the hook succeeds, nothing is communicated back to the client. The handling of the command proceeds normally.

If the hook fails, per the SVN DAV specification, `stderr` is packaged as an XML response to the client. In response, the client typically deletes the activity; i.e., cleans up the temporary files, etc., on the server side.

6.12.1 Configuration

Modify your prefs.xml file at all sites to contain the following tags. See 6.4, Changing a prefs.xml File. Below is a sample configuration of a pre-commit pre-replication hook.

NOTE:

Make sure the hook is not installed in the repository's hooks directory, since you don't want the SVN server to find it.

```
<Hooks>
  <enabled>true</enabled>
  <list>
    <hook name="pre-commit">
      <command>C:/cygwin/home/user/bin/pre-commit.bat</command>
      <captureExitCode>true</captureExitCode>
    </hook>
  </list>
</Hooks>
```

6.12.2 Other Configuration

Please provide the Subversion server version under the SVNProxy tag. See example below:

```
<SVNProxy>
  .
  .
  .
  <svnServerVersion>1.5.1</svnServerVersion>
</SVNProxy>
```

6.12.3 Repository-Specific Hooks

If you want different hooks to act on different repositories, you can do so. Create a script (for example, pre-replication.sh or .bat) that contains a case statement that calls each repository-specific hook by passing the repository name as a parameter. Change the prefs.xml to point to that script.

```
<Hooks>
  <enabled>true</enabled>
  <list>
    <hook name="pre-commit">
      <command>C:/cygwin/home/user/bin/pre-replication.bat</command>
      <captureExitCode>true</captureExitCode>
    </hook>
  </list>
</Hooks>
```

6.13 Using an Existing Repository

If you already have an existing Subversion repository, you can use it. Perform these steps after you complete the installation.

Step 1 Go to `/home/wandisco/repository`. You'll see a standard repository structure: the directories `conf`, `dav`, `db`, `format`, `hooks`, `locks`, `README.txt`.

Step 2 Archive that directory.

Step 3 Copy your repository into `/home/wandisco`.

Step 4 Rename your repository to `repository`.

WANdisco now uses your repository's content.

6.14 Establishing a Baseline for Replication

Before starting WANdisco, you should ensure that all sites start with an identical copy of the repository (the svnroots) - identical in all respects, except as noted below.

Depending on the size of your repository and available bandwidth to the remote sites, you can decide whether to copy or sync the repository over the network or ship a copy of the repository on a physical medium (for example, a CD, DVD or hard disk). Select the method that works best for your situation.

If you already have an older copy of the repository at the remote sites, for example, if, prior to deploying WANdisco, you were using a master-slave replication solution such as svnup, choose the **Synchronize** procedure.

6.14.1 Copying the Subversion Database

Otherwise, start by estimating how long it may take you to copy the repository over the network by determining the size of your repository and the bandwidth available to the remote sites. If you conclude that it takes too long, you will want to ship the repository to the remote sites on a physical medium.

Step 1 Determine the size of the repository. From a Unix command prompt, `cd` to your repository and type

```
du -s
```

This reports the size of your repository in kilobytes.

Step 2 Determine the network bandwidth. Copy a reasonable-sized file (say 100 megabytes) to the remote site using any means available (example, `scp` or `ftp`). Time the copy.

Step 3 Estimate how long the copy will take. Using the information gathered above, you can estimate how long it can take you to copy the repository to the remote sites over the network. For example, if copying a 100 megabyte file over the network took 10 minutes, copying your 5 gigabyte repository may take about 500 minutes (8 hours and 20 minutes).

6.14.2 Synchronizing With an Older Remote Copy

You can use `rsync` to sync up an older remote copy with your master copy. For example, from the machine with the master copy of myRepository, type

```
rsync -rvlHt /path/to/myRepository remoteHost:/path/to
```

Note that the final element, `myRepository`, is not specified in the remotehost's path. For further information, consult the `rsync` man pages.

6.14.3 Copying Over the Network

Use this procedure if:

- You do not have an older remote copy; i.e., you are copying the entire repository over.
- Your repository is small enough.
- You have enough network bandwidth to copy the repository to the remote sites in reasonable time.

Step 1 Ensure that the repository is not in use. If necessary, shut down the SCM server. For example, type

```
/etc/init.d/xinetd stop
```

Step 2 Package the master copy of your repository.

Step 3 Copy the package to the remote host.

Step 4 Log in to your remote host and unpackage the repository. For example, on the server with the master copy, type

```
cd /path/to
tar pzcf myRepository.tgz myRepository
ssh remoteHost mkdir -p /path/to
scp myRepository.tgz remoteHost:/path/to/
```

```
log into remoteHost
cd /path/to
tar pzxf myRepository.tgz
```

6.14.4 Shipping on a Physical Medium

If copying over the network may take too long, you can ship the repository to the remote destination on a physical medium, such as a CD, DVD or hard disk. Note that you do not have to wait for the baseline to be available at all sites before using WANdisco. Instead, you can follow the procedure below.

Using WANdisco before the baseline is available at all sites

Step 1 Deploy WANdisco as usual, but do not start the WANdisco server at the sites where the baseline is not yet available.

Step 2 When choosing a quorum, ensure that the sites where WANdisco can be started are sufficient to form a quorum. The simplest way to do this is to choose the Singleton Quorum policy, and choose the site that has the master copy of the repository as the distinguished node.

Safe Differences

The only things that can safely differ in the baselines across your sites are post-commit triggers. For example, if you generate email notifications from a post-commit trigger, it is a good idea to do that at only one site to avoid generating duplicate email notifications.

Common Pitfalls

It is important that the repositories are identical in all respects except as noted above. A common mistake when the desired baseline is an empty repository is to `init` a new empty repository at each site. Instead, you should `init` the repository at one site, and copy the empty repository to other sites.

For Subversion, there may be no negative consequences to this mistake, but an empty repository is so small, you might as well play it safe.

7 Replicator Management

7.1 Adding or Deleting Sites in a Replication Group

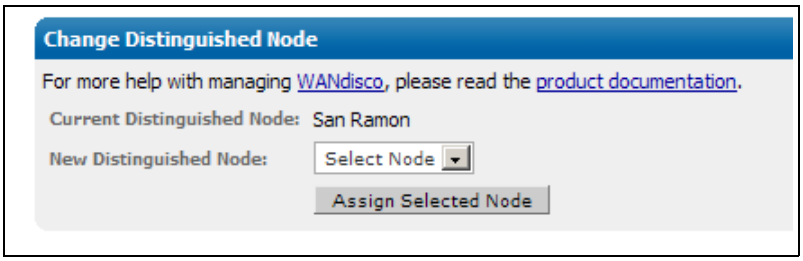
You can add or delete sites. For new sites, notify WANdisco of the IP addresses of the new sites, and WANdisco sends you a new license key file. Then create a new replication group, as described in 3.7.1, Creating the Replication Group.

To delete sites in a replication group, you create a replication group excluding the sites you want deleted. Follow the instructions in 3.7.1, Creating the Replication Group.

7.2 Changing the Distinguished Node

Step 1 To change the Distinguished Node, go to the Admin Console.

Step 2 Click on **Change Distinguished Node** command on the left side menu.



Step 3 Select the desired node from the drop down.

Step 4 Click **Assign Selected Node**. The transaction may take a few moments to take effect. Refresh the page to see the change.

7.3 Rotating the Distinguished Node

For replication groups with a Singleton quorum (or Multiple quorum with a even number of sites), you can schedule the Distinguished Node to change, based on physical location around the world.

For example, say you have Subversion MultiSite in San Jose, CA, in Madrid, and in New Zealand. Since being the distinguished node offers the fastest response time, you would want each of those locations to take advantage of the time they could each be the distinguished node.

To do that, you would edit the Preferences file **at only one location**. Use the local time for that location, and figure out the times the distinguished node would change. For example,

```
<AgreementManagerList>
  <AgreementManager name="52ec6735-ce20-11d9-8e57-00065be02953">
    <DisplayName>svn-am</DisplayName>
    <Quorum>
      <Schedule>
        <at name="09:00 AM">
          <!-- San Jose Site --> <DistinguishedNode>fb7723de-ce1e-11d9-
ae57-00065be02953</DistinguishedNode>
        </at>
        <at name="08:30 PM">
          <!-- Madrid Site --> <DistinguishedNode>659a768d-ce1f-11d9-
aeec-00065be02953</DistinguishedNode>
        </at>
        <at name="03:00 AM">
          <!-- New Zealand Site --> <DistinguishedNode>3fae40f3-ce20-
11d9-8e6a-00065be02953</DistinguishedNode>
        </at>
      </Schedule>
    </Quorum>
  </AgreementManager>
</AgreementManagerList>
```

The time syntax is `hh:mm:ss: AM|PM`. Seconds are optional.

NOTES:

If you do rotate your distinguished node, the other sites' Preferences files do not reflect the rotation. You must rely on the Admin Console (available at all sites) to display the current distinguished node (the site's name displays in green).

Make sure that the local MultiSite administrators know about the change.

See 7.2, Changing the Distinguished Node.

7.4 Toggling the Quorum Check

The replicator by default verifies if a network quorum is reachable when a write command is submitted. If the quorum is un-reachable, by default the write command is aborted and the following message appears on the Subversion client console:

```
Check the Network connectivity, failed to reach a
minimum quorum of nodes. Aborting the svn write operation.
```

7.5 About the Watchdog Mode

By default, WANdisco starts in watchdog mode. Whenever the replicator goes down, the watchdog mode restarts it. In watchdog mode, the replication process automatically disassociates from the terminal and becomes a daemon process, so you should not try running it in the background (with &).

NOTE:

Watchdog mode is not supported in Windows, but it is in Windows Cygwin.

You can turn off watchdog by typing `-nowdog`.

If WANdisco is unable to start up, for example if it terminates several times in quick secession, watchdog starts WANdisco in read-only mode.

```
$ ./bin/svnreplicator -h
Usage: svnreplicator [-v] [-verbose] [-nowdog] [-pause time]
[-email email-address]
```

-v	Print the svnreplicator version
-verbose	Verbose, console messages go to STDOUT/STDERR instead of logs/console.txt
-nowdog	Turn off watchdog mode. WANdisco will not restart automatically if it terminates. Use this option for testing.
-pause	Time in seconds that the watchdog pauses for, before restarting service. Defaults to 0 seconds.
-email	Specify an email address to send an alert to, whenever the Watchdog restarts or shuts down WANdisco. WANdisco generates an email per local replicator activity. Set up the email account for each site with the Email Settings, described in Chapter 4, Navigating the Interfaces.

Use the `-email` option to generate email alerts whenever WANdisco restarts. For instance:

```
$ svn-replicator/bin/svnreplicator -pause 5 -email “admin@blueand-
gold.com, scmuser@blueandgold.com”
```

8 Troubleshooting

8.1 How Do I Get WANdisco Support?

Before opening a ticket or submitting a new issue, always search the Knowledge base on http://support.wandisco.com.

If you want to open a ticket, you can do so at that URL.

8.1.1 How Do I Run the Talkback Script?

When you do contact WANdisco with a problem, the first thing WANdisco support asks for is the talkback file. Run the file by typing at `svn-replicator/bin`

```
perl talkback
```

Type in the pathname to SVNROOT when prompted. The output looks like this:

```
Please open a ticket by visiting http://support.wandisco.com and upload
the /talkback-<machine name>.zip, with a description of the issue.

Note: do not email the talkback files, only attach them via the web
ticket user interface.
```

The zip file is located at the root directory. Do not email the .zip file, just attach it to an issue at *http://support.wandisco.com*.

8.2 General Subversion MultiSite

8.2.1 Connection Request Timeout Messages

Sometimes in the WANdisco logs, you see connection request timeout information messages logged. These are informational messages and should be ignored unless it is guaranteed that the connection can be established in xxx milli-seconds and happens often.

In normal operation of WANdisco, two connections are established between each of the replicated machines, WANdisco connection and a DFTP connection. These two connections were established when MultiSite started and are used when required. A keep-alive signal is sent on the WANdisco port periodically. There is no traffic on DFTP until a file transfer.

Some lesser routers in the path of the two end points will close an established connection if there is no traffic on the connection without notifying the end points. When end points sent data on this stale connection, they hang forever. To deal with these lesser routers, MultiSite does not keep the DFTP open in its connection pool forever. MultiSite establishes a DFTP connection from receiver to sender when a file transfer was required. This solved the problem dealing with lesser routers.

Some companies have a corporate policy that network connections can only be established in one direction. To deal with this scenario, the replicated machines establish a DFTP connection to other nodes periodically and tear them down if there is no traffic within a known interval. Once a connection is established, any side is free to use the connection regardless of which side initiated the connection. A connection in use is never torn down until it is available as a free connection. This is the current implementation.

It takes between 300 to 400 milli-seconds to establish a network connection even on a slow Wide Area Network (WAN). By default, MultiSite waits for 500 milli-seconds before giving up that a connection cannot be established to a peer machine and prints this informational message. What if the establishments of connection always take 501 milli-seconds. In this case, a connection is never established. To solve this problem, the timeout value is adjusted in 10% increments of the last timeout, starting at 500 milli-seconds, to a maximum of 10 seconds for each timed out connection. Upon establishment of a successful connection, this timeout value is used for subsequent connection establishment unless an adjustment is required for failed attempts.

8.2.2 VPN, NAT, Firewall Timeouts

This section is useful if you are experiencing issues with slow commits on the non-distinguished node or if you have port-forwarding in your environment.

In a multisite configuration, most sites are connected through a WAN. Often times VPN and NAT devices are used to do IP translation and port forwarding. These devices need to maintain state in order to do the port forwarding on-the-fly. This state can grow if not cleaned out. Many devices simply reset the internal state after an inactivity timeout. For example, some Cisco NAT routers reset state after 7200 seconds or 2 hours.

The WANdisco replicator uses persistent TCP connections between the replicators. If these TCP connection are going through a NAT or port forwarding device, it is important to tune the VPN and/or the TCP stack at the replicator host machine. Many NAT devices have buggy implementation that resets the internal state without resetting the TCP connections.

In such a situation, the replicators may see a connection as established but no communication actually happens. The symptoms include a slow commit that is blocking WAN communication. You can run `netstat -a | grep <DConEPort>` to see if the TCP send queues are backing up. That, in conjunction with slow commits that appear to be hanging, or frozen, typically indicates the NAT is not gracefully resetting TCP connections.

You can further confirm this by using `tcpdump` or `ethereal` to check for excessive retransmissions on the DConENet connections. You could also look at your VPN/NAT device log to see if it reset any DConENet connections that appear to be in an `ESTABLISHED` state via the `netstat -a` command.

These are a few ways of addressing the issue :

- Specify a connection keepalive timeout in the prefs.xml file as:

  ```
  <DConENet> <ConnectionKeepAliveTime>1800000</ConnectionKeepAliveTime>
  ```

  This causes inactive connections to be closed and refreshed periodically (after 1800K millis or 30 minutes).

- Increase the keep-alive timeout on the NAT/Port forwarding device. If possible, have the DConENet connections never expire. Some devices let you set port specific QoS.

- On the replicator host, tune the TCP stack to have a smaller fuse on the TCP keep alive timer. For example, on Linux, you can specify a value like 1800 (seconds) in `/proc/sys/net/ipv4/tcp_keepalive_time` to reduce the interval from default 2 hours to 30 minutes.

- You can restart the Subversion replicator to kick out seemingly `established` connections but broken by NAT internal resets.

8.3 Error Messages

8.3.1 Missing License Key File

Subversion MultiSite depends on a license key file being present in the `svn-replicator/config` directory for each site. Please get a valid license from WANdisco and copy the file to the config directory. WANdisco does not start without the license file.

8.3.2 I'm Getting a SEVERE Exception

I'm getting a SEVERE exception, and replicator is aborting the Subversion transaction and shutting down.

If you get a message in the logs/SVNProxy*.log file similar to

```
svn: Commit failed (details follow):
svn: File not found: transaction '10-d', path '/development/Hello.txt'
```

it means the replicator has detected an out of sync condition. Remember the replicator continuously monitors your repository for any out of sync issues. If it detects this has occurred, it triggers an automatic shutdown to prevent further corruption.

This could happen if some one accidently committed directly to Subversion, bypassing the replicator, and ramped up the version in one site without giving the replicator any chance of replicating. This can be easily resolved by following the reset procedure outlined in 8.4.1, I Directly Committed to Subversion, How Do I Rsync?.

Follow all precaution to avoid bypassing the replicator:

Step 1 Ensure only svnreplicator host/IP address is allowed to connect to the Subversion server.

Step 2 Protect direct logins in Subversion replicator or Subversion server box from end user.

8.4 Oops!

8.4.1 I Directly Committed to Subversion, How Do I Rsync?

If you bypassed the replicator, you can reset the replicator state with these steps:

Step 1 Shut down all replicators.

Step 2 Reset each replicator:

```
$ svn-replicator/bin/reset
```

Step 3 If this happened on a production repository, you **must re-sync** all the repositories to the same state/data.

If this happened during an initial setup/evaluation stage, delete the old project in Subversion and create a new one.

Step 4 Restart all the replicators.

NOTE:

It is very important that you take all precautions to avoid directly checking in or committing to the backend Subversion repository.

8.4.2 I Pressed Ctrl-C During a Subversion Command!

If you were executing a read command (a command that does not modify the Subversion repository), you do not have to do anything.

If you were executing a write command, update your sandbox after the replicator has applied the command to the repository.

In addition, if you were adding files to the repository (either svn import or svn add, followed by svn commit), wait until you update your sandbox before you continue to use it.

9 Frequently Asked Questions

9.1 Can I Store Logs or Content on NFS?

NFS (Network File System) allows files and directories to be accessed remotely over a network using NFS clients. NFS clients are typically built into the operation system kernel these days. However, some operations, like renaming a file, are not guaranteed to be atomic over NFS. Here is a snippet from the rename function's `man` page on Linux, for example:

```
BUGS
On NFS filesystems, you can not assume that if the operation failed the
file was not renamed. If the server does the rename operation and then
crashes, the retransmitted RPC which will be processed when the server is
up again causes a failure. The application is expected to deal with this.
See link(2) for a similar problem.
```

Code management systems such as Subversion make heavy use of the `rename` operation to modify the underlying databases. Independent of WANdisco, it is a risky practice to store Subversion database content on NFS. The code management community at large recommends not using NFS for storing repositories.

WANdisco MultiSite is bundled with a built-in transactional journal and an object database. These are by default stored in the `svn-replicator/systemdb` and `svn-replicator/config` directories. These directories should not be mounted on an NFS drive. The replicator itself may be installed on an NFS drive but the `systemdb` and `config` directories should be on direct storage (non-NFS options like RAID, SCSI, SAN, etc). Replicator's transactional integrity can be compromised if writes to an NFS server are lost due to a potential NFS client cache crash after the NFS server has indicated IO completion.

9.2 Why Do I See IP Addresses as 0.0.0.0 in prefs.xml?

The address 0.0.0.0 is a special IP address, treated as a wild-card IP address. In other words, on a machine with multiple NICs (Network Interface Cards), it binds to all interfaces. The advantages of using wild-card IP address include:

- It avoids binding to a fixed IP address. If the host's IP address changes, (for example, the subnet changes, or the machine is moved to a different location) you don't have to change the wild-card IP in the prefs.xml file to the new IP address.
- There is wider bandwidth to TCP clients. Now TCP clients can connect to any NIC, because MultiSite is listening on multiple NICs.

The disadvantage to using the wild-card IP is that it gives coarser access control at the IP address level, as all address are being listened to at the specified port.

You can always switch from the wildcard IP address to a fixed, static IP address or a DNS host-name, though for the most part, WANdisco recommends you stick with wild-card addressing.

9.3 Should I Worry About Time Changes or Time Zones?

Time changes have no effect on the operation of MultiSite. Times zones also have no effect: all machines use the standard UTC.

9.4 Does WANdisco Support Dynamic DNS?

Yes, WANdisco supports dynamic DNS, but strongly discourages its use.

If a hostname is specified during the setup process, WANdisco requires that it should be able to connect to a valid DNS and resolve the hostname to valid IP address upon startup. If the host-name cannot be resolved to an IP (either by not being able to connect to DNS, or no entry is found at the given hostname), WANdisco dies gracefully. This has never been a problem during production and with static IPs.

However, if dynamic DNS support is required, please modify the `prefs.xml` file at each site and set `UseDynamicDNS` to `true` in `DConENet` element.

```
<Preferences>
  ...
  <DConENet>
     ...
     <UseDynamicDNS>true</UseDynamicDNS>
  </DConENet>
```

In addition, the following Java security properties should be set to different Time-to-live (TTL).

```
networkaddress.cache.ttl
networkaddress.cache.negative.ttl
```

Please read InetAddress Caching for more details.

9.5 Can I Use SSH Tunnel to Navigate a Firewall?

You can use SSH tunnels to test connectivity to a replicator's DConENet port through a firewall.

NOTE:

> SSH tunnels are not recommended for a production environment.

SSH tunnels are temporarily created using a secure shell. If the shell hangs up for any reason, the tunnel goes away. You don't want the connectivity to a replicator's WAN port to be dependent on a transient shell. We recommend using permanent IPsec tunnels (VPN/NAT devices can help) for navigating firewalls.

9.6 WANdisco Authentication

Authentication is the process of determining whether someone or something is, in fact, who or what it is declared to be. Authorization is the process of giving someone permission to do or have something.

The Apache user-names and passwords should match at all sites. The WANdisco Subversion replicator's license manager requires a valid user-name inside the HTTP authorization header to be passed for all DAV commands, except `OPTIONS` and `PROPFIND`. In other words, anonymous access to Apache is not allowed to enforce license requirements, unless you have an unlimited or an evaluation license. With an unlimited or evaluation license, you are not required to register the user. This typically means ensuring a `Require` valid-user line is specified in the Apache SVN DAV configuration files in the `/etc/httpd/conf/httpd.conf` and `/etc/httpd/conf/conf.d/*` directories. When using Basic Authentication, it is the end user or administrator's responsibility to keep Apache authentication databases in sync across all sites.

9.7 Encryption Around WANdisco Protocol

Details about any ECCN classifications you may have applied for and been granted from US Government for export (due to encryption capabilities in client for DAV over SSL).

The WANdisco Subversion MultiSite distribution does not actually perform any encryption or decryption of the DAV traffic. We rely on Apache to decrypt the SSL traffic and then use a proxy-pass definition within the Apache configuration to redirect the unencrypted request to the WANdisco replicator.

Communication between the WANdisco replicators running at each site/replica does not get encrypted directly by the WANdisco replicator either. Instead, many customers may use something like a persistent VPN connection to communicate the replicator to replicator traffic over an encrypted connection, but our code actually is doing no encryption.

Lastly, the WANdisco replicator simply sits as a proxy on the SVN server itself (the host running Apache + ModDAV) so there is no client component that we provide that would be sending any traffic to the SVN server.

9.8 How Do WANdisco Temporary Files Work?

Subversion MultiSite generates temporary files during the normal course of operation. The files have the prefix `svn-proposal-{GUID}_{seqnum}`. By default, they are written to `svn-replicator/systemdb/` directory. This can be over-ridden using the `svn-replicator/config/prefs.xml` file as following:

```
<DirPrefixMap>
   <fp->/home/svn/replicator/tmp/dir</fp->
</DirPrefixMap>
```

Subversion MultiSite periodically garbage-collectes these files at a configurable interval. For more details see the Distributed Agreement Engine Administration Guide.

WARNING:

Do not manually remove these files.

9.9 How Do I Restrict Direct Access to My Repository?

If you would like to prevent users from directly accessing your Subversion repository, use the Subversion `Location` directive as suggested below. You allow only specific IP addresses to access the repository.

This assumes that WANdisco and Apache server are running on the same machine.

From the example shown in 9.7, Encryption Around WANdisco Protocol:

```
<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>
```