everRun®

Setup and Installation Guide

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Brief Glossary of Terms

Installation Overview

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This chapter describes the main tasks required for a complete everRun installation and lists the source of information for each task. As you install, you can return to this chapter to find an information source.

NOTE: Throughout this guide, key terms are displayed in a **blue bold font**. The first instance of a key term links to a brief definition in the glossary at the end of the book. After you check a term, you can return to the text by clicking the section bookmark in the navigation panel at left.

In addition to the process described in this guide, you must install specific software to support certain everRun features, such as **SNMP** notification or the everRun **snapshot** feature. For further information, see *"Additional Installation Options" on page 4*.

Installation Sequence

The everRun® software must be installed onto an existing Citrix® XenServer™ virtualization environment. Before you begin, please review the tasks you'll perform.

1. Plan your configuration, obtain system components, and set up hardware.

2. Obtain the required Citrix and everRun software, documentation, and licenses.

3. Install and configure your **XenServer hosts** and the **XenCenter** management GUI, then add the XenServer license to each host in the pool.

4. Create a XenServer **resource pool** from the configured hosts and verify the network connection.

5. Create or import one or more Windows **virtual machines (VMs)**.

6. Now or at any later time you can install the Windows application(s) you want to protect — email server, database, and so forth — onto the VMs in the pool.

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7. Install the everRun software onto each XenServer host in the pool.

8. Install XenTools on each Windows VM.

9. Using the URL provided during the install process, open the **everRun Availability Center (eAC)** management GUI.

10. Use the eAC for the post-install configuration tasks: applying the everRun license, checking the pool isolation IP address, configuring the availability-link (A-link) networks, and enabling/configuring **quorum service** if it is required in your configuration.

Information Sources

Table 1 explains where to find the information needed for each of these tasks.

Table 1: Information Sources

Step	Information Source(s)
1. Plan your configuration, obtain system components, and set up hardware, including:	For a list of specific hardware and software recommended by Citrix, see *http://hcl.xensource.com/*.
• XenServer hosts	Citrix XenServer documentation is available from *http://www.citrix.com/*. The *XenServer Installation Guide*, available on the Citrix download site, describes the hardware and software requirements for the virtualization environment.
• A Windows management computer hosting XenCenter software	
• Storage repositories to address the needs of your configuration	
• NICS, switches, gateways, and networking hardware needed for your configuration	The *everRun Configuration Planning Guide* (included in an "everRun MX Documentation Set"-- download) lists the components recommended and describes the configurations supported for this release.
• If quorum service is used, two Windows computers hosting the quorum service software	
2. Download the required software (.iso files) and documentation. For each software product, create installation CDs from the **ISO image** supplied and place the license information in a known location.	Obtain XenServer software, documentation, and license from the everRun download site. Download instructions are included in the communication from everRun Order Administration.

Table 1: Information Sources

Step	Information Source(s)
3. Download the Supplemental Driver Disk ISO image and create a CD from the image.	
4. Install, configure, and verify your XenServer environment, including: • XenServer hosts and XenCenter • Network configuration • Storage configuration • Quorum service configuration After you have installed XenCenter, connect to each XenServer host and activate the software, including the Citrix license for the software version you have purchased.	The *everRun Configuration Planning Guide* provides guidelines for network and storage, and quorum server configurations for several deployment options. Chapter 3 of this guide, "System Configuration and Setup," describes the XenServer setup recommended for use with everRun. The *XenServer Installation Guide* describes how to install the XenServer software on host machines and the XenCenter software on a **management computer**. Use XenCenter Online Help for Citrix license instructions.
5. Use XenCenter to create a resource pool that contains master and member hosts. Then connect to the XenServer master host and create a bonded NIC for the XenServer management LAN. Check the network connectivity on both master and member hosts.	Instructions in Chapter 3, "System Configuration and Setup," describe how to use XenCenter Online Help for this work. The *XenServer Administrator's Guide* provides information on NIC bonding and "Create a NIC Bond on the Master Host" on page 22 of this guide describes how to create the NIC bond.
6. If the *everRun Release Notes* indicate that XenServer updates are required for the release, update the XenServer software.	Check *everRun Release Notes* to identify updates required for the release. The required updates are available at the everRun download site for the release.
7. Install everRun software on the XenServer hosts, and install the quorum service (QS) software on designated QS computers.	Chapter 4 of this guide, "Installing the everRun Software," describes the installation of everRun software and quorum service software.
8. Create the desired Windows guest VMs and install XenServer tools (the paravirtualization drivers) on each VM.	The XenCenter Online Help describes how to create Windows guest virtual machines (VMs) and install XenServer tools.

Table 1: Information Sources

Step	Information Source(s)
9. Install the Windows applications you want to protect (or install applications at any time after the VM is protected).	Use your software vendor's instructions to install application(s).
10. Use the URL provided by the everRun installer to open the eAC management GUI and connect to the XenServer **master host**.	In Chapter 4, see "Step 8: Launch the eAC Management GUI" on page 28.
11. Configure your XenServer/everRun resource pool by: • Installing the everRun license for your system • Configuring an A-link network scheme suitable for your deployment • Enabling quorum service and providing suitable IP addresses for preferred and alternate quorum service computers, if used • Verifying the isolation IP failover address for the pool and adjusting it if necessary	In Chapter 4, see "Step 9: Configure the Resource Pool in the eAC" on page 29.

Additional Installation Options

If you plan to use certain everRun features, such as SNMP or snapshots, additional software must be installed on your system. *Table 2, "Optional Software Installation," on page 5* indicates the relevant documentation required for each feature.

Table 2: Optional Software Installation

Feature	Software Required	See
everRun SNMP service	• Windows SNMP service • everRun SNMP extension agent software • Any third-party management utility that includes the ability to manage SNMP service	*everRun SNMP Guide*, Chapter 2
everRun snapshots	everRun VSS Provider	everRun Online Help > System Administration > Using everRun Snapshots > Setting up the everRun VSS Provider
everRun quorum service	All configurations except direct-connected two-host pools require the installation of **Setup_QSVC_6.2<version_id>.exe**, a Windows executable that is part of the everRun ISO image.	See *"Installing Quorum Service Software (When Used)" on page 27* of this guide.

System Requirements

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This chapter describes everRun configuration basics, as well as the hardware, software, disk space, and network requirements for the system.

Basic everRun Configuration

Figure 2-1 shows a schematic of a basic everRun configuration, which is a **resource pool** containing two **XenServer hosts** and a separate **management computer**.
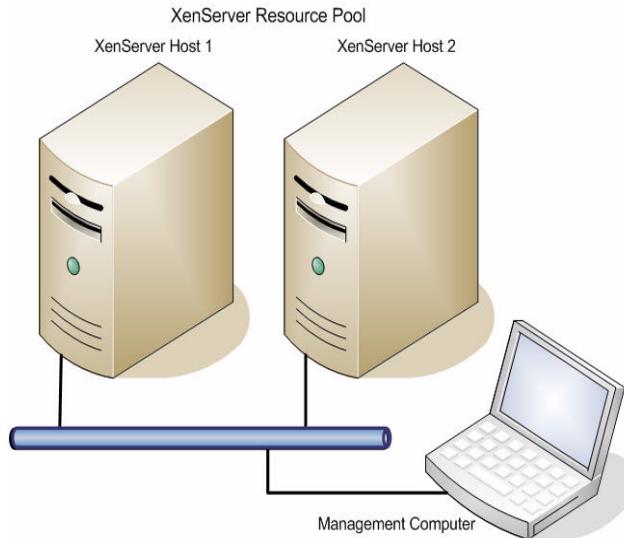
Figure 2-1   **A basic everRun configuration is a pool of two XenServer hosts that can support virtual machines, as well as a general-purpose PC that can run both the XenCenter management application and the browser-based everRun Availability Center management client.**

The XenServer software must be installed on two x64 (64-bit) servers, which are known as the XenServer hosts. The XenServer hosts are dedicated to the task of hosting **virtual machines (VMs)**. All hosts must be members of the same XenServer resource pool.

The **management computer** that runs the XenCenter management application and the browser-based **everRun Availability Center (eAC)** management client can run on any general-purpose Windows machine that satisfies the hardware requirements. This computer can also be used to run other Windows applications.

If the resource pool contains more than two XenServer hosts (using point-to-point cable links), or if the hosts in the pool are geographically separated (as in a SplitSite® deployment), two **quorum service computers** must be connected to the network, as described in the *everRun Configuration Planning Guide*.

Hardware Requirements

The hardware requirements are based on those given in the *XenServer Installation Guide*. A list of hardware and software components that have been reported to work with XenServer, as tested by Citrix, by the individual vendors, or by the Xen community, is available at *http://hcl.xensource.com/*.

For the most reliable operation, choose components tested by Citrix or by the individual vendors.

XenServer Hosts

Each XenServer host is an x64 server-class machine devoted to hosting multiple VMs. This machine runs a customized distribution of the Linux operating system, with a XenServer-enabled kernel that controls the interaction between the virtualized devices accessible by VMs and the physical hardware.

Table 3 lists the requirements for each system host. The processors in each host must support hardware virtualization, as shown in the CPUs row of the table.

Table 3: Requirements for XenServer Host Computers

Category	Requirements
CPUs	One or more x64 CPUs, 1.5 GHz minimum, 2 GHz or faster multicore CPU recommended. For VMs running Windows, the processors must be virtualization-capable Intel models with one or more (up to 8) CPUs. A second computer with identical processors is required for use as a redundant server for Protected Virtual Machines (PVMs—virtual machines that are protected by Stratus everRun software). The CPUs for every XenServer host computer must have hardware support for virtualization enabled in the BIOS.
CPUs (*cont*.)	For a list of processors supported by Stratus products (required for Level 2 and Level 3 protection, for example), refer to the everRun 6.2 Hardware Guide at: **https://everrun-support.stratus.com/portallogin.asp** If you are not certain whether your hardware supports everRun operation, download the **everRun_CompatibilityCheck** utility, available in the **Tools and Utilities** section of the everRun customer web portal. Download the *Compatibility Check Readme* document*,* also at the web site, for instructions.
Supported guest OS	Guests that are candidates for everRun protection must be running Windows Server 2003 Standard or Enterprise (32- or 64-bit, SP2), Windows Server 2003 R2 Standard or Enterprise (32- or 64-bit), Windows Server 2008 Standard or Enterprise (64-bit, SP1 or SP2), Windows Small Business Server (SBS) 2003 or 2008, or Windows Server 2008 Release 2.
RAM	2 GB minimum, 4 GB or more recommended.
Disk space for storage	Locally attached storage (**PATA**, **SATA**, **SCSI**, or **FC-SAN**) with a minimum of 72 GB of total disk space recommended. Shared storage repositories (**NFS** share, **iSCSI**, and **FC-SAN** as described in the *XenServer Installation Guide*) are also supported.
Disk space required	• 4 GB for XenServer in the host control domain, **Domain 0 (Dom 0)**, and 4 GB for everRun in a supported **storage repository** (SR). • Allow 10 GB minimum (Windows boot disk) for each Windows VM. This may be located in local attached storage or shared storage, as described under "Disk space for storage" above. • Additional storage as required for applications and data on each VM.

Table 3: Requirements for XenServer Host Computers

Category	Requirements
Network	For optimum performance and reliability, Stratus recommends five 1 GB network interface cards (NICs), with network switches to provide separate network channels, if necessary. If possible, use identical NICs. As detailed in Chapter 3, the network configuration should contain only four active networks, with each NIC connected to a separate Ethernet card. The fifth NIC is bonded to the management LAN, as described in "Create a NIC Bond on the Master Host" on page 22. All network components in a SplitSite configuration must have >155 Mbps minimum capacity, end-to-end (when Level 3 SMP will be used, two of the networks must be 1Gbps). For detailed information on network configurations recommended to a two-host pool, a multihost pool, a SplitSite pool, and Level 3 SMP operation, see the *everRun Configuration Planning Guide.*
IP Addresses	Each XenServer host must have a static IP address assigned for use by the management software. Obtain IP addresses for DNS primary and secondary servers, as well as gateway and subnet mask information for your management network, from your IT network administrator.
Ports	XenCenter uses port 443 in the local firewall for HTTPS communications, port 22 for `ssh`, and 5900 for VNC with Linux VMs. Make sure your firewall allows traffic via the appropriate ports. The eAC uses TCP ports 8080 and 8081 for communication, but you can change these defaults. (See Appendix A for more information.) Firewalls must permit everRun protected VMs to contact quorum service computers using UDP port 2189, and quorum service computers to contact everRun-enabled XenServer hosts using UDP port 2188.

Management Computer and Quorum Service Computers

The management computer can support the two graphical user interfaces (GUIs) that control the everRun system:

- **XenCenter,** which controls the XenServer software

- **everRun Availability Center (eAC)**, which is used to manage protected VMs

XenCenter, the client application for remote management of XenServer hosts, can be installed and run on any XP/Vista/Windows 7 workstation or laptop.

The browser-based eAC everRun management GUI can be loaded and run by a Flash-enabled web browser on any computer, including the management computer. Table 4 shows the system requirements for the management computer.

NOTE: The everRun eAC requires management network access and a compatible Flash-enabled browser.

If you are running a 64-bit operating system on your management computer, use a Flash-enabled 32-bit browser to access everRun. (At the time of this release, 64-bit browsers do not support Adobe Flash Player.)

Table 4: Requirements for the Management Computer

Category	Requirements
OS	Windows XP, Windows Server 2003; Windows Vista .NET framework version 2.0 or above, Windows 7.
CPU Speed	750 MHz minimum, 1 GHz or faster recommended
RAM	1 GB minimum, 2 GB or more recommended
Disk Space	100 MB minimum
NIC	One 100 Mb or faster

Quorum service software, if deployed, can be installed on any general-purpose Windows computer or laptop meeting the requirements listed in Table 5. Stratus recommends configuring two quorum service computers: a preferred quorum server and an alternate.

Table 5: Requirements for Quorum Service Computers

Category	Requirements
OS	Windows XP (SP2 or newer), Windows Server 2003, Windows Vista or Windows 7; always powered on.
Disk Space	100 MB minimum
NIC	100 Mb
Connectivity	Configure local configurations on A-link LANs

As noted in the *everRun Configuration Planning Guide*, quorum service computers are not required for a two-host local deployment with point-to-point private LANs.

Software Requirements and Sources

The software requirements for everRun MX are listed below.

Table 6: Required Software for everRun MX

Product	Source
everRun and XenServer software and documentation.	everRun customer web portal. Download instructions are provided with your everRun software order confirmation email.
everRun and XenServer license keys (reuse of the same XenServer OEM License for each host).	Your everRun software order confirmation email contains everRun license information. The XenServer OEM license file (**everrun.xslic**) is available on the everRun download site.
Supported Windows software for the virtual machines. See *everRun Release Notes* for details.	Your Windows software vendor.
Application software to run on the Windows environment.	Your application software vendor.

System Configuration and Setup

This document describes a basic, local two-host XenServer pool. For details on other deployment options, refer to the *everRun Configuration Planning Guide.*

Local Two-Host everRun Pool

everRun software runs as a turnkey application in a XenServer virtual environment. Figure 3-1 illustrates a basic two-host setup with four networks.
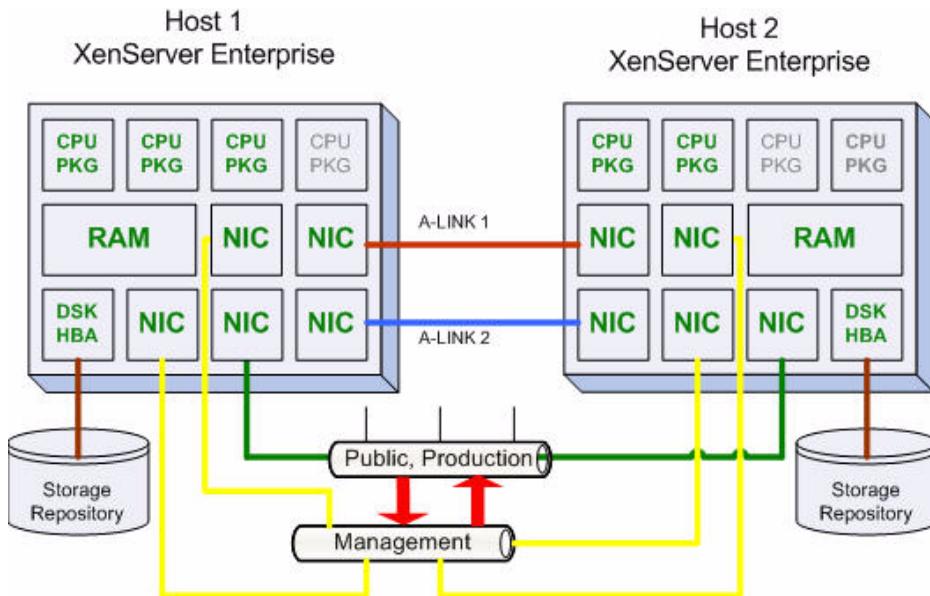
Figure 3-1   **Two private networks called availability links (A-links) synchronize and maintain redundancy between the components of two XenServer hosts. Separate network adapters connect the hosts to the production LAN and to the management LAN.**

The two servers in Figure 3-1 also contain two directly cabled A-link connections. The *everRun Configuration Planning Guide* describes this configuration in greater detail. The guide also includes more complex configurations — having two or more hosts — that require active, switched networks. In a switched configuration, additional **quorum service computers**, running on separate subnets, coordinate the redundant everRun software running on the two physical hosts.

The two interconnected XenServer hosts shown in Figure 3-1 are members of the same XenServer **resource pool**. In the recommended configuration, Host 1 is designated the **master host** and Host 2 is the **member host**. A separate, general-purpose **management computer** with access to the management LAN contains the **XenCenter** management console and provides browser access to the **everRun Availability Center (eAC)** client.

NOTE: In Figure 3-1, the configuration shows four networks that use five NICs. The fifth NIC is used to create a bonded management LAN, as recommended when you plan to enable XenServer High Availability (HA). This bonded NIC is not required for the everRun evaluation deployment, or for any configuration that does not include XenServer HA.

Step 1: Plan Your Configuration, Obtain Components

The *everRun Configuration Planning Guide* provides information to help you select the everRun deployment most suitable for your needs, obtain qualified components, and assemble the physical system. If you require assistance in customizing the deployments described in that guide, consult everRun Professional Services.

Step 2: Download Software and Documentation

Download instructions are included with your email from everRun Order Administration. Also included in this email is the everRun license key that will be used for everRun software installation.

Additional ISO images will be needed to provide support for hardware devices that are not included on the Citrix XenServer installation CD-ROM. The everRun web download portal also contains the Supplemental Driver Disk required for a new installation of everRun.

See the *Hardware Guide* or more information on the most up to date list of supported platforms, devices, and drivers.

Download Software to a Shared Directory

To prepare for installation:

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1. Create a shared directory on the management computer, using the standard Windows procedure for sharing a drive or folder on the network.

2. Download the Citrix and everRun ISO images to the shared directory on the XenServer management computer using your favorite web browser.

3. Download the Supplemental Driver Disk.

4. Create three CD-ROMs using your company's commonly accepted methodology - one CD created from the XenServer installation Disk ISO, one from the Supplemental Driver Disk ISO, and the everRun product ISO.

   Add the license files and other relevant material to this directory.

Step 3: Set Up the XenServer Environment

You must set up a running XenServer environment before you install the everRun software. You will install XenServer software on each host and install the XenCenter management application on a separate Windows management computer.

Set Up XenServer Hosts

A XenServer resource pool requires a minimum of two physical servers with Intel hardware virtualization technology. This section contains instructions for setting up the local area networks, storage repositories, and XenServer environment for the pool.

NOTE: Refer to the everRun MX 6.2 *Hardware Guide* for the required BIOS settings.

Advisory: Enable Multipathing on Fibre Channel Storage

If you are configuring fibre channel shared storage for your pool, you must enable multipathing on the storage repository. You must enable multipathing after XenServer installation and prior to installation of everRun software.

Without multipathing, guest VMs with a virtual disk image (VDI) configured on the associated FC SAN will not recover storage access properly following repair of a FC SAN until you restart the XenServer host. When multipathing is properly configured, you will avoid this problem. For more information, search the Citrix website for articles on multipathing, or contact everRun Technical Support.

If you plan to enable multipathing you should do it right after you install the XenServer software and the XenServer management network on your servers, but before you perform additional configuration.

Before you enable multipathing, you must:

- Verify that multiple targets are available on your storage server.

• Place the XenServer host in Maintenance Mode.

You can enable and disable storage multipathing using the **xe** command-line interface (as described in the *Citrix XenServer Administrator's Guide* (search the document for "multipathing"), or in XenCenter (search for "Multipathing" in the Online Help).

Define the Network Configuration

NOTE: Do not use DHCP to set up the XenServer hosts. Instead, use the static IP addresses you obtained from your local IT administrator. Also configure a suitable NTP server as part of each XenServer installation.

Set up the basic configuration shown in Figure 3-1; it contains four LANs that use five physical network interface cards (NICs) on each server. (The management LAN uses two NICs to create the bonded NIC.) This section describes the recommended network configuration for the basic deployment supported in this release.

NOTE: Remember, if you do not plan to use XenServer HA, you do not need to create a bonded NIC for the management network.

Stratus recommends the following network assignments for a local, two-host pool:

• **eth0 — XenServer management LAN**

   The system management LAN provides connectivity to the XenServer hosts for clients running the XenCenter management application and the everRun Availability Center (eAC) management software. Choose **eth0**, as recommended in the *XenServer Installation Guide*. For maximum reliability, it is highly recommended that you bond this network card with **eth4**, as described below.

• **eth1 — availability link 1**

   In a local, two-host pool, availability link 1 (A-link 1) is a direct-cabled, or an active, switched network connection from **eth1** on one host to **eth1** on a second host.

• **eth2 — availability link 2**

   In a local, two-host pool, availability link 2 (A-link 2) is a second direct-cabled, or an active, switched network connection from **eth2** on one host to **eth2** on the second host.

• **eth3 — production LAN**

   This is the network used to provide connectivity from application clients to applications operating on virtual machines resident on the XenServer hosts.

• **eth4 — bond with eth0, XenServer management LAN**

Use this NIC to create the bonded NIC for the XenServer management LAN, as described in "Create a NIC Bond on the Master Host" on page 22.

XenServer automatically creates a virtual bridge called a **Xen bridge (xenbr)**, which is named to correspond to each Ethernet adapter during XenServer installation. The XenServer convention names **xenbr0** to provide a virtual bridge to **eth0**, **xenbr1** to provide a virtual bridge to **eth1** and so forth. When you configure networks for use by the virtual machines or everRun software, you can refer to the corresponding virtual bridge name to understand the physical path connectivity. For more information, see the XenServer documentation.

NOTE: See the *everRun Configuration Planning Guide* for configuration details recommended for multihost pools, SplitSite pools, or a Level 3 SMP setting.

Define the Storage Configuration

The configuration shown in Figure 3-1 can use local storage attached to each of the XenServer hosts or it can use shared storage such as NFS, iSCSI, fibre channel (FC) SAN, or NetAPP® .

❖ Use the instructions for setting up local and shared storage in the relevant sections of the *XenServer Installation Guide*.

NOTE: For a basic discussion of how physical storage hardware is mapped to VMs in XenServer, see the *XenServer Administrator's Guide*.

Install the XenServer and XenCenter Software

After you have attached the network and storage devices to the network, you are ready to install the XenServer and XenCenter software. To ensure a successful XenServer setup, perform the following tasks in the sequence listed:

- Install the XenServer software, along with supplemental additional drivers that are required for XenServer 6.0.2, on the first host (the master host).

- Install the XenServer software on the second host.

- Install XenCenter software on the management computer.

- Install and activate the XenServer license as described in the XenCenter Online Help. If you are using an advanced version of Citrix software, use Citrix instructions to apply the XenServer licenses.

Instructions for each of these tasks are given in the following sections.

Install XenServer Software on the XenServer Hosts

Install XenServer using the CD-ROM:

1. Load the XenServer installation CD you created into the CD-ROM drive of XenServer Host 1 (the master host). Boot the server from the CD-ROM and select the appropriate language keymap as requested.

2. The next screen will display the Welcome to XenServer Setup dialogue.

   Press F9 at this time in order to load the device drivers. You will be presented with a subsequent dialogue box to select the Driver Source.

3. Remove the XenServer Installation Disk and place the Supplemental Driver Disk into the CD-ROM. Select **"Local Media"** and press **OK**.

4. The name of the *Supplemental Driver Disk* title will appear in the next dialogue box. Press the Right Arrow keyboard key while holding down the Alt key. This will present a new Linux shell window.

5. Mount the CD-ROM and prepare for driver installation using the following commands:

   mount -r /dev/cdrom /home

   sh /home/prepare_drivers

6. Once the script is completed, return to the installer by pressing the **Left Arrow** keyboard key while holding down the **Alt key**.

7. Select the **"Use"** option and press **Enter**, one or more drivers will be presented. **Press OK**.

   a. Press the **Right Arrow** keyboard key again, while holding down the **Alt key**, to go back to the Linux shell window.

   b. Run the below command to fix the reordering of the Network Adapters:

      /tmp/reorder-nics -r

   c. Then, run the below command to display the Network Adapters and MAC addresses:

      /tmp/reorder-nics -l

   d. Find the Network Adapter's MAC Address that you want to use for your management link in the list displayed by the above command, and note the name of that Network Adapter (for example, **eth0**).

   e. Return to the installer by pressing the **Left Arrow** keyboard key while holding down the **Alt key**.

8. After the drivers have been installed you will be presented with the Welcome to XenServer Setup dialog again. Remove the Supplemental Driver Disk and place the XenServer Installation Disk into the CD-ROM. Continue with the installation by pressing **OK**.

    a. When XenServer installer displays the list of the Network Adapters to select the Management Link, find the Network Adapter name that you noted in above (step d. of step 7.) and select that for the management Link (even if the XenServer installer displays an incorrect MAC address for that adapter).

9. Answer the subsequent installation dialogues, referring to the XenServer Installation documentation as needed.

10. At the dialogue entitled "New Media", you will be requested to reload the Supplemental Driver Disk again. Remove the XenServer Installation Disk and insert the Supplemental Driver Disk, **selecting OK**.

11. Select the **"Use"** option and press **Enter** on the subsequent dialogue to load the drivers.

12. Install the XenServer software on the second or any additional host(s) using the same procedure on each host.

Install XenCenter Software on the Management Computer

Before you install the XenCenter software, use the Windows Add or Remove Programs option on the Windows Control Panel to remove any previous version of XenCenter, as recommended by Citrix.

To install XenCenter using a CD-ROM:

1. Put the XenServer CD you created from the Citrix ISO file into the CD drive of your management computer.

    If Auto-play is enabled for the CD drive, the XenCenter installer launches automatically after a few moments.

    If Auto-play is not enabled for the CD drive, browse to the **\client_install** directory on the CD and find the file named **XenCenter.msi**. Double-click on the file icon to launch the XenCenter installer.

2. Follow the instructions displayed in the installer window. When prompted for the installation directory, either click **Browse** to change the installation location, or click **Next** to accept the default path **C:\Program Files\Citrix\XenCenter.**

To install XenCenter using a shared directory:

1. If you are installing from a shared directory, browse to the **\client_install** directory within the XenServer file structure and find the file named **XenCenter.msi**. Double-click on the file icon to launch the XenCenter installer.

2. Follow the instructions displayed in the installer window. When prompted for the installation directory, either click **Browse** to change the installation location, or click **Next** to accept the default path **C:\Program Files\Citrix\XenCenter**

Connect to XenServer Hosts and Install Licenses

To add the license to a server, connect in XenCenter to the server you want to use as the pool master host and install a XenServer license on that host. The **everRun.xslic** license file should be located on the management computer, in the directory where you stored it after download. After you have applied the license to the first host, you will be able to connect to and apply the license to additional XenServer host(s). For instructions on installing Citrix license files, see the XenCenter Online Help.

Step 4: Create a XenServer Resource Pool

To complete your XenServer setup, add each host to a resource pool that contains a master host and a member host (sometimes called the "slave" in CLI commands). Then use the XenCenter console (or any console window) to verify the network connections on both hosts.

Add the Master Host and Member Host(s) to a Pool

In the XenCenter Online Help, open the Help Contents and follow instructions in "About resource pools," "Create a pool," and "Add a server to the pool."

Verify Network Connections

To verify your XenServer setup, take a moment to verify your network connections. This step is critical to the success of an everRun installation.

XenServer software uses PIF objects to represent physical network interfaces. As explained in the "NIC/PIF Ordering in Resource Pools" section of the Networking chapter of the *XenServer Administrator's Guide*, you can use XenServer **xe** commands to review the MAC address and carrier (link state) parameters associated with each PIF and to verify that the devices discovered (**eth0**, **eth1**, etc.) correspond to the appropriate physical port on the server.

Use two commands for this task. First use **xe pif-list** to get the UUID (user ID) of the PIF you want to verify. Then use **xe pif-param-list** and the PIF UUID to identify which connector controls each network. You can run these commands from the console command line in XenCenter or from any remote console that can access the XenServer hosts.

As you verify each network cable, you may want to label the associated port with the network name, or create a simple table that lists the network connectivity for each port.

To get the UUID of a network PIF:

1. With all cables connected to your system, select a XenServer host in the XenCenter resource pane, then issue the following command in XenCenter to obtain network UUIDs:

   `# xe pif-list`

   You will see a display that looks something like this:

   ```
   uuid ( RO)                   : 5b430bc0-d4fd-098f-5d33-4f9cbf84c4a4
                  device ( RO): eth0
       currently-attached ( RO): true
                    VLAN ( RO): -1
           network-uuid ( RO): 7a002152-ed55-bbfe-01a9-1aa4c24cea1b


   uuid ( RO)                   : b7f1fae1-911f-5305-60be-cbeccf801127
                  device ( RO): eth2
       currently-attached ( RO): true
                    VLAN ( RO): -1
           network-uuid ( RO): df6b1575-4b72-b606-458b-67dd06e222db


   uuid ( RO)                   : efbd710d-dba8-75a4-d024-8479fd81dd4e
                  device ( RO): eth1
       currently-attached ( RO): true
                    VLAN ( RO): -1
           network-uuid ( RO): 67b4ee16-390b-b947-a604-5e760fd3eb31
   ```

2. Use this display to cut and paste each UUID you want to verify, as shown in the following sequence.

To use the UUIDs verify the connectivity of your networks:

1. With the cables still attached, look at the parameters for the network identified as **eth0** by issuing the following command using the UUID for **eth0**:

   `# xe pif-param-list uuid=5b430bc0-d4fd-098f-5d33-4f9cbf84c4a4 params=all`

   XenServer returns a long list of parameters associated with that UUID.

   ```
   uuid ( RO)                   : 5b430bc0-d4fd-098f-5d33-4f9cbf84c4a4
                    device ( RO): eth0
                       MAC ( RO): 00:1e:4f:f5:7f:7e
                  physical ( RO): true
                                               etc...
   ```

2. Scan down the list to find the carrier parameter:

```
                        carrier ( RO): true
```

The value of **true** indicates network connectivity.

3. Now remove the cable from **eth0** and issue the command again:

```
 # xe pif-param-list uuid=5b430bc0-d4fd-098f-5d33-4f9cbf84c4a4
params=all
```

XenServer should return the following parameter set:

```
                : 5b430bc0-d4fd-098f-5d33-4f9cbf84c4a4
                    device ( RO): eth0
                       MAC ( RO): 00:1e:4f:f5:7f:7e
                  physical ( RO): true
                                          etc...

                   carrier ( RO): false
```

The value of **false** indicates the network is not connected.

Repeat the sequence for each of the network PIFs (**eth1**, **eth2**, **eth3**...) to verify that the physical cable corresponds to the network

IP addresses are not available for all networks at this time. When the information becomes available, you may want to add it to your table. The information will be useful if you need to modify or troubleshoot the networks later on.

Create a NIC Bond on the Master Host

It is highly recommended that your network configuration contain five NICs, including a bonded NIC on the XenServer management network. This is recommended to provide maximum redundancy of the management network; it is also required to provide management network resiliency for Level 1 (XenServer High Availability or HA) protection.

To create a bonded NIC on the master host:

1. Highlight the master host and click the **NICs** tab.

   You should see five networks, with NICs numbered 0 to 4.

2. Click the **Create Bond** button.

3. Assuming that **NIC 0** was chosen as the Management LAN connection as recommended, choose **NIC 0** from the Available NICs box at left.

4. Assuming **eth4** is chosen for use as a Management LAN as recommended, from the list of available NICs, choose **NIC 4**.

5. Click **Create**.

During bonding, a progress bar displays in the lower-right corner of your screen. Wait for it to complete.

When you create a NIC bond on the pool master host, the bond should replicate to the pool member host(s). However, you should check to make sure the bonded network on the member host is connected, as described in the following process.

To check the status of the network on the member host:

1. In the XenCenter resource pane, select the member host.

2. Click the **Networks** or **NICs** tabs to see if the bonded NIC displays as Connected.

3. If it is not connected, use the following steps to connect:

   – Right-click the member host and select **Management Interfaces**.

   – From the list of interfaces, choose **0+4 bonded**.

4. Click **Finish** to apply the bonded interface.

Step 5: Create Windows Guest Virtual Machines

Now you can create one or more Windows virtual machines (VMs). Use the XenCenter GUI and the XenServer documentation listed in the following procedure.

To create a new guest VM:

1. Open the VM menu at the top of the XenCenter interface and choose the New command to display the Create VM wizard. See the XenCenter Online Help topic "Create a new VM" for instructions on installing and configuring a guest VM.

2. Use appropriate Windows installation media to install the operating system on the new VM.

3. See the XenCenter Online Help topics under "Configuring VM networks" for instructions on adding a network to your VM.

Additional topics in the XenCenter Online Help describe alternatives to creating a new VM: using templates, copying a VM, or importing a VM.

Step 6: Install Your Windows Applications

You can install applications on your Windows VMs before or after installing and configuring everRun.

Setup and Installation Guide

Installing the everRun Software

4

This chapter provides instructions for installing everRun in your XenServer environment. Following the installation of everRun 6.2, the hosts will be running the new version of everRun software plus required Citrix XenServer 6.0.2. The chapter also describes how to open the everRun Availability Center (eAC), the everRun management client, and install the everRun license.

Preparing to Install everRun

The following steps will be used to install everRun on each host in the pool. Perform these steps first on the master, then on each of the other member hosts in the pool.

NOTE: This installation procedure describes default installation options. If you would like to change any installer options, please refer to Appendix A, "everRun Installer Online Help".

Step 7: Using the everRun Installer

To install everRun software you will need to use either an everRun CD-ROM created after downloading the everRun software kit from the everRun website or the shared directory on the management computer you configured that contains the downloaded ISO files.

The CD or shared directory contains the everRun installer file, everRun-**6.2<version_id>**-installer.bin. Also located in the same directory is an everRun installer required folder labeled CitrixHotfixes.

1. Make the everRun installation files accessible to the XenServer host. This can be done by mounting the media created by burning the everRun product ISO to CD-ROM, or mounting the folder where the contents of the ISO kit were extracted, or by copying the files directly to a folder on the XenServer host.

---

2. If the media was burned to a CD-ROM, create a mount point for the CD-ROM by issuing the following command from the XenServer host console:

    ```
    mount -r /dev/cdrom /mnt
    ```

3. If the files were extracted from the product ISO and a remote folder is shared from a Windows computer, issue a command similar to the following:

    ```
    mount -t cifs //<yourcomputername>/<sharedfoldername> /mnt
    -o user=<yourusername>
    ```

4. Examine the new mount point to ensure that the **everRun-6.2<version_id>**-installer.bin file and the CitrixHotfixes folder are present issuing the following command from the XenServer host console:

    ```
    ls -la /mnt
    ```

Running the Installer

To run the Installer wizard:

1. From a console window run the installer file, **everRun-6.2<version_id>**-installer.bin from the mount point:

    ```
    bash /mnt/everRun-6.2<version_id>-installer.bin --install
    ```

2. Highlight **OK** and press **Enter**, then Press the **Tab** key so the scroll bar at right changes to red, scroll down and review the Stratus License Agreement. Press the **Tab** key to highlight **Accept** and press **Enter**.

3. The next screen displays the Sun Java Runtime Environment license. Review the agreement, highlight **Accept**, and press **Enter**.

4. Next select the XenServer storage repository (SR) where everRun software should be installed. Installation requires at least 3.9GB of available disk space. The installer displays all of the SRs you have configured for XenServer host access. SRs are listed in order of priority as recommended by Stratus; local storage at the top followed by shared storage SRs. Select the storage repository where you wish to install everRun software. Once selected, tab to **OK** and press the space bar to enter your choice.

5. If Citrix Hotfix 9, 10, 21, and 23 must be applied to the pool, a popup will be displayed indicating that it is required. Highlight **Continue** and press **Enter** to allow the everRun installation to continue.

6. A confirmation popup will be displayed indicating that all verification steps have been completed. Highlight **Continue** and press **Enter** to complete the installation.

    No further interaction is required. If Citrix Hotfix 9, 10, 21, and 23 must be applied, it will be uploaded and applied automatically by the installer.

7. When the installation completes note any post installation reminders. The final
    screen provides the URL required to launch the browser-based everRun
    Availability Center (eAC) console used to manage and monitor the everRun high
    availability environment. Record the URL for future reference. Press **OK** to close
    the Installer.

8. If you used a CD-ROM to install everRun type **eject cdrom** at the # prompt and
    press **Enter** to eject the media from the drive. If you used a mount point to install
    type **umount /mnt** at the # prompt to remove the mount point.

9. **Shutdown** all running VMs.

10. Reboot the host using the following command:

    ev host-reboot --localhost

NOTE: If this host is the master host, XenCenter will be disconnected and unavailable
until the master has finished rebooting. Restore the connection with the
master host when reboot completes.

Installing everRun on Additional XenServer Host(s)

To install the software on additional XenServer hosts, return to "Step 7: Using the
everRun Installer" on page 25 and repeat the sequence on each host in the pool. Note
that the final installer screen contains the same IP address as it did when you installed
on the pool master, because you always log into the eAC via the pool master host.

Installing Quorum Service Software (When Used)

If you plan to use quorum service (QS) in a pool (either because you have a multi-host
pool with switched A-link networks or because you have a SplitSite configuration), you
must install QS software on each of the two computers that maintains the quorum
service.

Quorum service — and the need for two quorum service computers — is described in
the *everRun Configuration Planning Guide*.

The installer for the quorum service is `Setup_QSVC_6.2<version_id>.exe`, a
Windows executable that is part of the everRun ISO image. Use the following process
to install the software on each quorum service computer.

NOTE: Always install the quorum service software included with the current everRun
release.

To install the quorum service software:

1. Copy the file from the downloaded everRun ISO onto the quorum servers.

2. On each server, locate the `Setup_QSVC_6.2<version_id>.exe` file and double-click it. The software installs automatically on the Windows computer.

3. After you open the eAC, you can configure the quorum servers as part of the pool configuration process. Install Quorum Servers on networks that are most convenient for your configuration.

About Quorum Service Communication Ports

As installed, protected VMs contact quorum service computers using UDP port 2189, and quorum service computers contact everRun-enabled XenServer hosts using UDP port 2188. If these port assignments conflict with your local infrastructure, you can use the procedure described in Appendix D to update the everRun port numbers.

Install the XenServer Tools

4. See the XenCenter Online Help topic "Install XenServer tools" for instructions on adding the required drivers on each VM.

TIP: To determine whether the XenServer tools have been installed, highlight a VM in the XenCenter resource pane and open the General tab. If the tools are required for that VM, a red **Tools not installed** message displays.

NOTE: If you are creating a new VM, you must install the Windows operating system and the XenServer tools on the VM. A VM imported from a template may already have Windows and the XenServer tools installed on it however, it is always a good idea to install XenTools again, at the correct version for the new pool.

Step 8: Launch the eAC Management GUI

You have installed all the elements of the XenServer-everRun system. Now open the everRun Availability Center (eAC) GUI and configure your everRun resource pool.

To open the eAC:

1. Type the URL provided at the end of the installation program — for example, http://10.40.196.10:8080 — into any Flash-enabled browser that has access to the XenServer management network.

By default, the URL directs your browser to TCP port 8080 of your pool master host. If you specified another port when you installed everRun, that port number will be part of the URL.

When the browser connects to the specified URL, a screen opens where you can log in to the eAC GUI for your XenServer pool.

2. Enter the username and password created during the XenServer installation, then click the **Login** button.

Before you can start to protect applications with everRun, you need to use the eAC to perform several pool-wide configuration tasks, which are described under Step 9.

Step 9: Configure the Resource Pool in the eAC

The final step in everRun installation is to use the eAC to configure the resource pool. Before you can protect or manage VMs with everRun, you must perform the following steps.

- Install the everRun license key.

- Configure the everRun availability link (A-link) networks.

- Set the pool isolation IP address for everRun failover. This provides access to the network device that supports automatic fail-over of pool mastership in cases and configurations where it can be done safely.

- Configure the quorum service computers, if used in your configuration.

Installing the License Key

Installing the current everRun license key is the first task in pool configuration. The following steps explain the basic process; for additional information, see the eAC Online Help. If you are installing a Beta version of everRun a license is not require and you may skip to the next section to begin configuring your A-link networks.

To apply the everRun license key:

1. When the eAC workspace opens for the first time, it displays a message that lets you choose the (single-host) default evaluation license or install a different everRun license. Choose **Install License** to display the license pop-up window.
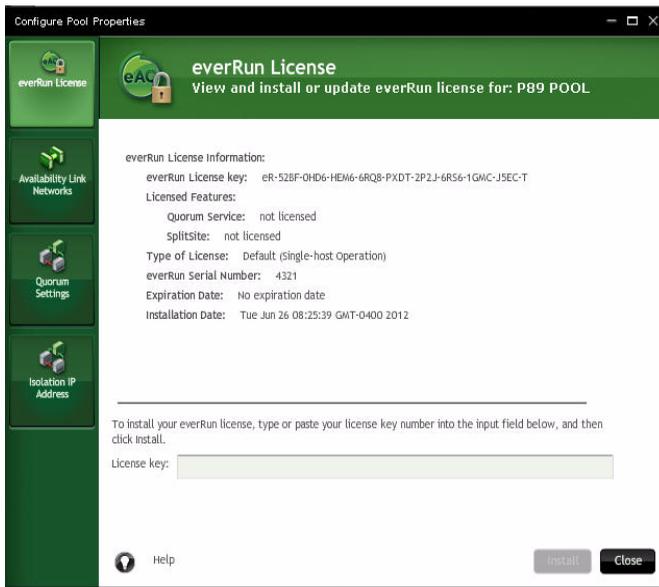
2. Locate the license key you obtained from everRun Order Support.

3. Copy the license key from the text file, paste it into the License Key field of the everRun License dialog box, and click **Install**.

   A message informs you that the license was accepted and applied.

4. Click **Close** to close the dialog box.

If you require additional details, see the Online Help topics under **Configuring an everRun Pool > License Management**.

Configuring the everRun Availability-Link (A-link) Networks

Click **Configure A-Links IP**. Provide an IPv4 network IP address scheme for your A-link networks that has no conflicts with existing addresses in your infrastructure. These A-links, which are critical to the successful operation of everRun, require private, dedicated subnets for each protected VM (PVM). Once you set up a pool-wide system of IP addresses, each protected VM is automatically assigned IP addresses from this scheme.

In the *everRun Configuration Planning Guide*, consult Chapter 4, Network Fundamentals, as well as the appendix that describes your configuration option, for recommendations and best practices for configuring private A-link LANs. See also the topics under **Configuring an everRun Pool > Pool-Wide Network Configuration>Configuring A-Links (Local Pool)** in the Online Help.

Setting the Pool Isolation IP Address

Click **Configure Isolation IP**. You must also set a **pool isolation IP address** before you begin to protect VMs, in order to guarantee high availability operation during a host outage.

For information on setting the IP address for maximum reliability, start with the following topics in Online Help: **Configuring an everRun Pool > Pool Isolation IP Address**.

NOTE: When planning your IPv4 pool network design, consult your network administrator if you need help in planning IP address ranges, netmasks, and other network details that are consistent with your existing infrastructure.

Configuring Quorum Service (When Applicable)

As outlined in the *everRun Configuration Planning Guide*, Chapter 5, Quorum Service Fundamentals, quorum service is mandatory when XenServer HA is not configured and:

- The pool contains more than two hosts.

- A-link network(s) are configured with active components (switches, gateways, routers — anything except short point-to-point cables).

- A configuration consists of multiple sites (SplitSite®), including multiple computer rooms.

See *everRun Configuration Planning Guide*, Chapter 5, Quorum Service Fundamentals, for recommendations and best practices for configuring a preferred and

alternate quorum server. For specific guidelines, choose the configuration option you prefer and use the quorum service guidelines recommended for that option.

For information on using the eAC GUI controls to configure quorum service, see the following topics in Online Help: **Configuring an everRun Pool > Quorum Service Management**.

Protecting Windows VMs

The pool configuration is now completed. Availability for a VM must now be applied by running the protection wizard from the eAC. Refer to eAC on-line help for more details.

Working with the eAC: An Overview

The everRun eAC GUI illustrated in this section lets you configure, monitor, and manage your protected VMs using menus, buttons, and icons to simplify task management. To provide a quick orientation, the illustration uses circled numbers to identify the five main areas of the workspace; the following list briefly describes each area.

① The **task bar** area contains the File and Help menus, as well as the shortcut buttons for the Protect ( ) and Unprotect ( ) functions.

② The **Protected VM Summary** area provides a quick way to view the status, by category, of all VMs and protected PVMs on the XenServer hosts.

③ The **resource pane** shows all system resources in a Windows tree view. This pane contains two tabs: **Virtual Machines** and **Hosts**. When you select a resource on one of these tabs, an orange bar highlights it, and the same resource is highlighted in the Virtual Machine Status table (circle 4). At the same time, the Detail tab at the lower right of the workspace (circle 5) displays detailed information for that resource.

④ The **Virtual Machine Status** table contains key information about each of the hosts, VMs, and protected VMs in the system. Check this table to learn if a VM is a candidate for protection and to identify the level(s) of protection it qualifies for.

⑤ Information in the **Detail** tab is context-sensitive: its display is determined by the resource selected in the resource tree. This space also contains a Welcome tab that links you to a number of basic help topics, online documentation, and customer support sites.

In the eAC, most tabs display in dark green, but the selected tab displays in light green.
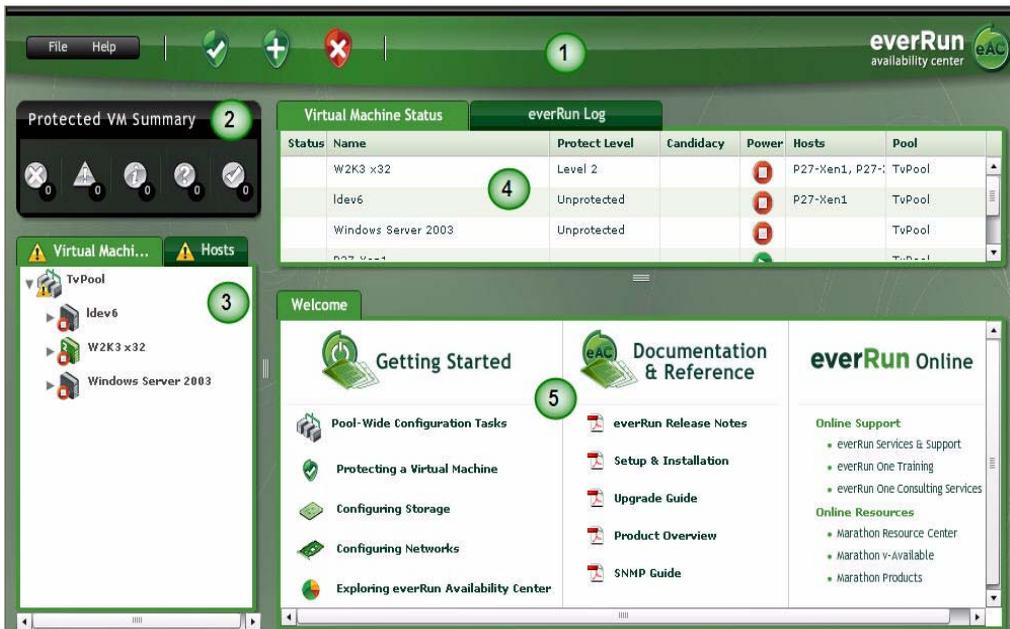
Learning More About everRun Management

After your pool has been configured, you can use the eAC to protect, unprotect, and otherwise manage the candidate VMs. To become more familiar with the eAC, consult the everRun Online Help as you learn how to use the eAC controls.

To learn about everRun system management:

1. Open the Help menu in the task bar, click **Search**, and type **everRun Protection Overview** into the search field.

2. Click the topic entitled **everRun Protection Overview**.

   This topic describes how to identify candidates (and non-candidates) for protection, and how to protect and unprotect a VM. Follow the links from this topic for more information about each task.

   The everRun Online Help also contains a section called **Exploring the everRun Availability Center** that explains each part of the GUI interface. As you begin to work with your protected virtual environment, use the Online Help topics when

you want to learn more about the interface, the management tasks, the interfaces to use for specific management tasks, system troubleshooting, and CLI command syntax.

everRun Installer Online Help

● ● ● ● ● ● ● ● ● ● ● ●

Viewing the Installer Online Help

Chapter 4, "Installing the everRun Software" describes how to run the installer wizard with the default options. In most cases, it is expected that the installer defaults will be used.

However, you may want to change some options because of your local network constraints. This appendix contains examples describing the use of the installer help options.

To display everRun Installer options:

To see all the options available in installer Online Help, along with a brief description of each option, issue the install command with `--help` *while the CD-ROM is still in the CD drive*:

❖ **# bash /mnt/everRun-6.2<version_id>-installer.bin --install [OPTIONS]**

The installer displays the following information:

--install	This parameter must be specified
--version	Reports version information for this installer
--port=n	Overrides default port numbers used for management software. Two ports are used: n and n+1
--sr-uuid=uuid	Optional UUID of the SR storage repository to use for creation of the product installation logical volume

`--help or -h`	Displays this text and additional information about ports, and the SR and VG options

To display everRun Installer Online Help text:

❖ To see Online Help that contains more descriptive text about each option, enter one of the following commands *while the CD-ROM is still in the CD drive*:

- `# bash /mnt/everRun-6.2<version_id>-installer.bin --help`

- `# bash /mnt/everRun-6.2<version_id>-installer.bin -h`

- `# bash /mnt/everRun-6.2<version_id>-installer.bin`

An Example: Assigning Communications Ports

The installer configures two TCP ports in the firewall on the XenServer host. These ports, which eAC uses to access the everRun application, are identified as ports 8080 and 8081 by default. If those port assignments are inconsistent with your network usage, this example describes how the installer options can be used to assign new port numbers for eAC access.

The everRun installer Online Help displays the following information about the port option:

```
The web-based management software requires two ports to be
enabled to accept remote connections. You may wish to override
the default port numbers with your own settings. These ports must
be configured identically across all XenServer hosts within the
management pool. The default configuration set up by the
installer is:

    ports: 8080 and 8081
The ports are enabled by the firewall rules set via iptables.
```

To change the default communication ports:

1. When you issue the install command, include the specific port(s) to use:

   ```
   bash /mnt/everRun-6.2<version_id>-installer.bin - install --
   port=6900
   ```

   This example sets ports 6900 and 6901 as the communication ports.

An Example: Managing Logical Volume Storage

If the installer reports an error in the installation process, you can use command-line options to correct the problem. The text in the Online Help briefly explains what to do:

> **sr-uuid option**
>
> **The product installation creates a logical volume for storing the product executables, scripts, and logfiles. By default the installer attempts to create the logical volume using storage from the default local storage repository (SR). If the installation cannot create the logical volume, you should use the SR option to specify the storage repository to use. Please refer to the product documentation [or everRun Customer Support] for more information.**

In this example, the installer reported an error in the installation process, which involved the **logical volume** required for everRun storage. Instead of successfully completing the installation, the installer sent the following message.

> **Could not mount logical volume storage for product installation. Examine the logfile for additional details.**

The location of the logfile is included in the final lines of the installer script.

> **logfiles saved to tmp/everRun...[directory path].**

In the example, the logfile contained the following line:

> **Attach everRun storage status: No default SR**

To locate and specify the UUID for the storage repository:

1. To see a list of local storage of type LVM in the pool (let's say you are **root@test1-master ~**), type the following at the console command line:

   [root@test1-master ~] # **xe sr-list type=lvm**

   When the list displays, you can select the local storage located on the test1-master host.

   uuid (RO) : c4571f60-cee4-f929-f19a-e7e816a8d545
   name-label (RW): Local storage
   name-description (RW):
   host (RO): test1-master
   type (RO): lvm
   content-type (RO): user

   uuid (RO) : 88d5ddbb-a864-5cf9-e6dc-68ba4a5dd0d7
   name-label (RW): Local storage
   name-description (RW):

```
host ( RO): test1-slave
type ( RO): lvm
content-type ( RO): user
```

In this case, the first example shows the local storage on test1-master, so the UUID you want is **c4571f60-cee4-f929-f19a-e7e816a8d545.**

2. Alternatively, to guarantee seeing local storage on test1-master, you can add the hostname to the command:

    [root@test1-master ~]# **xe sr-list type=lvm host=$(hostname)**

    This command shows the UUID for local storage on that host.

    ```
    uuid ( RO) : c4571f60-cee4-f929-f19a-e7e816a8d545
    name-label ( RW): Local storage
    name-description ( RW):
    host ( RO): test1-master
    type ( RO): lvm
    content-type ( RO): user
    ```

3. Now you can specify the UUID for the local storage repository when you rerun the everRun install command:

    ```
    bash /mnt/everRun-6.2<version_id>-installer.bin --install --
    sr=c4571f60-cee4-f929-f19a-e7e816a8d545
    ```

NOTE: Although the option name is **--sr-uuid**, it can be abbreviated to **--sr**.

Resolving Problems with Internet Explorer

If you are experiencing difficulty using Internet Explorer to access the everRun Availability Center, try one or more of the troubleshooting procedures documented in this appendix.

Internet Explorer Security Level Settings

eAC requires Adobe Flash Player 9 or later. On startup, the eAC application detects whether or not the correct version of the Flash Player is installed on your browser. If it does not detect a suitable version of Flash Player, the eAC launcher offers the option to download from the Adobe Flash Player site or from a local version stored on the everRun server. To ensure operation with the latest runtime it is recommended that, if you have an Internet connection, you always choose the Adobe download site.

If you are experiencing trouble installing Flash Player, verify that your Internet Explorer security level is not set to High or to a custom level that does not permit viewing of ActiveX controls. Before attempting to launch eAC, you or your system administrator should verify that the following settings are in effect on your browser.

The Medium Default Level Security permits you to view Flash content. Should you need to implement any Custom Level, ensure that both the Download Signed ActiveX controls and Run ActiveX controls and plug-ins options are set to Prompt.

To change your security level:

1. Open Internet Explorer.

2. Choose **Tools > Internet Options**.

3. Select the **Security** tab.

4. Select **Custom Level**.

5. Locate the section ActiveX controls and plugins.

6. Set Download Signed ActiveX Controls to **Prompt**.

7. Set Run ActiveX Controls And Plug-ins to **Prompt**.

Windows Vista Installation Failure

When used with some Windows Vista platforms the Adobe Flash Player may be installed but may not display Flash content. Update to the latest Flash Player to correct the User Account Control settings that cause this problem.

To run the utility:

1. Locate the installed Flash folder and right-click
   `C:\Windows\System32\Macromed\Flash\FlashUtil9d.exe`.
   The letter changes with each Flash version, so may be `FlashUtilb.exe` or
   `FlashUtile.exe`.

2. Select **Run as Administrator**.

3. Follow the steps to complete the Flash Player installation.

4. Restart your computer.

Windows Server 2003, 64-bit version

If you are running 64-bit Windows Server 2003 on your management computer, Stratus recommends the 32-bit versions of the Firefox or Internet Explorer browser.

Additional Troubleshooting Tips

If you are still experiencing trouble installing or running the Flash Player, please refer to the Adobe TechNote located at the following site for additional troubleshooting tips:

http://kb.adobe.com/selfservice/viewContent.do?externalId=tn_19166&sliceId=1

To Enable Multipathing in an everRun Setting

C

Overview

This appendix describes how to enable the multipath option for shared storage in an everRun-enabled XenServer pool.

Any time you select the multipath option for a protected VM (in XenCenter) the error message "Storage repository not available" displays. The workaround is to stop the everRun services, enable multipathing, and then re-enable the everRun services.

Disabling everRun Services

To temporarily disable all everRun services before you enable multipathing, issue the following commands in a Console window on each host in the pool:

```
# service everrund stop
# service mtcamlogd stop
# service xenfiled stop
# service mtclinkwatchd stop
# service pdmonitord stop
# service everrun-prep stop
```

Enabling the Multipath Option

Enable multipathing using the method documented by Citrix for the version of XenServer/XenCenter you are using.

You can enable and disable storage multipathing using the **xe** command-line interface (as described in the *Citrix XenServer Administrator's Guide* (search the document for "multipathing"), or in XenCenter (search for "multipathing" in the Online Help).

Re-enabling everRun Services

To re-enable everRun services after the multipath option is enabled, issue the following commands in a Console window on each host in the pool:

```
# service everrun-prep start
# service everrund start
# service mtcamlogd start
# service xenfiled start
# service pdmonitord start
# service mtclinkwatchd start
```

Updating everRun Port Assignments

D

Overview

The following everRun components use the User Datagram Port (UDP) numbers listed below, with default values defined in private header files.

Component Name	Default Port
Quorum server service (QSS)	2189
Quorum manager (QMAN)	2188
Datagram service (DGS)	2194
Linux kernel mode socket driver (LKSD)	1361

In the unlikely event of a site conflict involving one of these port numbers, everRun provides a capability to override the default values. This is done by defining the new port assignment in the **marathon.properties** file, then issuing a command to activate the new assignment.

Reconfiguring everRun Ports

It is *not* necessary to stop running PVMs in order to make the following changes from the everRun Availability Center (eAC):

- Enable quorum service

- Disable quorum service

- Set IP addresses for preferred and alternate quorum servers

However, when making changes that affect running PVMs, it is always a good idea to recheck the configuration after changes are made—to make certain that a quorum server can be reached from all PVMs after assigning a new IP address, for example.

Use the following procedure to reconfigure everRun Port assignments. Before you begin make sure that all PVMs are up and running.

1. With all PVMs running, use eAC to disable the everRun pool-wide Quorum Service. From eAC right-click on the pool icon from the navigation pane and select **Configure** from the properties menu to open the Configure Pool Properties dialog. Then click the **Quorum Settings** button and check the **Disable Quorum** check box. Click **Save** to save your settings. A confirm operation popup will appear. Click **YES**.

2. Perform a clean shutdown of all PVMs in the pool using the eAC or from a XenServer host command window by issuing the following command:

    `ev pvm-shutdown uuid=<UUID number>`

NOTE: The **`ev pvm-shutdown --all --waitFor`** command is another way to check all PVM state changes. This command notifies you when it has finished running, so you do not have to check the status of each PVM before proceeding to the next step.

---

3. Create the default everRun assignments by defining an alternative port number in the **site.properties** file on each XenServer host in the pool. Using a text editor of your choosing, create the site.properties file since it is not there by default:

    `var/everRun/current_everrun/bin/site.properties`

4. Override the default port number assignment(s) as follows:

NOTE: Changes in quorum port numbers on the server are not preserved when upgrading or rolling back the system. If you override default quorum port numbers on the server and then the system is upgraded or rolled back, you must override the default numbers again.

   • To override the default for the **quorum server** port number, add the following line to the properties file on each host in the pool:

   `mtc.default.pvm.quorum.server.port=<port-no>`

   • To override the default for the **quorum manager (client)** port number, add the following line to the properties file on each host in the pool:

   `mtc.default.pvm.quorum.client.port=<port-no>`

- To override the default for the **datagram service** port number, add the following line to the properties file on each host in the pool:

  ```
  mtc.default.pvm.dgs.port=<port-no>
  ```

- To override the default for the **Linux kernel mode socket driver** port number, add the following line to the properties file on each host in the pool:

  ```
  mtc.default.pvm.lksd.port=<port-no>
  ```

5. After making the desired modification(s) to the **site.properties** file on all hosts in the pool, restart the everRun Management Services daemon on each host:

   ```
   service everrund restart
   ```

6. If you changed the **quorum server port**, activate the new assignment using the following procedure otherwise you may skip to item 7.

   - Stop the Quorum Service on the quorum service computers. Issue the following command from a command window on each quorum service computer:

     ```
     net stop mtcqserver
     ```

   - From a command window on each quorum service computer, change to the directory where the everRun software is installed:

     ```
     CD /D C:\Program Files\Marathon
     ```

   - To set the new port assignment, run the following command:

     ```
     mtcqserver -install <nnnn>
     ```

     where <*nnnn*> matches the port value specified in the marathon.properties file, at the line mtc.default.pvm.quorum.server.port=<*port-no*>.

   - Restart the Quorum Service on each Quorum Service computer by issuing the following command from a command window on each Quorum Service computer:

     ```
     net start mtcqserver
     ```

7. Next, re-enable the pool-wide Quorum Service. From eAC right-click on the pool icon from the navigation pane and select **Configure** from the properties menu to open the Configure Pool Properties dialog. Then click the **Quorum Settings** button and check the **Enable Quorum** check box. Click **Save** to save your setting.

8. Restart PVMs using the eAC interface or from a command window that has access to the XenServer hosts:

   ```
   ev pvm-start uuid=<UUID number>
   ```

   See the previous note for related information.

Brief Glossary

• • • • • • • • • • • •

Here are some common terms you'll encounter in this guide. everRun terms and XenServer/Industry terms are listed separately. You'll find a more extensive glossary in the Online Help system, available from the **everRun Availability Center (eAC)**.

everRun® Terminology

availability links (A-links)
The connectivity path(s) between two availability managers (typically located on separate XenServer hosts) in an everRun-protected virtual machine (PVM).

Availability Manager (AM)
A purpose-built virtual appliance containing the everRun software that applies protection to a target virtual machine (VM). The AM, which exists on each everRun-enabled XenServer host, implements the logic and context required to create the protected VM.

bonded network interface card (NIC)
An everRun "bonded" NIC aggregates two separate network interface cards into a single logical interface. everRun uses a bonded NIC on the XenServer management network to provide a hot standby in case one NIC should fail.

Compute Instance (CI)
A component of the protected virtual machine (PVM) that represents a single instance of the everRun PVM on a XenServer host. A duplicate instance is cloned on another XenServer host.

Storage subsystem data protection
A path-redundant protection option, available to users whose configuration includes intelligent SAN systems that provide onboard data redundancy.

everRun Availability Center (eAC)
The browser-based everRun graphical user interface (GUI) used to manage and monitor everRun-protected virtual machines.

everRun mirroring
A process for creating and maintaining a set of identical disk images on separate physical disks. Each everRun protected VM relies on a pair of storage repositories (SRs), known as a **mirror set**, which maintain identical information.

pool isolation IP address
The IP address of an independent network device on the XenServer management network. everRun software pings this device to detect the health of the host's management network

connection. The results of the ping help isolate master/member failures and determine corrective action. By default the isolation IP address is that of the network's gateway device, which is the first usable IP address on the subnet.

protected VMs (PVMs)
Virtual machines (VMs) that have everRun availability software applied. For optimum availability, a PVM should run on two physical XenServer hosts.

quorum service
An everRun communication service, installed on one or more Windows clients on the LANs, that prevents host servers from operating independently in a non-communicating, partitioned mode of operation (commonly known as *split brain*). Also enables unattended restarts in failure modes that impact all networks (such as loss of connectivity between the two AMs in a PVM).

quorum service computer
The network-accessible PC that runs the everRun quorum service. The eAC provides a dialog box where you can specify an IP address for the preferred (or primary) quorum computer, as well as an alternate quorum server. All PVMs in a resource pool use the same quorum service computers.

snapshot
A read-only image that represents the disk image and configuration of a PVM at a certain point in time.

SNMP
Simple Network Management Protocol, a notification services that enables you to monitor the health of each everRun protected virtual machine (PVM) and to receive notice of state changes within the PVM.

split brain
An undesirable condition in which the two availability managers (AMs) servicing the two halves of an everRun protected VM are partitioned and operating independently.

XenServer™ and Industry Terminology

domain
In XenServer terminology, refers to the execution context that contains a running virtual machine (VM). The relationship between VMs and domains in XenServer is similar to that between programs and processes in an operating system: like a program, a VM is a persistent entity that resides on disk. When it is loaded for execution, a VM runs in a domain with a distinct domain ID. See **Domain0**, **DomainU**.

Domain 0 (Dom 0)
A privileged virtual machine (VM) that provides the platform management and drives the physical I/O devices and platform resources. Dom0 (rhymes with Mom) is the first domain started by the XenServer hypervisor at boot, running a Linux OS. Dom0 is sometimes referred to as the "control domain."

DomainU (DomU)
An unprivileged domain on a XenServer, running a guest operating system that has been ported to XenServer; for example, each Windows guest VM runs in a DomU. The U stands for "user."

FC-SAN
In storage virtualization, fibre-channel (FC) storage area networks (SAN) allow you to aggregate disks and logical units (LUNs) from disparate systems into shared storage pools.

iSCSI

Internet SCSI, an IP-based standard for linking data storage devices over a network and transferring data by carrying SCSI commands over IP networks. For an overview, see wikipedia.org.

ISO image

A disk image (archive file) of an optical disc using a conventional ISO format supported by many software vendors. The name "ISO" is taken from the ISO 9660 file system used with CD-ROM media.

logical unit number (LUN)

An address for an individual disk drive. The term is used in the SCSI protocol as a way to differentiate individual disk drives within a common SCSI target. In everRun, the LUN provides address information for individual storage volumes within a mirror set.

logical volume

In computer storage, logical volume management (LVM) is a method of allocating space on mass storage devices that is more flexible than conventional partitioning schemes. Volume management is one of many forms of storage virtualization. A volume manager can concatenate, stripe together, or otherwise combine partitions (volumes) into larger virtual ones that can be resized or moved.

management computer

In a XenServer configuration, the general-purpose Windows computer that is used to manage the XenServer software as well as the everRun software. Also called **client computer**.

master host

The physical node in a XenServer resource pool that contains an administration interface and forwards commands to individual member nodes.

member host

A physical node in a XenServer resource pool that has no administration interface and receives commands from the pool's master node. Also called **pool member**.

NFS

Network File System, an industry-standard client/server application that allows network users to access shared files stored on computers of different types. Users can manipulate shared files as if they were stored locally on the user's own hard disk.

PATA

Parallel Advanced Technology Attachment. One type of standard interface for connecting storage devices in personal computers. For an overview, see AT Attachment at wikipedia.org.

resource pool

A connected group of homogeneous XenServer hosts that, combined with shared storage, provide a platform on which virtual machines (VMs) run. Servers in a resource pool monitor the state and availability of their peers. Also called **pool**.

SATA

Serial Advanced Technology Attachment. One type of standard interface for connecting storage devices in personal computers. For an overview, see AT Attachment at wikipedia.org.

SCSI

A type of hard disk drive used in high-performance workstations and servers. For an overview see SCSI at wikipedia.org.

storage repository
In XenServer, any storage target that contains physical disks.

virtual disk image (VDI)
A disk abstraction that contains the contents of a virtual disk.

virtual machines (VMs)
File-based abstractions of dedicated machines, which provide the environment in which a hosted operating system (OS) runs. A VM is also known as a guest domain or "DomU" in XenServer terminology.

Xen bridge (xenbr)
In XenServer network configuration, the bridge parameter defines a method of connecting objects. For example, if a physical interface (PIF) object connects a network object (n) to a host object (h), the network corresponding to n is bridged onto a physical interface specified by the fields of the PIF object. Thus, if a NIC is named **eth0**, the associated bridge is **xenbr0**.

XenCenter
A Windows client (GUI) application that enables you to manage XenServer hosts, resource pools, and shared storage. It also lets you deploy, manage, and monitor VMs.

XenServer API (xapi)
The Citrix XenServer management API, the application programming interface that supports both XenCenter GUI and the xe command line interface (CLI).

XenServer hosts
As defined by Citrix, a host is a homogeneous system — aggregated into a single management entity — that can contain virtual machines. For detailed information, see the XenServer documentation.