Tivoli® Storage Network Manager Planning and Installation Guide

Version 1 Release 1.3 (July 26, 2001)

GC26-7380-04

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Contents

Summary of Changes

Changes for this publication are summarized below.

July 2001, Version 1 Release 1.3

The changes for this release are as follows:

- Tivoli Storage Network Manager requires Tivoli Kernel Services 1.1.2.
- Changes have been made to the Tivoli Storage Network Manager upgrade chapter. See "Upgrading Tivoli Storage Network Manager" on page 107.
- A chapter has been added to describe the Tivoli Storage Network Manager Try and Buy product. See "Try and Buy Product" on page 119.
- Other changes have been made where appropriate.

June 2001, Version 1 Release 1.2

This manual has been completely reorganized in response to customer feedback to provide documentation that makes it easier to follow when installing Tivoli Kernel Services and Tivoli Storage Network Manager. Tivoli Storage Network Manager version 1.1.2 requires that you install the Tivoli Kernel Services patch 1.1.1–TKS–0003 after you install Tivoli Kernel Services.

The organization is presented in a step–by–step linear manner as follows:

- Step 1: Prepare the manager machine ("Preparing for Installation" on page 15)
- Step 2: Install the manager machine ("Installing the Manager Machine" on page 25)
- Step 3: Install the managed host machines ("Installing the Managed Hosts" on page 71)
- Step 4: Configure the manager machine ("Configuring the Manager Machine" on page 81)

Preface

Tivoli Storage Network Manager is a comprehensive SAN management software product. This document explains how to plan for, install, and configure Tivoli Storage Network Manager.

Who Should Read This Document

This document is intended for Storage Area Network (SAN) administrators and network operators who need to install and configure Tivoli Storage Network Manager. Administrators and network operators should be familiar with SAN concepts. Readers should be familiar with the following:

- General procedures for installing software on a Windows® system
- Tivoli Kernel Services
- Tivoli Presentation Services
- SAN concepts
- Tivoli Enterprise™ Console (if you are displaying Tivoli Enterprise Console® events)
- SNMP concepts (if you are displaying SNMP traps)
- Tivoli NetView®

Once you install Tivoli Storage Network Manager, you should read through *Tivoli Storage Network Manager Getting Started Guide*. The guide is on the Tivoli Storage Network Manager CD–ROM. This will help you get started using the product.

Related Information

The following table indicates which Web site to access for additional information.

Table 1. Product Web Sites

Product	Web Site
Tivoli Web site	http://www.tivoli.com/storage
Tivoli Storage Network Manager	http://www.tivoli.com/tsnm
Tivoli Storage Network Manager device compatibility and SAN components list	http://www.tivoli.com/support/san/tsnm_devices.html
Tivoli Storage Network Manager function provided in relationship to the ANSI standards compliance in your SAN fabric	http://www.tivoli.com/support/san/tsnm_functionality.html
Tivoli Storage Network Manager product requirements and devices supported	http://www.tivoli.com/support/san/requirements.html
Tivoli Storage Network Manager downloads and fixes	http://www.tivoli.com/support/san/maintenance.html
Tivoli Storage Network Manager technical support	http://www.tivoli.com/support/san/index.html

Table 1. Product Web Sites (continued)

Product	Web Site
IBM® Universal DB2® Enterprise Edition	http://www.ibm.com/software/data/db2/udb/

Publications

This section lists publications in the *Tivoli Storage Network Manager* library and any other related documents. It also describes how to access Tivoli publications online, how to order Tivoli publications, and how to make comments on Tivoli publications.

Tivoli Storage Network Manager Library

The following documents are available in the *Tivoli Storage Network Manager* library:

- *Tivoli Storage Network Manager Planning and Installation Guide*, GC26–7380

  Provides information about installing and configuring Tivoli Storage Network Manager.

- *Tivoli Storage Network Manager Getting Started Guide*, on the Tivoli Storage Network Manager CD

  Provides information about how to use Tivoli Storage Network Manager.

Prerequisite Publications

To be able to use the information in this document effectively, you must have some prerequisite knowledge, which you can get from the following documents:

- Planning for Tivoli Kernel Services
- Introducing Tivoli Kernel Services Administration
- Installing Tivoli Kernel Services
- Tivoli Kernel Services Command Reference
- Troubleshooting Tivoli Kernel Services

Related Publications

The following documents also provide useful information related to *Tivoli Storage Network Manager*:

Table 2. Related Documents

Document	Order Number
Introduction to Storage Area Network, SAN	SG24–5470
Designing an IBM Storage Area Network	SG24–5758
Tivoli NetView for Windows NT® User's Guide	GC31–8502
Tivoli NetView for Windows NT Programmer's Guide	SC31–8416
Tivoli NetView for Windows NT Programmer's Reference	SC31–8417
Fibre Channel Connection to the Future	ISBN 1–878707–45
IBM Enterprise Storage Server™	SG24–5465
Implementing Fibre Channel Attachment on the ESS	SG24–6113
TME® 10 Enterprise Console User's Guide	GC31–8506
TME 10™ Rule Builder's Guide	SC31–8508

Table 2. Related Documents (continued)

Document	Order Number
TME 10 Enterprise Console Adapter's Guide	SC31–8507

Accessing Publications Online

You can access many Tivoli publications online at the Tivoli Customer Support Web site:

http://www.tivoli.com/support/documents/

These publications are available in PDF or HTML format, or both. Translated documents are also available for some products.

To access most of the documentation, you need an ID and password. If necessary, you can obtain these from the following Web site:

http://www.tivoli.com/support/getting/

Ordering Publications

You can order many Tivoli publications online at the following Web site:

http://www.ibm.com/shop/publications/order

You can also order by telephone by calling one of these numbers:

- In the United States: 800-879-2755
- In Canada: 800-426-4968
- In other countries, for a list of telephone numbers, see the following Web site:
  http://www.tivoli.com/inside/store/lit_order.html

Providing Feedback about Publications

We are very interested in hearing about your experience with Tivoli products and documentation, and we welcome your suggestions for improvements. If you have comments or suggestions about our products and documentation, contact us in one of the following ways:

- Send an e-mail to pubs@tivoli.com.
- Complete our customer feedback survey at the following Web site:
  http://www.tivoli.com/support/survey/

Contacting Customer Support

If you have a problem with any Tivoli product, you can contact Tivoli Customer Support. See the *Tivoli Customer Support Handbook* at the following Web site:

http://www.tivoli.com/support/handbook/

The handbook provides information about how to contact Tivoli Customer Support, depending on the severity of your problem, and the following information:

- Registration and eligibility
- Telephone numbers and e-mail addresses, depending on the country you are in

- What information you should gather before contacting support

Conventions Used in This Document

This document uses several conventions for special terms and actions, operating system-dependent commands and paths, and margin graphics.

Typeface Conventions

The following typeface conventions are used in this document:

Bold

Lowercase and mixed-case commands, command options, and flags that appear within text appear like **this,** in **bold** type.

Graphical user interface elements and names of keys also appear like **this,** in **bold** type.

Italic

Variables, values you must provide, new terms, and words and phrases that are emphasized appear like *this,* in *italic* type.

`Monospace`

Commands, command options, and flags that appear on a separate line, code examples, output, and message text appear like `this`, in `monospace` type.

Names of files and directories, text strings you must type, when they appear within text, names of Java™ methods and classes, and HTML and XML tags also appear like `this`, in `monospace` type.

1

Introducing Tivoli Storage Network Manager

A Storage Area Network (SAN) consists of storage devices connected to host systems through a fabric of fibre-based hubs, bridges, switches, routers, gateways, and directors. A SAN uses optimized protocols. SAN management requires a tool that understands this environment. Tivoli Storage Network Manager fulfills this requirement.

What Does Tivoli Storage Network Manager Do?

Tivoli Storage Network Manager is a tool for managing storage devices on a Storage Area Network (SAN) as shown in Figure 1. The manager component of Tivoli Storage Network Manager manages the hosts (managed hosts) on the SAN. Tivoli Storage Network Manager can then:

- Manage the SAN fabric by discovering and managing the SAN topology (Manage Networks)
- Assign and unassign SAN storage to the managed hosts (Manage LUNs)
- Monitor and extend file systems on the managed hosts (Manage File System Policies)

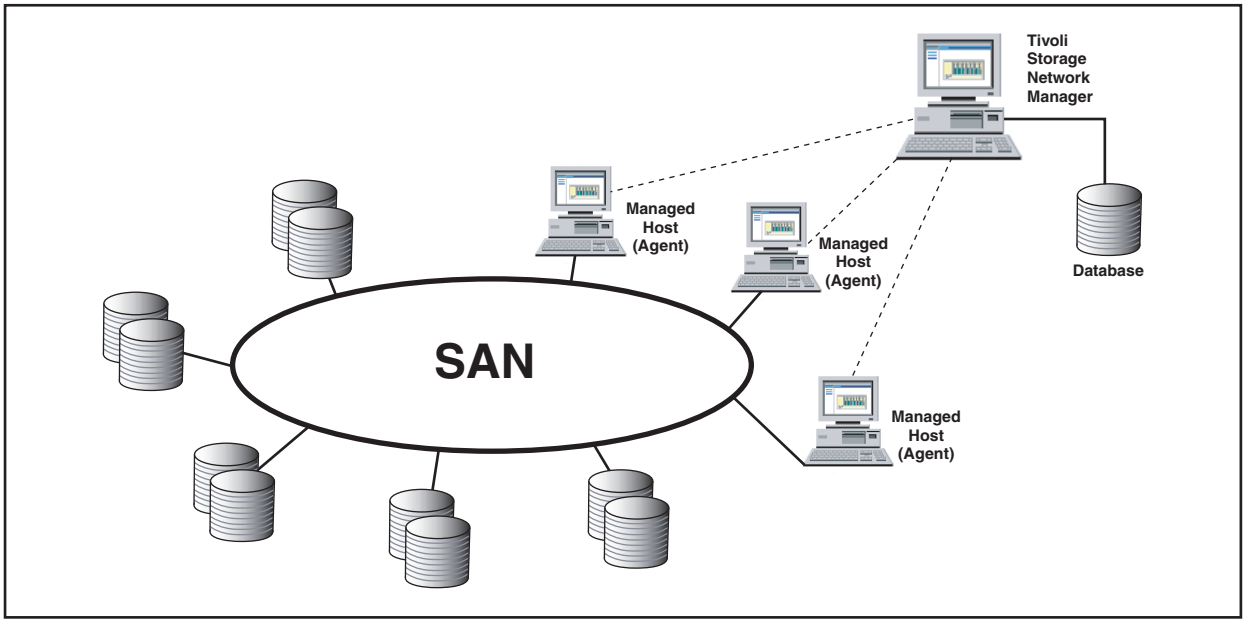

Figure 1. Tivoli Storage Network Manager Interacting with the Storage Area Network

Manage Networks

One of the challenges of network management is to keep track of all devices on a network. Another challenge is to ensure that you have current information about device configuration. Tivoli Storage Network Manager provides network management by performing a SAN topology discovery. The network discovery provides you with a database of network configuration information across the SAN. This discovery is displayed on the Tivoli NetView Console, from which you can also manage your Internet Protocol (IP)-based LANs and WANs. The discovery is done through a combination of both:

- Inband discovery (through the SAN network itself)
- Outband discovery by using Simple Network Management Protocol (SNMP) capabilities through Transmission Control Protocol/Internet Protocol (TCP/IP)

The ability to display topology information from both of these sources makes Tivoli Storage Network Manager a versatile tool. Tivoli Storage Network Manager is capable of managing devices that cannot support a Tivoli Storage Network Manager agent. A complete view of the physical topology and the status of every element in the topology is displayed. The display also shows the logical views at the device–centric, host-centric, and zone-centric levels.

You must launch the Tivoli NetView Console to use Manage Networks. Because Manage Networks uses Tivoli NetView as a topology console, you will be able to see a topology view and an Explorer view of the network.

You can also easily launch vendor applications to perform device management and configuration. The application can be either Web based or a native code application. If the interface is an application, it must reside on the same machine as the Tivoli NetView server.

Manage LUNs

You can control the assignment of disk storage subsystem resources (LUNs) to specific computers in your storage network. Manage LUNs performs LUN filtering at the host bus adapter (HBA) level. This enables multiple computers to securely share the same network bandwidth and the same disk storage subsystems.

Note: If you are using Tivoli Storage Network Manager to securely share storage, a Tivoli Storage Network Manager agent must be installed on every host system with access to that storage. Tivoli Storage Network Manager uses LUN masking to control storage access. Systems that do not have this agent installed may be able to access storage that is assigned to other hosts. This can cause data corruption. Alternatively, other measures, such as hardware zoning, can allow machines not running with a Tivoli Storage Network Manager agent to be safely integrated into the storage network.

Tivoli Storage Network Manager agent software performs local functions such as LUN masking and inband discovery on a host attached to the SAN. A host with a Tivoli Storage Network Manager agent is referred to as a **managed host**.

Tivoli Storage Network Manager supports many IBM and non-IBM disk drives. The disk drives supported include JBODs (Just a Bunch of Disks), RAID devices, and intelligent disk subsystems such as the IBM Enterprise Storage Server (ESS). Check the following URL for currently supported disk devices:

`www.tivoli.com/support/san/requirements.html`

For RAID devices, Tivoli Storage Network Manager supports both hardware RAID and software RAID. Hardware RAID LUNs are handled like ordinary LUNs by Tivoli Storage Network Manager. For software RAID, the LUNs which make up the RAID devices appear as separate LUNs to Tivoli Storage Network Manager. Each LUN must be allocated to the same managed host (or set of managed hosts).

For disk subsystems such as the IBM Enterprise Storage Server (ESS), a LUN is a logical disk drive. You can configure the ESS to have many LUNs. If you want Tivoli Storage Network Manager to manage ESS LUNs, the ESS must be configured for that support. The ESS LUNs that you want Tivoli Storage Network Manager to manage must be made available to all the managed hosts on the SAN. This is also true for other intelligent storage subsystems like the EMC Symmetrix. For information on ESS configuration, see the ESS documentation. For information on EMC Symmetrix configuration, see the EMC documentation.

To use Manage LUNs, you must log onto the Tivoli Console.

Manage File System Policies

You can monitor the capacity of file systems in your storage network by establishing policies at the domain, host group, or individual file system level. You can automatically extend supported file systems that are near maximum capacity. You do this by defining a threshold for the resource you want to monitor.

Tivoli Storage Network Manager can monitor file systems on Windoes NT, Windows 2000, AIX® 4.3.3, and Solaris 2.7. The following table shows which file systems can be monitored and which can be automatically extended on each supported operating system.

Note

The information in the following two tables are for planning purposes only and might not reflect the current level of support that is provided. Check with your marketing representative to determine when the support is available.

Table 3. Supported Operating Systems and File Systems

Operating System	File System Monitoring	File Systems Which Support Automatic Extension
Windows NT Server 4.0 with Service Pack 6	All	Not applicable
Windows 2000 Advanced Server or Professional	All	Not applicable
AIX 4.3.3	All	JFS
Solaris 2.7*	All	VxFS

* Solaris 2.7 supports software RAID that is implemented using VxVM version 7 only.

Manage File System Policies can also automatically extend file systems that make use of RAID. Hardware RAID is supported on all disk subsystems on all supported operating systems.

Support for software RAID is limited to the categories shown in the following table.

Table 4. Supported Software RAID

AIX 4.3.3	Solaris 2.7*
RAID-1 (mirror)	Concatenation (volume sets)
	RAID-0 (stripe)
	RAID-1 (mirror)
	RAID-5 (striping with distributed parity)
	RAID-1 + RAID-0
	RAID-0 + RAID-1

To use Manage File System Policies, you must log onto the Tivoli Console.

Other Management Activities

Once the SAN elements are discovered, storage resources are assigned, and policies are established for monitoring file systems, you can then do the following:

- Continually monitor all components within the discovered SAN topology
- Capture data to use for reporting on performance, capacity, and service level planning
- Automatically extend supported file systems that are nearing capacity
- Receive automatic notification when file systems exceed an administrator-determined threshold

Tivoli Storage Network Manager will also generate SNMP traps and Tivoli Enterprise Console events to report on all monitored activities. These events can be sent to the designated management console or the designated administrator.

Events and data from the SAN are continuously captured and processed, providing information, alerts, and notification to administrators for problem resolution. You can then launch specific SAN management software (within Tivoli Storage Network Manager) to assist in closure of the problem. This feature also provides you with an easy navigational tool to launch the specific application. You can launch applications to perform device management, configuration, and performance functions during the initial SAN setup.

How Tivoli Storage Network Manager Uses Inband and SNMP Events

Tivoli Storage Network Manager uses inband events and outband SNMP traps to trigger a discovery operation on the SAN. However, while this increases the versatility of the product, SNMP traps sent to Tivoli Storage Network Manager are not logged.

Inband events and SNMP traps are used identically. They provide the same information (a change might have occurred in the SAN and a discovery operation needs to be done). Inband events are detected by the Tivoli Storage Network Manager agents running on the managed hosts. SNMP traps are detected by Tivoli Storage Network Manager's Outband Change Agent. For Tivoli Storage Network Manager to receive the SNMP traps, you must configure the device (for example a switch) to send traps to Tivoli Storage Network Manager (manager machine).

Tivoli Storage Network Manager discovers SAN information by doing the following:

- Communicates with Tivoli Storage Network Manager agents. The agents run on the managed hosts (inband discovery).
- Issues Management Information Base (MIB) queries directly to switches and other devices (outband discovery).

Host and device information is gathered only by the inband operation. Topology information can be gathered by using either the inband or outband discovery operations. Both discovery operations provide the same level of information; however, zone information is only available through the inband discovery operation. Using both inband and outband discovery operations extends the range of devices supported by Tivoli Storage Network Manager. Some switches support only the inband mechanism and some support only the outband mechanism.

If no agents are running on the host systems, only outband discovery operations and SNMP trap monitoring are used to monitor the SAN. In this configuration, the Tivoli Storage Network Manager NetView console could indicate only switch and connection level information. The devices and hosts would appear as unknown devices. Because Manage LUNs and Manage File System Policies require host and disk information, you are unable to use those functions. If you want to take advantage of Tivoli Storage Network Manager in this way, you should configure Tivoli Storage Network Manager to receive outband traps. The outband traps determine when to initiate a rediscovery operation. You might want to consider this configuration if you have the following conditions:

- You want to include unsupported devices on your SAN
- You want to monitor machines that you do not directly control.

The SNMP traps sent by the devices and by Tivoli Storage Network Manager can be sent to the Tivoli NetView console. The events can be displayed in the Event browser. The events may also be sent to another trap console for monitoring. The advantage of sending the events to a Tivoli NetView console is that the user can view the event text. The user can then provide error recovery or other advanced processing, such as paging.

Configuration Options

You can configure your system in the following ways:

- Configure devices to send SNMP traps to an SNMP management console
- Configure SNMP traps so they can be sent to Tivoli Storage Network Manager
- Configure SNMP traps so they can be sent to both the Tivoli Storage Network Manager and the SNMP console

Configuring Devices to Send SNMP Traps to an SNMP Console

This is the most common configuration. Tivoli NetView or Tivoli NetView Lite will automatically be listening for SNMP traps on port 162. Many devices in your storage network may be configured to send SNMP traps to this port number. However, you still have to configure those individual devices to point to the machine that is running Tivoli NetView. If you have also configured Tivoli Storage Network Manager to send SNMP traps to the Tivoli NetView console, then this configuration allows you to track all the SNMP traps in your storage network. This can be done from one console. You can view information on the status of LUN assignments and file system extensions as well as information from your devices. You can view the changes in their condition described in Tivoli NetView's Event

Browser. This configuration logs SNMP traps, but does not use that information to update the topology information displayed in the Tivoli NetView console. However, Tivoli Storage Network Manager is still able to update the topology display to reflect the status of your storage network based on information gathered from its agents.

Configuring SNMP Traps to be Sent to Tivoli Storage Network Manager

You can configure the devices in your storage network to send SNMP traps directly to Tivoli Storage Network Manager. To do this, you need to configure the devices to send their traps to the Tivoli Storage Network Manager (manager) machine. You need to change the port number to 1001. This configuration allows Tivoli Storage Network Manager to rediscover the network topology in response to the SNMP traps it receives. However, the traps sent to Tivoli Storage Network Manager will not be logged in the Tivoli NetView Event Browser. The ability to view the trap information on a console would be unavailable in this situation. Because some devices do not support changing the port number to which they send SNMP traps, this configuration is not available in all hardware environments.

Configuring SNMP Traps to be Sent to Both Tivoli Storage Network Manager and the SNMP Console

Some devices can be configured to forward their SNMP traps to multiple locations. This configuration combines the best features of the configurations described above with none of their limitations. Under this configuration, you can view all of the events generated by Tivoli Storage Network Manager and your storage devices. This can be viewed in one common SNMP management console. Tivoli Storage Network Manager is able to respond to the SNMP traps it receives from the devices in your storage network. This helps determine when it should rediscover the network topology. Because not all devices support this ability, this configuration might not be available to all environments. However, if you are using the full version of Tivoli NetView and not Tivoli NetView Lite, you can take advantage of its Mid-Level Manager (MLM). The MLM can intercept SNMP traps and forward them to multiple locations. You would configure all of your devices to point to the machine that is runningTivoli NetView. Use port 162. You would then configure the MLM to forward SNMP traps it receives to Tivoli Storage Network Manager (manager machine) on port 1001.

How to Forward Tivoli Storage Network Manager and Device SNMP Traps to Tivoli NetView

Tivoli Storage Network Manager trap forwarding is performed through the Tivoli Console. This process is described in “Step 5: Configuring Event Reporting (Optional Step)” on page 90. The Tivoli Storage Network Manager traps are described in the online help for Tivoli Storage Network Manager.

For device SNMP traps; you need to configure each device to send its traps to the IP address of the system running Tivoli NetView. For information on configuring your device, refer to your device vendor documentation.

Rogue Hosts

If you are using Tivoli Storage Network Manager to securely share storage, a Tivoli Storage Network Manager agent must be installed and running on every host system with access to that storage. This is because Tivoli Storage Network Manager uses LUN masking at the host to control storage access. A system that does not have this agent installed and running is called a **rogue host**. A rogue host can access storage that is assigned to other hosts. This can cause data corruption.

Tivoli Storage Network Manager considers a host system a rogue host if it is in one of the following states:

1. Tivoli Storage Network Manager cannot identify the device.
2. There are no agents installed and running on the host system.
3. The host name (also known as the platform name) registered with a switch does not match the name of the host system.
4. There is an agent running on the host system, but it appears that the LUN masking support is not enabled when it should be. An example of this is if the device driver is installed but not active because the managed host was not rebooted.

The Manage Network console displays each host or unknown device that is determined to be a rogue host. Manage LUNs will not display rogue hosts in state 1, 2, or 3 above. Manage LUNs will display rogue hosts in state 4 (LUN masking support is not enabled when it should be).

There are two levels for a rogue host condition:

- Non–critical event: The Tivoli Storage Network Manager agent is not running on the host. This means that some information is not available within Tivoli Storage Network Manager. Specifically, host file system level information is not available and potentially, some device information. This is considered a lower level issue. The events generated by Tivoli Storage Network Manager are warnings.
- Critical event: If the agent is running, it means that the rogue host can potentially access data on other devices being managed with Manage LUNs. This is considered a more significant issue. Therefore, Tivoli Storage Network Manager generates critical events.

Rogue host warnings are sent out as SNMP traps and Tivoli Enterprise Console events when a rogue host condition is detected. A rogue host condition is detected during a discovery operation or Manage LUNs polling. Because Manage LUNs cannot secure the devices from systems not running the agent, additional severe rogue host alerts are sent when Manage LUNs is enabled. The time required to detect that a rogue host condition exists depends on the following:

- The time it takes for discovery processing
- The specified polling intervals

It is possible for users to want a rogue host (a machine not managed by Tivoli Storage Network Manager) on their SAN. In this case, the user needs to manage the rogue host's access to storage to prevent data corruption. You can manage access to storage through zoning, hardware LUN masking, or other means in order to prevent data corruption.

Rogue Hosts Displayed on the Tivoli NetView Console

A rogue host on Manage Networks can appear in two different forms. The first rogue host icon shown is displayed on the Tivoli NetView console if Tivoli Storage Network Manager detects a host system and one of the following conditions apply:

- The Tivoli Storage Network Manager agent is not running on the managed host
- Manage LUNs is enabled but the Manage LUNs device driver is not running on the managed host

Figure 2. Rogue Host Icon – Manage Networks

The second icon is shown as an Unknown Device icon, but should be treated as a rogue host. Tivoli Storage Network Manager detects this device, but there is insufficient information to identify this device. This object could be a host, disk, or some other type of device. This object needs to be treated as a rogue host because this object could be a host. If the object is a host, it could access the storage devices controlled by Manage LUNs. An unknown device and rogue host are treated in the same way. That is, the events generated are the same for a rogue host or an unknown device.

Figure 3. Unknown Device Icon – Manage Networks

Rogue Hosts Displayed on the Tivoli Console (Manage LUNs)

Only managed host systems running the Tivoli Storage Network Manager agent are displayed on the Manage LUNs console. A rogue host on the Manage LUNs console appears as follows:

Figure 4. Rogue Host Icon – Manage LUNs

Important Notes

This section lists some of the key points you should keep in mind before installing Tivoli Storage Network Manager:

- If you are using Tivoli Storage Network Manager to securely share storage, a Tivoli Storage Network Manager agent must be installed on every host system with access to that storage. This is necessary because Tivoli Storage Network Manager uses LUN masking to control storage access. Systems that do not have this agent installed may be able to access storage that is assigned to other hosts. This can cause data corruption. (You can use other means to restrict data access to the devices such as hardware zoning.)
- The Tivoli Storage Network Manager (manager component) and all managed hosts (agents) must have static IP addresses. In addition, the remote DNS server must know each machine's static IP address. For information on how to find the host name and static IP address of a network computer, see "Step 2: Checking for a Static IP Address" on page 17.
- Your network must be using DNS.

2

Planning for Installation

Important

Before installing Tivoli Storage Network Manager, make sure that your SAN is operational. Check the following:

- The hosts must be able to view and contact the storage devices. See "How to Check the Host's View of Devices" on page 132 and "How to Check the Host's View of LUNs" on page 132.
- The LUNs must be accessible to all the managed hosts on the SAN (only if this is desired).
- You have installed the appropriate HBAs and device drivers (for example, the QLogic HBA and device drivers). For a list of the devices supported, see the following URL:

  `http://www.tivoli.com/support/san/tsnm_devices.html`
- The common API setup program for the HBA must be run on each machine, called a managed host. The managed host is managed by Tivoli Storage Network Manager. This common API program is in addition to the actual drivers for the HBA, which are also required. For example, for a QLogic HBA you must run the EUSDSetup program. Contact your HBA manufacturer if you do not have this program.

Tivoli Storage Network Manager cannot run on a non-operational SAN.

You should always check the Tivoli Storage Network Manager web site for current information before installing the product. The Web site is:

`www.tivoli.com/support/san/requirements.html`

Manager Requirements

The requirements for the manager are as follows:

- Processor – Pentium® III 600 (minimum).
- Disk space and memory requirements – see the **README** file on the Tivoli Storage Network Manager CD–ROM.
- Operating system – Microsoft® Windows 2000 Advanced Server edition.

Managed Host Requirements

The requirements for the managed hosts are as follows:

- Disk space and memory requirements – see the **Readme** file on the Tivoli Storage Network Manager CD–ROM.
- Operating systems – see the **Readme** file on the Tivoli Storage Network Manager CD–ROM.

Note: If you are using Tivoli Storage Network Manager to securely share storage, a Tivoli Storage Network Manager agent must be installed on every host system with access to that storage. This is because Tivoli Storage Network Manager uses LUN masking to control storage access. Systems that do not have this agent installed may be able to access storage that is assigned to other hosts and cause data corruption. (You can use other means to restrict data access to the devices such as hardware zoning.)

Administrative GUI Console Requirements

The Tivoli Console Administrative functions perform systems management tasks and user tasks for Tivoli Kernel Services and the applications that run on Tivoli Kernel Services. The Tivoli Console provides general configuration facilities, to allow administrators to do the following:

- Define how the Tivoli Kernel Services and application services are deployed
- Determine how the Tivoli Kernel Services and application services are configured throughout the installation

The requirements for the administrative GUI console are as follows:

- Processor – Pentium III 400 (minimum).
- Disk space and memory requirements – see the **README** file on the Tivoli Storage Network Manager CD–ROM.
- Operating system – Windows 2000 Professional, Server, or Advanced Server editions.

Databases Supported

DATABASE 2 (DB2) Universal Database (UDB) Version 6.1 is shipped with Tivoli Kernel Services. DB2 must be installed on the Tivoli Kernel Services manager machine. A separate CD-ROM for DB2 is included with the Tivoli Storage Network Manager package.

Other Support

If you are planning to use the Manage Networks function of Tivoli Storage Network Manager, you must have Tivoli NetView. You can install Tivoli NetView Lite 6.0.1 from the Tivoli Storage Network Manager CD–ROM. If you have the full version of Tivoli NetView, you must still run the Tivoli NetView install procedure to configure Tivoli NetView.

If you plan to send Tivoli Storage Network Manager events to a receiver, you must have programming support for the following:

- SNMP
- The Tivoli Enterprise Console

- Tivoli NetView

SAN Environment

All systems must share a common storage area network connection to shared storage devices. Typically, this will be a connection over shared SSA, or Fibre Channel (switched or arbitrated loop) physical media. A SAN host bus adapter (HBA) and appropriate SAN device drivers are also required in each system. The interconnect technology and associated HBA can be SCSI, SSA, or Fibre Channel.

For information on the devices and SAN environment that are supported, check the following Web site:

`http://www.tivoli.com/support/san/requirements.html`

The Tivoli Storage Network Manager CD-ROM Installation Package

You will be receiving six CD-ROMs in the installation packages.

- Three DB2 CD–ROMs: One for Windows NT and Windows 2000, one for AIX, and one for Solaris
- Two Tivoli Kernel Services CD–ROMs: One for the installation depot and one for the bootprint
- One Tivoli Storage Network Manager CD-ROM which contains the following:
  - Tivoli Storage Network Manager for Windows 2000 (including the Tivoli Storage Network Manager agents)
  - Tivoli NetView Lite
  - Database table creation scripts and programs
  - Documentation

To be able to read PDF documents from the CD-ROM, you might want to download the latest Acrobat Reader from the Web. The Web site is:

`http://www.adobe.com/products/acrobat/readstep.html`

Tivoli Storage Network Manager cannot be installed from a remote (or mapped) network drive. It must be run either:

- Directly from the CD–ROM drive of the Installation Depot machine or
- The contents of the CD must be copied to a hard drive on the local machine. The install must run on the local machine.

For AIX machines (managed hosts) that do not have a CD–ROM drive, see “AIX Machines That do not Have a CD–ROM Drive” on page 131.

Overview of the Installation Steps

Table 5 provides a high–level checklist to help you install Tivoli Storage Network Manager successfully.

The installation instructions assume that you will be working with a manager machine and several managed host machines. References to the manager machine refers to the Tivoli Kernel Services Installation Depot and will have these programs installed:

- DB2
- Tivoli Kernel Services (including MQSeries® Server and the DAS Server)
- Tivoli Presentation Services (this includes the Tivoli Console)
- Tivoli NetView Lite
- Tivoli Storage Network Manager

On the managed host machines, you will be installing the Tivoli Kernel Services bootprint (endpoint server). You will also be deploying Tivoli Storage Network Manager agent software to them from the manager machine. The managed host machine is also referred to as the agent or bootprint machine.

Note: The managed host (or bootprint) machine **cannot** be on the same machine as the manager machine.

Table 5. Checklist for a New Install of Tivoli Storage Network Manager

Step	Description	See	Check when done
1	Check for the fully qualified host name of the manager machine.	"Step 1: Checking for the Fully Qualified Host Name" on page 15.	
2	Check for the static IP address on the manager machine.aInstall Tivoli	"Step 2: Checking for a Static IP Address" on page 17.	
3	Create two additional Windows user IDs.	"Step 3: Creating Two Additional Windows User IDs" on page 18.	
4	Install the SNMP service.	"Step 4: Installing the SNMP Service" on page 21.	
5	Disable the World Wide Web Publishing service.	"Step 5: Disabling the World Wide Web Publishing Service" on page 23.	
6	Install DB2.	"Step 1: Installing DB2" on page 25.	
7	Install Tivoli Kernel Services 1.1.2.	"Step 2: Installing Tivoli Kernel Services" on page 31.	
8	Run **makeNTaccount1108.bat**.	"Step 3: Run makeNTaccount1108.bat" on page 42.	
9	Run **idsetup.cmd**.	"Step 4: Run idsetup.cmd" on page 43.	
10	Change the JVM memory setting	"Step 5: Changing the JVM Memory Setting" on page 44.	

Table 5. Checklist for a New Install of Tivoli Storage Network Manager (continued)

Step	Description	See	Check when done
11	Launch the Tivoli Console.	"Step 6: Launch the Tivoli Console" on page 45.	
12	Create the Tivoli Storage Network Manager database.	"Step 7: Create the Tivoli Storage Network Manager Database" on page 46.	
13	Install or configure Tivoli NetView.	"Step 8: Install or Configure Tivoli NetView" on page 55.	
14	Install Tivoli Storage Network Manager.	"Step 9: Install Tivoli Storage Network Manager" on page 60.	
15	Launch the Tivoli Console.	"Step 10: Launch the Tivoli Console" on page 70.	
16	Install the Tivoli Kernel Services bootprint on managed host machines.	"Step 1: Installing the Tivoli Kernel Services Bootprint" on page 71.	
17	Run **bpsetup.cmd** on Windows managed host machines.	"Step 2: Run bpsetup.cmd on all Windows NT and 2000 Managed Host (Bootprint) Machines" on page 79.	
18	Run **bpsetup.cmd** on AIX managed host machines.	"Step 3: Run bpsetup.sh on all AIX Managed Host (Bootprint) Machines" on page 80.	
19	Display the ORBs and ORB sets.	"Step 1: Displaying the ORBs and ORB Sets" on page 81	
20	Join the manager ORB to the **BTSNetViewOrbset**.	"Step 2: Joining the Manager ORB to the BTSNetViewOrbset" on page 85	
21	Join the managed host ORBs to the **BTSManagedHostOrbset**.	"Step 3: Joining the Managed Host (Bootprint) ORBs to the BTSManagedHostOrbset" on page 86	
22	Enable the Manage LUNs component on the manager machine (required step if you want to use Manage LUNs and Manage File System Policies components).	"Step 4: Enabling and Disabling Manage LUNs (Optional Step)" on page 87	
23	Configure event reporting on the manager machine (optional step).	"Step 5: Configuring Event Reporting (Optional Step)" on page 90	
24	Use Tivoli Storage Network Manager.	"Step 6: Using Tivoli Storage Network Manager" on page 92	
25	Add a managed host to the SAN.	"How to Add a Managed Host to the SAN" on page 93	

The following checklist provides information on the steps to follow depending on which version of the product you have. You can install the Try and Buy product, the upgraded version, or the fully licensed version of Tivoli Storage Network Manager.

Table 6. Checklist for Different Installation Scenarios for Tivoli Storage Network Manager

Product Currently Installed	Installing Try and Buy CD 1.1.3	Installing Fully Licensed CD 1.1.3
No Tivoli Storage Network Manager	This is a new installation. Read "Try and Buy Product" on page 119 and follow the steps in Table 5 on page 12.	This is a new installation. Follow the steps in Table 5 on page 12.
Try and Buy product at the 1.1.3 level	The Try and Buy product will not be installed.	This is an upgrade. Follow the steps in "Upgrading Tivoli Storage Network Manager" on page 107.
Try and Buy product at the 1.1.3 level has expired	The Try and Buy product will not be installed.	This is an upgrade. Follow the steps in "Upgrading Tivoli Storage Network Manager" on page 107.
Fully licensed Tivoli Storage Network Manager 1.1.1 or 1.1.2	This is an upgrade. Follow the steps in "Upgrading Tivoli Storage Network Manager" on page 107. This will not install the license.	This is an upgrade. Follow the steps in "Upgrading Tivoli Storage Network Manager" on page 107.
Fully licensed Tivoli Storage Network Manager 1.1.3	The Try and Buy product will not be installed.	The product will not be installed.

Upgrading Tivoli Storage Network Manager

If you are upgrading Tivoli Storage Network Manager, see "Upgrading Tivoli Storage Network Manager" on page 107.

3

Preparing for Installation

Before you can install Tivoli Kernel Services and Tivoli Storage Network Manager on the manager machine, there are several steps to complete. The following sections describe those steps.

Step 1: Checking for the Fully Qualified Host Name

Tivoli Kernel Services requires fully qualified host names. Some machines might be configured to return a short host name, such as **bjklingenberg** instead of a fully qualified host name, such as **bjklingenberg.myorg.mycompany.com.** This causes problems for several Tivoli Kernel Services components which are expecting the ORB to always be using fully qualified host names. For more information, see the **readme** file on the Tivoli Kernel Services CD–ROM.

When installing on Windows 2000, ensure that the computer name is fully qualified. To verify this, follow these steps:

1. Right–click on **My Computer**.
2. Select **Properties**.
3. The System Properties window is displayed.

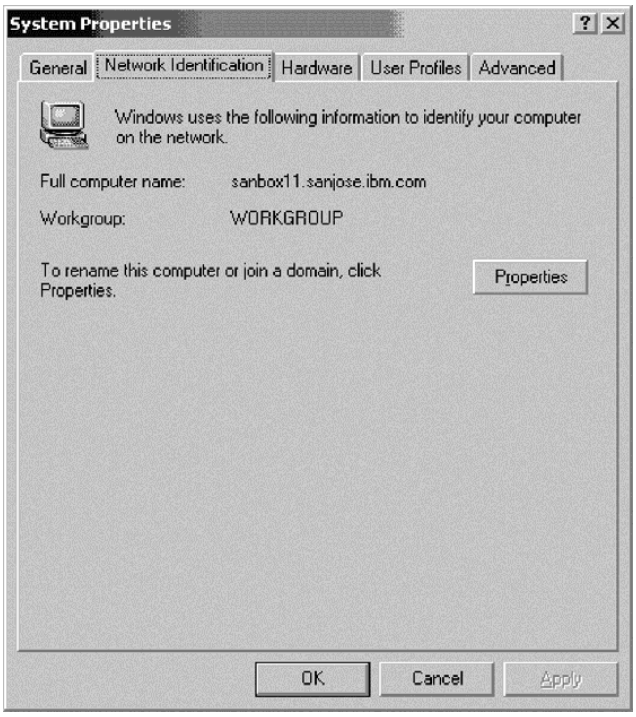

Figure 5. System Properties Screen

If the **Full computer name** field is not fully qualified with a domain name, you must change it. An example of a fully qualified name is **gromit.sanjose.ibm.com**.

4. If the computer name is not fully qualified, click **Properties**.
5. Click **More**.
6. The **DNS Suffix and NetBIOS Computer Name** screen is displayed.

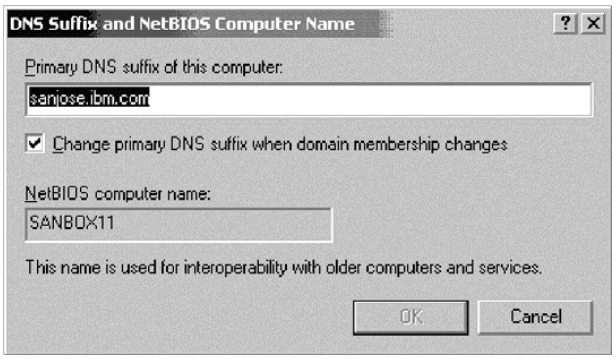

Figure 6. DNS Suffix and NetBIOS Computer Name Screen

7. Enter the domain name (Primary DNS suffix of this computer) for the machine. An example is **sanjose.ibm.com**. The machine will need to be rebooted for this change to take effect.

Step 2: Checking for a Static IP Address

The Tivoli Storage Network Manager (manager component) and all managed hosts (agents) must have a static IP address. The remote DNS server must know each machine's static IP address.

For Windows 2000: To find the static IP address, do the following steps:

1. Right–click on **My Network Places**.
2. Select **Properties**.
3. Right–click on **LAN connection**.
4. Select **Properties**.
5. Select **Internet Protocol (TCP/IP)**.
6. Click **Properties**.
7. The **Internet Protocol (TCP/IP) Properties** screen is displayed.

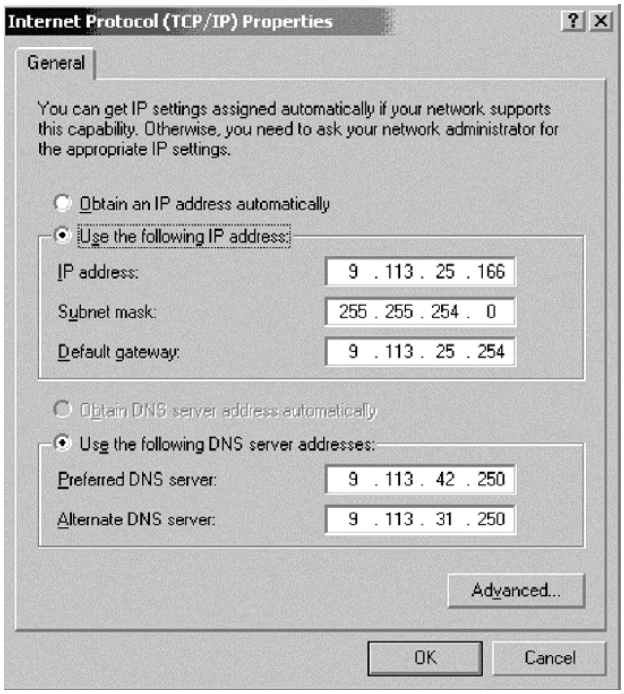

Figure 7. Internet Protocol (TCP/IP) Properties Screen

Make sure that all the fields are completed as shown.

Step 3: Creating Two Additional Windows User IDs

You will need three Windows user IDs on the manager machine with access to DB2 before you install Tivoli Storage Network Manager:

- A DB2 administrator (the default is **db2admin**)
- A DB2 user (first DB2 user ID, does not need administrative authority or **Log on as a service** authority)
- A DB2 user (second DB2 user ID, does not need administrative authority or **Log on as a service** authority)

Each user ID is restricted to 8 characters or less. An example of two new user IDs would be **tivoli1** and **tivoli2** or **db2user1** and **db2user2**. You can set the passwords for these user IDs to **Password never expires**. This avoids having to change the passwords.

If you want to change the passwords, see "Changing the Passwords for Database User IDs" on page 124.

To create a user ID (using the Computer Management window), follow these steps:

1. Right–click **My Computer** and click **Manage**. This will launch the Computer Management window. From here, click **Local Users and Groups** and then click **Users**.

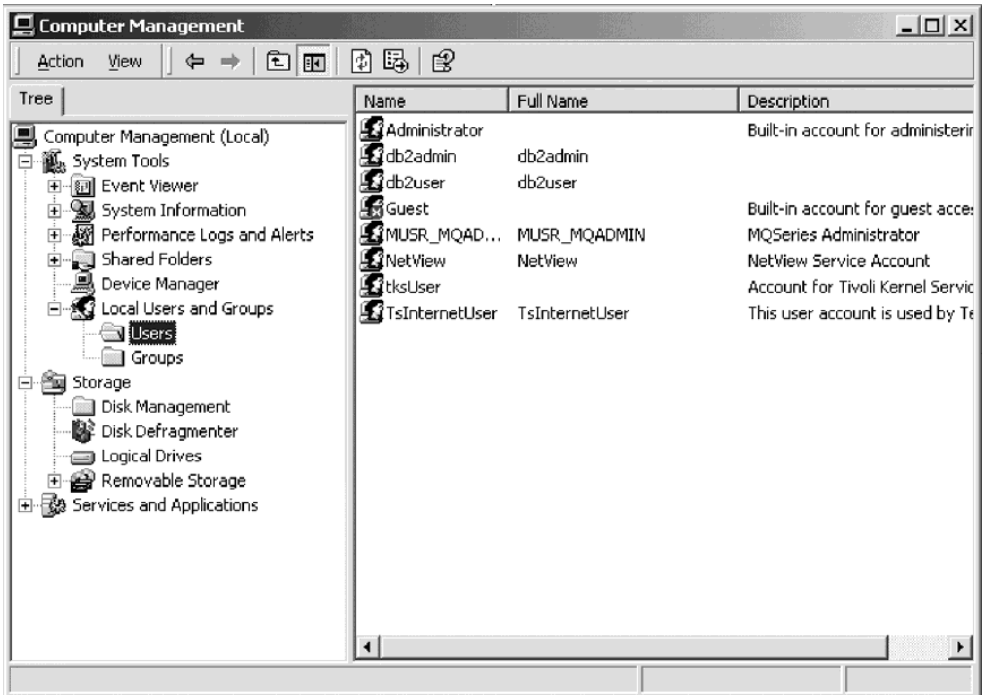

Figure 8. Computer Management Screen

2. From the menu bar, click **Action** and then click **New User**.

3. The **New User** dialog box is displayed. Enter the user name and password and then confirm the password. Uncheck **User must change password at next logon**, and check **Password never expires** (unless your enterprise has a policy to change passwords frequently). Click **Create**, then click **Close**.

Figure 9. New User Dialog

Granting New Users Administrative Authority

To grant a new user administrative authority, follow these steps.

1. Right–click **My Computer**.
2. Click **Manage**.
3. Click **Local Users and Groups**.
4. Click **Users.**
5. Double–click on the user you want to grant administrative authority to.
6. The User Properties window is displayed. Click the **Member of** tab.

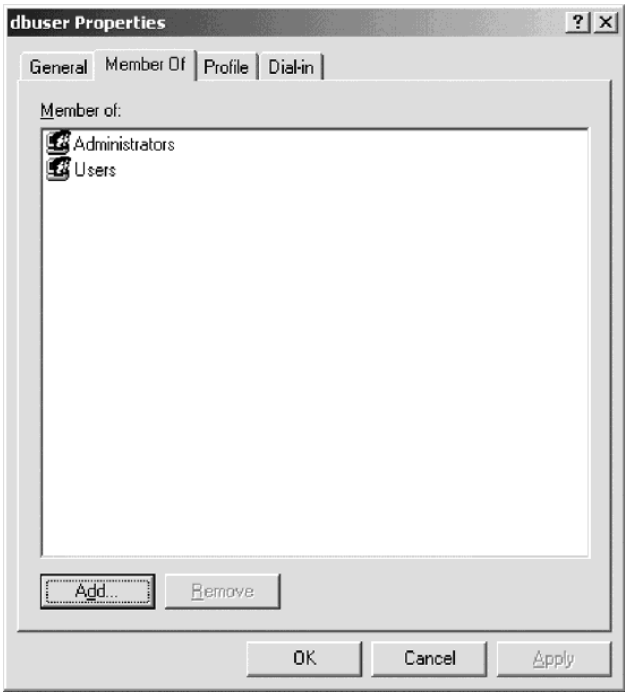

Figure 10. User Properties Window

7. Select **Administrators** and click **Add**.

Checking for Log on as a Service Authority

To check if your user ID has **Log on as a service** authority, do the following steps:

1. Click:

```
Start -> Programs -> Administrative Tools ->
Local Security Policy
```

2. The **Local Security Settings** screen is displayed.

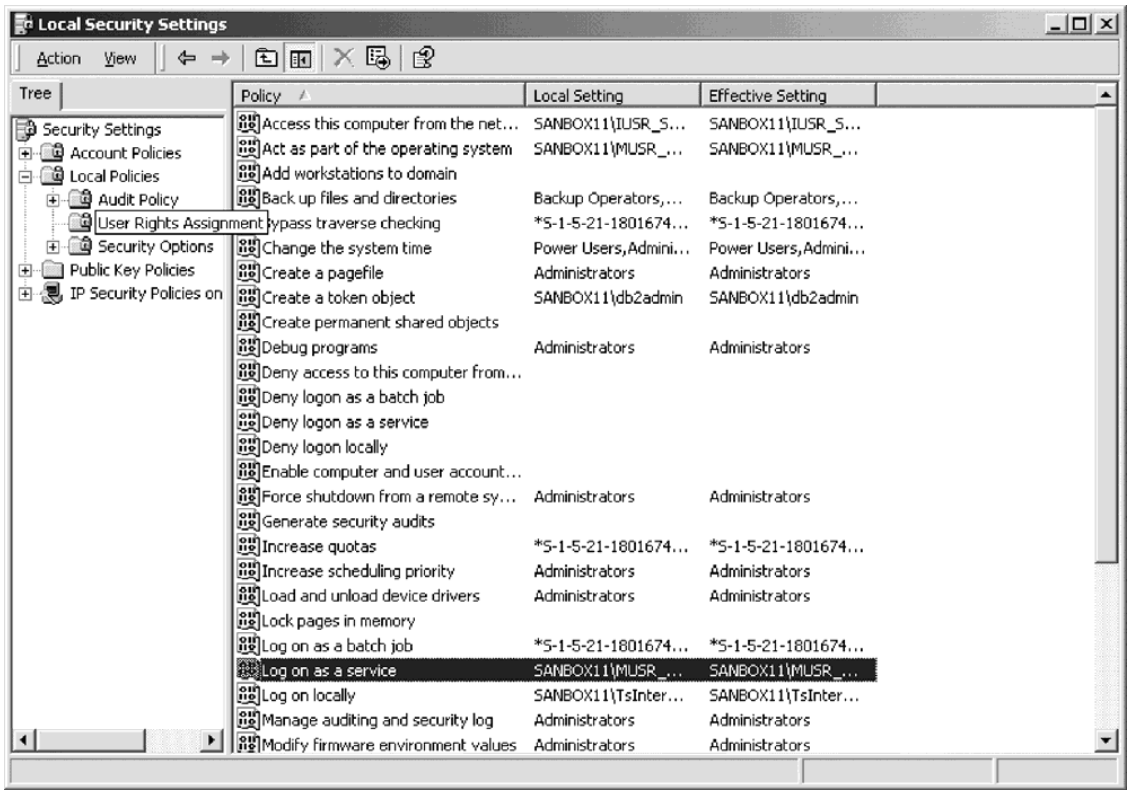

Figure 11. Local Security Settings

3. Double–click on **Log on as a service** and check to see if your user ID has this authority.

Step 4: Installing the SNMP Service

The Windows SNMP Service must be installed and running before installing Tivoli NetView Lite. You will need to restart your computer after installing the SNMP Service. If the SNMP Service is not installed, Tivoli NetView Lite will not be installed.

Follow these steps to install SNMP Service:

1. Click:

   ```
   Start -> Settings -> Control Panel
   ```

2. The Control Panel window is displayed. Double–click on the **Add/Remove Programs** icon.
3. The Add/Remove Programs window is displayed. Click **Add/Remove Windows Components** on the left.
4. The Windows Components Wizard window is displayed. Click **Management and Monitoring Tools** and then click the **Details** button.

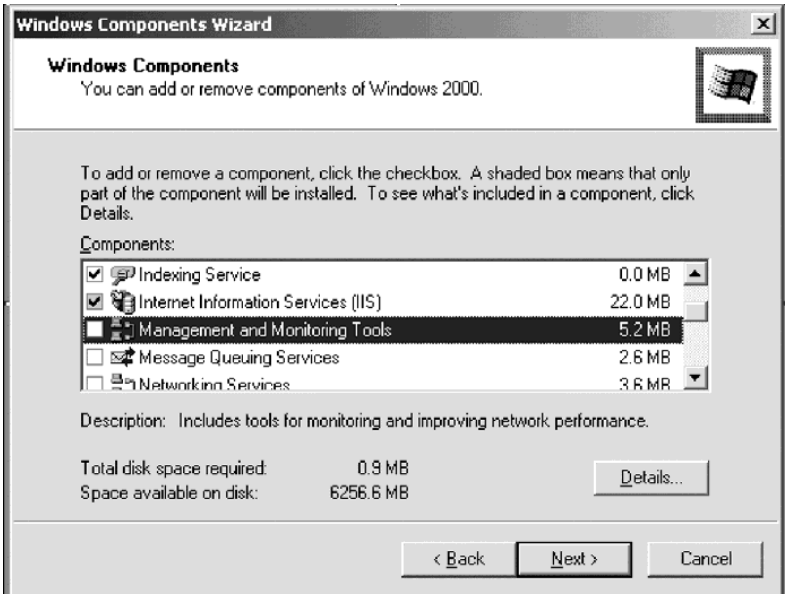

Figure 12. Windows Components Wizard

5. On the **Management and Monitoring Tools** screen, select **Simple Network Management Protocol**, then click **OK**.

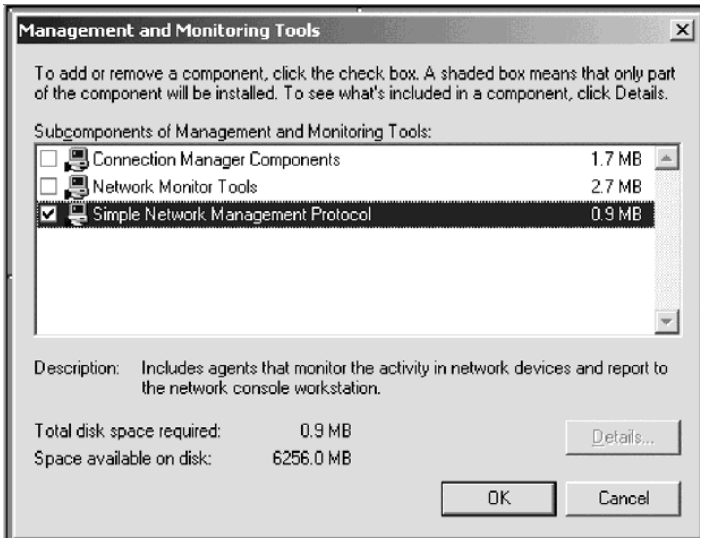

Figure 13. Management and Monitoring Tools Screen

6. On the Windows Components Wizard window, click **Finish**. This sequence of steps may ask you for the Windows 2000 CD–ROM. If so, insert the CD–ROM when prompted and click on the appropriate component.

Step 5: Disabling the World Wide Web Publishing Service

To disable the World Wide Web Publishing Service, follow these steps:

1. Right–click on **My Computer** on your desktop.
2. Select **Manage**.
3. The **Computer Management** screen is displayed. Click **Services** under **Services and Applications** on the left.

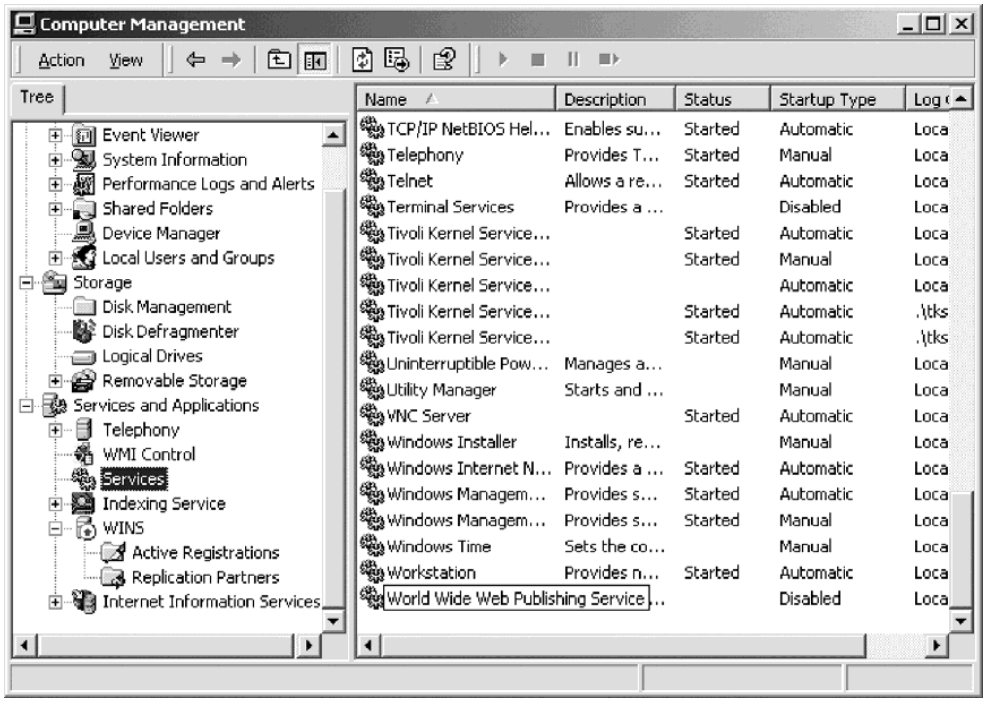

Figure 14. Computer Management Screen

4. Right–click on the **World Wide Web Publishing** service.
5. Select **Properties**.
6. The **World Wide Web Publishing Service Properties** screen is displayed. Stop the service and set the **Startup Type** to **Disabled**.

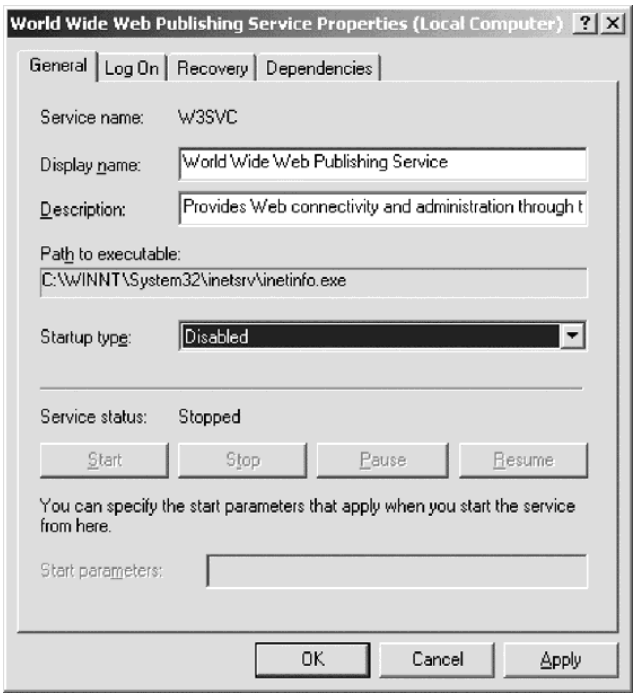

Figure 15. World Wide Web Publishing Service Properties Screen

4

Installing the Manager Machine

This section provides information on all the steps necessary to install the manager machine.

Step 1: Installing DB2

You must install DB2 before you install Tivoli Kernel Services. Tivoli Kernel Services will create DB2 tables for its data. Tivoli Storage Network Manager will also create DB2 tables for its data. You will be installing DB2 on the manager machine (Windows 2000).

To install DB2, follow these steps. These steps assume that DB2 will be installed on the **C** drive.

1. Log on with a user ID with administrator authority to run the installation program.
2. Put the DB2 CD into the CD-ROM drive. It is an AutoRun CD. The **Welcome** screen is displayed. On the **Welcome** screen, click **Next**.

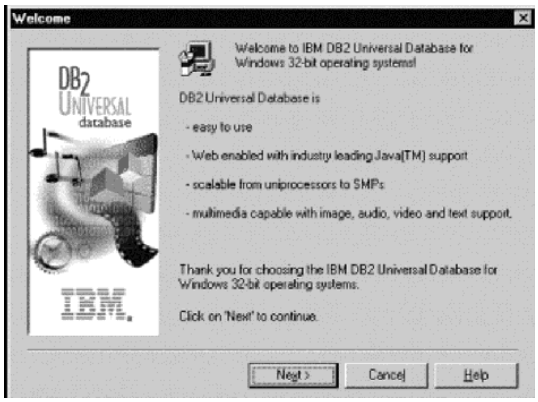

Figure 16. DB2 Welcome Screen

3. If the CD does not automatically run, then go into Windows Explorer and click on your CD-ROM drive. On the right of the Explorer window, double click on the **setup.exe** program. The following program is shown where the CD-ROM drive is **D:**

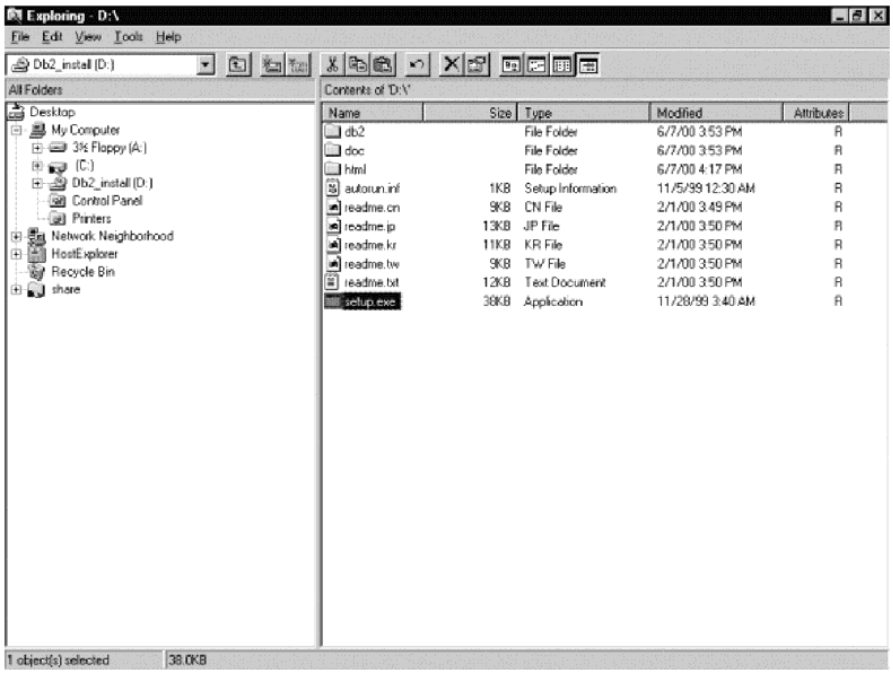

Figure 17. Explorer Window

4. On the **Select Products** screen, select **DB2 Enterprise Edition**. Click **Next** to continue.

   Note: You can select more than one choice. Most users might also want to install **DB2 Administration Client**.

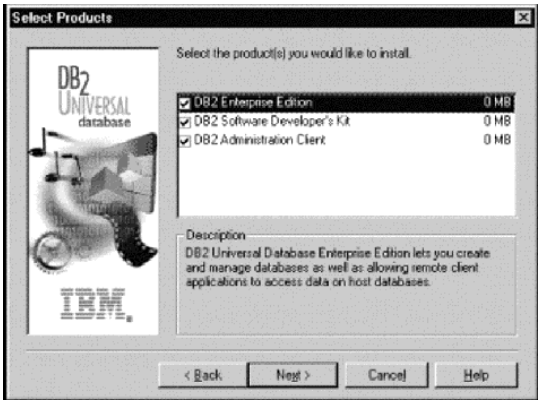

Figure 18. Select Products Screen

5. On the **Select Installation Type** screen, select a **Typical** install, then click **Next**.

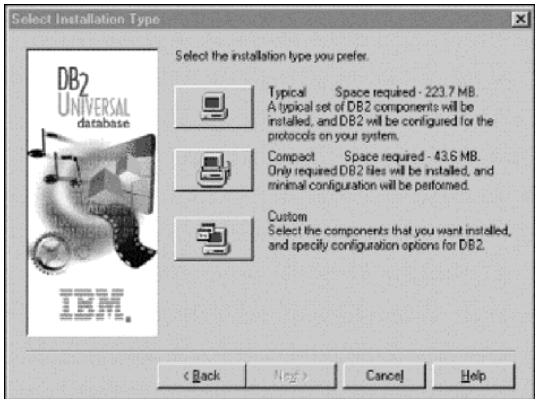

Figure 19. Select Installation Type Screen

6. On the **Choose Destination Location** screen, choose a location to install DB2. The default is **C:\SQLLIB**. Click **Next** to continue.

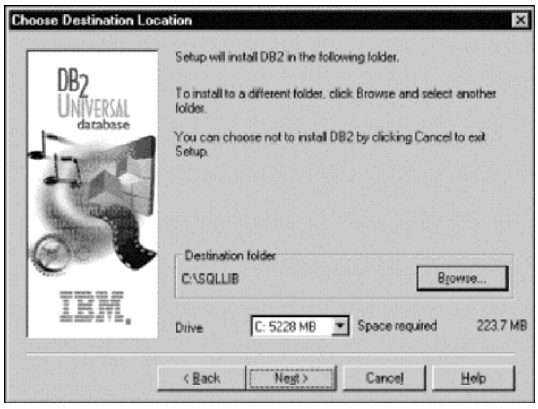

Figure 20. Choose Destination Location Screen

7. On the **Enter Username and Password for the Administration Server** screen, enter your DB2 Username and Password and click **Next.** If this username does not already exist, it will be created and given administrative authority to create DB2 tables and **Logon as a service** permission. The username must be between 6–8 characters in length.

   The default DB2 user ID that is created is **db2admin** with a corresponding password of **db2admin**. You can use this or change it. You will be using this user ID to install Tivoli Kernel Services and Tivoli Storage Network Manager.

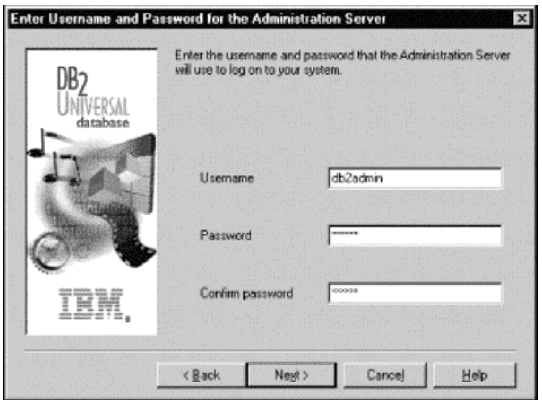

Figure 21. Enter Username and Password for the Administration Server Screen

8. On the **Start Copying Files** screen, click **Next**.

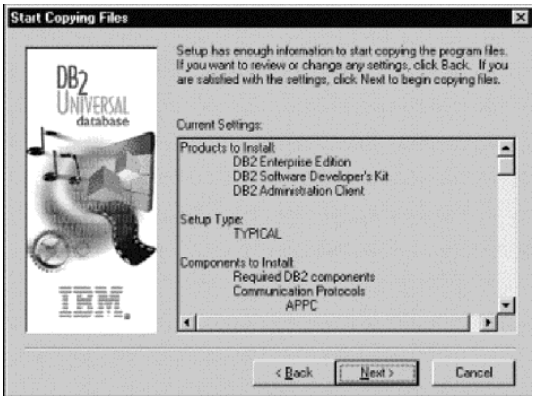

Figure 22. Start Copying Files Screen

9. DB2 will begin to install.

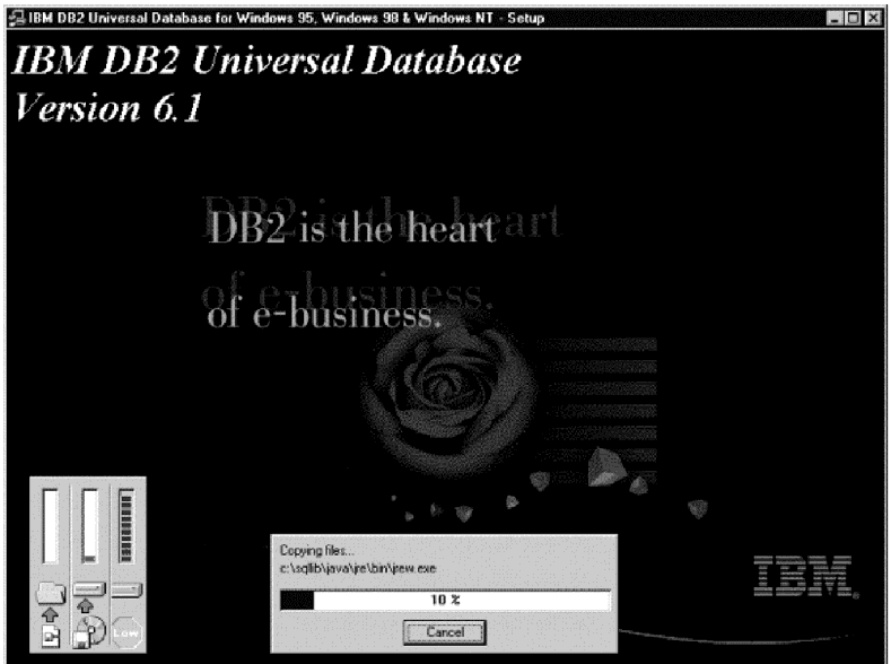

Figure 23. Copying Files Screen

10. After the install, on the **Setup Complete** screen, select **Yes, I want to restart my computer now**. Then click **Finish.**

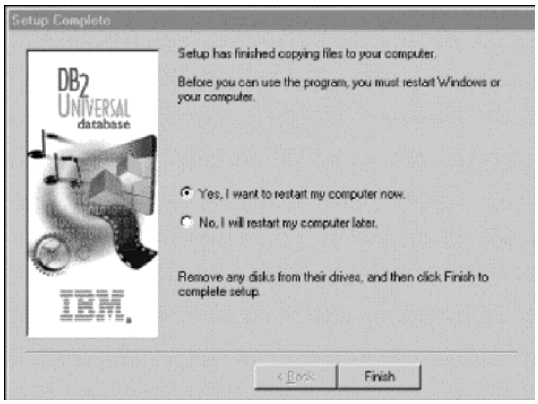

Figure 24. Setup Complete Screen

11. After the machine reboots, DB2 has been fully installed. Also, you will get a **DB2 First Steps** screen. You can practice using this utility if you are not familiar with DB2. When you are finished, dismiss this screen to continue the Tivoli Storage Network Manager installation.

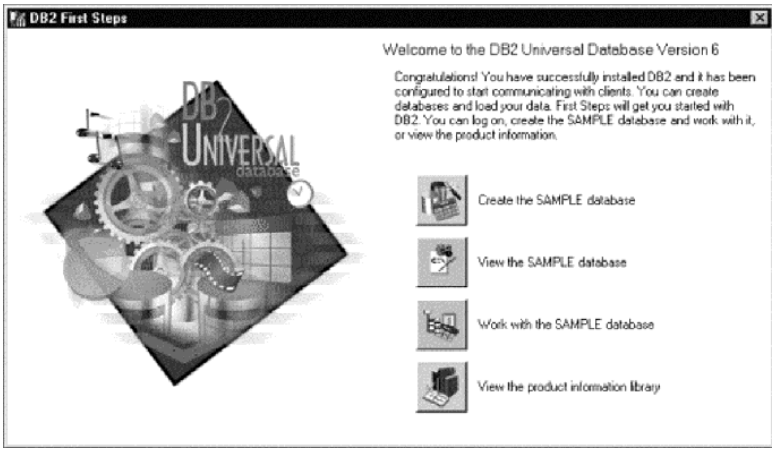

Figure 25. DB2 First Steps Screen

Step 2: Installing Tivoli Kernel Services

This chapter describes how to install Tivoli Kernel Services 1.1.2 on the manager machine (Windows 2000). Check the **Readme** file on the Tivoli Kernel Services CD before installing Tivoli Kernel Services. (Tivoli Kernel Services 1.1.2 is the same as Tivoli Kernel Services 1.1.1 with patch 1.1.1–TKS–0004.)

There is a new document, *Troubleshooting Tivoli Kernel Services*, that provides information on resolving problems with Tivoli Kernel Services.

Notes:

- Tivoli Kernel Services cannot be installed on a FAT file system. When choosing a destination directory, do **NOT** select a FAT file system.
- When installing Tivoli Kernel Services, you need to login as a user with the following characteristics:
  - A user name of 8 characters or less
  - Administrative authority
  - **Log on as a service** authority
  - DB2 administrative authority
- When installing the Tivoli Kernel Services installation depot, you must log onto the machine locally and not into a domain. You should also be a member of the local Administrators group.
- When installing Tivoli Kernel Services, ensure that DB2 is started and running by bringing up the DB2 Control Center. See “Checking for DB2” on page 125.
- Make sure that the **Windows Explorer** and **My Computer** are closed (to avoid any contention with building the Tivoli Presentation Services helpset). You can use Windows Explorer to start the installation, but the Explorer does not need to stay open.

The installation steps are as follows:

1. Log onto the manager machine using your **db2admin** ID.
2. Insert the Tivoli Kernel Services CD into the CD–ROM drive of the manager machine (Windows 2000).
3. The Tivoli Kernel Services CD is not an AutoRun CD. Go into Windows Explorer and click on your CD–ROM drive. On the right of the Explorer window, double–click the **Install.bat** program.
4. The **Welcome** screen is displayed. Click **Next** to continue.
5. You will see the **License Agreement** screen. Read the license agreement and if you agree, click **Yes**.

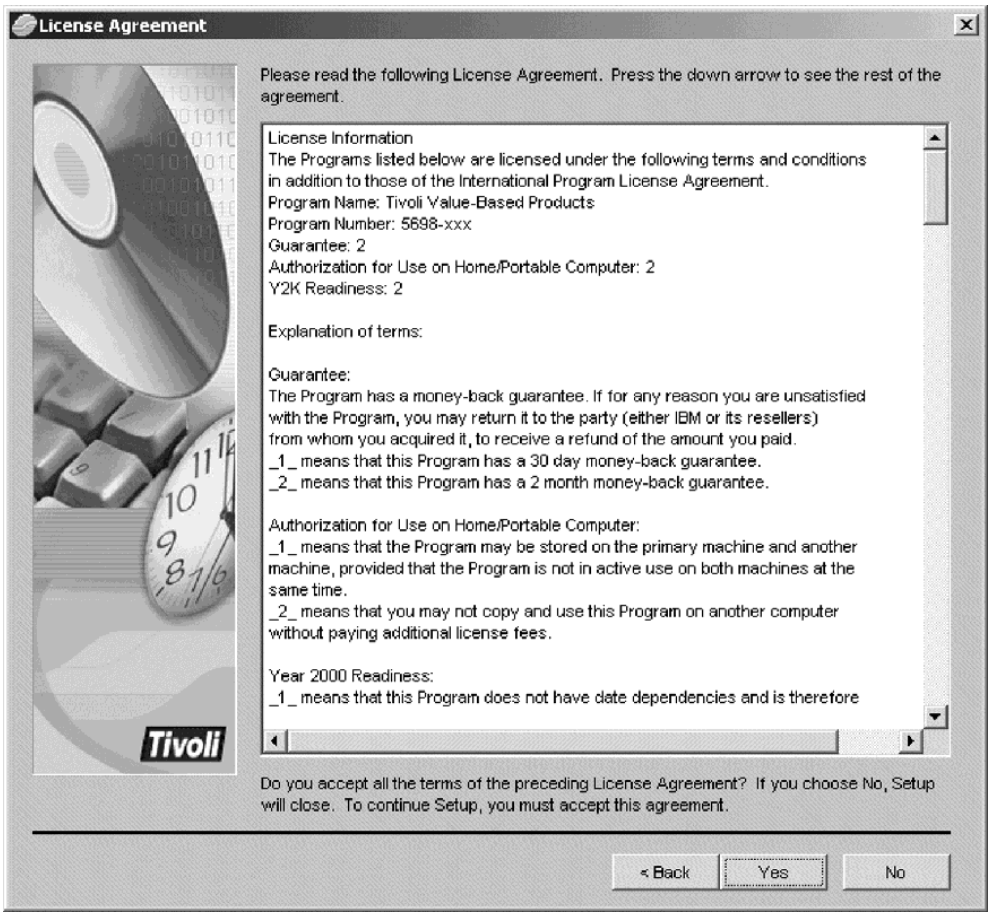

Figure 26. License Agreement Screen

6. You will see this **Readme File** of last-minute instructions. Read the contents and click **Next** to continue.

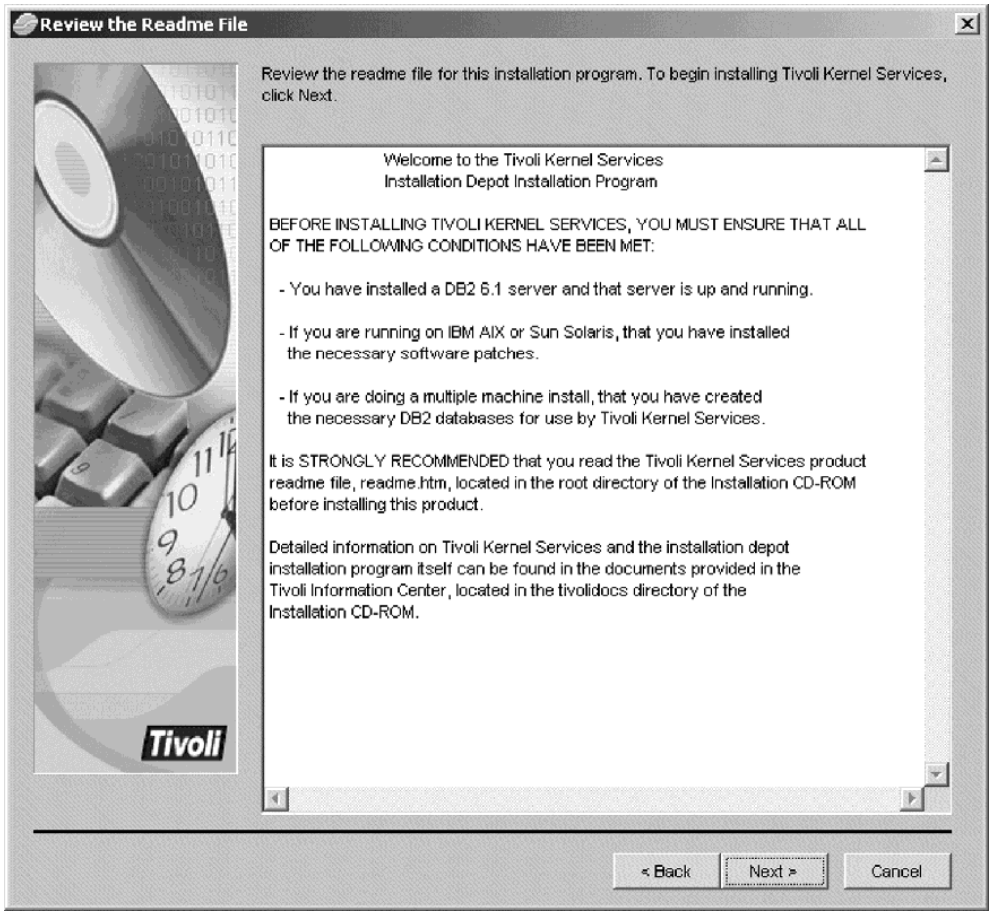

Figure 27. Readme File

7. Figure 28 allows you to choose the type of Tivoli Kernel Services installation. Select **Single machine install**. Click **Next** to continue.

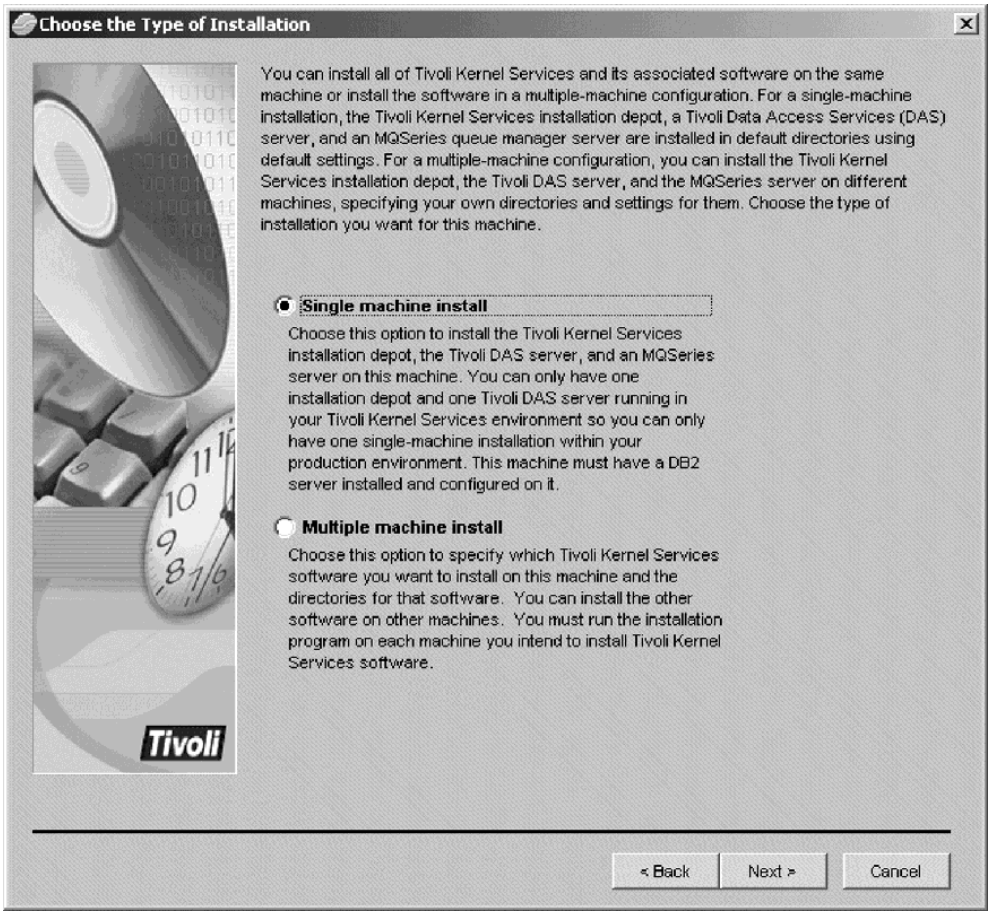

Figure 28. Specifying Type of Install

8. The **Enter the Namespace Name** screen is displayed. When installing Tivoli Kernel Services, it will ask you for a namespace. All ORBs, ORB sets, and other resources exist within namespaces. Namespaces are the main organizing construct in Tivoli Kernel Services. A namespace is a flat, non–overlapping structure within the distributed system. The primary purpose of a namespace is to form an identification scope for the objects that exist within it. Objects are tied to a through the creation of an object ID (OID) reference that serves as a persistent, active reference for that object. The name you select should be short, printable characters, and unique (if you have several installations). The namespace is appended to objects in Tivoli Kernel Services, such as ORBs and ORB sets. The namespace is also displayed on the Tivoli Console and in trace and error logs.

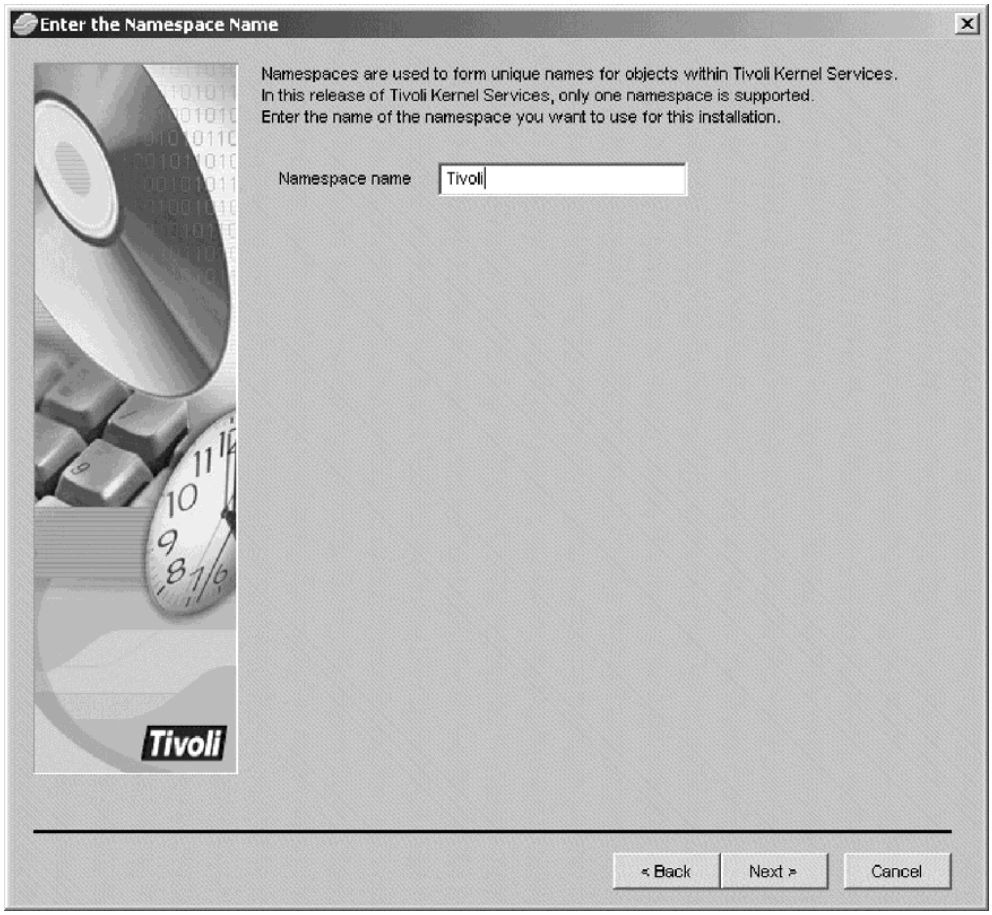

Figure 29. Specifying a Namespace

9. You are asked to specify the destination directory as shown in Figure 30. Click **Next** to continue.

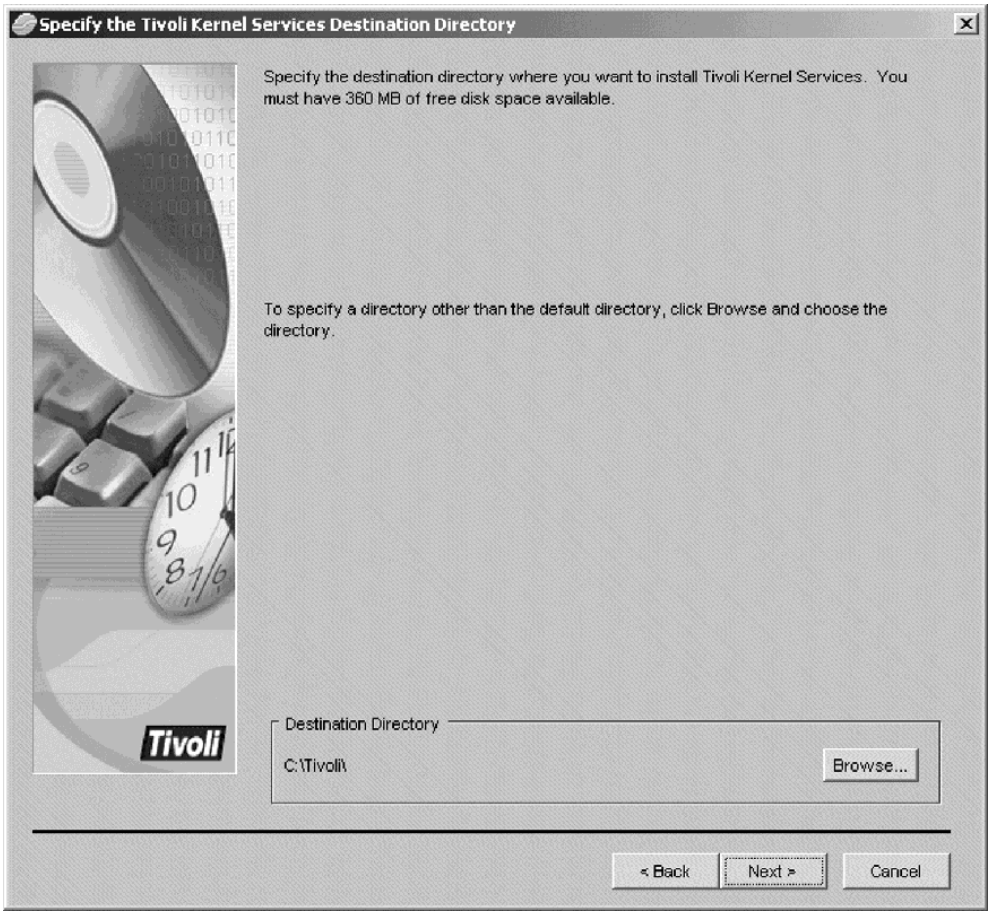

Figure 30. Specifying Destination Directory

10. The **Enter the Database Server Information** screen is displayed. If you are using the default user ID of **db2admin**, enter the user ID and password here. Click **Next** to continue.

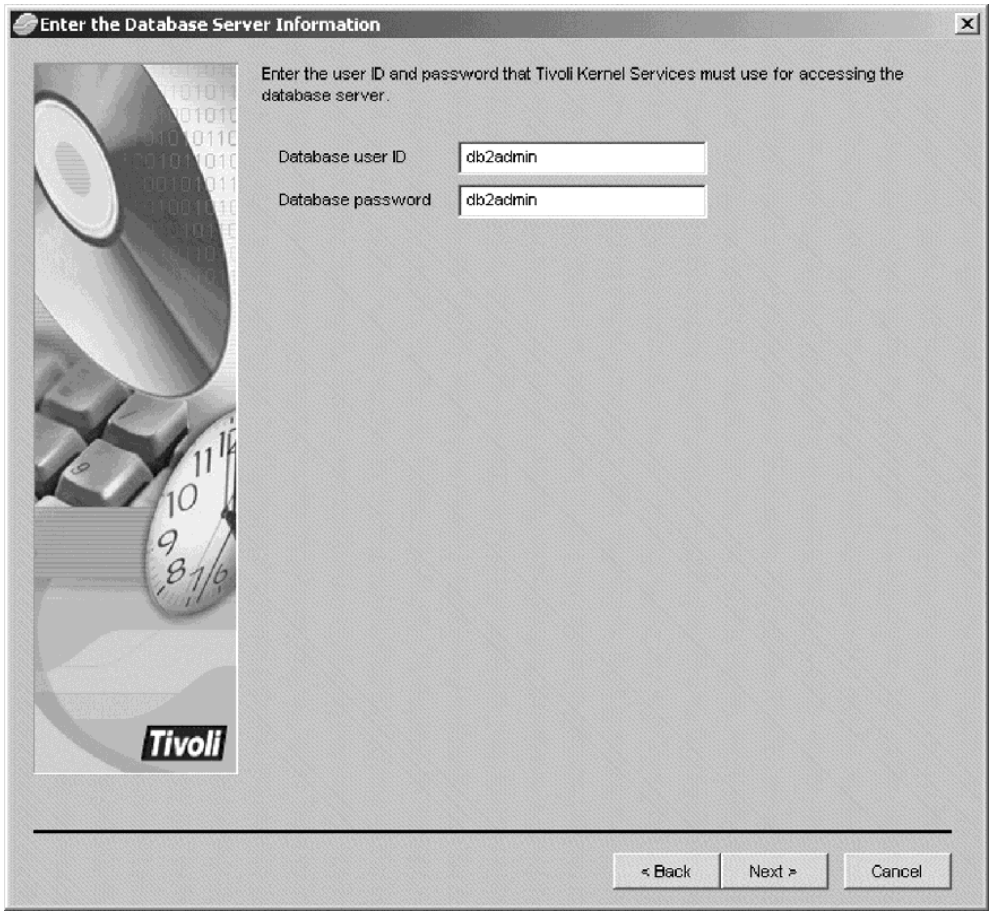

Figure 31. Specifying Database Information

11. The **Review Selected Installation Options** screen is displayed. Review your selections and click **Next** to continue.

    During the installation, you might see windows that seem to hang (for example, the **Copying Files** dialog box). Please be patient as some steps require at least 5–10 minutes.

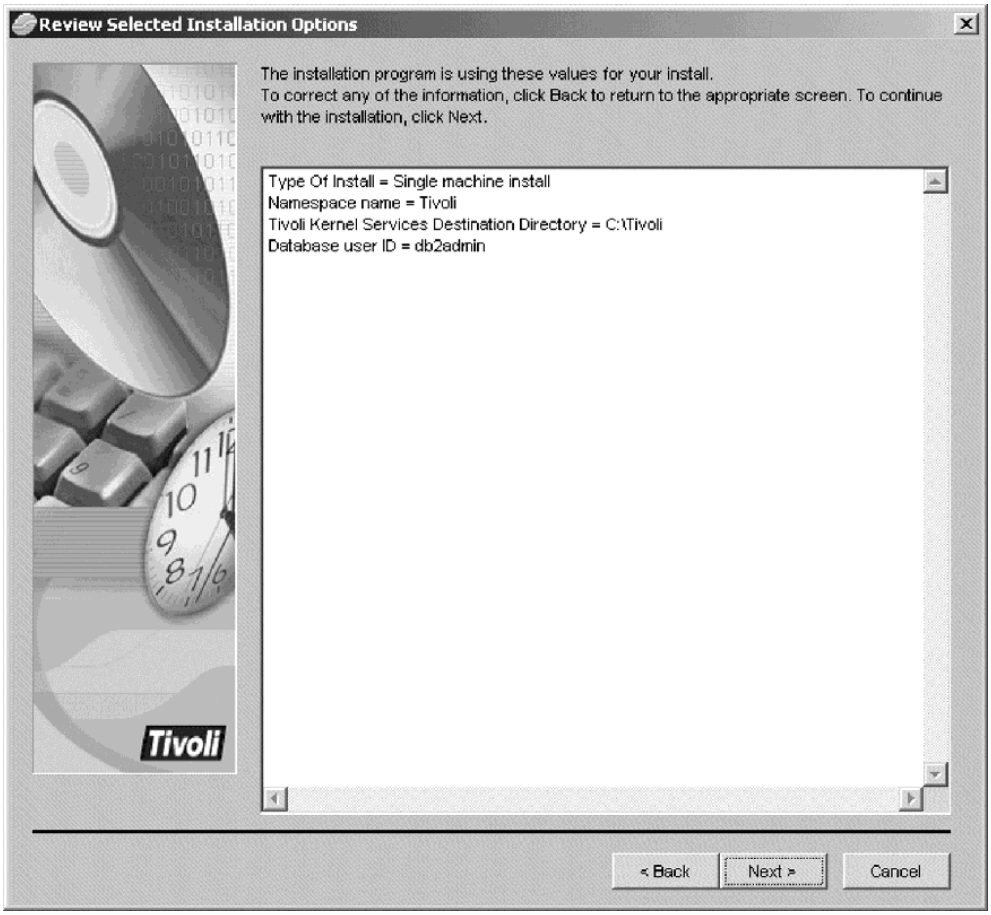

Figure 32. Review Selected Installation Options Screen

12. During the installation, you will see a DB2 CLP window. This shows the steps Tivoli Kernel Services is going through installing the DB2 tables. You can review the contents and close the window when the command completes. You will see this message:

    ```
    Tivoli database installation, creation, and configuration now
    complete.
    ```

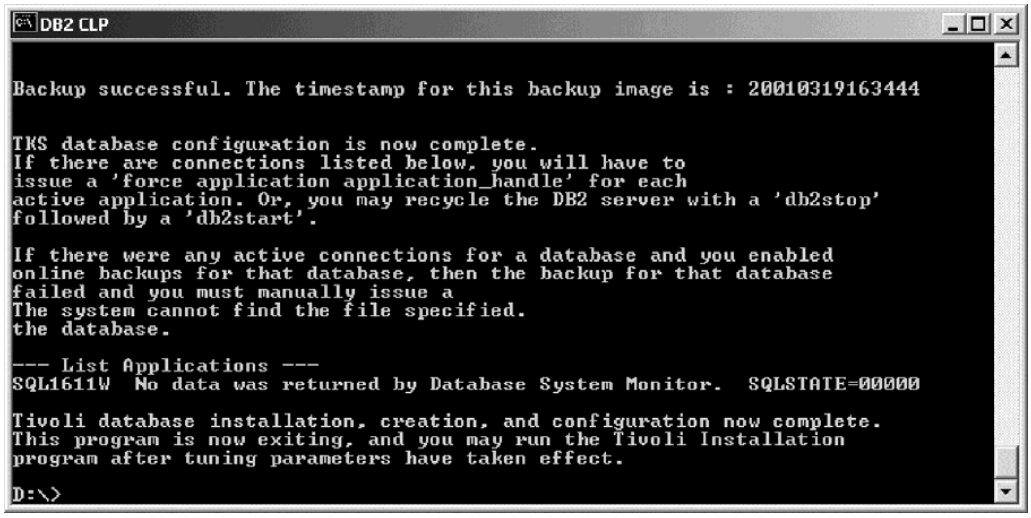

Figure 33. DB2 CLP Window

13. Towards the end of the setup phase, you will see the message text **PF Setup Complete!** and the **Next** button is activated. Click **Next** to continue.

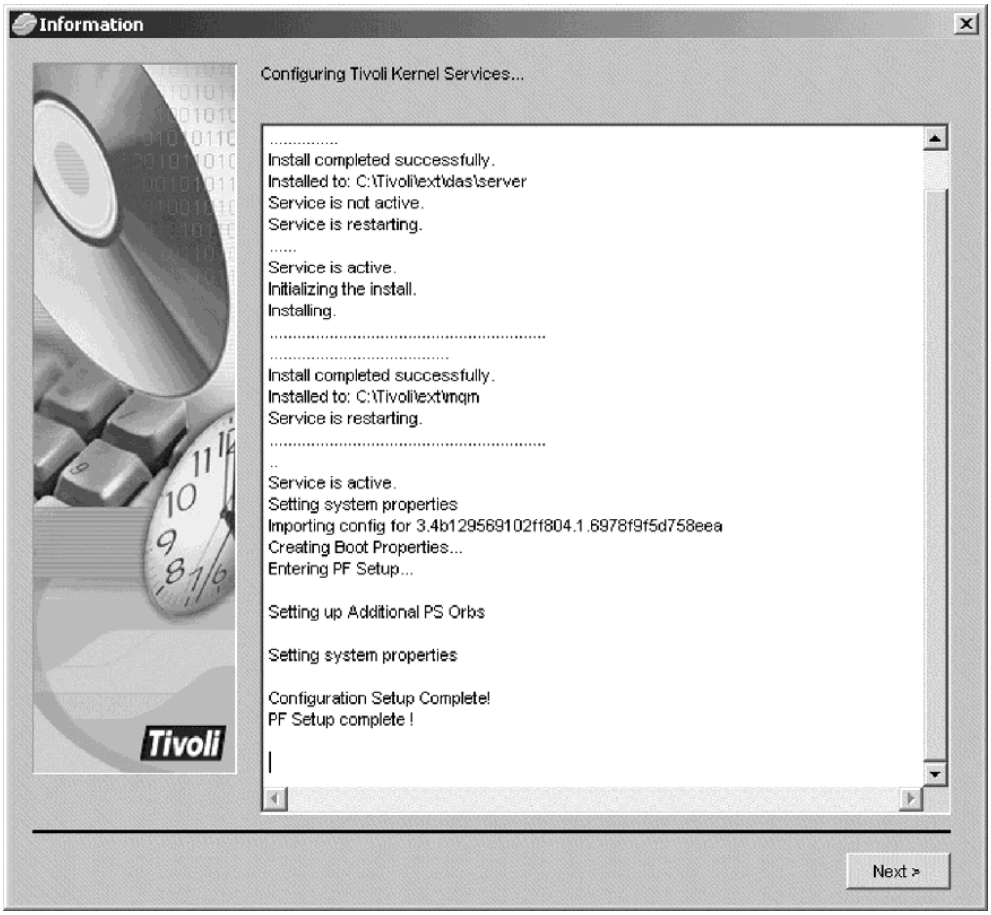

Figure 34. Information Screen

14. The **Tivoli Kernel Services Setup Is Complete** screen is displayed. Click **Finish** and the window will disappear. However, there is still Tivoli Kernel Services activity that is going on in the background. To monitor the CPU activity, right–click on the task bar and click **Task Manager**. The **Windows Task Manager** window is displayed. Click on the **Performance** tab to see the CPU activity. Wait until the CPU utilization drops down to about 4–5 %. This can take from 30 minutes to one hour.

    You will see two MQSeries services windows open: **runmqlsr.exe** and **runmqtrm.exe**. Do **not** close these windows.

    Note: If you are using a terminal emulator (like Virtual Network Computing), then your CPU activity will not drop. You will need to look at the CPU activity by process. Click on the **Processes** tab, and watch which processes are using CPU time. When only the terminal emulator is active, and all other processes have stopped using CPU time, then you can proceed.

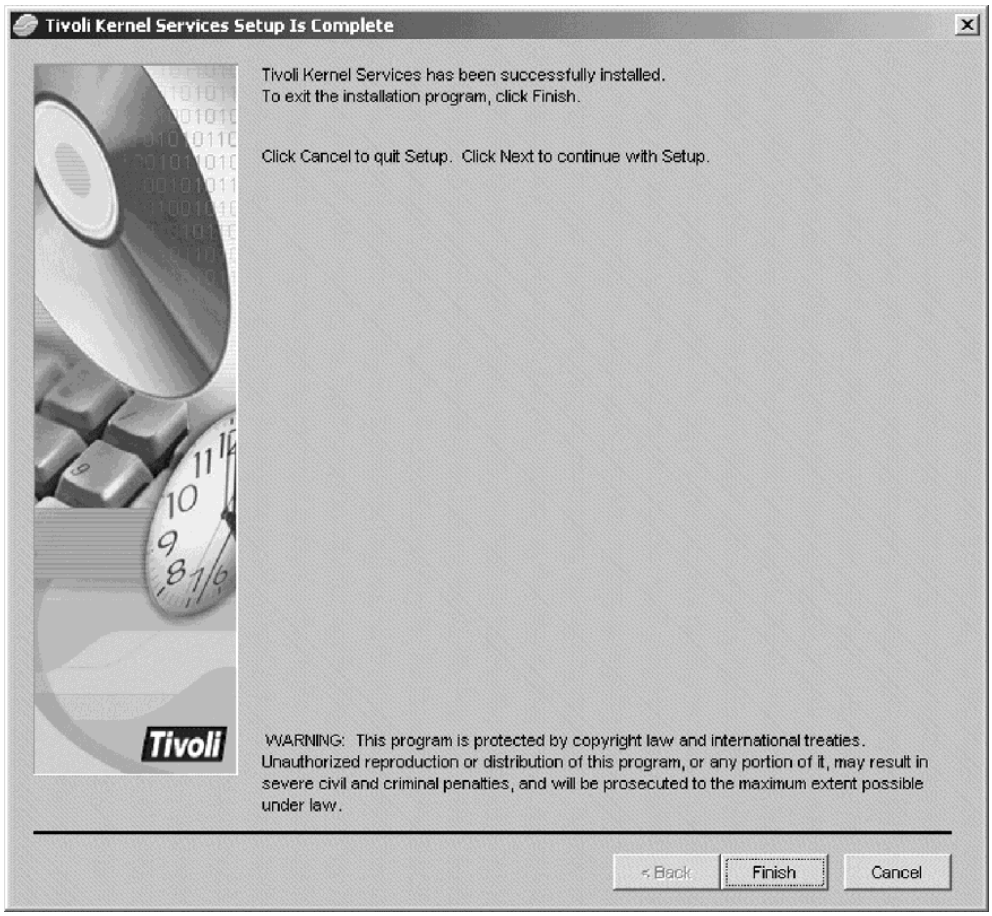

Figure 35. Tivoli Kernel Services Setup Is Complete Screen

Step 3: Run makeNTaccount1108.bat

In order for the **idsetup.cmd** and the Tivoli Storage Network Manager to run correctly, you must authorize your Windows 2000 user ID to Tivoli Kernel Services. This allows you (or the command files and programs) to issue commands to Tivoli Kernel Services from the command prompt. If you used the default user ID (**db2admin**), this step will register the **db2admin** user ID as a user of Tivoli Kernel Services with **superadmin** authority. This is run on the manager machine.

Note that after **makeNTaccount1108.bat** has been run, any user logged into Windows using the **db2admin** user ID has **full** Tivoli Kernel Services authority from the command line. This user ID should be used with caution and not be used by the casual user. For information on how to create a user ID with less authority, see "How to Create a Tivoli Storage Network Manager User ID" on page 96.

Follow these steps:

1. Make sure that **orb.1** is running.
2. Make sure that you are logged onto Windows by using the user ID that you intend to authorize for Tivoli Kernel Services applications. (We recommend that you use your DB2 administrative user ID which defaults to **db2admin**.)
3. Open a command window.
4. Change the directory to the drive where Tivoli Kernel Services is installed. For example:

   ```
   c:                (change to the drive where Tivoli Kernel Services
                      is installed)
   cd \Tivoli\orb.1  (change to the orb.1 directory)
   ```

5. Run the **setupenv** program by entering the following command from the command prompt:

   ```
   setupenv
   ```

   This enables Tivoli Kernel Services commands to be issued from this command prompt.
6. Change the drive to the CD–ROM drive that contains the Tivoli Storage Network Manager installation program. (Leave the Tivoli Storage Network Manager CD–ROM in this drive for the remainder of this section.) For example, if your CD–ROM drive is drive **e**, the type **e:**.
7. Change your directory to **\util** by issuing this command:

   ```
   cd \util
   ```

8. Run the **makeNTaccount1108.bat** file by specifying the fully qualified hostname for your machine and your Windows NT or Windows 2000 user ID.

   The format of the command is:

   ```
   makeNTaccount1108 <hostname> <userid>
   ```

   Where <*hostname*> is the fully qualified hostname for your machine, and <*userid*> is the Windows user ID.

   An example is:

   ```
   makeNTaccount1108 myhost.mydomain.com ibmuser
   ```

9. Note that this step gives your DB2 administrative user ID the authority to issue Tivoli Kernel Services commands. This step will register the DB2 administrative user ID as a user of Tivoli Kernel Services with **superadmin** authority. If you used the default of **db2admin**, the password is **db2admin**. However, this step requires you to enter a **different** password (**password**) for **db2admin**. Please follow these instructions exactly.

   When prompted for a password, enter the word **password**. This will happen two times. If you see an error message, run this command again.

   An example of the command and output is shown as follows. **Sanbox11.sanjose.ibm.com** is the fully qualified host name of the manager machine. This output might not exactly match your output. It has been edited for readability.

```
c:\util>makeNTaccount1108 sanbox11.sanjose.ibm.com db2admin

Creating an NT Account with Super Administrator authority.
Enter "password" as password when prompted.

c:\util>wcmd -u superadmin ssm crtSubcontext -c system/accounts
-sc sanbox11.sanjose.ibm.com
Password: (enter password here)

Trying to create context=system/accounts, subContext=sanbox11.
sanjose.ibm.com
Resource Attributes are:{objectClass=objectClass: OU, ou=ou:
sanbox11.sanjose.ibm.com}
Resource added:system/accounts/sanbox11.sanjose.ibm.com

c:\util>wcmd -u superadmin ssm crtInstance -c system/accounts/
sanbox11.sanjose.ibm.com -n db2admin -oc NTAccount
signOnTarget=system/services/signOnTargets/KernelService
"principal=security/SuperAdministrators/John D.Super"
host=sanbox11.sanjose.ibm.com

Password: (enter password here)

Resource Attributes are:{objectClass=objectClass: NTAccount,
host=host: sanbox11.sanjose.ibm.com, principal=principal:
security/SuperAdminitratotrs/John D. Super, signOnTarget=signOnTarget:
system/services/signOnTargets/KernelService, cn=cn: db2admin}
Resource added:system/accounts/sanbox11.sanjose.ibm.com/db2admin
```

10. You are now authorized to issue Tivoli Kernel Services **wcmd** commands. These **wcmd** commands are issued for you in the following programs.

11. Do not close the command prompt window. This can be used for the next step.

Step 4: Run idsetup.cmd

Run the **idsetup.cmd** file to perform critical updates to Tivoli Kernel Services that are necessary before the Tivoli Storage Network Manager installation program is run. This step is performed on the manager machine.

Follow these steps:

1. Make sure that **orb.1** is running.

2. Open a command prompt window, if the command window from the previous step has been closed.

3. Ensure that the Tivoli Storage Network Manager CD is in the CD–ROM drive. Change your drive to the **\util** directory of the CD–ROM drive (**e:**).

   For example:

```
e:
cd \util
```

4. Run the following script:

   ```
   idsetup <TKS_directory>
   ```

   where <*TKS_directory*> refers to the directory where Tivoli Kernel Services is installed. By default, this is **c:\Tivoli**. An example of running the script is as follows:

   ```
   c:\util idsetup c:\tivoli
   ```

   An example of the output is shown as follows:

   ```
   wcmd cfg removenode !.orbdefaults /.timestamp
   Remove directory "c:\tivoli"\orb.2\cfg\.orbdefaults\.timestamp
   You must recycle orb.1 now.
   ```

   Recycle the ORBs as described in "Step 5: Changing the JVM Memory Setting".

Step 5: Changing the JVM Memory Setting

To change the JVM memory setting, follow these steps:

1. Stop the ORBs on the manager machine. To stop the ORBs, follow these steps:

   a. From a command prompt window, issue the following commands for **orb.2**:

      ```
      net stop orb.2
      ```

      You will see this message:

      ```
      The Tivoli Kernel Services orb.2 service was stopped successfully.
      ```

   b. From a command prompt window, issue the following command for **orb.1**:

      ```
      net stop orb.1
      ```

      You will see this message:

      ```
      The Tivoli Kernel Services orb.1 service was stopped successfully.
      ```

   c. Recycle the DAS Server. Whenever **orb.1** is shut down on the manager machine, the DAS Server must be recycled. To recycle the DAS Server, issue these commands:

      ```
      net stop "Tivoli Kernel Services DASRestarter"
      net start "Tivoli Kernel Services DASRestarter"
      ```

2. Go into Explorer and edit the **LOCKCFG.properties** file in directory **c:\tivoli\orb.1\bin\w32–ix86**.

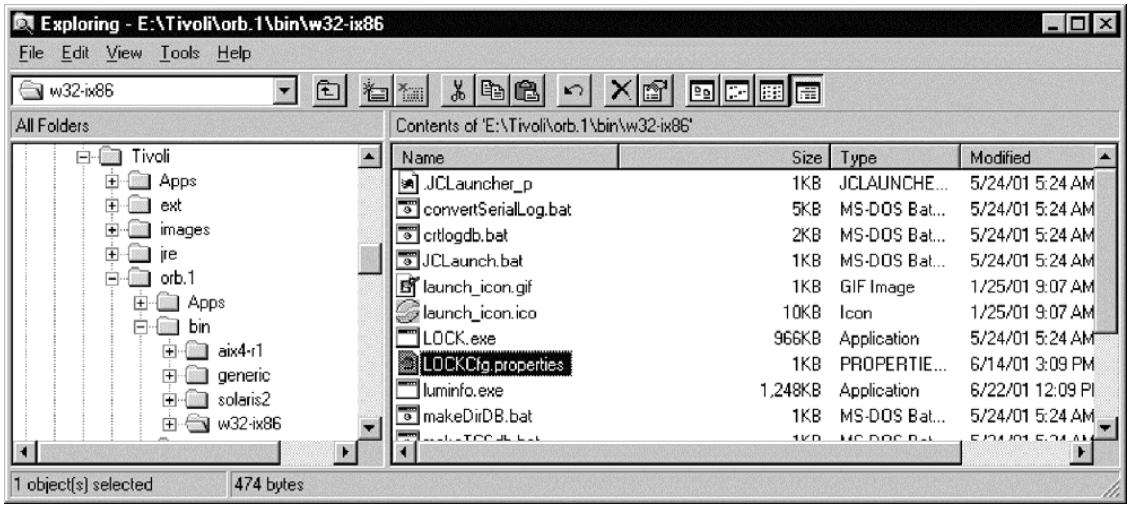

Figure 36. Changing the LOCKCFG.properties File

3. Change the following in the **LOCKCFG.properties** file:

```
LOCK_JVMARGS=-Xms32m\ -Xmx256m
       to
LOCK_JVMARGS=-Xms32m\ -Xmx512m
```

4. To start the ORBs, follow these steps:

   a. Start **orb.1** on the manager machine by issuing this command:

   ```
   net start orb.1
   ```

   You will see this message:

   ```
   The Tivoli Kernel Services orb.1 service is starting.
   The Tivoli Kernel Services orb.1 service was started successfully.
   ```

   b. Start **orb.2** by issuing this command:

   ```
   net start orb.2
   ```

   You will see this message:

   ```
   The Tivoli Kernel Services orb.2 service is starting.
   The Tivoli Kernel Services orb.2 service was started successfully.
   ```

Step 6: Launch the Tivoli Console

You should launch the Tivoli Console to make sure that the Tivoli Console is operating. To launch the Tivoli Console, double–click on the icon on your desktop. You can use the default Tivoli Kernel Services user ID and password: **superadmin** and **password** to login.

The Tivoli Console launches **orb.2**. If this is the first time you are launching **orb.2** after installing the Tivoli Kernel Services patch 1.1.1–TKS–0004, **orb.2** automatically shuts down for upgrading. You will have to re–launch **orb.2**.

Step 7: Create the Tivoli Storage Network Manager Database

> **Note**
> Do not install Tivoli Storage Network Manager if this procedure does not complete successfully. This procedure creates the Tivoli Storage Network Manager database that is required by Tivoli Storage Network Manager.

These instructions assume that you have installed the DB2 database when you installed Tivoli Kernel Services. You should not have any DB2 connections active while creating the Tivoli Storage Network Manager database.

To create the Tivoli Storage Network Manager database, you must be logged onto the manager machine as the DB2 administrator. (If you accepted the default, it is **db2admin**). This user ID must have **Log on as a service** authority and be a member of the Administrator Group.

Before installing Tivoli Storage Network Manager, you should run the **runstats** command for Tivoli Kernel Services. You should see a significant performance improvement when installing Tivoli Storage Network Manager. For information about the **runstats** command, see "Updating DB2 Statistics" on page 124.

Follow these steps to install the Tivoli Storage Network Manager database:

1. Make sure that the ORBs are stopped. To stop **orb.2**, issue this command:

   ```
   net stop "Tivoli Kernel Services orb.2"
        or
   net stop orb.2
   ```

   To stop **orb.1**, issue this command:

   ```
   net stop "Tivoli Kernel Services orb.1"
        or
   net stop orb.1
   ```

2. Put the Tivoli Storage Network Manager CD into the CD-ROM drive.

3. Go into Windows Explorer and click on your CD-ROM drive. On the right of the Explorer window, double click the **Install.bat** program. The following screen is displayed. Select **Create Database.**

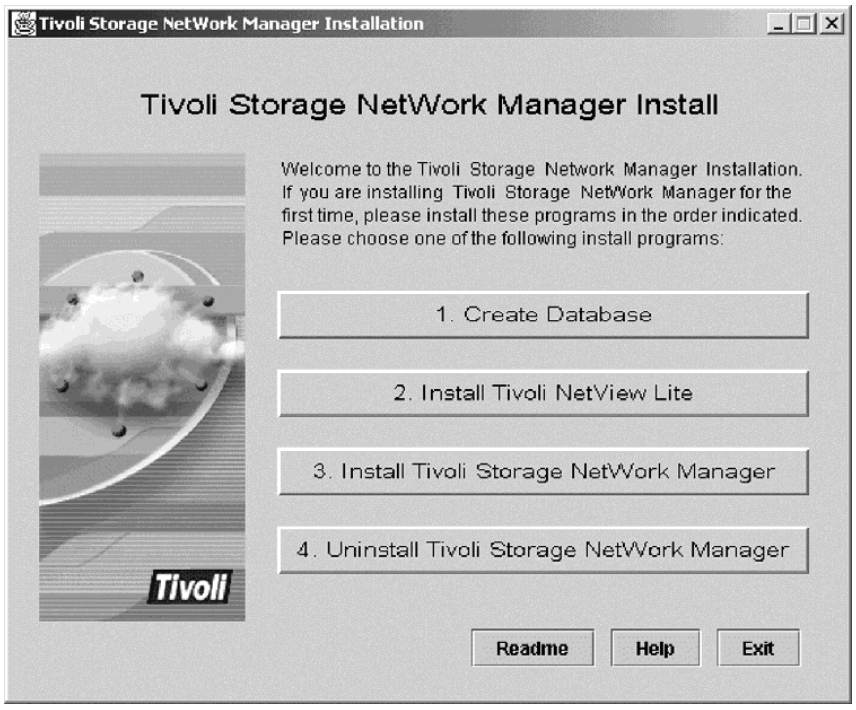

Figure 37. Tivoli Storage Network Manager Installation Screen

4. On the **Welcome** screen, click **Next**.

Figure 38. Tivoli Storage Network Manager Welcome Screen

5. At the **Installation Options** screen, you can Install and configure the Tivoli Storage Network Manager database and configure the DAS Server. If this is your first time installing Tivoli Storage Network Manager, you should select both choices. You can also copy the Tivoli Storage Network Manager database installation log and script to this computer. It is recommended that you check both of these options. You can also choose a directory for your script and log files. Click **Next** to continue the installation.

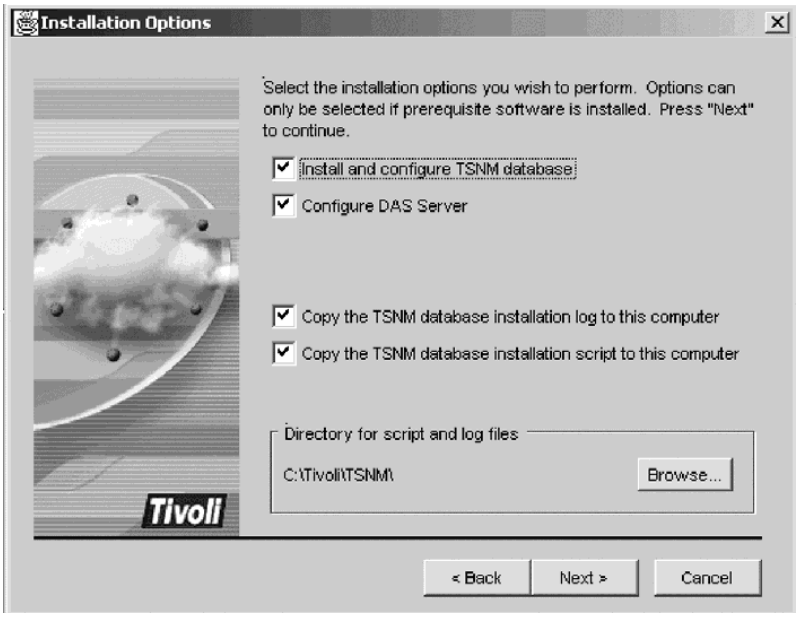

Figure 39. Installation Options

6. At the **DB2 User ID and Password** screen, enter your DB2 administrative user ID and password. This user ID must be in the Administrator Group and must have **Log on as a service** authority. Click **Next** to continue the installation.

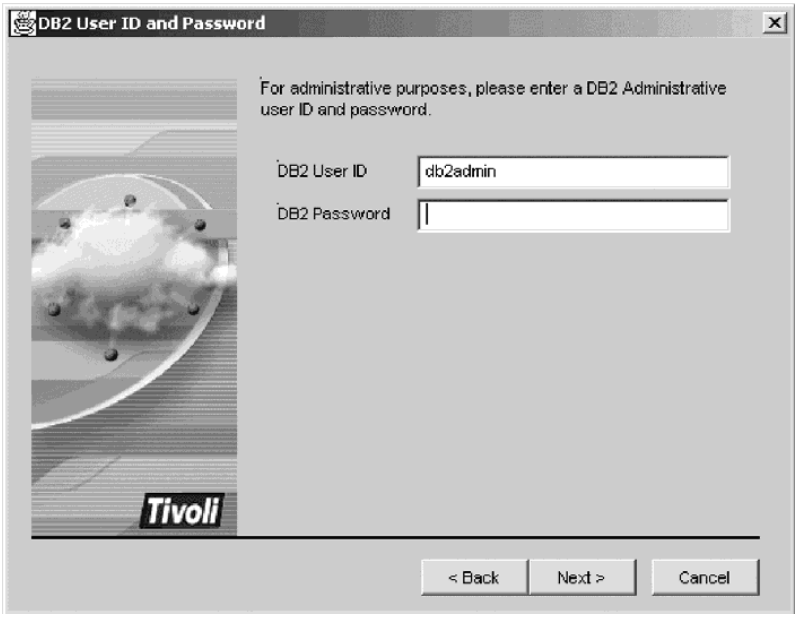

Figure 40. DB2 User ID and Password Screen

7. At the **Database Information** screen, enter two DB2 user IDs and passwords and the name of your DB2 database. These are the two user IDs you created in "Step 3: Creating Two Additional Windows User IDs" on page 18. Do **not** use **db2admin** as one of the user IDs here. The default DB2 database name is **tivolsan**. The Tivoli Kernel Services single machine install always sets the online database backup flag. Accept the default of **Enable on–line database backups** to be consistent with Tivoli Kernel Services. Click **Next** to continue the installation.

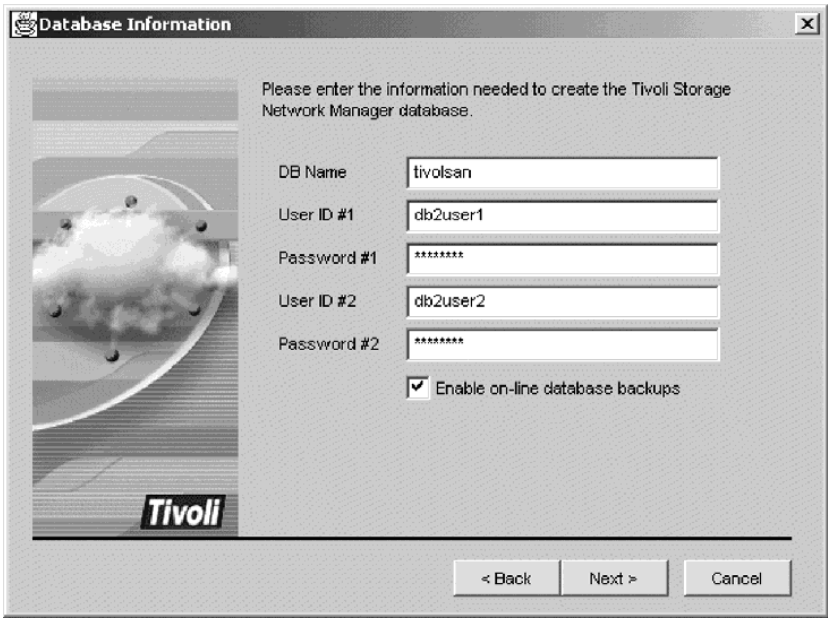

Figure 41. Database Information Screen

8. If you have a DB2 connection active, you will see the following **Active Connections** screen. You can stop DB2 automatically or manually. Select a choice, then click **Next**. If anyone is connected to the database you are trying to create (**tivolsan** in this case), the install program will fail.

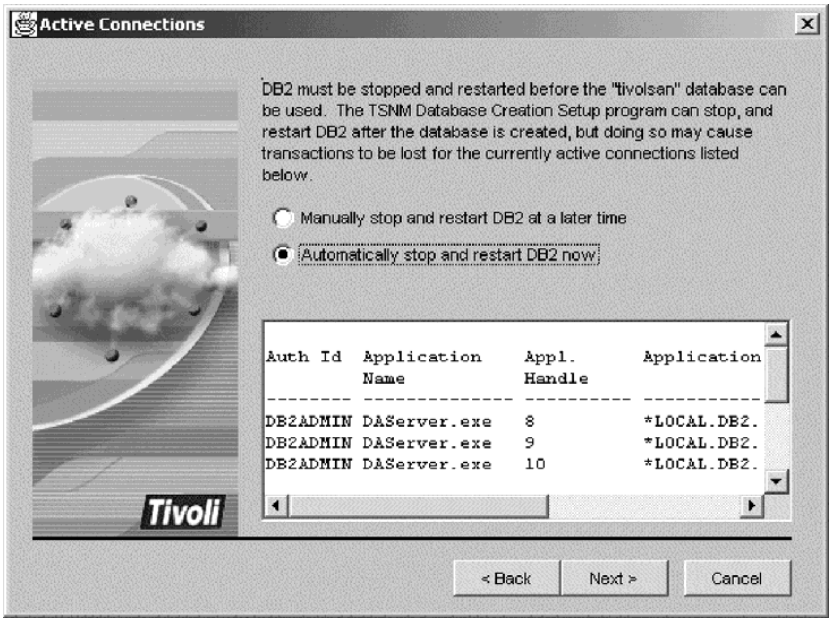

Figure 42. Active Connections Screen

9. At the **Confirm Database Parameters** screen, review the information. Click **Next** to continue the installation.

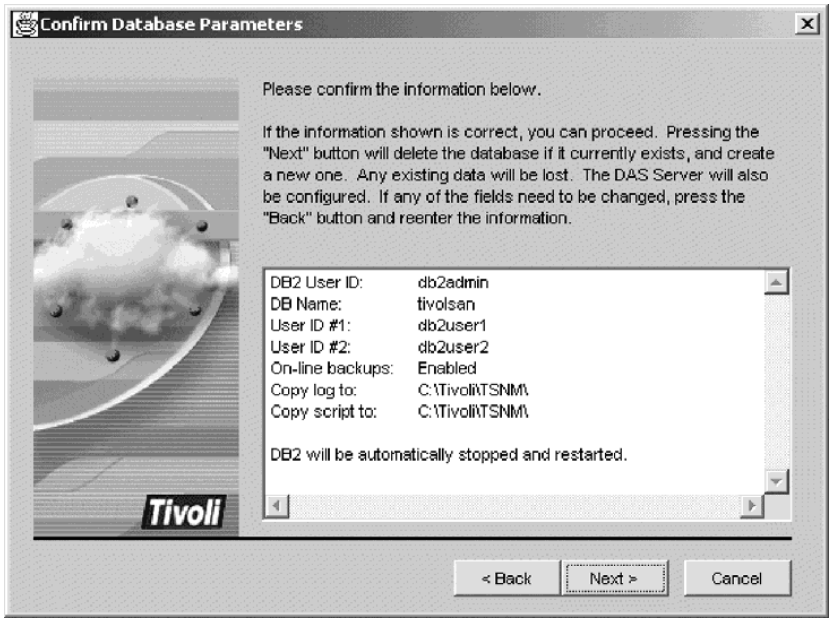

Figure 43. Confirm Database Parameters Screen

10. The **Database Creation Progress** screen is displayed. This can take from 5–10 minutes.

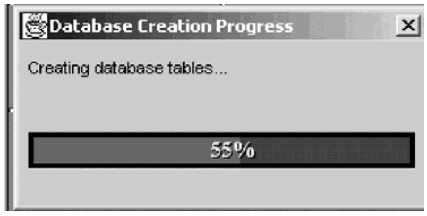

Figure 44. Database Creation Progress Screen

11. After the database has been created, you will see the **Installation Complete** screen. If the DAS server was not automatically restarted, see step 15 on page 54.

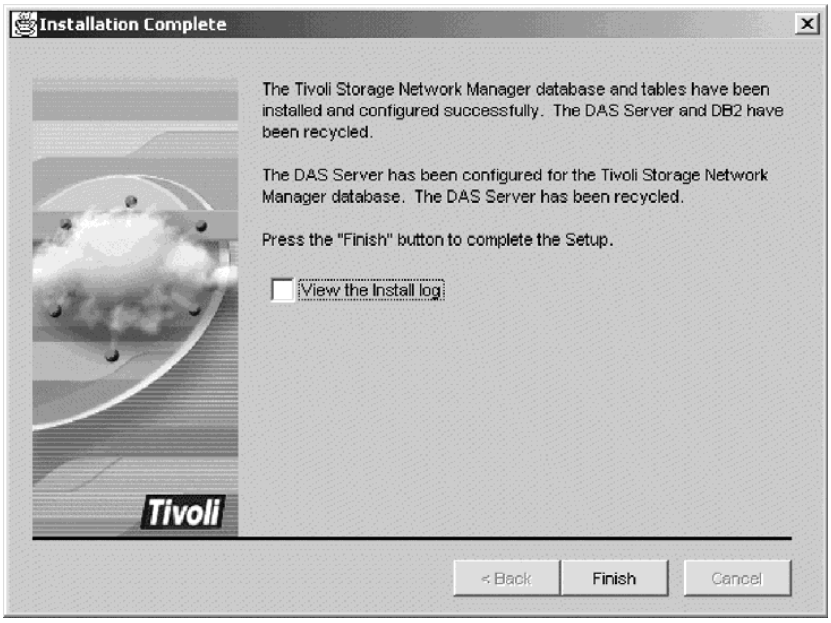

Figure 45. Installation Complete Screen

12. After the database is created, and if you selected to view the logs, you will see the **Install Log** screen. Click **Finish** to close this window.

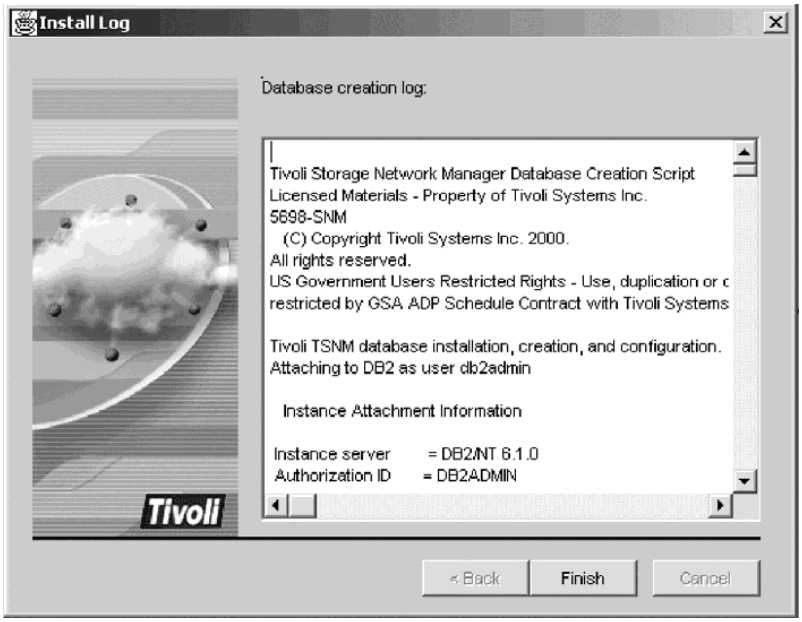

Figure 46. Install Log Screen

13. Run the **SADB.bat** script. This script is in the **\util** directory on the Tivoli Storage Network Manager CD. This script cleans up the File System Manager database tables. Run this step before you install Tivoli Storage Network Manager version 1.1.3.

To run this script, you need to supply the same user ID, password, and database name you used to create the Tivoli Storage Network Manager database. See Figure 41 on page 50. Run the script from a DB2 command window as follows:

```
SADB.bat <db2user1> <db2password1> <databasename>
```

Where <*db2user1*> is the DB2 User ID #1, <*db2password1*> is the DB2 Password #1, and <*databasename*> is the database name as supplied in Figure 41 on page 50. Note that you only need the **first** *db2user1* and *db2password1*.

14. If the installation fails, you will see the **Installation Failed** screen. You should not install Tivoli Storage Network Manager if this procedure fails. Make sure you check **View the Install Log** so you can view the installation log to determine what caused the procedure to fail. If you cannot determine what caused the failure, save the log and contact your service representative for help. The most common reasons for failure are:

    - A wrong password was entered for one or more of the user IDs entered. This problem can easily be corrected by running the database creation program again with the correct passwords.
    - There is an active connection to the Tivoli Storage Network Manager database. This can happen if you are rerunning the database creation program. To solve this problem, stop the ORBs and DAS Server by issuing these commands:

      ```
      net stop orb.2
      net stop orb.1
      net stop "Tivoli Kernel Services DASRestarter"
      ```

      Rerun the database creation program.

    Click **Finish** to close this window.

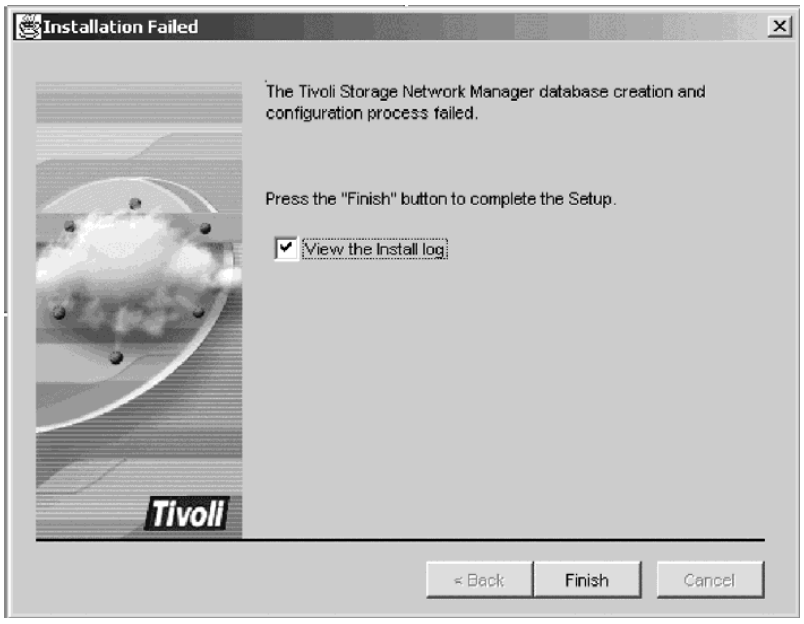

Figure 47. Installation Failed Screen

15. If you chose to manually stop and restart DB2 (Figure 42 on page 50) or if you get a message to recycle DAS, follow these steps:

    a. Stop **orb.2** (if running). Issue this command:

    ```
    net stop "Tivoli Kernel Services orb.2"
         or
    net stop orb.2
    ```

    b. Stop **orb.1**. Issue this command:

    ```
    net stop "Tivoli Kernel Services orb.1"
         or
    net stop orb.1
    ```

    c. From a command prompt, issue the following command:

    ```
    net stop "Tivoli Kernel Services DASRestarter"
    ```

    d. When the **net stop** command completes, issue **db2stop**.

    e. When the **db2stop** command completes, issue **db2start**.

    f. When the **db2start** command completes, issue the following command:

    ```
    net start "Tivoli Kernel Services DASRestarter"
    ```

    g. Start **orb.1**. Issue this command:

    ```
    net start "Tivoli Kernel Services orb.1"
         or
    net start orb.1
    ```

    h. Start **orb.2** (if you need to). Issue this command:

    ```
    net start "Tivoli Kernel Services orb.2"
         or
    net start orb.2
    ```

Step 8: Install or Configure Tivoli NetView

Tivoli Storage Network Manager will install Tivoli NetView Lite on your manager machine. If you already have Tivoli NetView installed in your enterprise, you still need to run this procedure so Tivoli Storage Network Manager can update the appropriate files in Tivoli NetView. See "Configuring Tivoli NetView" on page 104 for additional information about using an existing Tivoli NetView program.

For information about installing a remote Tivoli NetView console, see "Configuring a Remote Tivoli NetView Console" on page 105.

Tivoli NetView Lite uses ports 8010 and 8020 as its default ports.

Follow these steps to install or configure Tivoli NetView:

1. On the main Tivoli Storage Network Manager Installation screen, select **Install Tivoli NetView Lite**. See Figure 37 on page 47.
2. The install program checks to see if you have the correct version of Tivoli NetView 6.0.1 installed. If you have another version of Tivoli NetView, the program prompts you with:

   ```
   Do you want to completely remove the selected application and all
   of its components?
   ```

   If you click **OK**, then the window is displayed to say that maintenance is completed. Click **Finish**. You will see the main Tivoli Storage Network Manager Installation screen again. Select **Install Tivoli NetView Lite** to install Tivoli NetView Lite again.
3. The **Welcome to Tivoli NetView Setup** screen is displayed. Click **Next** to continue.

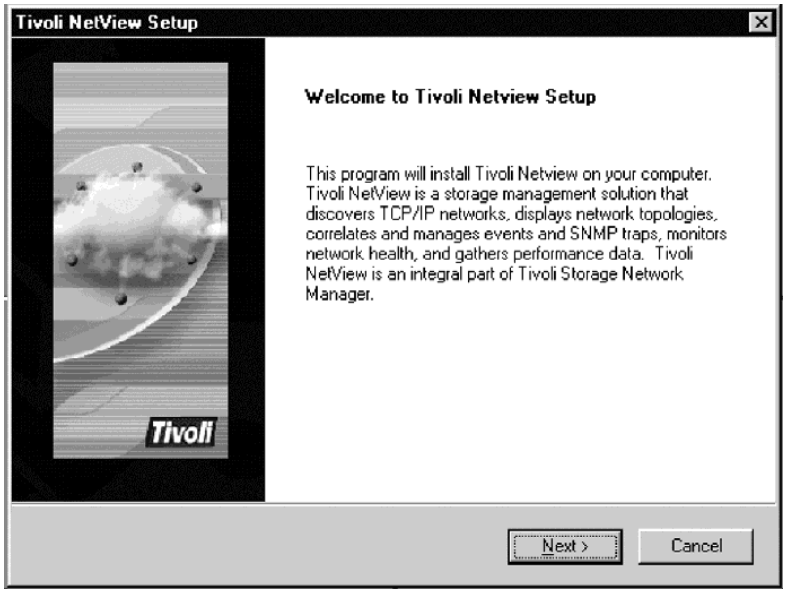

Figure 48. Welcome to Tivoli NetView Setup Screen

4. The **License Agreement** screen is displayed. Read the license agreement and if you agree, click **Yes** to continue.

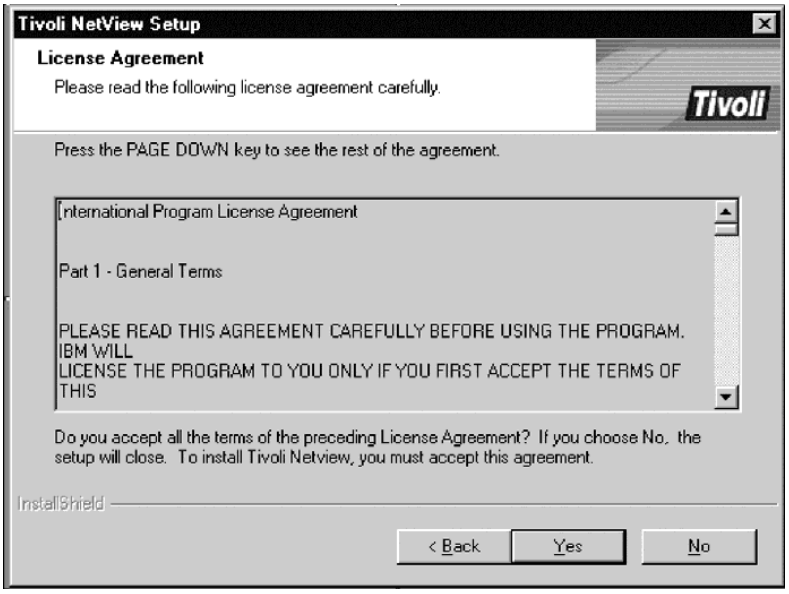

Figure 49. License Agreement Screen

5. The **User Information** window is displayed. Enter your name and your company's name. Then click **Next** to continue.

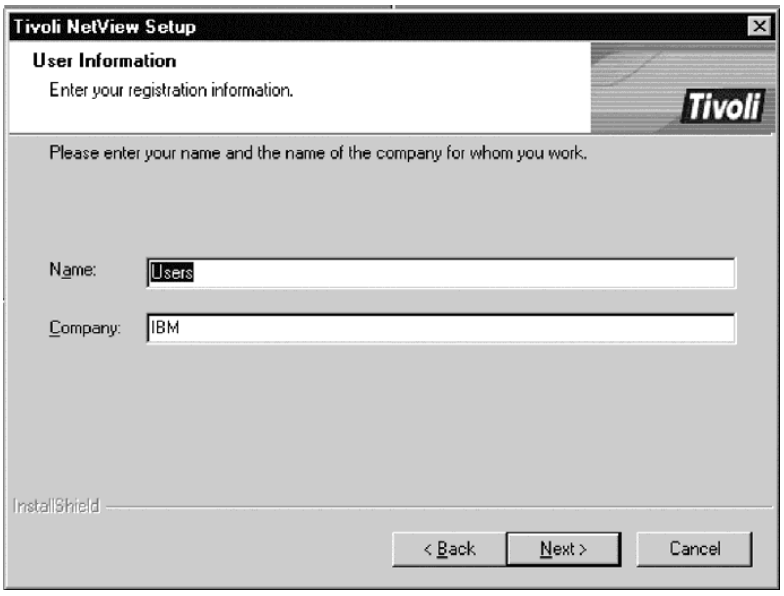

Figure 50. User Information Screen

6. The **Choose Destination Drive** window is displayed. Select the destination drive on which to install the program. Tivoli NetView is installed in the **\usr\ov** directory on the drive you select. Click **Next** to continue.

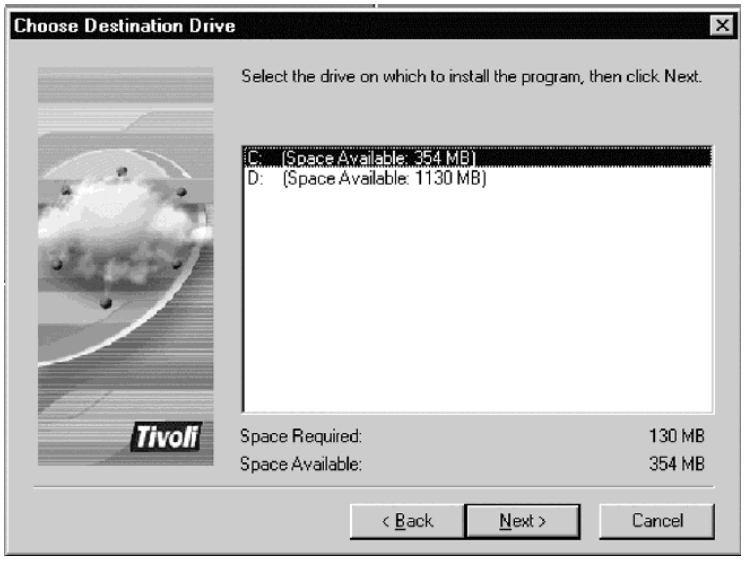

Figure 51. Choose Destination Drive Screen

7. The **Enter Password** window is displayed. This password is for the NetView Service Account to start the NetView Service. Windows will create an account with a user ID of NetView and the password that you type here. Enter your password twice, then click **Next** to continue.

Figure 52. Enter Password Screen

8. The **Start Copying Files** window is displayed. Review your current settings. If you want to change the settings, click **Back**. If you are satisfied with the settings, click **Next** to continue.

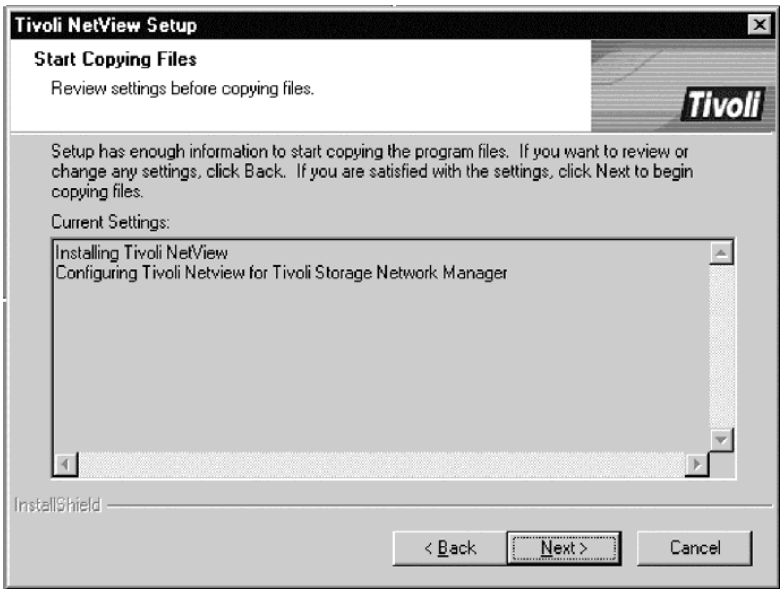

Figure 53. Start Copying Files Screen

9. The **Setup Status** window is displayed. This step might take several minutes to complete. You will see the NetView program group window. You can just close the NetView window. The **Finish** button will be activated when this step is completed. Click **Finish**.

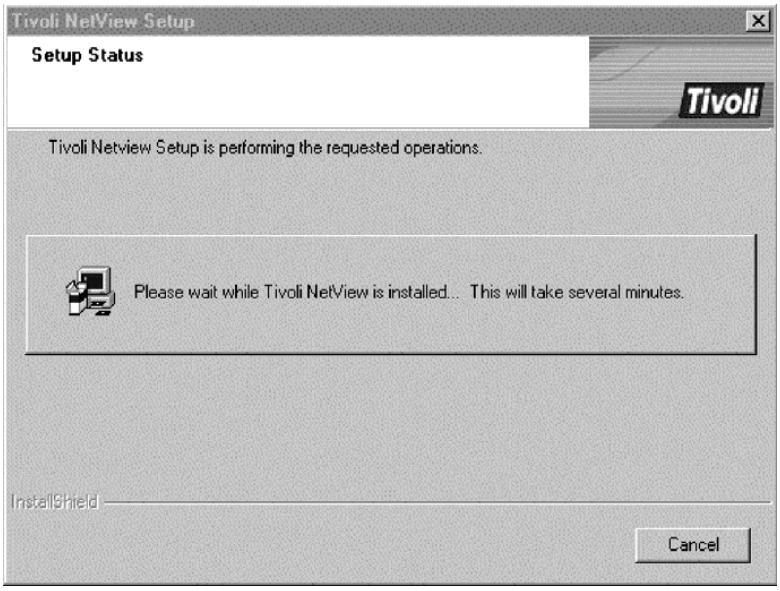

Figure 54. Setup Status Screen

10. Once the files have been copied, the **Setup Complete** window is displayed. Click **Finish** to complete the setup.

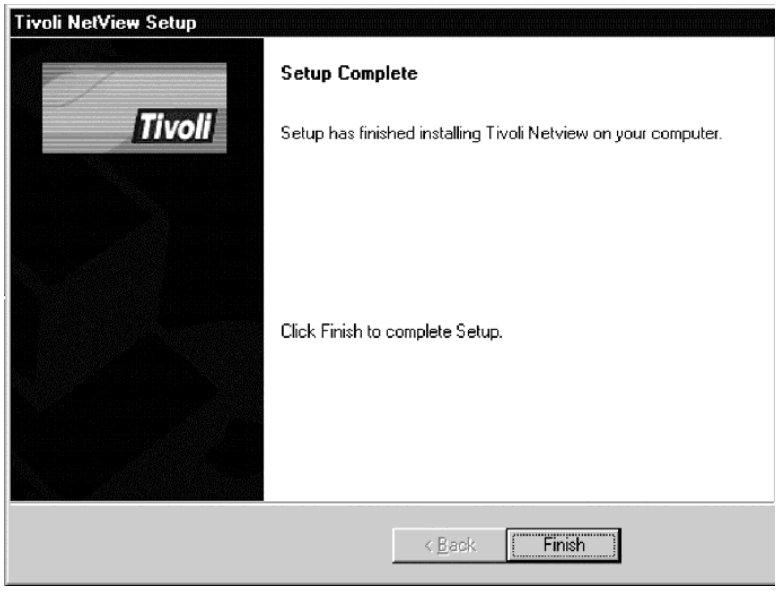

Figure 55. Setup Complete Screen

11. Once Tivoli NetView is installed, you will see the Tivoli NetView Console icon on your desktop.

Figure 56. Tivoli NetView Console Icon on Desktop

12. Reboot the machine.
13. To verify that Tivoli NetView has been installed, double–click on the Tivoli NetView Console icon on your desktop. You can then close the Tivoli NetView Console.

Step 9: Install Tivoli Storage Network Manager

Note: You must be logged into Windows as the user you granted Tivoli Kernel Services install authority to as described in "Step 3: Run makeNTaccount1108.bat" on page 42. If you have already run this script, you do not need to rerun it. We recommend that this user be your DB2 administrative ID.

If you are upgrading Tivoli Storage Network Manager, read "Upgrading Tivoli Storage Network Manager" on page 107 first.

Note: For users who are installing Tivoli Storage Network Manager Version 1.1.3 from the image on the Web: You must insert the Tivoli Storage Network Manager Version 1.1.1 or 1.1.2 CD to get the license key.

Follow these steps to install Tivoli Storage Network Manager:

1. If you did not reboot the system (from step 12 on page 59), recycle the ORBs and DAS Server. Follow these steps:

   a. Stop **orb.2** by issuing this command:

   ```
   net stop "Tivoli Kernel Services orb.2"
        or
   net stop orb.2
   ```

   Wait for **orb.2** to complete its shut down.

   b. Stop **orb.1** by issuing this command:

   ```
   net stop "Tivoli Kernel Services orb.1"
        or
   net stop orb.1
   ```

   Wait for **orb.1** to complete its shut down.

   c. Recycle the DAS Server by issuing these commands:

   ```
   net stop "Tivoli Kernel Services DASRestarter"
   net start "Tivoli Kernel Services DASRestarter"
   ```

   d. Restart **orb.1** by issuing this command:

   ```
   net start "Tivoli Kernel Services orb.1"
        or
   net start orb.1
   ```

   Wait for **orb.1** to complete initialization.

   e. Restart **orb.2** by issuing this command:

   ```
   net start "Tivoli Kernel Services orb.2"
        or
   net start orb.2
   ```

   Wait for **orb.2** to complete initialization.

   For information on how to check for when the ORBs have finished initializing, see "What are ORBs and ORB Sets?" on page 127.

2. Make sure that the Tivoli Console icon is on the desktop.

3. Reinsert the CD into the CD–ROM drive to bring up the main Tivoli Storage Network Manager screen. Select **Install Tivoli Storage Network Manager**. See Figure 37 on page 47.
4. On the **Welcome** screen, click **Next**.

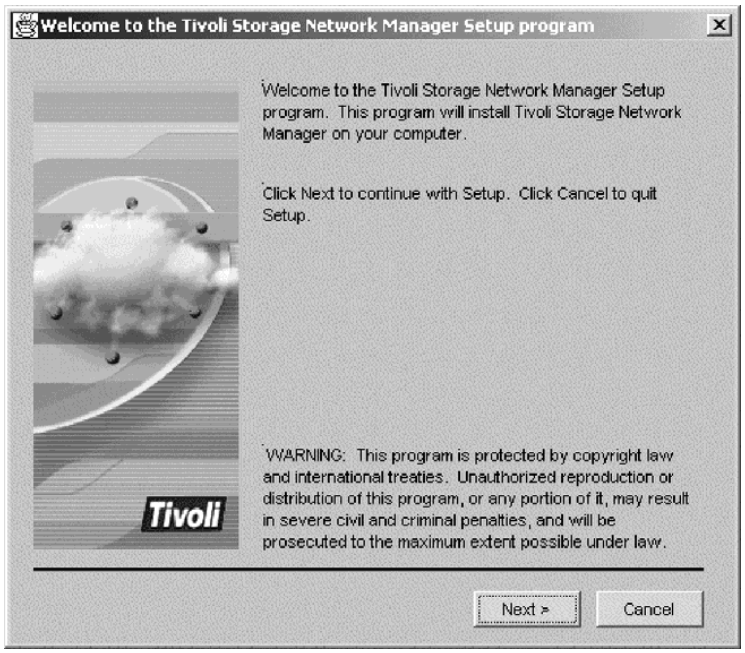

Figure 57. Tivoli Storage Network Manager Welcome Screen

5. On the **License Agreement** screen, read the license agreement. If you accept the terms of the agreement, click **Yes**.

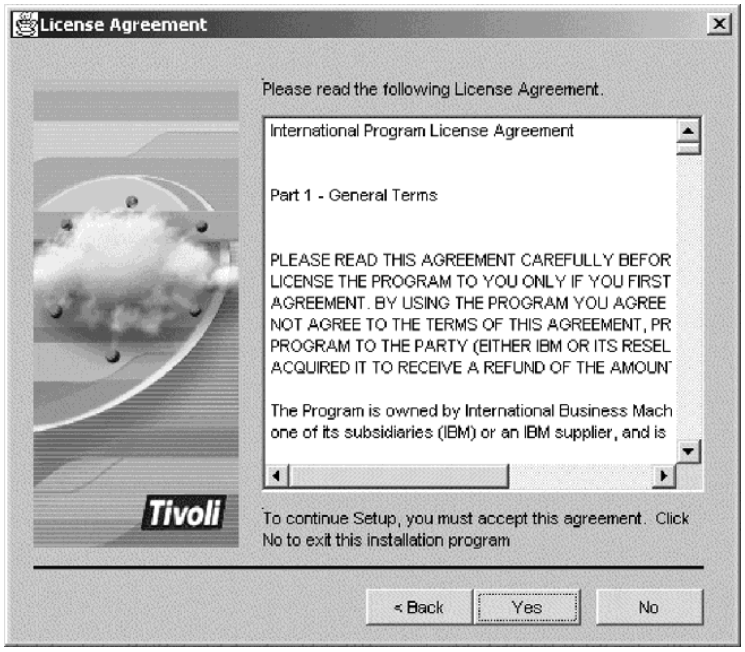

Figure 58. License Agreement Screen

6. On the **Tivoli Storage Network Manager Fully Licensed CD** screen, click **Next** to continue the installation.

   Note: For users who are installing Tivoli Storage Network Manager Version 1.1.3 from the image on the Web: You must insert the Tivoli Storage Network Manager Version 1.1.1 or 1.1.2 CD to get the license key.

Figure 59. Tivoli Storage Network Manager Fully Licensed CD

7. At the **Database Information** screen, enter two user IDs and passwords. These are the same user IDs you entered in Figure 41 on page 50 and must be entered in the same order. Then click **Next**.

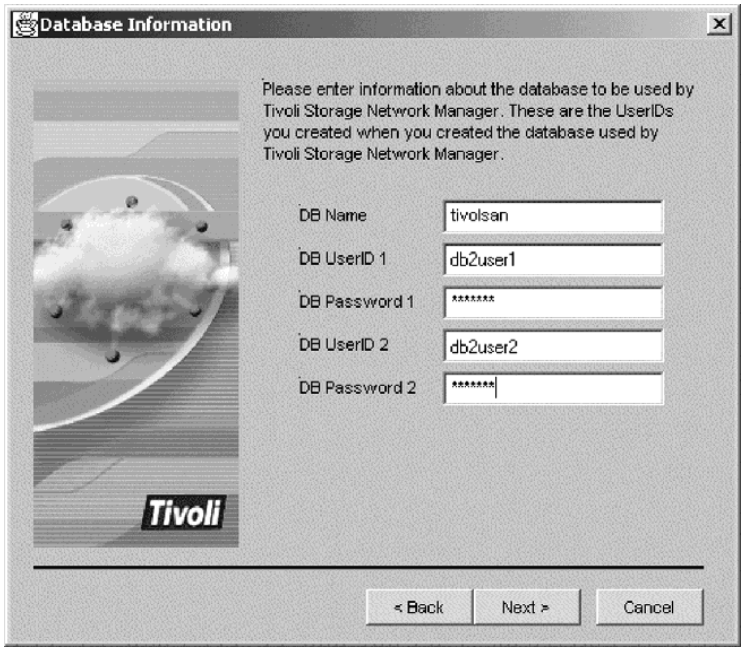

Figure 60. Database Information

8. On the **DAS Information** screen, make sure that the DAS Server name is fully qualified. An example of a fully qualified name is **hermes.sanjose.ibm.com**. Then click **Next**.

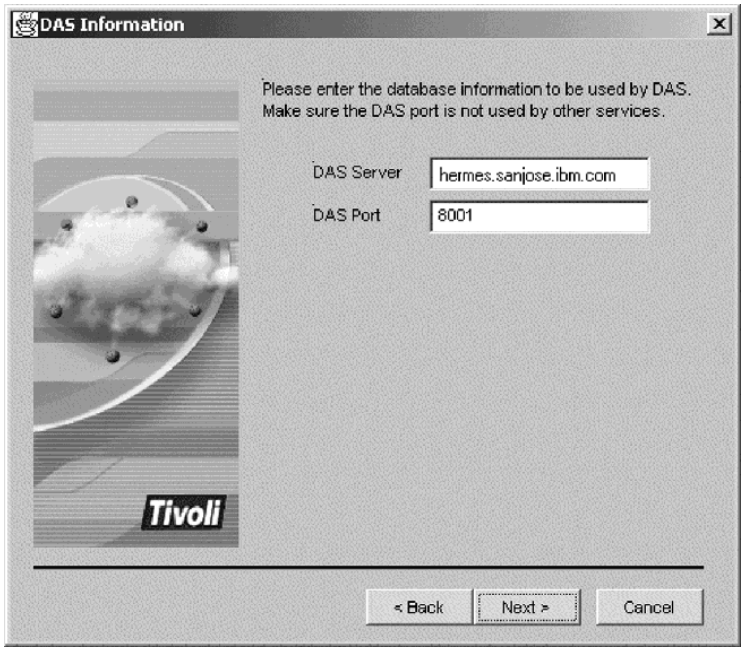

Figure 61. DAS Information Screen

9. On the **Select the Principal Access** screen, select **system/services/Smartset/principals/person1**, then click **Next**. (Note, that you must select a principal access.)

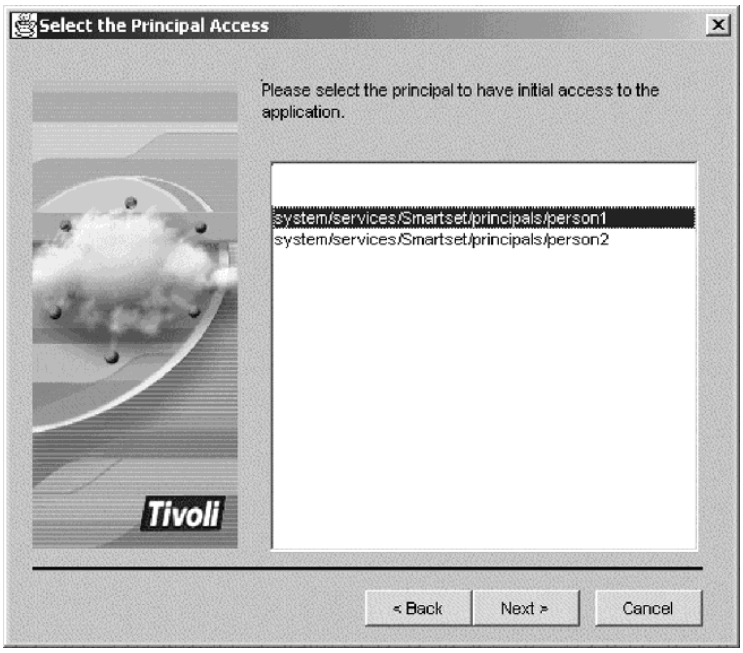

Figure 62. Select the Principal Access Screen

10. On the **Orbset Names** screen, enter the following:
    - Manager Orbset – default is **BTSManagerOrbset**.
    - Managed Host Orbset – default is **BTSManagedHostOrbset**.
    - NetView Console Orbset – default is **BTSNetviewOrbset**.

    Click **Next** to accept the defaults.

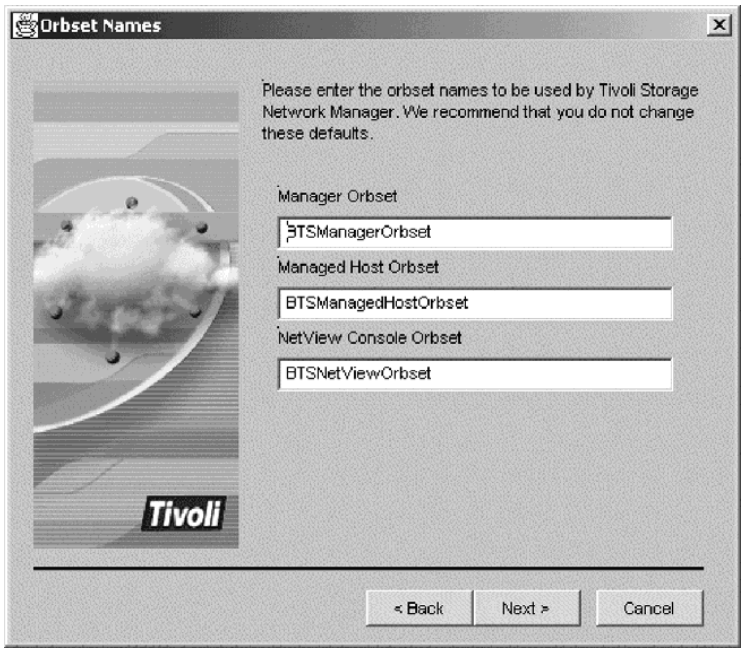

Figure 63. Orbset Names Screen

11. The **Select Orb to Deploy Manager** screen is displayed. Select the 9990 ORB and click **Next**. **Make sure you select the manager 9990 ORB.**

Figure 64. Select Orb to Deploy Manager Screen

12. The **Install Options Selected** screen is displayed. Review the information, then click **Next**.

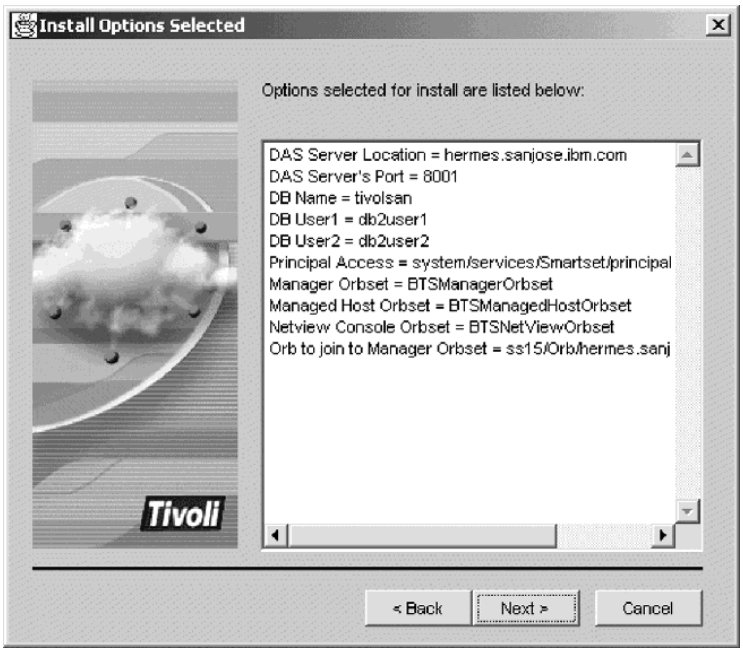

Figure 65. Install Options Selected Screen

13. The **Information** screen is displayed. Wait until the configuration is done and the **Next** button becomes active. You will also see the message:

    ```
    Tivoli Storage Network Manager Setup complete!
    ```

    This might take from 30 minutes to 1 hour.

    You should monitor this information screen. You can scroll up or down using the up or down arrows on the right. This information is also saved in an installation log file, **install.log**. The log file is located in the *<TKS_directory>***/Apps/TSNM/Install** directory. If you see a message for **wcmd error**, you need to rerun that command. For information on how to rerun a command, see "Troubleshooting Tivoli Storage Network Manager Installation Problems" on page 136.

    If you find that GUI components 22–26 do not install, see "Troubleshooting Tivoli Storage Network Manager Installation Problems" on page 136.

    Click **Next** to continue.

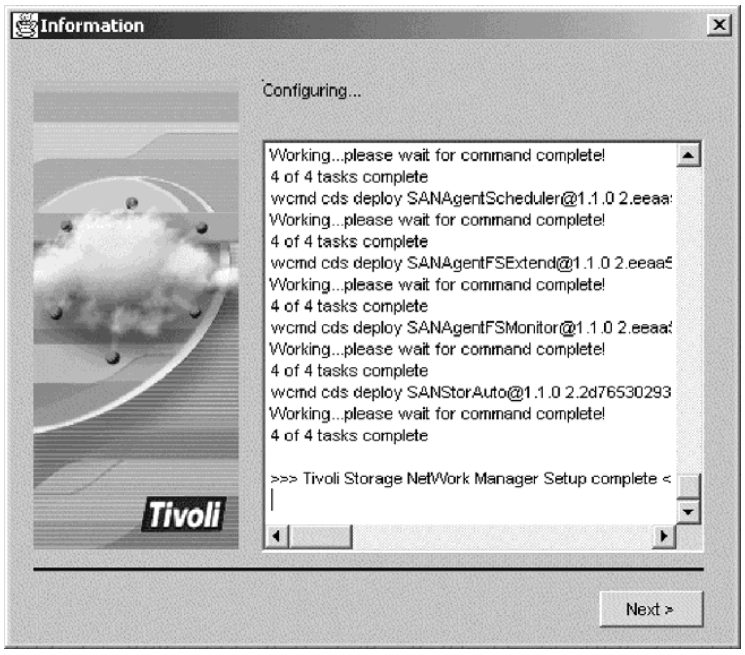

Figure 66. Information Screen

14. The **Setup Complete** screen is displayed. Select **Yes, I want to view the Readme file**. Click **Finish**. The **Readme** file is displayed. When you are finished reading the **Readme** file window, click **Finish**. The main Tivoli Storage Network Manager Installation screen is still active. Click **Exit** to close the window. You will be prompted with a message asking if you want to exit the program. Click **Yes**.

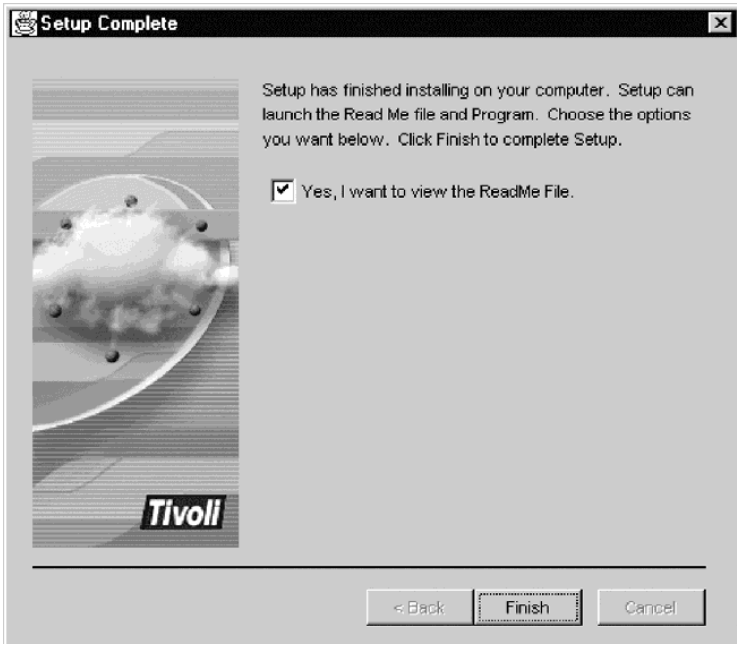

Figure 67. Setup Complete Screen

15. To monitor ORB activity, see "What are ORBs and ORB Sets?" on page 127. You should wait for **orb.1** activity to be low before issuing the following commands.

    To check for the services that should be running, issue the following commands from **orb.1**. You can repeat the **wcmd** command to see that all the SAN services are up and running.

    ```
    cd <TKS_directory>\orb.1
    c:\<TKS_directory>\orb.1>setupenv
    c:\<TKS_directory>\orb.1>wcmd accmgr listServices | sort
    ```

    where <*TKS_directory*> is where Tivoli Kernel Services is installed. You will be looking for the SAN services that are running. You will see other services for Tivoli Kernel Services listed, but you are looking for the following SAN services:

    ```
    SANAgentOutbandChangeAgent version 1.x.x
    SANDBParms version 1.x.x
    SANEvent version 1.x.x
    SANEventCorrelatorFactory version 1.x.x
    SANHostMgr version 1.x.x
    SANIndex version 1.x.x
    SANLicense version 1.x.x
    SANLunMgr version 1.x.x
    SANManagerService version 1.x.x
    SANQueryEngine version 1.x.x
    SANStorAuto version 1.x.x
    ```

    The 1.*x.x* refers to version 1, release level, and modification level.

    This can take up to one hour to complete. Wait until **orb.1** activity is low and all 11 services are running before proceeding.

Step 10: Launch the Tivoli Console

You should launch the Tivoli Console to make sure that the Tivoli Storage Network Manager portfolio has been updated. To launch the Tivoli Console, double–click the icon on your desktop. You can use the default Tivoli Kernel Services user ID and password: **superadmin** and **password** to login. Check to see that the Tivoli Storage Network Manager portfolio is displayed as shown in Figure 68.

Figure 68. Tivoli Console Portfolio

5

Installing the Managed Hosts

The managed hosts are also known as the agent or bootprint machines. The managed hosts are managed by the Tivoli Storage Network Manager manager machine. The managed host machines will have the Tivoli Kernel Services bootprint installed along with the Tivoli Storage Network Manager agent software (device drivers and other software). The following steps to install the managed hosts are described.

Note: The managed host (or bootprint) machine **cannot** be on the same machine as the manager machine.

Step 1: Installing the Tivoli Kernel Services Bootprint

Before installing the Tivoli Kernel Services bootprint, make sure that **orb.1** on the manager machine has finished initialization.

Before installing the Tivoli Kernel Services bootprint on a managed AIX host, check the following:

- Tivoli Kernel Services **readme** file
- Tivoli Storage Network Manager Web site for AIX fixes that need to be applied:
  `http://www.tivoli.com/support/san`

The Tivoli Kernel Services bootprint installation program must be run:

- As the **root** user on UNIX systems
- From a user ID with local, not domain, **Administrator** authority on Windows systems.

To install the Tivoli Kernel Services bootprint, follow these steps:

1. Log onto the managed host machine.
2. Insert the Tivoli Kernel Services bootprint CD into the CD–ROM drive of the managed host machine.
3. **For Windows:** The Tivoli Kernel Services bootprint CD is not an AutoRun CD. Go into Windows Explorer and click on your CD–ROM drive. On the right of the Explorer panel, double–click the **Install.bat** program.

   For AIX: Use these commands for mounting the device:

   ```
   mkdir /tmp/tmpTKS
   mount -v'cdrfs' -r'' /dev/cd0 /tmp/tmpTKS
   cd /tmp/tmpTKS
   ./install.sh
   ```

   Note that the ’’ following the **–r** option are two single quotes (not a double quote).

4. The **Welcome** screen is displayed. Click **Next** to continue.
5. You will see the **License Agreement** screen. Read the license agreement and if you agree, click **Yes**.
6. You will see this **Readme File** of last-minute instructions. Read the contents and click **Next** to continue.
7. The **Choose the Type of Bootprint** screen allows you to choose the type of Tivoli Kernel Services bootprint installation. Select **Tivoli Kernel Services endpoint server**. Click **Next** to continue.

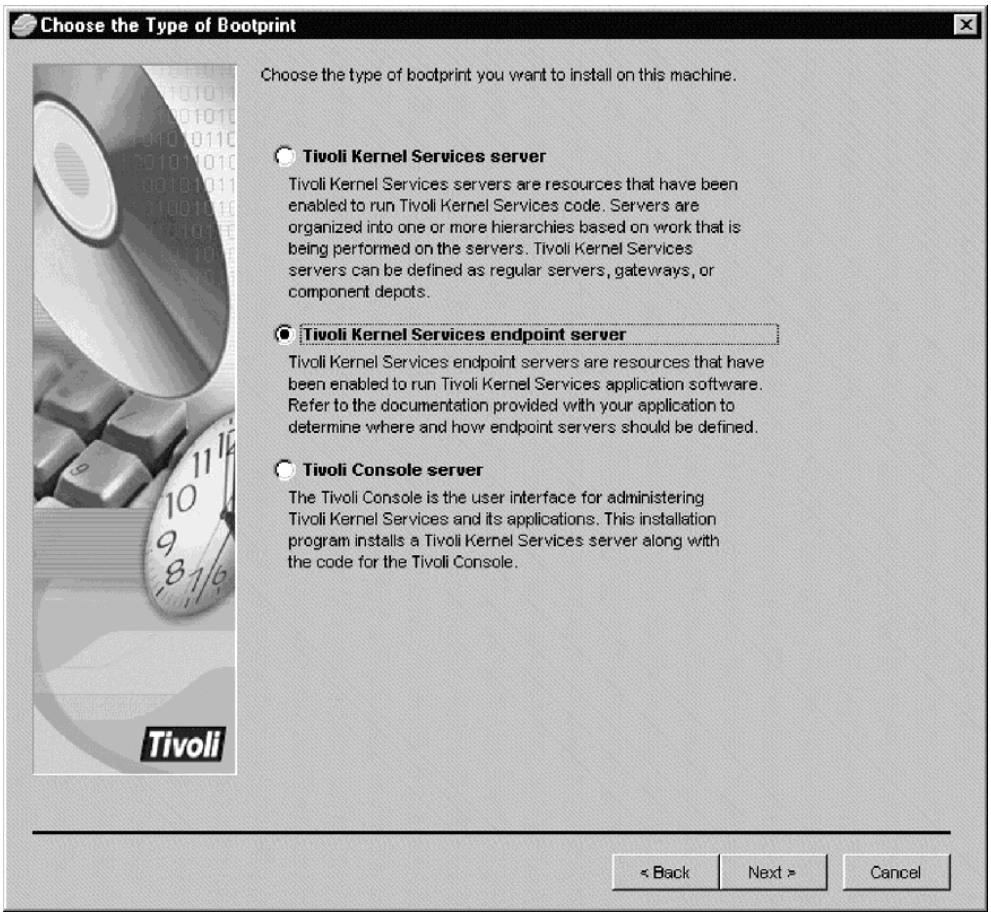

Figure 69. Choose the Type of Bootprint Screen

8. You are asked to specify the bootprint destination directory. Click **Next** to continue.

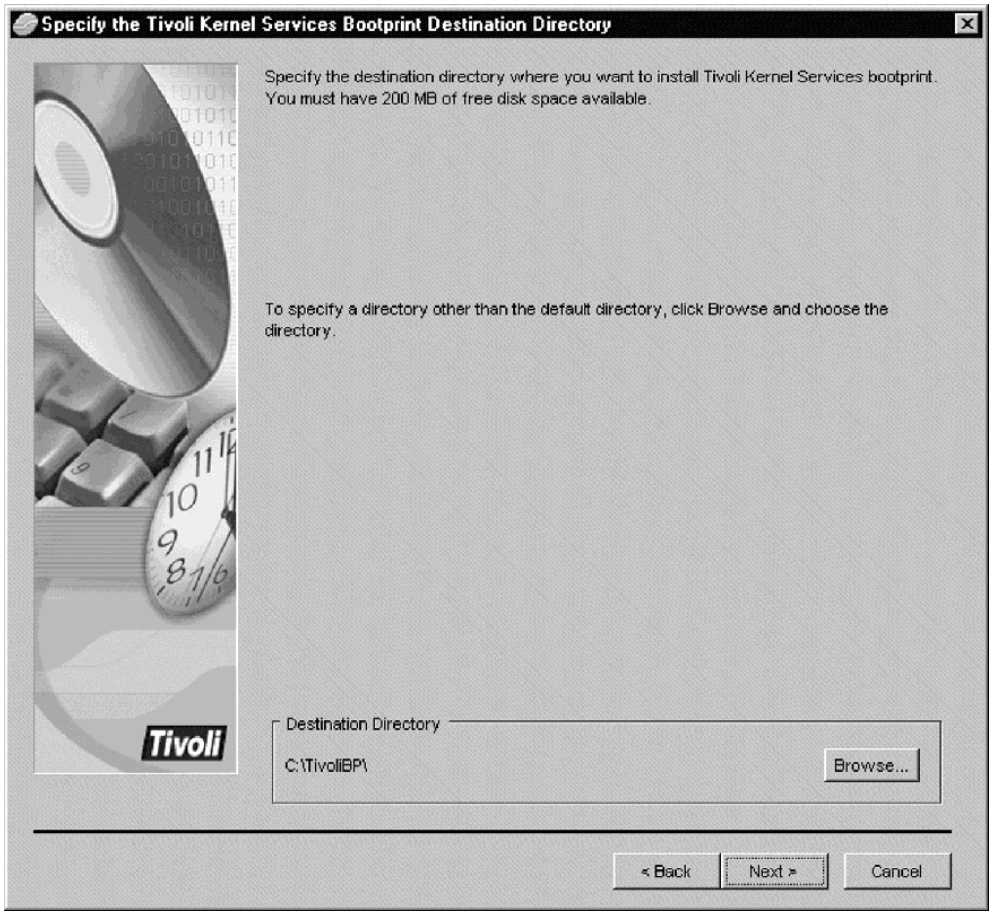

Figure 70. Specifying the Bootprint Destination Directory

9. The **Enter the Bootprint Information** screen is displayed. Enter the following information:
   - Bootprint server host name: *fully qualified host name of this managed host*
   - Bootprint server port number: **9990**
   - Installation depot host name: *fully qualified host name for your manager machine* (note: you need to replace the default value)
   - Installation depot port number: **9990**
   - MQSeries server host name: *fully qualified host name for your manager machine*
   - MQSeries server port number: **1414** (this is the default port for MQSeries)

   Uncheck the box for **Automatically start this bootprint server after install completes.** Click **Next** to continue.

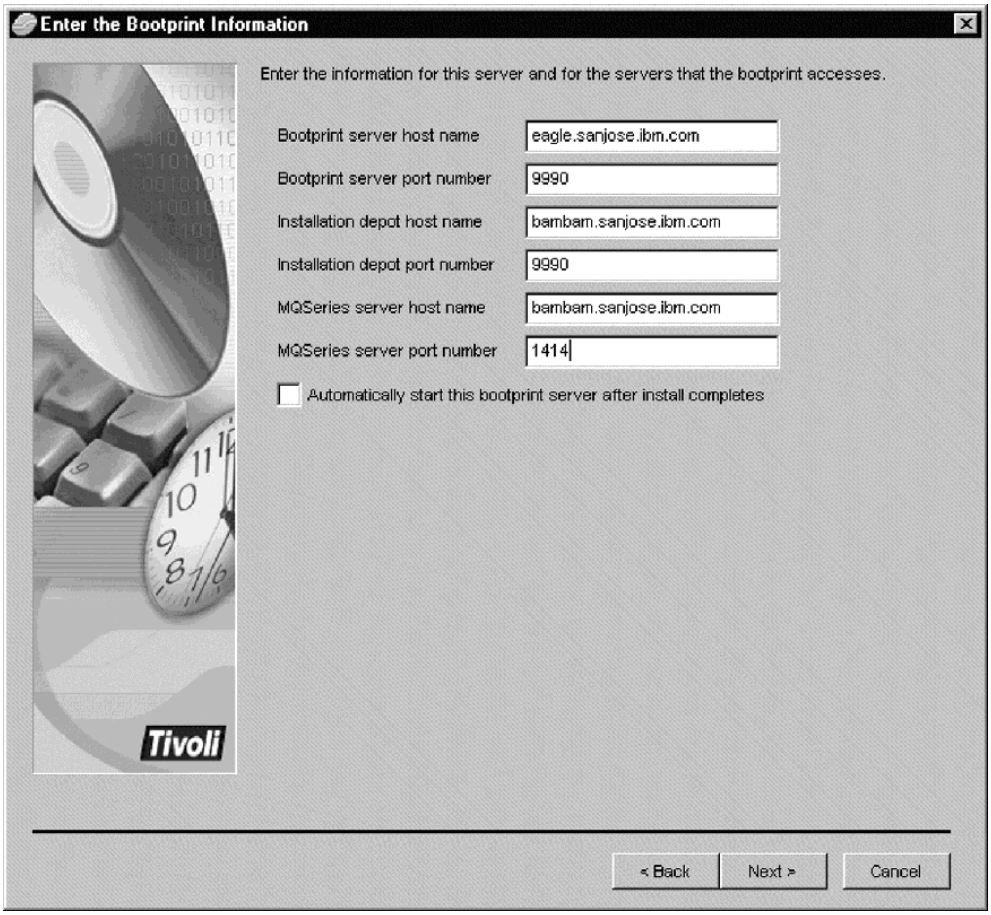

Figure 71. Specifying Bootprint Information

10. The **Enter the Tivoli Kernel Services Installer Information** screen is displayed. Accept the default user ID and password. Click **Next** to continue.

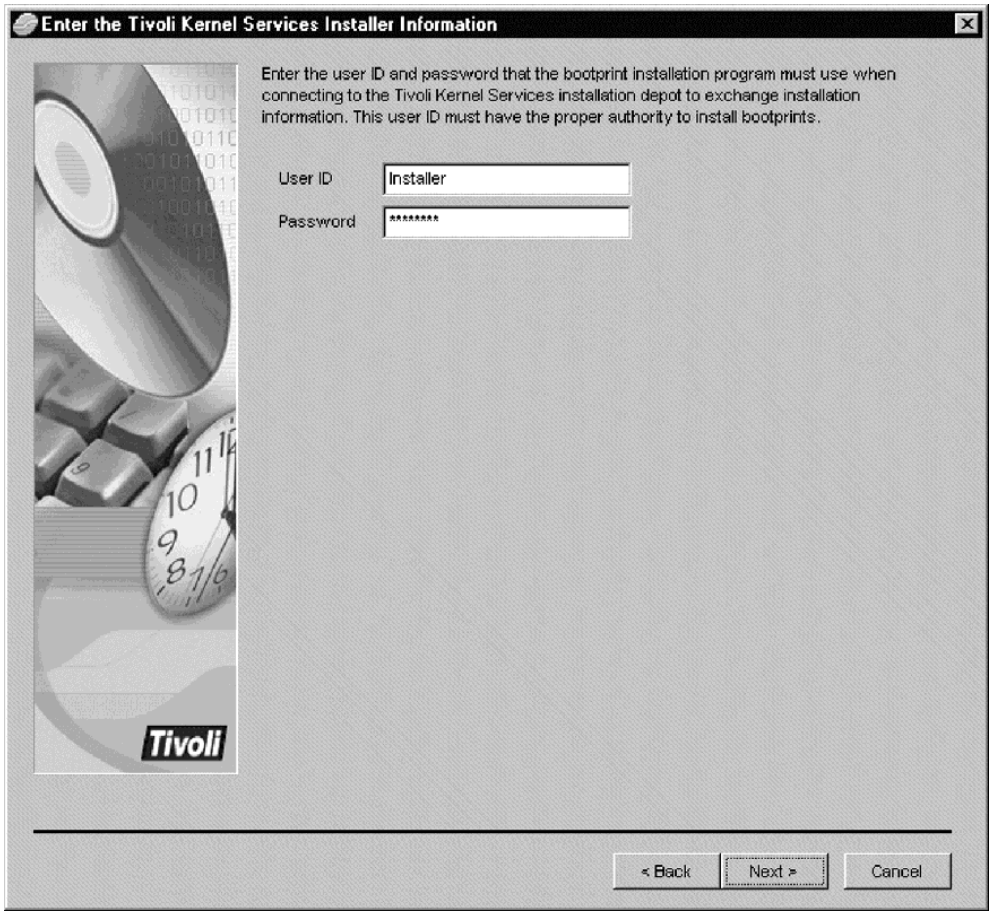

Figure 72. Specifying Installer Information

11. The **Review the Selected Options for the Bootprint Server** screen is displayed. Verify that the information that is entered and click **Next**. The installation will begin.

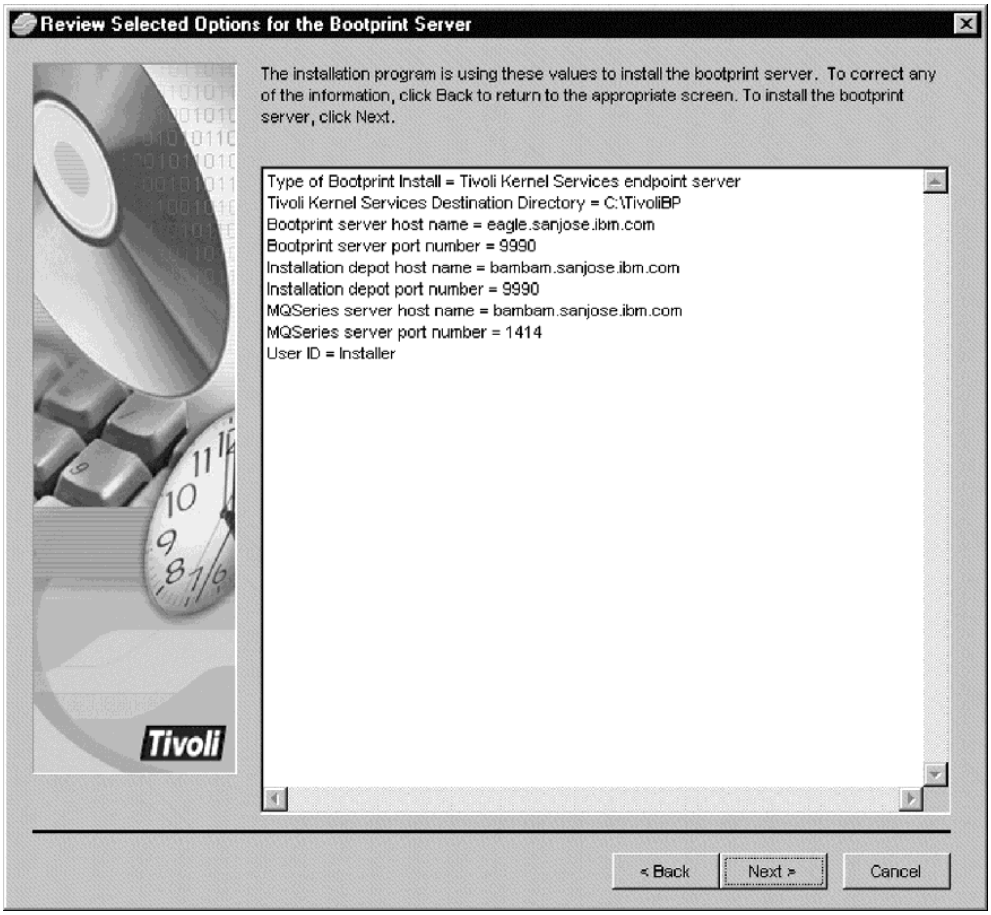

Figure 73. Reviewing Selected Options

12. The **Information** screen is displayed. Click **Next** to continue.

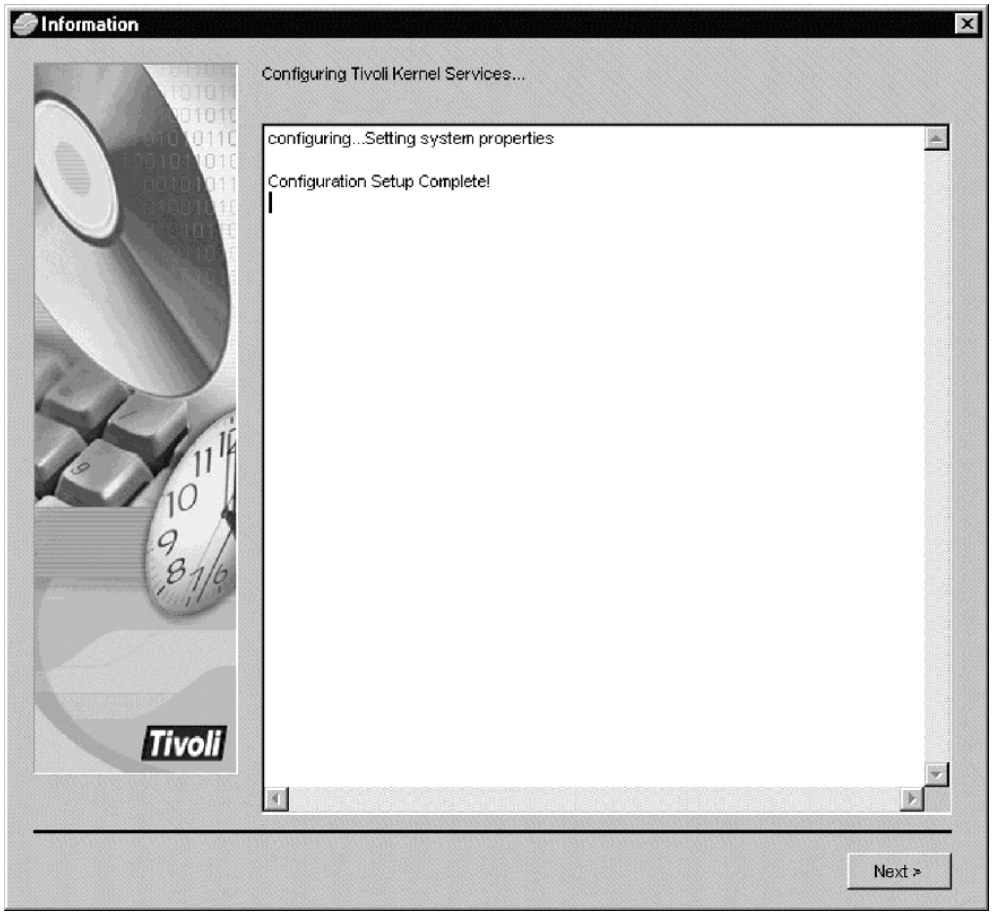

Figure 74. Information Screen

13. When the installation has completed, the **Bootprint Server Is Complete** screen is displayed. Click **Finish**.

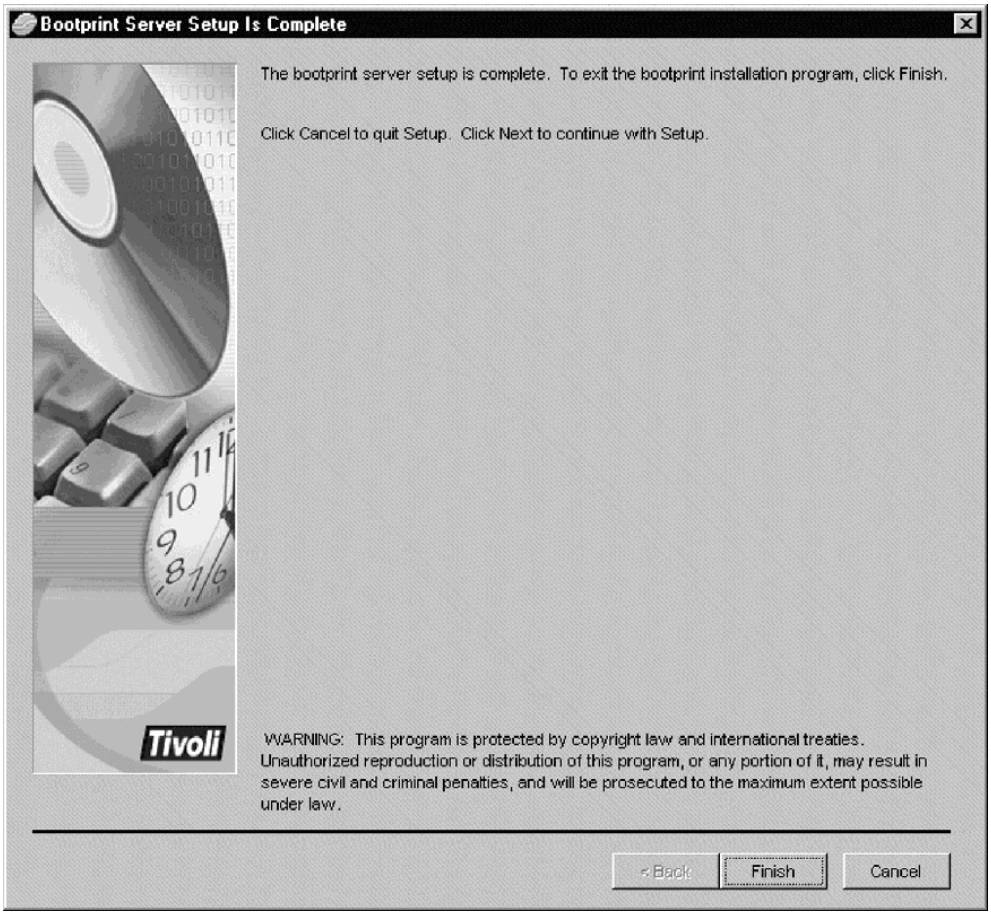

Figure 75. Bootprint Server Is Complete Screen

Step 2: Run bpsetup.cmd on all Windows NT and 2000 Managed Host (Bootprint) Machines

Before running this step, make sure that you have run "Step 4: Run idsetup.cmd" on page 43.

Run the **bpsetup.cmd** to perform critical updates to Tivoli Kernel Services that are necessary before the Tivoli Storage Network Manager installation program is run. This step must be run on **all** Windows NT and Windows 2000 managed host (bootprint) machines.

Follow these steps:

1. At this point, **orb.1** should not be running. Open a command prompt window.
2. Ensure that the Tivoli Storage Network Manager CD is in the CD–ROM drive. If your CD–ROM drive is **e**, then type **e:**.
3. Change your drive directory to **\util**. For example:
   ```
   cd \util
   ```
4. Run the following command:
   ```
   bpsetup <TKSBP_directory>
   ```
   Where *<TKSBP_directory>* refers to the directory where the Tivoli Kernel Services bootprint is installed. By default, this is **c:\Tivolibp**.
5. From a command prompt window, start the managed host **orb.1** by issuing the following command:
   ```
   net start orb.1
   ```
   If this is the first time you are launching **orb.1** after installing the Tivoli Kernel Services patch 1.1.1–TKS–0004, **orb.1** automatically shuts down for upgrading. You will have to re–launch **orb.1**.
6. Close the command prompt window by issuing the following command:
   ```
   exit
   ```

Step 3: Run bpsetup.sh on all AIX Managed Host (Bootprint) Machines

Run the **bpsetup.sh** script to perform critical updates to Tivoli Kernel Services that are necessary before the Tivoli Storage Network Manager installation program is run. This step must be run on **all** AIX managed host machines (if you have AIX managed host machines).

Follow these steps:

1. At this point, **orb.1** should not be running. Ensure that the Tivoli Storage Network Manager CD is in the CD–ROM drive and mounted. We will refer to the CD–ROM mounted directory as **/cdrom/TSNM**. Issue these commands:

   ```
   mkdir /cdrom/TSNM
   mount -v'cdrfs' -r'' /dev/cd0 /cdrom/TSNM
   cd /cdrom/TSNM
   ```

   Where '' on the **–r** option are two single quotes (not a double quote).

2. Change your working directory to the **/util** directory on CD. For example:

   ```
   cd /cdrom/TSNM/util
   ```

3. Run the following command:

   ```
   sh bpsetup.sh <TKSBP_directory>
   ```

   Where *<TKSBP_directory>* refers to the directory where Tivoli Kernel Services bootprint is installed. The **sh** command is necessary because the **bpsetup.sh** file does not have execute permission on the CD.

4. Start the managed host **orb.1** by issuing this command:

   ```
   startsrc -s LOCK.orb.1
   ```

   If this is the first time you are launching **orb.1** after installing the Tivoli Kernel Services patch 1.1.1–TKS–0004, **orb.1** automatically shuts down for upgrading. You will have to re–launch **orb.1**.

6

Configuring the Manager Machine

Once you have installed the managed hosts, then you can configure the manager machine. The following steps are described.

Step 1: Displaying the ORBs and ORB Sets

Tivoli Storage Network Manager uses Tivoli Kernel Services ORBs to manage hosts in your storage network. You must specify the following:

- Which ORBs (bootprint machines) are to be managed
- Which ORB (machine) is the manager
- Which ORBs (machines) are running Tivoli NetView

Join these ORBs to the appropriate ORB sets.

Follow these steps to display the ORBs and ORB sets:

1. From the Tivoli Console portfolio, click **Administer Management Software**, and then click **Manage ORBs**. You will see the **Manage ORBs** screen.

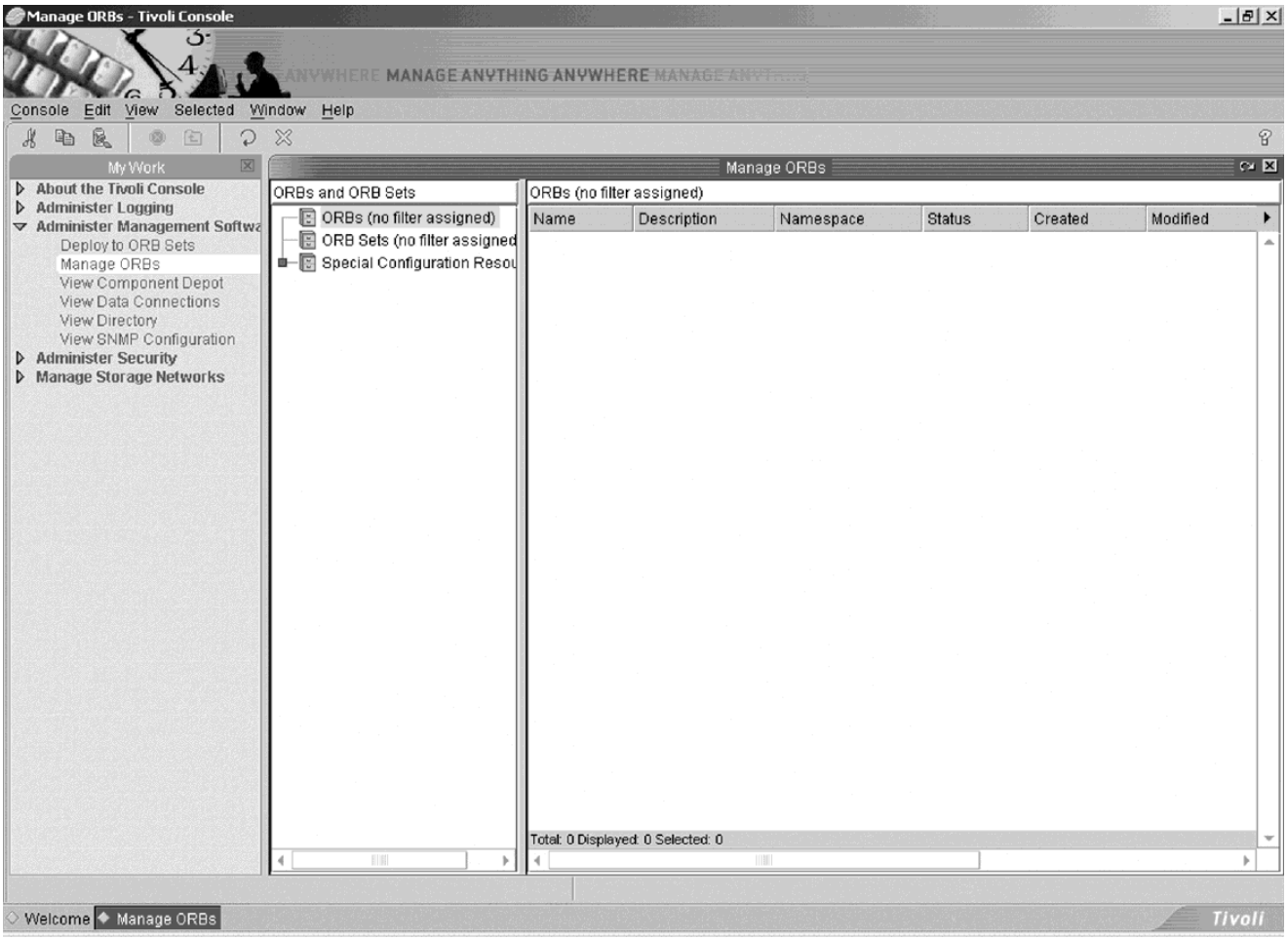

Figure 76. Manage ORBs Window

2. In the **Manage ORBs** window, right-click on **ORBs (no filter assigned)** in the left pane. Click **Get ORBs**.

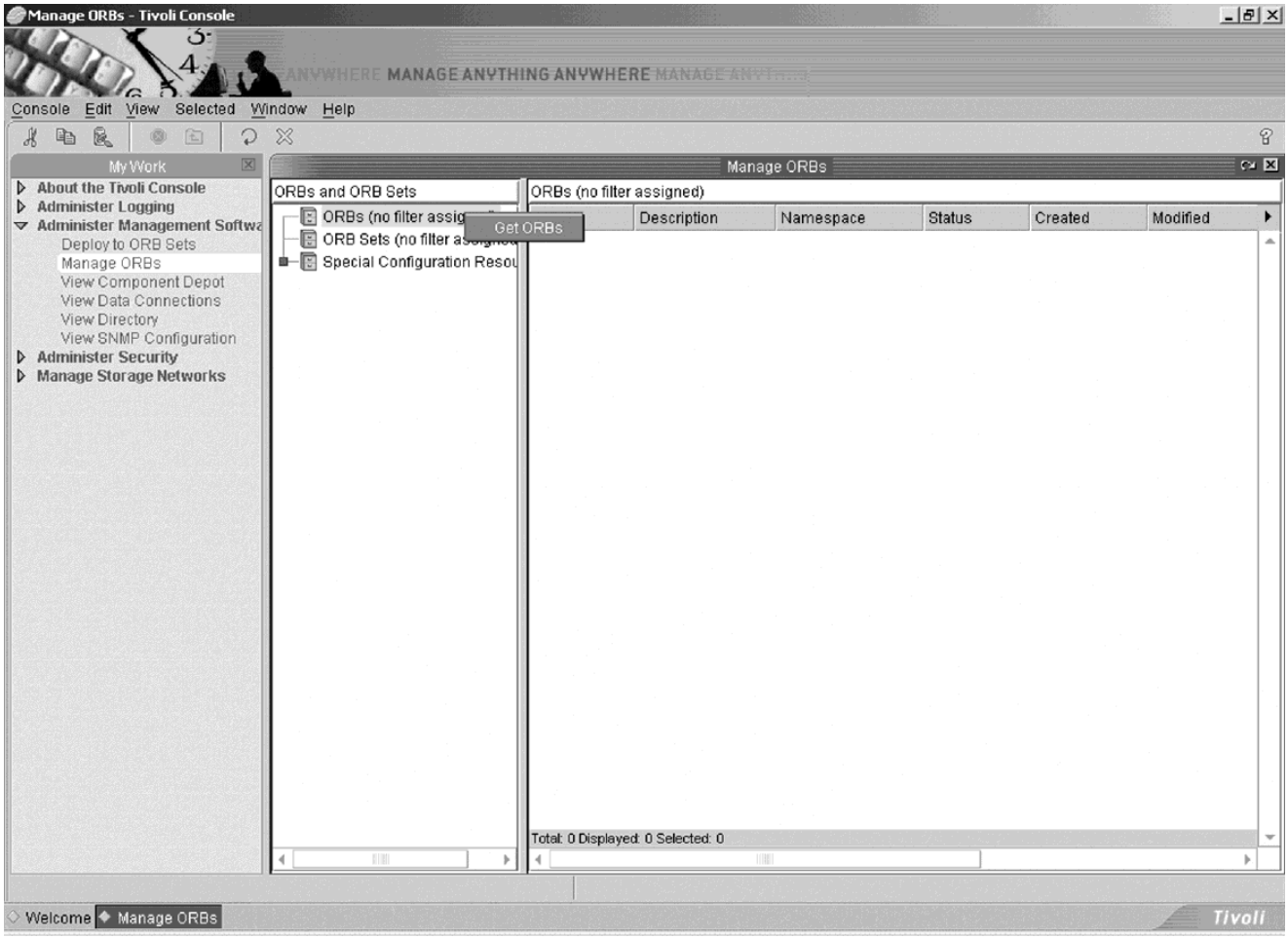

Figure 77. Get ORBs context menu

3. The **ORB Filter Chooser** dialog window is displayed. Do not enter any information here. By leaving the screen as it is, all of the ORBs are displayed. Click **OK**.

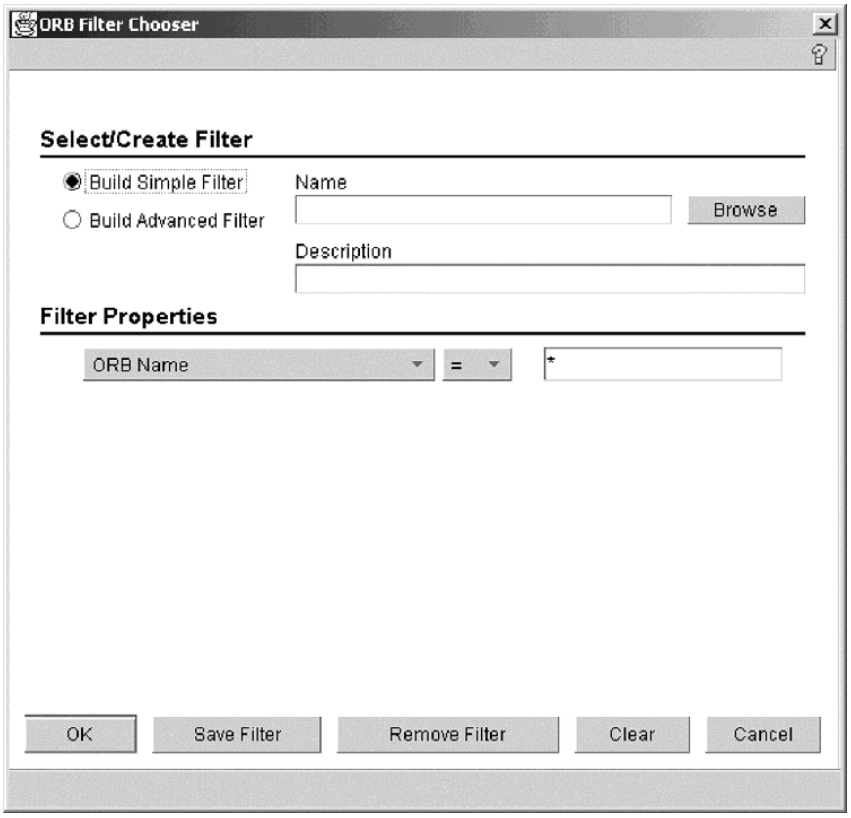

Figure 78. ORB Filter Chooser Dialog

4. Repeat the above process for **ORB Sets** by right-clicking on **ORB Sets** in the left pane and selecting **Get ORB sets**.
5. When the **ORB Set Filter Chooser** dialog is displayed, click **OK**.
6. You should now see all of your ORBs. Under the **ORBs** section, you will see all of the ORBs running on the manager machine and the managed hosts. The ORBs look like **<***fully_qualified_machine_name_nnnn***>**. An example of a fully qualified name is **hermes.sanjose.ibm.com_9990**.
7. You should see two ORBs that represent your manager machine in the left pane. In Figure 79 on page 86, the manager is named **hermes.sanjose.ibm.com**, and its two ORBs are **hermes.sanjose.ibm.com_9990** and **hermes.sanjose.ibm.com_9991**. The manager ORB set is automatically copied.

   To check for the manager ORB, click on **BTSManagerORBset** in the left pane. The manager ORB is displayed in the right pane.
8. If the manager ORB is not automatically copied on the **Manage ORBs** window, follow these instructions. Right–click the <*yourManagerHostname*>**_9990** ORB (in the left pane) of the machine where you installed Tivoli Storage Network Manager. Click **Copy**. Then right–click the **BTSManagerORBset** in the left pane and click **Paste**. This can take 15 minutes or more.

Step 2: Joining the Manager ORB to the BTSNetViewOrbset

Follow these steps:

1. On the **Manage ORBs** window, right-click the **<***yourManagerHostname***>_9990** ORB (in the left pane) of the machine where you installed Tivoli NetView and click **Copy**. Then right-click the **BTSNetViewOrbset** in the left pane and click **Paste**.
2. Check for ORB activity. Issue the following commands from the Tivoli NetView ORB to check for the **SANManagerDaemon** service:

   ```
   c:\<TKS_directory>\orb.1>setupenv
   c:\<TKS_directory>\orb.1>wcmd accmgr listServices | sort
   ```

   where <*TKS_directory*> is where you installed Tivoli Kernel Services. Reissue the **wcmd** command until you see the **SANManagerDaemon**. This is what you will see:

   ```
   SANManagerDaemon version 1.x.x
   ```

   where version 1.*x.x* is version 1, release level, and modification level. Do not proceed until this service is up. This can take 30 minutes or more.
3. Launch the Tivoli NetView console to make sure that it displays. Verify that the **Storage Area Network** icon and the **Storage Net Mgr** menu item appear.

Figure 79 on page 86 shows a completed ORB set assignment where the manager and Tivoli NetView are running on a machine named **hermes**. There are three managed hosts.

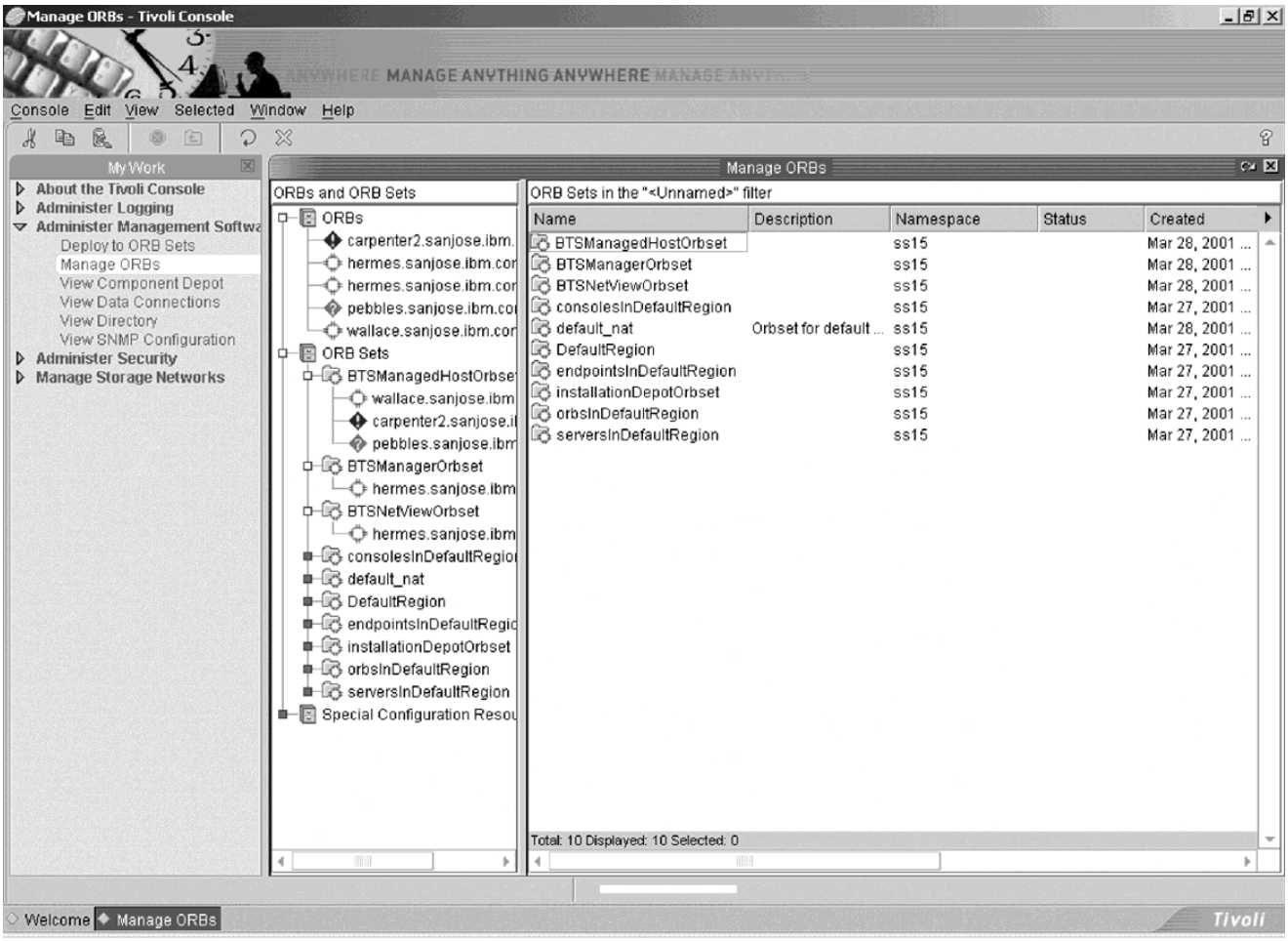

Figure 79. View of Completed ORB Set Assignments

Step 3: Joining the Managed Host (Bootprint) ORBs to the BTSManagedHostOrbset

This must be done for **all** managed hosts.

Follow these steps:

1. On the **Manage ORBs** window, right-click the **<***yourManagedHostHostname***>_9990** ORB and click **Copy**. Then right-click the **BTSManagedHostOrbset** and click **Paste**.
2. Check for ORB activity. To check for the services that should be running after you join the managed host, issue these commands for the managed host **orb.1**. To issue these commands from the manager machine for the managed host machine (**wallace.sanjose.ibm.com_9990**), enter:

   ```
   c:\<TKS_directory>\orb.1>setupenv
   c:\<TKS_directory>\orb.1>wcmd -i wallace.sanjose.ibm.com_9990 accmgr
                  listServices | sort
   ```

   where <*TKS_directory*> refers to the directory where you installed Tivoli Kernel Services. You will see these services:

```
SANAgentDiskPool version 1.x.x (this will not appear until after
                                Manage LUNs is enabled)
SANAgentFSExtend version 1.x.x
SANAgentFSMonitor version 1.x.x
SANAgentHostQuery version 1.x.x
SANAgentInbandChangeAgent version 1.x.x
SANAgentScanner version 1.x.x
SANAgentScheduler version 1.x.x
```

Where 1.*x.x* is version 1, release level, and modification level.

This can take up to 30 minutes or more. (Some tests have taken one or two hours.)

See Figure 79 on page 86 for completed ORB set assignments.

Important

If you will be using the manager machine as a managed host (connected to the SAN), you must join **orb.2** to the **BTSManagedHost Orbset**.

Do **not** connect **orb.1** to the **BTSManagedHostOrbset**. This will cause problems with the manager functions.

Step 4: Enabling and Disabling Manage LUNs (Optional Step)

This step is required if you want to use the Manage LUNs and Manage File System Policies components. When Tivoli Storage Network Manager is installed for the first time, the Manage LUNs component is disabled. To use the Manage LUNs component, you must enable it using the LUN Manager Enable/Disable window (Figure 80 on page 88). Enabling or disabling LUN management has serious consequences for your SAN. You should read through the following paragraphs to help you understand the consequences of enabling and disabling Manage LUNs.

If you have a host which requires access to LUNs in your storage network, you must assign the LUNs to those hosts using Manage LUNs. This must be done immediately after clicking the **Enable** button on the LUN Manager Enable/Disable window. Failure to do this will result in the affected hosts losing access to those LUNs after you click the **Deploy** button. This is especially important if you have managed hosts which boot from a remote LUN. Failure to make the appropriate LUN assignments for such hosts will result in their being unable to access their boot drives.

If you have unmanaged hosts connected to your SAN, you must take extra precautions after enabling Manage LUNs. Manage LUNs works by masking LUNs from the hosts it manages and handling the assignments of those LUNs. An unmanaged host might be able to access a LUN that Tivoli Storage Network Manager has already assigned to one of its managed hosts. Such access could result in the loss or corruption of data. To avoid this situation, make sure to control LUN accessibility by unmanaged hosts through other means such as zoning or hardware masking.

Note that disabling Manage LUNs can also have serious consequences:

- Once you click the **Disable** button, all current and pending LUN assignments will be immediately removed from Tivoli Storage Network Manager's database.

- Also, disabling Manage LUNs might allow hosts to access LUNs that have already been assigned to other hosts–potentially leading to data corruption. You should ensure that you have some other form of hardware or software–based LUN access control in place before clicking the **Disable** button.
- Disabling Manage LUNs will also disable automatic file system extension. However, Manage File System Policies will still be able to monitor file system capacity and issue warnings when those monitored file systems exceed their thresholds.

To enable and deploy Manage LUNs, follow these steps:

1. Open the Tivoli Console portfolio. Click the following:

   ```
   Manage Storage Networks -> Administer Storage Network ->
   Enable/Disable LUN Manager
   ```

2. The **LUN Manager Enable/Disable** screen is displayed. Click **Enable** to activate the buttons on the **Manage LUNs** screen.

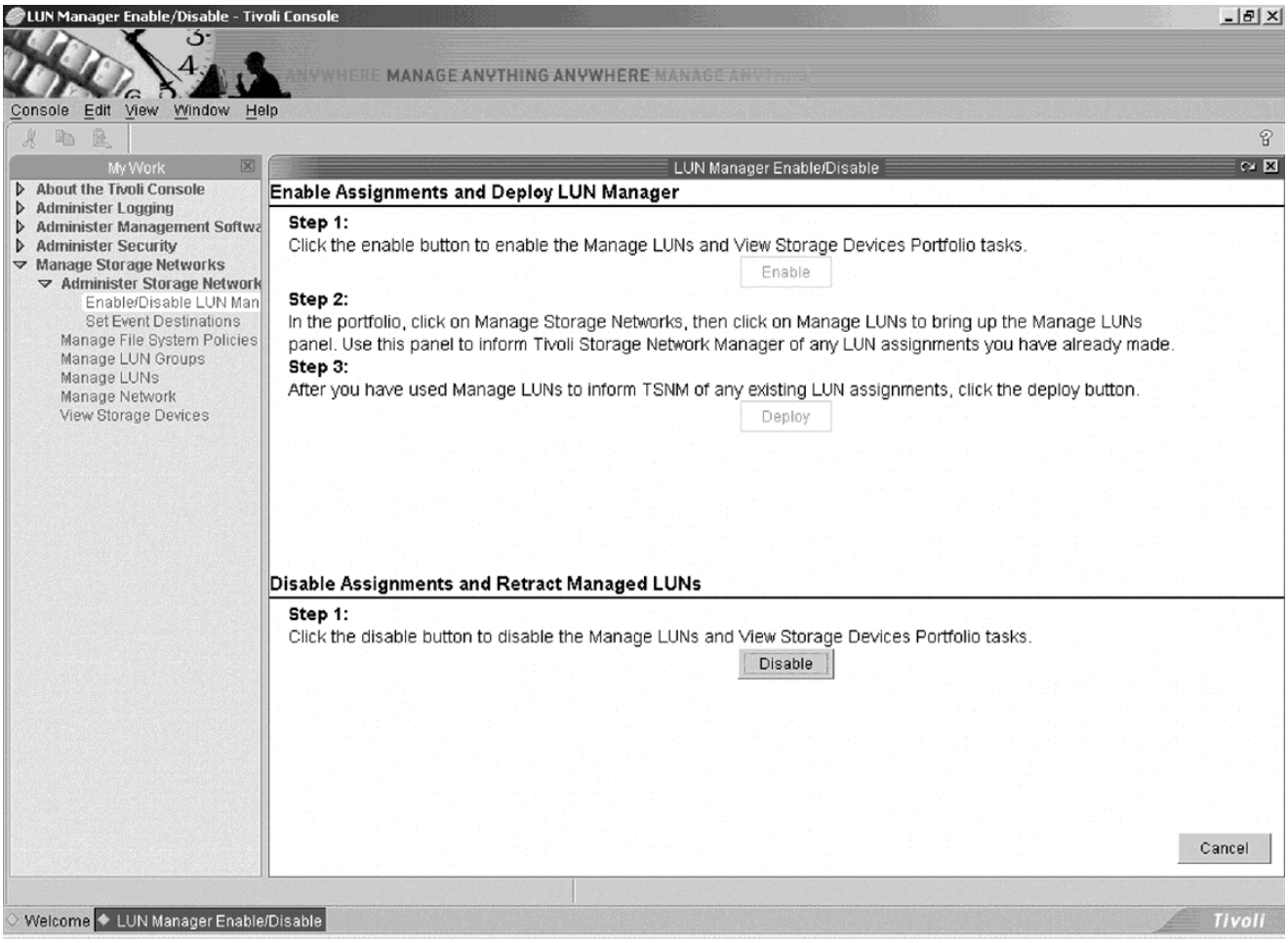

Figure 80. LUN Manager Enable/Disable Screen

3. Go to the **Manage LUNs** screen to make your LUN assignments. If some of the hosts in your storage network had LUNs assigned to them **before** you installed Tivoli Storage Network Manager, you must immediately use **Manage LUNs** to redo any LUN assignments which you had previously made. Failure to do this will result in the host being unable to access the LUNs you had previously assigned to it after it is rebooted.

The status for the assigned LUNs will be **Assign Pending** until you deploy Manage LUNs. Go immediately to step 4 to deploy Manage LUNs.

4. Once you have made your LUN assignments, go to the **LUN Manager Enable/Disable** screen. Click **Deploy** to begin masking LUNs from your managed hosts and to finalize the LUN assignments you have made.
5. Check for ORB activity. See "What are ORBs and ORB Sets?" on page 127. To check for the services that should be running after you deploy Manage LUNs, issue these commands for the managed host **orb.1**. To issue these commands from the manager machine for the managed host machine (**wallace.sanjose.ibm.com_9990**), enter:

```
c:\<TKS_directory>\orb.1>setupenv
c:\<TKS_directory>\orb.1>wcmd -i wallace.sanjose.ibm.com_9990 accmgr
                listServices | sort
```

where <*TKS_directory*> refers to the directory where you installed Tivoli Kernel Services. You will see these services:

```
SANAgentDiskPool version 1.x.x (this will not appear until after
                                Manage LUNs is enabled)
SANAgentFSExtend version 1.x.x
SANAgentFSMonitor version 1.x.x
SANAgentHostQuery version 1.x.x
SANAgentInbandChangeAgent version 1.x.x
SANAgentScanner version 1.x.x
SANAgentScheduler version 1.x.x
```

where 1.*x.x* is version 1, release level, and modification level.

This can take up to 30 minutes or more.

6. Finally, reboot all of your managed hosts with the exception of AIX machines. It is not necessary to reboot a managed AIX host after enabling or disabling **Manage LUNs**. You will now be able to use the **Manage LUNs** component to assign or unassign LUNs to and from your managed hosts.

The buttons on the Enable/Disable Manage LUNs screen are as follows:

Enable

Activates the buttons in the Manage LUNs screen and allows Tivoli Storage Network Manager to begin making LUN assignments on the SAN.

Deploy

Turns on LUN masking and enables Tivoli Storage Network Manager to manage the LUNs on your SAN. Optionally, this will also automatically extend the file systems of managed hosts with access to those LUNs. You will need to reboot your managed host machines (except for AIX) after you click **Deploy**. AIX machines do not need rebooting.

Disable

A confirmation dialog window is displayed. If you are sure that you want to disable LUN masking, click **OK** on the dialog to prevent Tivoli Storage Network Manager from providing LUN management services.

Cancel

Closes the window without making any changes.

To disable Manage LUNs, follow these steps:

1. Open the Tivoli Console portfolio. Click the following:

   ```
   Manage Storage Networks -> Administer Storage Network ->
   Enable/Disable Manage LUNs
   ```

2. The **Enable/Disable Manage LUNs** screen is displayed. Click **Disable** to deactivate the buttons on the **Manage LUNs** screen.

You will no longer be able to assign or unassign LUNs.

Step 5: Configuring Event Reporting (Optional Step)

This is an optional step. Tivoli Storage Network Manager provides support for centralized monitoring of events throughout your enterprise. If you use a system such as the Tivoli Enterprise Console or an application that can receive SNMP events, Tivoli Storage Network Manager can be easily configured to send events to it. Support for such centralized management applications is available through the Tivoli Console. If you are not currently using any centralized management application, you can configure Tivoli NetView to receive SNMP traps. You can keep track of all of the storage network-related events detected by Tivoli Storage Network Manager in the Tivoli NetView Event Browser.

Configuring event reporting is a two–phase process. First, you must set the SNMP trap or Tivoli Enterprise Console event destination (or both) in the **Event Destination** window to send traps and events. Then you must configure the Tivoli Enterprise Console server or SNMP application (or both) to receive traps and events.

Devices that support sending SNMP traps can be configured to send the traps to a trap console, such as Tivoli NetView or to Tivoli Storage Network Manager. Sending the traps to the Tivoli NetView Console allows you to view trap information. You can then make decisions that are based on vendor specific information included in the trap. Sending the traps to Tivoli Storage Network Manager allows automatic rediscoveries as a result of the traps.

During installation, the Tivoli NetView Console is configured to listen for SNMP traps on port 162. The Tivoli Storage Network Manager is configured to listen for SNMP traps on port 1001. This default setting allows both the Tivoli NetView Console and Tivoli Storage Network Manager to reside on the same system and to receive SNMP traps. Devices must be configured to send SNMP traps to both destinations.

The port monitored by Tivoli Storage Network Manager for SNMP traps can be changed by issuing the following Tivoli Kernel Services command from the **orb.1** directory:

```
cd orb.1
setupenv
wcmd cfg put /com/tivoli/sanmgmt/User SnmpTrapPort=<xxx>
```

Where *xxx* is the port number.

To configure Tivoli Storage Network Manager to send SNMP Traps or Tivoli Enterprise Console Events to the appropriate locations, follow these steps:

1. Open the Tivoli Console portfolio. Click:

   ```
   Manage Storage Networks -> Administer Storage Network ->
   Set Event Destinations
   ```

2. The **Event Destinations** window is displayed as shown in Figure 81.

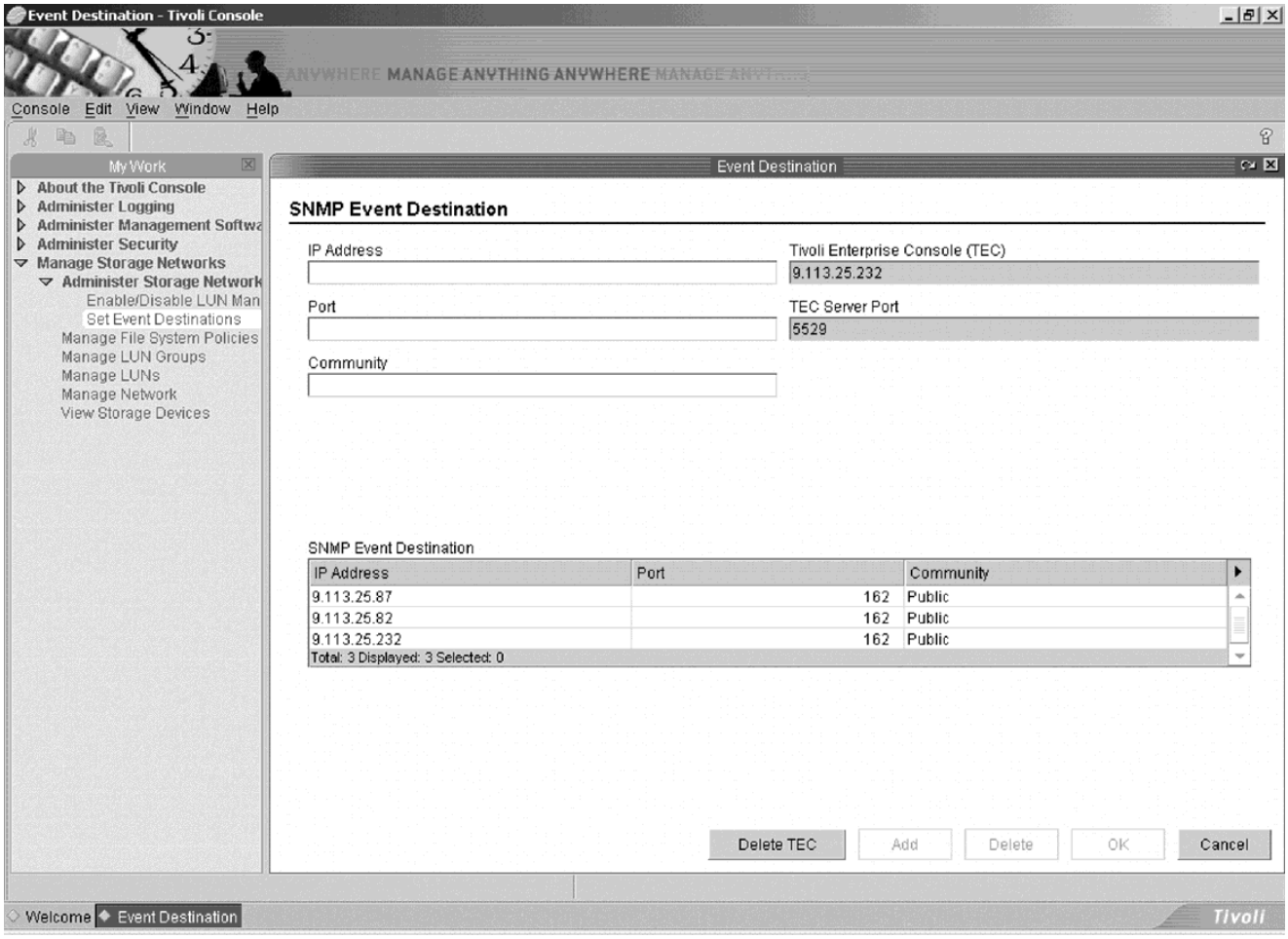

Figure 81. Event Destinations Window

3. On the left side of the window, you can specify one or more locations where you want SNMP traps sent. To do this, enter information in the following fields:

   IP Address
   IP address of a host or device that can receive SNMP traps.

   Port Port number that the host or device will use to listen for SNMP traps. The default is **162**.

   Community
   Name of the community to which your SNMP host or device is assigned. The default is **Public**.

   For the SNMP Event Destination information, information can be:

   - Added (**Add** button)
   - Deleted (**Delete** button)

   Information is added or deleted to or from the **SNMP Event Destination** list in the lower part of the window. Once you click the **Add** or **Delete** button, the changes are saved in the database.

4. On the right side of the window, you can specify the location of your Tivoli Enterprise Console Server. To do this, enter information in the following fields:

   Tivoli Enterprise Console Server
   IP address of your Tivoli Enterprise Console server. If your Tivoli Enterprise Console server is running on a Windows NT machine, you must also specify the port it uses in the **TEC Server Port** field.

   TEC Server Port
   If your Tivoli Enterprise Console Server is running on a Windows NT machine, you must enter the port it is configured on to listen for events. You can skip this step if your Tivoli Enterprise Console Server is running on a UNIX platform.

   Once you have completed entering your information, click **OK**.

Follow these steps to configure event reporting to a Tivoli Enterprise Console server:

1. From the TME desktop, import the **tsnm_110.baroc** file. This file is in the **/Util** directory on the Tivoli Storage Network Manager CD.
2. Enter the IP address of your Tivoli Enterprise Console server into the **Tivoli Enterprise Console Server** field.
3. If your Tivoli Enterprise Console servers are running on Windows NT, you must enter the port it is configured to listen on into the **TEC Port** field. If your Tivoli Enterprise Console server is running on a UNIX machine, you can skip this step.
4. Click **OK**.

Step 6: Using Tivoli Storage Network Manager

Once you have completed the procedures above, you can start using Tivoli Storage Network Manager. For information on how to use Tivoli Storage Network Manager, see *Tivoli Storage Network Manager Getting Started Guide*.

In order to use the **Launch Application** function from the Tivoli NetView Console, a Web browser (for example, Netscape or Internet Explorer) must be open at the time **Launch Application** is selected.

7

Other Tivoli Storage Network Manager Activities

After you have installed Tivoli Storage Network Manager and are running it, you might want to make changes to your SAN. This section describes how to add a managed host to the SAN when the LUN Manager is enabled and you do not want the host to lose access to the LUNs.

This section also describes the following:

- How to create a Tivoli Storage Network Manager user ID.
- How to set up the Tivoli Console and Tivoli NetView Console on a remote server.
- How to configure Tivoli NetView if you have Tivoli NetView installed rather than Tivoli NetView Lite.
- How to configure a remote Tivoli NetView console.
- How to launch an application from Tivoli NetView.

How to Add a Managed Host to the SAN

If you want to add a managed host to the SAN, follow these directions.

On the **manager machine**:

1. Set up a staging ORB set (by creating a new (empty ORB set). In this example, we will call the staging ORB set **BTSStagingOrbset**:
   a. Open the Tivoli Console by double–clicking on the Tivoli Console icon on the desktop.
   b. Go to the Manage ORBs window by clicking **Administer Management Software –> Manage ORBs** on the portfolio.
   c. You will see the Manage ORBs window. Right–click on the **ORB sets** on the left pane.
   d. Click **Create an ORB set**.
   e. You will see the **Create an ORB Set** dialog window. Enter the namespace, ORB set name, and description of the ORB set (optional). Click **OK**.
2. Deploy the agent components other than the LUN Manager (SANLUNMGR) to the staging ORB set. (These are the same components that install deployed to the managed host ORB set.) Deploy these components to the staging ORB set:

```
SANAgentScanner
SANAgentInbandChangeAgent
SANAgentHostQuery
SANAgentScheduler
SANAgentFSExtend
SANAgentFSMonitor
```

Follow these steps:

a. On the Tivoli Console portfolio, click **Administer Management Software –> View Component Depot**. The **View Component Depot** window is displayed.

b. On the left pane, click **Depot's Installed Components**. The installed components are displayed on the right pane.

c. Sort the list by clicking on the table filter. Select the components listed above. These are top level components that install other components. Right–click on the components and click **Copy**.

d. On the Tivoli Console portfolio, click **Administer Management Software –> Deploy to ORB Sets**. The **Deploy to ORB Sets** window is displayed.

e. Click on **Namespaces** in the left pane to list the namespaces. Click on your namespace to list the ORB sets.

f. On the left pane, click on the staging ORB set **BTSStagingOrbset**. Right–click on the ORB set and click **Paste**. This will deploy the required components.

On the **managed host (bootprint or agent) machine**:

1. Install the Tivoli Kernel Services bootprint on each managed host. See "Step 1: Installing the Tivoli Kernel Services Bootprint" on page 71. Make sure that when you install the bootprint, you do **not** check the box for automatically starting the bootprint server after installation completes.
2. For Windows managed host machines, follow these steps (**orb.1** should not be running) :
   a. Open a command prompt window.
   b. Ensure that the Tivoli Storage Network Manager CD is in the CD–ROM drive. If your CD–ROM drive is **e:**, then type **e:**.
   c. Change your drive directory to **\util**. For example:
      ```
      cd \util
      ```
   d. Run the following command:
      ```
      bpsetup <TKSBP_directory>
      ```
      where *<TKSBP_directory>* refers to the drive and directory where the Tivoli Kernel Services bootprint is installed, for example **c:\Tivolibp**.
   e. Issue the following command to start **orb.1**:
      ```
      net start "Tivoli Kernel Services orb.1"
           or
      net start orb.1
      ```
3. For AIX managed host machines, follow these steps (**orb.1** should not be running):
   a. Ensure that the Tivoli Storage Network Manager CD is in the CD–ROM drive and mounted. We will refer to the CD–ROM mounted directory as **/cdrom/TSNM**. Issue these commands:

```
mkdir /cdrom/TSNM
mount -v'cdrfs' -r'' /dev/cd0 /cdrom/TSNM
cd /cdrom/TSNM
```

Where '' on the **–r** option are two single quotes (not a double quote).

b. Change your working directory to the **/util** directory on CD. For example:

```
cd /cdrom/TSNM/util
```

c. Run the following command:

```
sh bpsetup.sh <TKSBP_directory>
```

Where *<TKSBP_directory>* refers to the directory where Tivoli Kernel Services bootprint is installed. The **sh** command is necessary because the **bpsetup.sh** file does not have execute permission on the CD.

d. Issue this command to start **orb.1**:

```
startsrc -s LOCK.orb.1
```

On the **manager machine**:

1. Wait for the managed host ORB to appear in the Manage ORBs window. Join the managed host ORB to the staging ORB set. This will cause all of the components except for the LUN Manager agents to be deployed.
2. When the new managed host appears in the Manage LUNs window, make LUN assignments to it. Note that the new host will appear as a rogue host and the assignments will have a status of **Assign Pending** until Manage LUNs is deployed.
3. When the assignments are complete, join the ORB to the managed host ORB set (**BTSManagedHostOrbset**). See "Step 3: Joining the Managed Host (Bootprint) ORBs to the BTSManagedHostOrbset" on page 86. Wait until the ORB appears in the **ORBs and ORB Sets** window and the deploy operation has completed. You can check to see if the **SANAgentDiskPool** component is up by issuing the following command:

```
c:\<TKS_directory>\orb.1>setupenv
c:\<TKS_directory>\orb.1>wcmd -i jason.sanjose.ibm.com_9990 accmgr
                  listServices | sort
```

Where *<TKS_directory>* refers to the drive and directory where you installed Tivoli Kernel Services and **jason.sanjose.ibm.com_9990** is the managed host name.

4. Once the components are joined and the ORB's status changes to reboot required (as indicated by the ORB reboot icon), reboot the managed host machine. If the managed host machine is AIX, you do not have to reboot the machine.
5. Remove the ORB from the staging ORB set through the Manage ORBs window. This step is important to run to avoid problems with future uninstalls or upgrades. Follow these steps:

   a. Go to the Manage ORBs window by clicking **Administer Management Software –> Manage ORBs** on the portfolio.

   b. You will see the Manage ORBs window. Right–click on **ORB sets** on the left pane. Then click **Get ORB sets**.

   c. This brings up the **ORB Set Filter Chooser** dialog window. Click **OK**.

   d. The ORB sets are listed in the left pane. Click on **BTSStagingOrbset** to list the ORBs in the staging ORB set.

e. Right–click on the ORB to remove. Then click **Remove**. This removes the ORB from the staging ORB set.

How to Create a Tivoli Storage Network Manager User ID

You can create a Tivoli Storage Network Manager user ID. The Tivoli Storage Network Manager roles allow you to do Tivoli Storage Network Manager administrative functions such as assigning and unassigning LUNs to or from a host.

Follow these steps to create a Tivoli Storage Network Manager user ID:

1. Log on to the Tivoli Console by double–clicking on the **Tivoli Console** icon. When the log in screen appears, enter the User ID of **superadmin** and password **password**. We recommend that you change this password. If the Tivoli Console is not up and running, see "Starting the Tivoli Console" on page 123.
2. From the Tivoli Console portfolio, click **Administer Security** and then click **Add User**.

   Note: The response may be slow, but please do not click more than once on **Add User**.

Figure 82. Tivoli Console Portfolio

3. Click **User** to see the **User** window. You only need to enter values for **cn**. The other fields are optional fields.
   - cn: **TSNM Administrator** (this is case–sensitive)
   - givenName: your first name
   - sn: surname
   - middleName: your middle name
   - initials: your initials
   - generationalQualifier: III, IV, Jr., and so forth
   - telephone number: your telephone number

   Do **not** click **OK** here. In the left pane of the **User** window, click **Statically Assigned Roles**.

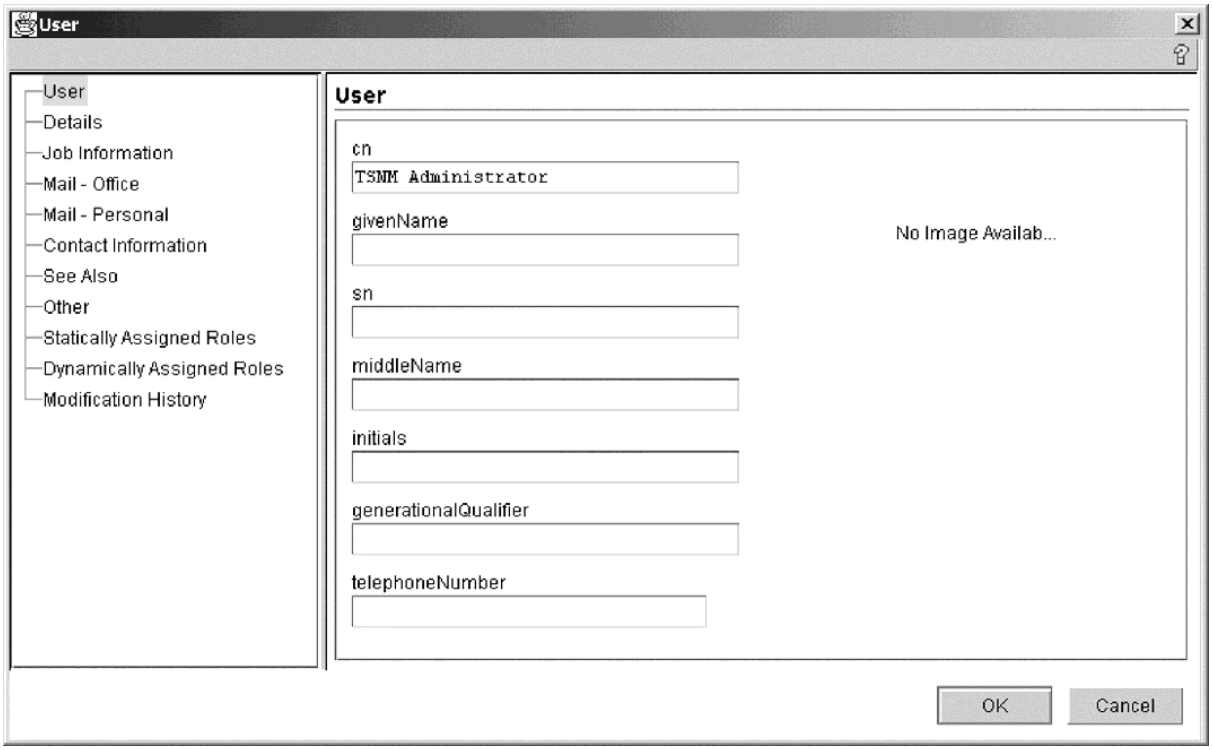

Figure 83. User Window – User

4. On the **User – Statically Assigned Roles** window, click on **New**.

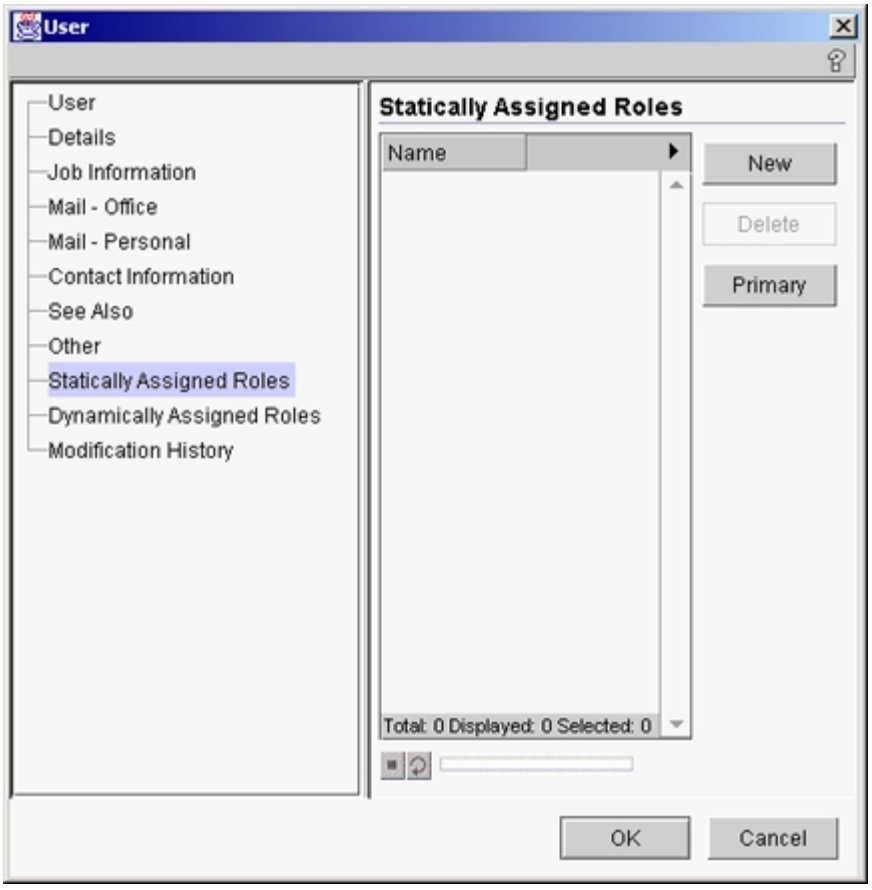

Figure 84. User – Statically Assigned Roles Window

5. The **Select Roles to Assign** dialog is displayed. Select **ALL** the roles. To select all the roles, under the **Select** column, click the top of the list and frag the mouse down the list to the end. All the boxes will be checked. Click **OK**.

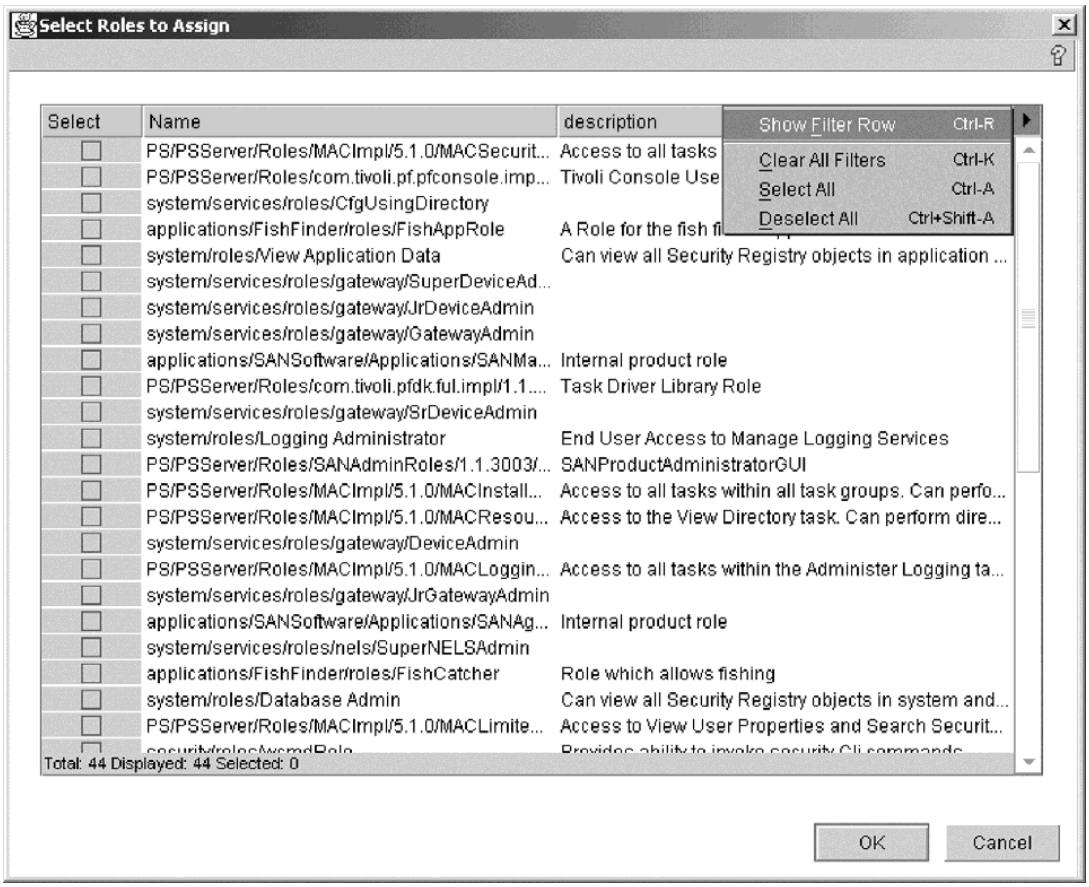

Figure 85. Select Roles to Assign Dialog

6. This will return you to the **User – Statically Assigned Roles** window. Click **OK**.

7. You are returned to the Tivoli Console. The **User Properties** window will be open displaying the properties for the user you just created. Now you need to create a Kernel account for this user to log onto the Tivoli Console. To do this, click the **New** button to the right of the area labeled **Accounts**.

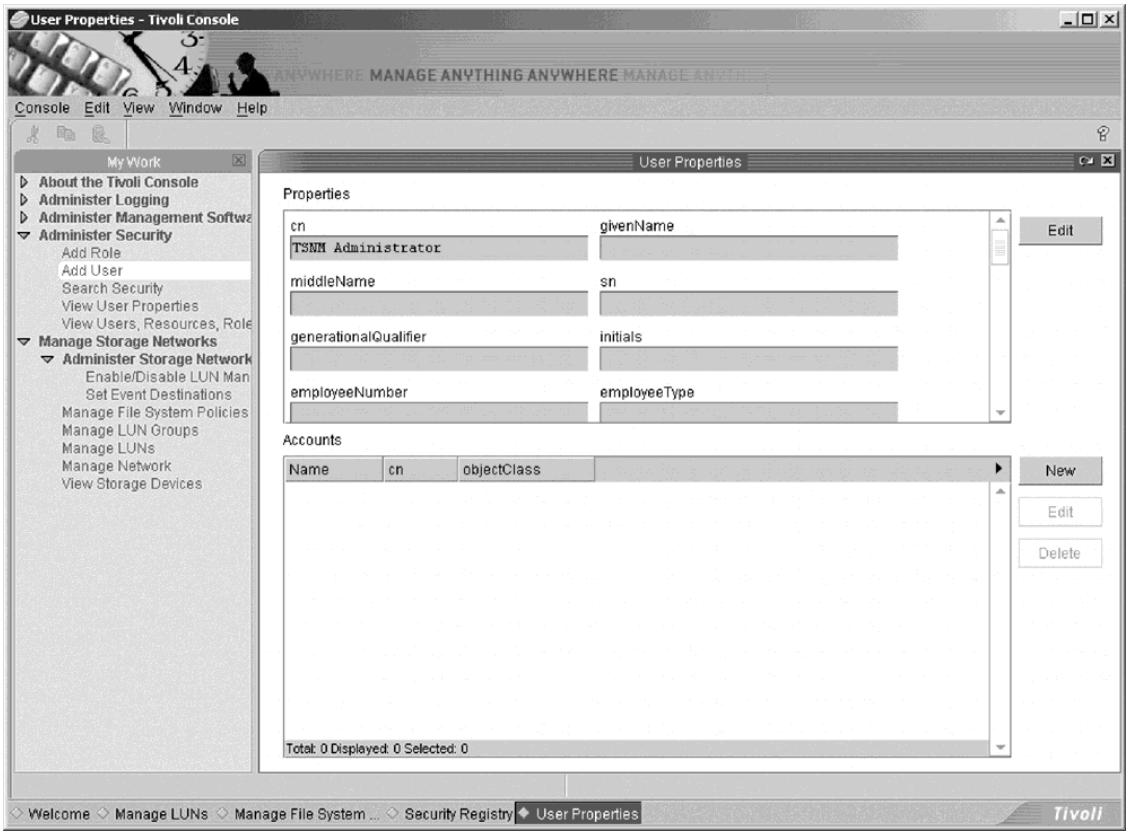

Figure 86. User Properties Window

8. The **Select an Account Type** window is displayed. Click **KERNELACCOUNT**, then click **OK**.

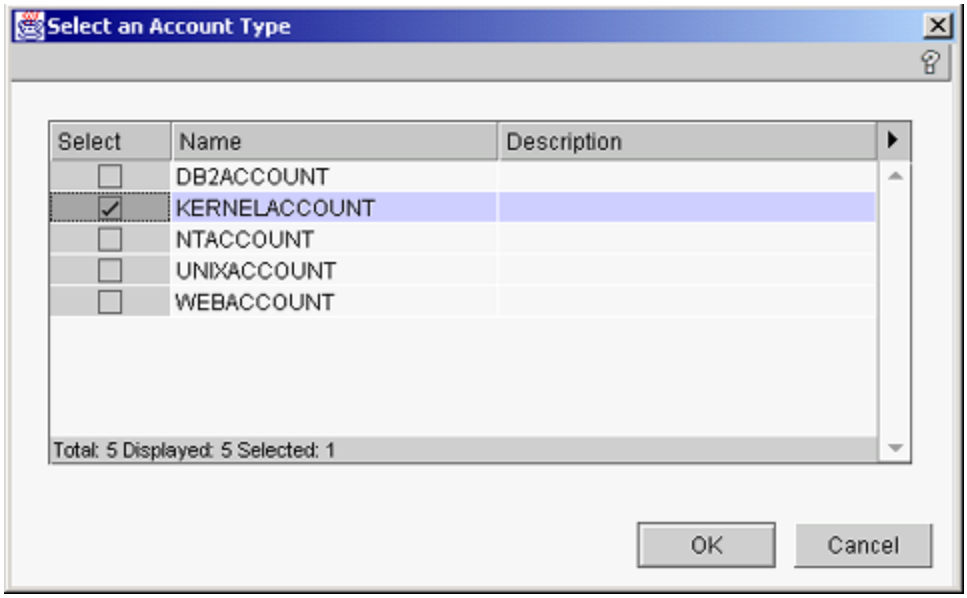

Figure 87. Select an Account Type Window

9. On the **Account** window, click **Identification**, then enter the following:
   - cn: the user ID you created (this is case–sensitive and will be the user ID to login to the Tivoli Console for Tivoli Storage Network Manager)
   - host: <*fully_qualified_manager_hostname*>. An example of a fully qualified hostname is: **hermes.sanjose.ibm.com**.
   - password: **password**

   Note that this information is case-sensitive. Click **OK**.

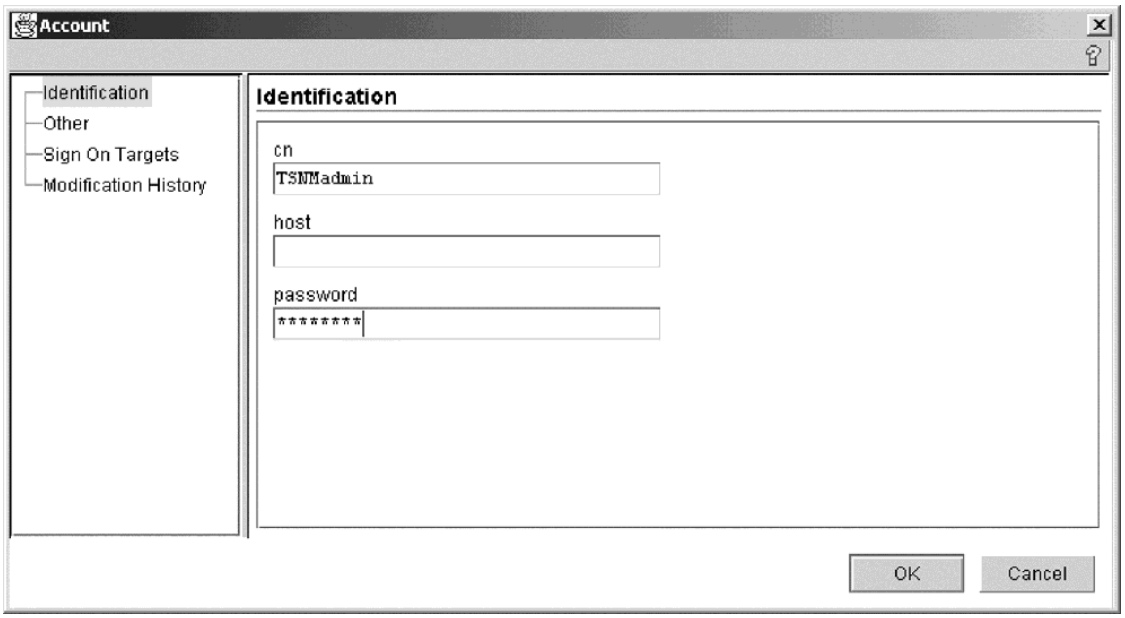

Figure 88. Account Window

10. An example of what your screen should look like is shown in Figure 89. This should display your new user ID.

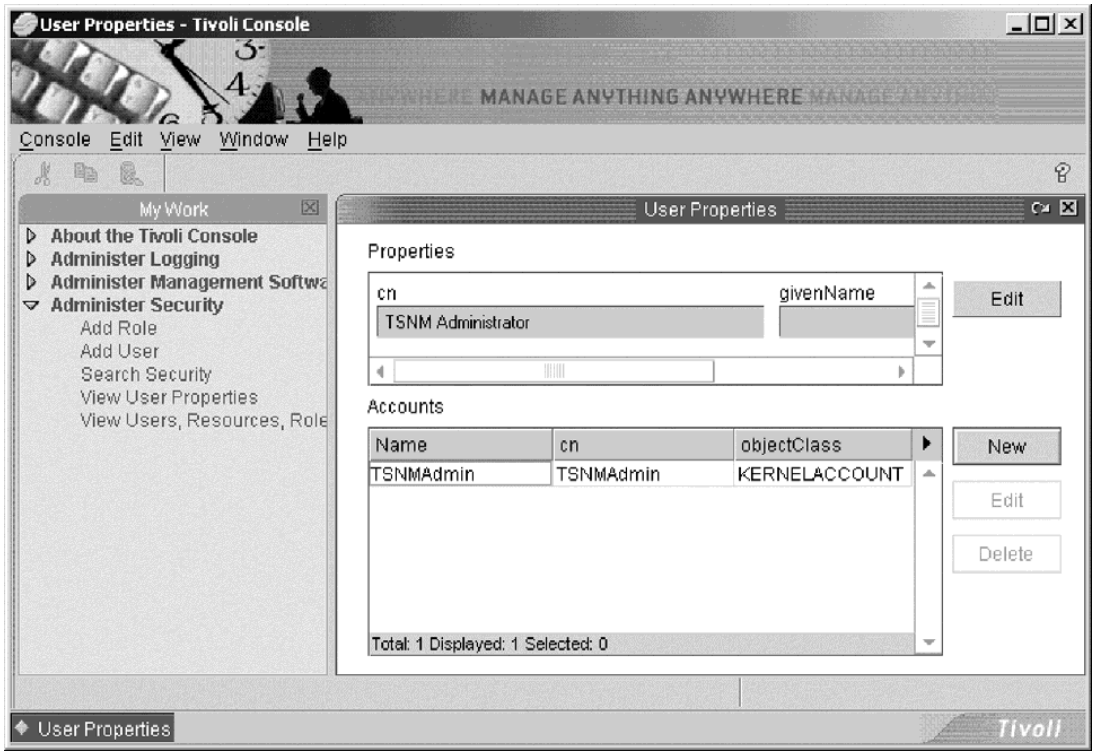

Figure 89. User ID Created

11. Exit the Tivoli Console by clicking **Console** on the menu bar and then clicking **Exit**. This closes the active task. Close the Tivoli Console by clicking on the Close (**X**) icon on the top right of the window.

12. You will be restarting the Tivoli Console using the new user ID you created. When you restart the Tivoli Console with a different user ID, you must completely close the Tivoli Console, then restart it. Restart the Tivoli Console by double-clicking on the Tivoli Console icon on the desktop.

13. Log on to the Tivoli Console using your new user ID and password (this is case–sensitive).

14. The Tivoli Storage Network Manager roles will appear in the Tivoli Console portfolio.

Setting Up a Tivoli Console and Tivoli NetView Console on a Remote Server

To set up a remote Tivoli Console, follow these steps:

1. Install the Tivoli Kernel Services bootprint on the server. See "Step 1: Installing the Tivoli Kernel Services Bootprint" on page 71. When you see the **Choose the Type of Bootprint** screen, select **Tivoli Console server**. This selection automatically adds the bootprint to the **consolesInDefaultRegion** ORB set. When the server is started, the proper code from the Installation Depot machine is downloaded to the bootprint server.

   When you see the **Enter the Bootprint Information** screen, make sure you **uncheck** the box to **Automatically start this bootprint server after install completes**.

2. Run "Step 2: Run bpsetup.cmd on all Windows NT and 2000 Managed Host (Bootprint) Machines" on page 79 (for Windows machines) or "Step 3: Run bpsetup.sh on all AIX Managed Host (Bootprint) Machines" on page 80 (for AIX machines).

3. Start **orb.1** on the server. For Windows, issue **net start orb.1** from a command prompt window. For AIX, issue this command: **startsrc –s LOCK.orb.1**.

4. Wait until you see this message in the **stdout** or **stdout.txt** file:

   ```
   ICE Browser 5.x.x
   ```

   This indicates that the Tivoli Kernel Services bootprint:

   - Has connected properly to Tivoli Kernel Services
   - Has downloaded the console specific code from the Installation Depot
   - Has successfully started

   Make sure the Tivoli Console icon appears on your desktop and that you can launch it. You can launch the Tivoli Console by double–clicking on the icon on your desktop.

To set up the Tivoli NetView Console, follow these steps:

1. Install Tivoli NetView. See "Step 8: Install or Configure Tivoli NetView" on page 55.
2. Make sure that the Tivoli NetView console comes up by double–clicking on the icon on the desktop.
3. Join the remote console node to the **consolesInDefaultRegion**.
4. Join the *<fully_qualified_hostname>*_**9990** ORB of the machine that is running Tivoli NetView to the **BTSNetViewOrbset**. See "Step 2: Joining the Manager ORB to the BTSNetViewOrbset" on page 85.

Tips on Running with Tivoli NetView

This section describes how to configure Tivoli NetView (as opposed to Tivoli NetView Lite). This section also describes how to configure a remote Tivoli NetView Console and how to launch an application from the Tivoli NetView Console.

Configuring Tivoli NetView

If you have Tivoli NetView installed in your enterprise, you must still run the procedure to configure Tivoli NetView. You must do the following:

1. Install the Tivoli Kernel Services bootprint (endpoint server) on the machine where Tivoli NetView is installed. (If Tivoli NetView is installed on the manager machine, this step is not necessary.)
2. Run the procedure to install or configure Tivoli NetView. See "Step 8: Install or Configure Tivoli NetView" on page 55.
3. Complete the installation by joining the <*fully_qualified_hostname*>**_9990** ORB of the machine that is running Tivoli NetView to the **BTSNetViewOrbset**. See "Step 2: Joining the Manager ORB to the BTSNetViewOrbset" on page 85.

Configuring a Remote Tivoli NetView Console

If you want to use a remote Tivoli NetView console that supports the Manage Networks component, follow these steps:

1. If there is no Tivoli Kernel Services bootprint (endpoint server) on the Tivoli NetView console machine, then you must install it. This should follow the regular procedures for adding a host after Tivoli Storage Network Manager has been set up. (The machine does **not** need to be added to the **BTSManagedHostOrbset** unless you want to have Tivoli Storage Network Manager manage this remote machine.)
2. Follow the procedure to install Tivoli NetView Lite ("Step 8: Install or Configure Tivoli NetView" on page 55). This will install Tivoli NetView Lite on the endpoint machine.
3. Join the <*fully_qualified_hostname*>**_9990** ORB of the machine that is running Tivoli NetView to the **BTSNetViewOrbset**. See "Step 2: Joining the Manager ORB to the BTSNetViewOrbset" on page 85.

Launching an Application from the Tivoli NetView Console

Devices that launch their own management applications rather than using a Web or telnet interface must have the PATH environment variable set. The PATH variable must be set to the location of the application. If you do not set the PATH variable, you will get an application not found error when trying to launch the management application for the device.

Ton set the PATH variable:

1. Right–click on **My Computer** on your desktop.
2. Select **Properties**.
3. Select the **Advanced** tab –> **Environment Variables**.
4. Under **System Variables**, select **PATH**.
5. Edit the PATH variable to include the location of the application.

8

Upgrading Tivoli Storage Network Manager

This section describes how to upgrade Tivoli Storage Network Manager. Tivoli Storage Network Manager Version 1.1.3 requires Tivoli Kernel Services Version 1.1.2 (or Tivoli Kernel Services Version 1.1.1 with patch 1.1.1–TKS–0004). You will need the Tivoli Storage Network Manager Version 1.1.3 CD or the image from the Web site. You do not have to reinstall Tivoli NetView Lite.

If you are installing Tivoli Storage Network Manager Version 1.1.3 from the Web image, you will need the Tivoli Storage Network Manager Version 1.1.1 or 1.1.2 CD for the license key.

Before running the upgrade procedure, identify the currently installed level of Tivoli Kernel Services by following these steps:

1. Open a command prompt window on the manager (Installation Depot) machine.
2. Change to the directory where Tivoli Kernel Services is installed.
3. Go to the **orb.1** directory.
4. Set up the environment for issuing commands:
   ```
   setupenv
   ```
5. Enter the following command:
   ```
   wcmd cds listComponentVersions TivoliKernelServicesInstallationDepot
   ```
   The command returns these values for Tivoli Kernel Services:

Table 7. Tivoli Kernel Services Version Numbers

Version Number	Follow steps for	See
Lower than 5.1.2	Upgrade 1	“Steps for Upgrade 1” on page 108.
5.1.2 or 5.1.3	Upgrade 2	“Steps for Upgrade 2” on page 110.
5.1.5	Upgrade 3	“Steps for Upgrade 3” on page 111.

Steps for Upgrade 1

To upgrade Tivoli Storage Network Manager, follow these steps:

1. From the Tivoli Console portfolio, go to the Manage ORBs screen. Click **Administer Management Software –> Manage ORBs.**
2. On the Manage ORBs screen, display the ORBs and ORB sets.
3. Remove the ORBs from the manager and managed host ORB sets. If you used the defaults, the ORB sets are **BTSManagerOrbset**, **BTSManagedHostOrbset**, and **BTSNetViewOrbset**. To remove an ORB, right–click on the ORB, then click **Remove**. This removes the ORB from the ORB set.
4. Stop **orb.1** and **orb.2** on the manager machine.
5. Uninstall Tivoli Kernel Services on the manager machine. See *Installing Tivoli Kernel Services* and the **Readme** file on the Tivoli Kernel Services CD for instructions on uninstalling Tivoli Kernel Services.
6. Delete everything in the Tivoli Kernel Services directory on the manager machine. For example, if you used the directory name **c:\tivoli** for the manager machine, delete that directory and all subdirectories, including the Tivoli Storage Network Manager subdirectories.
7. Install Tivoli Kernel Services 1.1.2 on the manager machine. See "Step 2: Installing Tivoli Kernel Services" on page 31.
8. Insert the Tivoli Storage Network Manager Version 1.1.3 CD into the CD–ROM drive or go to the directory where you have downloaded the Web image. Run the **SADB.bat** script. This script is in the **\util** directory on the Tivoli Storage Network Manager CD. This script cleans up the File System Manager database tables. Run this step before you install Tivoli Storage Network Manager Version 1.1.3. If you choose to recreate the **tivolsan** database, you must run **SADB.bat** script **after** you recreate the database.

   To run this script, you need to supply the same user ID, password, and database name you used to create the Tivoli Storage Network Manager database. See Figure 41 on page 50. Run the script from a DB2 command window as follows:

   ```
   SADB.bat <db2user1> <db2password1> <databasename>
   ```

   Where <*db2user1*> is the DB2 User ID #1, <*db2password1*> is the DB2 Password #1, and <*databasename*> is the database name as supplied in Figure 41 on page 50. Note that you only need the **first** *db2user1* and *db2password1*.
9. Run "Step 3: Run makeNTaccount1108.bat" on page 42.
10. Run "Step 4: Run idsetup.cmd" on page 43.
11. Run "Step 5: Changing the JVM Memory Setting" on page 44.
12. If you are upgrading from Tivoli Storage Network Manager 1.1.1: If you want to save the data stored in your database, contact Tivoli Customer Support for help.

    If you do not want to save the data in your database, you can recreate your database. See "Step 7: Create the Tivoli Storage Network Manager Database" on page 46.
13. Install Tivoli Storage Network Manager Version 1.1.3. See "Step 9: Install Tivoli Storage Network Manager" on page 60.

    For users who are installing Tivoli Storage Network Manager Version 1.1.3 from the image on the Web: After the **License Agreement** screen, you will see the

following**Product License Key Needed!** screen. You must insert the Tivoli Storage Network Manager Version 1.1.1 or 1.1.2 CD to get the license key. Click **Browse** on the **Product License Key Needed!** screen to tell Tivoli Storage Network Manager where the CD–ROM drive is located. You will see the **Select Directory** screen. Provide the CD–ROM drive location and click **OK**. Then click **Next** on the **Product License Key Needed!** screen to continue with the Tivoli Storage Network Manager installation. Once the next screen appears, you can remove the licensed CD.

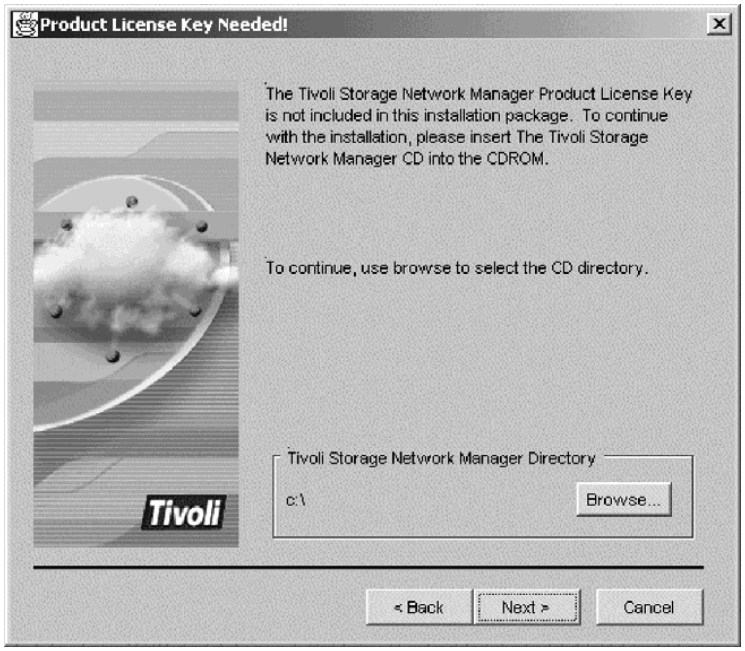

Figure 90. Product License Key Needed! Screen

14. Stop **orb.1** on the managed host machines. Note that managed host machines are also known as agent or bootprint machines.
15. Uninstall the Tivoli Kernel Services bootprint on the managed host machines. See *Installing Tivoli Kernel Services* and the **Readme** file on the Tivoli Kernel Services CD for instructions on how to uninstall the product.
16. Delete everything in the Tivoli Kernel Services directory on the managed host machines. For example, if you used the **c:\tivolibp** directory name for the managed host machine, delete that directory and all subdirectories, including the Tivoli Storage Network Manager subdirectories.
17. Run “Step 1: Installing the Tivoli Kernel Services Bootprint” on page 71.
18. Run “Step 2: Run bpsetup.cmd on all Windows NT and 2000 Managed Host (Bootprint) Machines” on page 79.
19. Run “Step 3: Run bpsetup.sh on all AIX Managed Host (Bootprint) Machines” on page 80.
20. Run “Step 1: Displaying the ORBs and ORB Sets” on page 81.
21. Run “Step 2: Joining the Manager ORB to the BTSNetViewOrbset” on page 85.
22. Run “Step 3: Joining the Managed Host (Bootprint) ORBs to the BTSManagedHostOrbset” on page 86.

23. Run “Step 4: Enabling and Disabling Manage LUNs (Optional Step)” on page 87.
24. Run “Step 5: Configuring Event Reporting (Optional Step)” on page 90.
25. Run “Step 6: Using Tivoli Storage Network Manager” on page 92.

Steps for Upgrade 2

To upgrade Tivoli Storage Network Manager, follow these steps:

1. From the Tivoli Console portfolio, go to the Manage ORBs screen. Click **Administer Management Software –> Manage ORBs.**
2. On the Manage ORBs screen, display the ORBs and ORB sets.
3. Remove the ORBs from the manager and managed host ORB sets. If you used the defaults, the ORB sets are **BTSManagerOrbset**, **BTSManagedHostOrbset**, and **BTSNetViewOrbset**. To remove an ORB, right–click on the ORB, then click **Remove**. This removes the ORB from the ORB set.
4. On the main Tivoli Storage Network Manager screen, press the **Uninstall Tivoli Storage Network Manager** button to uninstall the product.
5. Install the Tivoli Kernel Services Patch 1.1.1–TKS–0004. See the Tivoli Kernel Services **Readme** file to install this patch.
6. Insert the Tivoli Storage Network Manager Version 1.1.3 CD into the CD–ROM drive or go to the directory where you have downloaded the Web image. Run the **SADB.bat** script. This script is in the **\util** directory on the Tivoli Storage Network Manager CD. This script cleans up the File System Manager database tables. Run this step before you install Tivoli Storage Network Manager Version 1.1.3. If you choose to recreate the **tivolsan** database, you must run **SADB.bat** script **after** you recreate the database.

   To run this script, you need to supply the same user ID, password, and database name you used to create the Tivoli Storage Network Manager database. See Figure 41 on page 50. Run the script from a DB2 command window as follows:

   ```
   SADB.bat <db2user1> <db2password1> <databasename>
   ```

   Where <*db2user1*> is the DB2 User ID #1, <*db2password1*> is the DB2 Password #1, and <*databasename*> is the database name as supplied in Figure 41 on page 50. Note that you only need the **first** *db2user1* and *db2password1*.
7. Run “Step 5: Changing the JVM Memory Setting” on page 44.
8. Install Tivoli Storage Network Manager Version 1.1.3. See “Step 9: Install Tivoli Storage Network Manager” on page 60.

   For users who are installing Tivoli Storage Network Manager Version 1.1.3 from the image on the Web: After the **License Agreement** screen, you will see the following**Product License Key Needed!** screen. You must insert the Tivoli Storage Network Manager Version 1.1.1 or 1.1.2 CD to get the license key. Click **Browse** on the **Product License Key Needed!** screen to tell Tivoli Storage Network Manager where the CD–ROM drive is located. You will see the **Select Directory** screen. Provide the CD–ROM drive location and click **OK**. Then click **Next** on the **Product License Key Needed!** screen to continue with the Tivoli Storage Network Manager installation. Once the next screen appears, you can remove the licensed CD.

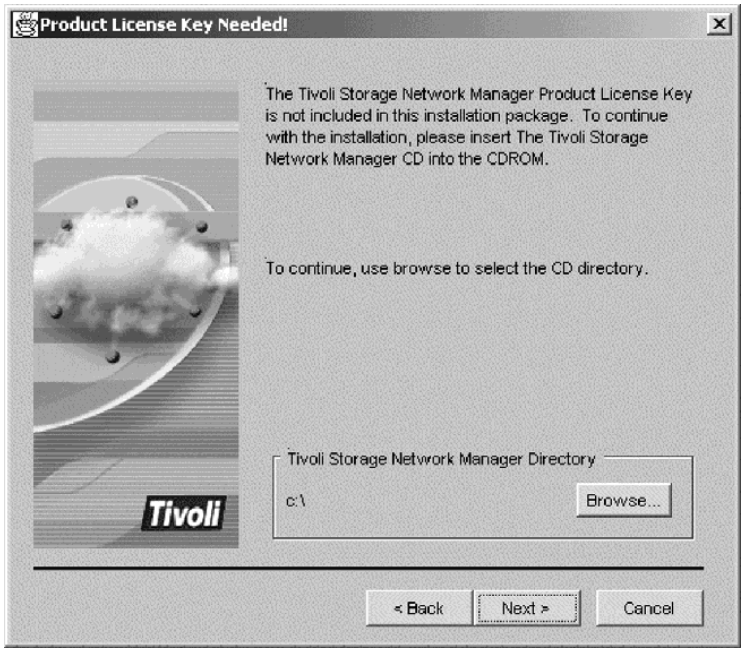

Figure 91. Product License Key Needed! Screen

9. Run "Step 1: Displaying the ORBs and ORB Sets" on page 81.
10. Run "Step 2: Joining the Manager ORB to the BTSNetViewOrbset" on page 85.
11. Run "Step 3: Joining the Managed Host (Bootprint) ORBs to the BTSManagedHostOrbset" on page 86. Wait about 60 minutes, then recycle all the managed host ORBs.
12. For each managed host ORB, check to see that the managed host ORB services are running. You can issue this command:

    ```
    wcmd accmgr listServices
    ```

    You should see the updated version of these managed host services come up:

    ```
    SANAgentDiskPool version 1.1.4005 (this will not appear until after
                                  Manage LUNs is enabled)
    SANAgentFSExtend version 1.1.4005
    SANAgentFSMonitor version 1.1.4005
    SANAgentHostQuery version 1.1.4005
    SANAgentInbandChangeAgent version 1.1.4005
    SANAgentScanner version 1.1.4005
    SANAgentScheduler version 1.1.4005
    ```

13. Run "Step 4: Enabling and Disabling Manage LUNs (Optional Step)" on page 87.
14. Run "Step 5: Configuring Event Reporting (Optional Step)" on page 90.
15. Run "Step 6: Using Tivoli Storage Network Manager" on page 92.
16. If you add any new managed host (agent or bootprint) to the SAN, be sure to install the Tivoli Kernel Services 1.1.2 bootprint on that managed host.

Steps for Upgrade 3

To upgrade Tivoli Storage Network Manager, follow these steps:

1. Install the Tivoli Kernel Services Patch 1.1.1–TKS–0004. See the Tivoli Kernel Services **Readme** file to install this patch.
2. Run "Step 5: Changing the JVM Memory Setting" on page 44.
3. Launch the Tivoli Console. To launch the Tivoli Console, double–click the icon on your desktop. You can use the default Tivoli Kernel Services user ID and password: **superadmin** and **password** to login. Once you have successfully logged in, you can then exit the Tivoli Console.
4. Install Tivoli Storage Network Manager Version 1.1.3. On the main Tivoli Storage Network Manager screen, press the **Upgrade Tivoli Storage Network Manager** button. See "Step 9: Install Tivoli Storage Network Manager" on page 60.

   For users who are installing Tivoli Storage Network Manager Version 1.1.3 from the image on the Web: After the **License Agreement** screen, you will see the following**Product License Key Needed!** screen. You must insert the Tivoli Storage Network Manager Version 1.1.1 or 1.1.2 CD to get the license key. Click **Browse** on the **Product License Key Needed!** screen to tell Tivoli Storage Network Manager where the CD–ROM drive is located. You will see the **Select Directory** screen. Provide the CD–ROM drive location and click **OK**. Then click **Next** on the **Product License Key Needed!** screen to continue with the Tivoli Storage Network Manager installation. Once the next screen appears, you can remove the licensed CD.

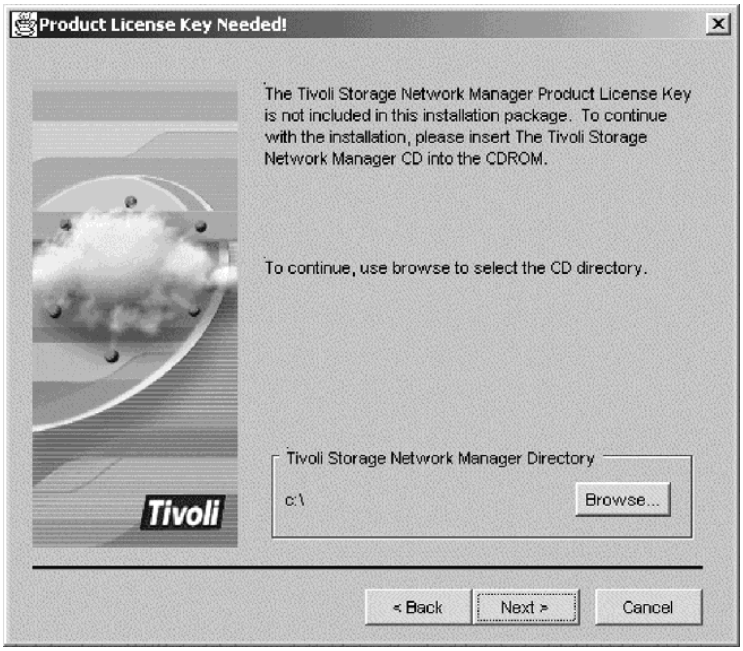

Figure 92. Product License Key Needed! Screen

5. After you have installed Tivoli Storage Network Manager, wait about 60 minutes. You can then recycle the manager and managed host ORBs.
6. For each managed host ORB, check to see that the managed host ORB services are running. You can issue this command:

   ```
   wcmd accmgr listServices
   ```

   You should see the updated version of these managed host services come up:

```
SANAgentDiskPool version 1.1.4005 (this will not appear until after
                                Manage LUNs is enabled)
SANAgentFSExtend version 1.1.4005
SANAgentFSMonitor version 1.1.4005
SANAgentHostQuery version 1.1.4005
SANAgentInbandChangeAgent version 1.1.4005
SANAgentScanner version 1.1.4005
SANAgentScheduler version 1.1.4005
```

7. If you add any new managed host (agent or bootprint) to the SAN, be sure to install the Tivoli Kernel Services 1.1.2 bootprint on that managed host.

9

Uninstalling Tivoli Storage Network Manager

This section describes how to uninstall Tivoli Storage Network Manager and Tivoli NetView Lite.

Uninstalling Tivoli Storage Network Manager

This section describes the uninstall procedure for Tivoli Storage Network Manager. The uninstall procedure can take up to five hours. When the uninstall process is complete, all Tivoli Storage Network Manager components will be removed from both your manager and managed host machines. Tivoli NetView is not deleted. After the uninstall, the managed host (agent or bootprint) machines might be able to see LUNs which Tivoli Storage Network Manager had previously been masking from them.

After the uninstall process, all of the entries related to Tivoli Storage Network Manager will be removed. However, the uninstall process will not affect Tivoli Kernel Services in any other way. You will still be able to launch the Tivoli Console, and any users or customizations you have created will still be available.

For information about uninstalling Tivoli Kernel Services, see *Installing Tivoli Kernel Services*. For information about uninstalling DB2, see the documents on the DB2 CD.

To uninstall Tivoli Storage Network Manager, follow these steps:

1. Make sure that the ORBs are up and running on the manager and managed host machines.
2. Insert the Tivoli Storage Network Manager CD into the CD–ROM drive. Go into Windows Explorer and click on your CD-ROM drive. On the right of the Explorer panel, double click the **Install.bat** program. The following screen is displayed. Click **Uninstall Tivoli Storage Network Manager**.

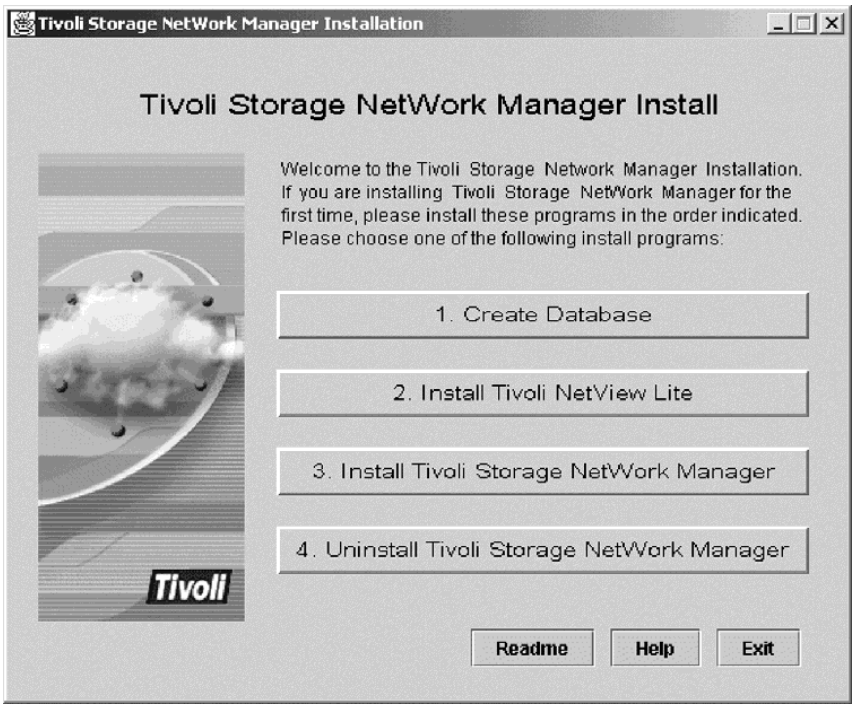

Figure 93. Tivoli Storage Network Manager Installation Screen

3. You will see the **Tivoli Storage Network Manager Uninstall** screen. Click **Next** to continue.

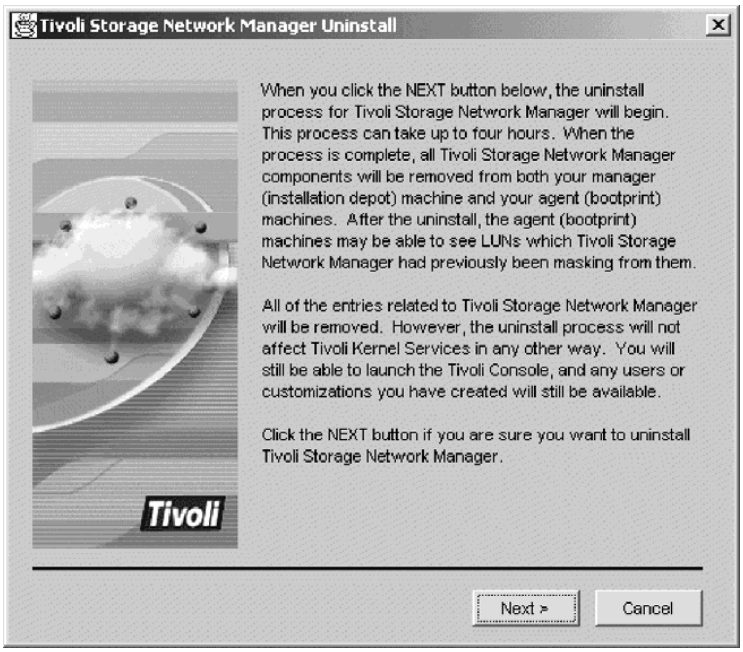

Figure 94. Tivoli Storage Network Manager Uninstall Screen

4. You will see the **Tivoli Storage Network Manager Uninstall Status** screen. When Tivoli Storage Network Manager has finished uninstalling the code, the **Next** button is activated. Click **Next** to continue.

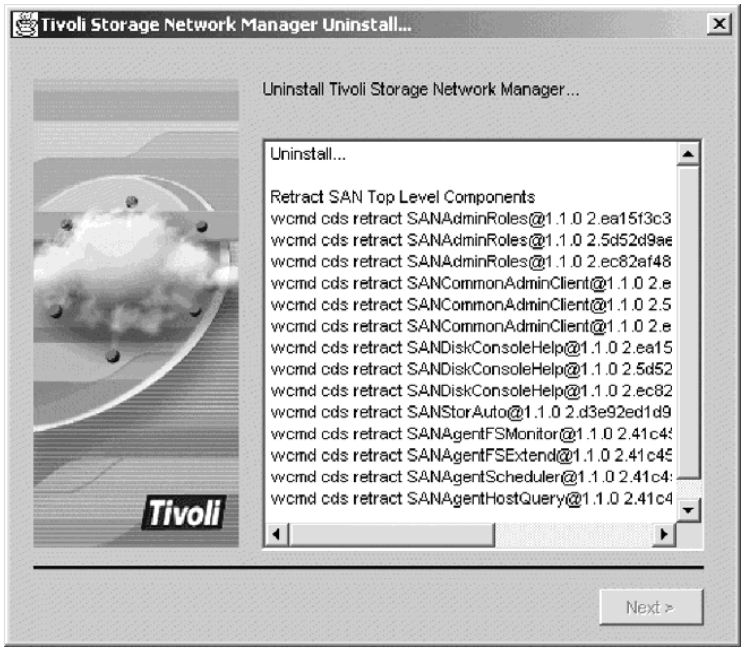

Figure 95. Tivoli Storage Network Manager Uninstall Status Screen

5. You will see the **Tivoli Storage Network Manager Uninstall Complete** screen. Click **Finish**. If you want to reinstall Tivoli Storage Network Manager, you must wait about five hours for Tivoli Storage Network Manager to finish the uninstallation process.

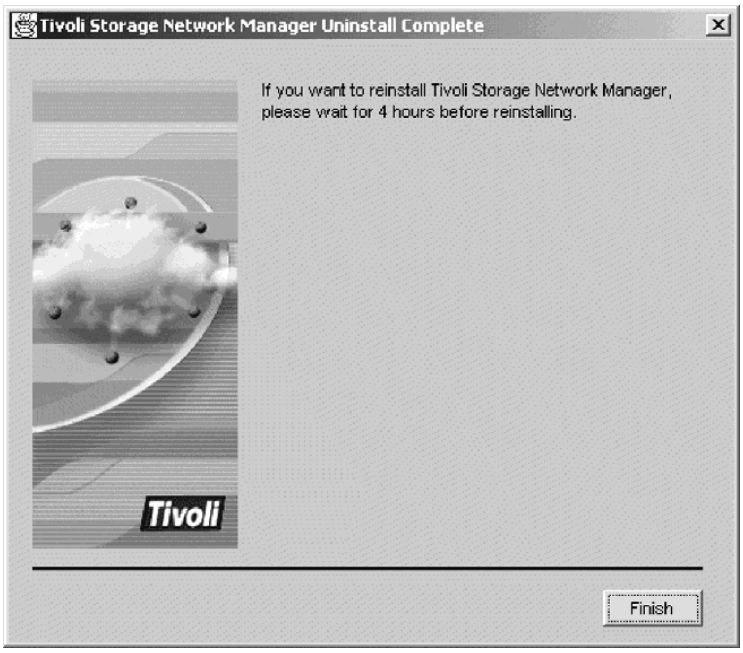

Figure 96. Tivoli Storage Network Manager Uninstall Status Screen

6. The uninstall program should recycle the ORBs and DAS Server on the manager machine. If you get a message that tells you to recycle the ORBs and DAS Server, you should do so. See "What are ORBs and ORB Sets?" on page 127.
7. Recycle the ORBs for the managed host machines.

Note: If you are uninstalling and reinstalling the same version of Tivoli Storage Network Manager, you must recycle all the ORBs on the manager and managed host machines before reinstalling Tivoli Storage Network Manager.

Uninstalling Tivoli NetView Lite

If you need to uninstall Tivoli NetView Lite, you can do so by clicking:

```
Start -> Programs -> NetView -> Installation -> Uninstall NetView
```

10

Try and Buy Product

If you have the Try and Buy version of Tivoli Storage Network Manager, it will be fully enabled for 60 days. The 60 days starts when you install Tivoli Storage Network Manager.

Information about the Try and Buy product is displayed within the GUI windows. For the Manage Network component, the Try and Buy information is displayed in the Tivoli Storage Network Manager Configuration panel on the Tivoli NetView console. For the Manage LUNs and Manage File Systems components, the information is displayed in the information area of the Tivoli Console.

When there are 10 or fewer days remaining for usage of the Try and Buy product, you will receive messages informing you of this condition. SNMP traps and Tivoli Enterprise Console events are sent once a day to inform you of this condition.

To install the Try and Buy product, follow the steps for a new install of Tivoli Storage Network Manager. See Table 5 on page 12.

Ending the Try and Buy Product

After the Try and Buy product time period ends, the following actions will be taken:

- The discovery function will be turned off.
- The Tivoli NetView databases are purged.
- The LUN assignments will be frozen:
  - You will still be able to view current LUN assignments.
  - You will not be able to assign or unassign LUNs.
  - You will be able to disable LUN management, but will not be able to enable it.
- File system monitoring will be turned off. However, you will still be able to view the policies.

Converting the Try and Buy Product to a Fully Licensed Version

You must first purchase the fully licensed version of Tivoli Storage Network Manager. You will receive the fully licensed CD–ROM. The fully licensed version of the product detects the presence of the Try and Buy product. The Try and Buy product is upgraded to a fully licensed version.

The conversion can occur any time during the Try and Buy period or any time after the Try and Buy product time period has ended.

Once you have purchased the fully licensed version of the product, follow these steps:

1. Insert the fully licensed CD into the CD–ROM drive.
2. Go into Windows Explorer and click on your CD–ROM drive. On the right of the Explorer panel, double–click the **Install.bat** program.
3. The main Tivoli Storage Network Manager panel is displayed. Click **Upgrade Tivoli Storage Network Manager**.

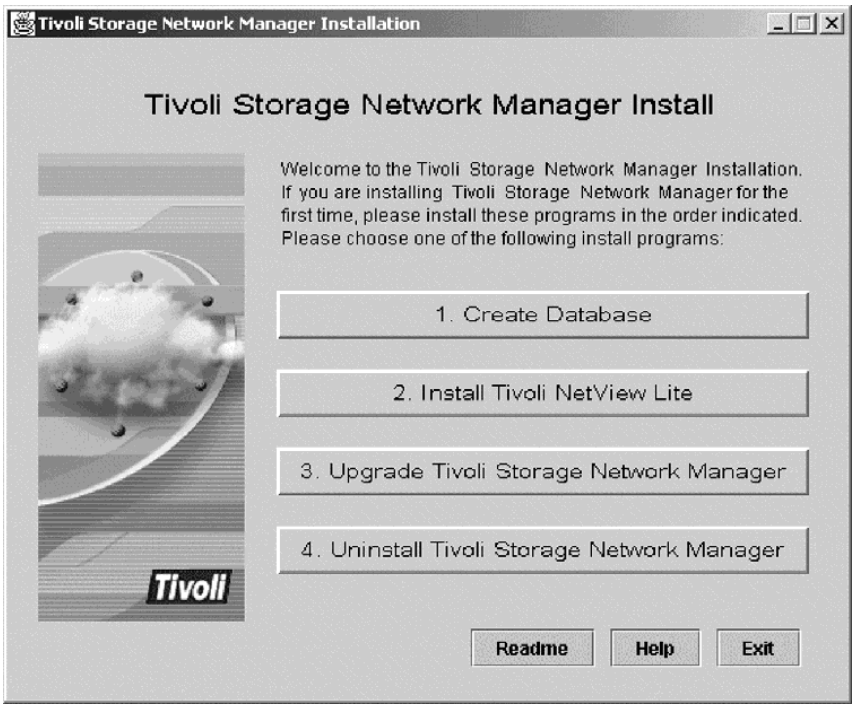

Figure 97. Main Tivoli Storage Network Manager Screen

4. The **Welcome** screen is displayed. Click **Next** to continue.
5. The **License Agreement** screen is displayed. Read the license agreement. If you agree, click **Yes** to continue.
6. The **Tivoli Storage Network Manager Fully–Licensed CD** screen is displayed. Click **Next** to upgrade the product.

Figure 98. Tivoli Storage Network Manager Fully–Licensed CD Screen

7. The **Information** screen is displayed. The license is updated during the upgrade procedure but you can click **Next** to start using the product immediately.

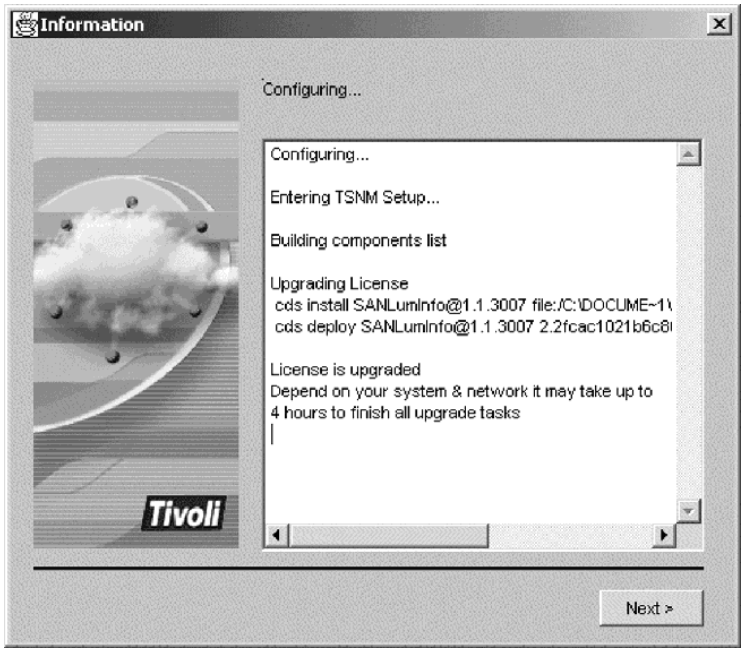

Figure 99. Information Screen

A

Hints and Tips

This section contains information on hints and tips. For more information, see the following:

- Tivoli Kernel Services documentation on the Tivoli Kernel Services CD–ROM. This has information about Tivoli Kernel Services, Tivoli Console, MQSeries, ORBs, ORB sets, and namespaces.
- DB2 documentation on the DB2 CD–ROM.
- Tivoli NetView documentation.

The Tivoli Console

This section provides information on how to start and sign onto the Tivoli Console.

Starting the Tivoli Console

To start the console, you can click on the **Tivoli Console** icon on the desktop.

To start the Tivoli Console manually for the Installation Depot:

1. Open a command window on the installation depot machine and change to the location where the installation depot software is installed.
2. Go to the **orb.2** directory.
3. Set up the environment on the installation depot (Windows 2000):
   ```
   setupenv
   ```
4. Verify that the ORB is up and running by issuing the following command:
   ```
   wcmd svc ls LSM
   ```
   Check that **PsJcLauncherService** is listed. The **PsJcLauncherService** must be running before starting the Tivoli Console.
5. Start the Tivoli Console with the following command:
   ```
   wcmd jclauncher LaunchJC
   ```

Signing on to the Tivoli Console

After the Tivoli Console initializes, you are prompted to sign on. Tivoli Kernel Services has the following default user ID and password:

Table 8. Tivoli Kernel Services Default User ID and Password

User ID	Password	Role
superadmin	password	Automatically has complete access to all objects and all roles in the system, whether they are created by Tivoli Kernel Services, by an application, or by the system administrator.

Use the **superadmin** user ID when you sign on to the Tivoli Console for the first time. This user ID gives you access to all the portfolio tasks and allows you to perform all actions associated with those portfolio tasks.

Tips on Running with DB2

This section provides tips on running with DB2.

Changing the Passwords for Database User IDs

To change the password for a database user ID, issue the following command to Tivoli Kernel Services. This command should be entered on one line, but is presented on two lines here for readability.

```
wcmd ssm modifyAttributes  -c applications/SANSoftware/Applications/Database
-n <user_ID> -op replace password=<password>
```

where <*user_ID*> is the user ID for which you want to change the password and <*password*> is the new password. This command needs to be issued for each user ID you want to change. You need to recycle the manager ORB once the command has been issued.

Updating DB2 Statistics

The DB2 **runstats** command updates the statistics about the physical characteristics of a database table and its associated indices. These characteristics include the number of records, the number of pages, and the average record length. The DB2 optimizer uses these statistics when generating query plans to determine the fastest access algorithms to use to access data in the database.

If you do not run the **runstats** command, database transactions could be very slow. These commands should be run when you have a large amount of data that has changed. For Tivoli Storage Network Manager, this would occur after the first discovery operation or when doing major reconfigurations of the SAN. You should consider running these commands on a regular basis, for example weekly.

Tivoli Kernel Services provides a script to update statistics on Tivoli Kernel Services databases. You should run the script after installation, after you install an application, and after significant changes in the configuration. Information about running the script is provided in “Running runstats on Windows Systems” on page 125.

Running the **runstats** command can result in *significant* performance improvement. Tivoli strongly recommends that you run **runstats** at least weekly.

Running runstats on Windows Systems

If you installed Tivoli Kernel Services by using the default database names, you can run **runstats** on a Windows system. You enter the following command from a DB2 Command window. You can open a DB2 Command window by clicking:

```
Start -> Programs -> DB2 for Windows NT -> Command Window
```

```
<TKS_directory>\orb.1\bin\w32-ix86\runstats <DB2userid> <DB2password>
```

Where *<DB2userid>* and *<DB2password>* are your DB2 user ID and password. *<TKS_directory>* is where you installed the DB2 **runstats.bat** file. If you chose database names that are different from the defaults, make a copy of the **runstats.bat** file, and modify the copy to use the names you selected.

You should also run the **runstatsTSNM** command. This command can only be run after you have created the Tivoli Storage Network Manager database. If you used the default database name of **tivolsan**, the script will run as provided. If you renamed your database, you must modify the script and provide your new database name before running it. The command is as follows:

```
<directory>\orb.1\bin\w32-ix86\runstatsTSNM <DB2userid1> <DB2password1>
<DB2userid2> <DB2password2>
```

Where *<DB2userid1>* and *<DB2password1>* are the user ID and password for the first DB2 user. *<DB2userid2>* and *<DB2password2>* are the user ID and password for the second DB2 user. *<directory>* is where you installed the DB2 **runstatsTSNM** file.

Checking for DB2

To see if DB2 is up and running, follow these steps:

1. Click on the following:

   ```
   Start -> Programs -> DB2 for Windows NT -> Control Center
   ```

2. You will get a login dialog window. Enter your DB2 administrator ID and password and click **OK**.
3. You will see your **DB2 Control Center** window with the host name where the DB2 database is installed.
4. Once you install Tivoli Storage Network Manager, you will be able to verify that your DB2 databases are created as shown below.

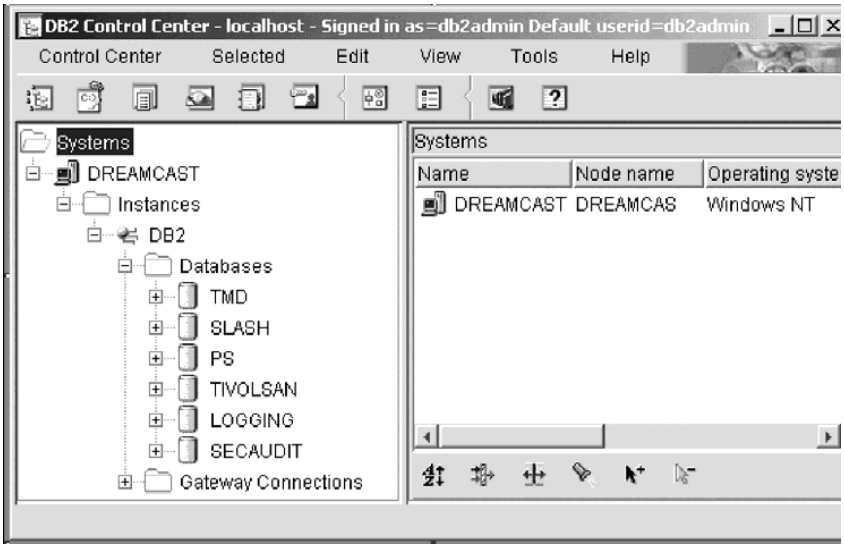

Figure 100. DB2 Control Center with DB2 Databases

Stopping and Restarting a DB2 Server

To open a DB2 command window, click:

```
Start -> Programs -> DB2 for Windows NT -> Command Window
```

To stop DB2, enter the following command from the DB2 Command window: **db2stop**.

To restart DB2, enter the following command from the DB2 Command window: **db2start**.

Stopping and Restarting a Tivoli DAS Server

The Tivoli Data Access Services (DAS) server runs as a service on Windows systems.

Whenever you recycle the ORBs on the manager machine, you must also stop and restart the DAS Server.

You can start or stop a Tivoli DAS server by doing the following on Windows 2000:

1. Select:

   ```
   Start -> Settings -> Control Panel
   ```

   Double–click on **Administrative Tools**, then double–click on **Services**.
2. Highlight **Tivoli Kernel Services DAS Restarter Service**.
3. Click **Start** to start the Tivoli DAS server or **Stop** to stop the Tivoli DAS server.

What are ORBs and ORB Sets?

In a large–scale distributed system like Tivoli Kernel Services, applications require preference and configuration data to adapt to different environments. Applications also need a way to store, retrieve, and modify this data. This is accomplished by configuring and managing the ORBs (Object Request Broker) and ORB sets that exist in various namespaces across the system.

All ORBs, ORB sets, and other resources exist within namespaces. Namespaces are the main organizing construct in Tivoli Kernel Services. A namespace is a flat, non–overlapping structure within the distributed system. The primary purpose of a namespace is to form an identification scope for the objects that exist within it. Objects are tied to a namespace through the creation of an object ID (OID) reference that serves as a persistent, active reference for that object. When this occurs, the object becomes associated with the namespace for the remainder of its lifetime.

The ORB is the central routing and control component for Tivoli Kernel Services. It is responsible for the following:

- Routing messages between objects
- Enabling the security of the virtual machine within which the objects run
- Producing proxies for remote communications
- Collecting memory when objects are no longer used.

ORBs can be added to and deleted from namespaces, as well as from ORB sets.

ORB sets are the primary ORB grouping mechanism. The main purpose behind the grouping of ORBs is to reduce the administrator's configuration burden. This is accomplished by

associating specialized configuration data to an ORB set and then grouping ORBs within that ORB set. All ORBs within the ORB set will now contain that configuration data. Any ORBs added to the set at a later date, will also contain that configuration data.

In Tivoli Kernel Services, **orb.1** is the installation depot ORB, and **orb.2** is the Tivoli Console ORB. The Tivoli Console is used for the GUI interface into Tivoli Kernel Services and Tivoli Storage Network Manager. Tivoli Kernel Services and Tivoli Storage Network Manager require that both ORBs be running. When installing Tivoli Kernel Services, there are long initialization sequences which occur only the first time the Tivoli Kernel Services ORBs are started after installation. Subsequent ORB startups are fairly quick, and start automatically when the system is rebooted. The sections below describe how **orb.1** is started the first time and how to start **orb.2** the first time. This section also describes how to check for the completed initialization of both **orb.1** and **orb.2**.

For more information on ORBs and ORB sets, see *Planning for Tivoli Kernel Services*.

Starting or Restarting an ORB

The generic procedure for starting or restarting an ORB is platform dependent. For more information on starting and stopping an ORB, see *Installing Tivoli Kernel Services*. The steps for starting an ORB are described below.

Whenever you recycle the ORBs on the manager machine, you must also recycle the DAS server. You must also recycle the ORBs in a specific order. See "Order of Starting and Stopping the ORBs" on page 129.

For Windows NT:

Follow these steps:

1. Select:
   ```
   Start -> Settings -> Control Panel
   ```
   Double–click on **Services**.
2. Highlight the Tivoli Kernel Services ORB you want to start and click **Start**.

For Windows 2000:

Follow these steps:

1. Select:
   ```
   Start -> Settings -> Control Panel
   ```
   Double–click on **Administrative Tools**, then double–click on **Services**.
2. Highlight the Tivoli Kernel Services ORB you want to start and click **Start**.

For Solaris: Enter the following command from a command window:

```
etc/init.d/<ORBname>.LOCK start
```

where <*ORBname*> is the name of the ORB you want to start.

For AIX: Enter the following command from a command window:

```
startsrc -sLOCK.<ORBname>
```

where <*ORBname*> is the name of the ORB you want to start.

Stopping an ORB

The generic procedure for stopping an ORB is platform dependent. For more information on starting and stopping an ORB, see *Installing Tivoli Kernel Services*. The steps for stopping an ORB are described below.

For Windows NT: The steps are as follows:

1. Click:

   ```
   Start -> Settings -> Control Panel -> Services
   ```

2. Highlight the Tivoli Kernel Services ORB you want to stop and click **Stop**.

For Windows 2000: The steps are as follows:

1. Click:

   ```
   Start -> Settings -> Control Panel -> Administrative Tools ->
   Services
   ```

2. Highlight the Tivoli Kernel Services ORB you want to stop and click **Stop**.

For Solaris:

Enter the following command from a command window:

```
/etc/init.d/<ORBname>.LOCK stop
```

where <*ORBname*> is the name of your ORB.

For AIX:

Enter the following command from a command window:

```
stopsrc -sLOCK.<ORBname>
```

where <*ORBname*> is the name of your ORB.

Order of Starting and Stopping the ORBs

When starting and stopping the ORBs, you should do it in a specific order. When stopping the ORBs, stop the ORBs in this order:

1. ORBs on managed host machines (if running)
2. **orb.2** (manager machine if running)
3. **orb.1** (manager machine)

Whenever **orb.1** is shut down on the manager machine, the DAS Server must be recycled. To recycle the DAS Server, issue these commands:

```
net stop "Tivoli Kernel Services DASRestarter"
net start "Tivoli Kernel Services DASRestarter"
```

When starting the ORBs, start the ORBs in this order:

1. **orb.1** (manager machine)
2. **orb.2** (manager machine)
3. ORBs on managed host machines

How orb.1 is Started

Orb.1 starts automatically as a service in the install program. When the install program ends, Tivoli Kernel Services is not done. It can take up to an hour to initialize **orb.1**. Make sure that you allow enough time for **orb.1** to initialize. **Orb.1** can be seen in the **Task Manager/Processes** as **Java.exe**.

To monitor CPU activity, right–click on the task bar and click **Task Manager**. You will see the **Windows Task Manager** window. Click on the **Performance** tab to see the CPU activity.

To determine when **orb.1** is initialized the first time, do the following:

1. Check the CPU graph. This graph will show close to 100% utilization for a long time. When this CPU activity decreases to less than 10%, and stays there, you are close to being finished.
2. Once the CPU activity drops off, check the log *<TKS_directory>***\orb.1\log\stdout.txt** where *<TKS_directory>* is the directory where Tivoli Kernel Services is installed. Look for the following message (refresh your view of the log occasionally):

   ```
   FWP1734I The build help set utility has completed successfully.
   ```

   This message appears the first time **orb.1** is initialized. All other times, you will get this message:

   ```
   FNGCP0069I All components have been started. Some components might
   not be ready for use.
   ```

3. Installation is now complete, and **orb.1** has been initialized.

How to Start orb.2

Orb.2 must be started manually the first time. All other times, **orb.2** starts automatically after the system is rebooted. When **orb.1** has completed initialization, **orb.2** can be started.

Use one of the two methods below to manually start **orb.2**.

To start the **orb.2** service from a command window:

1. Open a command window.
2. Issue the following command:

   ```
   net start "Tivoli Kernel Services orb.2"
        or
   net start orb.2
   ```

3. **Orb.2** will start in the background.
4. When **orb.2** has completed initialization, the Tivoli Console icon is placed on the desktop.
5. You can double–click the Tivoli Console icon if you want to start it. To start the Tivoli Console for the first time, you must enter a valid Tivoli Kernel Services user ID and password on the login window. The initial default login is user ID **superadmin** with a password of **password**.

To start the **orb.2** service from the Services window:

1. Click the following:

   ```
   Start -> Settings -> Control Panel -> Administrative Tools
   ```

2. Double–click on the **Services** icon.
3. Scroll down to **Tivoli Kernel Services orb.2**.
4. Click **Start**.
5. **Orb.2** will start in the background.
6. When **orb.2** has completed initialization, a Tivoli Console icon is placed on the desktop.
7. You can double–click the Tivoli Console icon if you want to start it. To start the Tivoli Console for the first time, you must enter a valid Tivoli Kernel Services user ID and password on the login window. You can use the initial default login of user ID **superadmin** with a password of **password**.

Running wcmd Commands

Tivoli Kernel Services commands enable you to perform system operations from a command line interface (CLI) instead of using the Tivoli Console. This is useful when you do not have access to a graphical display. For complete information about Tivoli Kernel Services commands, see *Tivoli Kernel Services Command Reference*.

The **wcmd** examples in this section assume that the person issuing the commands is implicitly identified to Tivoli Kernel Services by the appropriate account and user information. If this is not the case, you must use the **–u** option on each **wcmd** command. You must also specify a Tivoli Kernel Services user ID that is authorized to perform the command.

An example of using the **–u** option is:

```
wcmd -u superadmin accmgr listServices | sort
```

You will be prompted for a password.

If you want to list the services that are running on a managed host from your manager machine, you can issue this command:

```
wcmd accmgr listServices –i wallace.sanjose.ibm.com
```

where **wallace.sanjose.ibm.com** is the managed host machine. If you omit the **–i** option, the command returns a list of services installed on the local ORB.

AIX Machines That do not Have a CD–ROM Drive

If you have an AIX machine that does not have a CD–ROM drive, you must copy the following programs to the local drive:

- Tivoli Kernel Services bootprint code from the Tivoli Kernel Services bootprint CD
- The **bpsetup.sh** program from the Tivoli Storage Network Manager CD
- The **javaTSNM.prm** program from the Tivoli Storage Network Manager CD

How to Check the Host's View of Devices

Before you install Tivoli Storage Network Manager, you must make sure that your SAN is operational. One of the checks is to make sure that the host can view the attached storage devices on the SAN.

For **Windows NT**: Go to:

```
Start -> Settings -> Control Panel
```

On the **Control Panel**, double–click on **SCSI Adapters**.

For **Windows 2000**: Click on the following:

```
Start -> Settings -> Control Panel
```

Double–click on **System**. This brings up the **System Properties** window. Click on:

```
Hardware  -> Device Manager -> SCSI and RAID controllers
```

For **AIX**: issue this command:

```
lsdev -C -c disk
```

You can also use **smit** to view the attached storage devices. Select **Devices**, then **Disks**.

How to Check the Host's View of LUNs

When your disks are attached to the SAN, the host should be able to view all the LUNs. This will be true before the Tivoli Storage Network Manager is installed. After Tivoli Storage Network Manager is installed and Manage LUNs is enabled, the host will only be able to view the LUNs that are assigned to it. To check this on Windows, click:

```
Start -> Programs -> Administrative Tools ->
Disk Administrator
```

The Disk Administrator shows which disks (LUNs) the host can see.

Running with More Than 12 Hosts

If you have more than 12 hosts running, special consideration must be given to the Messaging Service Component of Tivoli Kernel Services. Tivoli Kernel Services uses MQSeries servers to route messages between ORBs. Each MQSeries server can support about a dozen ORBs. To use multiple MQSeries Servers, see *Installing Tivoli Kernel Services*, section *Using Multiple MQSeries Servers*.

B

Troubleshooting

This section contains information on troubleshooting. For more information, see the following:

- Tivoli Kernel Services documentation on the Tivoli Kernel Services CD–ROM. This has information about Tivoli Kernel Services, Tivoli Console, MQSeries, ORBs, ORB sets, and namespaces.
- DB2 documentation on the DB2 CD–ROM.
- Tivoli NetView documentation.

Troubleshooting Tivoli Kernel Services Problems

For complete information on troubleshooting Tivoli Kernel Services problems, see *Installing Tivoli Kernel Services.*

Problem 1

The Tivoli Console does not appear on the desktop.

What to Do

Recycle the ORBs and DAS Server or database. See "What are ORBs and ORB Sets?" on page 127.

Problem 2

The GUI loses its connection to the DAS Server.

What to Do

Recycle the ORBs and DAS Server. See "What are ORBs and ORB Sets?" on page 127.

Problem 3

You are running Tivoli Kernel Services 1.1.1 and get the following message:

```
WARNING: File C:\Tivoli\orb.2\boot\SDSRemoteService
Interface@5.1.1.jar does not exist
```

You cannot start **orb.2**, and it stalls in state 3.

What to Do

Reboot the machine.

Problem 4

Tivoli Kernel Services patch 1.1.1–TKS–0003: The Tivoli Kernel Services upgrade program ends unexpectedly or returns immediately to the command prompt when started.

What to Do

If the Tivoli Kernel Services upgrade program ends unexpectedly or returns

immediately to the command prompt when started, enter a **wcmd tksinstaller listenstatus** command. This command checks on the status of the upgrade program. If no output is displayed, the upgrade program is not running. In that case, restart the upgrade program to continue the patch install. If the upgrade program again fails, recycle the ORB and retry the command. If the upgrade program continues to end unexpectedly, contact Tivoli Customer Support personnel.

The upgrade program generally exits prematurely at least once in the later phases of patch processing, usually after completing task 18 of 30.

When the Tivoli Kernel Services upgrade program ends unexpectedly or returns immediately to the command prompt when started, enter a **wcmd tksinstaller listenstatus** command. This command checks on the status of the upgrade program. If no output is displayed, the upgrade program is not running. In that case, restart the upgrade program to complete the patch install. If the upgrade program again fails, recycle the ORB and retry the command. If the upgrade program continues to end unexpectedly, contact Tivoli Customer Support personnel.

Troubleshooting Tivoli NetView Problems

If you have problems with installing Tivoli NetView, see the following problem list.

Problem 1

If you get the following error message, the SNMP Service has not been installed:

```
Tivoli NetView has determined that the SNMP service is
not available.
Please install this service before continuing.
```

What to Do

Install the SNMP Service. See “Step 4: Installing the SNMP Service” on page 21.

Problem 2

The Tivoli Storage Network Manager dialog windows do not open.

What to Do

Check the following:

- Ensure that **GetPortNo.dll** and **NetViewRequester.exe** are in the correct location. This should be in the directory path **C:\WINNT\system32**, assuming that **C:\WINNT** is where your Windows directory is located.
- Check for conflicting port numbers. The **Services** file in **C:\WINNT\system32\drivers\etc** should contain the following information (these are the default port numbers). You can change the port numbers in these statements. The ports must use TCP because Tivoli Storage Network Manager requires TCP.

  ```
  NVDAEMON         8010/tcp   # NetView Daemon Port Number
  NetViewRequester 8020/tcp   # NetView Requester Port Number
  ```

Problem 3

There is an error message that **Storage Net Mgr** cannot be started when Tivoli NetView starts.

What to Do

Check the following:

- Ensure that **SanManager.Reg** is located in **C:\usr\ov\registration\c**.

- Ensure that the **NetViewRequester.exe** location is defined correctly in the **SanManager.reg** file.

Problem 4

The properties are not displaying properly in the Explorer view.

What to Do

Check the following:

- Ensure that the **San_property_fields** is located in **C:\usr\ov\fields\c**.
- Run **ovw_fields** from a command window to ensure that the Tivoli Storage Network Manager fields are registered successfully in Tivoli NetView. After issuing the command, check the NetView error log for errors. The error log is located in **C:\usr\ov\log\nv.log**. Then restart Tivoli NetView.

Problem 5

The topology is not displayed on the NetView Console.

What to Do

Verify that the **NvDaemon** is running. From the NetView menu bar, select:

```
Options -> Server Setup
```

NvDaemon should be displayed as one of the daemons with a Behavior of **well_behaved** and a State of **running**. See Figure 101.

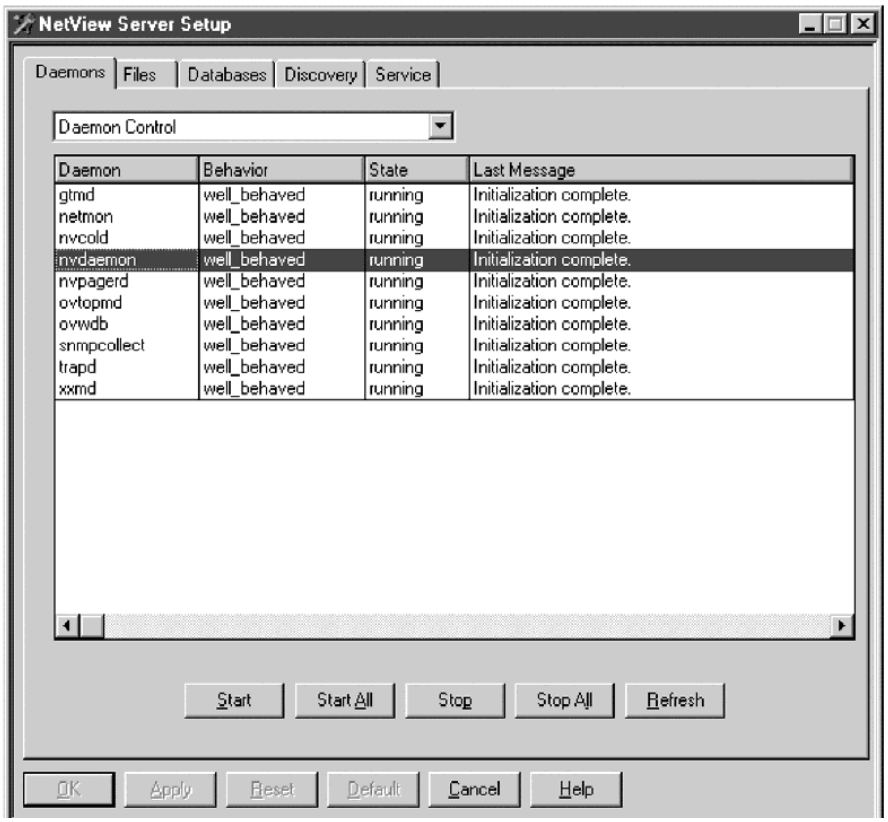

Figure 101. NetView Server Setup Window

If **NvDaemon** is not running, do the following:

- Verify that **NvDaemon.lrf** is located in **C:\usr\ov\lrf.**

- Verify that **NvDaemon.exe** is located in **C:\usr\ov\bin.**
- Issue **otenable** and **ovstart** from a command prompt window.
- Issue **ovaddobj \usr\ov\lrf\nvdaemon.lrf** from a command prompt to register **NvDaemon**.
- Issue **ovstart** and **ovstatus** from a command prompt.

Problem 6

MQSeries installation stops after installing 69% of the code. No error messages are displayed.

What to Do

MQseries cannot be installed if the NetView daemons are running. To correct this problem, follow these steps:

1. Issue **ovstop** to stop all the NetView daemons.
2. Install MQSeries.
3. Issue **ovstart**.
4. Issue **ovstatus** and ensure that all the NetView daemons are running in well a behaved state.

Problem 7

You click on **Storage Net Mgr** on the Tivoli NetView menu bar, and nothing happens.

What to Do

Change the port numbers for **NVDAEMON** and **NetViewRequester**.

Problem 8

The topology view is not correct. New devices are not displayed in the topology view.

What to Do

Contact Tivoli Customer Support for help.

Troubleshooting Tivoli Storage Network Manager Installation Problems

Problem 1

You see the message **wcmd error** in the Information window during installation.

What to Do

You must manually rerun the **wcmd** command that caused the error. To do this, open a command window, change to the *<TKS_directory>***\orb.1** directory, and enter **setupenv**. You must then reissue the **wcmd** command that failed. Copy the failed **wcmd** command from the installation log screen, paste it into the command window you just opened, and press **Enter**. The **wcmd** command should look like this:

```
wcmd cds install <component_name@version> <rootSourceURL>
```

Where *<component_name@version>* is the name and version of the component that failed to install. The *rootSourceURL* specifies the root directory under which the component jar file is found. If you have already dismissed the installation screen, you can copy the **wcmd** command from the installation log. The installation log file is named **install.log**. This file is located in the

<*TKS_directory*>**\Apps\TSNM\Install** directory. Repeat these steps for every **wcmd error** message you find in the installation log file.

An example of log messages you receive for GUI components that failed are shown. Note that this example might not show the messages exactly as they appear in your installation log but has been edited for readability.

```
cds install SANDiskConsoleHelp@1.1.2008 file:///D:\tsnmmain\tsnm\
Installing 22 of 27 components, please wait...
Wcmd Install Error:

cds install SANDiskConsoleImpl@1.1.2008 file:///D:\tsnmmain\tsnm\
Installing 23 of 27 components, please wait...
Wcmd Install Error:

cds install SANCommonAdminClient@1.1.2008 file:///D:\tsnmmain\tsnm\
Installing 24 of 27 components, please wait...
Wcmd Install Error:

cds install SANAdminClient@1.1.2008 file:///D:\tsnmmain\tsnm\
Installing 25 of 27 components, please wait...
Wcmd Install Error:

cds install SANAdminRoles@1.1.2008 file:///D:\tsnmmain\tsnm\
Installing 26 of 27 components, please wait...
Wcmd Install Error:

cds install SANGUIInterfaces@1.1.2008 file:///D:\tsnmmain\tsnm\
Installing 27 of 27 components, please wait...
13 of 13 tasks complete
```

An example of log messages you receive for assigning roles components that failed are shown. Note that this example might not show the messages exactly as they appear in your installation log but has been edited for readability.

```
Assigning Roles
 ssm modifyAttributes -p system/services/Smartset/principals/
     person1 -op add staticRole=PS/PSServer/Roles/SANAdminRoles/
     1.1.2008/SANProductAdministratorGUI
Wcmd Error:

FNGOB3008E Command method exception: com.tivoli.tmd.
TmdNotAuthorizedException: ISWSC0003E
You are not Authorized to View "PS/PSServer/Roles/SANAdminRoles/
  1.1.2008/SANProductAdministratorGUI" object..
 ssm modifyAttributes -p system/services/Smartset/principals/
     person1 -op add staticRole=PS/PSServer/Roles/SANAdminRoles/
     1.1.2008/SANResourceGUI
Wcmd Error:
```

An example of a **deploy** command that failed is shown. Note that this example might not show the messages exactly as they appear in your installation log but has been edited for readability.

```
 cds deploy SANManagerDaemon@1.1.2008 2.534362d91214422a.1.450b9951ebbdcd85
Working...please wait for command complete!
Wcmd Deploy Error:
```

To rerun these commands, follow these steps:

1. Open the **install.log** file in **Notepad**. The **install.log** file is in the <*TKS_directory*>**\Apps\TSNM\Install** directory.
2. Search for the text string **error**.

3. Copy the command or commands from the **install.log.**
4. If you have one command to rerun, paste the command into the command prompt window.
5. Preface the command with **wcmd**. For example, if you need to rerun the **SANDiskConsoleHelp** component, the command should look like the following command. This command should be entered on one line, but is presented on two lines here for readability.

```
wcmd cds install SANDiskConsoleHelp@1.1.2008
     file:///D:\tsnmmain\tsnm\
```

6. Run the command.
7. If you have many commands to run, you might want to put these commands into a **.bat** file and run the commands all at once. An example of many commands in a **.bat** file should look like the following example. Each **wcmd** command should be entered on one line, but is presented on multiple lines here for readability.

```
wcmd cds install SANDiskConsoleHelp@1.1.2008 file:///D:\
     tsnmmain\tsnm\
wcmd cds install SANDiskConsoleImpl@1.1.2008 file:///D:\
     tsnmmain\tsnm\
wcmd cds install SANCommonAdminClient@1.1.2008 file:///D:\
     tsnmmain\tsnm\
wcmd cds install SANAdminClient@1.1.2008 file:///D:\
     tsnmmain\tsnm\
wcmd cds install SANAdminRoles@1.1.2008 file:///D:\
     tsnmmain\tsnm\
wcmd cds install SANGUIInterfaces@1.1.2008 file:///D:\
     tsnmmain\tsnm\

wcmd ssm modifyAttributes -p system/services/Smartset/
     principals/person1 -op add staticRole=PS/PSServer/Roles/
     SANAdminRoles/1.1.2008/SANProductAdministratorGUI
wcmd ssm modifyAttributes -p system/services/Smartset/
     principals/person1 -op add staticRole=PS/PSServer/
     Roles/SANAdminRoles/1.1.2008/SANResourceGUI

wcmd cds deploy SANManagerDaemon@1.1.2008 2.534362d91214422a.1.
     450b9951ebbdcd85
```

Problem 2

Tivoli Storage Network Manager GUI components 22–26 do not install.

What to Do

Slow machines (for example, 600 MHz machines) can cause the Tivoli Storage Network Manager GUI components installation to fail. If you find from the log that GUI components 22–26 do not install, follow these directions. You must install them manually. These components are on the Tivoli Storage Network Manager CD. The components are:

```
SANDiskConsoleHelp@1.1.0
SANDiskConsoleImpl@1.1.0
SANCommonAdminClient@1.1.0
SANAdminClient@1.1.0
SANAdminRoles@1.1.0
```

You will also see an MCIMPORT failure for SANDiskConsoleHelp@1.1.0. The others will fail also. To manually install the components, issue the following **wcmd** command:

```
wcmd cds install <component_name>
```

where <*component_name*> is the name of the component.

Problem 3

No topology information is returned from a discovery operation on the Tivoli NetView console.

What to Do

The common API setup program for the HBA must be run on each machine, called a managed host. The managed host is managed by Tivoli Storage Network Manager. This common API program is in addition to the actual drivers for the HBA, which are also required. For example, for a QLogic HBA you must run the EUSDSetup program. Contact your HBA manufacturer if you do not have this program.

Recovery Procedures

This section provides information on how to recover from errors.

Problem 1

You copied the wrong ORB into an ORB set.

What to Do

An example of joining the wrong ORB into an ORB set is if you joined **orb.2** into the **BTSNetViewOrbset** instead of **orb.1**. To recover, you must first remove **orb.2** from the ORB set, then join **orb.1** to the ORB set. To remove an ORB from an ORB set:

1. From the Tivoli Console portfolio, click **Administer Management Software –> Manage ORBs**.
2. You will see the Manage ORBs screen. Display the ORBs and ORB sets.
3. Select the ORB to be removed from the ORB set and click **Remove**.
4. Wait for the ORB to be retracted from the ORB set. In this example, this can take 30 minutes to 2 hours depending on the speed of the machine.

To join the ORB to an ORB set, follow these steps:

1. From the Tivoli Console portfolio, click **Administer Management Software –> Manage ORBs**.
2. You will see the Manage ORBs screen. Display the ORBs and ORB sets.
3. Select the manager ORB to join to the **BTSNetViewOrbset**. Right–click on the ORB and click **Copy**. Then right–click on the **BTSNetViewOrbset** and click **Paste**.

This should join the manager ORB to **BTSNetViewOrbset**.

Glossary

The terms in this glossary are defined as they pertain to the Tivoli® Storage Network Manager. If you do not find a term you are looking for, you can refer to the following URL: **http://www.tivoli.com/support/documents/glossary/termsm03.htm**.

A

access right
The permission to perform a certain action on a resource.

Advanced Interactive Executive (AIX)
An operating system used in the RISC System/6000® computers. The AIX operating system is IBM's implementation of the UNIX® operating system.

agent
A software entity that runs on endpoints and provides management capability for other hardware or software, for example, an SNMP agent. See also *Tivoli Storage Network Manager agent.*

AIX
See *Advanced Interactive Executive*.

AL
See *arbitrated loop*.

alert
An event designed to be captured by an external system management application.

alert interval
The amount of time that must pass after an alert is raised before the same alert can be raised again.

alphanumeric
Pertaining to data that consist of any combination of the letters A through Z, and integer numbers 0 through 9.

APAR
See *authorized program analysis report*.

arbitrated loop
A Fibre Channel interconnection technology that allows up to 126 participating node ports and one participating fabric port to communicate. See also *Fibre Channel Arbitrated Loop* and *loop topology*.

authorized program analysis report (APAR)
A report of a problem caused by a suspected defect in a current release of a program.

B

bandwidth
This is a measure of the data transfer rate of a transmission channel.

bootprint
In Tivoli Kernel Services, the footprint of code that is manually installed on Tivoli Kernel Services servers. Bootprint is short for bootstrap and footprint. The bootstrap code is the essential code needed for a machine to boot. The bootprint is associated with a particular installation depot.

bridge
Facilitates communication with LANs, SANs, and networks with dissimilar protocols.

browser
A client application for viewing text and images. The browser uses an HTTP server across a TCP/IP communication stream.

C

client
(1) A function that requests services from a server, and makes them available to the user. (2) A term used in an environment to identify a machine that uses the resources of the network.

client-server relationship
Any process that provides resources to other processes on a network is a server. Any process that employs these resources is a client. A machine can run client and server processes at the same time.

community name
In Tivoli Kernel Services, a name used by an SNMP service. This service attempts to access Management Information Base (MIB) variables on machines that have an active SNMP daemon. Required community names for **get** and **set** commands are often different. Community names are like passwords used to obtain data that are stored in MIB variables.

console
A user interface to a server.

D

DATABASE 2™ (DB2)
A relational database management system. DB2 Universal Database™ is the relational database management system that is Web-enabled with Java support.

deploy
In the Tivoli Kernel Services, deploy means to push components from the installation depots to the appropriate servers and endpoints. This is based on configuration information.

device-centric view
Tivoli Storage Network Manager displays the device to host relationship. It is used to identify dependencies on a device basis.

device driver
A program that enables a computer to communicate with a specific type of device, for example, a disk drive.

discovery
The detection of network topology changes such as new and deleted nodes or new and deleted interfaces.

domain
In Tivoli Kernel Services, a domain is an organizational division of the distributed system that is based on groups and hierarchies of components in subsystems. Several different domains can exist within an installation, and domains can nest within other domains or overlap with other domains. For example, Tivoli Kernel Services includes one or more security domains. Domains are implemented using ORB sets. In Tivoli Storage Network Manager, a domain is a fibre channel SAN with a network of hosts attached. This is called a SAN domain.

E

endpoint
In the Tivoli Kernel Services, an endpoint is a system running a management agent. An endpoint communicates only with its assigned gateway. See also *gateway*.

enterprise network
A geographically dispersed network under the auspices of one organization.

ESS Specialist
The Web-based management interface to the Enterprise Storage Server.

event
In the Tivoli environment, any significant change in the state of a system resource, network resource, or network application. An event can be generated for a problem, for the resolution of a problem, or for the successful

completion of a task. Examples of events are: the normal starting and stopping of a process, the abnormal termination of a process, and the malfunctioning of a server.

F

fabric
Fibre Channel employs a fabric to connect devices. A fabric can be as simple as a single cable connecting two devices. The term is often used to describe a more complex network utilizing hubs, switches, and gateways.

FC
See *Fibre Channel*.

FCS
See *Fibre Channel standard*.

fiber optic
Refers to the medium and the technology associated with the transmission of information along a glass or plastic wire or fiber.

Fibre Channel
A technology for transmitting data between computer devices at a data rate of up to 1 Gb. It is especially suited for connecting computer servers to shared storage devices and for interconnecting storage controllers and drives.

Fibre Channel Arbitrated Loop (FC-AL)
A reference to the Fibre Channel Arbitrated Loop standard, a shared gigabit media for up to 127 nodes, one of which can be attached to a switch fabric. See also *arbitrated loop* and *loop topology*.

Fibre Channel standard
An ANSI standard for a computer-peripheral interface. The I/O interface defines a protocol for communication over a serial interface that configures attached units to a communication fabric. Refer to ANSI X3.230-199x.

FICON™
A fibre connection. A next-generation I/O solution for IBM S/390® parallel enterprise server.

G

gateway
1) In the SAN environment, a gateway connects two or more different remote SANs with each other. 2) In the Tivoli Kernel Services environment, a gateway is a component that manages communications and connections between a group of endpoints and Tivoli Kernel Services. The gateway converts server protocols to endpoint protocols, and endpoint protocols to server protocols.

H

hardware zoning
Hardware zoning is based on physical ports. The members of a zone are physical ports on the fabric switch. It can be implemented in the following configuration: one to one, one to many, and many to many.

HBA
See *host bus adapter*.

host
Any system that has at least one internet address associated with it. A host with multiple network interfaces can have multiple internet addresses associated with it. Used interchangeably with server.

host bus adapter (HBA)
In the SAN environment, a fibre channel HBA connection that allows a host to attach to the SAN network.

host–centric view
Tivoli Storage Network Manager displays the host to device relationship. It is used to identify usage on a host basis.

host group
A logical grouping of hosts that are defined by the administrator. A host can belong to only one host group. The hosts in a host group share a common policy.

hub
A Fibre Channel device that connects up to 126 nodes into a logical loop. All connected nodes share the bandwidth of this one logical loop. Hubs automatically recognize an active node and inserts the node into the loop. A node that fails or is powered off is automatically removed from the loop.

I

IBM Enterprise Storage Server
Provides an intelligent disk storage subsystem for systems across the enterprise.

inband discovery
Tivoli Storage Network Manager uses inband discovery mechanisms (through the SAN network itself) to discover the topology and devices. The inband discovery mechanisms use GS-3 and SCSI inquiry commands through the fibre channel. See also *outband discovery*.

installation depot
The Tivoli Kernel Services component that installs code from the distribution media. The installation depot pushes the components to the Tivoli Kernel Services servers.

internet protocol (IP)
A protocol used to route data from its source to its destination in an Internet environment.

I/O
Input/output.

I/O device
An addressable read and write unit, such as a disk drive device, magnetic tape device, or printer.

IP
See *internet protocol*.

IP address
A group of four decimal numbers that provides a unique address for the computer.

J

Java
A programming language that enables application developers to create object-oriented programs. These programs are very secure, portable across different machine and operating system platforms, and dynamic enough to allow expandability.

Java runtime environment (JRE)
The Java runtime environment is known as the Java Virtual Machine (JVM). The browser passes applets to the Java Virtual Machine. The Java Virtual Machine then runs the applets.

Java Virtual Machine (JVM)
The Java runtime environment is known as the Java Virtual Machine (JVM). The browser passes applets to the Java Virtual Machine. The Java Virtual Machine then runs the applets.

JBOD
Just a Bunch Of Disks.

JDBC
Java Database Connectivity. Part of the Java Development Kit which defines an application program interface for Java to provide standard SQL access to databases from Java programs.

L

LAN (Local Area Network)
A network covering a relatively small geographic area (usually not larger than a floor or small building). Transmissions within a Local Area Network are mostly digital, carrying data among stations at rates usually above one megabit.

local object creator and killer (LOCK)
The Tivoli Kernel Services component that starts, monitors, restarts, and stops an ORB. On Microsoft Windows, the LOCK runs as a service. On UNIX, the LOCK runs as a daemon.

LOCK
See *local object creator and killer.*

logical unit number (LUN)
The LUNs are provided by the storage devices attached to the SAN. This number provides you with a volume identifier that is unique among all storage servers. A LUN can be synonymous with a physical disk drive or a SCSI device. For disk subsystems such as the IBM Enterprise Storage Server, a LUN is a logical disk drive. This is a unit of storage on the SAN which is available for assignment to a host.

loop topology
In a loop topology, the available bandwidth is shared with all the nodes connected to the loop. If a node fails or is not powered on, the loop is out of operation. This can be corrected using a hub. A hub opens the loop when a new node is connected and closes it when a node disconnects. See also *Fibre Channel Arbitrated Loop* and *arbitrated loop*.

LUN
See *logical unit number*.

LUN group
A logical grouping of LUNs defined by the administrator. One or more LUNs can be assigned to a file system.

LUN masking
LUN masking blocks access to the storage devices by a host on the SAN. LUN masking is provided by the Tivoli Storage Network Manager agent on the managed host. Intelligent disk subsystems like the IBM Enterprise Storage Server also provide subsystem LUN masking. See also *port zoning* and *subsystem masking*.

M

managed host
A host that is managed by Tivoli Storage Network Manager. The host is being managed for LUN assignments and file system monitoring and extension. These host systems are also used for inband discovery of the SAN. A managed host has a Tivoli Storage Network Management agent installed and active on it.

management information base (MIB)
The physical and logical characteristics of a system make up a collection of information that is called a management information base (MIB). The individual pieces of information that comprise an MIB are called MIB objects, and they reside in the SNMP Agent.

MIB
See *management information base*.

MIB object
A MIB object is a unit of managed information that specifically describes an aspect of a system. Examples are CPU utilization, software name, hardware type, and so on. A collection of related MIB objects is defined as a MIB.

N

Name Server
The Name Server provides a directory of N_Ports within a fabric. The Name Server maintains a database of such items as ID, worldwide names, and supported FC-4s for each N_Port. An N_Port can query the Name Server at any time to discover other N_Ports that are attached to the fabric.

namespace
All ORBs, ORB sets, and other resources exist within namespaces. Namespaces are the main organizing construct in Tivoli Kernel Services. A namespace is a flat, non–overlapping structure within the distributed system. The primary purpose of a namespace is to form an identification scope for the objects that exist within it. Objects are tied to a namespace through the creation of an object ID (OID) reference that serves as a persistent, active reference for that object.

N_Port node port
A Fibre Channel-defined hardware entity at the end of a link which provides the mechanisms necessary to transport information units to or from another node.

NL_Port node loop port
A node port that supports arbitrated loop devices.

network topology
A physical arrangement of nodes and interconnecting communications links in networks. This is based on application requirements and geographical distribution of users.

O

object identifier (OID)
In Tivoli Kernel Services, a data type that identifies a particular object instance within the distributed system of Tivoli Kernel Services. An object identifier is composed of many identifiers, such as a space identifier and an application-specific object identifier, with each identifier containing a type and a value. Activators activate the OID so that applications can access the object instance.

object request broker (ORB)
An ORB is a mechanism that allows methods to be invoked on objects independent of their location.

OID
See *object identifier*.

open system
A system whose characteristics comply with standards that are made available throughout the industry. This system can be connected to other systems that comply with the same standards.

ORB
See *object request broker*.

ORB set
In Tivoli Kernel Services, a group of ORB IDs. ORB sets can be nested and can contain ORBs from different namespaces (installations).

outband discovery
Tivoli Storage Network Manager issues Simple Network Management Protocol (SNMP) queries through TCP/IP to perform outband discoveries (outside the SAN network itself). Interconnect elements (switches) usually have outband management capabilities. The outband discovery gathers device and topology information. See also *inband discovery*.

P

point-to-point topology
Consists of a single connection between two nodes. All the bandwidth is dedicated for these two nodes.

port

An end point for communication between applications that are generally referring to a logical connection. A port provides queues for sending and receiving data. Each port has a port number for identification. When the port number is combined with an Internet address, it is called a socket address.

port zoning

In fibre channel environments, port zoning is the grouping together of multiple ports to form a virtual private storage network. Ports that are members of a group or zone can communicate with each other, but are isolated from ports in other zones. See also *LUN masking* and *subsystem masking*.

portfolio

A container for the task groups that are assigned to a specific user or specific roles. To start tasks, users must open the portfolio. When the portfolio is open, it displays within the Tivoli Console to the left of the workspace.

portfolio handle

A tab on the left side of the Tivoli Console that represents the portfolio when the portfolio is closed.

protocol

The set of rules governing the operation of functional units of a communication system if communication is to take place. Protocols can determine low-level details of machine-to-machine interfaces, such as the order in which bits from a byte are sent. They can also determine high-level exchanges between application programs, such as file transfer.

proxy

An object that directs method calls to the target object that it represents. The target object is typically located on a different ORB from the proxy.

R

RAID

Redundant array of inexpensive or independent disks. A method of configuring multiple disk drives in a storage subsystem for high availability and high performance.

region

In Tivoli Kernel Services, an organizational division of the installation that is based on the user's operations. For example, a branch office or a subsidiary is a type of region. The organization of an installation into regions is generally constant over time. The organization of domains (and therefore indirectly the organization of components) within the distributed system of Tivoli Kernel Services is based on regions. See also *domain*.

resource

An entity, such as a device, a database, software, and so on.

retract

Reverses a deploy operation. See *deploy*.

rogue host

A condition detected by Tivoli Storage Network Manager. A host system attached to the SAN that does not have a Tivoli Storage Network Manager agent installed and active is considered to be a rogue host. This situation is considered a severe error condition if you are using Manage LUNs. SNMP traps and Tivoli Enterprise Console events are issued.

S

SAN (storage area network)

A high-speed network that enables any-to-any interconnection of heterogeneous servers and storage systems.

SCSI

Small Computer System Interface. An ANSI standard for a logical interface to computer peripherals and for a computer-peripheral interface. The interface utilizes a SCSI logical protocol over an I/O interface that configures attached targets and initiators in a multi-drop bus topology.

server
A program running on a mainframe, workstation, or file server that provides shared services. Used interchangeably with host.

shared storage
Storage within a storage facility that is configured such that multiple homogenous or heterogeneous hosts can concurrently access the storage. The storage has a uniform appearance to all hosts. The host programs that access the storage must have a common model for the information on a storage device. You need to design the programs to handle the effects of concurrent access.

SNMP (Simple Network Management Protocol)
An internet protocol designed to give a user the capability to remotely manage a computer network. SNMP polls and sets terminal values, and monitors network events.

SNMP agent
An implementation of a network management application which is resident on a managed resource. Each node that is to be monitored or managed by an SNMP manager in a TCP/IP network, must have an SNMP agent resident. The agent receives requests to either retrieve or modify management information by referencing MIB objects. MIB objects are referenced by the agent whenever a valid request from an SNMP manager is received.

SNMP endpoint
A system running an SNMP management agent.

SNMP manager
An SNMP manager refers to a managing system that executes a managing application or suite of applications. These applications depend on MIB objects for information that resides on the managed system.

SNMP trap
A message that is originated by an agent application to alert a managing application of the occurrence of an event.

software zoning
Is implemented within the Simple Name Server (SNS) running inside the fabric switch. When using software zoning, the members of the zone can be defined with: node WWN, port WWN, or physical port number. Usually the zoning software also allows you to create symbolic names for the zone members and for the zones themselves.

storage administrator
The person responsible for defining, implementing, and maintaining storage management policies.

storage view
For a given disk, displays the hosts that have the disk attached.

subsystem masking
Subsystem masking is the support provided by intelligent disk storage subsystems like the Enterprise Storage Server. See also *LUN masking* and *port zoning*.

switch
A component with multiple entry and exit point or ports that provide dynamic connection between any two of these points.

switched topology
A switch allows multiple concurrent connections between nodes. There can be two types of switches, circuit switches and frame switches. Circuit switches establish a dedicated connection between two nodes. Frame switches route frames between nodes and establish the connection only when needed. A switch can handle all protocols.

T

TCP (Transmission Control Protocol)
A reliable, full duplex, connection-oriented, end-to-end transport protocol running on top of IP.

TCP/IP (Transmission Control Protocol/Internet Protocol)
A set of communications protocols that support peer-to-peer connectivity functions for both local and wide area networks.

title bar
In the user interface (or help interface), the area at the top of the screen. This area contains the product title on the left, and a logo on the right. See also *navigation menu*, *work area*, and *user interface*.

Tivoli Assistant
A user assistance mechanism that contains contextual help information for Tivoli software. It is represented by a question mark, and can be easily toggled on and off. When the Tivoli Assistant is open, it displays within the Tivoli Console to the right of the workspace.

Tivoli Console
The user interface for the deployment and management of software and services by organizations that are using Tivoli management software.

Tivoli Enterprise Console
A console used outside of the Tivoli Kernel Services framework. This console uses a graphical user interface that enables system administrators to view and respond to dispatched events from the event server.

Tivoli Kernel Services
The Tivoli Kernel Services provides the infrastructure to manage network computing resources of many different types from a single point. The products in this environment provide a consistent interface to different operating systems and services. The Tivoli Kernel Services allows administrators to control users, systems, applications, and resources from one desktop. This environment also provides a streamlined way to automate and delegate routine, time–consuming tasks.

Tivoli Presentation Services
The Tivoli user interface architecture for deploying and managing software and services. See also *Tivoli Console*, an integral part of this architecture.

Tivoli Storage Manager
A client/server program that provides storage management to customers in a multivendor computer environment.

Tivoli Storage Network Manager
A Tivoli product that provides topology discovery and display, LUN management, and file system monitoring and extension for storage area networks (SANs).

Tivoli Storage Network Manager agent
The software which performs local functions such as LUN masking, file system monitoring and extension, and inband discovery on a host attached to the SAN. A managed host has a Tivoli Storage Network Management agent installed and active on it.

topology
An interconnection scheme that allows multiple fibre channel ports to communicate. For example, point-to-point, arbitrated loop, and switched fabric are all fibre channel topologies.

U

user ID
A numeric or some other means of identifying a user.

user interface
The area contained within the browser window. The user interface is comprised of the navigation menu, the title bar, and the work area.

W

WAN
Wide Area Network.

Web
The World Wide Web. The network of HTTP servers that contain programs and files, such as hypertext documents that contain links to other documents on HTTP servers.

Windows NT
A Microsoft distributed operating system that is used for client/server systems.

Windows 2000
A Microsoft distributed operating system that is used for client/server systems.

Z

zone centric view
Displays the zones and the devices within the zone. The zone that an entity resides within is maintained as a searchable attribute of the entity. This means that a find operation can be performed to highlight the entities within a zone.

zone view
A logical topology view presented as a series of screens which display the hosts and devices within a zone.

zoning
In Fibre Channel environments, zoning allows for finer segmentation of the switched fabric. Zoning can be used to create a barrier between different environments. Ports that are members of a zone can communicate with each other, but are isolated from ports in other zones. Zoning can be implemented in two ways: hardware zoning and software zoning.

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