# LANDesk® Management Suite v2.01—Architecture and Implementation

The first section of this document provides a brief description of the new architecture for Intel's LANDesk® Management Suite v2.01; the second part discusses issues that people who are about to install the application need to understand.

## Architecture Introduction

This section describes some of the thought processes behind the new technology and then provides definitions for many of the new terms.

The heart of this section is a map to the different components of the product and where their communications cross and intersect. This includes a discussion of how the components communicate with each other.

**Something New!**

In January of 1993, Intel released LANDesk Manager v1.00. During that same time period, Intel was working on the requirements for the next generation of desktop management. Among the top goals for the designers was to introduce a previously unseen level of integration.

The plan was to make the individual pieces of functionality in the tools accessible by a separate programming language and provide the customers with the ability to write new mini-applications utilizing and combining building blocks from the many applications.

Among the many changes required in Intel's base technology to do that, one of the most important was that all the applications needed to share a common list of devices that could be managed, so that a functionality call from a printing management tool could access the same data that was being accessed by a workstation management tool.

A common data base of devices to be managed was needed.

And since another requirement for the new product was that it not be limited to data from individual servers, the data base had to have information from a wide variety of types of NetWare* servers, in preparation for a long-term product goal to be able to handle information from a wide variety of servers and from many different network operating systems.

In the first release of the new architecture, at the very minimum it had to have a common data base of NetWare 3.x bindery- and NetWare 4.x bindery-emulation servers as well as NetWare 4.x Directory Services servers.

No common data base existed that could combine NetWare bindery discovery with NetWare Directory Services (NDS) discovery, so that Intel needed to write its own data base with its own discovery mechanism.

Thus, the concept of the Management Server and the new architecture for Intel's LANDesk Management Suite was born.

**Definitions**

The full installation process takes place on one server and then that installation is used to manage additional servers and users without repeating the full installation process on any of those additional devices. The server that has the full installation on it is referred to as the Management Server, while the additional servers are referred to as Managed Servers.

All the devices that are being managed by a single Management Server are referred to as a **Management Domain.**

A **Node** refers to either a DOS/ Windows* workstation or a NetWare 3.x or 4.x file server.

A **Console** is the Windows workstation that is running the management software that queries, controls, and reports on the managed devices.

The new event management system is referred to as **AMS**, or Alert Management System.

Any Managed Server that has Intel's Server Monitor agent loaded on it is a **Server Monitor Client**.

Any Managed Server that has loaded the metering NLM that relays the information about who is accessing files on its local disk, is a **Metering Relay Server.**

A **Managed Workstation** is any DOS or Windows workstation that is enabled for remote control, diagnostics, distribution, or Desktop Management Interface (DMI) remote management.

A **Service Executor** is a workstation that has been configured to be able to execute an event that may be required based on an AMS alert. For instance, a workstation that has a modem attached to it can send alerts to a paging facility.

## The New Architecture

Here are some of the key architectural features that are new in the LANDesk Management Suite. (See figure 1)

- A centralized data base of managed devices.
- A regular discovery process that knows how to examine both bindery (and bindery emulation) and NDS trees and merge the information to the common data base.
- A centralized alerting mechanism that can take alerts from multiple distant servers and workstations, and then express the various event reactions in several different methods across several different machines.
- The ability of the Server Monitor-managed clients to keep track of their threshold monitoring at the remote server location, instead of requiring a Windows console constantly executing the server monitor application with the graphical charts open.
- The ability of Server Monitor to maintain its own list of devices that are enabled with Intel's Server Monitoring agents in the background.
- A new protocol that operates in Windows and sits on top of IPX that allows the DMI agent from the Desktop Management Task Force to be remotely managed.
- An entirely new metering technology that allows distant metering servers to communicate with the Management Server, and pass its information across.

### The Big Picture

The chart below is a graphical representation of the new LANDesk Management Suite architecture.

There are many elements that this illustration highlights:

- There is not just one component in the LANDesk Management Suite architecture that all other components report to.
- There are some situations where one device may simultaneously serve the functionality of many different components, depending upon the configuration.
  For instance:
  - A file server can function as a Metering Relay Server, Discovered Server, Inventoried Server, and Server Monitor Client.
  - A DOS/Windows workstation can be metered, inventoried, remote controlled, diagnosed, distributed to, and DMI-managed (as well as occasionally acting as a probe, if desired).
  - A Management Server can also be a Server Monitor Client, Inventoried Server, and a Metering Relay Server (and by default it is the first server on which discovery is performed).
- Many components have multiple points of communication with other components. For example, a Server Monitor Client communicates its alerts to the Management Server and can be queried and configured by the Console.

**LANDesk® Management Suite Architecture**

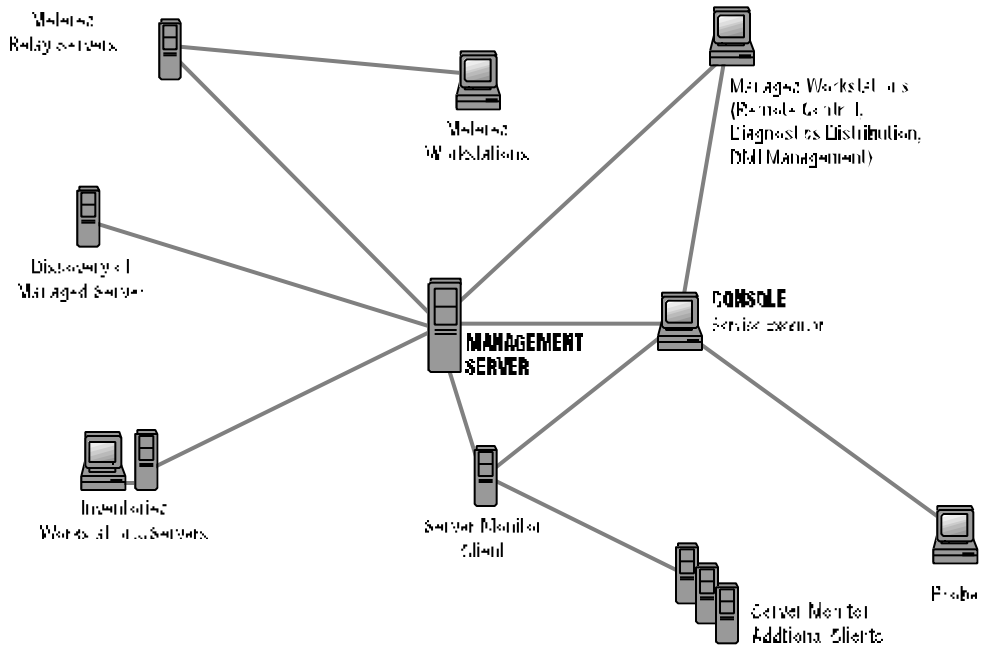


Figure 1

- The Management Server and the Console reside at the center of the management structure and have almost as many points of communication coming and going into them as the other shown components do altogether.
- If any one level of communication is having problems, it does not necessarily affect the levels of communication between any of the other components.

**Communication Between Components**

In the diagram, every component of LANDesk Management Suite communicates with either the Management Server or the Console — except for Metered Workstations. In the Primary Communications section, all the components which directly communicate with the Management Server or the Console will be briefly described. The other two components will be discussed below that in Secondary Connections section.

**Primary Communications**

The Management Server is the center of the management universe.

It maintains the data base of objects (and from the number of unique PCs and servers in the data base it determines whether or not you have exceeded the number of licenses you are authorized for).

When a Console is running the management software from the management server, the two devices maintain a constant link with each other. The Console is automatically enabled to be a Service Executor and perform events based on alerts that AMS receives and the pre-defined actions that are configured for those alerts.

On regular intervals it will go out and perform a search on a pre-defined list of servers or NDS organizational units to update its list of managed devices. It will do a complete search of the server and report on a wide range of attributes (such as printing, attached workstations, etc.).

When a workstation or server is inventoried, before it starts the scan it will verify the existence of the Management Server and then afterwards it will send the inventory package in an stream of packets.

Metering Relay Servers maintain a table in memory that duplicates the master table on the Management Server of the applications to be metered and what the thresholds are. They also are able to communicate via AMS (the Alert Management System) to the Management Server.

When the Management Server performs the regular discovery of servers, it will check to find out what workstations are attached to it and then will go out and check those workstations to find out if they have the USERTSR.EXE remote control agent loaded on it, in order to find out what type of network interface card is in the machine, and if it is DMI-enabled with the DMTF service layer and Intel's RAP (Remote Access Protocol) technology.

AMS is the link between the Management Server and the Server Monitor Client. When thresholds are crossed, the Server Monitor Client automatically forwards its information to the Management Server.

The Console is the Windows workstation that runs the main query/control/report software off the Management Server.

Between the Console and the Managed Workstations, a peer-to-peer relationship exists. The Console finds out about the device by searching the data base on the Management Server and then creates a link directly between the Console and the agents loaded on the Managed Workstation.

A similar connection exists between the Console and a Server Monitor Client. When the Server Monitor tool is executed, the Console receives a list of all the NetWare file servers with the Server Monitor agent loaded on it, and then when the Console seeks information from a specific server, a peer-to-peer-type relationship is temporarily established.

The other type of connection that a Console can have is to a probe. A probe is a DOS workstation running an application that allows it to detect traffic that is occurring on the machine's network segment. When a Console is running, it can seek for probes (which send a specific type of advertisement packet) and then establish a peer-to-peer-type connection with that device to see traffic on distant network segments — even through routers and bridges.

**Secondary Connections**

Although Metering Relay Servers do maintain a point of connection with the Management Server, it is only to pass alerts and to receive updates of the tables of applications it is supposed to meter.

There is a secondary level of communication which takes place between the file server that is being metered and the workstations that are running the metered applications. Metered software cannot be executed on a workstation that does not

have the metering agent loaded beforehand (automatically put into the Load command of the WIN.INI file by the installation configuration program in user's log-in scripts). When a workstation accesses a metered application, a connection is made between the Metering Relay Server and the Metered Workstation. That connection is severed when the metered application is closed.

When a user enters Server Monitor for the first time, the application builds a list of servers being monitored. This list is stored in an editable .INI file and subsequent sessions of Server Monitor will verify the existence of only the servers contained in the file and will not perform another WAN-based search unless specifically instructed to do so. It is possible to edit this list to include only the services on a local area network and thus eliminate any potential WAN traffic.

## Implementation Introduction

This portion of the document is divided into two parts: 1) Implementation Recommendations; and 2) Technical Implementation Issues.

The list of topics covered by Implementation Recommendations includes configuring management domains (with examples), how much to purchase, pricing, and upgrading.

In this section, there is a Q & A section as well as the system requirements for LANDesk Management Suite v2.01.

## Implementation Recommendations

With LANDesk Management Suite, Intel is shifting its focus from management based on server licenses, to management based on node licenses. Instead of purchasing one product per server, customers will now plan out how many users and servers are going to be managed (they both count equally as managed nodes) and purchase the number of licenses needed to manage them.

The full installation product takes place on one server and then that installation is used to manage additional servers and users without repeating the full installation process. The server that has the full installation on it is referred to as the Management Server, while the additional servers are referred to as Managed Servers. All the devices that are being managed by a single Management Server are referred to as a Management Domain. A Node refers to either a DOS/Windows workstation or a NetWare 3.x or 4.x file server.

It is recommended that there be one Management Server for a single location, or site. Explaining the reasoning behind this is the purpose of this portion of the document.

Node licenses are added on an incremental basis. For instance, if an office of a company had 3,000 users located there, then a sample installation would be to dedicate a single server as the Management Server and then to purchase three copies of the 1,000 user version of LANDesk Management Suite, perform a full install once, and then once the product is fully operational, run a routine out of the management console that adds the other 2,000 nodes.

**One License Per Site**

Even though one-per-site-installation is recommended, there is no physical limitation within the product to force a Management Domain to be limited to a single physical location. But there are some speed and efficiency limitations that might reduce the performance of the product when used to manage devices through Wide Area Network (WAN) links (such as 1-megabit & 56Kb lines) that are heavily used and/or that do not have much bandwidth to spare.

There are two factors that can determine the size of a LANDesk Management Suite Management Domain.

- The limitations within the physical architecture of the network.
- The logical structure of the MIS department within the organization.

A LANDesk Management Suite Management Domain can be configured in Novell NetWare 3.x environments by specifying the server names and their users to be included in the domain. In the 4.x environments, LAN administrators can specify all of an NDS tree or any part (or parts) of it.

There is nothing preventing users from installing a Management Domain in a WAN that includes several remote sites — but the performance level might not be acceptable.

## Small Networks

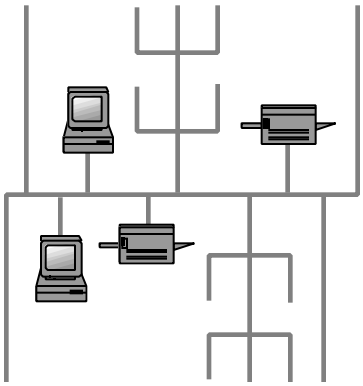

Figure 2

## Large Single-Site Networks

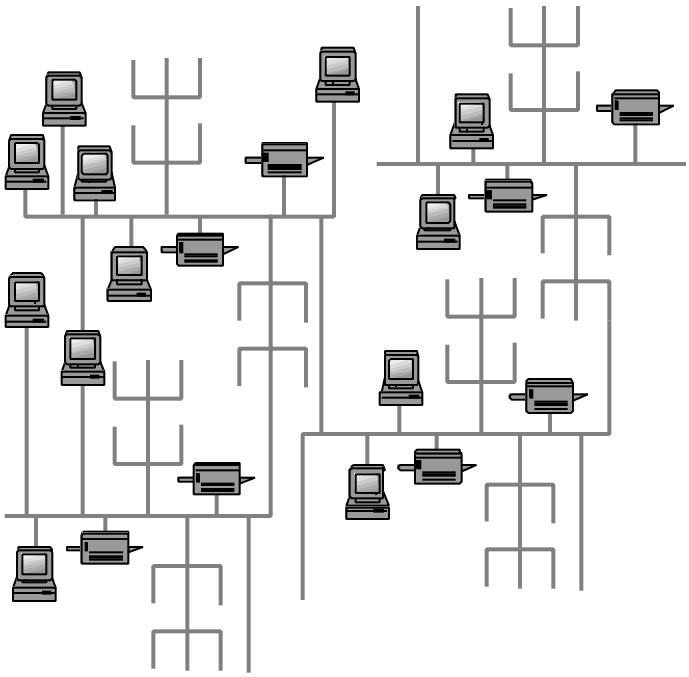

Figure 3

There is also nothing preventing users from installing a separate Management Domain for each file server in a company — but then LAN administrators would be forfeiting many of the powerful background processes, integrated management functionalities, and multi-user asset management utilities (such as metering and distribution).

In both cases, the most effective management will happen if installations of Management Domains are done on regional servers that manage desktops and servers who have quick and easy access to those regional servers.

The reason you might want to limit the size of your domain within a WAN is that LANDesk Management Suite has several background services that perform different tasks (such as metering, alerting, server monitoring, software distribution, and device discovery) that create background packet traffic.

In some cases the frequency with which the background traffic is generated is configurable to minimize traffic, but many MIS organizations and computer support centers are extremely sensitive about traffic over sensitive backbone segments. It is for this reason that it is recommended that a Management Domain be limited to a single location.

Since management products are generally implemented initially on test networks, and then on a gradual roll-out, one site at a time, many companies might find that the background traffic is acceptable between sites and consequently configure their Management Domains to include several sites.

As of release v2.0, Management Domains do not have the ability to communicate with each other. This is not permanent and will be one of the first enhancements to the product in the near future.

What follows are four examples of LANDesk Management Suite installations:

**Small Networks**

It is advisable to have the management domain encompass the largest number of servers and workstations within a single location that is possible. (See Figure 2)

Therefore, in any limited-size network that contains few wide-area links and where there is not much emphasis on isolated segments, it would be recommended to have all servers and workstations be in the same domain.

**Large, Single-Site Networks**

In some larger sites, the networks are high-speed and high-efficiency. In these organizations the existence of LANDesk Management Suite's background traffic would be acceptable, especially considering the benefits that the functionality provides. (See Figure 3)

In these cases, it would be acceptable to have dozens, or even hundreds of servers be within a single management domain.

**A Wide-Area Network with Slow or Infrequent Links**

There are conditions in which it would be advisable to break up several smaller networks and create management domains which surround those.

LANDesk Management Suite has the ability to merge inventory data bases between servers, and a single console can view different domains at different times. Additionally, the software distribution package is able to pass distribution packages to remote domains and then distribute from them. (See Figure 4)

**A Wide-Area Network with Multiple Sites and Branch Offices that are Tied Together with Fast, Efficient Links**

Finally, it is possible that the centralized services provided by LANDesk Management Suite are important enough that it would lead a LAN management organization to conclude that the entire network should be within a management domain. (See Figure 5)

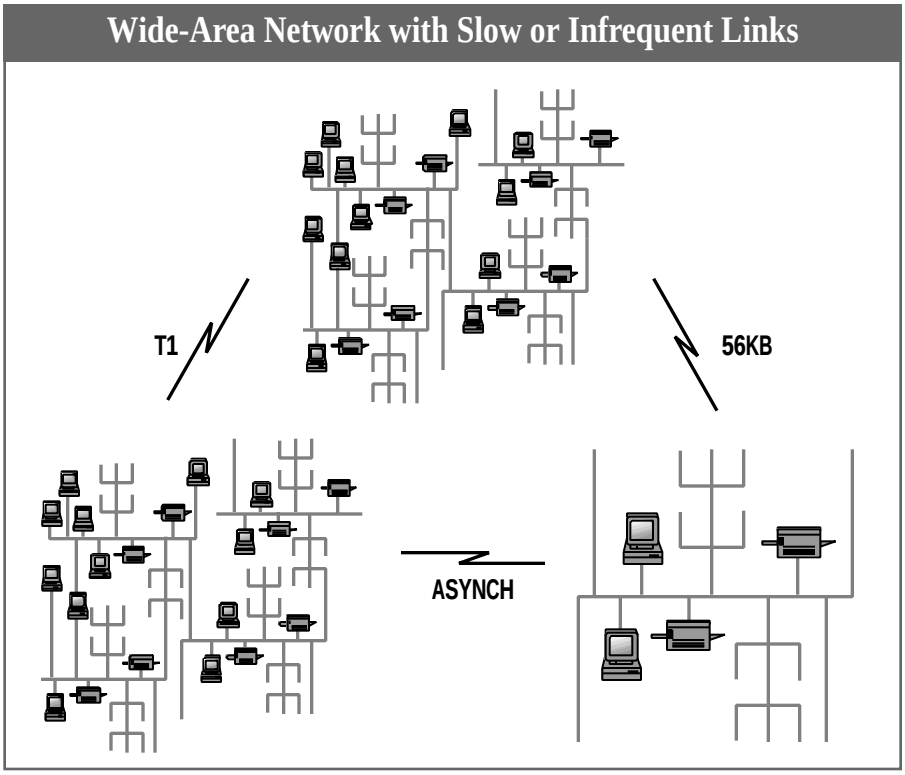


Figure 4

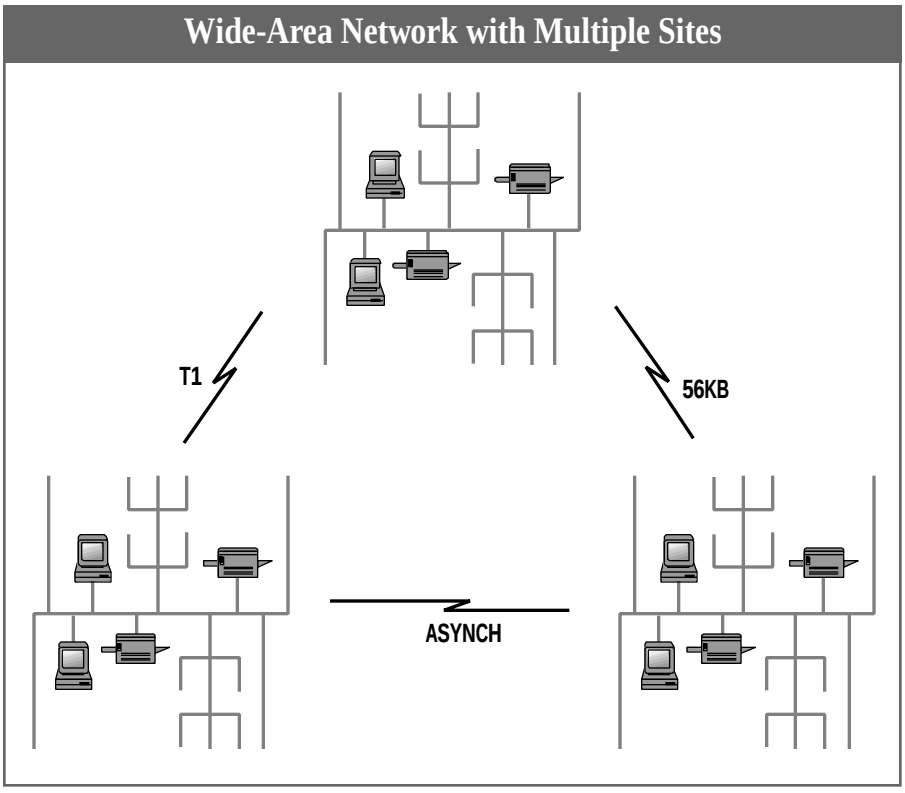


Figure 5

It is advised that management implementations of this nature are carefully thought out using information included in the architecture section at the beginning of this document which includes descriptions of the background traffic generated by LANDesk Management Suite. This information is available for evaluators with an advanced technical understanding of network technologies to determine domain strategies on wide area networks.

## Technical Implementation Issues

**Technical Implementation Questions and Answers**

**Question:**
How long will a typical installation take?

**Answer:**
To create a Management Server, plan on 1-3 hours. Creating a Managed Server takes approximately 15-30 minutes. Managed workstations are created as a part of users logging in to Managed Servers and an automatic workstation configuration program running.

**Question:**
Is there any way I can reduce the amount of time it takes to create a Management Server?

**Answer:**
Updating to the latest network drivers (the Novell client drivers are now shipped on the CD-ROM for LANDesk Management Suite v2.01) and the latest STREAMS and CLIB NLMs for NetWare 3.11 and 3.12 files servers and BTRIEVE* files ahead of time can significantly reduce installation headaches.

**Question:**
Is there anything I need to do to my server to configure it before I start installing LANDesk Management Suite?

**Answer:**
Yes. You will need to reconfigure BTRIEVE utilizing the BSETUP NLM to allow for the number of open files to be greater than 25 or to make it 23 greater than is currently needed for another product utilizing BTRIEVE, if such a product already exists on your management server.

**Question:**
Do I need to do that to all my servers?

**Answer:**
No, just to the management server where you plan on installing the bulk of the product.

**Question:**
How do you enforce your licensing and do my end users who are being managed see any notice?

**Answer:**
When the product senses you are attempting to manage more nodes than you have purchased licenses for it produces a screen every ten minutes on your management console only telling you how many nodes it senses you have, how many you've purchased, and how to get more information on purchasing more. If you click OK the reminder screen will not reappear for ten more minutes and you are not prevented from performing any functionality. Managed clients do not see any notification or any license information of this type.

**Question:**
Do I need a CD-ROM drive to be able to install the product?

**Answer:**
Yes. The software is installed from a Windows workstation that requires access to a drive letter accessing a CD-ROM drive.

**Question:**
How much memory will LANDesk Management Suite require to run as a core on a branch server (i.e. RAM amount and additional Cache Buffers)?

**Answer:**
A minimum of 12 megabytes is required on the file server. Above that you must have an additional 4 megabytes of RAM free, which equates to approximately 1000 cache buffers.

**Question:**
What NetWare parameters would I look at that would help me determine if the customer needs to add more memory and how much memory?

**Answer:**
Cache Buffers. It is recommended to have at least 40% cache buffers available after LANDesk Management Suite's NLM and everything else is loaded.

**Question:**
How much hard disk space will LANDesk Management Suite require if I load all the modules on the Management Server?

**Answer:**
The static amount after a new install is just short of 60Mb. We are recommending 70Mb in our present documents but 80Mb would be closer to reality. The breakdown is — 20Mb of disk space for the core management database. (1Kb per discovered device and 15Kb per inventoried device in the Inventory Database plus the space for the contents of each data base file.) This obviously varies according to the size of the network— 60Mb of disk space for LANDesk Management Suite software. However, if you intend to use software distribution, for every console you're going to be using to build distribution packages, you need to add approximately 20-30Mb (the entire SYSTEM directory and several key configuration files are backed up) and then make sure you have enough space to store the distribution package files (approximately 40% of the size of the fully installed package).

**Question:**
Does your product create much background traffic?

**Answer:**
With all the levels of communication taking place between different components of the suite, there is a minimal amount of traffic is being generated by this activity. Since there are many components to the system and each communicates in a different way, the following series of questions and answers attempts to deal with these issues.

**Question:**
What is the amount of "chatter" between servers when they are "quiet" vs. when alerts/other traffic are being sent to the Core server?

**Answer:**
During the quiet period between discovery cycles or real-time management of remote clients, LANDesk Management Suite does not produce any chattering type of packets traffic on the network. While you have workstation that is executing the management console, there will be one ping packet every five minutes. When you alter the table of applications to be metered, that information is sent to other servers within the management domain. Alerts are sent when necessary. In the LANDesk Management Suite v2.00 release the Server Monitor tool produced some background chatter at all times; this has been eliminated with the v2.01 release.

**Traffic during active period is described as follows:**

**Discovery Manager** — The Discovery Manager has a configurable "heartbeat", meaning the frequency with which it attempts to discover the network. The Discovery Manager will generate an average of 100 packets per second within a discovery cycle because it is limited by bandwidth and the response time of devices to reply back to the core server. During a discovery cycle, the core server cannot request information from more than one node at a time. As a general rule, a device will take from two to four packets to respond within a discovery cycle unless it is a server that needs to be explored and discovered (as specifically stated in the LDINIT.INI file) and that will generally take up to 4,000 packets per second.

**AMS** — The Alert Management System will generate four packets per event that needs to be passed between the managed server and the core server. It is quiet until there is an event that needs to take place.

**Meter** — When any user attempts to access an application, a series of eight packets will pass between the workstation, the relay server, and the meter server. File termination will result in four packets. Within Windows, a file copy will result in two packets. After execution, a DOS application will not result in any traffic overhead and a Windows application will result in one packet sent every 30 seconds.

**Server Monitor**— When you first run the Server Monitor console, a list of devices to manage is built by searching for the servers that are listed in the SAP table of the Management Server and attempting to contact them at the rate of 30 per second. Every time thereafter that the Server Monitor console is run, the servers on the list (stored in an editable .INI file) are contacted to find out if they can respond; inactive servers are grayed out in the list.

**Question:**
What will be the impact across the WAN lines (for instance, two 1-megabit lines and a 56Kb link)?

**Answer:**
We recommend that you not have domains that span disparate environments such as 1-megabit links and 56Kb links. The inventory manager can merge inventory databases from remote domains and then you can remotely control across the fast links without the real-time discovery. Software distribution can distribute from one domain to another the built packages and then spawn the distributions remotely, again without having the real time remote links crossing.

**Question:**
What impact on an extremely fast link will there be if clients send their inventory information directly to the Core server which is across the fast link as opposed to putting a Core server locally to those clients and copying the database to the "main" server?

**Answer:**
The most significant impact on network traffic is generally in the morning when people arrive at work and log in to the network and simultaneously all send traffic over the WAN as they send their inventory information to the Management Server. Each inventory login will take approximately 5Kb. Additionally, when the option is chosen to also do software scans, the size of the information transferred will grow to 15Kb plus the average size of the ASCII configuration files that are scanned in (for example, many workstations will average around the following file sizes: 1Kb for CONFIG.SYS, 1Kb for AUTOEXEC.BAT, 1Kb for NET.CFG, 1Kb for STARTNET.BAT, 10Kb for 2 SYSTEM.INI and 16Kb for WIN.INI).

# System Requirements

### Management Server

- Novell NetWare 3.11, 3.12, 4.02, or 4.1. (These versions are referred to as NetWare 3.1x and 4.x.)
- 12Mb of system RAM, with 4Mb dedicated to LANDesk Management Suite's 20 NLMs.
- 70Mb of free disk space for the following:
- 20Mb of disk space for the Management Database. (1Kb per discovered device in the Management Database; 15Kb per inventoried device in the Inventory Database plus space for the contents of each system file.)
- 50Mb of disk space for LANDesk Management Suite software.
- Account with SUPERVISOR or ADMIN equivalent rights.
- CLIB Version 3.12g.
- BTRIEVE Version 6.10c.

### Management Workstation

- 25MHz Intel486™ processor-based PC or better.
- VGA or Super VGA graphics adapter and monitor.
- Mouse supported by Windows 3.1x.
- 12Mb of system RAM.
- 10Mb of local hard disk space for local data gathering.
- Network adapter or interface card with an ODI device driver capable of operating in promiscuous mode. (This is not necessary if you use Software Probe to gather data for Traffic Monitor and Performance Monitor.)
- MS-DOS* 5.0 or later.
- Microsoft Windows 3.1x, running in enhanced mode and configured for NetWare.
- Novell's 1.2 client kit or later (included on the CD-ROM for LDMS v2.01).

### Other servers in your domain

- Novell NetWare 3.11, 3.12, 4.02, or 4.1. (These versions are referred to as NetWare 3.1x and 4.x.)
- 5Mb of free disk space.
- 550Kb of system RAM for Management Tool NLMs.

### Software Probe stations

- 33MHz Intel386™ processor-based PC or better.
- 2Mb of system RAM.
- 20Mb of local hard disk space for Performance Monitor's logs.
- Network adapter or interface card with an ODI device driver capable of operating in promiscuous mode.

### Client workstations

- DOS or Windows workstations. (Macintosh* support is available for the inventory scan.)
- 12Kb of system RAM available for optional TSRs.
- Novell's WINUP9 Windows Update Kit for VLM and NETX.
- Macintosh — System 6 or System 7.
- OS/2* — V1.3 or V2.x.
- Novell's 1.2 client kit or later (included on the CD-ROM for LDMS v2.01) HIGHLY RECOMMENDED.

## Product support numbers

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