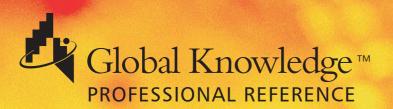
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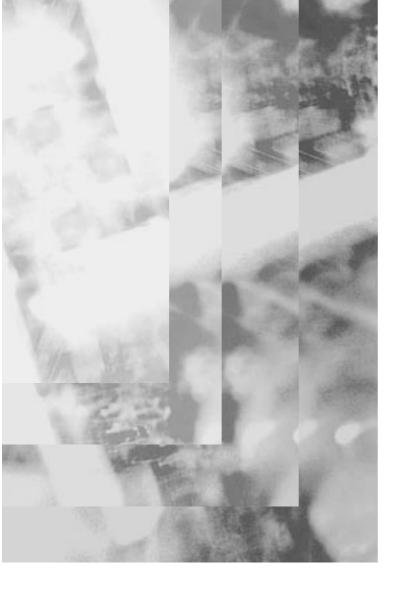
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Thank your for the opportunity to serve you. We look forward to serving your needs again in the future.

Warmest regards,

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Contents

Introduction		xxiii
Chapter 1: Chall	lenges of the Virtual Environment	1
Introduction		2
What Defines	a Mainframe?	2
Benefits o	f the Mainframe Model	3
History ar	nd Benefits of Distributed Computing	5
	orkstation	5
Enter I	Distributed Computing	6
Two-Ti	ered Computing	6
Three-	Fiered Computing	6
Distrib	uted Computing and the Internet	8
Benefit	s of Distributed Computing	9
Meeting th	ne Business Requirements of Both Models	9
The Main Diff	erences Between Remote Control	
and Remote l	Node	11
Remote C		11
	s of Remote Control	12
Downs	ides to Remote Control	12
Remote N	NAC STATE OF THE PROPERTY OF T	14
	se Remote Access?	15
	acks of Remote Node Computing	16
	v Do You Choose?	16
The Thin-Clie		17
Key Conce	• 1000	18
	ning of Terminal Services and MetaFrame	19
	on of Terminal Services	20
	2000 Terminal Services	21
	Exactly Is Terminal Services?	21
Install		23
	Requirements for Terminal Services	23
Types of	of Terminal Services Installations	24

Terminal Services Licensing	25
Terminal Services Tools	27
The Virtual Memory	30
Remote Desktop Protocol (RDP)	31
The Terminal Services Client	33
Local Drive Mapping	36
Network Load Balancing for Windows 2000	36
Citrix MetaFrame	37
The ICA Protocol	37
Application Publishing	41
The ICA Client	41
The MetaFrame Server	46
MetaFrame Server Tools	49
Citrix and the Internet	52
Choosing Terminal Services or MetaFrame	53
Bottom Line Value of Using Thin-Client Technology	54
Calculating Hard Costs	54
Calculating Soft Costs	55
Summary	57
FAQs	58
Chapter 2: Routing and Remote Access Services	
for Windows 2000	61
Introduction	62
Designing and Placing RAS Servers on the Network	62
Sizing the Servers	62
RAM	63
Processors	64
Storage	64
Network Interfaces	68
Clusters	68
Modems	69
Placing the RAS Servers on the Internetwork	72
Remote Access Protocols	74
Dial-up Clients	75
PPP and SLIP	75
CHAP and PAP	75
VPN Clients	76
PPTP	78
L2TP	80
IPSec	81
Installing the Windows 2000 Remote Access Service	82

FAQs

Contents

135

ΧV

Chapter 4: Designing a Citrix MetaFrame Internetwork	139
Introduction	140
Designing and Placing MetaFrame Servers on the Network	140
Sizing the Server	141
RAM	143
Processors	145
Storage	148
Network Interfaces	153
Modems	153
Placing the Server on the Network	156
Designing an Internetwork with Multiple	
MetaFrame Servers	157
Placing Servers on the Network	158
Implementing Load Balancing Procedures	159
Utilizing License Pooling	161
Implementing MetaFrame-Supported Protocols	161
TCP/IP	162
IPX/SPX	162
NetBEUI	163
ICA	163
Analyzing the Environment	164
Designing the Internetwork	168
LAN	168
WAN	170
Internet	172
Upgrading to Citrix MetaFrame 1.8 for Windows	174
Summary	176
FAQs	176
Chapter 5: Deploying Terminal Services Clients	179
Introduction	180
Limitations of Terminal Services Clients	180
Licensing	180
Licensing a Terminal Services Client	183
Operating System Limitations	184
Protocol Limitations	184
Other Limitations	184
Client Considerations	185
Installing the Client Manually	186
32-bit Windows	186
16-bit Windows	189
Windows CE	191
Deploying the Client Using Automated Installation Methods	192

	Contents	xvii
32-bit Windows	192	
Sample Automated Installation	193	
Using the Client Software	193	
Terminal Services Client	193	
Client Connection Manager	195	
Summary	201	
FAQs	202	
Chapter 6: Citrix MetaFrame Clients	205	
Introduction	206	
Selecting a Protocol	206	
Installing MetaFrame Clients	212	
DOS	212	
Creating DOS ICA Client Installation Floppy Disks	214	
Windows 16-Bit	215	
Windows 32-Bit	215	
Creating Windows 32-Bit Client Installation		
Floppy Disks	216	
Macintosh	218	
OS/2	220	
OS/2 Installation	220	
Win-16 OS/2 Installation Procedure	221	
DOS OS/2 Client Installation Procedure	222	
UNIX	222	
Steps to Perform a Text-Based UNIX (Linux)		
Client Installation	224	
Using the Red Hat Package Manager (RPM)		
to Install the Client	225	
Deploying MetaFrame Clients Using		
Automated Installation	228	
Steps to Create Preconfigured Client Install Disks	229	
Creating a New Client Update Database	229	
Configuring MetaFrame Clients	230	
Configuring the UNIX Clients	232	
Connection Tab	235	
Window Tab	237	
Application Tab	237	
Preferences Tab	238	
Server Location Tab	239	
HotKeys Tab	239	
Disk Cache Tab	240	
Drive Mapping	241	
Win32 Client Configuration Overview	242	
Configuring the Win32 Clients	244	

ICA Settings	250
ICA Client Mappings	251
Mapping Win32 Client Audio	252
Troubleshooting Basic Client Connectivity.	252
Summary	254
FAQs	256
Chapter 7: Installing Terminal Services	259
Introduction	260
Gathering Business Goals and Objectives	260
Components of Windows 2000 Terminal Services	262
Windows 2000 Multiuser Kernel	263
Remote Desktop Protocol (RDP)	263
Terminal Services Client	264
Terminal Services Administration Tool	264
Terminal Services Encryption	264
Remote Administration Mode	265
Application Server Mode	268
Testing Configurations and Deploying a Pilot	271
Installation	271
Rolling Out the Final Configuration	277
Local Printer Support	277
Roaming Disconnect	277
Enhanced Performance	278
Multiple Login Support	278
Clipboard Redirection	278
Securing ClipBook Pages	279
Windows 2000 Server	280
Windows 2000 Advanced Server	280
Terminal Services Licensing	281
Installing the Terminal Services Licensing Component	282
Activating the Terminal Services License Server	282
Using the Training Tools	283
Administrators	284
Terminal Services Manager	284
Terminal Services Configuration	284
Terminal Services Client Creator	285
Terminal Services Licensing	285
End Users	285
Summary	286
Using Terminal Services to Provide Applications	20~
over the Internet	287
FAQs	287

Chapter 8: Installing Citrix MetaFrame	289
Introduction	290
Business Drivers for Selection of Citrix MetaFrame	290
Installating MetaFrame 1.8	294
Integrating with the Active Directory	300
Mixed Mode	300
Native Mode	301
Installing NFuse	303
Feature Release 1	308
NFuse 1.5	308
RC5 Encryption	309
SSL Relay	309
TCP-Based Browsing	309
Web Install	309
SpeedScreen Latency Reduction	309
Testing Configurations and Deploying a MetaFrame Pilot	310
Application Launching and Embedding	312
Rolling Out MetaFrame to the Environment	312
Presenting Applications to Users	313
Defining the Environment	313
Installing the ICA Client	313
Citrix MetaFrame Licensing	314
Training	315
Administrators	315
End Users	315
Summary	316
FAQs	316
Chapter 9: Configuring the User Experience	319
Introduction	320
Configuring Parameters with Active Directory Utilities	320
Creating a Custom MMC Console	323
Configuring the User Properties	324
Using Citrix MetaFrame Utilities	334
Shadowing	334
Establishing a Shadow Session	
Using the Shadow Taskbar	335
Establishing a Shadow Session Using	
Citrix Server Administration	337
Applying Group Policy	339
Understanding Group Policy and Active Directory	341
Creating a Custom MMC Console for Group Policy	343

Connection Profiles and Session Configuration	350
Specifying Shadow Permissions to a Connection Profile	354
Summary	357
FAQs	359
Chapter 10: Configuring Terminal Sessions	361
Introduction	362
Creating Sessions	362
Configuring Sessions	367
Applying Security Across All Sessions	374
Encryption	374
Logon Settings	376
Session Permissions	377
Special Internet Security Measures	378
Summary	379
FAQs	380
Chapter 11: Installing and Publishing Applications	383
Introduction	384
Selecting Compatible Applications	384
Installing Applications on the Server	386
User-Specific	386
User-Global	387
Testing the Applications	391
Shadow Registry	395
Application Compatibility Scripts	397
Publishing Applications	405
Using Published Application Manager	405
Multisession Applications	407
"Short and Drop"	407
Load Balancing	407
Creating an ICA File	409
Netscape	422
Internet Explorer	422
Summary	422
FAQs	423
Chapter 12: Utilizing the Internet	425
Introduction	426
Phoenix Manufacturing Case Study	426
Providing Business Applications over the Internet	428
The Total Cost of Ownership Advantage	428
Business-to-Business Arrangements	430
Overview of Connecting to Sessions over the Internet	431
Overview of Connecting to Sessions over the Internet	431

	Contents
	404
Using MetaFrame Client and VPN	431
Server Farms	433
Using a Web Browser	433
Configuring the Server to Provide Applications	407
from a Web Page	437
Configuring the Original Installation	438
Determining How the Application Is Displayed	440
NFuse	442
Configuring the NFuse Components	443
Installing the NFuse Services on	444
the Citrix Server Farm	444
Installing the NFuse Web Server Extensions	446
Using the Web Site Wizard to Set Up an Initial Site	448
Web Access Screen Examples	452
Infrastructure Impacts	454
Firewall Setup Considerations	454
Summary	456
FAQs	457
Chapter 13: Optimizing, Monitoring,	
and Troubleshooting Windows 2000	
and Terminal Services	459
Introduction	460
Optimizing Your Resources	460
Handling Changes in the Environment	460
Tape Backup	462
Imaging	463
Increased Users	463
New Applications	466
Internet Configuration Changes	466
Performance Tuning	468
Monitoring	469
Session Utilities	470
Shadowing Sessions	474
Troubleshooting	478
Establishing Drive Mapping	478
Resolving Connectivity Issues	479
Preventing Users from Downloading Files	482
Printing	484
How Printing Works	485
Resolving Printing Problems	485
Summary	486
FAQs	488

xxi

Chapter 14: Managing Citrix MetaFrame 1.8	
for Windows 2000 Fast Track	491
Introduction	492
Understanding Mid-Tier Architecture	492
Remote Node and Remote Control	494
Connecting Client Types	495
Remote Desktop Protocol (RDP)	495
Supported Operating Systems	496
Supported Protocols	496
The Independent Computing Architecture	497
Supported Operating Systems	497
Supported Protocols	498
Licensing	499
Application Load Balancing	499
Designing and Deploying Terminal Services MetaFrame	500
Design	500
Deploying MetaFrame	502
Configuration	503
Utilizing the Internet	504
Managing Your Systems	505
The Value of a Thin-Client System	506
The Future of Windows and MetaFrame	507
Microsoft Windows 2000	507
Citrix MetaFrame	508
FAQs	508
Appendix A: Secrets	511
Appsrv.INI Parameters	512
Improving Terminal Services Performance	519
Index	521

Introduction

A Brief History of Citrix

More than five years ago, Citrix had a product on the market that could do what no other product on the market could do. Citrix WinView allowed a single DOS or Windows 3.1 application to be simultaneously shared from a single computer to multiple computers over phone lines or network links. This meant that companies that had installed hundreds of computers with individual phone lines and remote control software could then reduce their remote services costs and administrative hassles.

Back then, a single WinView server could host an average of 14 remote dial-in users simultaneously. As a result, an application only needed to be installed one time as opposed to the administrator performing 13 separate installations. Users received a major benefit too, in the fast response that an application loaded and ran compared to other remote control software or remote node software packages. Citrix WinView worked wonders for many, until Microsoft released Windows 95.

Citrix Moves to 32-bit Applications with WinFrame

When Microsoft produced Windows 95, Citrix found that there was a problem that WinView couldn't solve. Windows 95 could *not* share out a 32-bit application because it was based on IBM's OS/2 using 16-bit Windows emulation.

As a result, Citrix went to work with Microsoft, licensed the Windows NT 3.5*x* operating system, and built Citrix WinFrame. The

new WinFrame had the Windows 3.1 Graphical User Interface (GUI) because that's the GUI that Windows NT 3.5x also had. Even so, the new WinFrame product enabled the sharing of 32-bit applications, in addition to supporting high-end server hardware with Symmetrical Multiprocessors (SMP), so that fewer servers could support more users. Citrix built the WinFrame software with two components:

- MultiWin kernel
- Independent Computing Architecture (ICA) protocol

Actually, ICA stood for *Intelligent Console Architecture* back then. They changed it after Windows NT 4.0 came out and after they worked out an agreement with Microsoft. The new agreement gave Microsoft the license to MultiWin kernel, enabling Microsoft to introduce Windows NT 4.0 Terminal Server Edition many months after the release of Windows NT 4.0.

Citrix changed the ICA acronym to stand for *Independent Computing Architecture*, becaue ICA provided terminal sessions on any platform, whereas Microsoft's terminal sessions were limited to Microsoft 32-bit clients (or Windows 3.11 for Workgroups using 32-bit TCP/IP). At the time that Terminal Server Edition was released, Citrix released a new product called Citrix MetaFrame for Windows NT 4.0 Terminal Server Edition. MetaFrame enabled Terminal Server to share out sessions via ICA. A MetaFrame server could utilize the other products that Citrix creates—such as Application Load Balancing—that are not available for plain Terminal Server.

The difference between WinFrame and MetaFrame is this: WinFrame has a completely rewritten kernel from Windows NT 3.5x. When you install WinFrame, you are installing an entire operating system and do not need to have Windows NT 3.5x already installed. MetaFrame, on the other hand, is the ICA component combined with administrative interfaces to assist in managing the applications. It requires an underlying Windows NT 4.0 (or now, Windows 2000) server operating system be installed, and it must have Terminal Services enabled.

So when all is said and done, Microsoft provides MultiWin and Citrix provides ICA plus more options.

Why Use a Thin-Client Application Server

One of the major benefits of using either plain old Terminal Services on Windows 2000 or the enhanced Citrix MetaFrame version is that you can conserve significant bandwidth that would otherwise have been consumed by *fat clients*. A fat client is typically a client/server application that spends time consuming bandwidth by loading up data into the client application from the server and adding chatty overhead traffic. Both Terminal Services and MetaFrame provide *thin clients*, which have minimal bandwidth requirements.

Fat clients take forever to connect and load up their data. It is so bad sometimes that someone from Citrix compared it to sucking peanut butter through a straw. (I think that is the most appropriate analogy I've ever heard considering how long some applications can take when they load over a 56 Kbps phone connection.)

One fat client is bad enough. When you compound the problem with hundreds of fat clients accessing the same application over links that range from phone lines to T3 leased lines, you have poor performance and dissatisfied users.

Current Shifts and Trends in the Industry

In recent years there has been a dramatic increase in corporate mergers, acquisitions, and migrations. These changes have created increasingly complex and far-reaching internetworks with a huge number of remote users and *virtual associates*. The new name for this type of company is the *virtual organization*. Becoming a virtual organization is not an easy thing to do. People tend to feel disconnected and turnover may increase. Communication and fast response is a key to the virtual organization's success. To help manage this for the virtual associates, companies are providing laptops, VPN service, online voice mail, teleconferencing, distance learning, browser-based desktops, and wireless devices. All of these items are facilitated by the Internet.

In addition to revolutionizing corporate communications, data processing, and applications deployment, the Internet has spawned a new business paradigm: e-business. E-business can be divided into two types of transactions:

- Business to Business (B2B) transactions are conducted between a business and its vendors.
- Business to Customer (B2C) transactions are conducted between a business and its customers.

Both virtual organizations and e-businesses require that applications be provided to end users through an Internet connection.

Because there are so many different types of Internet connections, you may never know how fast someone can access your site. One thing you can be sure of—your Internet users will never experience the same speed of access or the reliability that you have when you are hooked directly into that network.

Speed, or rather performance, is the most important thing that you can provide to your Internet users. A customer will not tolerate a lagging download of an application that an employee onsite might tolerate. The customer is not paid to use your application and is, in fact, *paying* to receive a product or service from you. Indeed, if your Internet applications are not screaming along, your competition will begin to look like a better option. Vendors, too, will look to other partners if your application does not perform well.

But applications are not built on the Internet. They are built by a programming team in a software development firm, where every programmer has a 10MB or better connection to the server on which the application resides. It's a controlled environment, with controlled bandwidth and accessibility. It *must* be in order to maintain the proprietary software code. When the application is tested, it is ported to the Internet in a compiled format and executed from a remote site.

One of the benefits of using the ICA protocol from Citrix to provide applications is that almost all of the latest browsers support ICA natively. Your customers and vendors don't need to install anything in order to access an application that you publish on the Web with Citrix. Microsoft released its own Internet client in June, 2000 for publishing applications. I personally prefer the Citrix client for the Internet because it is simpler, has some client utilities, and is proven. You should check out Microsoft's version before making your own decision.

Wireless devices provide an even greater challenge. Some, like Palm Pilots, do not understand straight HyperText Markup Language (HTML), and rightly so. Can you imagine an entire Web page from Microsoft loading onto the three-inch screen of a Palm Pilot? You'd need a magnifying glass and some migraine medication to read through it. The point

is, you don't want to supply an entire desktop to a wireless device, you want to limit it to a client application interface. Besides, wireless devices are somewhat unreliable and suffer from a high level of latency, which won't allow for an application to load quickly. In fact, for wireless devices to interact on your network, you'd want to use a thin client. That's where MetaFrame and Terminal Services come in. Citrix MetaFrame provides wireless device thin clients. Microsoft Terminal Services on Windows 2000 supports the Windows CE thin client.

Corporations have implemented thin clients for a variety of business reasons, including equipment cost reduction and centralized administion. Some expanded their services to end users. Plenty reduced their bandwidth consumption. Now, many are exploring e-business and wireless device usage in their virtual organizations without rewriting applications to native HTML.

The authors on this book describe all the ways that you can use both Microsoft Windows 2000 Terminal Services and Citrix MetaFrame in your environment. They cover:

- Designing the infrastructure
- Implementing the plan
- Troubleshooting the deployment
- Configuring servers and clients
- Deploying applications over the Internet
- Monitoring end users
- Securing applications and data

Most importantly, they tell you how to improve your applications' performance with thin clients so that users don't feel like their application is sucking peanut butter through a straw!