

NetWare 6.5 First Class Introduction

Advanced Technical Training

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Welcome to NW 6.5 First Class

- Class times
 - 4 Hours
- Breaks
 - 10 minutes every hour
- Phone calls
 - Please turn Cell Phones OFF or:
 - Silent
 - Stun (take any calls out of the room)

N Introductions

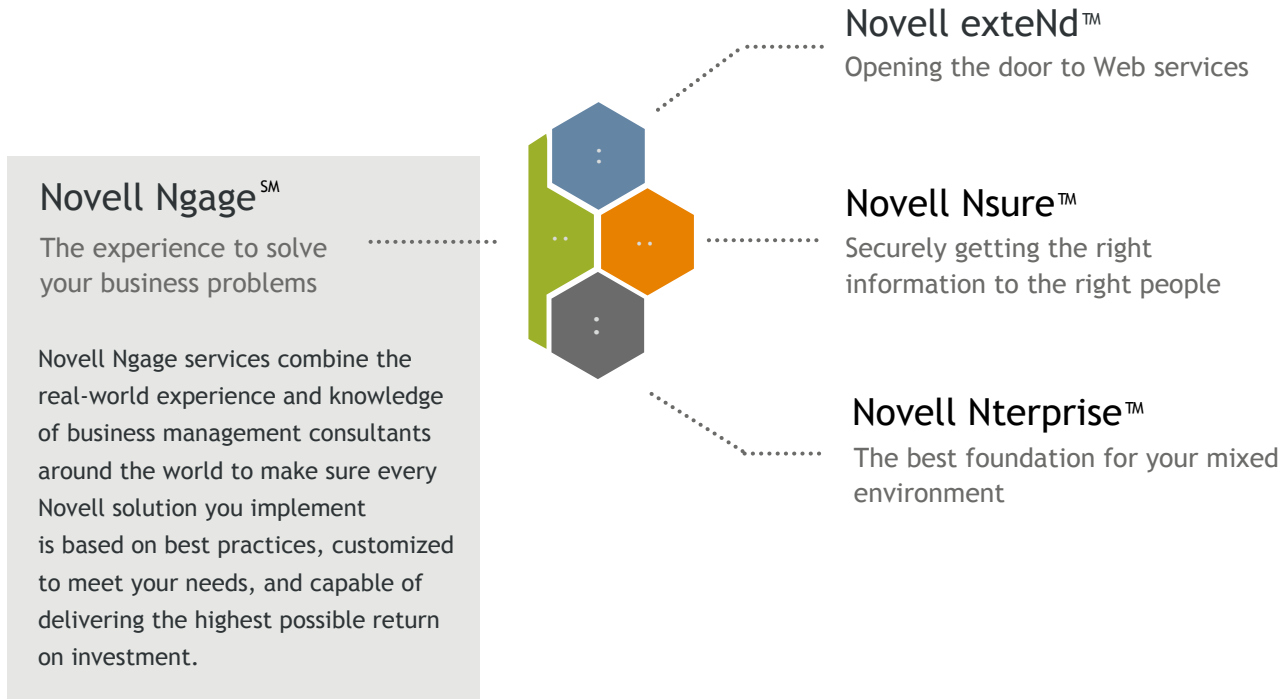
- Mitchell Smith masmith@novell.com
- Live in Utah and Arizona - Born in Toronto Canada
- Novell Inc
- 16 years (started with WordPerfect 1987)
- Novell uses a mixed network environment.
- How can I make this class the best class for you?
- Interests are my family, being a Grandfather, boating, racing, motorcycles, golf, scuba diving and Scouting.





Novell one Net vision and the Advanced Technical Training Mission

Empower Novell's customers and partners to design, implement and support Novell's Net Business Solutions.



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Professional Education Programs Public Training Offerings

- **Advanced Technical Training (ATT)**

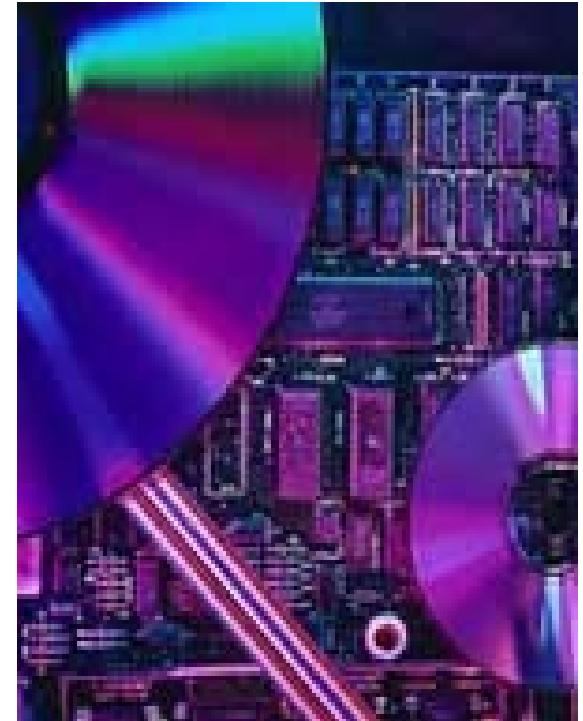
Courses delivered on an engineering level. Course covers support issue, in-depth architectural reviews and advanced enterprise solutions. Highly technical training consists of both lecture and hands-on labs. Pre-requisite assumes product knowledge.

- **Bootcamp**

Course is accelerated and condensed delivery of a subject matter. Training addresses a solution or technology and assumes some pre-requisite knowledge or skills.

- **First Class**

Course is the first education offering on a subject matter. Hands-on exercises provide a thorough understanding of the implementation, configuration and administration. Course consists of high-level exercises.

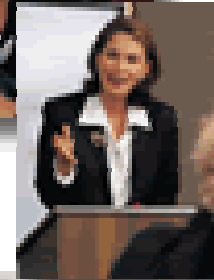


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Professional Education Programs Custom Training

Specialized offerings designed to meet the your unique training needs.

- Performance Improvement Consulting
- Customized Training





Novell Direct Technical Training Current Courses

	Nterprise	Nsure	exteNd
New	GroupWise 6.5 Services & Troubleshooting	Border Manager	
ATT	NetWare 6 Services & Troubleshooting	Advanced DirXML	
Existing	Novell Cluster Services ZENworks for Desktops 4	Advanced eDir 8.7	
New	NetWare 6.5 First Class	iChain 2.2	
Technical Training		Novell Nsure Technical Workshop	
Existing	ZENworks for Servers 3		J2EE Apps in exteNd App Server Novell exteNd App Server Admin Using Novell exteNd Composer Using Novell exteNd Director

Go to: www.novell.com/registernow for complete course descriptions and registration information

N NW 6.5 First Class Course Objectives



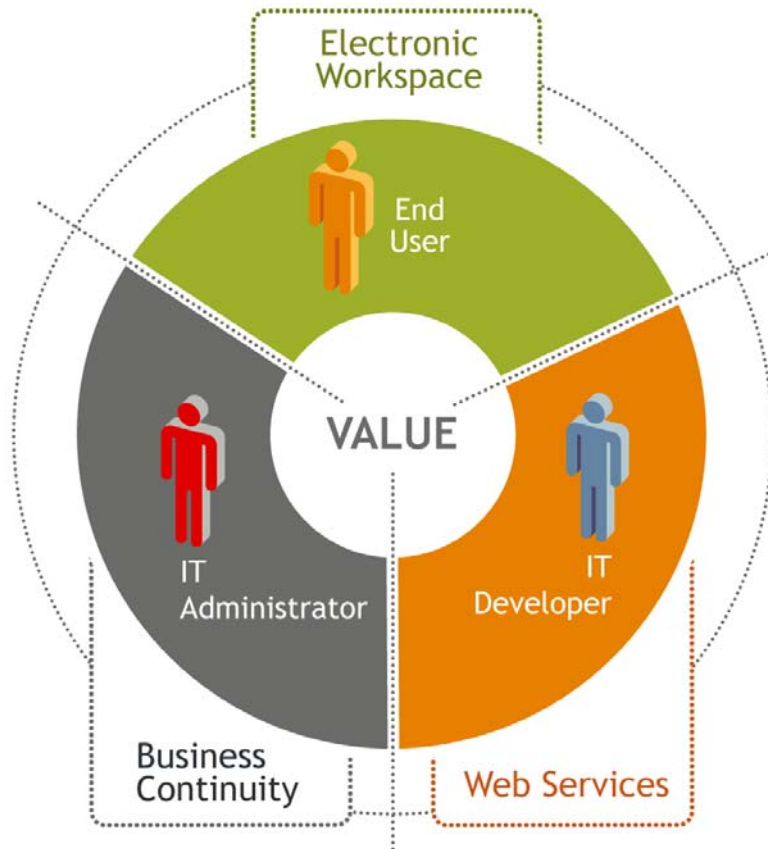
Understand the key components that make up NetWare 6.5 and how those components may be implemented to solve key business problems.

Provide a hands on experience with NetWare 6.5 beta code.



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NetWare 6.5 strategic areas of focus



- Provide end users with valuable services that enhance personal and team productivity
- Provide a strong J2EE and open source development story
- Continue the tradition of industry proven reliability and security
- Create an environment where technologies can inter-operate to avoid vendor lock-in

N Agenda

Business Continuity - IT Administrator

- Installation
- Administration tools
- NetWare Storage Services
- File Access
- DirXML
- Virtual Office

Web Services - IT Developer

- Web Tools

Enterprise Management

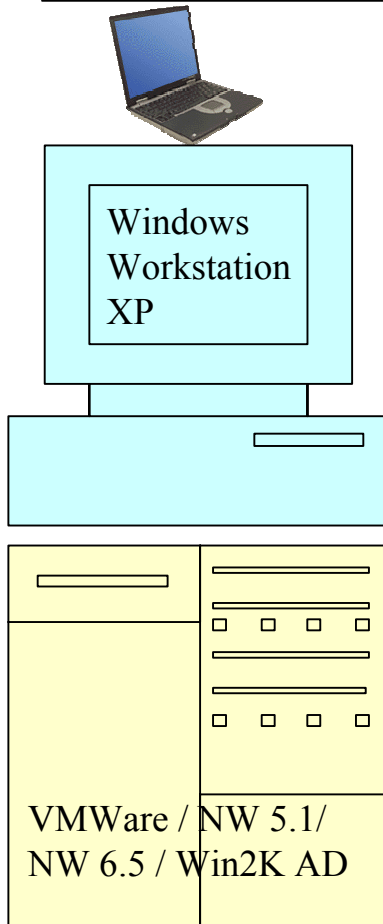
- Enterprise Branch Office

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NW 6.5 First Class Equipment Layout

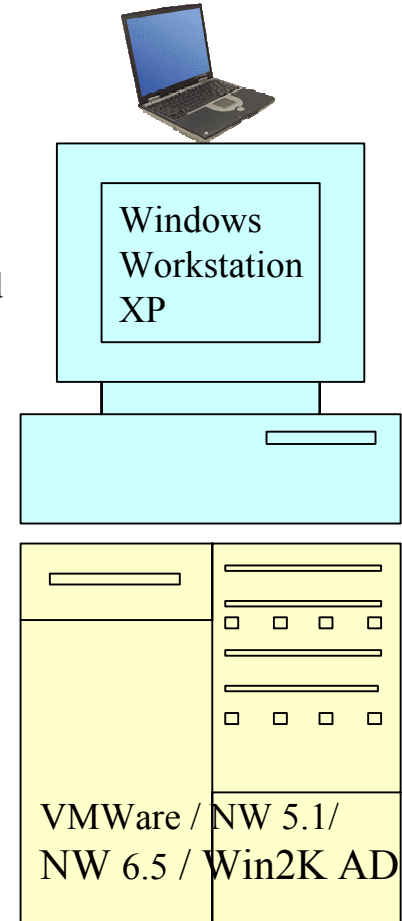
1 Network, 3 laptops, per 2 Students

DHCP
Assigned
10.0.0.x



NW 6.5 server
Digital Airlines
DA_TREE
10.0.0.1
Most NetWare services
GroupWise

DHCP
Assigned
10.0.0.x





NW 6.5 First Class Equipment Layout

- Server settings Changed
 - NetWare 6.5 preinstalled using a Custom installation
 - Startx commented out in Autoexec.ncf
 - Server started with the Server -nl switch
 - GroupWise 6.5 installed

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Lab information

Finished Labs

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NetWare 6.5 Installation

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Install, Migration and Server Consolidation

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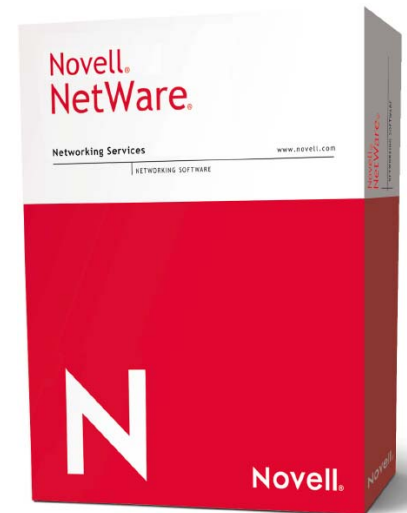
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N Section Agenda

Installation Options

- New NWDEPLOY
- Basic NOS Install
- Pre-Migration Server
- Custom Server
- Special Purpose Installs
- Remote Upgrades

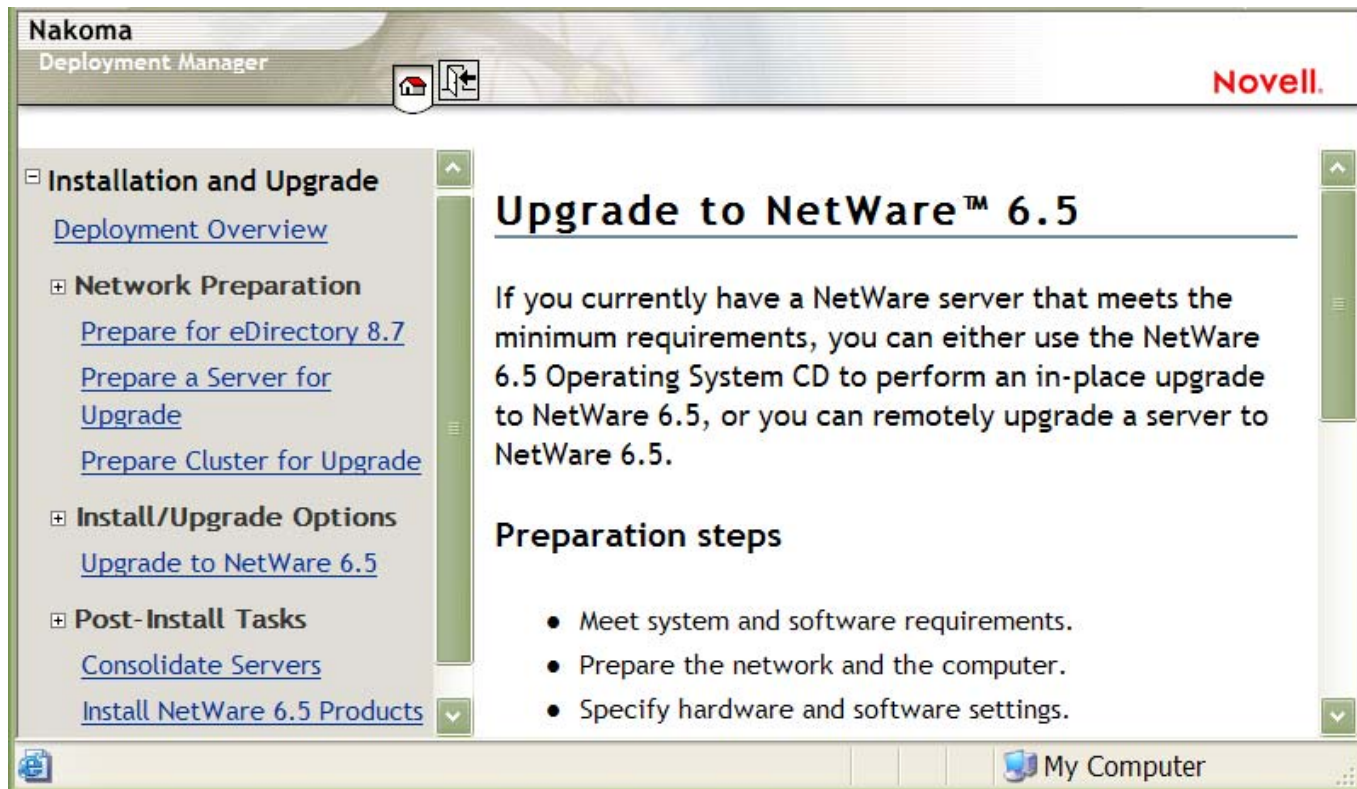
Server Consolidation Tool 2.0



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Using the New NWDEPLOY

NWDEPLOY is run from the root of the NetWare 6.5 OS CD. It will help you prepare for a new installation or, or upgrade to, NetWare 6.5

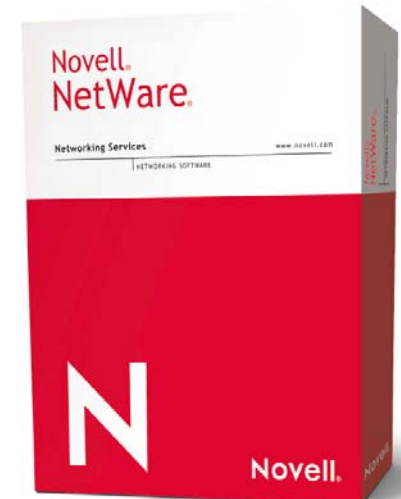


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Installing Basic Netware Server

The Basic NetWare option copies only the files needed for a basic NetWare server, including files for the following products:

- Apache 2 Admin Server
- CIFS/AFP
- eDirectory 8.7
- Java Virtual Machine (JVM)
- LDAP Service
- Novell International Cryptographic Infrastructure (NICI)
- Novell Licensing Services
- Novell Modular Authentication Service (NMAS)
- Pervasive SQL 2000i
- Novell Certificate Server 2.4.0
- NetWare Remote Manager
- Secure Authentication Services
- Scripting Engine (for PHP and Perl support)
- Storage Management Services
- Tomcat 4 Servlet Container
- W0 (Security Domain Key)





NW 6.5 System Requirements

Minimum System Requirements

- DOS Partition needs to be large enough to hold NW6 files, recommended size at LEAST 200 MB.
- Single Processor
- A server-class PC with a Pentium III 550 MHz or AMD K7 processor
- 512 MB of RAM

Recommended system requirements:

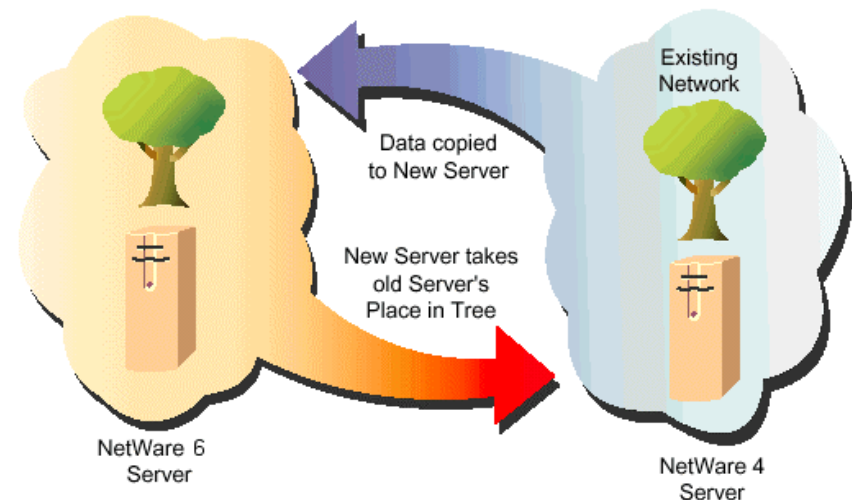
- Dual Processor
- 1 GB of RAM

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Pre-Migration NetWare Server

The Pre-Migration NetWare option installs a NetWare server that an existing server will be migrated to at a later time. The Pre-Migration NetWare option copies only the files needed for a Pre-Migration NetWare server, including files for the following products:

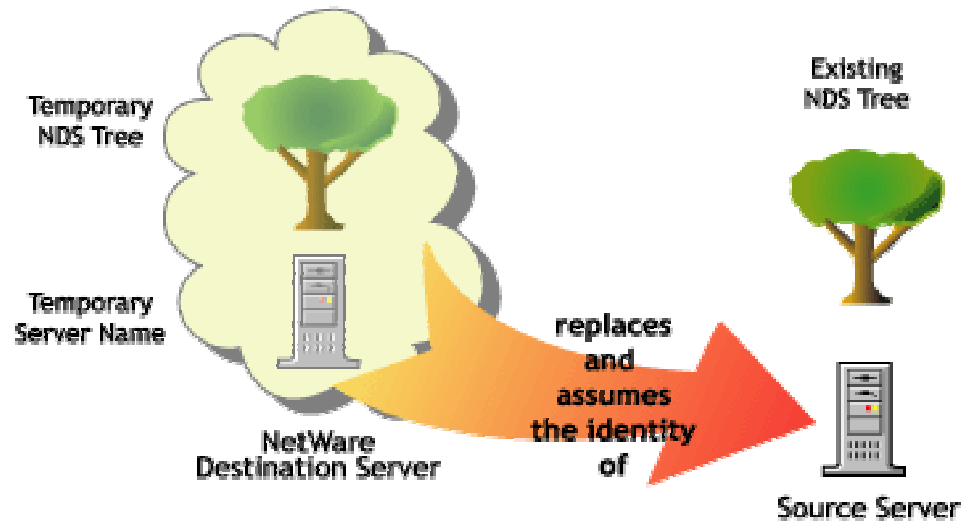
- eDirectory 8.7
- Java Virtual Machine (JVM)
- Novell International Cryptographic Infrastructure (NICI)
- Novell Licensing Services
- Novell Certificate Server 2.4.0
- NetWare Remote Manager
- Storage Management Services
- W0 (Security Domain Key)



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NetWare Migration Wizard

- Migrations supported
 - NW 3.12, NW 4.2, NW 5.0, NW 5.1 - to NW 5.1, NW 6, NW 6.5
 - NW 6 only to NW 6
 - NW 6.5 only to NW 6.5
- Volume and directory granularity and choice

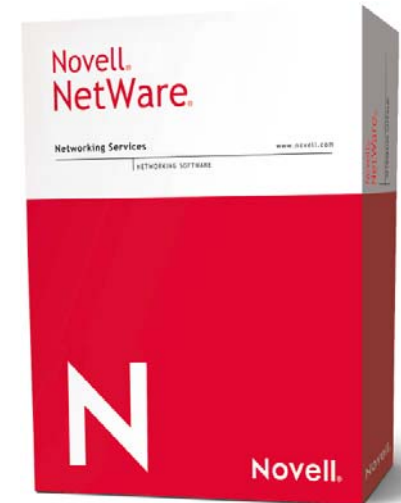


N Installing Custom NetWare Server

The Custom NetWare option gives you the freedom to install any combination of products you want.

After you select Custom NetWare and click Next, the Components page displays and you can choose which additional NetWare components to install.

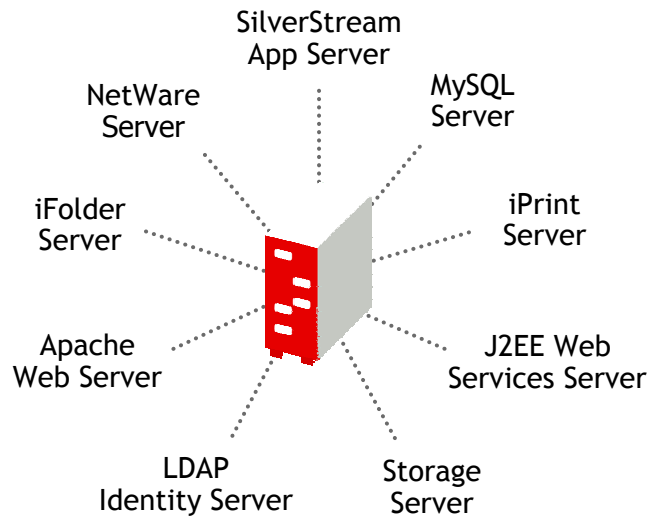
- To view a description of a component, place the cursor over the component name.



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Special Purpose Installations

Patterned Deployments



List of Possible Installations

- Basic NOS
- Pre-Migration Server
- Custom Server

- Novel AMP Server
- Nterprise Branch Office - Central Office Server
- DNS/DHCP Server
- iFolder Server
- iPrint Server
- LDAP Server
- exteNd J2EE web app server
- NetWare Backup Server
- Management Server
- Virtual Office Server
- Web Search Server
- Apache/Tomcat Server
- Network Attached Storage Server



Simplicity of pre-configured deployments, empowers you to offer better solutions with a click of a mouse

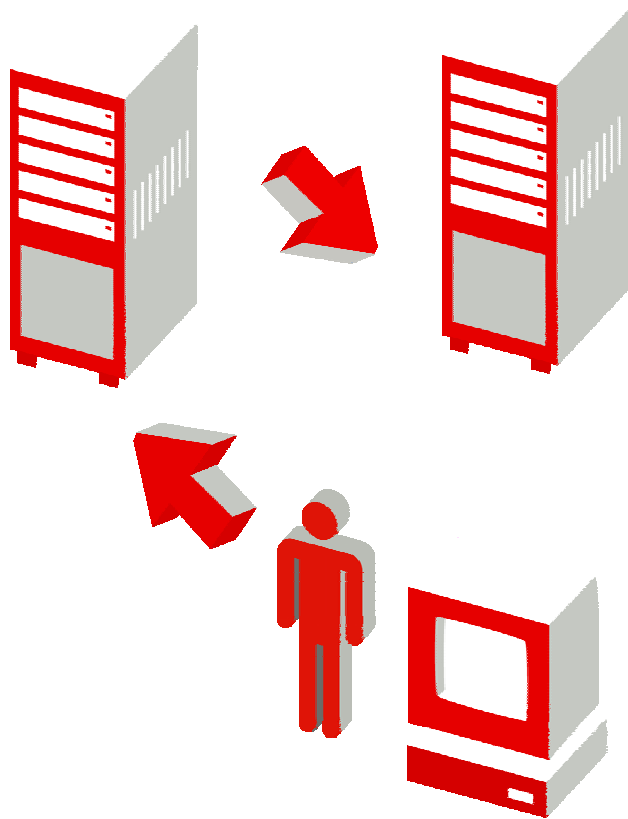
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Upgrading to NetWare 6.5

- **System Requirements** - Server to be upgraded must be running either:
 - NetWare 6 with Support Pack 2
 - NetWare 5.1 with Support Pack 5
- When you upgrade to NetWare 6.5, both the operating system and eDirectory are upgraded.
- Only NetWare products that are currently installed are upgraded.
 - Enterprise server is migrated to the Apache 2 Web server
 - During the upgrade, if the Enterprise Server is installed, information in the config files is migrated to the Apache 2 server's config files.
 - After the Apache 2 Web server is installed, the Enterprise server is automatically removed.
- Several components will be selected during an upgrade. These are the suggested default components. If any of these checked products are already installed on the server that will be upgraded, leaving the defaults checked will reinstall the products.
 - Unchecking the defaults does not uninstall the product.

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Upgrading Remotely



One of the new features in NetWare 6.5 is the ability to perform upgrades from a central location, launching a Server to Server upgrade - REMOTELY!!!

The process is a simple one that can be accomplished in two different ways:

- Remote Upgrade from iManager 2.0
- Remote Upgrade from Deployment Manager

Server Consolidation Tool 2.0

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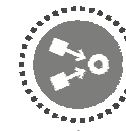
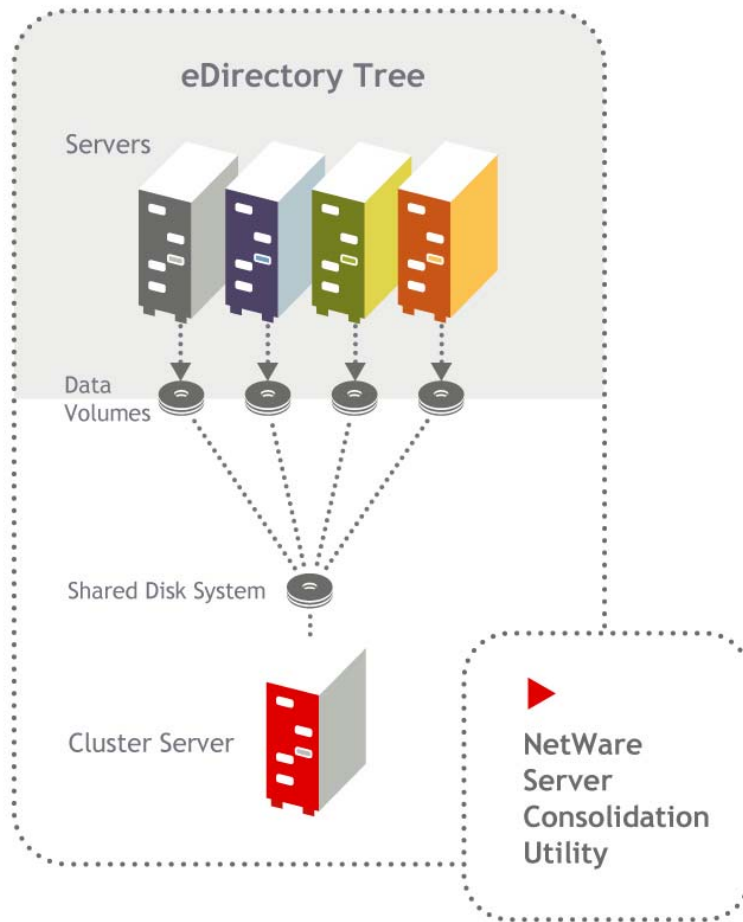
Server Consolidation, Volume Copy, Printer Consolidation

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Server Consolidation Utility 2.0



Consolidate files, data and other network resources



Reduce the number of software and hardware configurations you have to manage



Leverage SAN & other high availability solutions

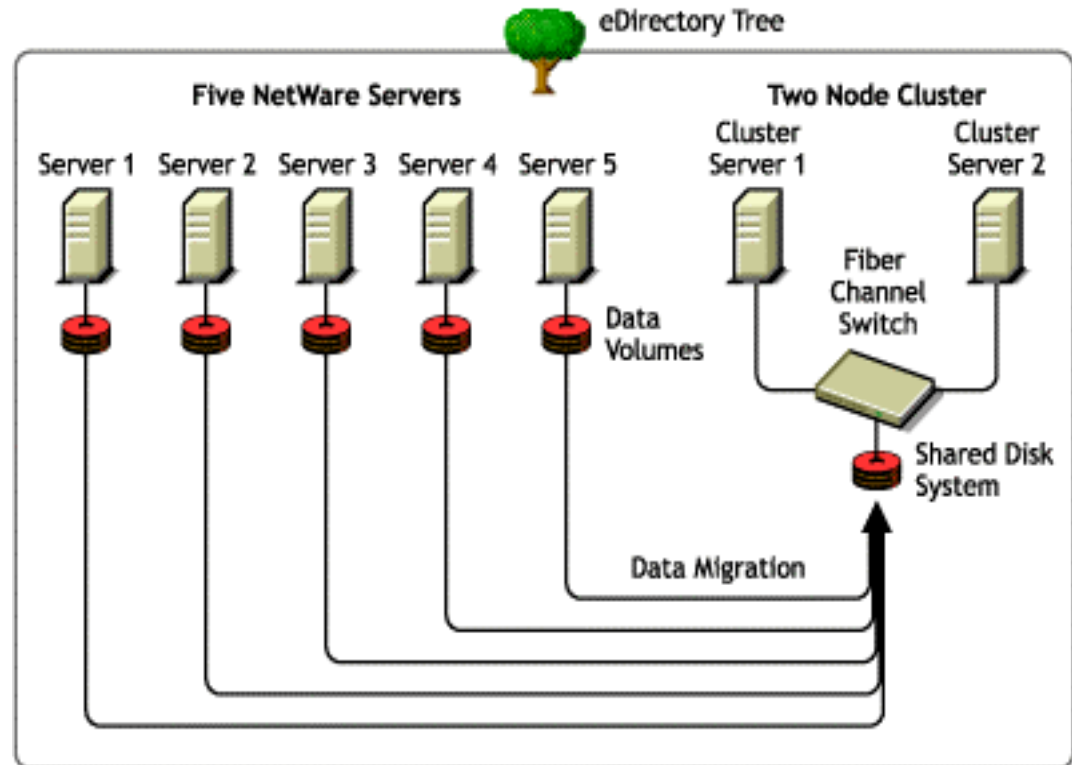
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Server Consolidation Utility 2.0

Suppose you have five existing NetWare servers and you recently purchased two multiprocessor servers and hardware to create a two-node cluster complete with a SAN.

You want to migrate the data from each of the five servers to the SAN.

Rather than manually moving all the data or backing up the data and restoring it to the SAN, you can use the Server Consolidation Utility, which automates the data migration process.



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Installing Server Consolidation Tool

The Server Consolidation Utility is located on the OS CD in the products\servcons directory. Expand the utility and install it on a workstation by double-clicking the nwsc.exe file.

Workstation Requirements

- Windows NT/2000/XP Pro with 50 MB of available disk space. The Server Consolidation Utility does not work with Windows XP Home Edition or Windows 98.
- Novell Client software installed and connected to the network.
- Supervisor rights on the source server and the destination server.
- (If copying data from NetWare 4) IPX protocol running on the Novell Client workstation.
- The source server, destination server, and client workstation running on the same LAN segment for best performance.

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Installing Server Consolidation Tool

Server Requirements

- Destination server running NetWare 5.1, 6, or 6.5
- Source server running NetWare 4.1, 4.2, 5, 5.1, 6, or 6.5. To copy data from NT Servers or NetWare 3 servers, use the NetWare Migration Wizard.
- (If copying data from NetWare 4.1 or 4.2) Each volume to be copied running long name space support. To add long name space support to a NetWare 4.1 or 4.2 volume, enter at the server console **LOAD LONG** and then **ADD NAME SPACE LONG TO *volumename*** Replace *volumename* with the name of the NetWare 4.2 volume.
- A current backup of eDirectory.

N How it Works!

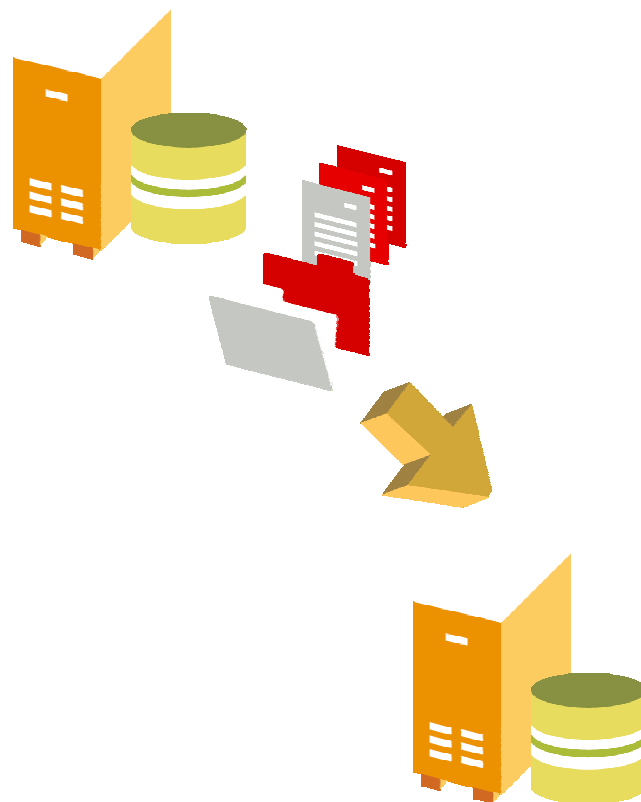
It is a fast Server-to-server file copy that does not go through a client

It copies data from all Novell file systems to all Novell file systems including Clusters (it copies either entire volumes or individual folders)

- Traditional to NSS or traditional
- Traditional and NSS to cluster volumes
- NSS to NSS or traditional

Data that is copied

- Attributes
- Inheritance filters
- Ownerships
- Trustees
- Size restrictions
- Anything that you can back up, we can copy



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Printer Consolidation

Printer consolidation

- Novell Distributed Printing Services™ (NDPS®)
- Any Printer Server Manager (PSM) to any other PSM
- Drag printer agent to new print manager
- All printer agent information moved (not copied)
- Can move multiple printers at once

Note:

- Doesn't migrate print jobs



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Features of Server Consolidation

Scheduling a Consolidation Project

Allows users to schedule projects to run when it is most convenient. This means that administrators can create a consolidation project during the day and schedule it to be run during the night when there is a smaller chance that files that are to be moved will be open and worked on.

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Server Consolidation Issues

Consolidation Issues - There are certain rules that you should be aware of when copying files or moving printer agents.

- Open files cannot be copied.
- Printer agents can be moved. Print queues cannot.
- Printer agents that are moved still use the same print broker.
- You can move printer agents back after initially moving them.
- Printer agents can only be consolidated within the same tree. They cannot be moved between different trees.
- Print Services Managers must be operational.
- You might need to manually load or reload the appropriate TSA.NLM

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NetWare 6.5 Administration

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NetWare 6.5 Administration

NetWare 6.5 Gives New Features and Functionality to

- Remote Manager
- iManager 2.0

NetWare 6.5 also adds enhanced NTP functionality



Remote Manager

Added Functionality

- IP Address Management
- Accessing GUI screens
- Group Monitoring



Remote Manager IP Address Management

NetWare Remote Manager

NW65DA1

User: (admin)

Diagnose Server

- [Health Monitor](#)
- [Profile / Debug](#)
- [Reports / Log Files](#)
- [NDPS Broker Health](#)
- [NDPS Manager Health](#)

Manage Server

- [Volumes](#)
- [Partition Disks](#)
- [Console Screens](#)
- [Connections](#)
- [Set Parameters](#)
- [Schedule Tasks](#)
- [Console Commands](#)
- [View Memory Config](#)
- [View Statistics](#)
- [Down / Restart](#)
- [Managed Server List](#)
- [IP Address Management](#)**
- [Licensing Information](#)
- [Configure Internetworking](#)

Manage Applications

- [List Modules](#)
- [Protected Memory](#)
- [System Resources](#)
- [NetWare Registry](#)
- [Protocol Information](#)

IP Address Management

Page Refresh Rate

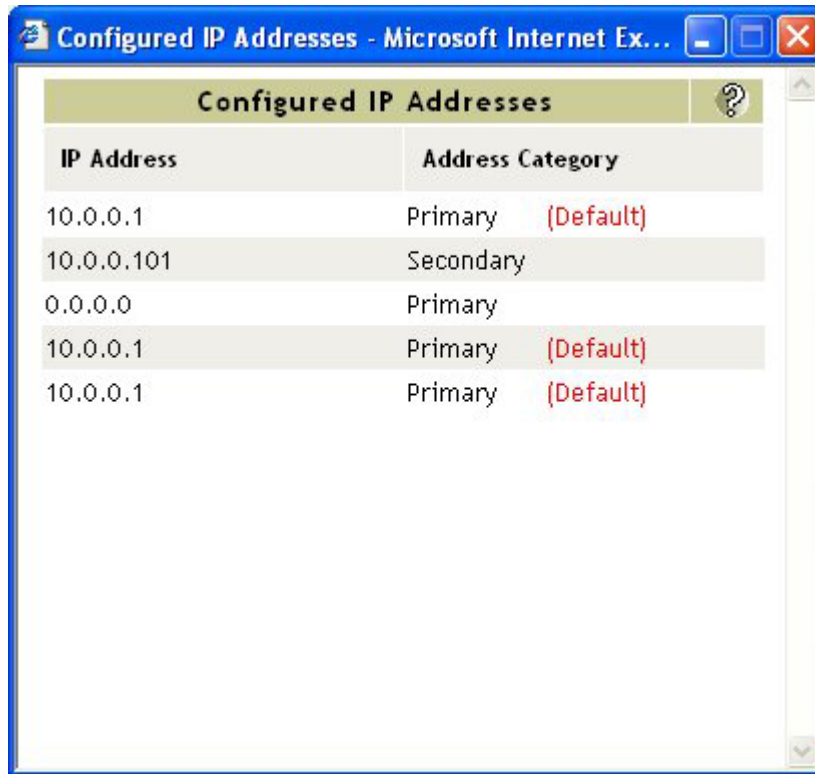
[Show Configured IP Addresses](#)

Configuration Summary				
Application	IP Address	Port	Protocol	Status
Admin Tomcat	0.0.0.0	9005	TCP	VALID
Admin Tomcat	0.0.0.0	9009	TCP	VALID
Apache 2.0	0.0.0.0	80	TCP	VALID
Apache2.0	0.0.0.0	443	TCP	VALID
ApacheAdmin	10.0.0.1	2211	TCP	VALID
ApacheAdmin	10.0.0.1	2200	TCP	VALID
DNS Server	10.0.0.1	53	TCP	VALID
DNS Server	10.0.0.1	53	UDP	VALID
exteNdAppServer	Default IP	83	TCP	VALID
exteNdAppServer	Default IP	83	TCP	VALID
exteNdAppServer	Default IP	446	TCP	VALID
exteNdAppServer	Default IP	446	TCP	VALID
exteNdAppServer	Default IP	446	TCP	VALID
exteNdAppServer	Default IP	446	TCP	VALID

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Remote Manager IP Address Management (cont.)

Show configured IP addresses:



The screenshot shows a web browser window with the title 'Configured IP Addresses - Microsoft Internet Ex...'. The main content is a table with the following data:

IP Address	Address Category
10.0.0.1	Primary (Default)
10.0.0.101	Secondary
0.0.0.0	Primary
10.0.0.1	Primary (Default)
10.0.0.1	Primary (Default)



Remote Manager IP Address Management

NetWare Remote Manager

NW65DA1

User: (admin)

Diagnose Server

- [Health Monitor](#)
- [Profile / Debug](#)
- [Reports / Log Files](#)
- [NDPS Broker Health](#)
- [NDPS Manager Health](#)

Manage Server

- [Volumes](#)
- [Partition Disks](#)
- [Console Screens](#)
- [Connections](#)
- [Set Parameters](#)
- [Schedule Tasks](#)
- [Console Commands](#)
- [View Memory Config](#)
- [View Statistics](#)
- [Down / Restart](#)
- [Message Center List](#)

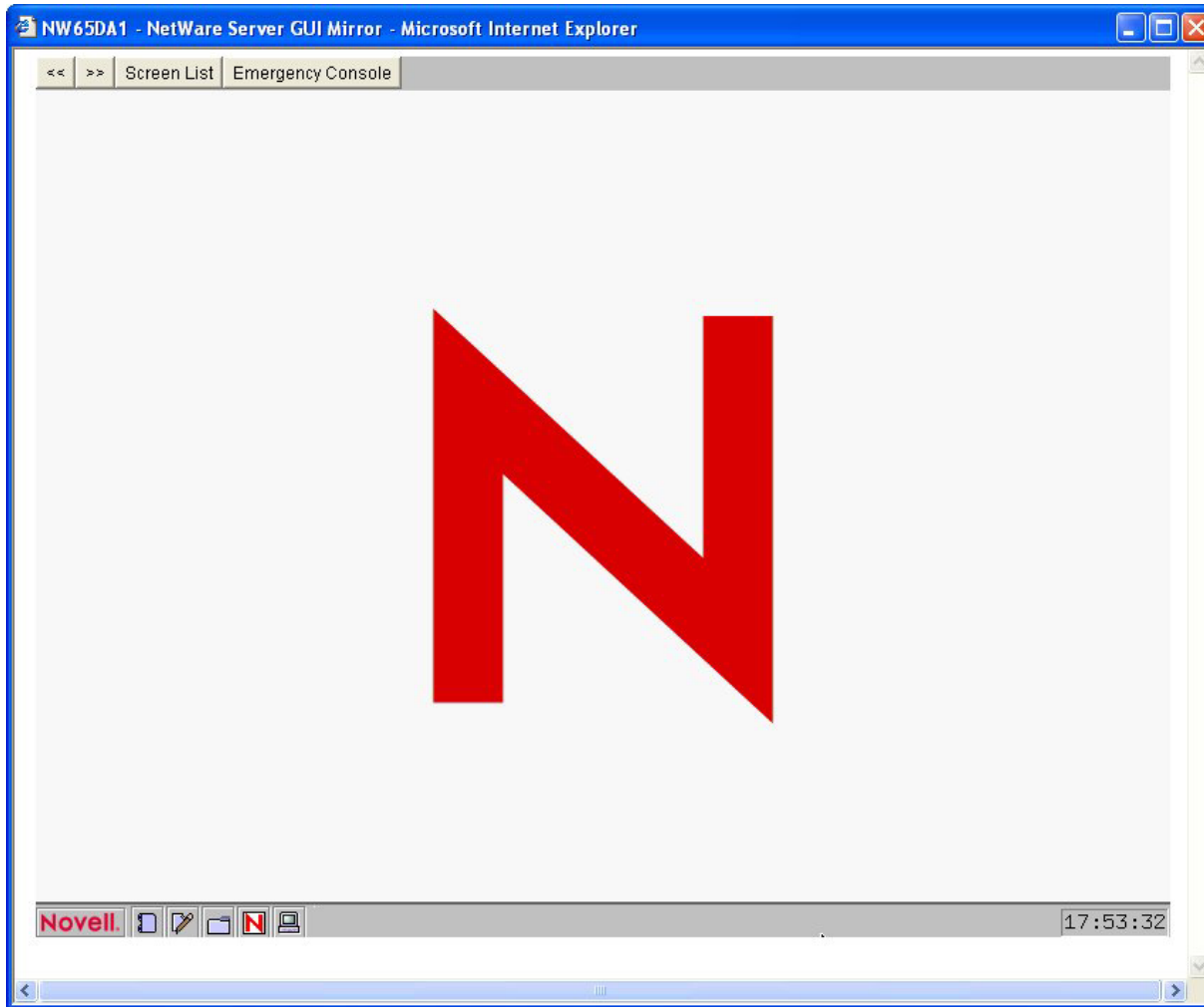
Configuration Change for Application Web Search 3.0.0

Application Name	Web Search 3.0.0
Application Description	NetWare Web Search Server 3.0.0
Address Type	IPv4
New IP Address/DNS	10.0.0.1
Address Category	10.0.0.1 10.0.0.101
Protocol	0.0.0.0
Port	10.0.0.1 10.0.0.1

Apply Cancel

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Remote Manager Accessing GUI Screens



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Remote Manager Group Monitoring


Use Group Operations


[Configure New Group](#)


[Select Group](#)

Group Monitoring Operations



 DA1 iPrint

 DA1 Ping

 DA1 Web Service Access

N iManager 2.0

Changes to the interface

- View Objects
- History tracking
- Other page

New Tasks

- Certificate Management
- Partition Management
- RBS Services



iManager 2.0 View Objects



Novell iManager

User: admin.DA.DA-TREE.

Browse Search

Context: DA

Name: *

Type: All Available Types

Apply

Objects: [Multiple Select](#)

- .. (up one level)
- Airports
- Corp
- Customers
- Partners
- Services
- Tomcat-Roles
- apchadm-Administrators
- admin
- iFolder_ServerAgent
- Novell+NetWare 6 Server Beta+650
- Apache Group
- apchadm-Registry
- iFolder_Settings
- iFolder_Idap01
- iFolder_server01

Novell iManager
Version 2.0

You are currently logged in as user **admin.DA** in the Novell eDirectory tree **DA-TREE**

Please select a task on the left.



iManager 2.0 History Tracking



Modify Object

Specify the object(s) to modify.

Select a single object | [Select multiple objects](#) | [Advanced Selection](#)




Object name:



OK

Cancel

History

-  [Feelias.GRU.AM.Airport](#)
-  [MRichards.ATL.AM.Airp](#)
-  [DA_Printer.Services.DA](#)

Clear Cancel



iManager 2.0 Other Page

Modify Object: DA1

General | Operator | Index Management | **Nsure Audit** | Replica | SNMP | WAN Traffic Manager | Security
Identification | See Also | **Other**

Valued Attributes

- dnipDNSServerVersion
- DS Revision
- emboxConfig
- GUID
- indexDefinition
- languageId
- LDAP Server
- modifiersName
- ndsPredicateStatsDN
- nfapCIFSAsync
- nfapCIFSAuthent
- nfapCIFSComment
- nfapCIFSDebug
- nfapCIFSDFS
- nfapCISFDialect
- nfapCIFSLoginScripts
- nfapCIFSNDUserContext
- nfapCFSOpLocks
- nfapCFSPPDCAddr
- nfapCFSPPDCName

Edit...

Delete

Unvalued Attributes

- Account Balance
- Allow Unlimited Credit
- Audit:File Link
- cACertificate
- Certificate Validity Interval
- Cross Certificate Pair
- DirXML-Associations
- DNIP:DHCP Server Reference
- DNIP:DNS Server Reference
- DNIP:LocatorPtr
- dnipDHCPVersion
- Full Name
- Host Device
- httpServerDN
- masvAuthorizedRange
- masvDefaultRange
- masvProposedLabel
- Messaging Server
- Minimum Account Balance
- NCS:Load Factor





iManager 2.0 Certificate Management

The screenshot displays the Novell iManager 2.0 web interface. At the top, the title bar reads "Novell iManager". Below it is a navigation bar with several icons. The user information shows "User: admin.DA.DA-TREE.". On the left is a vertical navigation menu with the following items: Roles and Tasks, Group Management, Help Desk Management, Install and Upgrade, iPrint Management, LDAP Management, License Management, NetStorage Administration, NetWare Product Usage, NFAU Management, NMAS Management, Novell Certificate Access, and Novell Certificate Server Management. Under "Novell Certificate Server Management", several links are listed: Create Certificate Authority, Create CRL Object, Create SAS service object, Create Server Certificate (highlighted), Create Trusted Root, Create Trusted Root Container, Create User Certificate, and Issue Certificate. The main content area is titled "Create Server Certificate Wizard" and contains a "Welcome to the Create Server Certificate Wizard" message with a key icon. Below the welcome message, there is a text prompt: "Select the server which will own the certificate." This is followed by two input fields: "Server:" with a dropdown arrow icon, and "Certificate nickname:" with a text box. At the bottom, there is a "Creation method" section with three radio button options: "Standard (Default parameters)", "Custom (User specifies parameters)", and "Import (Allows a PKCS12 file to provide the keys and certificates)".



iManager 2.0 Partition Management

Novell iManager

User: admin.DA.DA-TREE.

Roles and Tasks

- Help Desk Management
- Install and Upgrade
- iPrint Management
- LDAP Management
- License Management
- NetStorage Administration
- NetWare Product Usage
- NFAU Management
- NMAS Management
- Novell Certificate Access
- Novell Certificate Server Management
- Partition and Replica Management**
 - [Create Partition](#)
 - [Merge Partition](#)
 - [Move Partition](#)
 - [Replica View](#)**
 - [View Partition Information](#)
 - [Replica Wizard](#)

Replica View

Add Replica Refresh

Server name: NW65DA1.Services.DA

Partition	Type	Filter	State
[Root]	Master	Edit	on

Done



iManager 2.0 RBS Services

Novell iManager

User: admin.DA.DA-TREE.

Configure

- + Role Configuration
- + Task Configuration
- + Property Book Configuration
- + Collection Configuration
- + Module Configuration
- + Plug-in Setup and Install
- + Portal

Novell. iManager
Version 2.0

www.novell.com

You are currently logged in as user **admin.DA** in the Novell eDirectory tree **DA-TREE**

Please select a task on the left.



iManager 2.0 RBS Services (cont)

iManager Task Builder Wizard

Novell iManager

User: admin.DA.DA-TREE.

Configure

- Role Configuration
- Task Configuration
 - Create iManager Task**
 - [Create eGuide Task](#)
 - [Modify Role Assignment](#)
 - [Modify Description](#)
 - [Delete Task](#)
 - [Delete Property Book Page\(s\)](#)
- Property Book Configuration
- Collection Configuration
- Module Configuration
- Plug-in Setup and Install
- Portal

Create iManager Task

Step 1: Choose object type and platform

The Task Builder will take you through the necessary steps to build custom tasks and property pages. For more details and examples refer to Help.

Available classes:

Target device:

Plug-in type:

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NetWare 6.5 and NTP

- Before NetWare 6.5, NetWare used to use NTP-aware TIMESYNC.NLM
 - Limited in functionality, compared to RFC 1305
- NetWare 6.5 allows you to use either TIMESYNC.NLM or NTP
 - TIMESYNC is still the default
 - But NTP that ships with NetWare 6.5 is xntpd 3-5.93e fully compliant to RFC 1305

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Novell® Storage Services

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May 5, 2003



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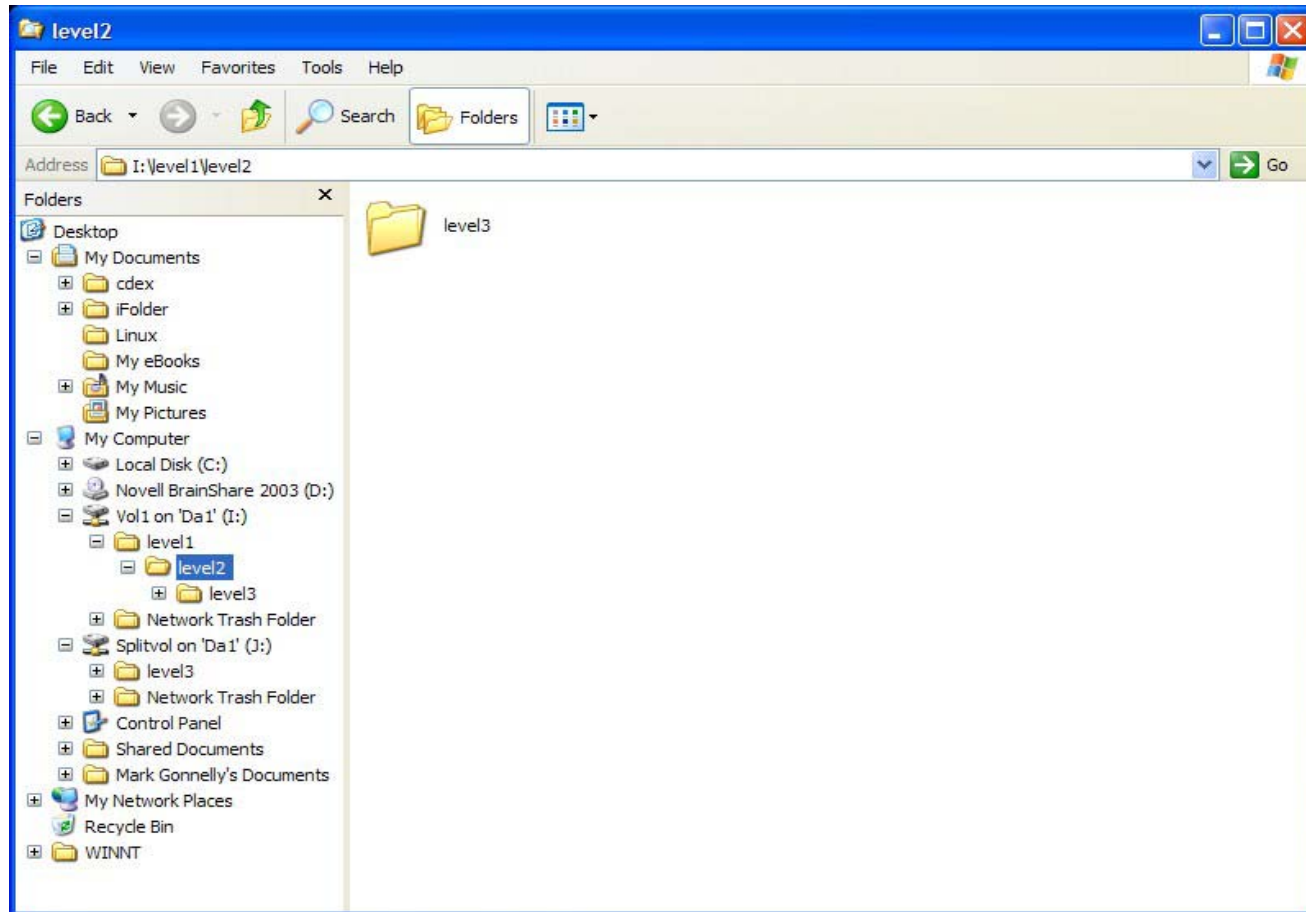
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What's New in Storage?

- Junctioning
- Versioning
- SnapShot
- Software RAID
- NSS Internal Changes
- iSCSI
- Clustering updates

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Junctioning



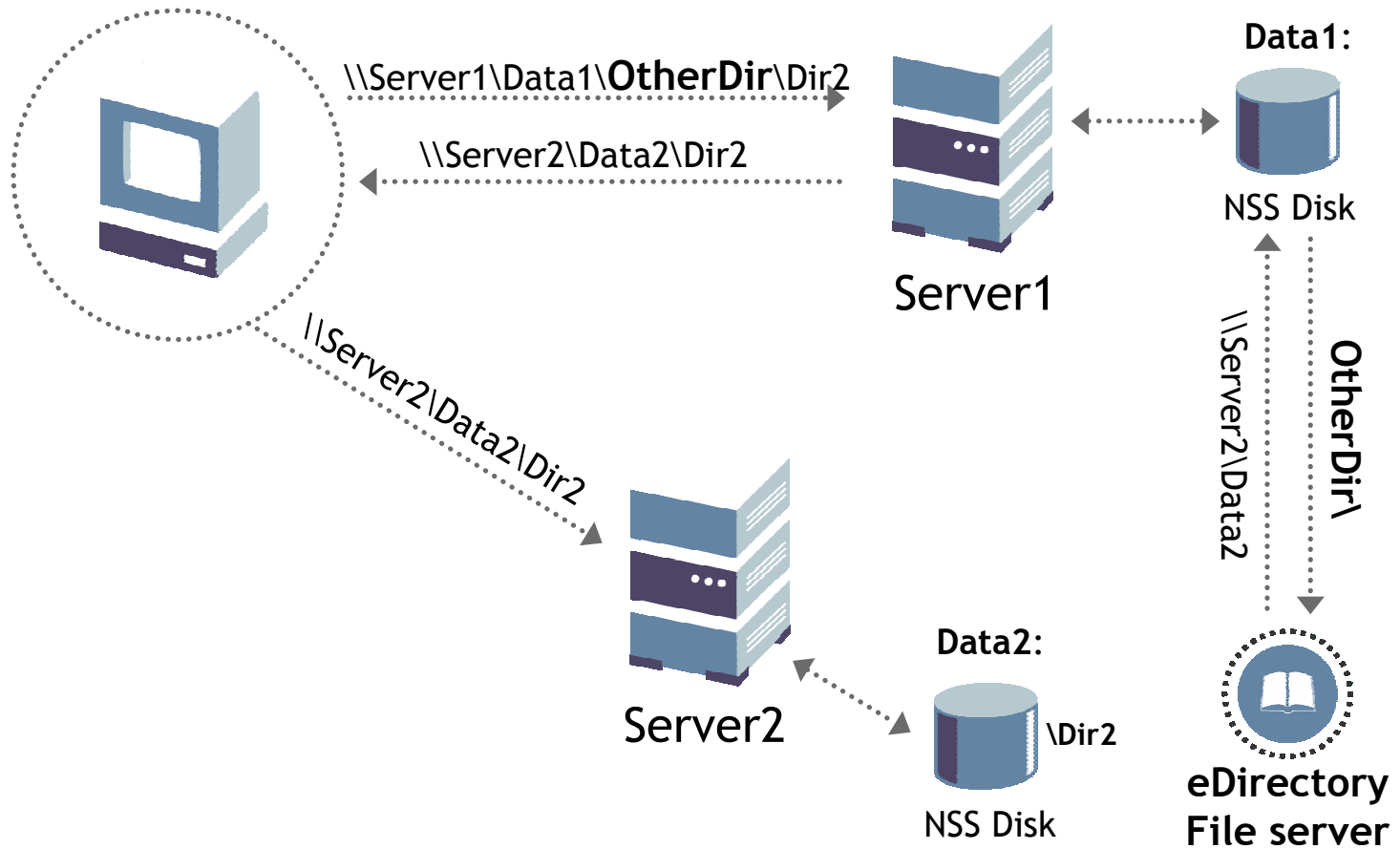
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Distributed File System Junctions (DFS)

- Similar to reparse points used on NTFS
- Looks like a directory to a user
- Junction can only point at volume root, not a subdirectory
- Must be NetWare 6 NSS volume (legacy NSS volume will work if last volume in path)
- Managed by iManager or ConsoleOne
- Junctions are cached for speed

N

DFS Junctions - How it works



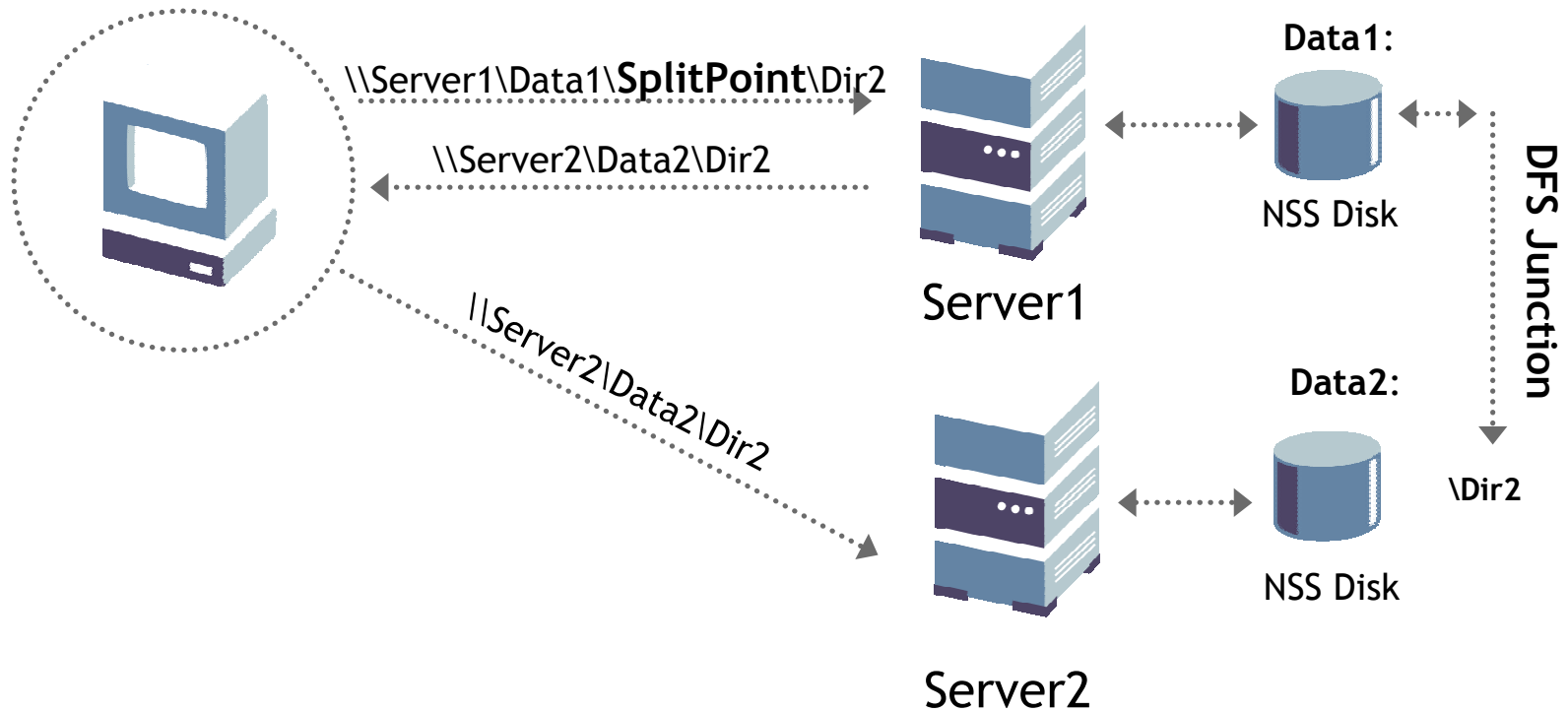
N

Volume Move and Split - DFS

- You can rename a volume on the same server
- You can split only NSS volumes but you can move both NSS and traditional.
- The destination volume must be an NSS volume.
- The destination volume must physically exist before you move data to it

N

What Happens when a volume is split?



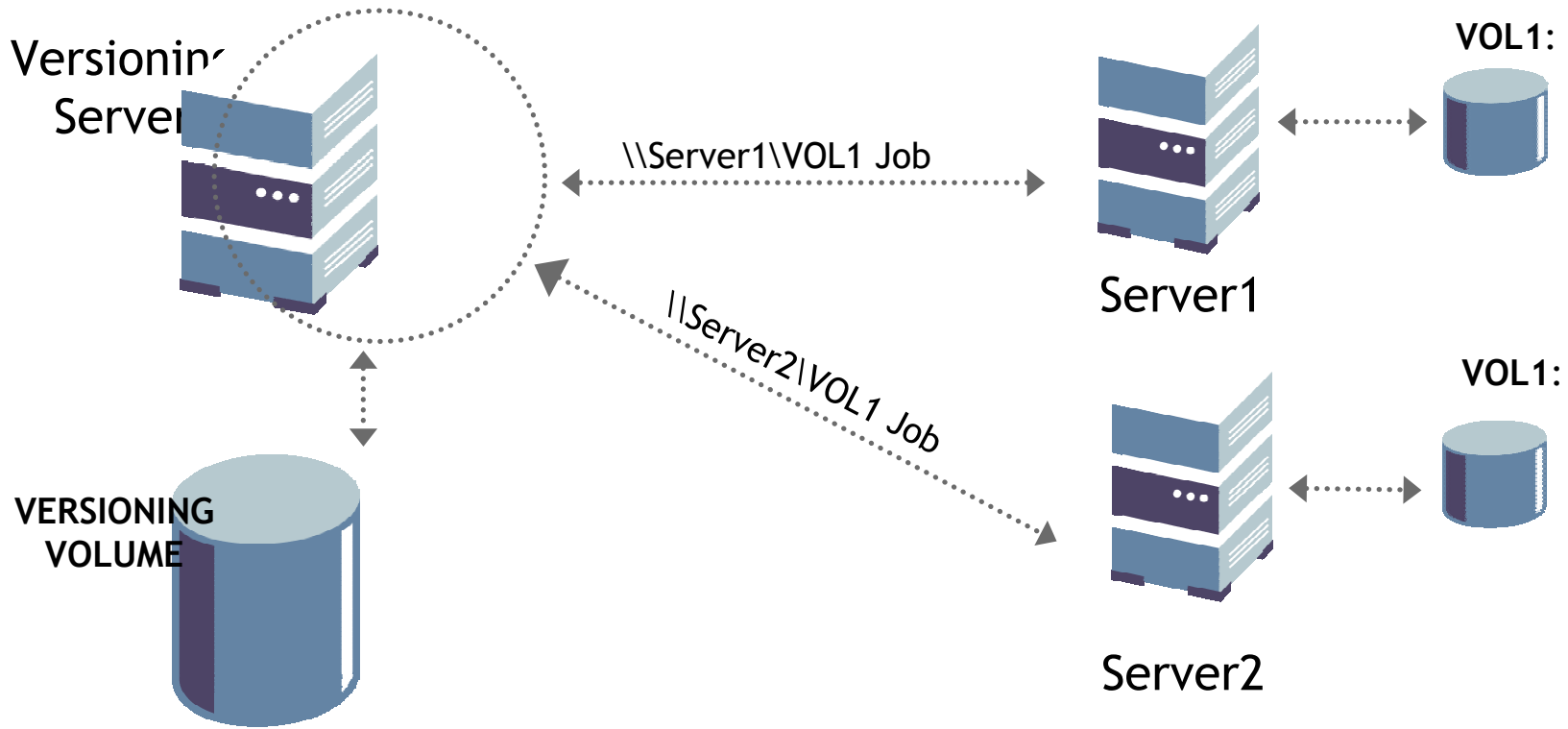
N

Versioning

- Provide a lower cost of management for IT departments by allowing users to self restore files.
- Provide a means to allow users to be more productive by allowing them to correct their own mistakes.

N

How Does Versioning Work?



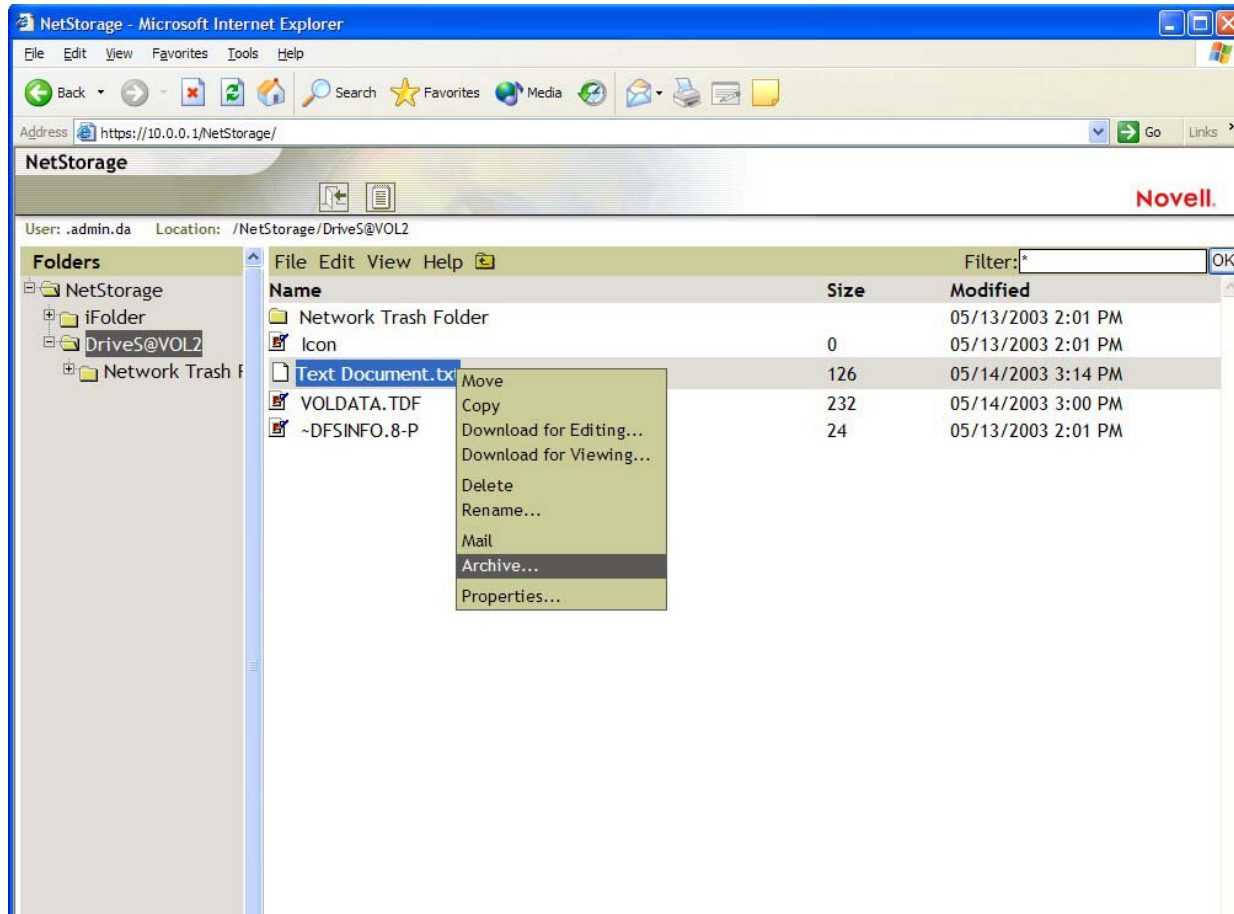
N

Versioning features

- Retains trustee and attribute information and enforcement
- Integration of file restore UI into NetStorage for cross platform support
- iManager management tools for setup and configuration
- Integration with Windows XP “View Previous Versions” property dialogues
- Integration with Virtual Office



NetStorage Archive





Previous Versions

The screenshot shows the NetStorage web interface in Microsoft Internet Explorer. The main window displays a file list for the location /NetStorage/DriveS@VOL2. A 'File Versions' dialog box is open, showing the 'Archive' for the file 'Text Document.txt' at the location 'VOL2/Text Document.txt'. The dialog lists three previous versions of the file with their respective sizes and modification dates.

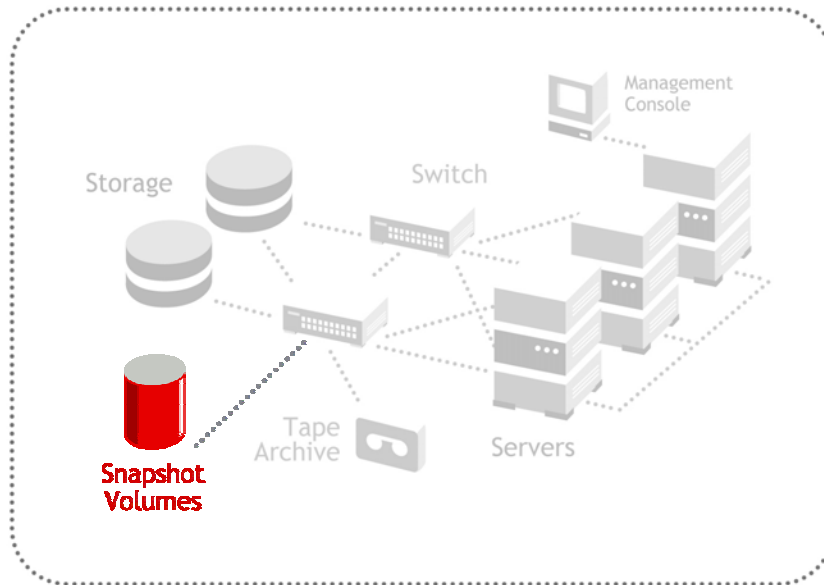
Name	Size	Modified
Network Trash Folder		05/13/2003 2:01 PM
Icon	0	05/13/2003 2:01 PM
Text Document.txt	126	05/14/2003 3:14 PM
VOLDATA.TDF	232	05/14/2003 3:00 PM
-DFSINFO.8-P	24	05/13/2003 2:01 PM

Name	Size	Archived
Text Document.txt	126	05/14/2003 3:14 PM
Text Document.txt	103	05/14/2003 3:13 PM
Text Document.txt	80	05/14/2003 2:49 PM

Restore to: [VOL2/Text Document.txt] [Restore] [Download] [View] [Close]

N

Snapshot backup



Anytime backup



Snapshot tools integrated into console



Snapshot is independent of hardware vendor, even mix of vendors.



View & select file versions

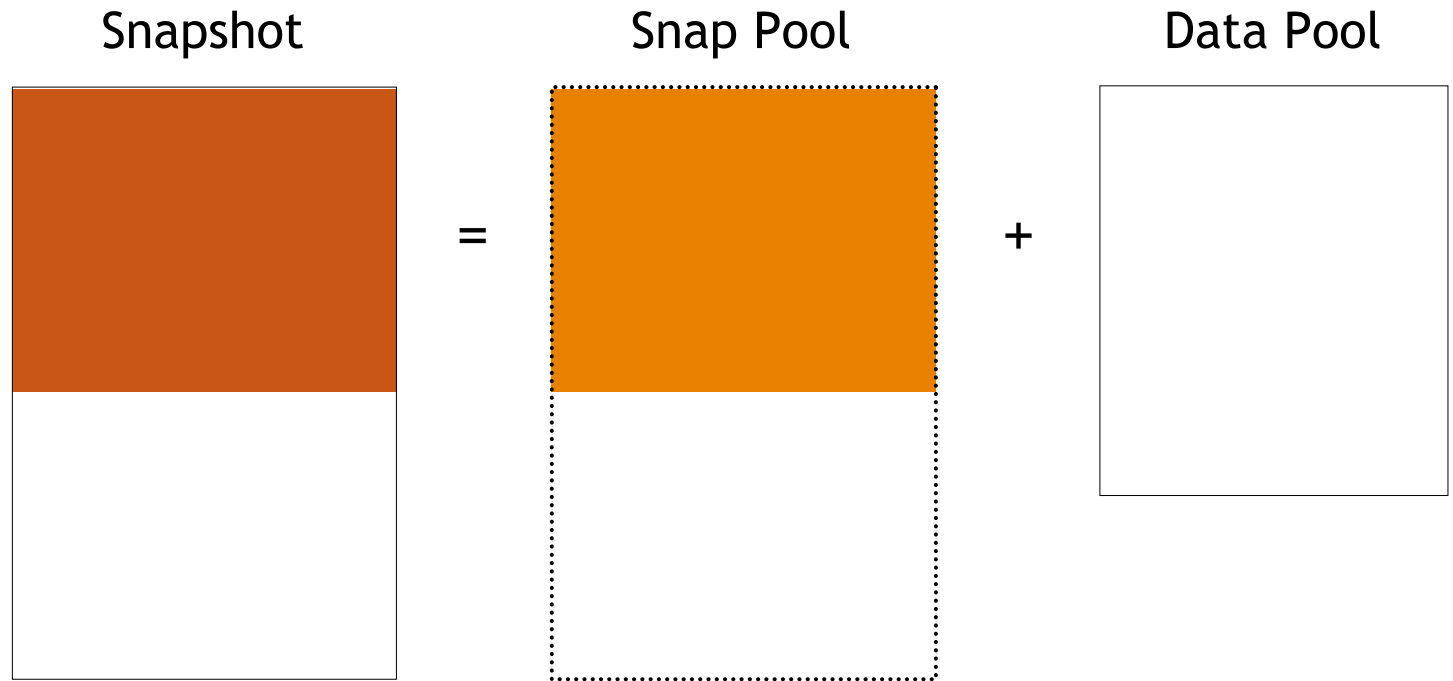


Snapshot Technology

- Creates a virtual image of the pool at that moment
- Not a full copy of the pool
 - Cannot be used to restore a deleted original pool
- Uses Copy On Write to save changes
- Main purpose is to allow backup of open files
- Can be used to restore deleted or corrupted files



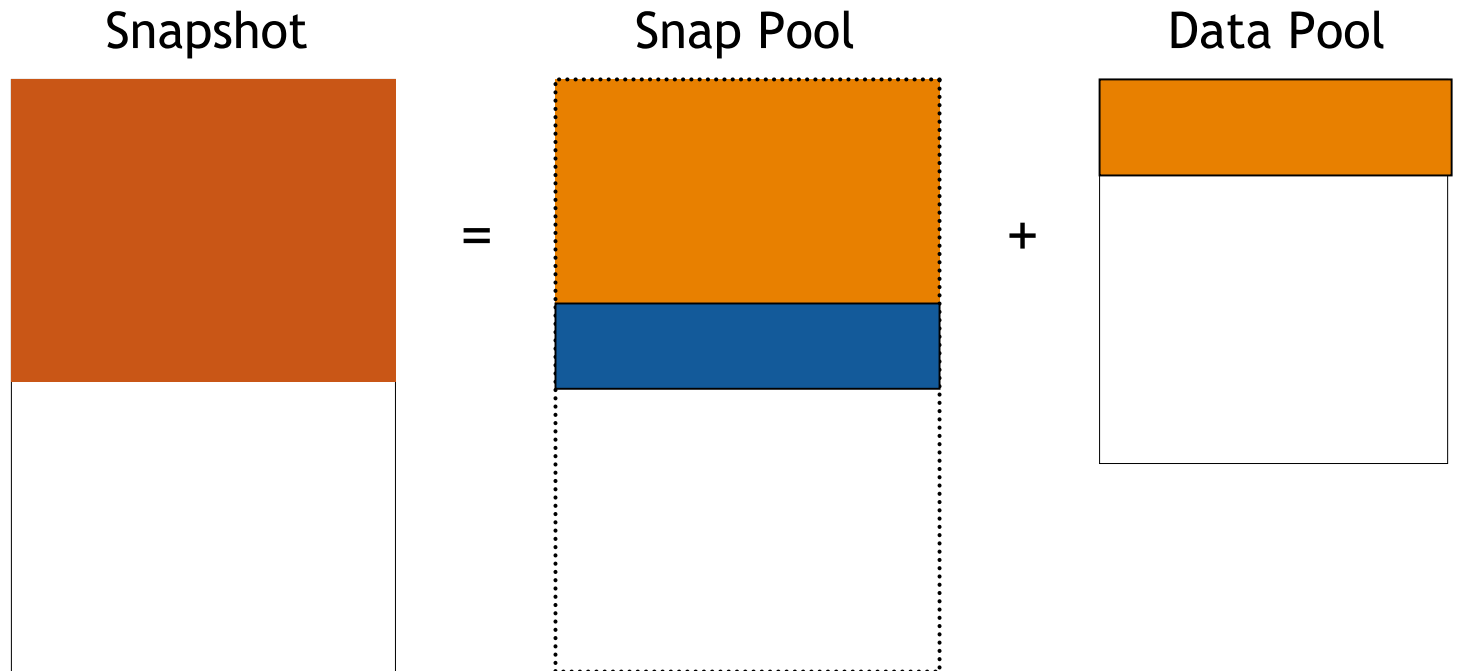
How snapshot works



At creation time, all the data for a Snapshot Pool comes from the Snap Pool. No data is actually stored in the Snapshot.



How snapshot works



Changes to the Snap Pool causes the old data to be copied to the Data Pool. The Snapshot Pool gets it's data from both.



GUI interface

The screenshot shows the Novell iManager web interface in Microsoft Internet Explorer. The browser address bar shows `http://151.155.139.120/nps/servlet/service?`. The page title is "Novell iManager" and the user is logged in as "admin.novell.SAS_620_TREE".

The left sidebar contains a "Roles and Tasks" menu with various categories like DHCP Management, DNS Management, etc. The main content area is titled "Storage Management > Pool > Snapshot".

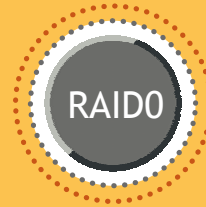
The "Pool Snapshot" dialog box is open, showing a list of snapshots for the selected pool "SNAPPOOL". The dialog includes a "Pools:" dropdown menu and a table of snapshots.

Actions	Snapshots:	Details:
New...	SNAPPOOL_S1	Snapshot name: SNAPPOOL_S2
Delete	SNAPPOOL_S2	Snapshot of Pool: SNAPPOOL
Rename...		Pool Size: 6.47 GB
Add to Pools		Stored on Pool: SNAPPOOL
Remove from Pools		State: Deactive
		Creation Date: Mar 10, 2003 11:14:04 AM
		Size: 19.53 MB

An "OK" button is visible at the bottom of the dialog box.

N

RAID 0



- Introduced in NetWare 6.0
- Allows up to 8 partitions into a RAID 0 device
- Greatly improves performance
- If one partition fails, the entire RAID device fails.
- No fault tolerance

N

RAID1 (Mirroring)



- Mirroring completely rewritten for Nakoma.
- Faster Remirroring - Saves blocks mirrored on the disk. Remirrors only necessary blocks after an Abend or power down.
- Add mirroring at any time - No need to set up mirror objects at partition creation time.
- Mirrored pools can be seen by all nodes in a cluster.
- Fully multi-processor enabled.
- Scalable - Same size memory for all size partitions.

N

Mirror restrictions



Up to 4 partitions can be mirrored together.

All partitions must be the same size.

N

RAID10 (Mirrored RAID0)



RAID 10 can be achieved by first creating 2 RAID 0 devices. Create partitions on these RAID devices and mirror them.

This achieves the speed of RAID 0 with the fault tolerance of RAID 1 (mirroring).

N

RAID 5



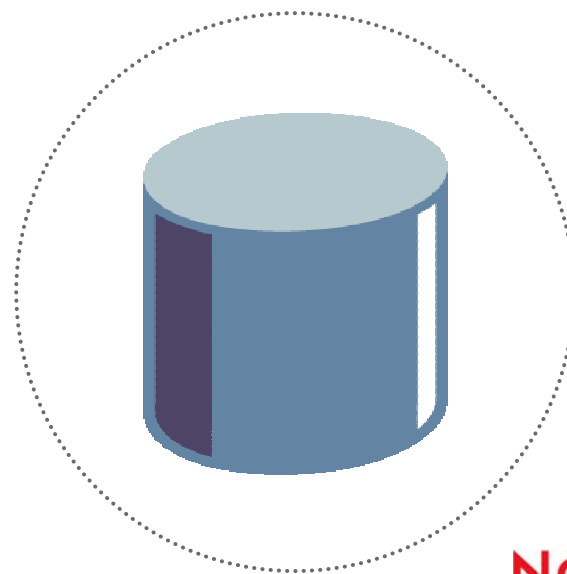
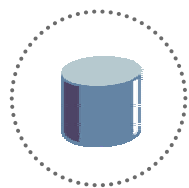
- Software RAID 5 is now part of NetWare 6.5.
- Parity is calculated across partitions to allow failure of a single partition without losing the pool.
- Capacity of RAID device = (Total Partitions - 1) * partition size.
- Maximum of 8 partitions in a single RAID device.
- Recommended stripe size is 64k



NSS Internal Enhancements

Terabyte File Size Support

- 64 bit file size pointers for files >4GB or 18,446,744,073,709,551,615
- Only NSS volumes are supported
- Supported platforms and protocols are:
 - Windows Client: 4.9+
 - NetWare: NW6 SP2+
 - CIFS: NW6.5+



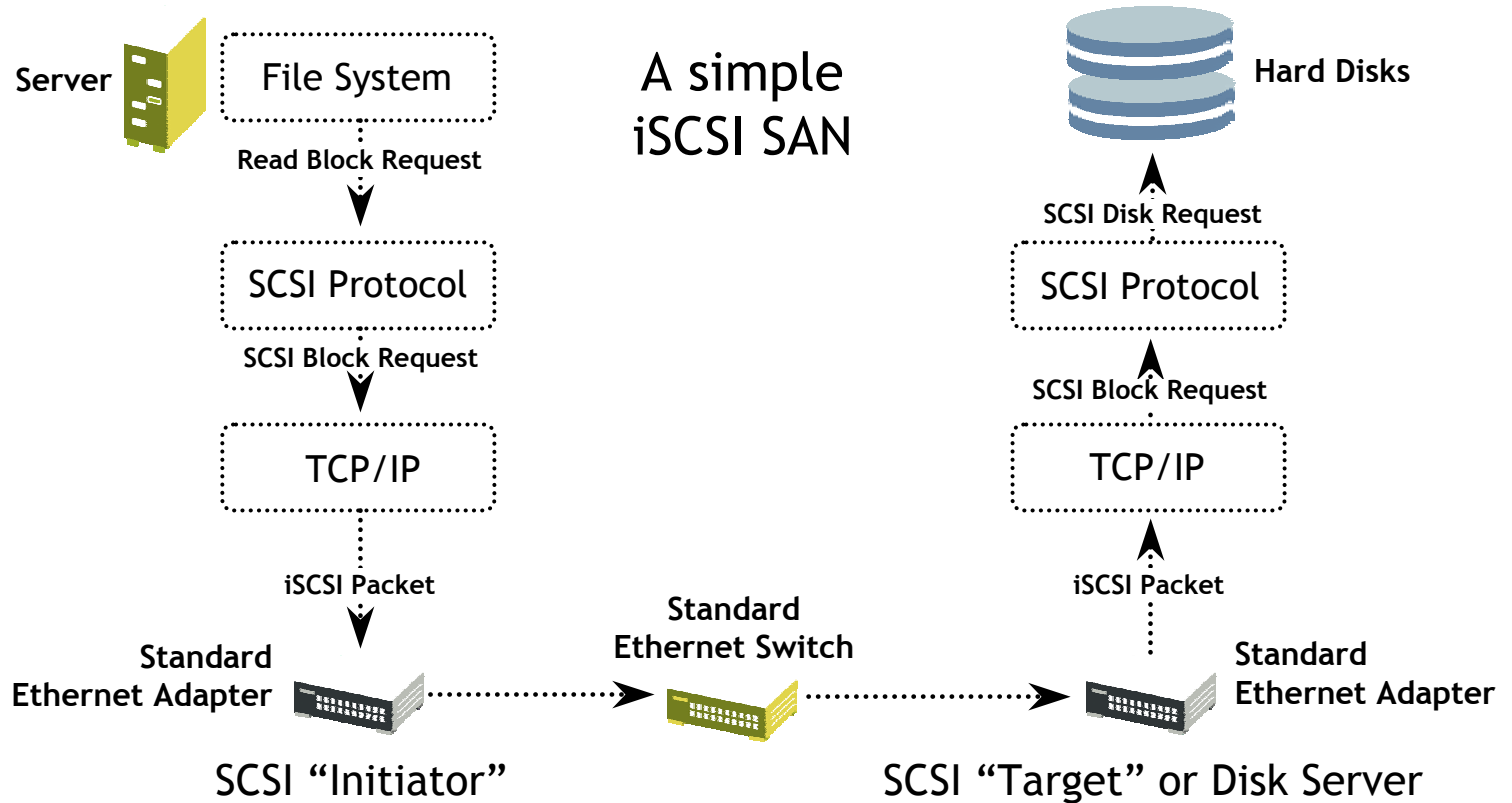
N iSCSI

iSCSI is a new internet standard which defines how industry standard SCSI (Small Computer Systems Interface) storage protocols are run over industry standard TCP/IP.

- V1.0 was ratified on February 11, 2003
 - This was Internet Draft version 20 of the specification:
 - “SCSI protocols are request/response application protocols with a common standardized architecture model and basic command set as well as standardized command sets for different device classes (disks, tapes, media-changers, etc.)”
 - “iSCSI is a transport protocol for SCSI that works on top of TCP/IP. The iSCSI protocol aims to be fully compliant with the standardized SCSI architectural model.”

N

iSCSI SAN Fundamentals



N

The Solution: An inexpensive SAN

iSCSI on Gigabit Ethernet Hardware is a fraction of the cost of a full Fibre Channel SAN solution.

- Estimates are 4 to 10 times less expensive for the same amount of storage
- Not as performant as Fibre Channel

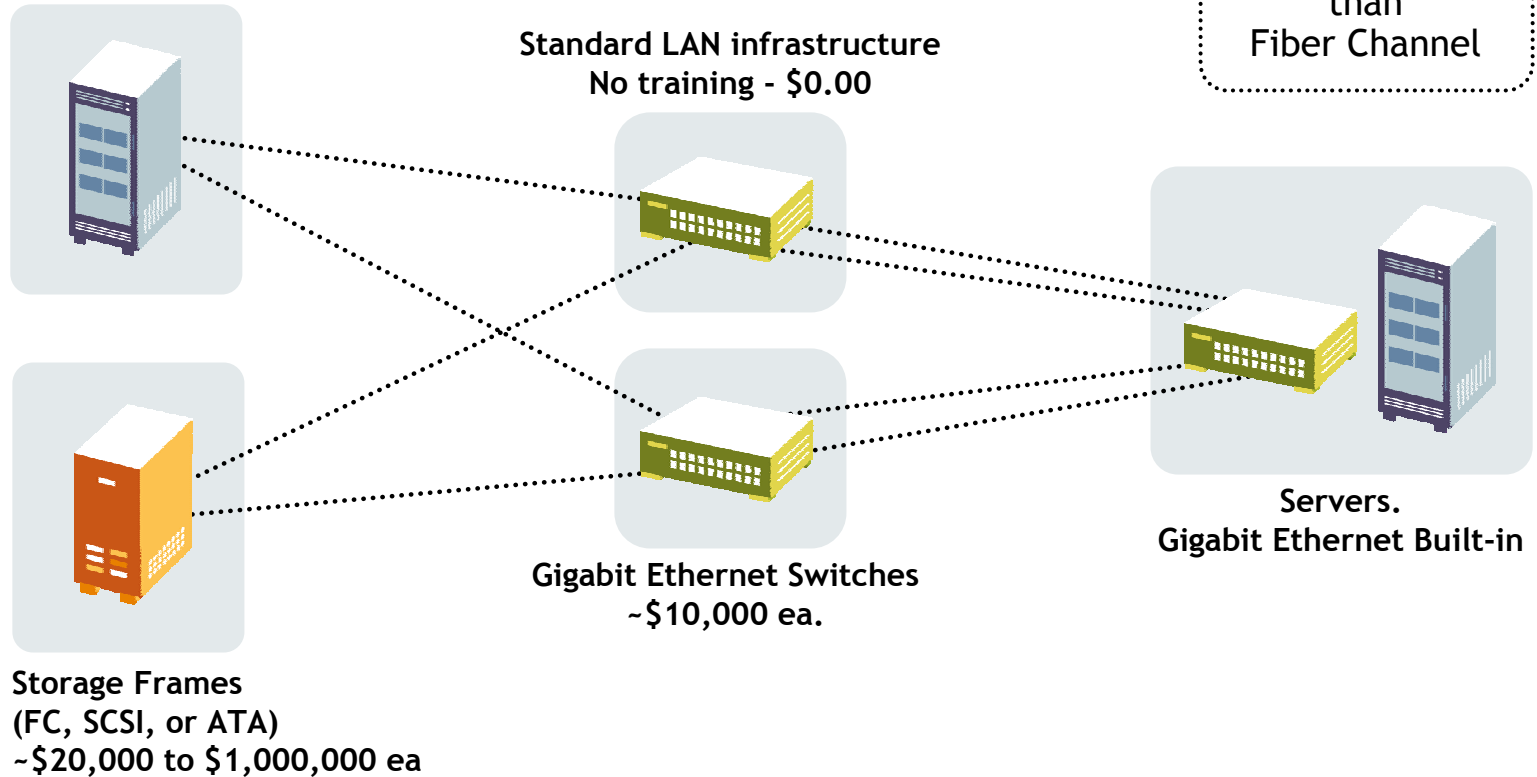
Use existing servers as your shared storage.

- DAS servers converted into iSCSI Storage Arrays.
 - No new hardware costs incurred.



iSCSI Value

SAN Deployment using iSCSI Solutions





Deployment Plans for iSCSI

Initiator Software stack

- Web download for NW5.1 and NW6
- Included in NetWare 6.5

Target Software stack

- Included in NetWare 6.5 only

Hardware iSCSI adapters

- Third Party Certification Program through DeveloperNet

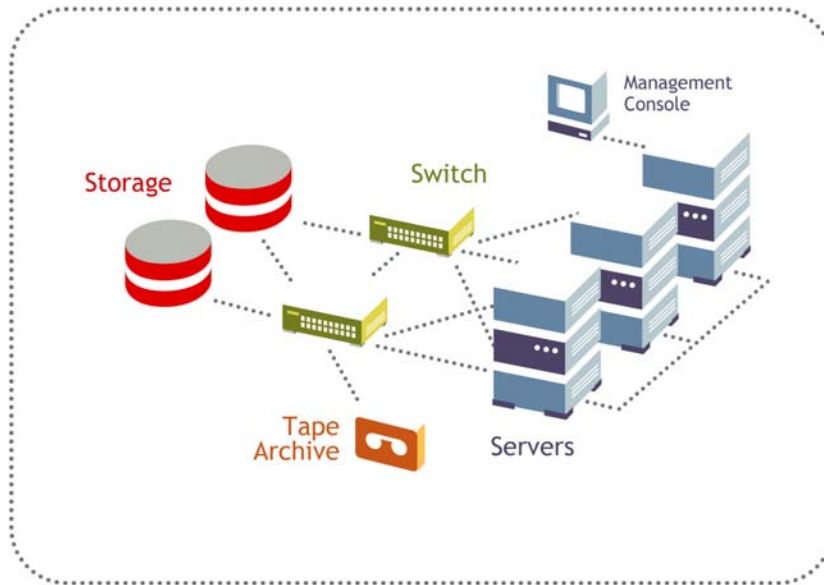
Initial release will support RFC

- First Beta in NW6.5 on Draft 08 (no longer moving forward)
- Open Beta in NW6.5 and download for NW5.1 & NW6 on RFC (Draft 20)
- Subsequent releases will add management framework
iSCSI HW adapters

for



Cluster SAN architecture



Up to 32 clustered servers



Read only shared volumes



Web service enabled-fail over



Quarantine of failing service



Maintenance mode



XML management

N

New features in NCS 1.7

Maintenance Mode

- new cluster command ("Cluster maintenance on/off") has been added to allow you to temporarily pause the exchange of LAN heartbeat packets in order to perform maintenance on external LAN devices without causing false node failure detection if that maintenance would cause heartbeat packets to be lost for more than the cluster heartbeat threshold.

IP Management

- NCS now refreshes the IP information every time a node joins the cluster, and has new handlers to catch IP events generated by the OS. The IP address of a server can now be changed transparently to NCS and its applications. However, because NCS has dependency on others, such as eDirectory, we still recommend a restart of the server.

N Other New Features

Cascade Failover Prevention

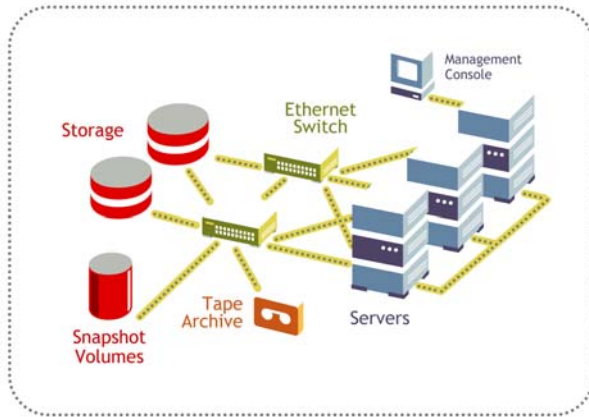
- NCS has mechanisms to detect bad resources that cause server abend, and put the resources in comatose in order to prevent a cascading failover (wherein a bad resource can failover and abend all nodes in its preferred nodes list)

A new `_ADMIN:\Manage_Cluster (XML)` virtual file interface that enables script based cluster management.

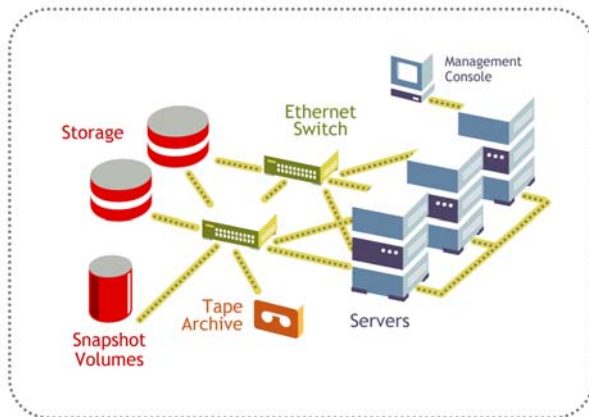
- It's now possible to write a script to migrate a cluster resource from one server to another, for example, in automated cluster volume backup by migrating volumes to the server that has a direct attached tape device, and then back again after the backup has completed.

N

Business continuance cluster



New York



London



Complete geo site failover



System available in seconds



Protect against disasters

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A

File Access NetWare 6.5

Advanced Technical Training

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NetWare 6.5 File Access

NetWare 6.5 Provides Enhancements to or support for:

- NFAP
- NCP and Client
- Authentication
- OpenSSH
- NetStorage and FTP
- NetDrive



NFAP Enhancements in NetWare 6.5

NFS, CIFS, AFP Integrated into the File system

- Installed by default
- NSS Only
 - Greater than 4GB files
 - Unicode/UTF-8 native, no translation
 - Locking semantics across all protocol



CIFS Enhancements in NetWare 6.5

CIFS Protocol Enhancements

- Opportunistic Locking
- MS Login Scripts (9x first)
- Greater than 4GB files
 - NT, 2K and XP only - 9x cannot support =>4GB
- Unicode Native
 - Fix internationalization issues
 - NSS volumes only



NFS Enhancements in NetWare 6.5

NFS Protocol Enhancements

- Lock Manager
 - Cross Protocol Locking
 - Advisory => mandatory in other protocols
 - Other protocols locks => Mandatory in NFS
- Greater than 4GB files
 - NFS v3 clients only, also supported in NetWare 6
- NetWare Rights Mode
 - In addition to Independent mode

N

NFS Enhancements in NetWare 6.5

Completely re-written from the ground up

- NFS v2 and v3 over UDP and TCP support
- Added scalability/performance (5X previous)
- Full SMP support
- Web Based Admin, dynamic parameter configuration
- NSS volumes only
- Status Logging support

Integrated UNIX User Management using
DeNIS



AFP Enhancements in NetWare 6.5

AFP Protocol Enhancements

- Version 3.1
 - Mac OS 10.2.x
 - Cluster Failover with automatic reconnect (first and only!)
 - File names longer than 31 characters
 - Alternate Authentication Methods
- Greater than 4GB files
 - Mac OS 10.x only
- Added scalability/performance
 - NSS volumes only



NCP Enhancements in NetWare 6.5

NCP Protocol Enhancements

- Greater than 4GB files
 - In NetWare 6 SP2 and beyond
- Novell Client 4.9 (NT/2000/XP) enhancements
 - Greater than 4GB file support
 - Distributed File System Junction support
 - New login methods
 - Hide the Novell Client GUI from initial boot up
 - LDAP contextless login



Novell Client Enhancements (cont)

- Novell Client 4.9 enhancements
 - Uninstall from Add/Remove Programs
 - Client download and install from a web page
 - Update Agent
 - Can update itself (checks for newer version)
- Novell Client 3.4 (95/98) enhancements
 - Uninstall from Add/Remove Programs
 - Client download and install from a web page
 - Update Agent

N

Novell Client Enhancements (cont)

Client Properties

The image shows the 'Novell Client Configuration' dialog box with the 'Client' tab selected. The 'Client Properties' section is active, displaying various settings for network drives and server connections. The 'First network drive' is set to 'F'. The 'Preferred server' is empty, and the 'Preferred tree' is 'ATT-IMAGING'. The 'Client version' is '4.90 BETA_331'. There are buttons for 'Service Pack Files' and 'Add', 'Remove', 'Replace' at the bottom of the tree view.

Tree	Name context
DA-TREE	da
ATT-IMAGING	image
EPDLAB	EPD
VM-TREE	novell



Novell Client Enhancements (cont)

Hiding the client

Novell Client Configuration

Initial Novell Login:
NMAS Authentication:
OEM Extended ASCII Password:
Default Policy Support:
Policy Path and Filename: WS\System32

Show on login:

<input type="checkbox"/> Location List	<input checked="" type="checkbox"/> Tree
<input checked="" type="checkbox"/> Advanced Button	<input checked="" type="checkbox"/> Tree Button
<input checked="" type="checkbox"/> Variables Button	<input checked="" type="checkbox"/> Context
<input type="checkbox"/> Clear Connections	<input checked="" type="checkbox"/> Context Button
<input checked="" type="checkbox"/> Workstation Only	<input type="checkbox"/> Force Logoff Button
<input checked="" type="checkbox"/> Suppress single sign-on for this Login	

Welcome screen:

Bitmap Filename: N\WELCOME.BMP
Caption: Begin Login

OK Cancel

LDAP Contextless login

Novell Client Configuration

Enable LDAP Treeless Login:
Enable LDAP Contextless Login:
Enable LDAP Context Search Scope:

Trees:

da-tree	Add
	Delete
	Properties...

Servers:

da1	Add
	Delete
	Properties...
	Up
	Down

Settings...

OK Cancel



Authentication in NetWare 6.5

Authentication enhancements

- All protocols move to a universal password
 - Novell client
 - Other services like LDAP
 - New password becomes authoritative in compatibility scenarios
- Password Management in NW6.5
 - Expiration
 - Restrictions
 - All native client capabilities supported
- Backwards compatible to NFAP Simple Password

N

Authentication in NetWare 6.5

Authentication enhancements - cont.

- New client will automatically convert NDS RSA password to the new universal password for all services.
- Still have to initialize first time if the new client is not used, and Simple Password was never set in NW6 and NW5.1.



Open SSH

The OpenSSH suite integrated with NetWare 6.5 includes:

- The ssh program that replaces rlogin and telnet
- scp (replaces rcp)
- sftp (replaces ftp)
- sshd (server side of the package)
- Other basic utilities like ssh-keygen or sftp-server

SSH-compliant client tested with NetWare 6.5

- PuTTY
- Red Hat Linux open SSH clients



NetStorage and FTP Enhancements in NetWare 6.5

NetStorage

- Locking semantics added
- Cluster aware NetStorage
- Through Apache 2.0
- With NetStorage installed on one NetWare 6.5 server, users can potentially have access to any NetWare 5 or later server

FTP

- Dynamic Configuration updates
- Security Extensions (RFC 2228)
- Support for Unix like permissions
- Multiple Anonymous users
- Cluster related Enhancements
- Web based administration



NetDrive Enhancements in NetWare 6.5

NetDrive now supports iFolder 2.1

Use NetDrive to access an iFolder server:

- On a thin-client workstation that does not have adequate resources to manage local copies of all your iFolder files.
- In a shared computing environment, such as a university, where multiple users access their personal iFolder accounts from the same computer.
- If you have multiple iFolder accounts and want to use more than one account at the same time from the same workstation.

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A

NetWare 6.5 DirXML

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N

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N What is it?

DirXML lets applications, databases and directories share data dynamically.



Problem



HR



ERP



Database



Operating System



Mail



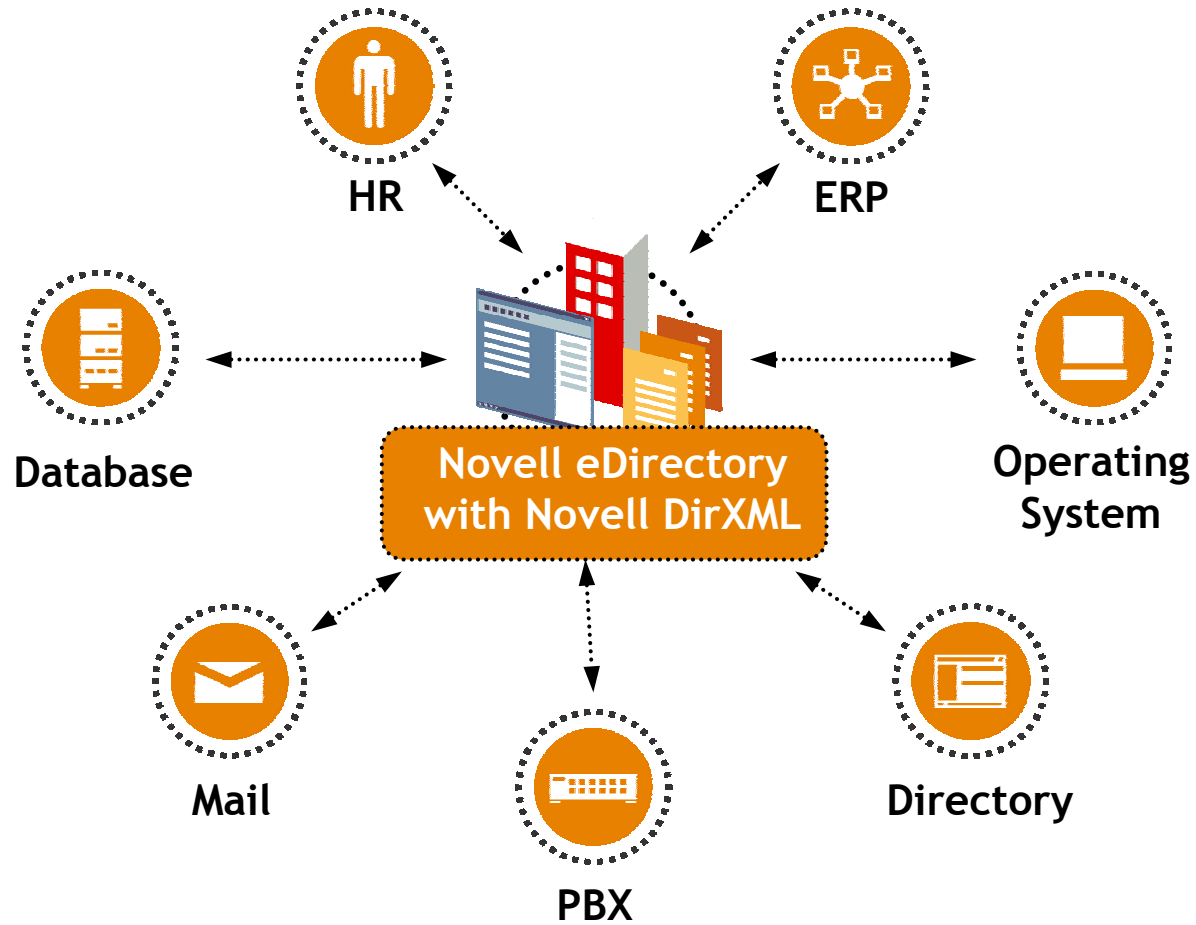
PBX



Directory



Solution





Included with NW 6.5

DirXML engine

Drivers

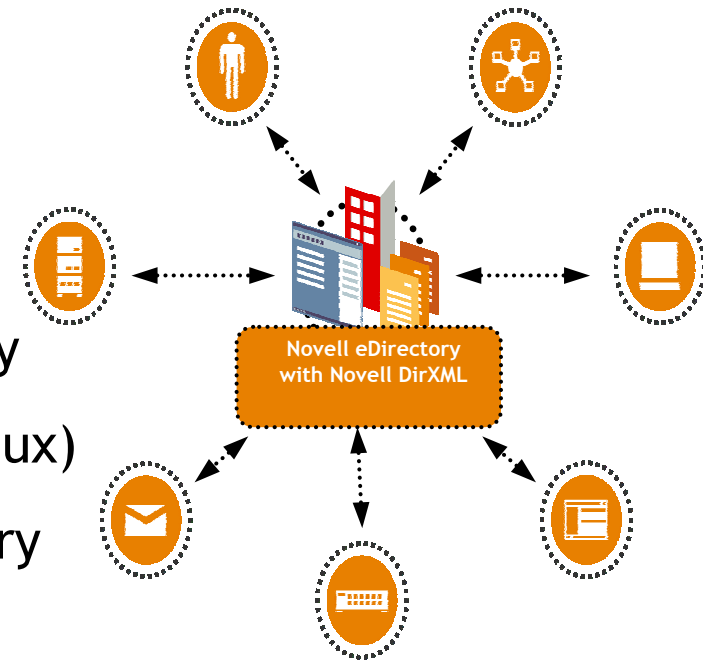
- eDir to eDir
- NT
- AD
- Evaluation Drivers - 90 day trial

Password synchronization

N

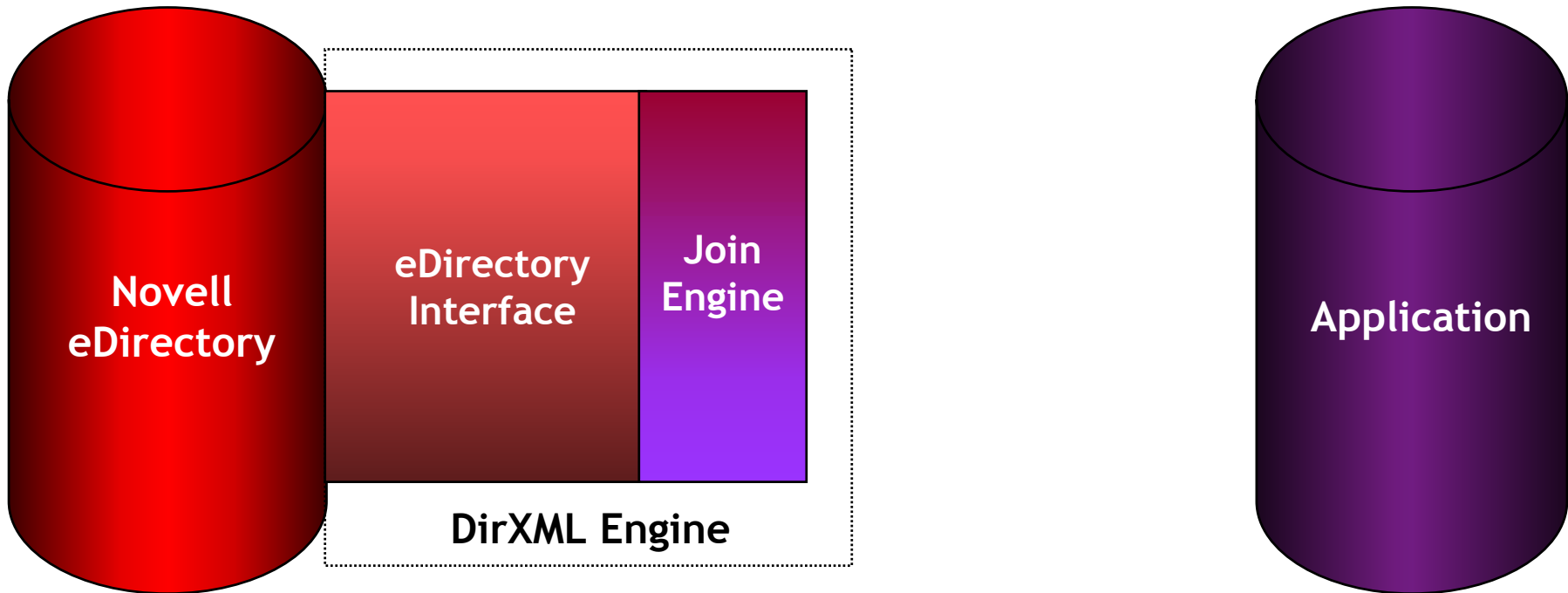
The Hub

1. Requires eDirectory
2. Install on any platform with eDirectory
NetWare, Windows, Unix (Solaris, Linux)
3. DirXML engine is installed on eDirectory
 - Extends schema



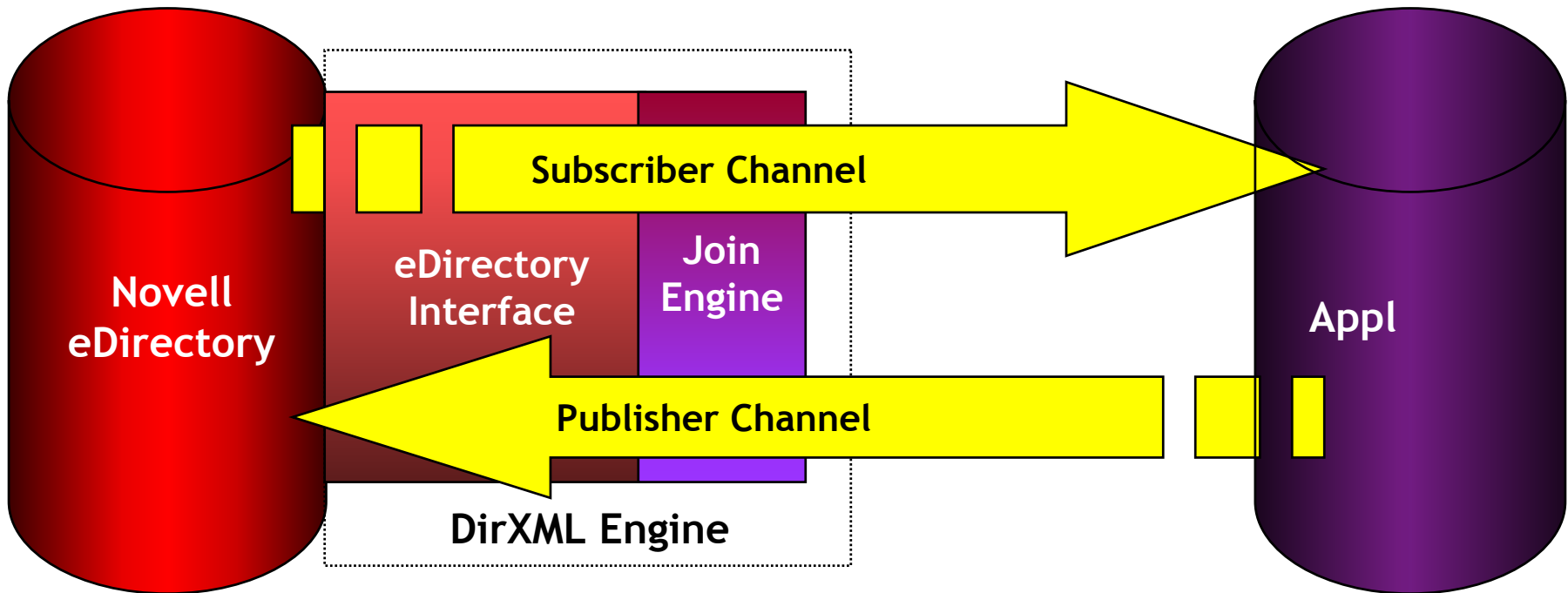


DirXML Engine



N

Channels



N

Authoritative Data Sources



Problem

Some applications are authorities over certain data and should be the sole publishers of that data

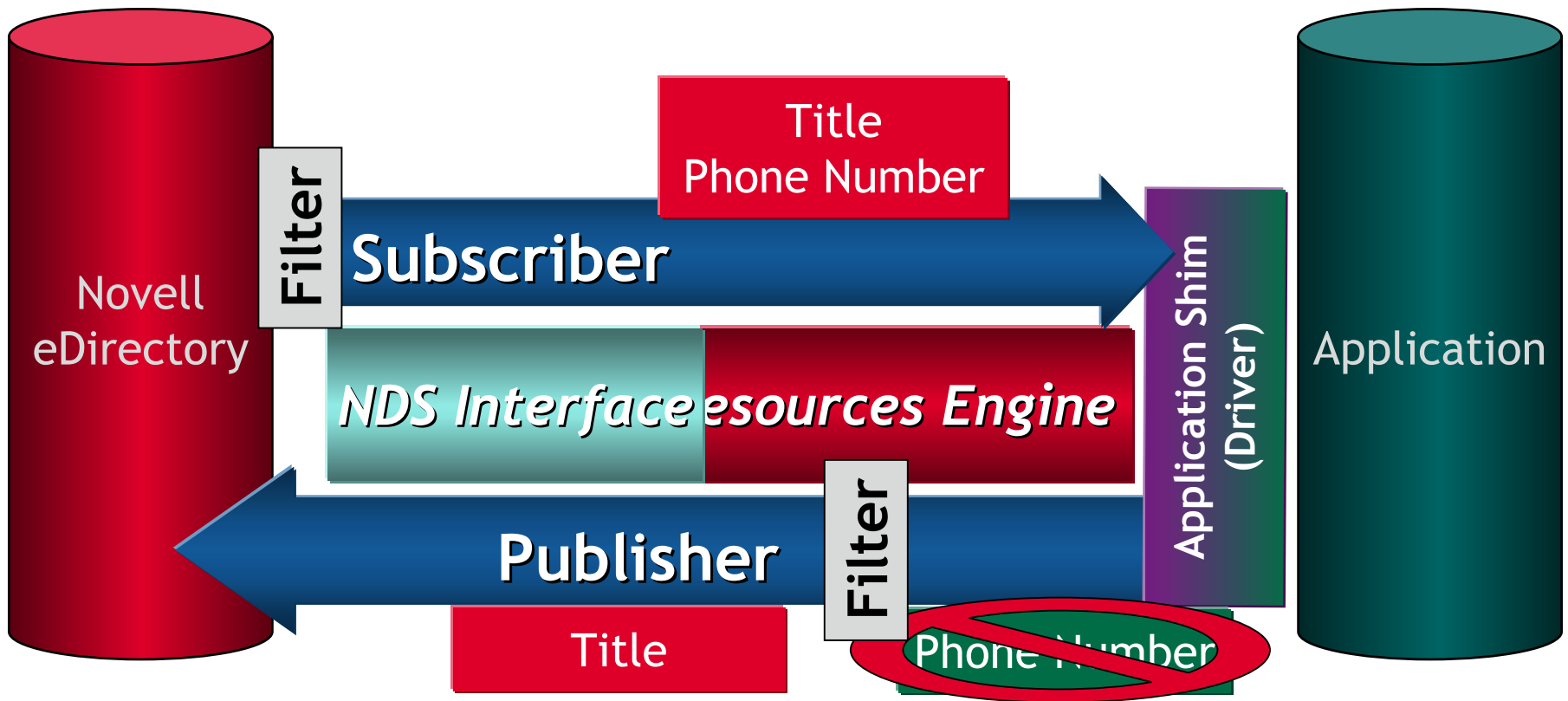


Solution

Publisher and subscriber filters control the flow of changes to the data

N

Filters





Summary

Data-sharing service

- Provides bi-directional data flow between eDirectory™ and enterprise applications
- Administrator determines the data to be shared

Matches existing business processes

- Runs on the following Novell eDirectory supported platforms (NetWare®, Win2K, NT, Solaris, Linux)
- Manages the data relationships between the connected applications
- Requires no changes to existing applications

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A

Virtual Office & Virtual Teams

www.novell.com

N

Novell.

N Changing trends...

Users are becoming more mobile

- Telecommuting
- Working at a branch office
- Internet kiosk in a public place
- 35% of PCs sold into business organizations are laptops – IDC

N ...changing needs

Users want access to the same information wherever they are:

- Email
- Project files
- Team resources
- Bookmarks



Virtual Office Value in a Nutshell

Empowering the common end-user

1

Access

- Global, integrated, familiar

2

Sharing

- Dynamic, interactive, productive

3

Self-Help

- User-driven, user-friendly, intuitive

N

Convergence of Internet Capabilities

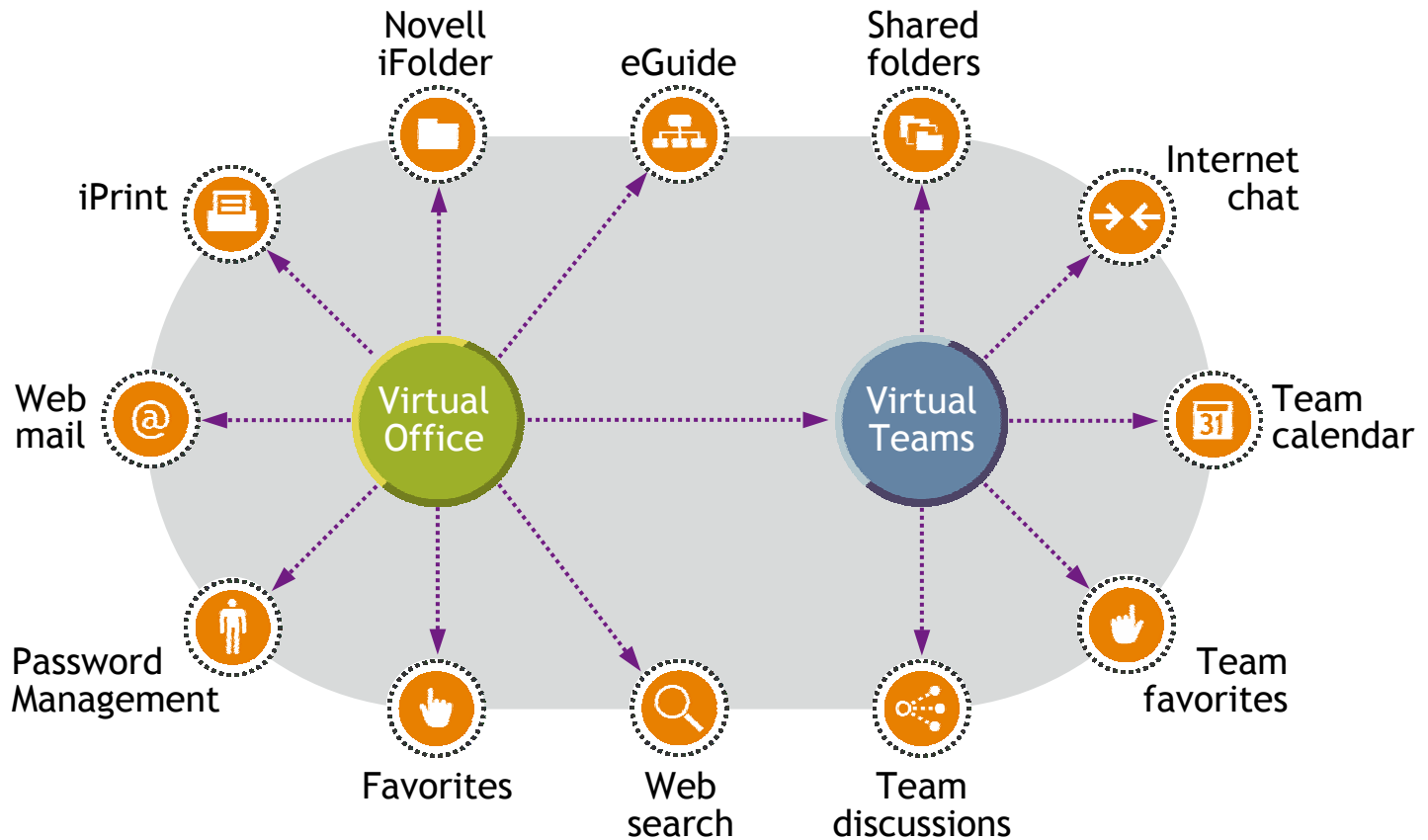
Virtual Office (VO) integrates elements from emerging Internet technologies into an out-of-the-box experience.

VO helps businesses implement pressing strategies around these maturing Internet capabilities.





Services overview in Virtual Office





Virtual Office

Virtual Office - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <https://10.0.0.13/nps/servlet/portalservice?NPService=AuthenticationService&NPServiceDataType=PortalData> Go Links

Virtual Office Logout help

FCSTUDENT

Home

My Virtual Teams:
FCTEAM

Virtual Team Tasks:
Create Virtual Team
Join Virtual Team
Manage Virtual Team

eGuide

Last Name: Search

First Name: [Advanced Search](#)

Email

Folder: OK Compose

Delete	From	Subject
<input type="checkbox"/>	user3	Re: Looking for the Iron
<input type="checkbox"/>	user2	Re: Just a reminder...

Total Messages:2

My Bookmarks

Novell

virtual Office News

Welcome to Virtual Office

Virtual Office allows administrators to bring iFolder, iPrint, eGuide, eMail, and personal bookmark services together in a personalized portal for corporate users.

Virtual Office also allows corporate users to create virtual teams to collaborate with others and share information within the corporate environment. To create a new team, click [Create Virtual Team](#) in the left navigation area. View the shared information of a virtual team by selecting a team from the left navigation frame.

N

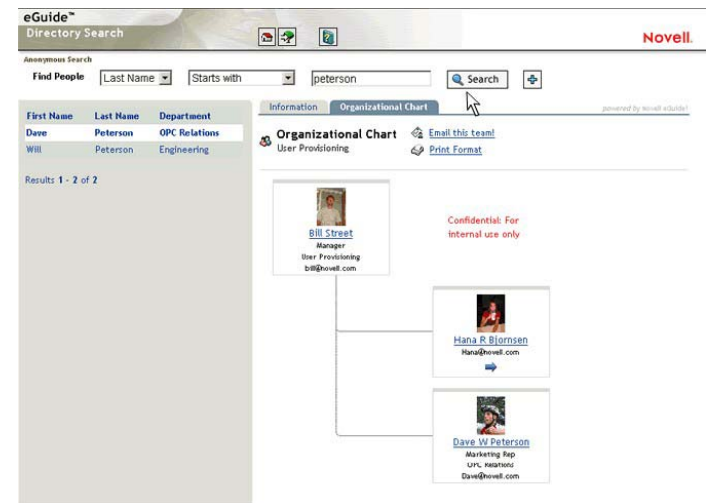
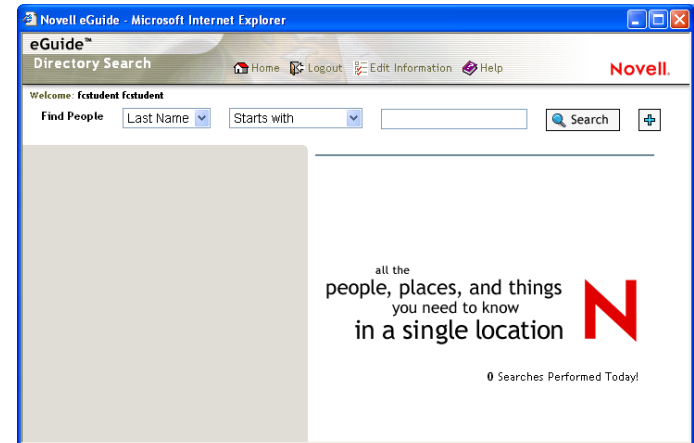
Virtual Office components

- eGuide
- iFolder
- iPrint
- Web mail
- Password Management
- Favorites
- Web search

N

eGuide Summary

- eDirectory leveraged searchable directory
- Uses ldap for quick searches
- Organizational chart capabilities with pictures



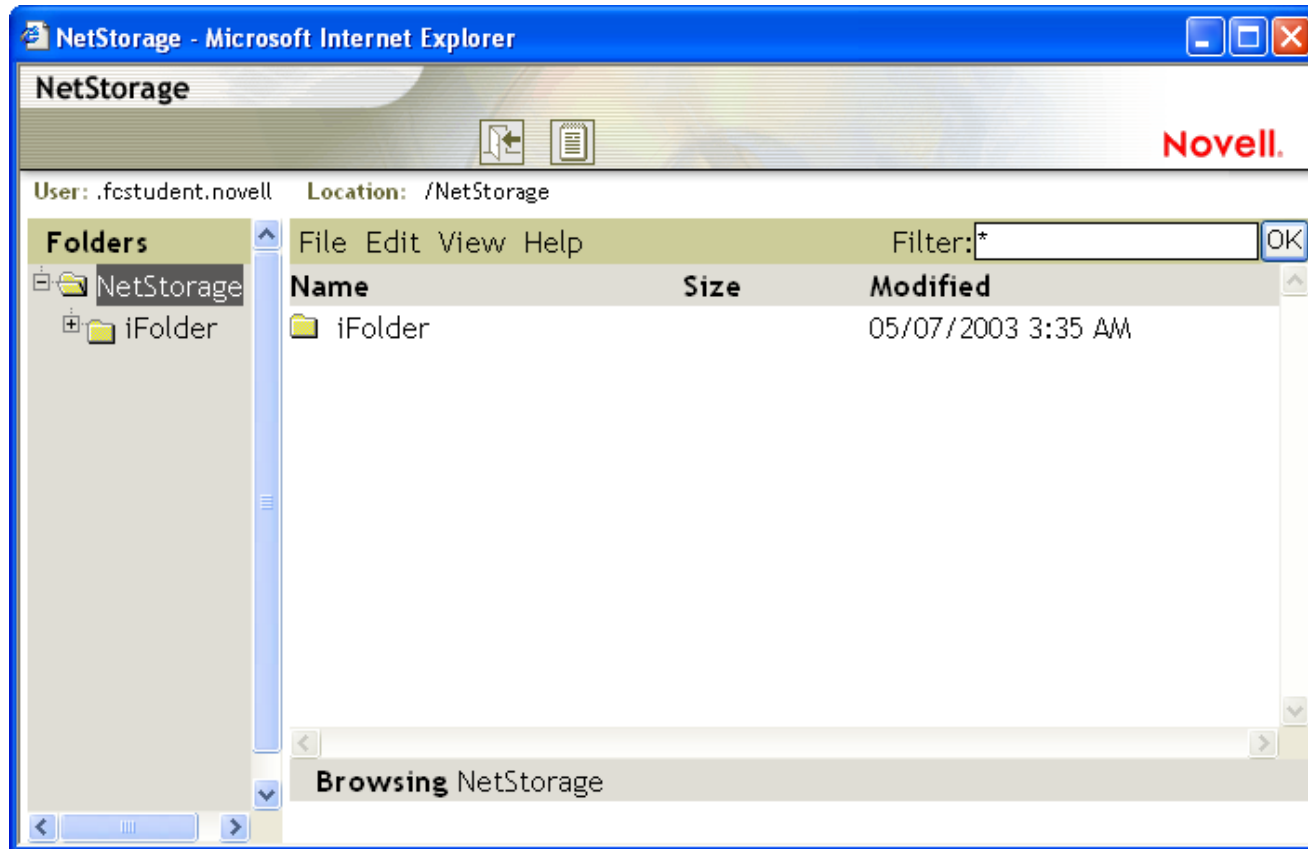
N iFolder summary

Novell iFolder lets your files follow you—everywhere

- No matter where you are, your files are always with you
- Automatically backs up your local data
- Simplifies the way files are used across the Net
- Files are always safe, secure, and up-to-date
- Secures and protects corporate digital assets
- Accelerates the productivity of today's mobile professionals

N

iFolder Example





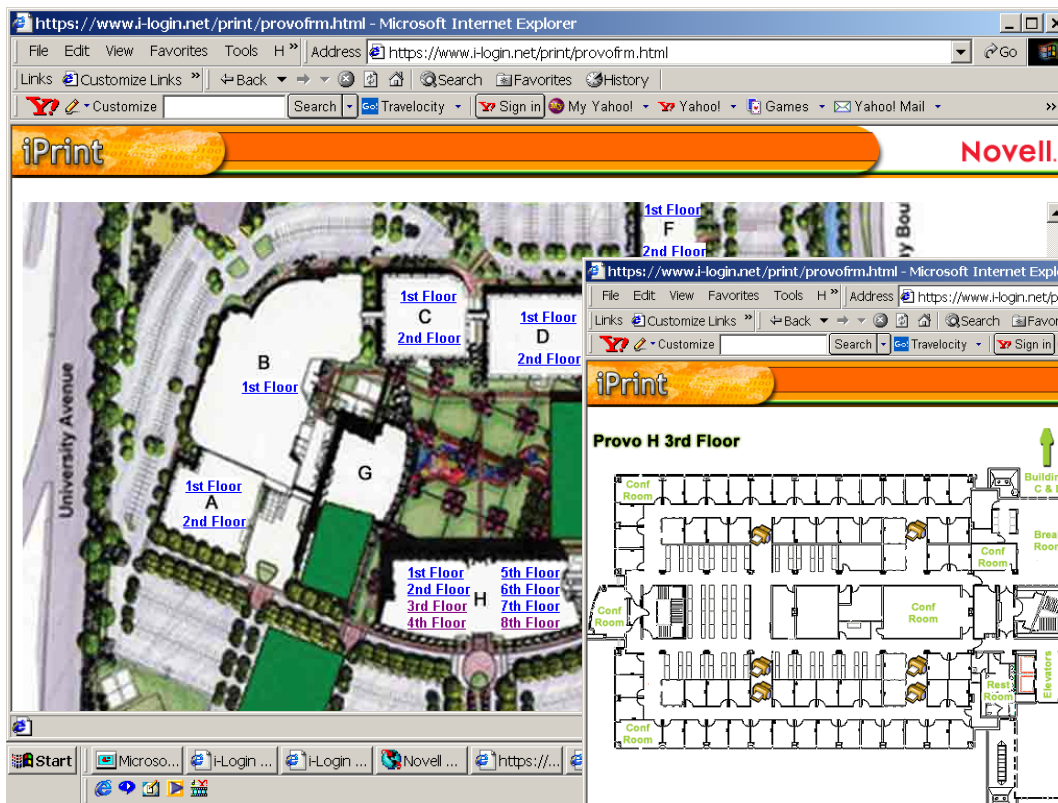
iPrint summary

- Drop-in solution
- Simplify the user's experience
- Provides global access
- Open standards
- Secured access and data

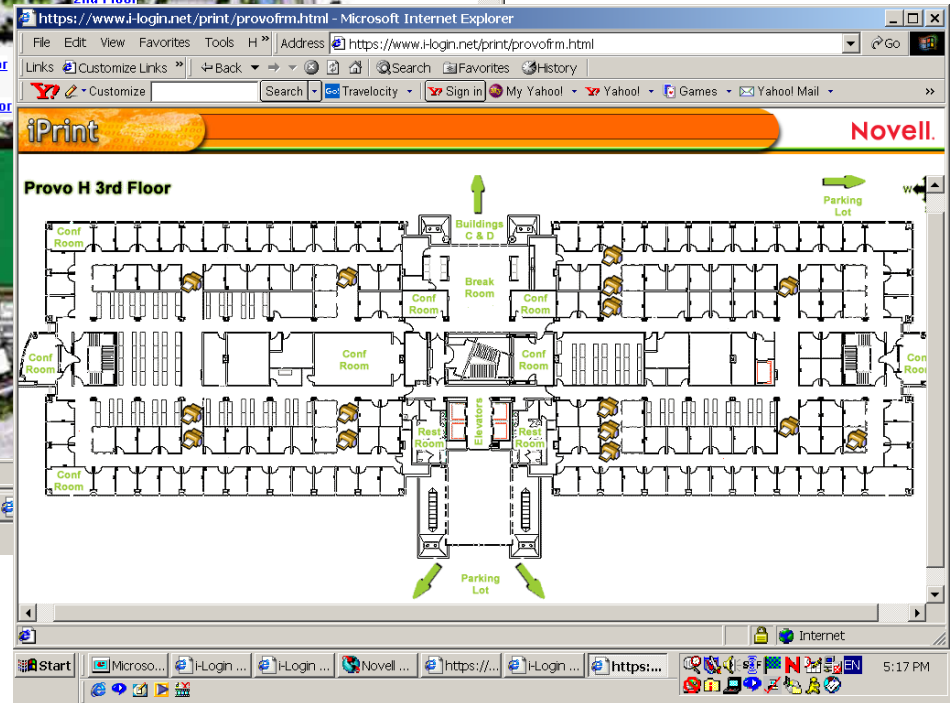


Novell iPrint Example

Discover Printers
From Maps



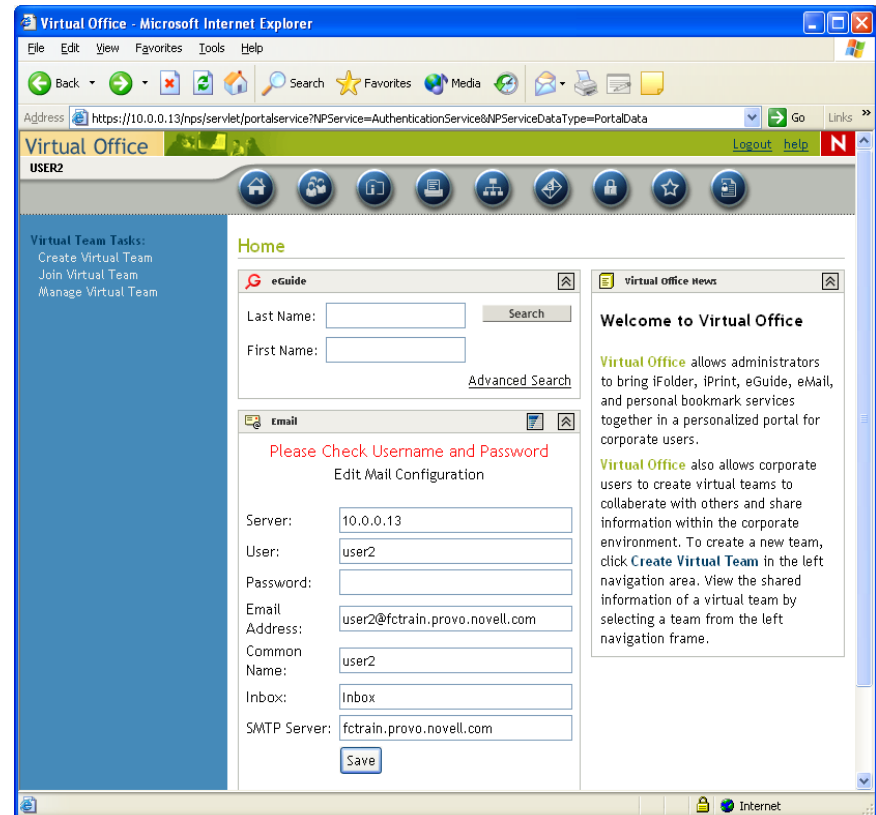
Visual Location
based Printing



N

Web Mail

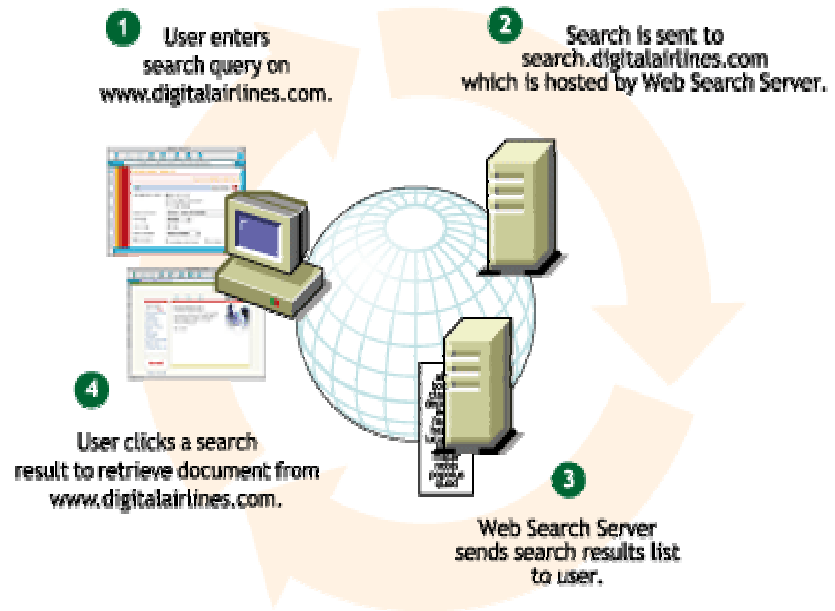
- Open standards (imap4) access to any mail system: Novell GroupWise, Lotus Notes or Microsoft Exchange
- Display a quick peek at your inbox
- Easy to configure and deploy





Web Search

NetWare Web Search Server offers a powerful full-text search engine you can use to add search capabilities to your Internet or intranet Web sites.





Why NetWare Web Search Server?



Features

- Indexes any web site (HTTP/HTTPS)
- Indexes any file server (NFS mounts)
- Indexes over 2 dozen file formats
- Indexes files in almost any language
- Filters search results using eDirectory™ rights
- Detects a variety of duplicate URLs
- Promotes specific search results
- Customizable HTML output (other formats also)
- Limits searches to specific categories (meta-tags)
- Skips specified portions of files (header, toc, etc.)

N

Favorites and Password management

Favorites

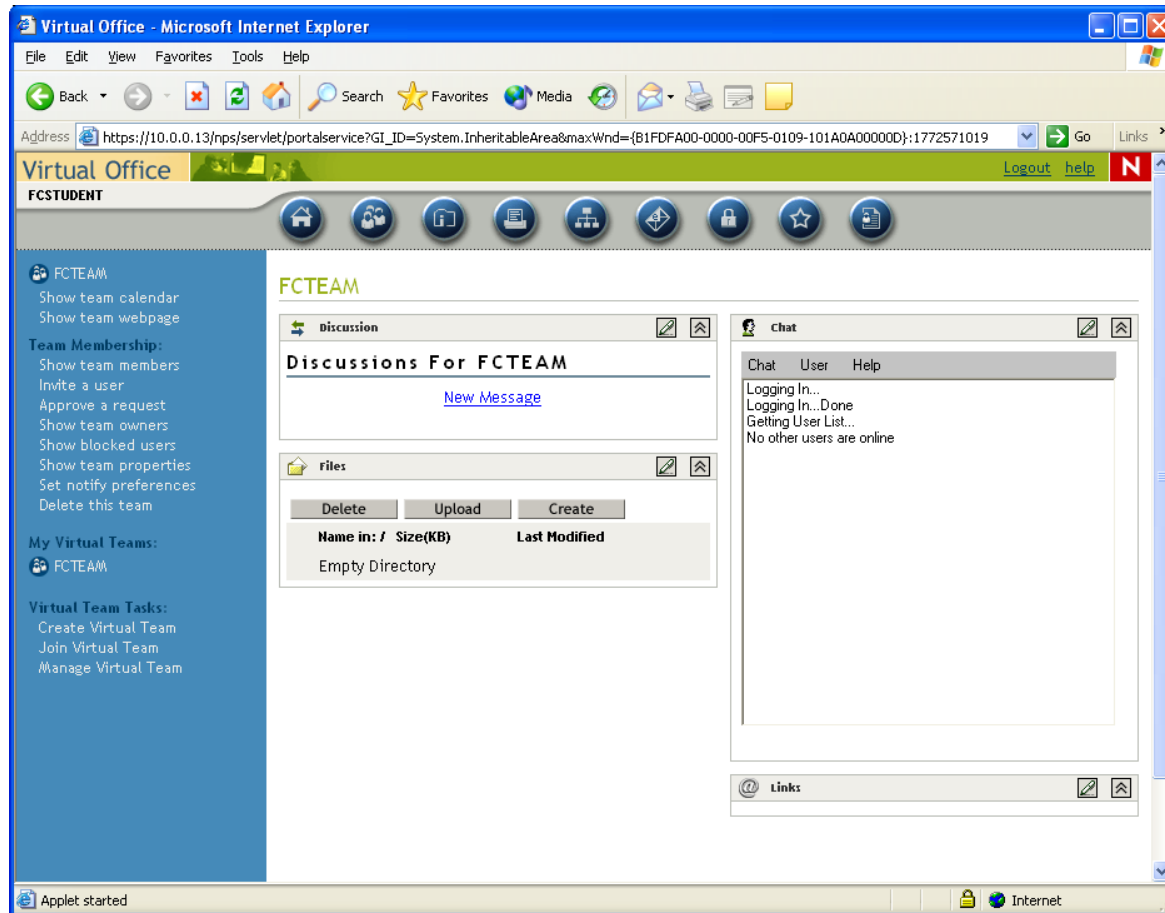
- Enable users to keep a list of bookmarks that travels with them
- No more lost links due to workstation or laptop crashes or physical damage/loss

Password Management

- User can change passwords in an authenticated portal from anywhere



Virtual Team



N

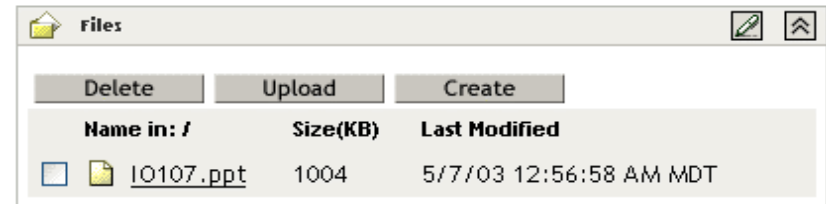
Virtual Team components

- Shared documents
- Internet chat between members
- Team calendaring
- Team favorites
- Discussion board

N Shared documents summary

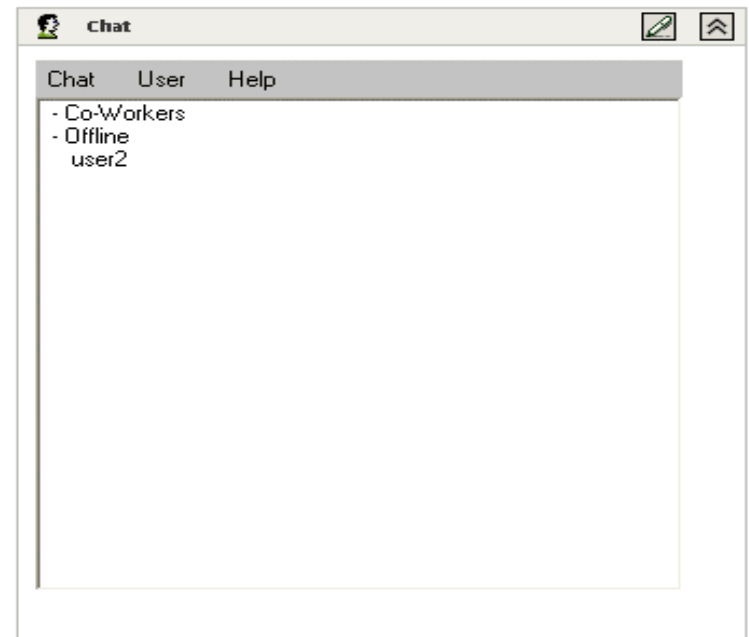
Shared documents allow for dispersion of data from a central location to all team members

- Critical files can be kept in single, central repository
- No need for an IT administrator to create a special directory for sharing
- Files can be modified and uploaded, changed and revised by any who has access



N Chat summary

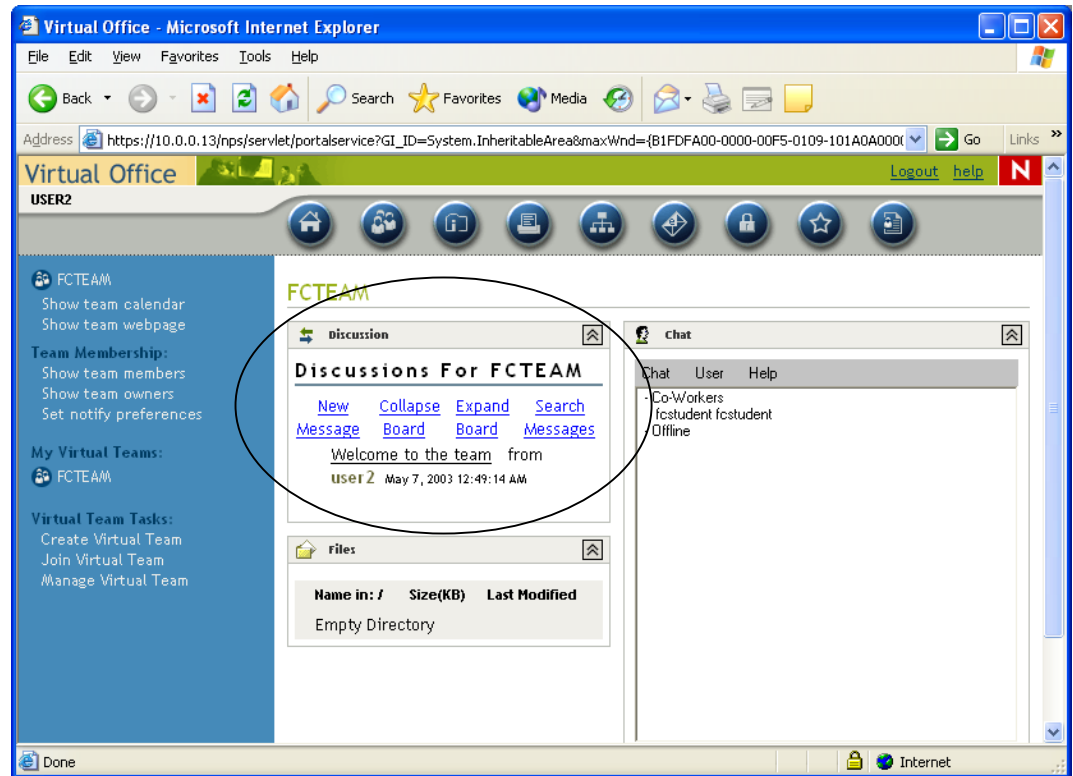
- Chat can be one-on-one or multiuser
- Chat requires no special client: use from any internet connection
- Reduce phone costs of those in remote offices



N

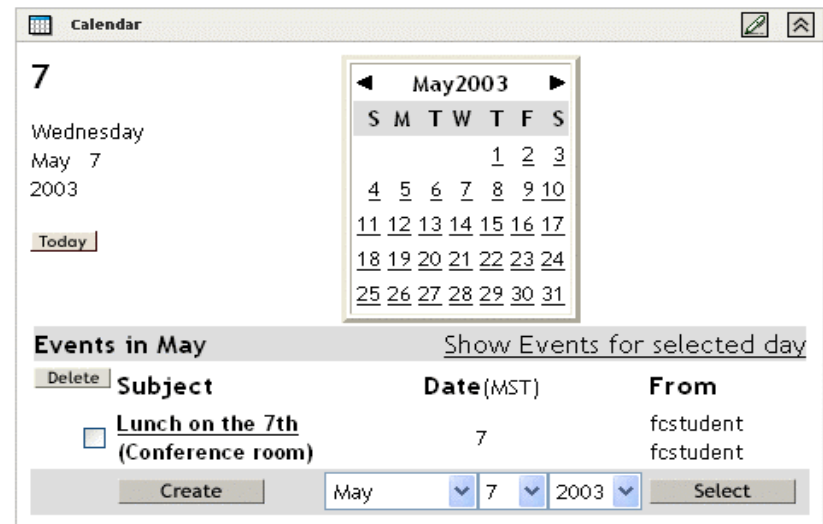
Discussion Boards summary

- Post and carry on discussions
- Review ideas
- Revise ideas



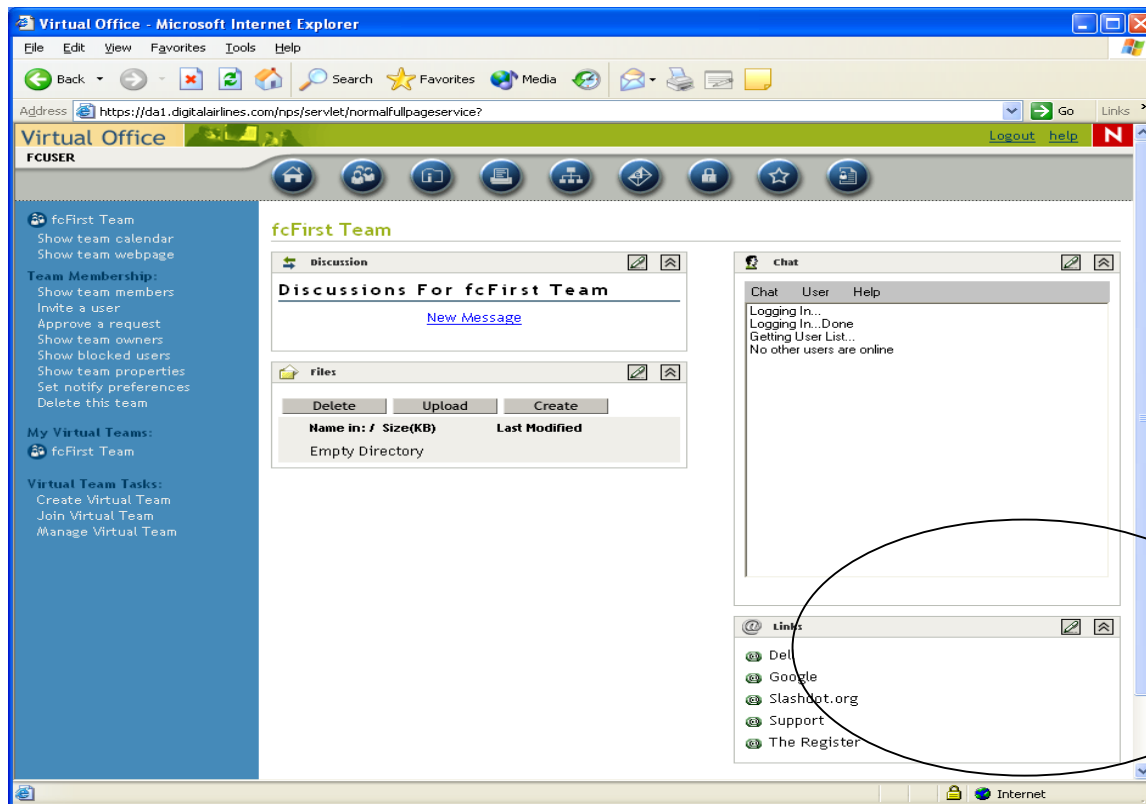
N Team Calendaring

Post a calendar of team and/or company meetings that affect the team members



N Team Favorites

Keep central list of important links, forms and other network resources





VO End-User Experience

VO accounts are automatically provisioned to NW 6.5 users when they first login to VO



Users see a personalized VO home page

- Find the services available
- Find people
- Access web-mail, Novell iFolder
- Find documents
- Personal public webpage

The same experience follows users everywhere

Novell®

Novell
A

Novell® NetWare 6.5 Web Tools/Services

www.novell.com



Novell.



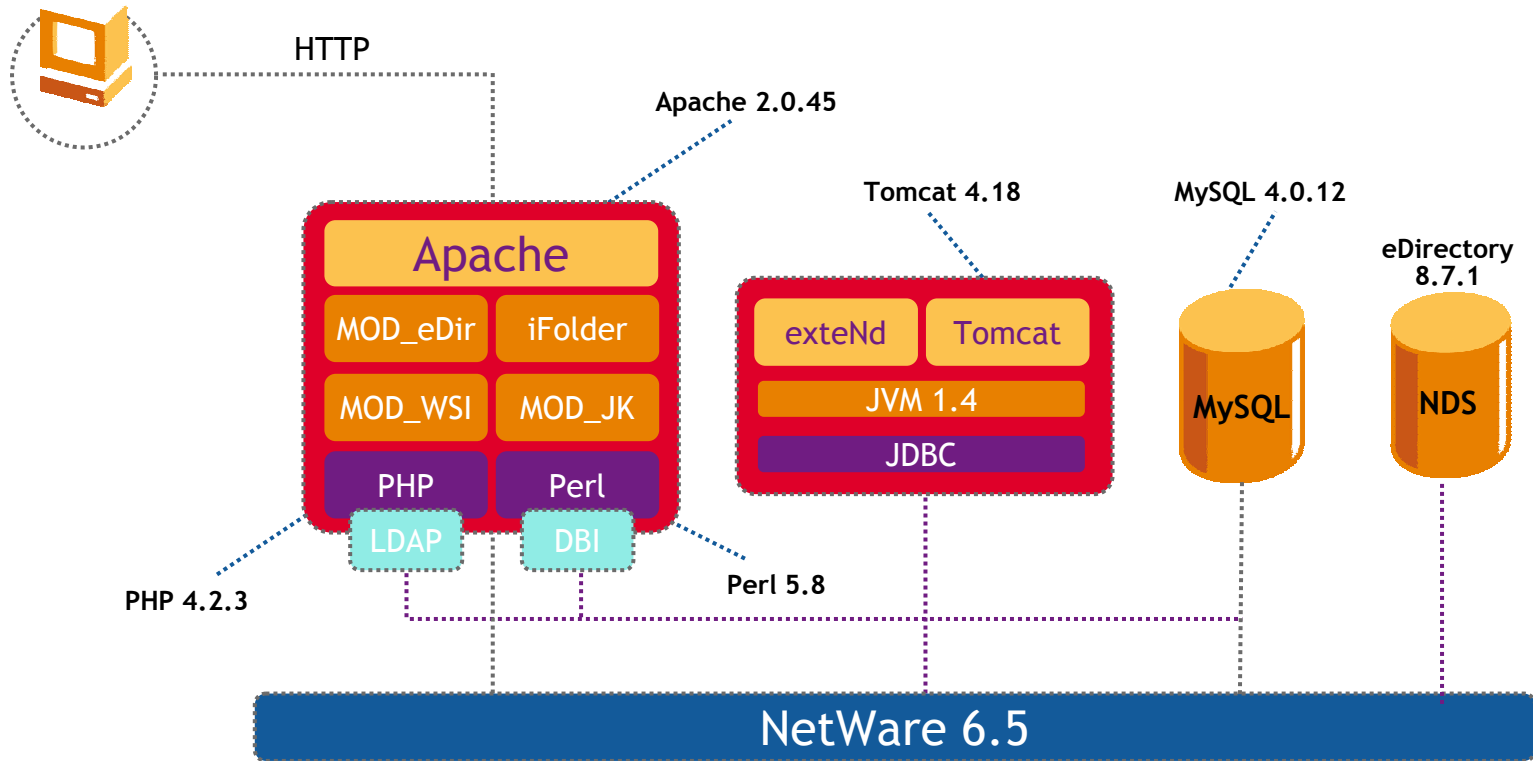
NetWare 6.5 Web Tools and Services

Agenda

- Novell exteNd Services
- AMP:
 - Apache
 - MySQL
 - Perl/PHP
- Tomcat

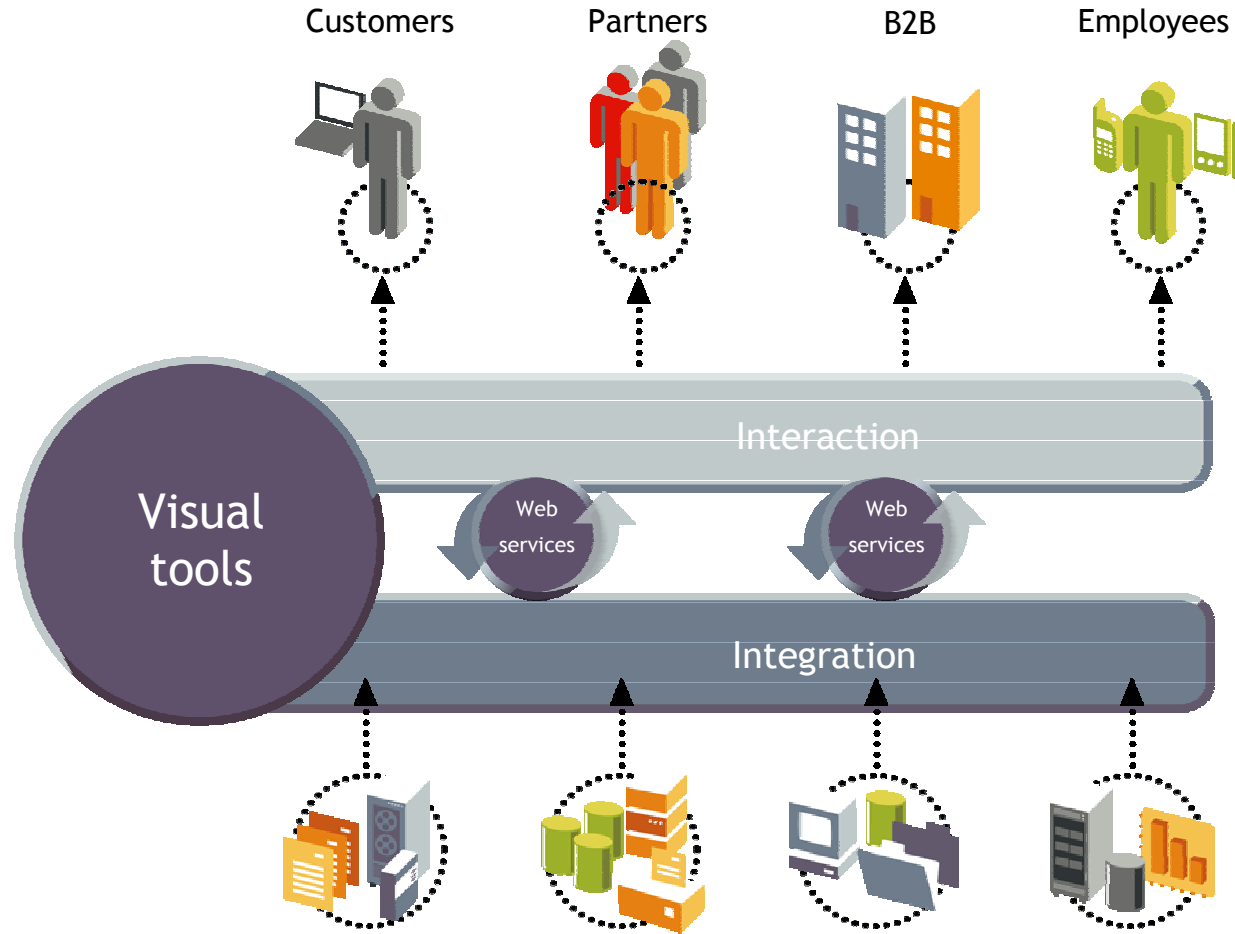


NetWare 6.5 Web Services Architecture





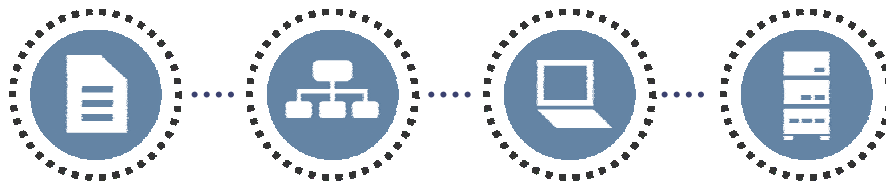
Novell exteNd Overview



N Novell exteNd Components

The Novell exteNd product suite is made up of four fully integrated components that work together or on their own:

- Novell exteNd Application Server
- Novell exteNd Workbench
- Novell exteNd Director
- Novell exteNd Composer

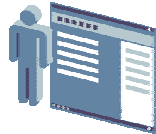




Novell exteNd Application Server

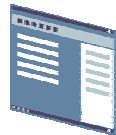
Client Tier

Web Service



Java Client

Web Browser



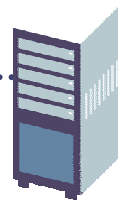
CORBA Client

Wireless

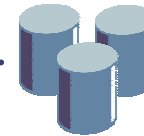


Middle Tier

Novell exteNd
Application Server



Data Tier



Cloudscape
DB2
Informix
MS Access
MS SQL Server
Oracle
Sybase ASA
Sybase ASE
Sybase SQL Anywhere



SAP
Peoplesoft
Notes
Etc.



*3270
*5250
*CICS RPC
*JDBC
*JMS
*HTML

Web Services

*available with Novell exteNd Composer

N

Novell Open Source Components



•Implementation:

- Small to medium size business applications and departmental level projects
- Projects where existing Open Source applications and utilities can be leveraged
- Rapid application development projects where prototypes must be built quickly
- Projects that have no requirement to scale at the enterprise level.
- Projects that have no requirement to consume older proprietary legacy systems.
- Rapid application development with a need to render dynamic content to the web



Novell Scripting Solutions

Listing 1:HTML version

```
<html>
  <head>
    <title>My First Script</title>
  </head>
  <body>
    <h1>My First Script</h1>
    <p>Welcome to my first script.</p>
  </body>
</html>
```

Listing 2:hello.php3

```
<?php
    $title = "My First Script";
    $greeting = "Welcome to my first script.";
?>
<html>
  <head>
    <title><?php echo($title) ?></title>
  </head>
  <body>
    <h1><?php echo($title) ?></h1>
    <p>Welcome to my first script.</p>
  </body>
</html>
```

Listing 3:hello.cgi

```
#!/usr/bin/perl
$title = "My First Script";
$greeting = "Welcome to my first script.";
Print <<EOF;
Content-type: text/html

<html>
  <head>
    <title>$title</title>
  </head>
  <body>
    <h1>$title</h1>
    <p>$greeting</p>
  </body>
</html>
EOF
```

Listing 4:hello.jsp

```
<HTML>
<H!> My First JSP </H1>
<Body>
<%= "Hello World!" %>
</Body>
</HTML>
```

NetWare® Apache Web Server Manager - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address [https://pintail.provo.novell.com:2200/apacheadmin/main.htm](#)

Apache Advanced Administration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address <https://pintail.provo.novell.com:2200/apacheadmin/main.htm> Go Links

Apache Manager

Novell

Objects:

- [Apache Group](#)

Welcome to Advanced Apache Administration! [?](#)

[Add Server Group](#)

Server Status [?](#)

Restart	Health	Server Name	Last Configuration Update	Update Flag
<input type="checkbox"/>		win-test	Wed Mar 26 10:19:08 MST 2003	Complete
<input type="checkbox"/>		PINTAIL	Wed Apr 02 03:10:38 MST 2003	Complete

[Restart Servers](#) [Refresh](#)

Done

Internet



Manage Multiple Apache Servers!

Apache Advanced Administration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print Edit Links

Novell.

Apache Advanced Administration

Objects:

- Apache Servers
 - NetWare Servers**
 - Http-ExampleServer
 - ldap_module
 - auth_ldap_module
 - eDir_module
 - Mime_Magic_Module
 - cgi-bin
 - Icons-Directory
 - Document-Root
 - System-Root
 - Manual-Directory
 - Error-Directory
 - Linux Servers
 - Windows Servers
 - Protect-ht-Files

Directives for Server Group: NetWare Servers

[Add Server Group](#) | [Add Server](#) | [Add Virtual Server](#) | [Add Module](#) | [Add Block](#) | [Remove Object](#)

Lead directive with a '+' or a '-' to override or remove an inherited directive.

```
ServerRoot "SYS:/APACHE2"  
ThreadStackSize 65536  
StartThreads 50  
MinSpareThreads 10  
MaxSpareThreads 75  
MaxThreads 250  
MaxRequestsPerChild 0  
SecureListen 443 "SSL CertificateDNS"  
DocumentRoot "SYS:/APACHE2/htdocs"  
ErrorLog "|SYS:/APACHE2/bin/rotlogs.nlm  
sys:/apache2/logs/error_log 5M"  
CustomLog "|sys:/apache2/bin/rotlogs.nlm  
sys:/apache2/logs/access_log 5M" common  
Alias /icons/ "SYS:/APACHE2/icons/"  
Alias /manual "SYS:/APACHE2/manual"  
Alias /error/ "SYS:/APACHE2/error/"  
ScriptAlias /cgi-bin/ "SYS:/APACHE2/cgi-bin/"
```

Save and Apply Save Directive Lookup Configuration File

https://psgw8.provo.novell.com:2200/apacheadmin/banner.jsp?Action=Back&DN=cn=NetWare+Servers,cn=Apache+Serve Internet



Apache 2.0 on NetWare 6.5 Benefits

- Highly scalable and fast
- Easily managed
- Tight integration with eDirectory and SSL through NetWare-specific Apache modules
- Provides a web container for J2EE environment
- Pre-configured to work with Tomcat-Jakarta
- Compatible with Novell exteNd Application Server

N

Apache 2.0 on NetWare 6.5

- Replaces the Netscape Enterprise Web Server
 - Migration utility to facilitate upgrades
- Two instances of Apache
 - Web based administration server
 - Specialized configuration
 - Configuration stored in SYS:\adminserv
 - Running in protected address space
 - DO NOT ALTER!
 - General purpose web server
 - Configured through the standard httpd.conf file
 - Customizable
 - Running in OS address space

N

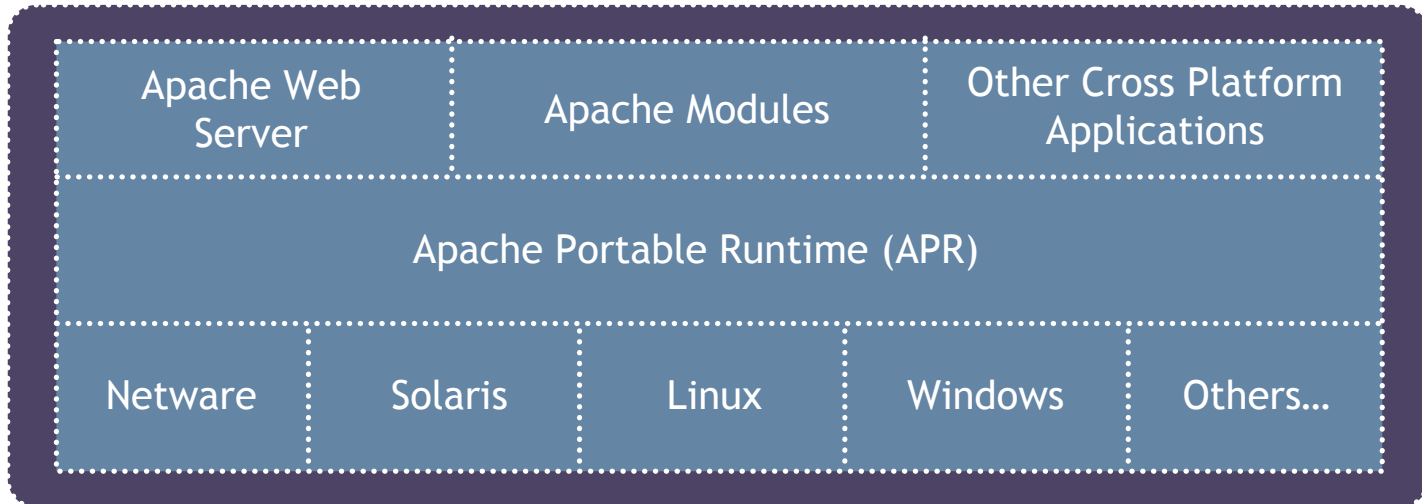
Apache 2.0 Improvements

- Better multi-processor utilization
- Better performance
 - Built on new LIBC/NKS libraries
 - More efficient use of the NetWare APIs through APR
- Additional Startup Options
 - -e (Redirect any startup error to a file)
 - -n (Rename the Apache console screen)
- Additional Command Line Options (apache2 <option>)
 - settings (Display worker thread information)
 - restart (Quick restart after config change)
 - shutdown (Terminates a running instance of Apache2)
 - More ...

N

Apache 2.0 Architecture

- Apache Portable Runtime Library (APR)
 - Offers a standard cross platform set of APIs
 - Each implementation of APR is customized for a specific platform
 - A general purpose cross-platform library



N

Apache Web-Based Administration

- Can manage any Apache server on any platform that supports an LDAP connection
- Web based administration allows the user to administer any Apache Web Server from anywhere
- Web farm administration is much easier since each server's configuration is stored in eDirectory
- Configuration directives can be applied to a single server or shared among multiple servers

N

eDirectory-Based Configuration

- Allows the administrator to define each web server's configuration in terms of eDirectory objects
- Each Apache Web Server, virtual server, module, directory, location, and file block is described as eDirectory objects
- By describing the Apache configuration in terms of objects, the web server can be configured and managed just like any other eDirectory object

N

Tomcat4 on NetWare Philosophy

- “Only for Management” didn’t coincide with reality
- New philosophy: “Separate management” out of the way of the default Tomcat instance
- Default Tomcat instance has a few changes as necessary
- Internal Novell application (non-admin) play in the same world as 3rd party applications

N

Managing

- New to Tomcat4 are the admin and manager apps

/tomcat/admin

- Ability to manage separate pieces of server.xml in a web-based fashion
- <https://<IPADDR>:2200/tomcat/admin/index.jsp>

/tomcat/manager

- Allows you to manager context's life-cycles
- <https://<IPADDR>:2200/tomcat/manager/html>
 - Start
 - Stop
 - Restart

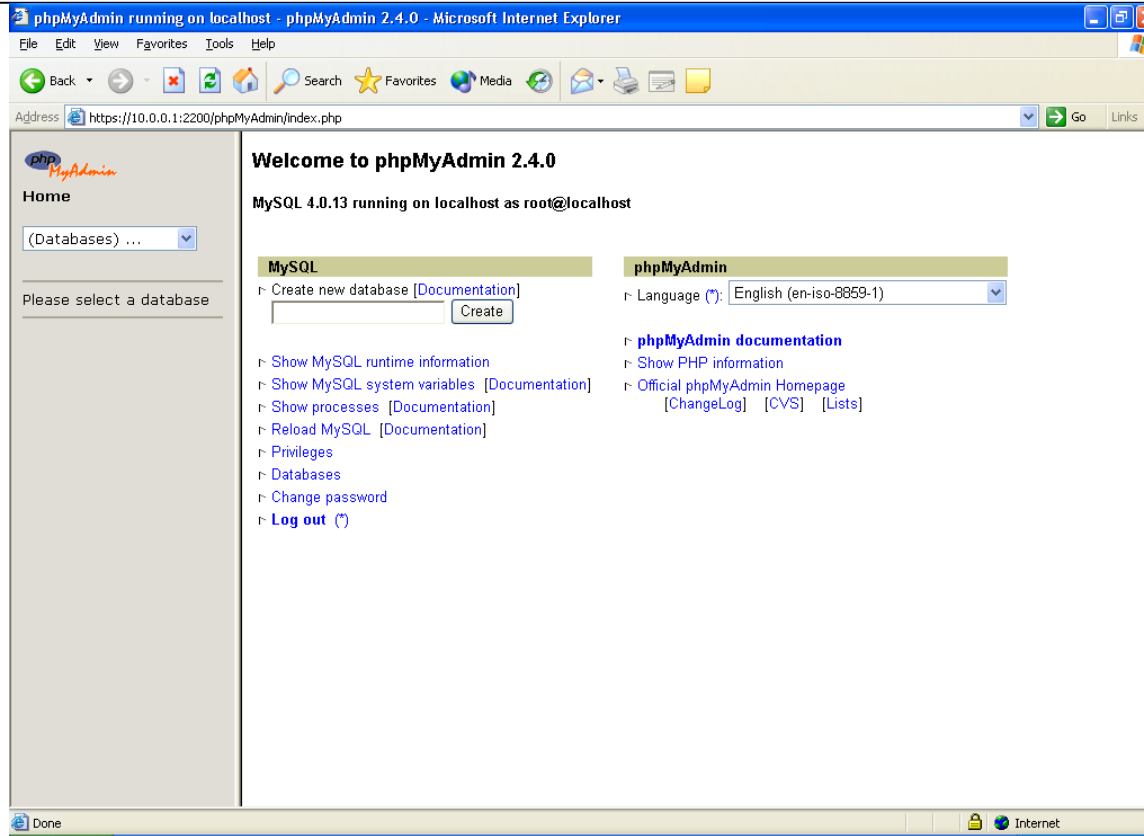


MySQL

- Structured Query Language
- MySQL is a database



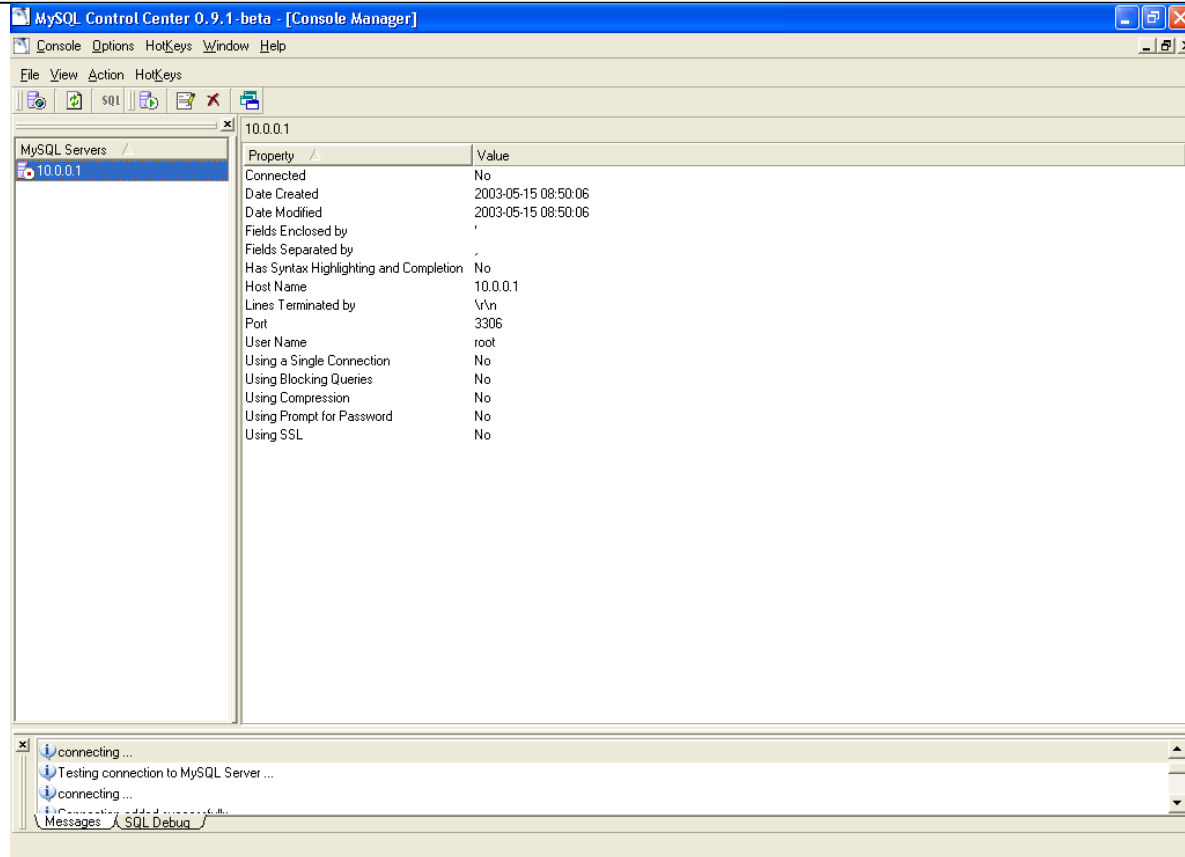
phpMyAdmin MySQL Administration



https://10.0.0.1:2200/phpMyAdmin/index.php



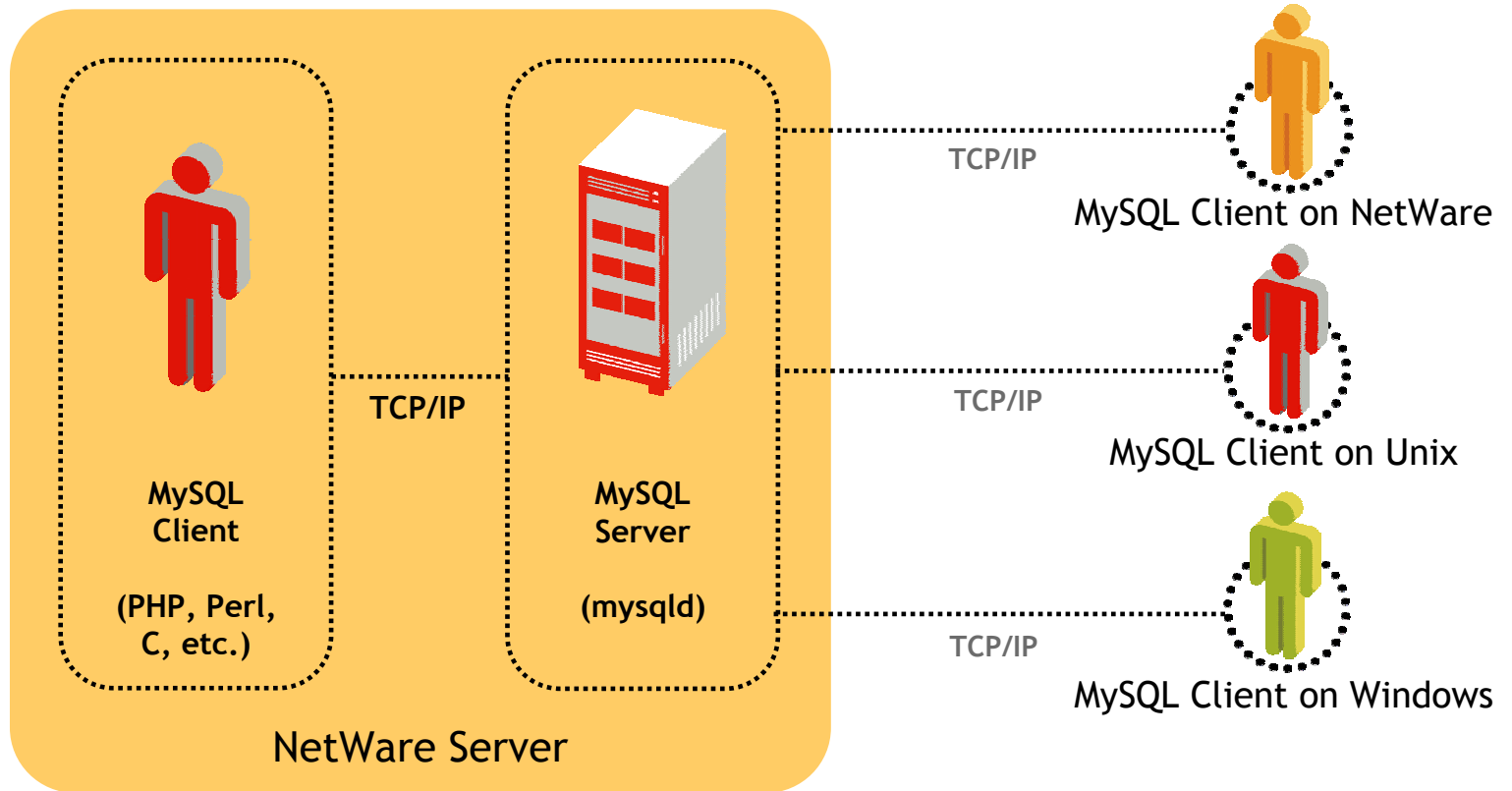
MySQL Control Center



<server>:sys:/mysql/win/mysqlcc-0.9.1.win32.zip

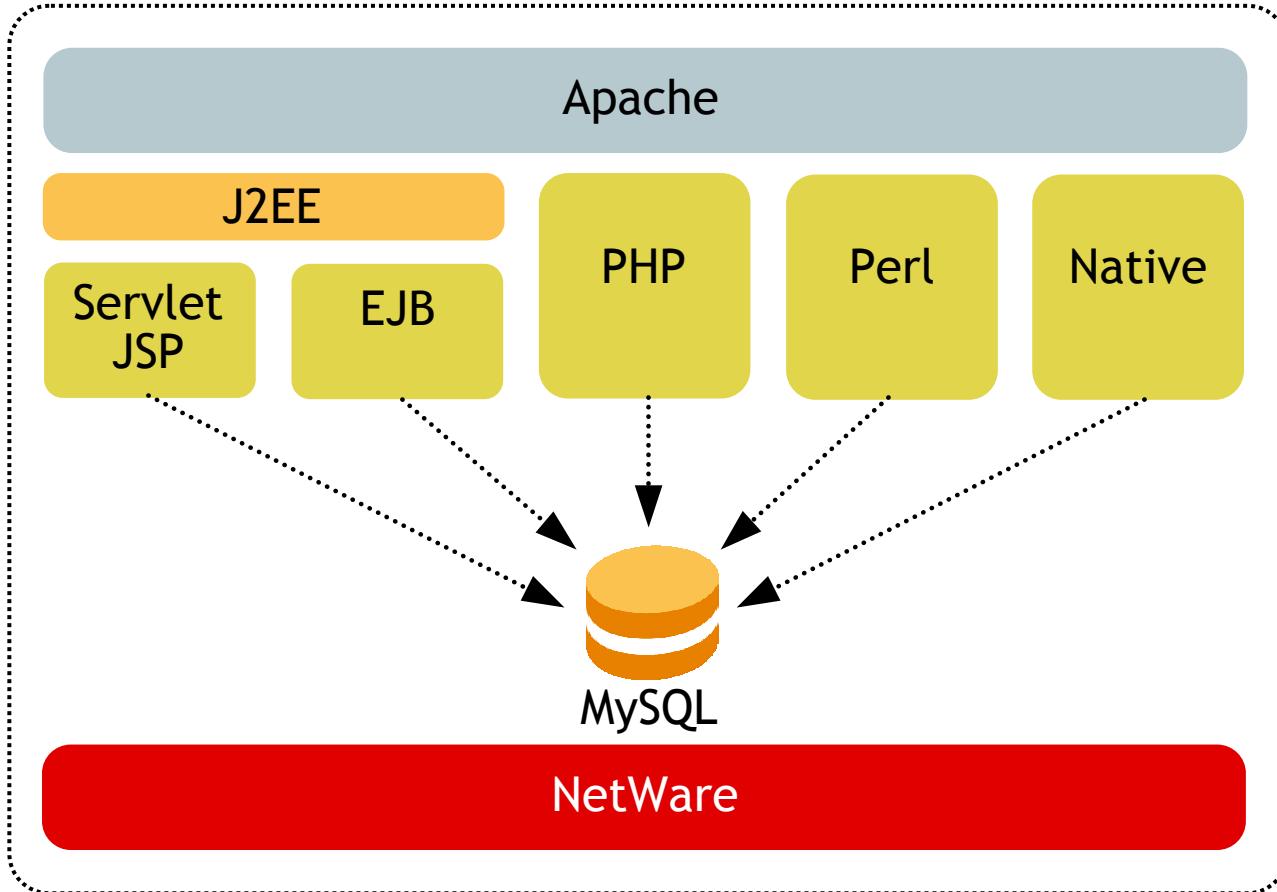


MySQL Architecture



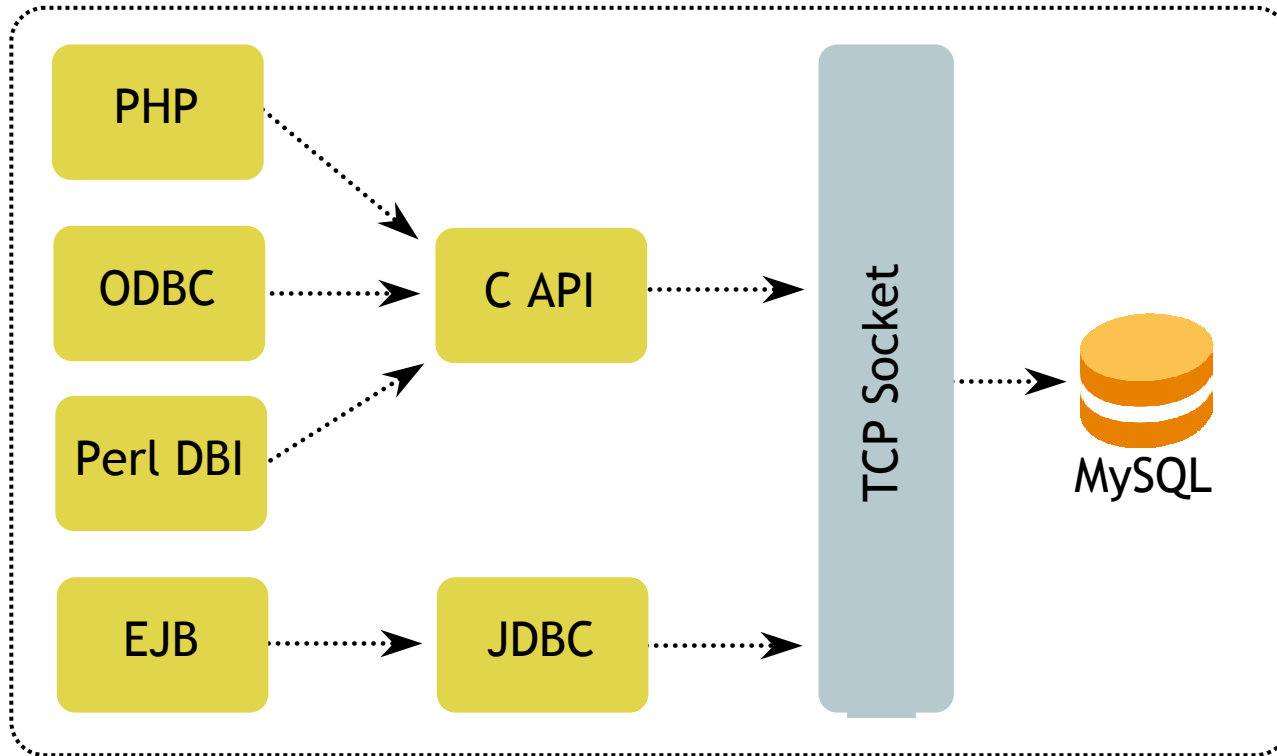


MySQL Web Architecture



N

MySQL Programming Interfaces



N `mysqld_safe`

- The `mysqld_safe` command/process is a monitor process for the MySQL server (`mysqld`):
 - Run a number of system and option checks
 - Run a check on the MyISAM and ISAM tables
 - Provide a screen presence for the MySQL server
 - Start `mysqld`
 - Re-start `mysqld` if it goes down on an error
 - Send error messages from `mysqld` to a `HOSTNAME.err` file in the data directory
 - Send `mysqld_safe` screen output to a `HOSTNAME.save` file in the data directory

N

What is PHP?

- PHP is simple enough for casual web pages, yet powerful enough for eCommerce sites
- Used to provide connectivity to multiple databases:
 - MySQL
 - ODBC
 - Oracle
 - Informix
 - SyBase
 - Microsoft SQL

N

What does PHP stand for?

- PHP, originally was *Personal Home Page*, now it stands for *PHP: Hypertext Preprocessor* (a recursive acronym)
- Originally created as an open-source alternative to Active Server Pages
- PHP is a server-side, cross-platform, HTML embedded scripting language
- PHP uses PERL style variables (scalars, arrays, and hashes, but its syntax is more like C
- PHP binaries and source code can be downloaded from <http://www.php.net>. Free for personal and commercial use

N

Simple PHP Example

```
<?php

    $title = "PHP Sample Program";
    $list  = array(
        "PHP is simple",
        "PHP is fast!",
        "PHP is powerful",
        "PHP can connect to databases",
        "PHP can even connect to LDAP directories"
    );
?>
<HTML>
    <HEAD>
        <TITLE>
            <?php echo $title; ?>
        </TITLE>
    </HEAD>
    <BODY>
        A small list of PHP's attributes:<BR><BR>
        <UL>
            <?php
                foreach( $list as $item ) {
                    print "<LI>$item";
                }
            ?>
        </UL>
    </BODY>
</HTML>
```

N

Simple PHP Example Output

A small list of PHP's attributes:

PHP is simple

PHP is fast!

PHP is powerful

PHP can connect to databases

PHP can even connect to LDAP directories

N

How is PHP used?

- Typically used with Apache Web server (most popular Apache module)
- PHP is used to customize web pages from simple modifications (e.g., changing the background color) to very complex operations such as retrieving information for other data sources (e.g., a database)
- PHP is used to preserve a certain look and feel throughout a web page while changing content



Novell Open Source Components

The screenshot shows the Novell developer website. The navigation bar includes links for COMPANY, MY NOVELL, SOLUTIONS, PRODUCTS, TRAINING, SUPPORT, PARTNERS, and DEVELOPERS. The main content area is titled "Looking for Open Source?" and features a list of open source projects:

- [Apache for NetWare](#)
- [LDAP Libraries for C](#)
- [LDAP Libraries for Java](#)
- [MySQL for NetWare](#)
- [Perl 5 for NetWare](#)
- [PHP for NetWare](#)
- [PostgreSQL for NetWare](#)
- [Rsync for NetWare](#)
- [Tomcat for NetWare](#)

Below the list, there are sections for "Apache for NetWare" and "LDAP Libraries for C", each with a brief description and a list of related links.

<http://developer.novell.com/ndk/qstart/opensource.htm>



Open Source Databases and Scripting

» MySQL for NetWare

MySQL is the world's most popular Open Source Database, designed for speed, power, and precision in mission-critical, heavy-load use.

- [MySQL for NetWare](#)

» Perl 5 for NetWare

Perl is a high-level programming language with an eclectic heritage written by Larry Wall and a cast of thousands. It derives from the ubiquitous C programming language and to a lesser extent from sed, awk, the Unix shell, and at least a dozen other tools and languages. Perl's process, file, and text manipulation facilities make it particularly well-suited for tasks involving quick prototyping, system utilities, software tools, system management tasks, database access, graphical programming, networking, and World Wide Web programming.

- [Perl 5 for NetWare](#)

» PHP for NetWare

PHP is a cross-platform, HTML-embedded, server-side Web scripting language that is used to create dynamic Web pages. It is also easy to use and maintain. PHP is typically used with the Apache Web server and provides many extensions, including connectivity to databases such as MySQL and support for XML, LDAP, and UCS.

- [PHP for NetWare](#)

» PostgreSQL for NetWare

PostgreSQL is a sophisticated Object-Relational DBMS, supporting almost all SQL constructs, including subselects, transactions, and user-defined types and functions. It is the most advanced open-source database available anywhere.

- [PostgreSQL for NetWare](#)

<http://developer.novell.com/ndk/qstart/opensource.htm#mysql>



Web service and app development

The screenshot shows the Novell Developer website. The top navigation bar includes links for COMPANY, MY NOVELL, SOLUTIONS, PRODUCTS, TRAINING, SUPPORT, PARTNERS, and DEVELOPERS. Below the navigation is a green header for "Web Application Development". A left sidebar contains a menu with categories like "products & technologies", "code examples", "software & downloads", "technical information", "developer program", and "developer training & support". The main content area is titled "> developer" and features a section "Develop Web Services and J2EE applications with Novell exteNd". This section lists three products: "Web Services" (Build and deploy a Web Service), "Interactive Portal" (Create your own custom portal), and "Novell XForms" (Reduce the complexity of developing Web pages). Below this is a paragraph about learning Java, J2EE, JSP, Servlets, EJB, JavaScript, Web Services, SOAP, UDDI, Apache, Tomcat, MySQL, PHP, and Perl. A sub-section "start with the right products" lists "exteNd Application Server", "exteNd Composer", and "exteNd Director" with brief descriptions. On the right, there are three promotional boxes: "Novell Brainshare 2003 REGISTER NOW", "developer news & events" (listing BrainShare for Developers, Novell exteNd Developer Seminar, and Getting its story straight), and "developer downloads" (listing exteNd App Server, exteNd Composer, exteNd Director, exteNd jBroker, exteNd Workbench, and NetWare AMP). A "Novell Developer Kit" box is also present, along with "frequently asked questions".

<http://developer.novell.com/ndk/qstart/opensource.htm>



NAMP Resources

osNamp.com
Your Open Source Destination for NetWare AMP

HOME ACCOUNT TOPICS DOWNLOADS FORUMS SUBMIT CONTACT US

Main Menu

- Home
- Modules
 - Downloads
 - Members List
 - News
 - Recommend Us
 - Search
 - State
 - Topics
 - Top List
 - Web Links
 - Forums

Key Novell URL's

- New TID's
- Minimum Patch List
- Product Updates (Weekly)
- Developer NDS (March)

User's Login

Username:

Password:

Remember me

Don't have an account yet?

Welcome to osNamp
Your Open Source Destination for NetWare AMP

Novell has started to really embrace the Open Source concept. With the introduction of NetWare AMP (Apache, MySQL and PHP/PERL), Novell has put themselves on the map to a much larger developer audience.

Our goal at osNamp is to provide a resource that will enable developers from around the world to utilize this excellent Open Source solution for NetWare 6.0.2 servers.

osNamp is using an Open Source CMS called PostNuke, so we've put everything you need in the downloads section to get you starting turning your NetWare 6.0.2 server into an excellent CMS.

Since we've just started, we're looking for a few good folks to help maintain the site, if you are interested, please click [here](#).

Thank you again for stopping by.... and don't forget to [register](#).

News: New Version of MySQL

Posted by: Admin on Tuesday, March 18, 2003 - 02:41 pm

 MySQL has released a new version of its database platform... Version 4.0.12-DEV. If you are in a production environment, continue to use 4.0.11-Gamma. Changlog [here](#). The file is located in our download sections.

comments?  

Events: MySQL Users Conference & Expo 2003

Posted by: Admin on Monday, March 17, 2003 - 04:02 pm

 MySQL will be having their first ever Users and Expo Conference April 10th - 12th in San Jose.. Click [here](#) for more information.

comments?  

Events: Novell Brainshare 2003

Poll

Primary platform you write applications for?

- NetWare 5.x, 6.x
- Windows 9x
- Windows 2000, XP
- Linux / Unix
- OS/2
- Other

[Results | Polls]

Votes: 3
Comments: 0

Categories Menu

- All Categories
- Events (Mar 17, 2003)
- General (Mar 16, 2003)
- News (Mar 18, 2003)
- Support (Mar 16, 2003)

Other Stories

- New Version of MySQL (Mar 18, 2003)
- MySQL Users Conference & Expo 2003 (Mar 17, 2003)
- Novell Brainshare 2003 (Mar 17, 2003)
- PHP 4.3.2 RC1 Released (Mar 17, 2003)

<http://www.osnamp.com/>

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A

Novell® Nterprise™ Branch Office™

www.novell.com

N

Novell.



Novell® Branch Office Issues

Branch offices are expensive to support

- Private WAN links
- Local Backup
- Directory services replication
- Local IT staff
- Disaster recovery

Need to consolidate services

- Servers, storage, and apps consolidation
- But still need to provide branch office users with the same end user experience



The Nterprise Branch Office Solution

NBO reduces the cost of supporting Branch Offices

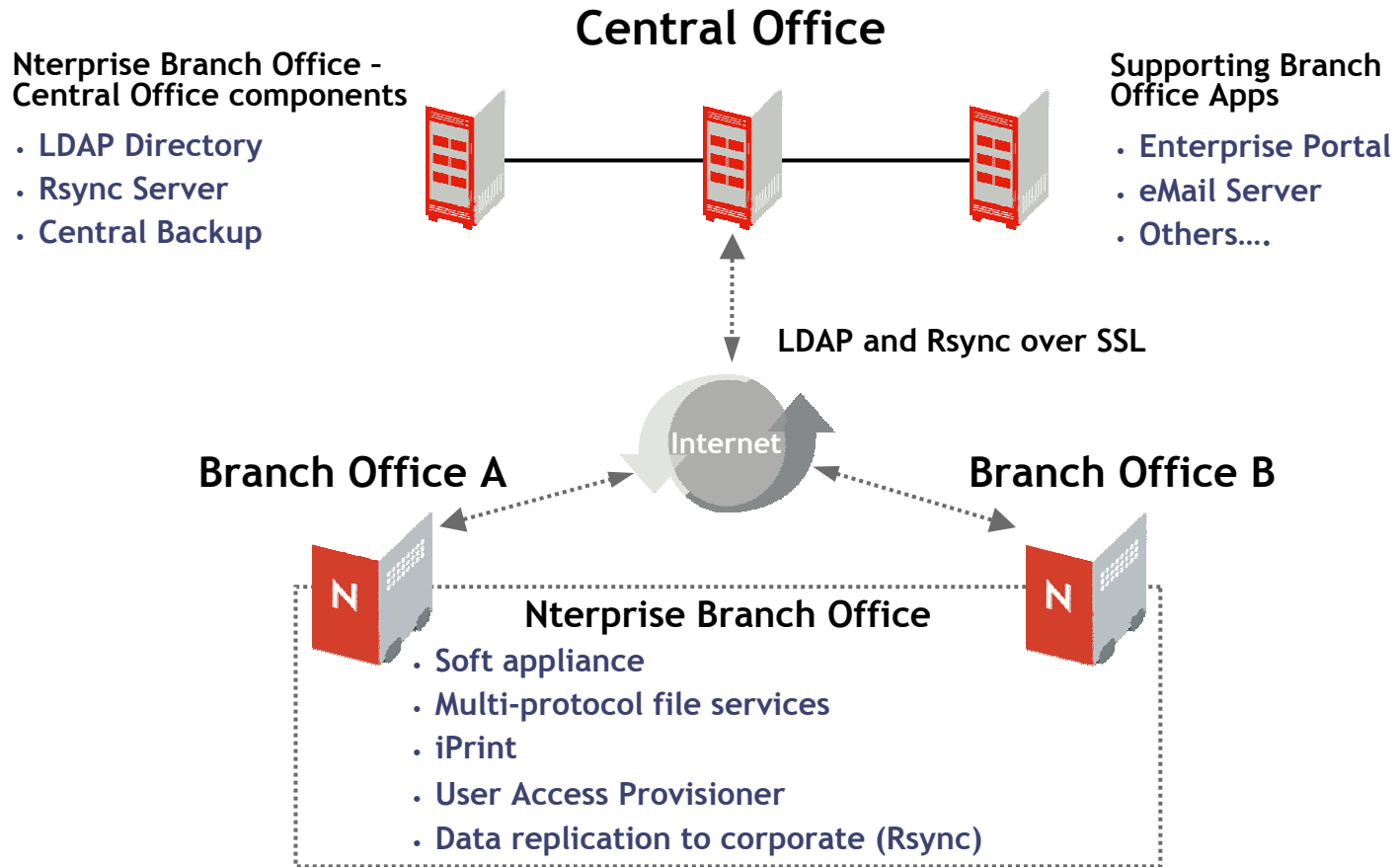
- Eliminates the data replication to corporate
- Simplifies directory services and automatically provisions branch office users
- Replace private WAN connections with Internet connections
- Appliance provides ease of deployment, management and disaster recovery

Enables intelligent consolidation

- Centralize apps, but still provide local services like file and print
- Remote administration and centralized IT support

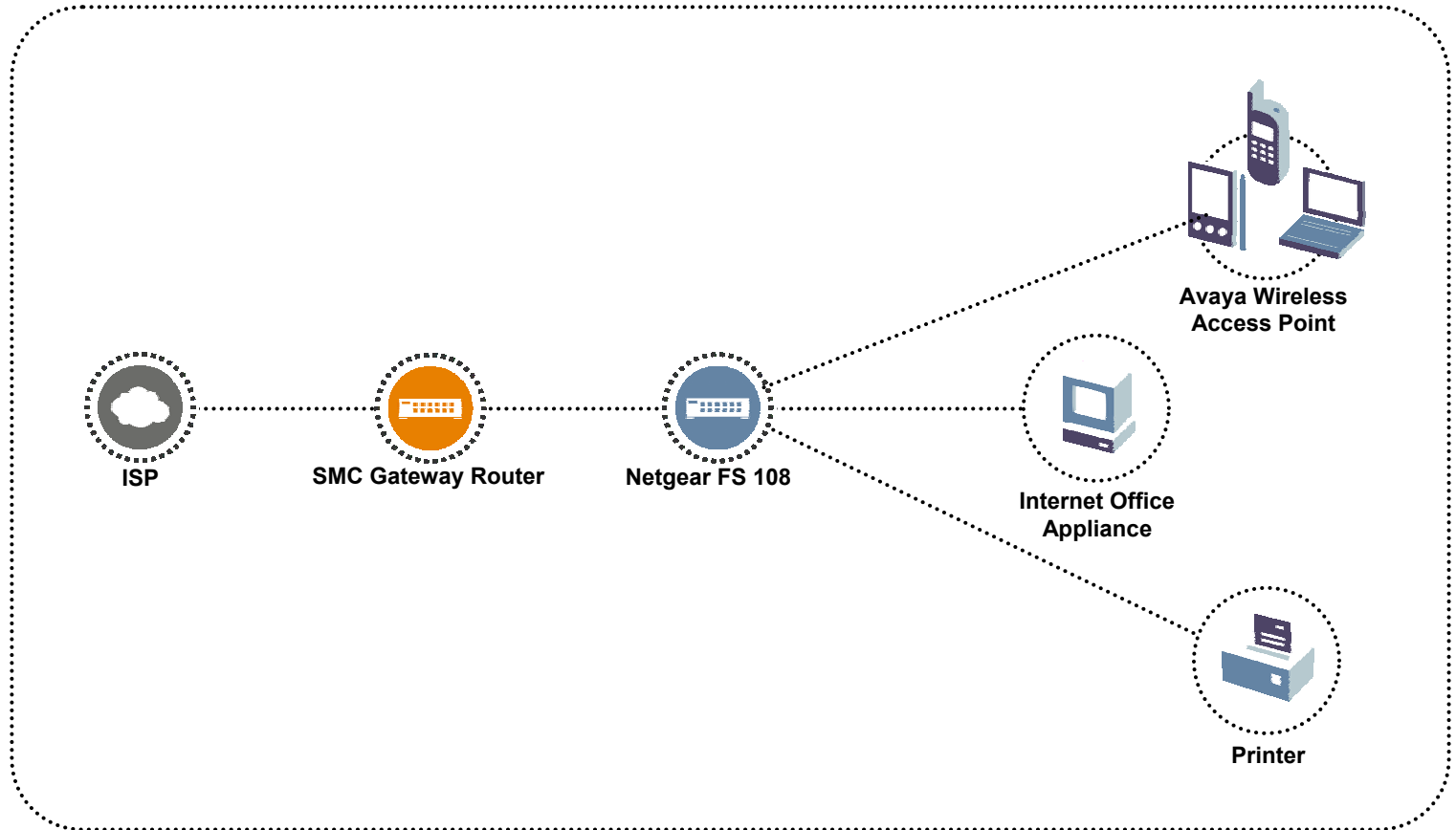


Nterprise Branch Office Architecture





Branch office infrastructure

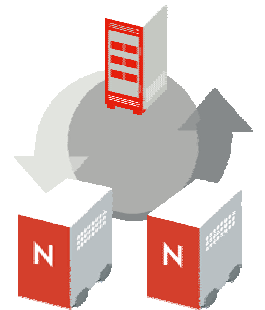


N

Eliminating Backup Challenges

Centralize branch office backup, archive, and restore

- Data replicated to Central Office using Rsync Technology
- Data is backed up at the Central Office, eliminating the need for local backup in the branch office
- No need to rely on borrowed resource to swap tapes (Tape Monkey Video)
- Only the changes are replicated



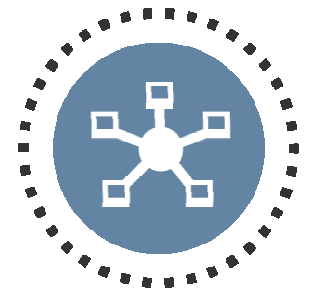
Novell.

N

Simplifying Directory Services

Manage users centrally without the overhead of a distributed directory

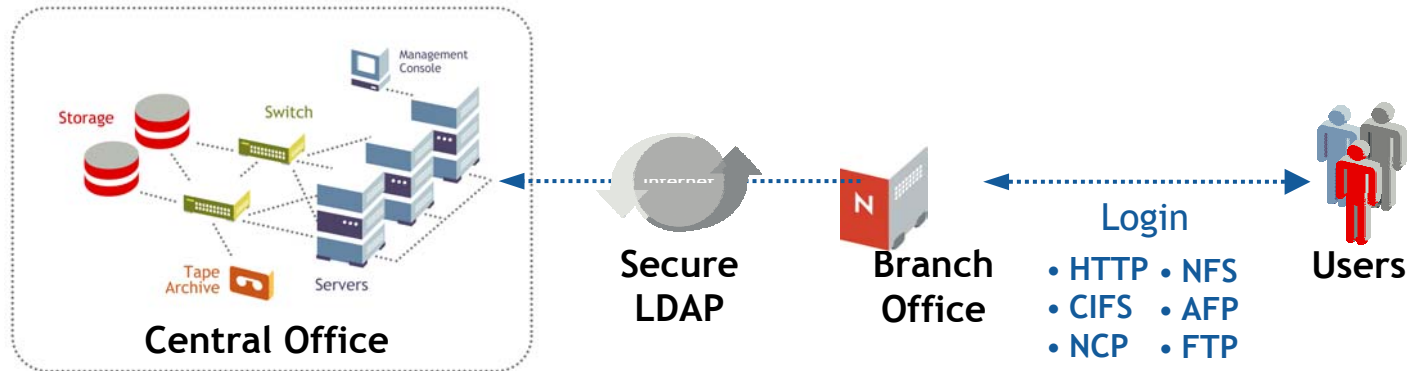
- Eliminate directory replicas and synchronization
- Users are automatically provisioned through central office directory
- No directory management required on the Nterprise Branch Office appliance



Novell.

N

Simplifying Directory Services



User Access Provisioner

1. User logs into local Nterprise Branch Office server
2. Nterprise Branch Office server performs a secure LDAP lookup to the central LDAP directory
3. Once user credentials are validated, user is automatically provisioned on Nterprise Branch Office server

N

Lowering network connectivity costs

Leverage the Internet for network connectivity to corporate

- Enterprise Branch Office is designed to replace expensive WAN links with public Internet connections (DSL, T1, Cable Modem, etc.)
- SSL encryption for all communication between Enterprise Branch Office and Central Office
- Internet connection will increase bandwidth, while decreasing costs
- Private WAN can still be used for customers that can't use the Internet due to regulations or corporate policies



N

Appliance Advantages

- Hands-free deployment: Insert the CD and server images in just a few minute
- Appliance look and feel that eliminates the need to manage the OS
- Soft appliance that can leverage existing hardware
- Remote management through Web browser, Telnet, or command line

N

Appliance Advantages

Disaster tolerant solution that provides easy recovery

- Local appliance is a disposable service cache
- If it fails, throw it away
- Until replacement hardware is found, services are available from the Central Office

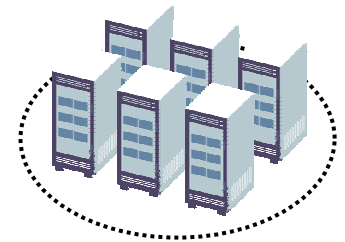


N

Intelligent Server Consolidation

Centralize business apps, but still provide needed local services such as file and print

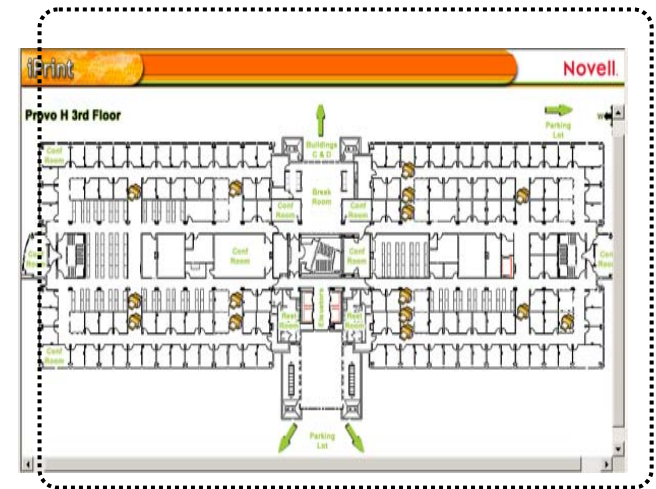
- Consolidate line of business apps into central portal and expose through Web browser or Citrix
- Consolidate IT support processes
- Local file and print services provided by Nterprise Branch Office appliance



N File and Print

Improves the productivity of branch office employees through local file and print services

- Access and share files on local appliance using any desktop OS - Windows, Mac, Linux/Unix
- Multiple protocol support - NCP, CIFS, AFP, NFS, FTP, HTTP, HTTPS
- Print through local appliance using iPrint
- Discover and install printers using Web browser
- All print spooling occurs on the local appliance





Nterprise Branch Office Deployment Requirements

Central Server

- An LDAP-enabled eDirectory™ tree running DS 8.6.2 SP 1 or later with simple passwords assigned to all user
- (Optional) NetWare® 6 SP2 or NetWare 5.1 SP5 for backing up data to the central office using RSync software
- If using the Internet, open the necessary ports for Nterprise Branch Office appliance to communicate with Central Office

Branch Office

- Server class PC with a a Pentium II or AMD K7 processor or better
- 512 MB of RAM minimum (1 GB recommended)
- 9 GB hard disk storage minimum
- Bootable CD-ROM drive and floppy drive



Other Admin Tools

Web based Administration

- Nterprise Branch Office Web Administrator
 - https://ip_address:2222
- DARCI - Direct Action Response Command Interface (Section 508 Compliant)
 - https://ip_address:2222/darci

Telnet (Off by Default)

Command line

Optional

- Portal Administration (available in Web Administrator)
- NoRM (available but not a published tool for Nterprise Branch Office)



@ 10.0.0.2 - Microsoft Internet Explorer

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Nterprise Branch Office Setup Wizard

Welcome to Novell® Nterprise™ Branch Office™ Setup Wizard


You can set up Nterprise Branch Office appliance as a stand-alone appliance or as part of a central office network.

IMPORTANT: If users will log in using LDAP username and password or data from the appliance will be backed up to the central office, configure your central office servers prior to completing this wizard. See "[Nterprise Branch Office Setup Guide](#)" in the documentation to complete these tasks.

Once these components are installed, Nterprise Branch Office Setup wizard allows you to set:

- Appliance supervisor password (required)
- Appliance DNS name (optional)
- User Access Provisioner settings (optional--requires an LDAP certificate you created before running the wizard)
- Replication (optional--requires replication be on the central office servers before running the wizard)

If you do not configure the DNS name, User Access Provisioner and replication now, they can be configured later using the Nterprise Branch Office Web Administrator utility.

 Start



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Step 1: Set General Settings

Set supervisor password, appliance name, DNS name, and DNS server address. A password change will cause the browser to ask you to relogin after you finish the wizard.

Set supervisor password

Enter supervisor password:

Re-enter supervisor password:

Set Appliance Name

Enter the appliance name:

Set DNS Name, Domain, and Server Address

Enter the DNS name:
(e.g. branchoffice)

Enter the DNS domain:
(e.g. somecity.mycompany.com)

Enter the DNS server address:

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Nterprise Branch Office Setup Wizard



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Health: Yellow

IP Settings
[IP Address](#)
[IP Access Protocols](#)
[Authentication Sources](#)

Date & Time Settings
[Date & Time](#)
[Time Zone](#)

Configuration Settings
[Replication](#)
[Local Backup](#)
[Import/Export Settings](#)
[End User Web Access](#)
[Portal Administration](#)

iPrint Management
[Printer](#)
[Printer Drivers](#)

Nterprise Branch Office Upgrade
[Upgrade](#)

[Shutdown](#)
[Restart](#)

IP Address

Appliance IP Address:

Appliance Subnet Mask:

Default Gateway IP Address:

DNS

Name	Domain
<input type="text" value="boma"/>	<input type="text" value="novell.com"/>

DNS Server IP:

Appliance Adapters:

```
APP_K6XM8STJP
├── eth0
│   ├── Subnet: 10.0.0.0
│   ├── Mask: 255.0.0.0
│   └── Addresses:
│       └── 10.0.0.2
```

[When do I need to apply settings?](#)



Branch Office Case Study

Novell Inc.

1 Situation

- 5,000+ distributed employees
- 117 offices worldwide
- 40% work outside traditional office
- 171 applications
- Expensive to manage

2 Approach

- Deploy Nenterprise Branch Office appliances
- Consolidate servers and apps to data center
- Deploy corporate portal
- Simplify directory structure

3 Business results

- 50% reduction in WAN costs
- 70% reduction in remote connection costs
- 50% reduction in onsite visits
- **Nearly 10% reduction in total IT budget**



Best Competing Alternatives

Status Quo <ul style="list-style-type: none">• Continue with your current architecture and systems• Keep private WAN connections between sites• Novell loyalists continue to manage a partition per site and 3 replicas per partition• Continue to send IT staff on site or staff IT resources locally• Cost continues to escalate - complexity remains high	Microsoft <ul style="list-style-type: none">• Deploy 2 domain controllers at the branch• Deploy 2 domain controllers at a hub/data center to support the branch• Use private WAN links• Cost continues to escalate - complexity is high
Total Centralization <ul style="list-style-type: none">• Consolidate the architecture and centralize all services• IT group saves money and resources• Take a productivity hit with the workforce at the satellite offices• Users rebel and start taking things into their own hands	Cheap SOHO Appliance <ul style="list-style-type: none">• Deploy small form factor SOHO appliances at the branches• Toshiba \$1,150 - \$1,610• PowerElf \$1,699 - \$2,633• SUN Cobalt Qube \$1,149 - \$2,400• No centralized management - requires onsite management

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Thanks for Coming...

Please remember to turn in the evaluation form

Other ATT courses available on the web

- <http://www.novell.com/registernow>
- Customized training also available

Thanks for supporting Novell!!!