Open Enterprise Server
a technical overview

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Solutions Creation & Marketing
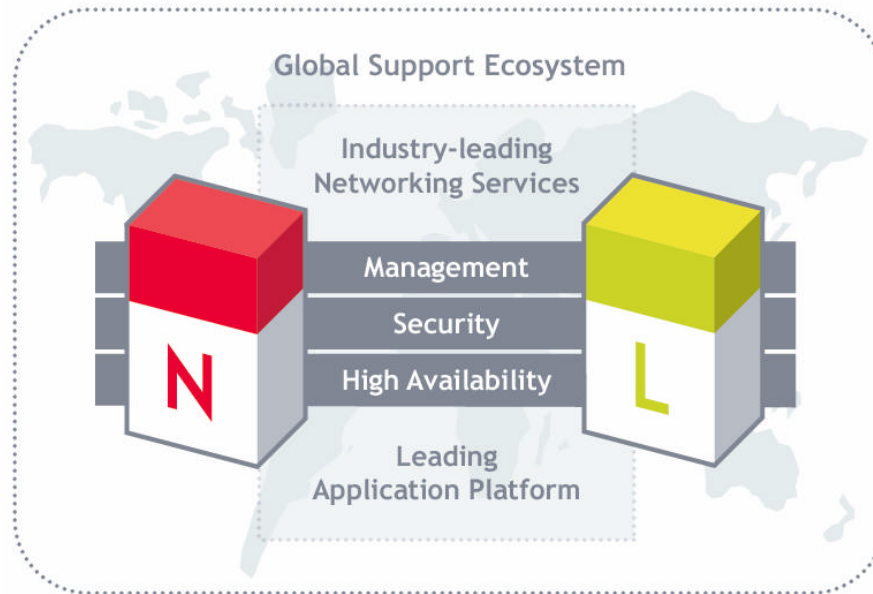*Novell, Inc.*
dclower@novell.com

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Open Enterprise Server
what is it?

Open Enterprise Server

Global Support Ecosystem

Industry-leading Networking Services

Management

Security

High Availability

N   **L**

Leading Application Platform

Unmatched Enterprise Security

Common Management

Reliable, Scalable, Enterprise Services

1,000s of Applications

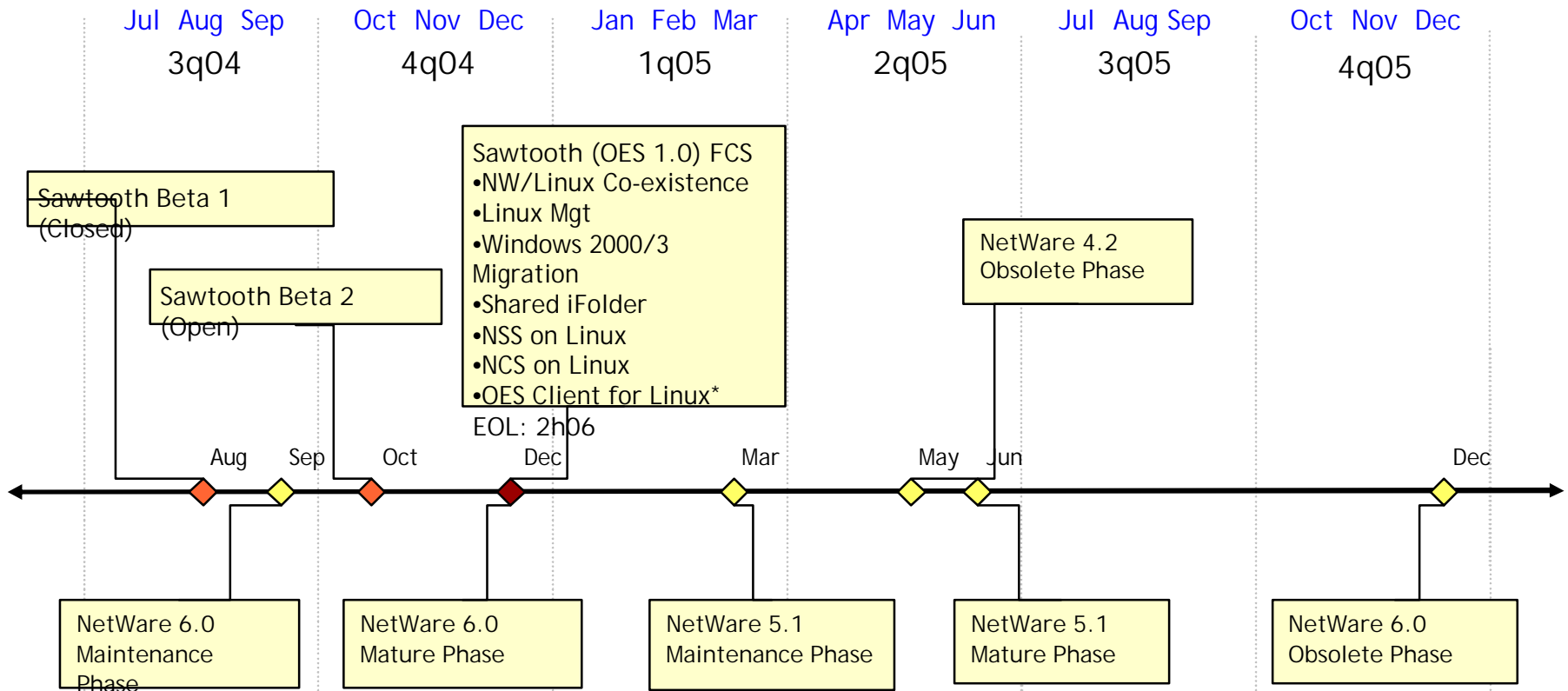Greater Choice and Flexibility

Realize Benefits from Open Source

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Open Enterprise Server and the Long-time NetWare Customer

Key Dates
OES & NetWare

Jul Aug Sep	Oct Nov Dec	Jan Feb Mar	Apr May Jun	Jul Aug Sep	Oct Nov Dec
3q04	4q04	1q05	2q05	3q05	4q05

Sawtooth Beta 1 (Closed)

Sawtooth Beta 2 (Open)

Sawtooth (OES 1.0) FCS
- NW/Linux Co-existence
- Linux Mgt
- Windows 2000/3 Migration
- Shared iFolder
- NSS on Linux
- NCS on Linux
- OES Client for Linux*

EOL: 2h06

NetWare 4.2 Obsolete Phase

Aug   Sep   Oct   Dec   Mar   May Jun   Dec

NetWare 6.0 Maintenance Phase

NetWare 6.0 Mature Phase

NetWare 5.1 Maintenance Phase

NetWare 5.1 Mature Phase

NetWare 6.0 Obsolete Phase

Maintenance Phase: New and Upgrade part numbers removed from Price List.
Mature Phase: No more support packs or critical fixes. Additive Licenses are removed from Price List.
Obsolete Phase: Technical Support is no longer available except through special contracts on a customer by customer basis.

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What's New
in the NetWare kernel

- BASH
- PCI-X Support
- USB device support enhancements – Multi LUN
- MSI (Messaged-Signaled Interrupts) support
- ACPI 2.0 support
- Internal debugger
  - Soft break points
  - Improved SMP support
  - Protected memory debugging improvements
- Search facility for NetWare registry
- Red Hat Package Manager
- CIMOM services
- Fast reboot (failover) configurable

- MONO
- NXBit Support
- Python-based RUG
- SYSLOG
- Reboot watchdog –

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What's New
in storage

Freeze/Thaw Support
- iFolder
- MySQL
- NSS
- CIMOM

Cluster Enablement
- NFS   (active/passive & active/active)
- CIFS   (active/passive)   • FTP   (both)
- AFP   (both)   • NetStorage   (active/passive)
- MySQL   (active/passive)   • Apache   (active/passive)
- iFolder   (active/passive)   • iPrint   (active/passive)
- LDAP   (active/passive)   • Virtual Office (active/passive)
- DNS/DHCP   (active/passive)   • DHCP   (active/passive)

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What's New
in file services

iFolder
- Bug fixes in iFolder 2.1.4
- Peer to peer iFolder (NetWare, stretch goal)
- Sharing in iFolder 3.0 (stretch goal)

NetStorage
- Posix file system rights
- Bulk operations
- Move files/directories
- Salvage
- Modify rights

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What's New
in printing

iPrint

- iPrint client for Linux
- iPrint client for Mac
- Pre-set printer driver defaults
- Custom banner pages
- DNS printer name support
- Auditing
- Command line management
- Printer consolidation tool
- Support for Port 9100

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What's New
in management

CIM Instrumentation
- Health Monitor: Processor performance, Physical Memory, Network Performance, Basic Server Configuration, Process Reporting
- Storage Management
- iPrint

iManager performance enhancements

Browser support
- Mozilla
- Epiphany

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What's New
in other areas

Logging and Auditing
- Manageability for Basic Logging Functions
- File and File Directory Structure Logging
- eDirectory Logging

Install
- RPM Packaging
- RCD Support
- Better Silent Installs Support

Server Consolidation Utility
- Active Directory migrations

Client32

(To be discussed in the client section)

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What About …
the application space?

Updates
- Apache 2.0.49
- JVM 1.4.2.?
- Tomcat 4.1.30
- MySQL 4
- exteNd App Server 5.1

MONO on NetWare

And … entitlement to run Intel-based x86 applications on SUSE Linux Enterprise Server !!

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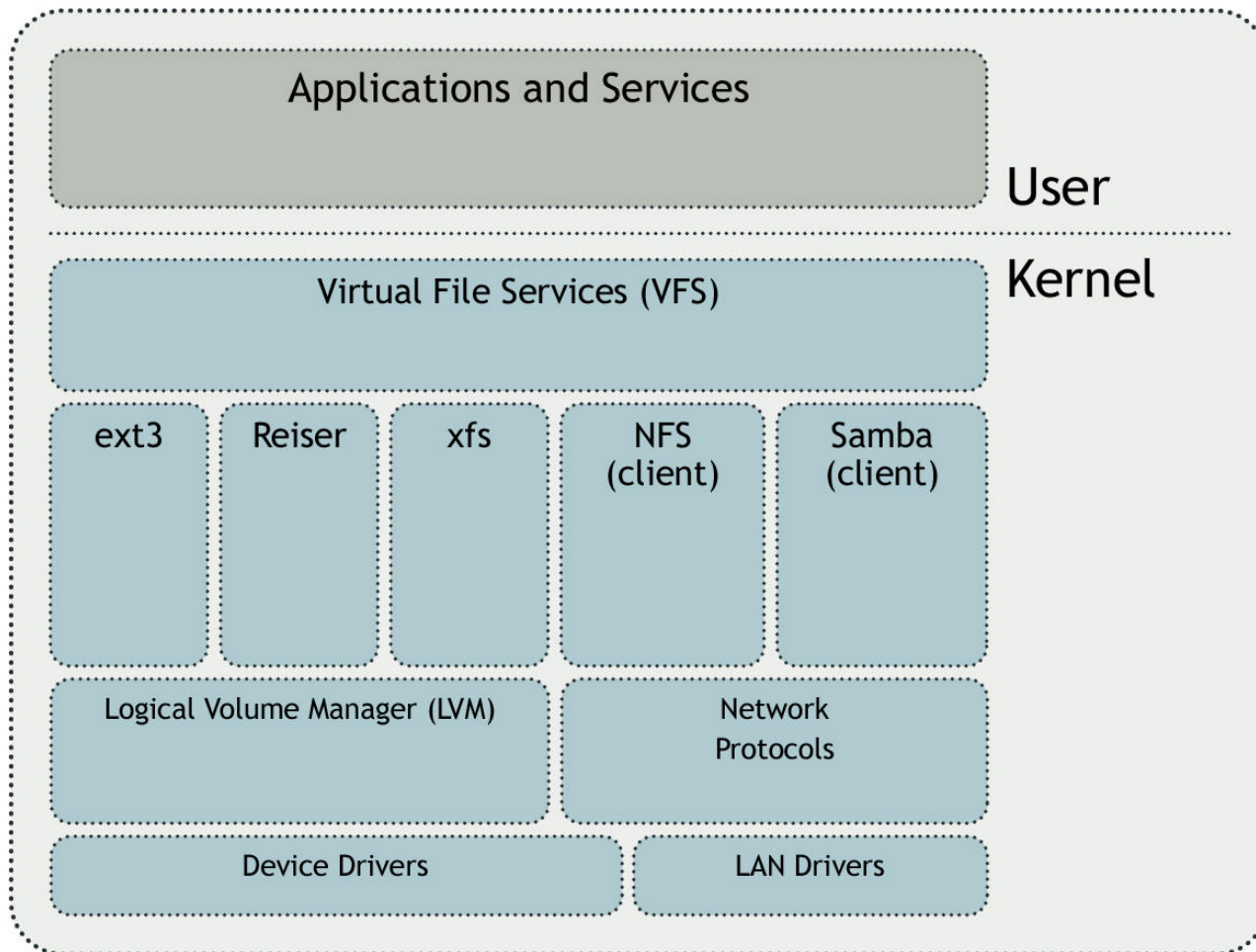# Storage and Clustering

Linux
storage architecture

Linux File System Design Goals

- Multiple hardware devices - provide access to many different hardware devices

- Multiple logical file systems - support many different logical file systems

- Multiple executable formats - support several different executable file formats (like a.out, ELF, java)

- Homogeneity - present a common interface to all of the logical file systems and all hardware devices

- Performance - provide high-speed access to files

- Safety - do not lose or corrupt data

- Security - restrict user access to access files; restrict user total file size with quotas

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Linux
architecture

Applications and Services — User

Kernel
- Virtual File Services (VFS)
- ext3
- Reiser
- xfs
- NFS (client)
- Samba (client)
- Logical Volume Manager (LVM)
- Network Protocols
- Device Drivers
- LAN Drivers

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ACL package allows for multiple per file or directory

Linux File System Limitations

- Restricted to POSIX compliance
  - Case Sensitive
  - Single stream
- Simplistic access controls
  - Read, Write, eXecute for Owner, Group, World
  - Only one per file or directory
    - ACL package allows for multiple per file or directory

Volume Manager Limitations

- Hard device relationships
- No on the fly expansion

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Novell's File System
NSS

Novell Storage Services

- NetWare style file system
- Rich ACL model
  - S,R,W,C,E,M,F,A + inheritance + IRFs
- Rich Attributes
  - 17 different file attributes
  - Plus extended attributes (application defined)
- Integrated with eDirectory
  - For enterprise wide management

NSS on Linux

- Open Enterprise Server (OES) v1.0
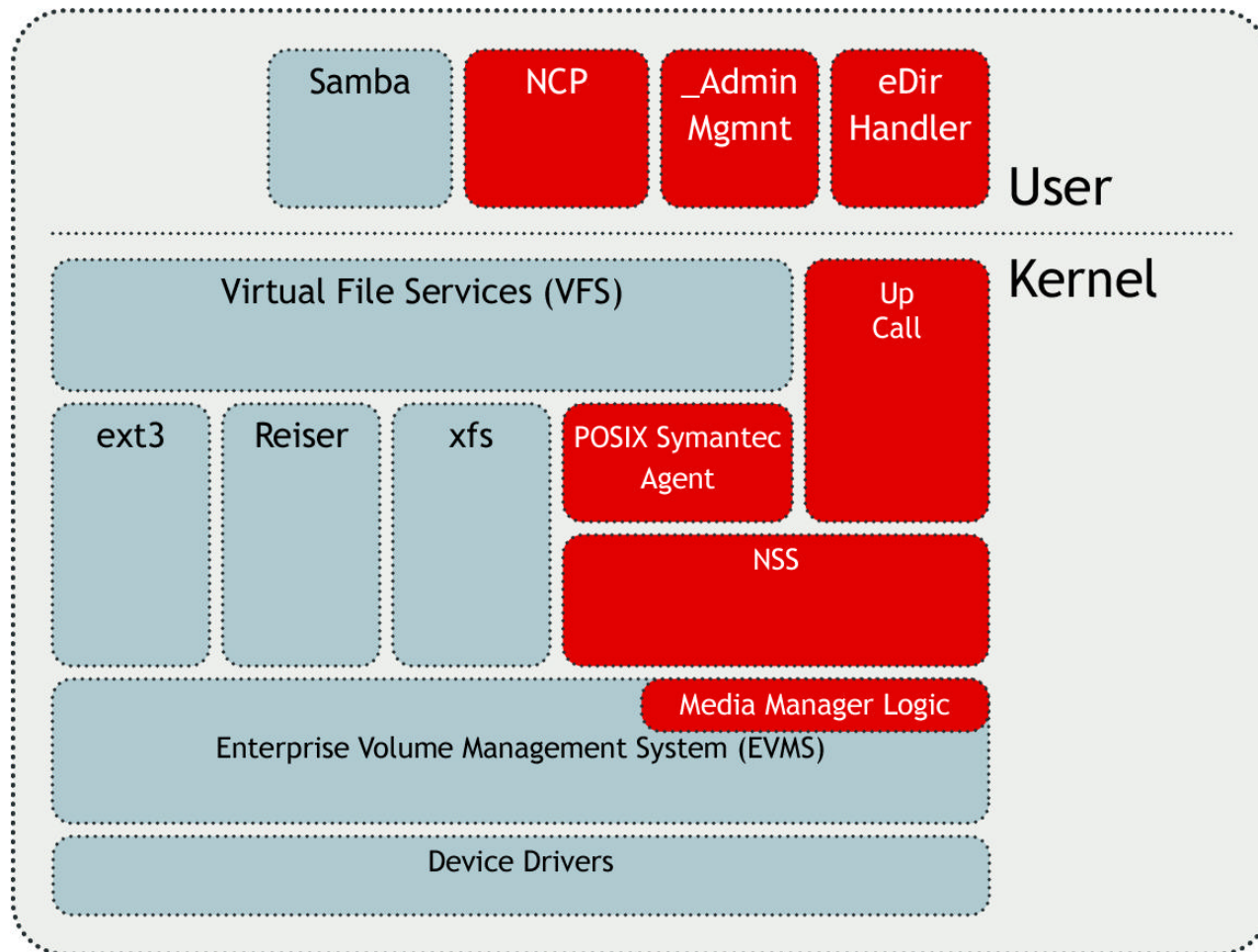- Implemented as a File System in Linux

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Linux
NSS architecture on linux

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Why?
NSS on linux

Why? - Two goals:

Rich & Secure File management

- Tree Visibility
- Inherited Rights
- Salvage
- Quotas
- eDirectory GUIDs
- And more (NONE of the existing 20 or so Linux file systems have these features)

Easy Migration

- Simply mount existing data on Linux

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NSS Only?
are other file systems supported?

No.

Pick the right tool for the right job:

- Choose the workload!

    - For database: Pick a good Linux FS like EXT3 or Reiser

    - For Shared User data: Pick NSS

    - For HPC: Pick Lustre

- Also look at staff training/familiarity

    - For Mainframe Data migration: Pick VFS (Veritas) or JFS (IBM) based on existing data format & training on Unix systems

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What About …
non-NSS file systems?

OES v1 will support Open Standards management

- Generic Linux File System Management through standards

    - Hooked into eDirectory and iManager

- Common Information Model (CIM) and Web Based Enterprise Management (WBEM)

- ACLs tied into eDirectory via RFC2307

- Pluggable Authentication Module (PAM) for eDirectory (called LUM)

SNIA SMI-S

- Storage Networking Industry Association specification

- Storage Management Initiative - Specification

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Clustering
what's included?

NWCS on Linux
- eDirectory Enabled
- Full rich HA Clustering solution

Any fast mount Journaled File System
- Not just NSS
- EXT3, Reiser, etc.
- Clustered Parallel File Systems (GFS, Polyserv, Lustre, Etc.)

EVMS integrated
- Cluster Volume Broker integrated with EVMS

SUSE Clustering Base
- Simple 2 Node only Heartbeat package for service management.

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Clustering
what else?

Mixed Clusters
- NW Kernel OES and Linux Kernel OES in same cluster
- Will not support other versions mixed.

Failover Mixed:
- ONLY resources that have identical configurations on both platforms.
- MySQL, Groupwise (both still to be proven).

Failover Migrate:
- Planning required to migrate a resource from NW to Linux or back for those that are not 100% identical cross platform.
- CIFS to SAMBA for example.

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Linux
backup applications

File System APIs

- Standard Linux File System Application APIs (Open, Read, Write, Close)
  - No "Archive" state.
  - Must look at file dates and compare with own backup database.
    - Very inefficient

Applications

- Custom agents to vendor specific APIs
  - Databases: Oracle, MySQL, etc.
  - These agents get the richness offered by the vendors

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Linux
backup limitations

VFS for file systems only

- Only metadata available via POSIX interfaces

  - Can't even get ACL package enhancements

- No interface for backup specific applications

  - Mod date change issues

  - Simultaneous access issues

  - Extensibility issues

No common Backup interface for Applications

- Each vendor specific, agents abound.

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Linux
a backup infrastructure

Open Source

- Ubiquitous for all Linux distributions

Rich API

- Standards based
- Specific features/functions for backup
- Features for Information Lifecycle Management (Event tracking)

Object Oriented

- Support any data/metadata into a common stream object
  - Granular data types (Database records)
  - Data associations preserved (Emails in a mail box)

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Linux
more backup infrastructure

Multiple Formatters
- Not just SIDF, but PAX and other proprietary formats
- Format conversion
- Cross file system restores

Layered Architecture Model
- Rapid development of application specific target service agents

Proven Process Model
- Scalable, high performance backup & restore processes.
- All applications & FS benefit from performance improvements

Virtualized and Normalized interfaces
- Applications, file systems and backup applications can all be upgraded independently and still interoperate.
- Location transparency of applications/backup hosts.

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Linux
other backup components

Bulk Transfer agents

- Streaming capability for moving backup/restore data sets efficiently.

- Parallel IO

- Similar concept to NetWare SMS SMDR

  - But much improved for performance / scalability

TSA for NSS on Linux

- Backup/restore rich attributes and ACLs

- Restore to Linux from NetWare Backup

- Coexist in same network with enterprise backup applications.

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Open Enterprise Server and the Linux Opportunity

Open Enterprise Server
networking application services for the enterprise

	File Services	iFolder, NSS	Personal file backup and anytime/anywhere access. Granular file trustee rights management and virtual storage mgt.
	High Availability	Novell Clustering	Clustering / high availability for NetWare and Linux
	Print Services	iPrint	Support IPP standards-based printing for Windows, Mac and Linux clients. Using web-based maps, users can quickly find and install printers.
	Identity Services	eDirectory	eDirectory. Web address book w/search and self-administration.
	Administration Services	iManager	Browser-based single point of administration for all OES Services.
	Web Experience	Net Storage, Virtual Office	Unified web access experience with gadgets to all OES Services. Use Tomcat and a Java Virtual Machine. Include exteNd and MySQL for ISVs.
	Install and Patch/ Update Services	RPM & Red Carpet	Server-based install with Express and Custom options. Red Carpet Daemon pre-configured to use a Novell hosted Red Carpet Enterprise server with patches and updates
	Health Monitoring Services	CIM & iManager	CIM-based management and providers. Server health monitoring integrated into iManager.
	Desktop Integration	Novell client experience	Login script support, file access, background authentication, iPrint, iFolder available both on Windows and Linux desktops

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Open Enterprise Server v1.0
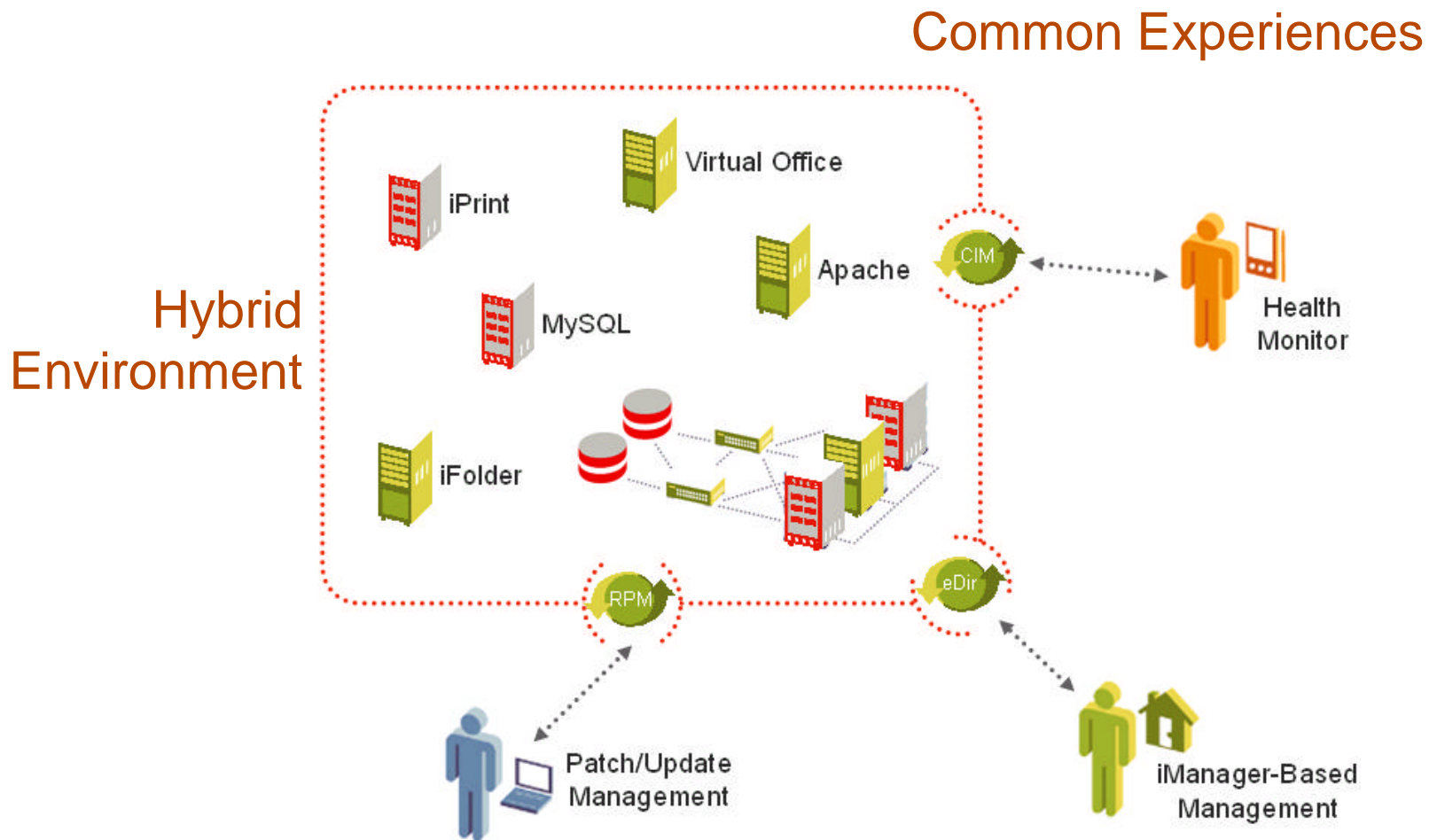## service differences by platform

OES-NetWare

- iFolder 2.1.4
- iPrint 4.5 (NDPS & iPrint)
- exteNd App Server
- Nsure Audit

OES-Linux

- iFolder 3.0 (sharing)
- iPrint 5.1 (iPrint only)
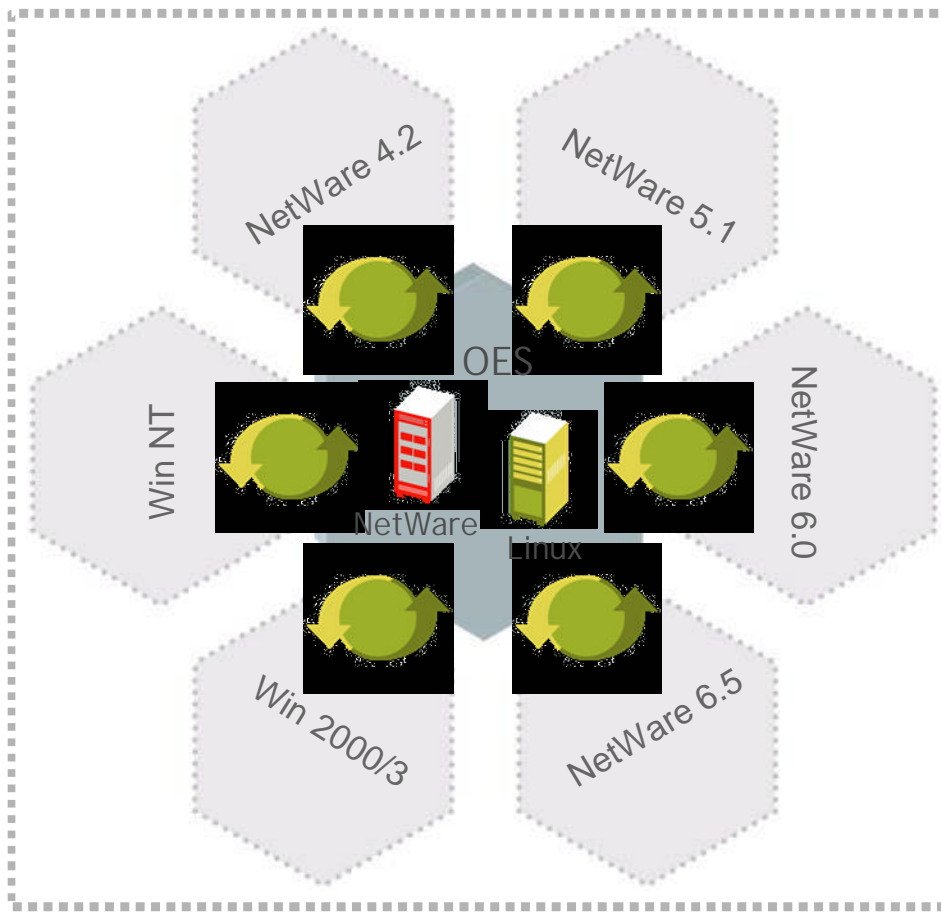- No exteNd App Server (jboss)
- No Nsure Audit (SP1)

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Coexistence:
deployment agility

Common Experiences

Hybrid Environment

iPrint

Virtual Office

Apache

MySQL

CIM

Health Monitor

iFolder

RPM

eDir

Patch/Update Management

iManager-Based Management

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Coexistence:
with existing infrastructure

Directory Services Additive
NW 4.x: NDS 6.21
NW 5.x: NDS 7.62c, 8.58
NW 6.x: eDir 8.7.0, 8.7.1

Seamless file services
integration (Windows,
NetWare, Unix, Linux)

Linux and Windows
desktop support

Directory synchronization
(NT, AD, eDirectory, etc)*
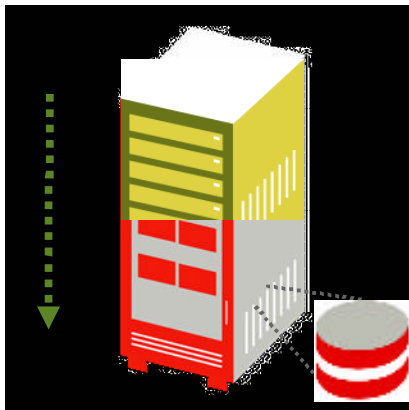
* Requires additional purchase **Novell.**

Upgrades
NetWare-to-linux (copyless)

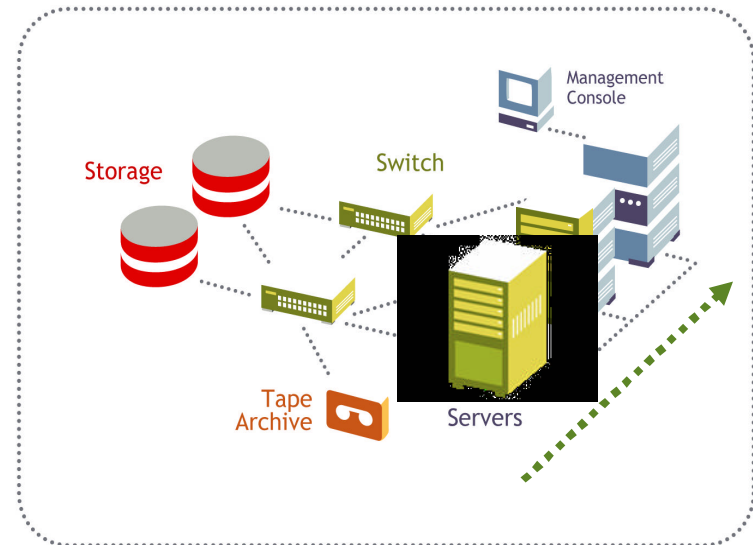## Made possible by NSS on Linux

In-place Upgrade

- Works with directly attached storage
- Good for non-SYS volumes only

Rolling Upgrade

- Working solution for NSS-based SANs
- Zero down time

Management Console

Storage

Switch

Tape Archive

Servers

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Familiar Console Commands
possible OES-provided "aliases"

- config
- volumes
- modules
- down
- restart/reset server
- version
- NSS commands
- cluster commands
- iPrint commands

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Installation Options
supported on OES

OES-NetWare Onto Bare Metal

- Novell Installation Services (NIS) Install
- Custom Installation
- Pattern Deployments
- OS Only Installation (basic pattern)
- Template Install (response file-based)

OES-Linux Onto Bare Metal

- YaST-Integrated Installation ("magic" CD)
- YaST Pattern
- YaST Custom Install
- YaST-based OES Pattern Deployments

OES Services On Existing Linux OS (SUSE or Red Hat)

- OES-Linux Services CD Installation
- OES-Linux Services Tarball Installation

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Tools
for upgrading & migrating

Remote Upgrade
- Same hardware

Migration Wizard
- Different hardware – same name

Server Consolidation (SCU)
- Different hardware – different name
- Different hardware – different tree
- Windows NT/AD migration

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Tools
Capabilities

Supported Sources

- NetWare 4.2, 5.1, 6.0, 6.5 (eDir, NDS, NSS, Traditional NW FS)
- Windows NT 4 (NT Domains, NTFS)
- Windows 2000/2003 (AD, NTFS)

Supported Destinations

- OES-NetWare
- OES-Linux

Capabilities

- Users (including user space restrictions)
- Groups
- File system (trustees and ownerships)
- Containers (users and groups only)
- Printing (stretch goal)

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Packaging
how will OES be delivered?

OES CDs
- NetWare OS
- SLS 9 (Enterprise edition)
- OES-NetWare Services
- OES-Linux Services
- Windows Client Components
- Linux Client Components

OES ISO Images
- NetWare OS
- SLS 9 (Enterprise edition)
- OES-NetWare Services
- OES-Linux Services
- Windows Client Components
- Linux Client Components

OES-Linux CDs (included as one or more additional CDs with the shipping SLES 9 CDs)
- SLS 9
- OES-Linux Services
- Linux Client Components

OES-Linux ISO Images
- OES-Linux Services
- Linux Client Components

OES Linux Services Tarball
- OES-Linux Services
- Linux Client Components

OES Linux Services Red Carpet Channel RPM
- OES-Linux Services
- Installer Package

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Client & Client Strategy

Client
working strategy

- Get OES Client for Linux right ("clientless")
  - Complete the experience/value: login scripts, optional NCP file redirection, 'N' functionality, integrated iFolder, iPrint, NetDrive, etc., Copernicus integration (SSO, Kerberos auth, etc.)
- Integrate it with Novell Linux Desktop
- Offer same complete functionality on Windows and Mac
- Drive innovation (i.e., integration of access points for Novell services) through this common client

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Customer Feedback

"I'd really, really like to have a NetWare client for Linux that supports <u>filesystem redirection</u> and <u>user home directories</u> on the NetWare server. You obviously have no idea what <u>a tremendous, gaping hole</u> that is in your suite."

"Great step in the right direction! CRUCIAL that you decided to offer a nwclient to run a <u>login script</u> against the linux backend. Did you say also that there will be a nw client for the linux desktop? (say yes, say yes!)"

"A major hurdle we have was this. Our users have been around for a long time and have become accustomed to <u>mapped drive</u>. I very exicted to read an article this morning that they will be supported."

"PLEASE, NEVER ever consider to abandon <u>NCP</u> in favor of Samba and it's vastly inferiour CIFS protocol."

"The most important in the first release is to have NSS file system, iPrint, iFolder and <u>NetWare client for both Windows and Linux desktops</u>. If you can manage this and also be very aggressive in marketing I am sure it will be a huge success."

"The <u>client components</u> are more useful to me at this point. I have been trying to get my supervisor interested in Linux desktops but lack of user-friendly client support has been a problem."

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Poll
Cool Solutions

Which one of these do you consider the most important of the Open Enterprise Server services?

Mapped Drive Support for Linux	27%
iManager	19%
Novell Storage Services	17%
Clustering	12%
Directory Management	12%
iFolder	8%
iPrint	4%
Other	2%

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OES Client for Linux

Driving Factors
OES client for linux

1. Run-away OES success requires tight integration of access points to OES services into the Linux desktop

  - Visibility, presence
  - Ease of use, default behaviors
  - Rich experience, even better than Windows
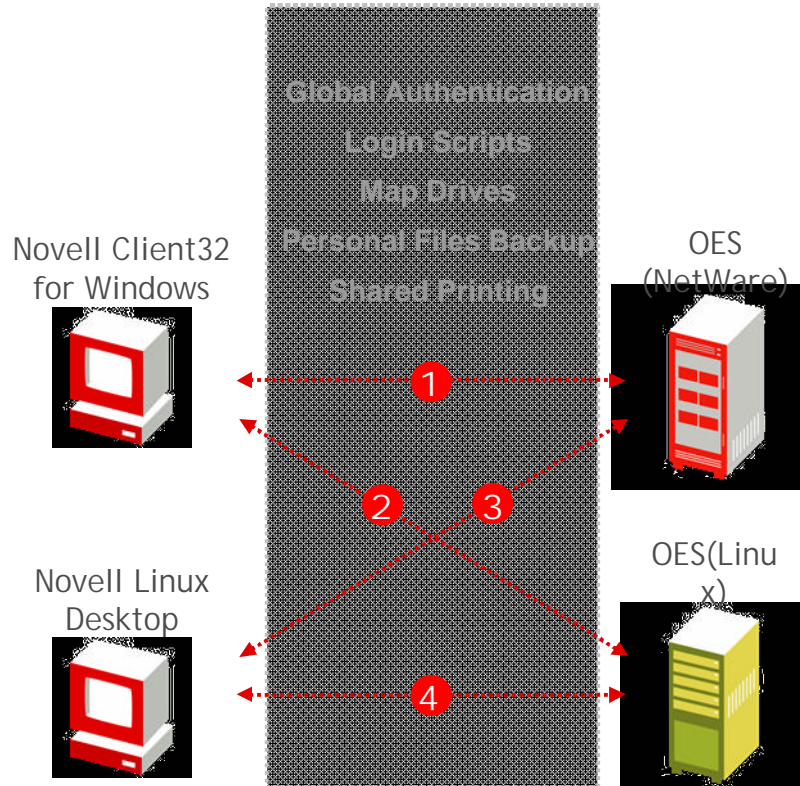
2. Customer Requirements

  - Make Linux a viable alternative to Windows
  - Preserve Client32-like experience

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Client
preserving the Novell experience

(1) Secure, scalable experience resulting from 2 decades of innovation in the workgroup productivity arena

(2)
- eDir on Linux srvr
- NSS on Linux srvr
- NCP on Linux srvr
- iPrint Srvr on Linux
- iFolder Srvr on Linux
- Novell login script support on Linux srvr

Novell Client32 for Windows

Novell Linux Desktop

Global Authentication
Login Scripts
Map Drives
Personal Files Backup
Shared Printing

OES (NetWare)

OES(Linux)

(3)
- Background auth on Linux desktop
- Novell login script support on Linux desktop
- iPrint Client on Linux desktop
- iFolder Client on Linux desktop
- Linux printer drivers on NetWare srvr
- Optional NCP support

(4)
- Capabilities of (2) and (3) combined

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Marchitecture
a simple diagram

Novell OES Client

OES Services Access

- iFolder Client
- iPrint Client
- NetDrive
- Network Login Script (mapped drive)
- File Access Redirector

- SSO
- Common Installation
- Consistent Desktop Presence
- Component-based Configurability

Copernicus Auth Frmwrk

| RSA | Kerberos | Liberty | SAML | NMAS | ... |

File Access Protocol

| NCP | CIFS | Web DAV | HTTP | FTP | NFS | AFP | ... |
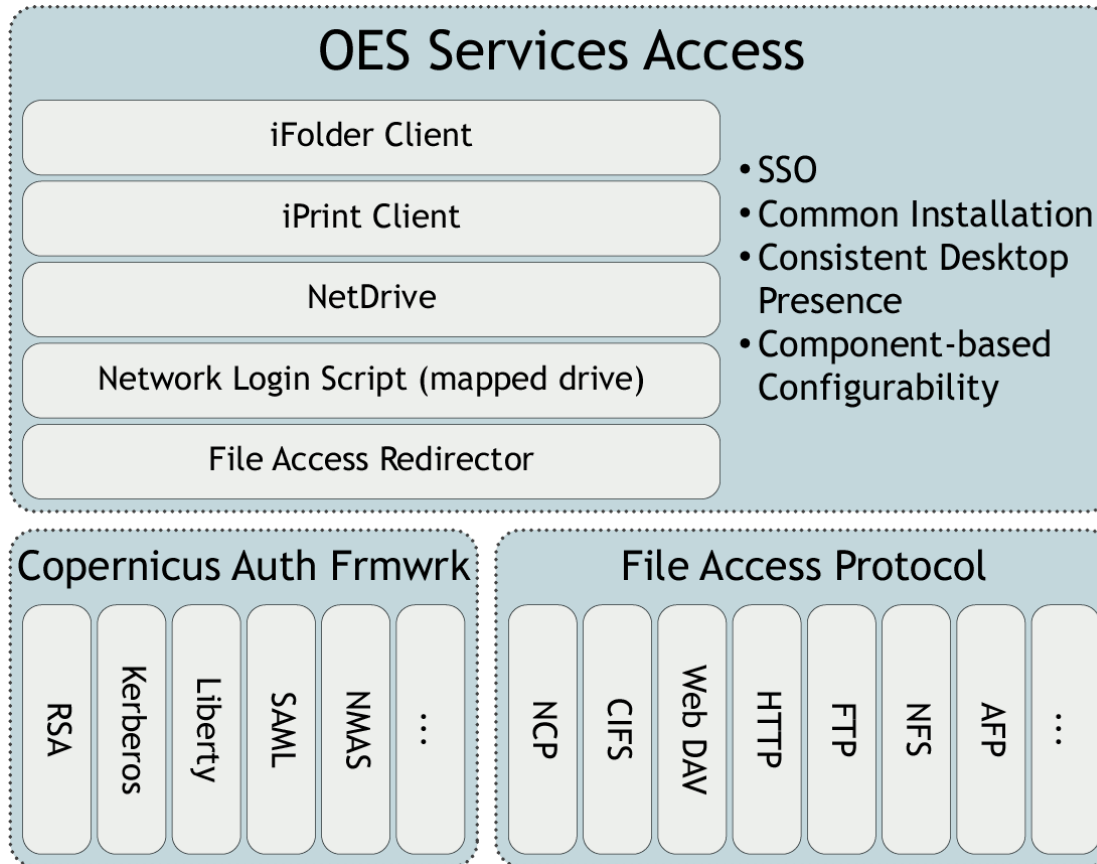
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Client
required development

"Basic" Functionality

    iFolder, iPrint, NMAS

    Novell login script support (mapped drives)

    Copernicus authentication framework

    NCP file redirection (optionally available)

    RSA-based authentication (optionally available)

"Stretch" Functionality

    Common OES Client Install

    Net Drive?

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Client
delivery vehicles

Sawtooth
> iPrint, iFolder, Net Drive, etc.

Web Download (shortly after Sawtooth)
> NCP file redirector
> Novell login script
> Mapped drives

Integration into NLD (Cassidy – Summer '05)
> Copernicus integration, SSO

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Client32

Novell Client v4.9
Windows NT/2000/XP

SP1a Features

- Greater than 4GB file support
- LDAP-Based Context-less Login
- UNC Path Filter (A performance optimization of service location and caching.)
- NMAS Client 2.3 Integration
- NICI Client 2.6.4 Integration
- Support for Novell DFS Junctions for NCP-based Clients
- Workstation Only check box is "sticky"
- Un-install from Add/Remove Programs
- Client download and install from a web page
- Force Logoff option on Login Screen Dialog
- Language Indicator on Login Screen Dialog
- File Op-Lock Level 2 Support

SP2 Features

- Service Location Protocol version 2 (SLP v2)
- Display of Advanced Password Policy settings
- Unicode file naming in mixed language environments

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