Samba-3: New Directions

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Agenda

- Goals and Directions for Samba-3
- New Features
  - Identity Management
    - The new ***passdb backend***
    - The role of ***idmap backend***
    - Group Mapping
  - Virtual File System Drivers
- New Tools

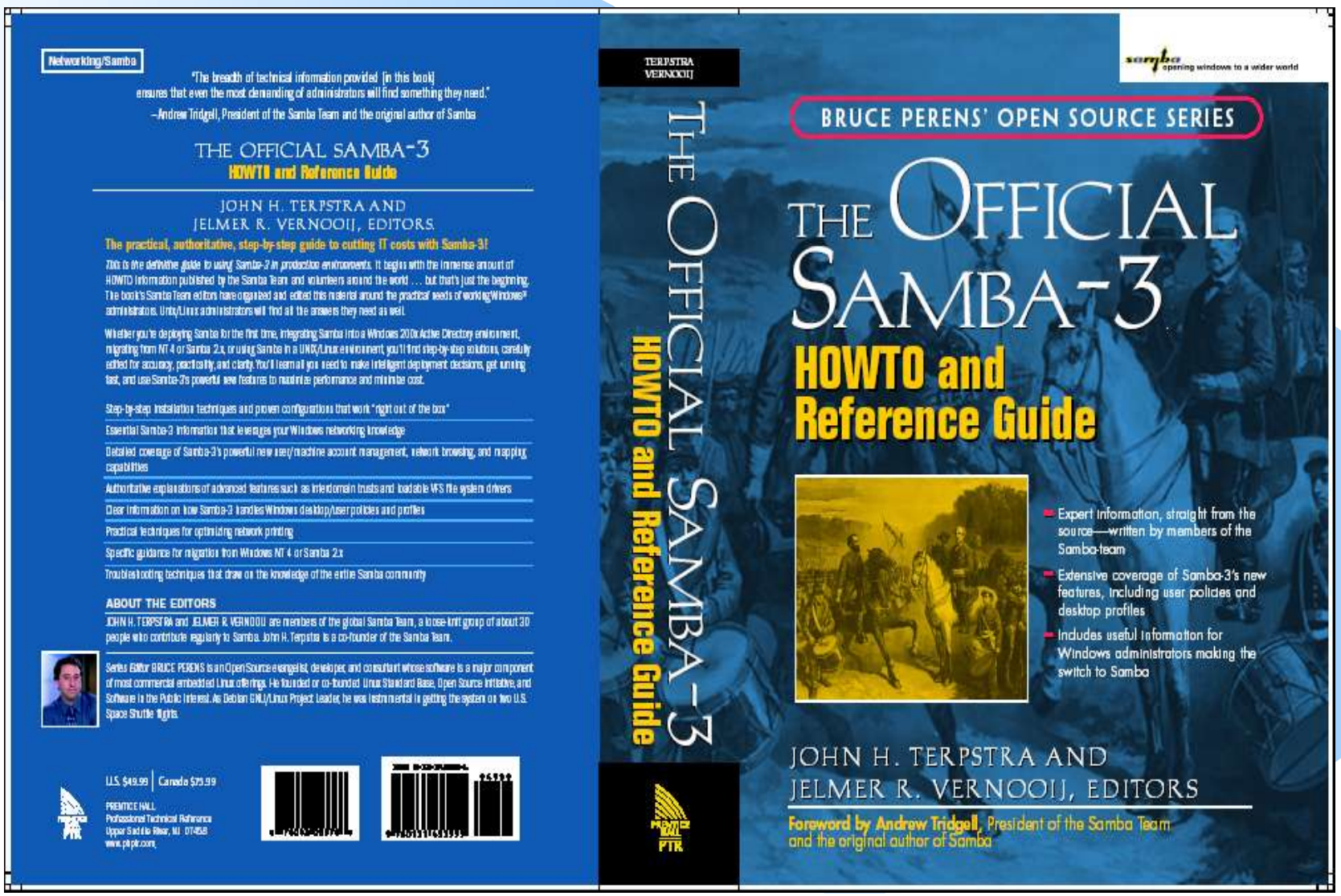
Samba-3 – Goals

- Answer user demand for Migration
  - NT4 to Samba-3
    - Better Domain Control
    - Improved Interdomain Trusts
    - Ability to migrate NT4 user and group accounts to Samba-3
- Native Active Directory Integration
  - Ability to run with plain CIFS over TCP/IP
- New / Better Bug Tracking
  - http://bugzilla.samba.org

Samba-3 – More Goals

- More Secure
  - Compatibility with Windows XP/2003
    - schannel and signing support
      - No more need for registry changes on clients
- Better Documentation
  - New Samba-HOWTO-Collection
    - Published by Prentice Hall
      "The Official Samba-3 HOWTO and Reference Guide", ISBN: 0-13-145355-6
      - Can be pre-ordered from Amazon.Com now

Samba-3 HOWTO & Ref Guide



Samba-3 – More Goals

- Better Internationalisation
  - Required a move to Unicode
  - Necessary to enable newer NT/2KX protocols
- More/Better Admin Tools
  - Allow management of users and groups
    - Not complete yet
      - New **net** command
      - Introduction of the *group_mapping.tdb*
      - Addition of the **profiles** tool
      - Addition of the **editreg** tool (not complete)

New Features

- Active Directory Support
  - LDAP/Kerberos
  - Can join ADS Realm
- Unicode Enabled
- New Authentication Subsystem
  - New loadable multi-module support
    - Passdb, VFS
- Better Security
- New default filename mangling system
- **Net** command
- Windows 32-bit error codes
- Better printer handling
- Migration Support
- Interdomain Trusts
- More ...

Identity Management Changes

- New *passdb backend* parameter
  - Default: smbpasswd, guest
  - Optional:
    tdbsam, ldapsam, mysql, xmlsam, ldap_compat
- Default preserved Samba-2.2.x behaviour as much as possible
- The *guest* parameter is default
  - Provides default account for the guest user

LDAP Improvements

- Compatibility mode available so administrators can migrate when they are ready
- New schema
  - Has support for future features
    - Logon Hours, Logon Machines, Password change control, more ...

LDAP Recommendations

- Recommended to use OpenLDAP 2.1.x or later
  - Can use:
    - Sun One ID Server (iPlanet)
    - IBM Tivoli Identity Manager
    - Microsoft ADAM
    - Novell eDirectory

Virtual File System Support

- Recycle Bin facility extended
  - New Syntax – read HOWTO for details
- Audit & Extd_Audit modules
  - Extd_audit logs to normal log files
  - Audit logs to syslog only
- Fake_perms module for Profile support (for read-only profiles)
- Others: NetAtalk, Read_Only, example modules to encourage 3rd party devel.

New Tools

- New or enhanced commands:
  pdbedit, net, profiles, editreg, SWAT
  - Note: editreg is not complete
- New Samba Components:
  wrepld (not complete)
  winbindd – now manages ID-mapping
  group_mapping.tdb
  – stores NT <-> UNIX ID database

Samba and the need for Standardisation

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Agenda

- Short history of Samba/MS Windows protocols
- Brief review of recent protocol changes
- The future of Samba
  - What must change
  - What may change
  - Preferred Action
- Summary

Short History

- Server Message Block (SMB) protocol
  - Developed by IBM/3Com/Microsoft
  - Documented as in RFC1001/1002
  - Published by Xopen Committee
- Approx. 1992:
  - Windows NT3.1 protocol enhancements
- Approx. 1995:
  - Extended for NT4

More Recent History

- Protocol Renamed to:
  - Common Internet File System (CIFS)
    - Provides significant extensions
    - Samba-Team helped to document protocol
      - Necessary for implementation
        - NT4 / 200x Domain Control Implementation
    - Microsoft Published Documentation
      - Does NOT cover DCE RPC Protocols
        - Does NOT cover the Domain Control Protocols that sit on top of them either

Recent Changes

- Original protocols very insecure
  - Uses *anonymous* connection to IPC$ share
    - Trusted and can open possible exploits
  - Microsoft have implemented techniques to tighten security
- Original SMB protocols use:
  SMB / NetBIOS / TCP/IP == NetBT
  Uses B/Cast or WINS (NOT DNS)
- Also uses:
  DCE RPC / Named Pipes / NetBT

More Recent Changes

- MS Windows 200x / XP
  - Can run without NetBIOS over TCP/IP
    - Can run:
      SMB / TCP/IP == NetBIOSless SMB
      - Heavily depends on DNS
  - Introduces Digital Signing
    - Encryption
      - schannel, sign'n'seal
    - Not the same as *encrypted passwords!*
  - New protocol extensions (DCE RPC)
    - Auto added with service packs

Futures – I

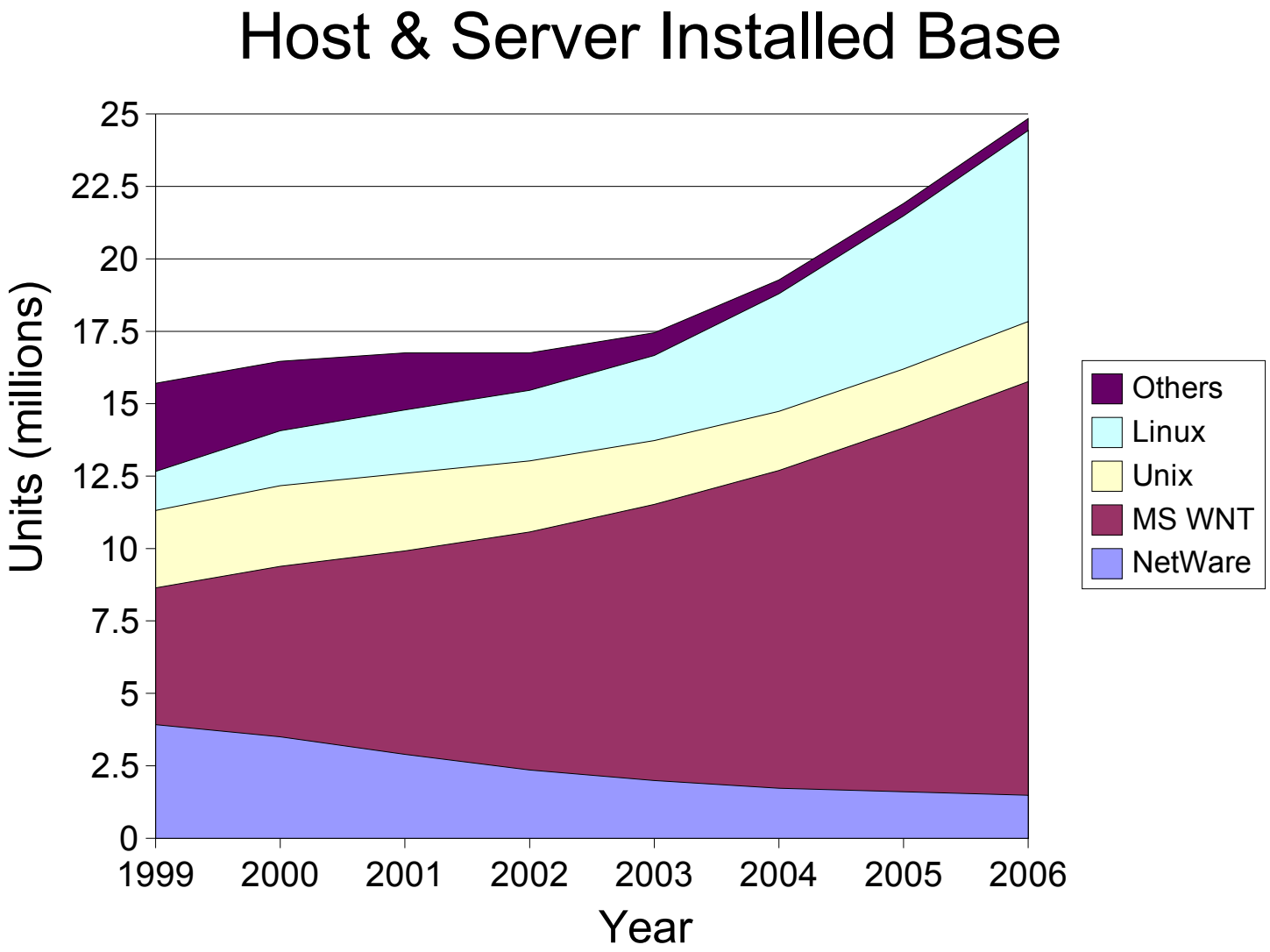
- What MUST change:
  - CIFS is not a standard
    - Constantly changing
      - Adding proprietary functionality
    - Protocol is extremely complex
    - Risk that after any service pack or on-line update an old protocol may be broken
      - Affects Microsoft clients as much as Samba
      - Means ALL systems must be kept up to date **and** at the same update / revision level

Futures – II

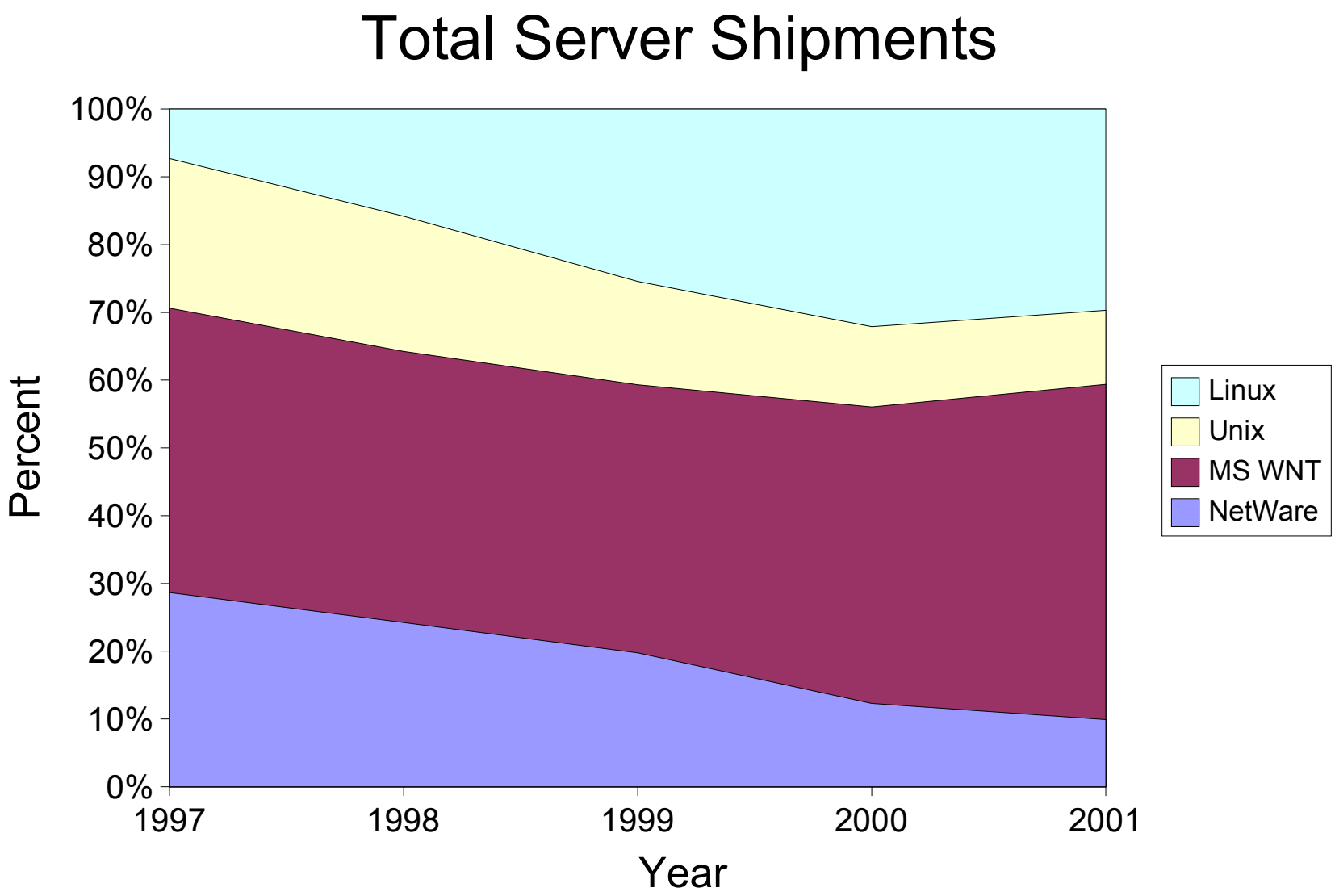
- What MAY change
  - We need to understand the market to see what may happen

... Let's look at some graphs

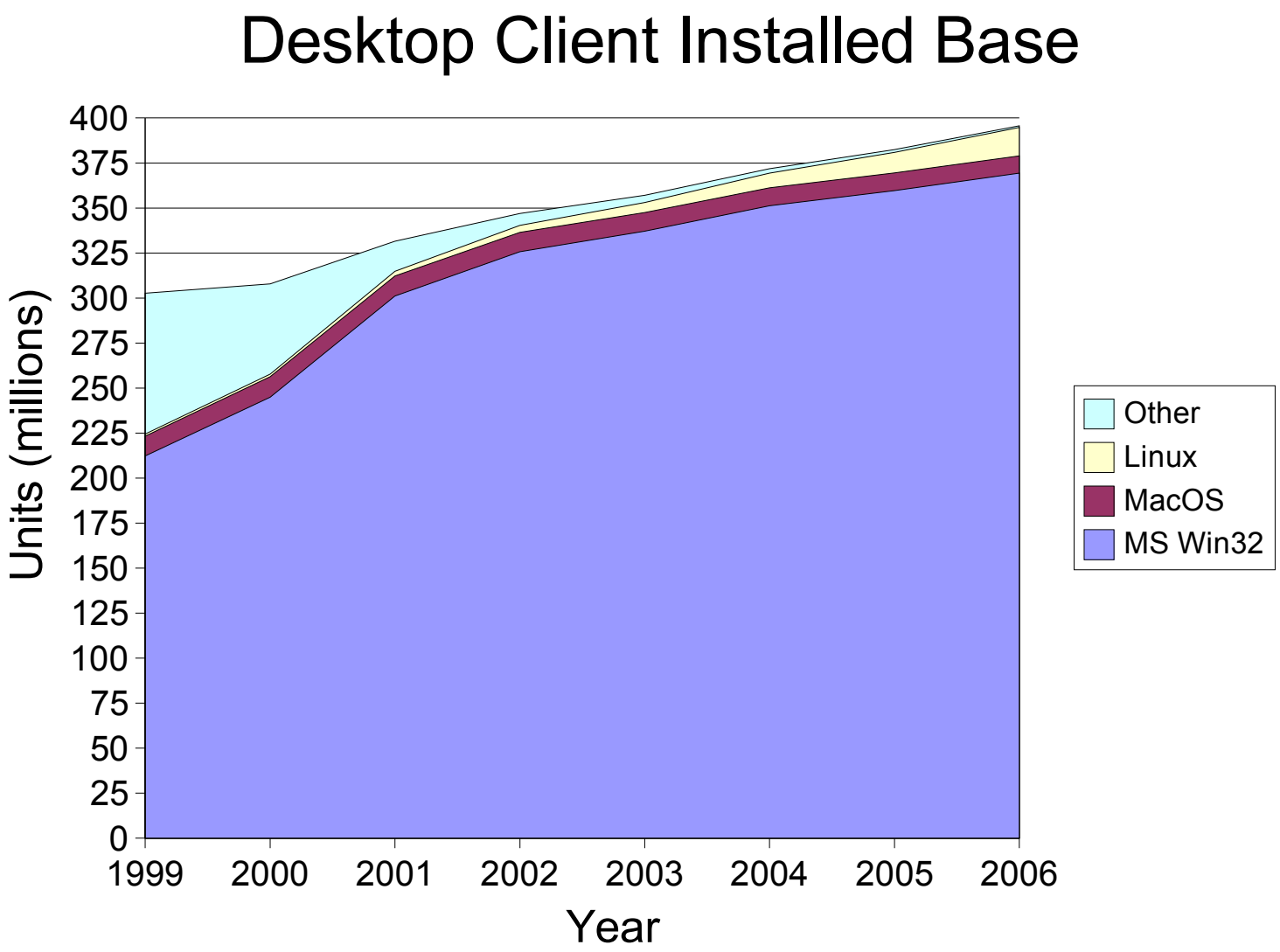
The Installed Server Market



New Server Shipment OS Profile



Installed Desktop Market



More Futures

- Conclusion from market information:
  - MS Windows is Dominant Server Platform
    - CIFS is the dominant File and Print Protocol
      - Is Insecure
        - Must be made more secure!!!!!
      - Is NOT UNIX/Linux oriented
        - Protocol addresses the needs of NTFS and Win200x/XP
  - Windows 200x/XP server shipments exceeds UNIX+Linux
    - Therefore likely to remain dominant well into the future!

Even More Futures

- CIFS is so complex that it is time to replace it
  - Session encryption built-in
    - Protected by legislation against reverse engineering
  - Opportunity for Microsoft to replace underlying file system architecture
    - If NTFS can be replaced with an object based technology that has dynamically expandable meta-data capabilities:
      - Means new security measures can easily be added

Futures – III

- Action
  - If we want MS Windows networking to be more UNIX/Linux enabled:
    - Need CIFS protocol extensions that are:
      - More POSIX oriented (NOT just Windows ACLs)
      - Semantically closer UNIX/Linux file system support
    - Need client drivers for MS Windows
  - Need agreed public standards
    - So Businesses / Governments can specify them
  - Need a clear roadmap to the future

Summary

- The future of MS Windows networking protocols will remain uncertain and unpredictable
  - We need a roadmap for stability and interoperability
- Samba is threatened by changes to the protocols
  - We need publicly arbitrated standard protocols for all IT file and print services

Integrating UNIX and Linux with Active Directory

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Agenda

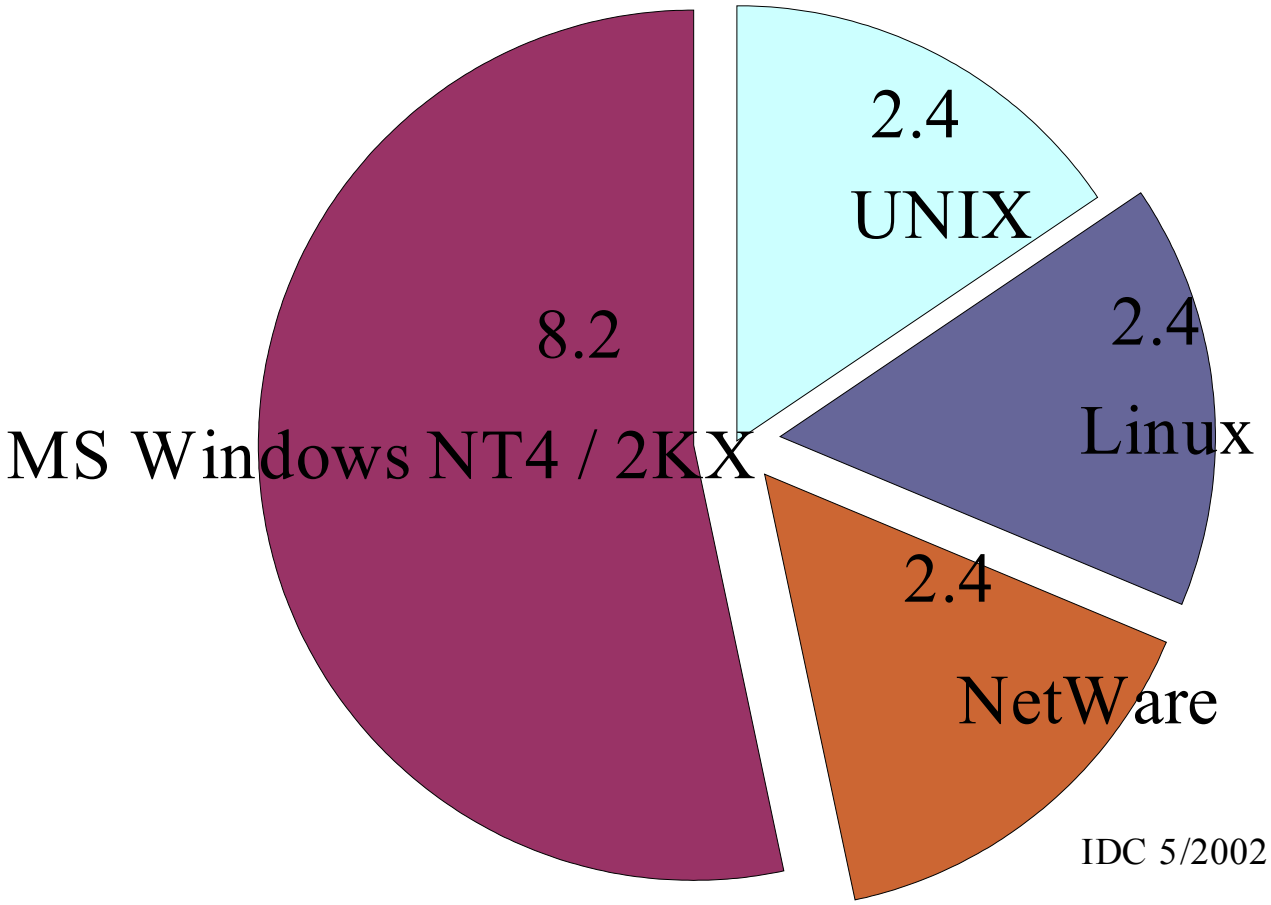
- Definition of the Integration Problem
- Technical Background
- Review of Solution Choices
  - Kerberos
  - LDAP
  - Samba Winbind
  - Vintela Authentication Services
- Making the choice for CIFS ID Management
- Demonstration

Market Information

- MS Windows NT4 Migrating to MS Windows Server 200x
  - With Active Directory
  - NAS / UNIX / Linux CIFS usage is growing
- Therefore:
  - Integration need growing

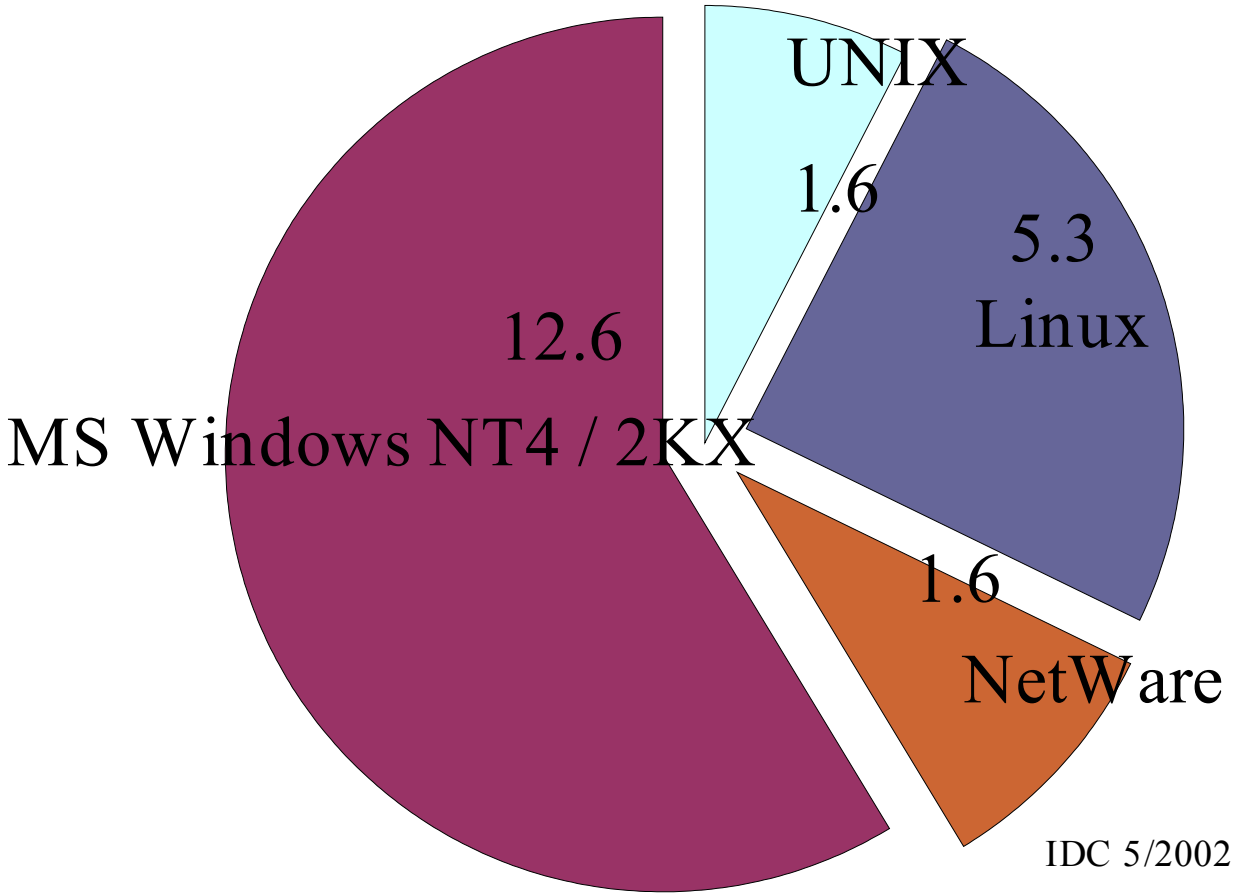
Server Market Share - 2001

15.4 Million of Servers



Market Share – Forecast 2005

21.1 Millions of Servers



Problem Definition

- CIFS File System operations require
  - Authentication
    - Front-end to access controls
    - Datastore location is a network design decision
      - Can be local to each device or centralized
    - Must know limitation of protocols and methods
  - Identity Resolution
    - Needed to provide unique attributes per user
    - Used to control access to CIFS resources
    - Needs to bridge disparate identity attributes

User Identity Differences

- UNIX / Linux User Identifiers
  - Older – 32 bit Unsigned Int
  - Newer – 64 bit Unsigned Int
    - uid=543(jht) gid=876(users) groups=876(users),71(ntadmin),238(engrs)
- MS Windows has complex security identifiers
  - Incompatible with UNIX / Linux eg:
    - S-1-5-21-1593769616-160655940-3590153233-2013

Bridging the ID Gap

- MS Windows Security Identifiers
  - Design Issues
    - Map to UNIX compatible UID/GID
      - On central store
      - On client / domain member server
    - Store extended information in AD Schema

Cross Machine Integrity

- How to ensure integrity:
  - Provide Consistent UID/GID for all users
  - Essential for cross protocol file sharing
    - CIFS / NFS
- Centralization v's Synchronization
  - Sync solution requires more supervision
  - How secure is sync method?

Technical Background

- Microsoft Active Directory
  - Kerberos / LDAP support
  - In Windows only environment also uses proprietary protocols
- AD is the Authentication and Identity management backend of choice
  - Provides centralized network user identity administration
  - Integrates with external directories through tools like MIIS (was MMS – Microsoft Metadirectory Service)

What works with AD?

- Interoperability Choices
  - Kerberos – complex to install, addresses Athentication
  - LDAP – Identity Management, does not address Authentication
  - Samba Windbind
    - Authentication and Identity Management
    - Has own ID Map solution
  - Vintela Authentication Services
    - Authentication and Identity Management
    - RFC2307 schema extension for UID/GIDs

Pure MIT / Heimdal Kerberos

- Key Limitations
  - Must generate a per client keytab file
    - Need to migrate keytab to each client
  - Time must be kept in sync between AD servers and all Kerberos clients
    - Uses extra external process (NTP)
  - Inconvenient Authentication Only solution
    - Requires client machine pseudo-user account in AD
    - Must sync */etc/passwd* with AD User Accounts to provide UID/GIDs etc.
    - No disconnected mode operation

PADL LDAP Tools

- Available from PADL Software
  - Two modules:
    - pam_ldap, nss_ldap
  - Benefits:
    - Runs on most UNIX platforms today, Free
    - Supports RFC2307 + MS Service for Unix
- Disadvantages
  - Poor Scalability
  - Lacks secure authentication to AD
  - No disconnected mode operation

Samba Winbind

- Has three parts:
  - PAM: pam_winbind.so, handles authentication
  - NSS: libnss_winbind.so, handles identity management
  - Daemon: winbindd, handles communication with remote NT4 DC's and with Active Directory DCs
  - Caches user ID info in winbindd_cache.tdb
- New to Samba-3.0.0 winbind also does all Samba ID Map handling
  - Stores mapping info in winbindd_idmap.tdb
  - Maps Windows SIDs to Unix UIDs/GIDs

Samba Winbind

- Pros:
  - NO disconnected mode operation
  - Authentication and Identity Management
    - UNIX Accounts AND for Samba
  - Scalable through caching of data
- Cons:
  - Same UID/GID across all Samba servers ONLY with LDAP Account backend
    - Complex configuration
  - Exposes ALL backend accounts
    - NT4 Domain / Active Directory Domain

Vintela Authentication Services

- Commercial Solution
  - AD RFC2307 AD Schema Extension
  - Microsoft Management Console Snap-In
    - UNIX Account enablement / disablement
    - Stores UID/GIDs and other UNIX account attributes
  - Uses secure Kerberos authentication
    - LDAP over Kerberos
  - AD member client cache
    - Stores only UNIX enabled account info
    - Does periodic intelligent sync to keep current

Vintela Evaluation

- Pros:
  - Has disconnected mode operation
  - Easy configuration
  - Consistent UID/GIDs
  - No local accounts needed
  - Scalable
  - UNIX / Linux machines get AD Machine Account
- Cons:
  - Commercial (Payware)

Making the Choice for CIFS

Viable choices are:

Method	Authentication	ID Management
Samba Winbind	OK	OK
Vintela Authentication Services	OK	OK
Both	OK	OK

Demonstration & Questions