Samba-3: Integration and Cost Reduction

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Core Messages

- FLOSS holds the keys to innovation
- Server adoption of FLOSS is maturing
  - Protocols are already unified or standardized
- Standardization precedes commoditization
- The Desktop is the current battle-ground

Outline

- Key Challenges FLOSS Faces Today
  - The Role of Standardization
    - Particularly in Large Scale Markets
  - Threats
    - Warrant of Fitness and Public Interest
    - The Battle for the Desktop
    - Responsive Action
- Samba-3 Opportunities
  - Replacement of MS Windows NT4
  - Integration with MS Windows Active Directory

Key User Challenges

- People are creatures of habit
  - Challenged by disruption
  - Dependant on the familiar
  - Sociological factors affect consumer choice
- Change is painful
  - Re-orientation
  - Fear of the unknown

The FLOSS Challenge

- FLOSS is highly disruptive
  - Business Model Changes
    - Forces the business focus to customer service
    - Makes technology a commodity
- FLOSS is under attack
  - Intellectual Property Disputes
    - Patent Claims
    - Licensing Terms
    - Copyright Claims

Consequences of Protection

- Software Patents / Licensing
  - Limit diffusion of innovation
    - Those who pay get to use it
  - Designed to disadvantage non-customers
- Copyrights Protect Author Rights
  - Identifies the Innovator
  - Protected through a delicate legal system
- Central Issue is Reward for Effort

Debunking Myths

- FLOSS is supported software
  - User support
  - Mailing lists with a difference
  - Service Companies
- FLOSS does NOT destroy Innovation
  - Users are tired of forced software updates
  - All products tend towards commoditization
    - That increases the need for innovation

Escape the Maze

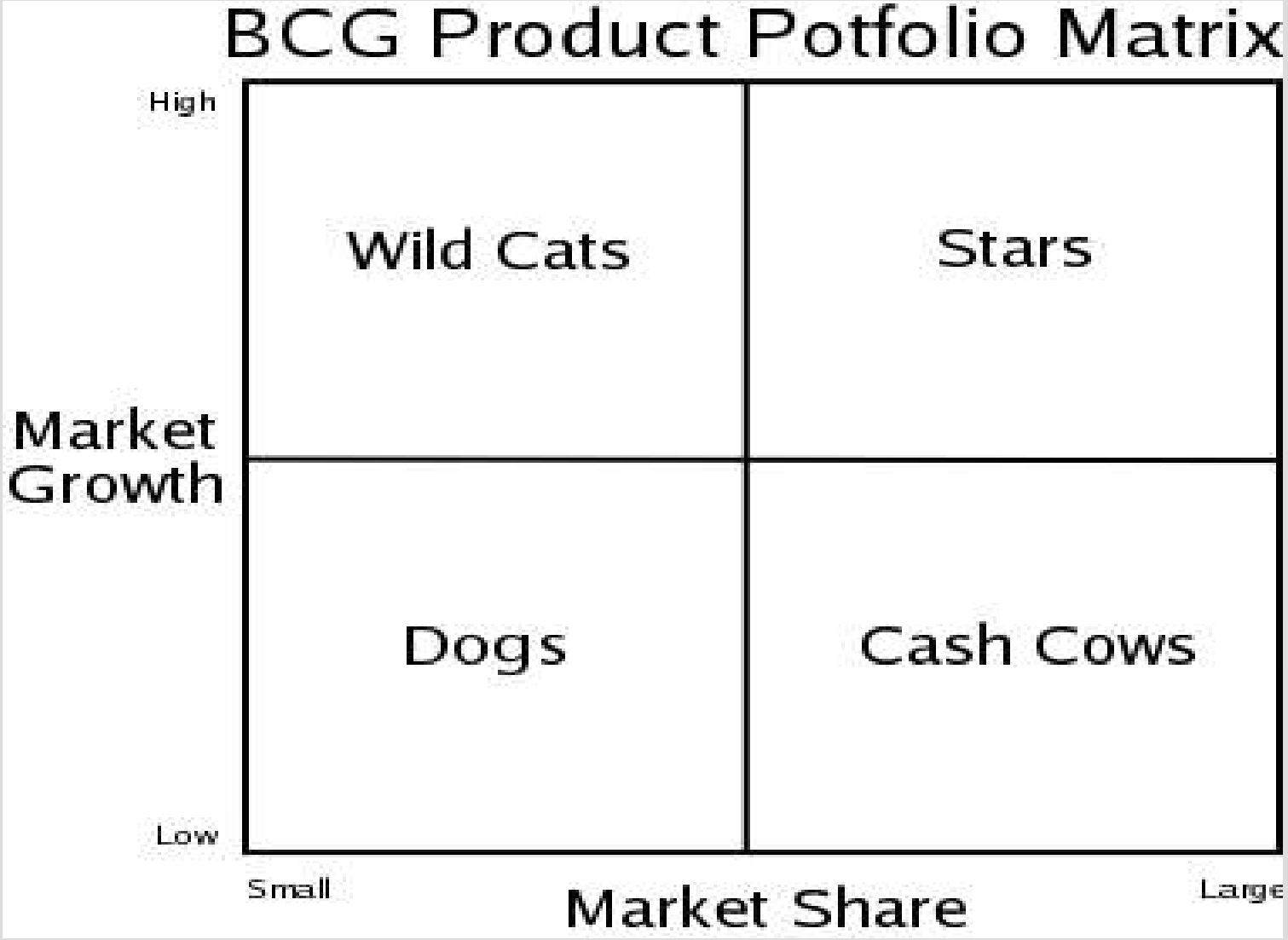
- First priority is to understand the problem
  - Who does innovation?
  - What factors drive innovation?
  - How are the fruits of innovation delivered?
  - Who benefits from innovation?
- Need to understand products and their life cycles
  - How do FLOSS and proprietary software compete?

PLC and Standardisation

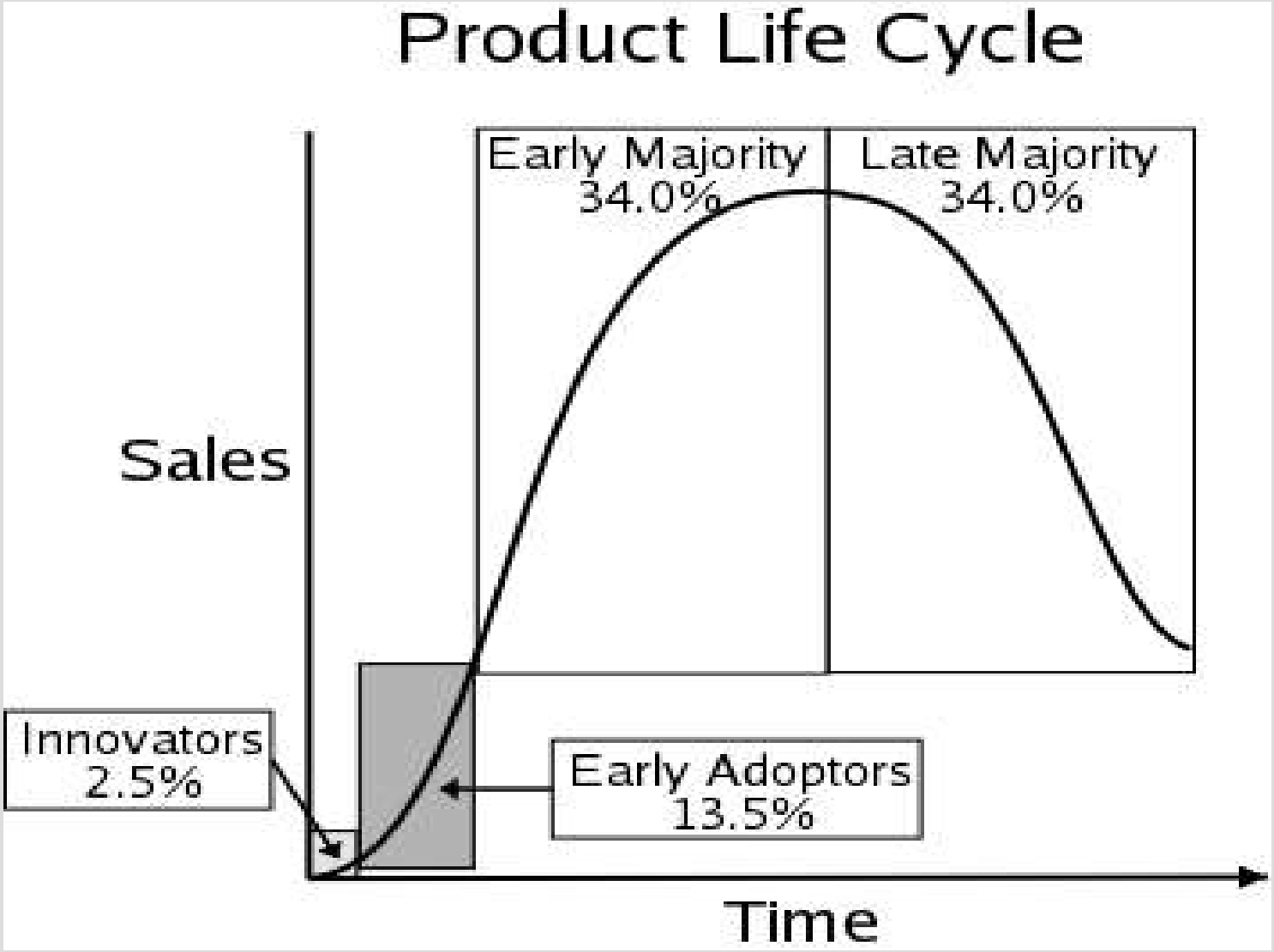
- PLC theory started with Boston Consulting Group
  - Measuring successful business practices
  - Product Portfolio Matrix
  - How products behave from inception through obsolescence
    - Need to understand key factors
- Standardization is a pre-cursor to mass consumerism

(PLC = Product Life Cycle)

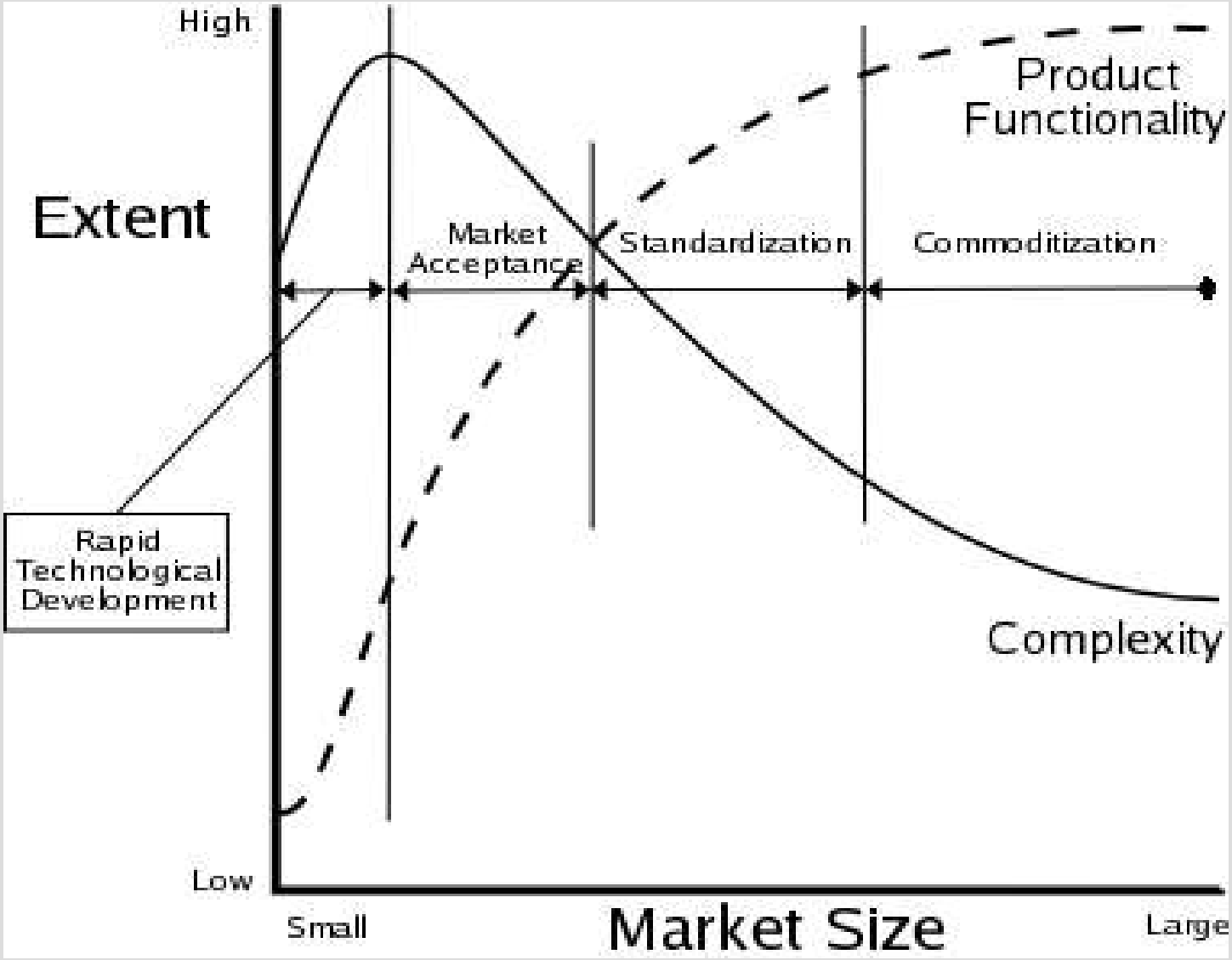
Product Portfolio Matrix



PLC Definition



Software Development Cycle



Two Roads to the Consumer

- Monopoly and Market Manipulation
  - Selective appeal to customers who can enhance corporate profits
  - Control of distribution channels
  - Valued by investors
    - (who do not like service businesses)
- Standardized Commodity Markets
  - Presumes free market operation
  - Forces shift from technology to needs satisfaction process based service business

Monopolization: Benefit and Risk Factors

- Corporate profit motive is most strong
  - Discriminate in selection of customers
- Technology as a tool
  - To coerce update cycles
  - Maintain barriers against competitive market entry
- Seeks protection of Intellectual Property
  - Patents, Copyrights, Licensing
- Sensitive to the Law of Diminishing Returns
  - Profit versus cost of development limits Innovation

Commoditization: Benefit and Risk Factors

- What is Standardization?
  - Process by which products are made to conform with publicly arbitrated specifications that are designed to eliminate incompatibilities in competitive offers and provide a uniform platform for software deployment.
- What does Standardization do?
  - Removes technology barriers
  - Opens the market to mass commodity adoption
  - Reduces costs of ownership
  - Increases the need for innovation through service

FLOSS and Standardization

- Natural Partners
  - Development process is by mutual assent
  - Much focus on backwards compatibility
    - Protects consumer investment in infrastructure
- Promotes Innovation
  - Not subject to Law of Diminishing Returns
    - Development model is not economically driven
    - Distribution is economically driven
      - By consumer needs
      - By consumer willingness to pay for services
        - Outsource provision opportunities

Warrant of Fitness

- Recent reaction to software that is provided without Warranty
  - Claims that GPL software is not FIT for Sale
  - Position is that consumers need to be protected
- Monopoly mindset reaction to FLOSS invasion of market

The Public Interest & Software

- Warranty is not necessary when source code is open
  - Anyone can fix something that is broken
  - Anyone can add functionality
- Position that the consumer is best protected by freedom to change without constraint
  - Allows innovation and adaptation of software to new task requirements

FLOSS and the Consumer

- FLOSS and Standardization reduces the cost of market entry for new consumers
- Expands the total market size
  - More consumers = greater service opportunity
    - Product customization
    - Delivery standardization
    - Customer hand-holding (Service Specialisation)
- Combined effect is HIGHER MARKET VALUE

FLOSS Status

- The Server is largely won for FLOSS
  - Apache, Samba, MySQL, PostgreSQL, SQUID, CUPS
  - Linux and xxxBSD
- The Desktop is Maturing
  - KDE / Gnome
  - Applications
    - OpenOffice, Evolution, Mozilla, GIMP
- Conclusion: Desktop is the current challenge

Desktop Dominance – Step I

- Education
  - The applications users need already exist
  - Help build reference sites
  - Involvement of LUGs
- Certification
  - Linux Professional Institute

Desktop Dominance – Step II

- Get more applications
  - Accounting, Project Management, Reporting, Database client tools
  - Convince development houses to build for FLOSS platforms
    - Convince developers that there is a market for specialty and niche solutions

Desktop Dominance – Step III

- Demonstrate commercial viability
  - Business model built around service and support
  - Close partnership with major FLOSS vendors who have consumer orientation
- Promote greater public acceptance of FLOSS standardization

Call to Action

- All involved in FLOSS activities
  - Help more users with solutions to their problems
  - Help businesses executives to understand the problem solution process
    - Importance of support contracts
    - How to find support staff
  - Help Value Added Resellers to understand HOW to be profitable through customer service and support
- Call for Open Public Standards in Software!

What is Samba-3?

- File and Print Server
- Domain Security Context Controller
  - Handles network logon and access control
- Compatibility
  - Servers
    - MS Windows NT4 / 2000 / 2003
  - Clients
    - MS Windows 9x / Me / NT4 / 2000 / XP Professional

Samba-3: Recent Development

- Goals and Devel. Directions for Samba-3
- New Features & Tools
  - Identity Management
    - ***passdb backend, idmap backend,*** Group Mapping
  - Virtual File System Drivers
- Future Directions & Concerns
- Overview of Integration Choices
  - Kerberos, LDAP/PADL, Samba, VAS

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 ordered from Amazon.Com now
  - New Samba-3 by Example
    - Published by Prentice Hall, ISBN: 0-13-147221-6
      - Can be pre-ordered from Amazon.Com now

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 - migrate when ready
- New schema
  - Has support for future features
    - Logon Hours, Logon Machines, Password change control, more ...
- 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-3 HOWTO & Ref Guide

Networking/Samba

"The breadth of technical information provided [in this book] ensures that even the most demanding of administrators will find something they need."
–Andrew Tridgell, President of the Samba Team and the original author of Samba

THE OFFICIAL SAMBA-3
HOWTO and Reference Guide

JOHN H. TERPSTRA AND
JELMER R. VERNOOIJ, EDITORS

The practical, authoritative, step-by-step guide to cutting IT costs with Samba-3!

This is the definitive guide to using Samba-3 in production environments. It begins with the immense amount of HOWTO information published by the Samba Team and volunteers around the world . . . but that's just the beginning. The book's Samba Team editors have organized and edited this material around the practical needs of working Windows® administrators. Unix/Linux administrators will find all the answers they need as well.

Whether you're deploying Samba for the first time, integrating Samba into a Windows 2000 Active Directory environment, migrating from NT 4 or Samba 2.x, or using Samba in a UNIX/Linux environment, you'll find step-by-step solutions, carefully edited for accuracy, practicality, and clarity. You'll learn all you need to make intelligent deployment decisions, get running fast, and use Samba-3's powerful new features to maximize performance and minimize cost.

- Step-by-step installation techniques and proven configurations that work "right out of the box"
- Essential Samba-3 information that leverages your Windows networking knowledge
- Detailed coverage of Samba-3's powerful new user/machine account management, network browsing, and mapping capabilities
- Authoritative explanations of advanced features such as interdomain trusts and loadable VFS file system drivers
- Clear information on how Samba-3 handles Windows desktop/user policies and profiles
- Practical techniques for optimizing network printing
- Specific guidance for migration from Windows NT 4 or Samba 2.x
- Troubleshooting techniques that draw on the knowledge of the entire Samba community

ABOUT THE EDITORS

JOHN H. TERPSTRA and JELMER R. VERNOOIJ are members of the global Samba Team, a loose-knit group of about 30 people who contribute regularly to Samba. John H. Terpstra is a co-founder of the Samba Team.

Series Editor BRUCE PERENS is an Open Source evangelist, developer, and consultant whose software is a major component of most commercial embedded Linux offerings. He founded or co-founded Linux Standard Base, Open Source Initiative, and Software in the Public Interest. As Debian GNU/Linux Project Leader, he was instrumental in getting the system on two U.S. Space Shuttle flights.

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- Expert information, straight from the source—written by members of the Samba-team
- Extensive coverage of Samba-3's new features, including user policies and desktop profiles
- Includes useful information for Windows administrators making the switch to Samba

JOHN H. TERPSTRA AND
JELMER R. VERNOOIJ, EDITORS

Foreword by Andrew Tridgell, President of the Samba Team and the original author of Samba

Samba-3 by Example

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SAMBA-3 BY EXAMPLE Practical Exercises to Successful Deployment

JOHN H. TERPSTRA

Get Samba running right, the *first* time . . . every time!

Here's the Samba-3 cookbook you've been searching for! This book's complete configuration files, step-by-step implementation instructions, network diagrams, and automated scripts make Samba-3 deployment a breeze. From small office networks to enterprise environments, here are proven configurations and expert guidance you won't find anywhere else. Long-term Samba Team member John H. Terpstra covers all these scenarios, and more:

- "No frills" Samba servers: replacing Windows 9x peer-to-peer networks and supporting Windows 2000 and XP clients
- Small- to-mid-sized networks requiring basic security, user groups, and remote access
- Secure, scalable networks with domain logons and roaming profiles
- Deploying Samba in environments that utilize routers and firewalls
- Improving network user experience through desktop profile controls, policy controls, and folder redirection
- Full-fledged enterprise network environments–with hot tips to enhance availability and performance
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If you're a Windows network administrator responsible for deploying or managing Samba, *Samba-3 by Example* is your indispensable resource.

CD-ROM INCLUDED

CD-ROM contains all example configuration files, scripts, and tools covered in the book.

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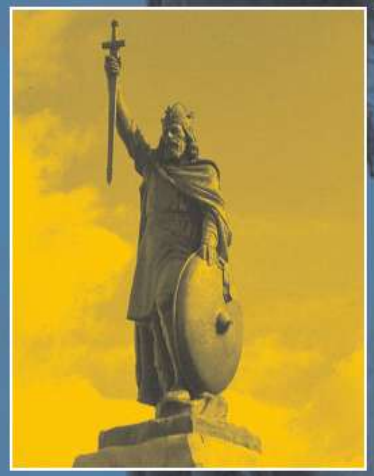


- Real-world configuration files with step-by-step instructions
- Covers a wide range of practical Samba-3 deployment scenarios from the smallest Windows network *to the distributed enterprise Windows network*
- A must for every Windows network administrator responsible for Samba
- Includes detailed examples of how OpenLDAP and Samba-3 can scale to meet large network needs

JOHN H. TERPSTRA

Samba Futures

- Samba-4 is already well under way
  - Re-write from the ground up
    - Being done by Andrew Tridgell – Founder of Samba
    - Improved Modularization
    - Code Clean Up, PIDL (new IDL Compiler)
  - Approx. 2 Years from completion

- Samba-3 will gain back-ports of some Samba-4 features

Facts to Note

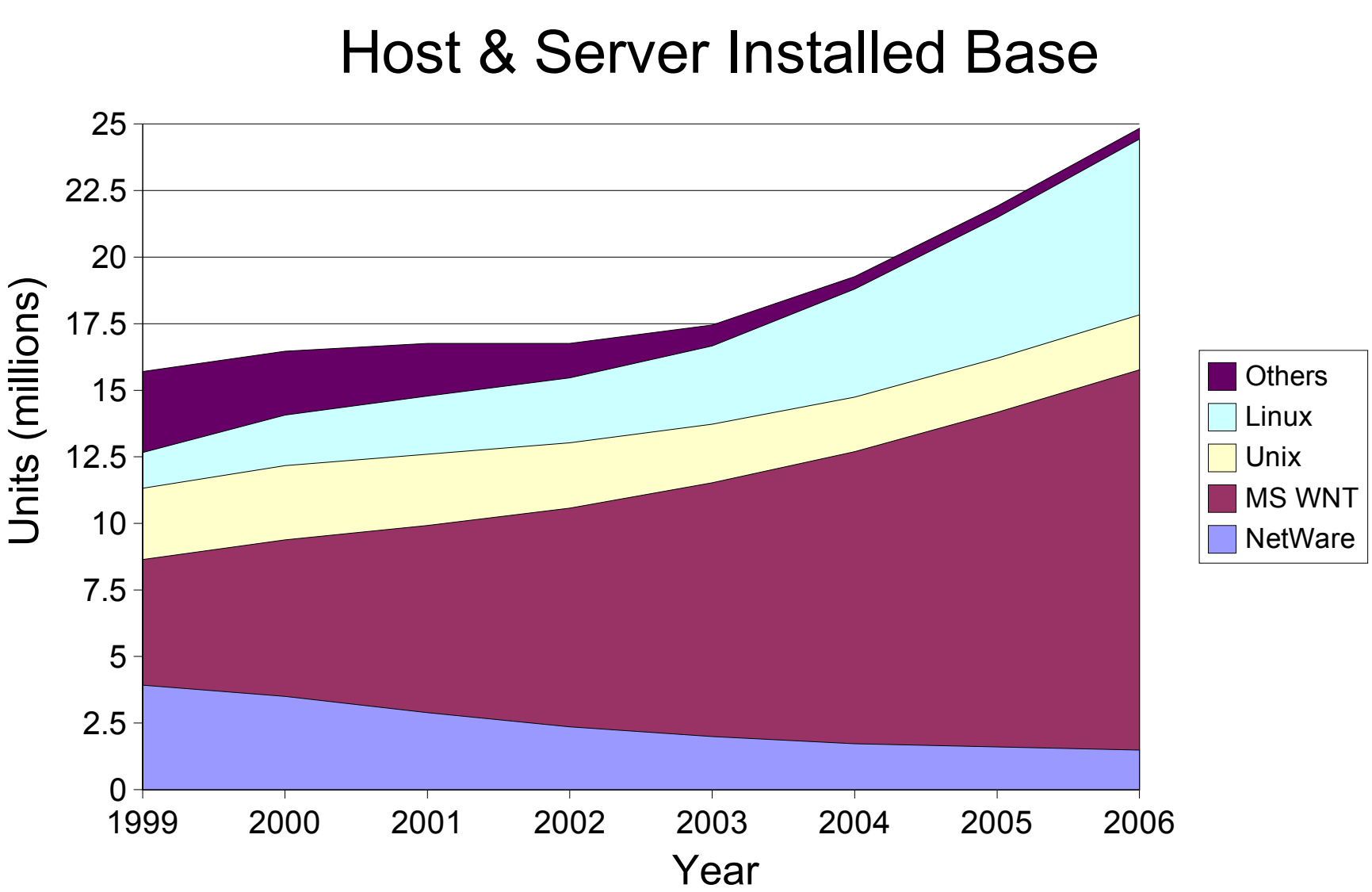
- CIFS is not a standard
  - Constantly changing
    - Microsoft udates add proprietary functionality
  - Protocol is extremely complex
  - Risk that after any service pack or on-line update an old protocol may be broken
    - Affects Microsoft clients as much as Samba
    - Means ALL systems must be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

Future Concerns

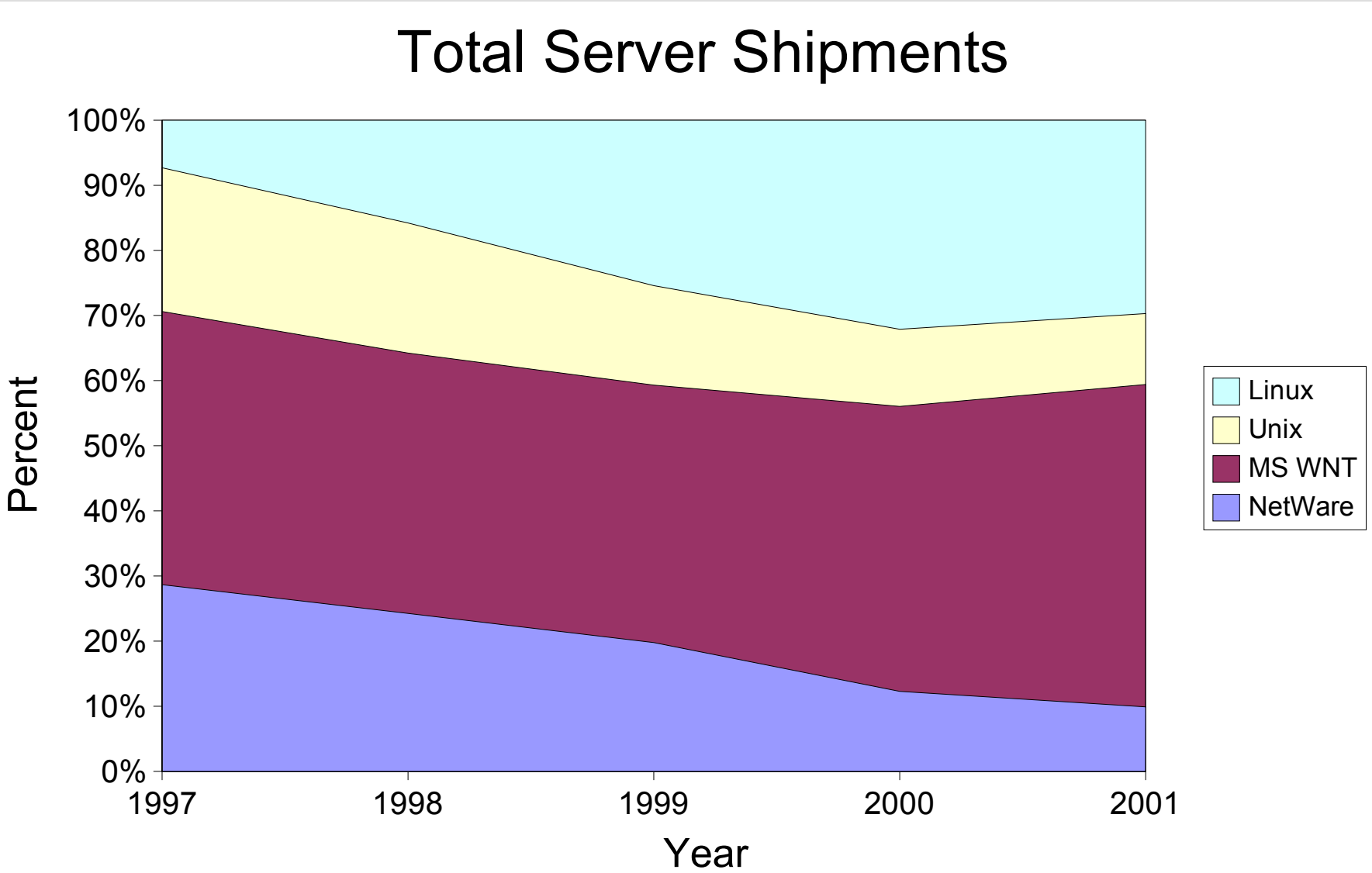
- What MAY change
  - We need to understand the market to see what may happen

... Let's look at some graphs

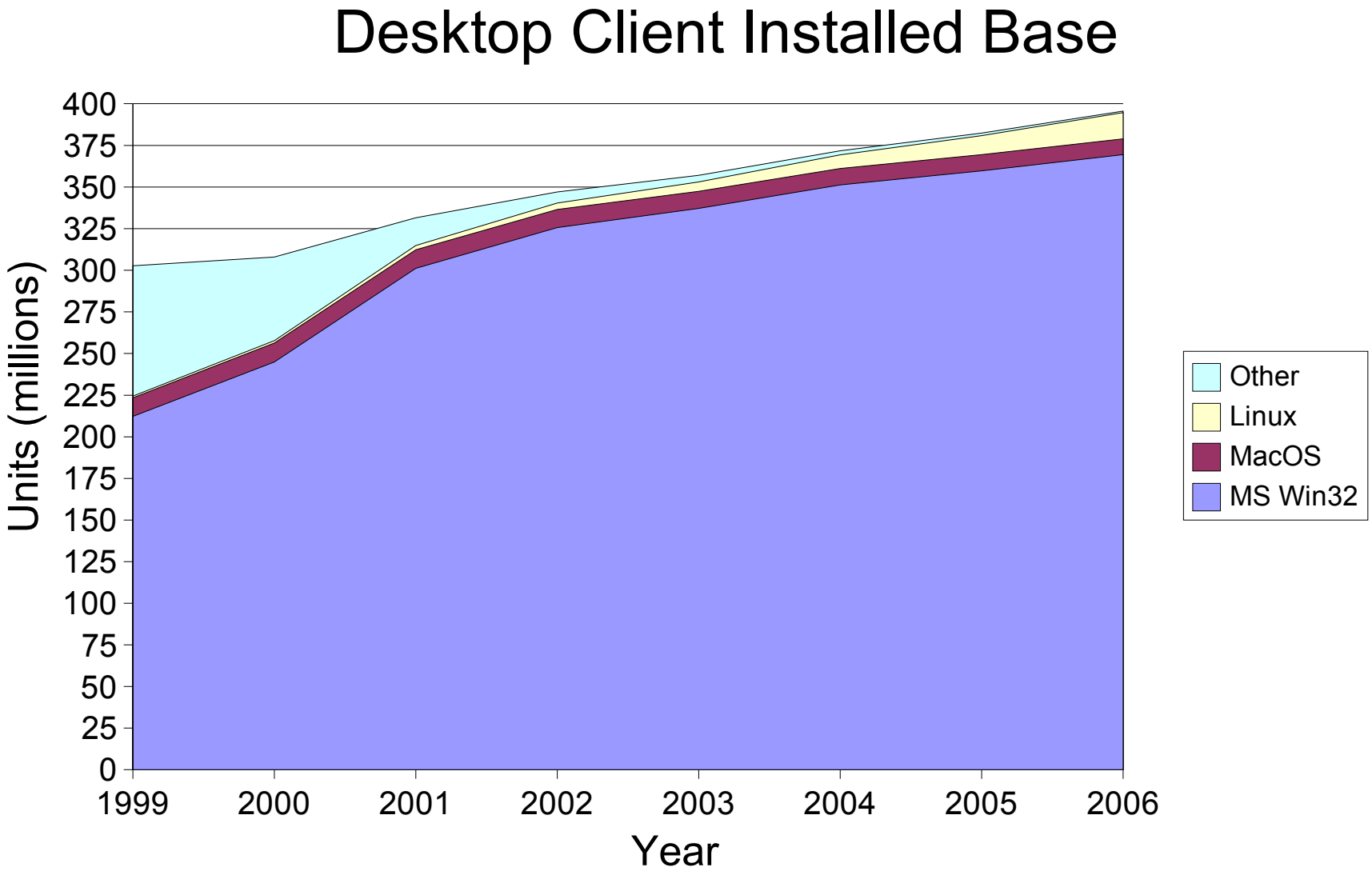
The Installed Server Market



New Server Shipment OS Profile



Installed Desktop Market



Market Conclusions

- MS Windows is Dominant Server Platform
  - CIFS is the dominant File and Print Protocol
    - Is NOT secure
      - Must change!!!!!
    - Is NOT UNIX/Linux oriented
      - Protocol addresses the needs of NTFS
- Windows 200x/XP server shipments exceeds UNIX+Linux
  - Therefore likely to remain dominant well into the future!

Even More Futures

- CIFS is complex - 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

Market Information

- MS Windows NT4
  - Migrating to MS Windows Server 200x
    - With Active Directory
  - Migrating to Samba-3
    - To avoid licensing costs
- Microsoft Active Directory adoption is growing
- NAS / UNIX / Linux CIFS usage is growing
- Therefore:
    - Integration need growing

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 a Windows only environment this 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 Authentication
  - 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 Windows Services 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

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

Making the Choice

Viable choices are:

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

End

Questions / Comments

Presentation Available From:
http://samba.org/~jht/Presentations