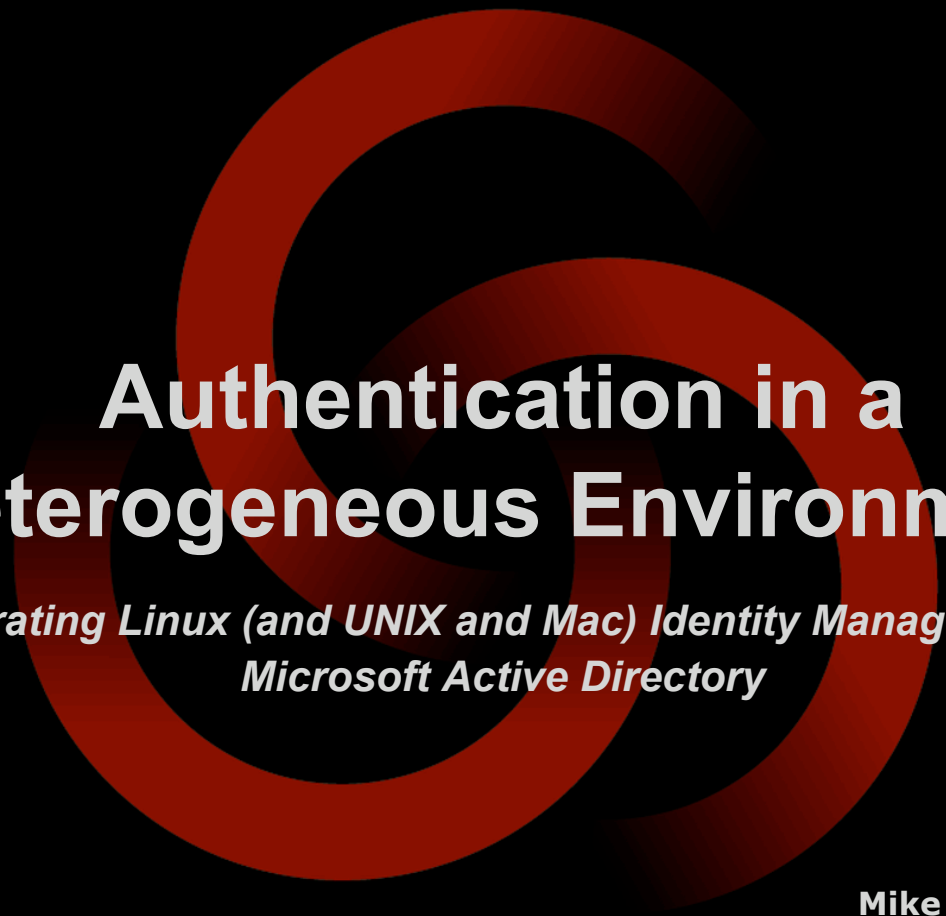

Authentication in a Heterogeneous Environment

Integrating Linux (and UNIX and Mac) Identity Management in Microsoft Active Directory

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What this talk is about

- Making Windows Active Directory and Linux work nicely together
  - Why would you want to do that
  - Some tech points about AD
- Different ways of doing it
  - Some free, some cost
  - Pros and cons
- Recommendations and guidelines
- Mainly about OS logon (ssh, telnet, …)
  - A little bit about web

Assumptions

- #1 you are in an environment that uses AD
  - ~80% of medium to large businesses
- #2 you are not happy with your current Linux/Unix/Mac Auth setup
  - Security, scale, 'it's a mess right now', SOX, HIPAA, PCI, ….
  - You might be happy but others (PHBs, Auditors, …) are not
- #3 you think AD might be a solution
  - Or it has been strongly 'suggested' that you should do it

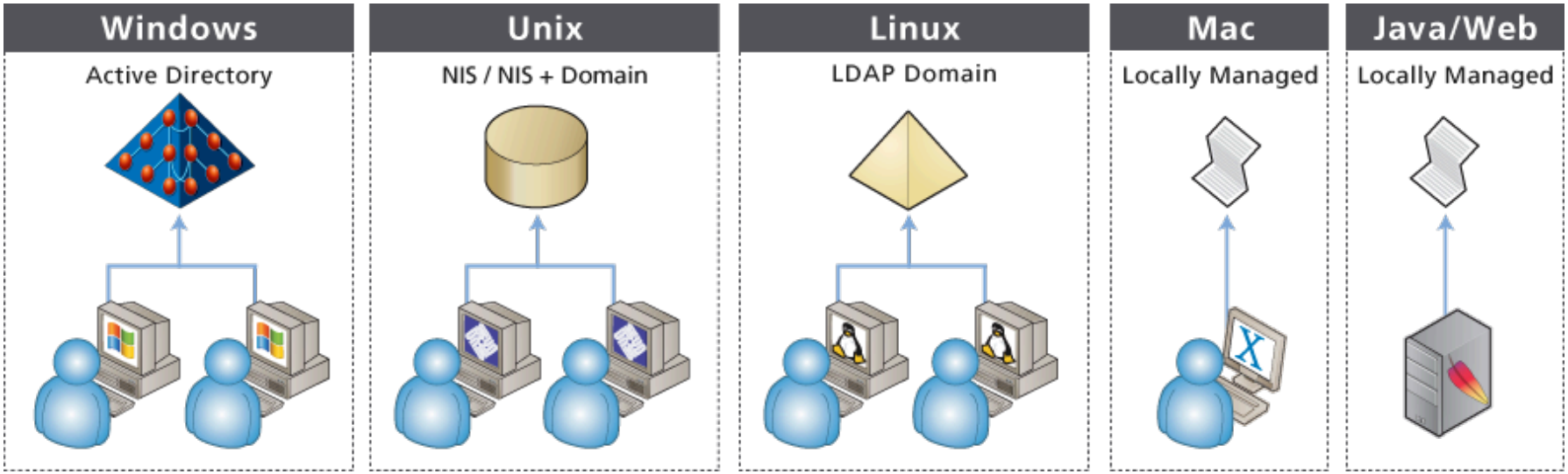
So now what?

What are we trying to achieve

- Security
  - Strong encryption, no pw hashes on the wire, …
- Centrally manage users
  - adding new users to machine (no more /etc/passwd editing)
  - Single click disable
  - scalable
- Single Sign on – same user and password everywhere
  - Zero sign on: sign on once and never type user and password again
- Auditable
- Central reporting
- Consistent password policy

You probably have something like this

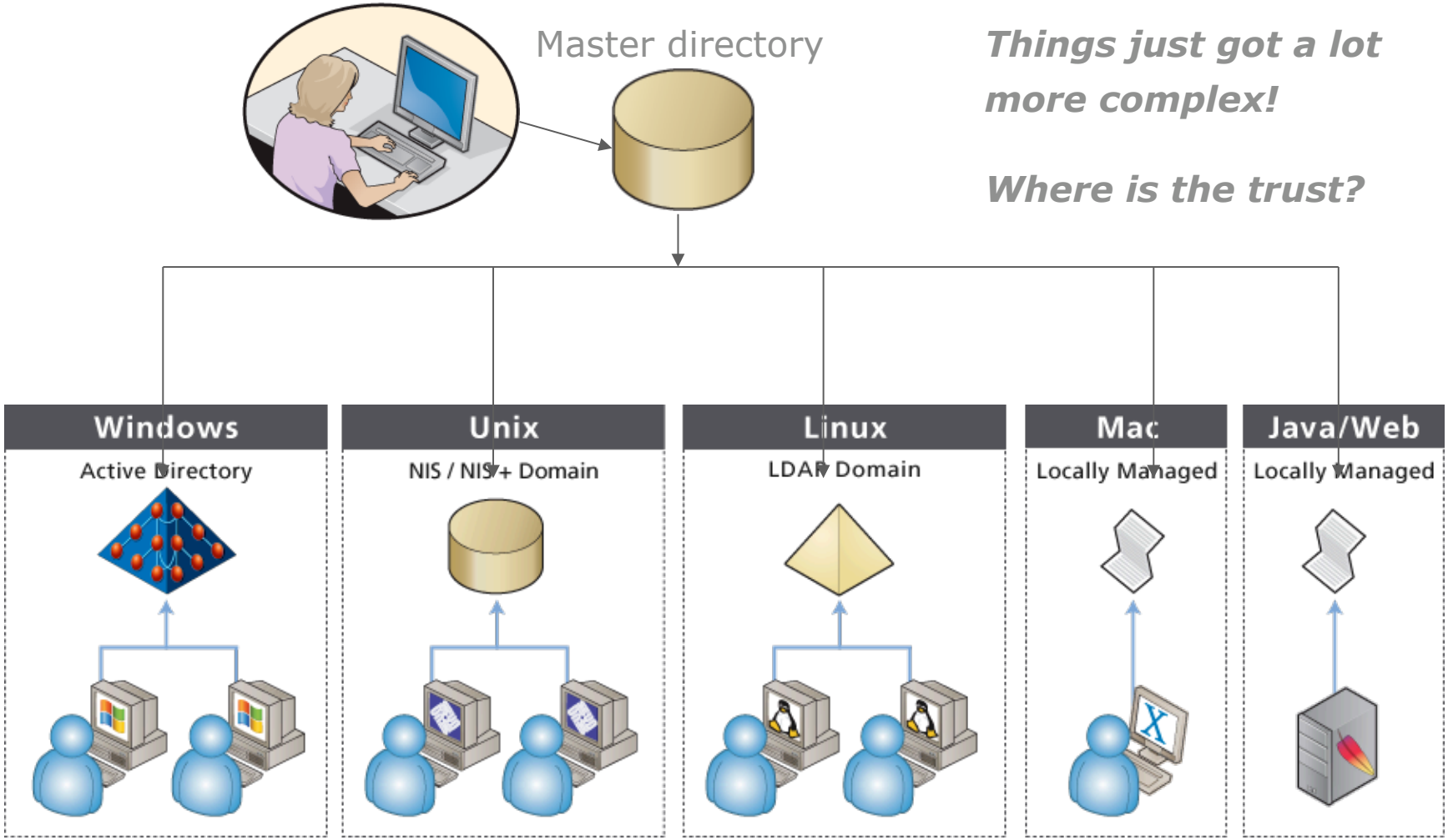
- AD for Windows
- NIS, /etc/passwd, perhaps LDAP for UNIX
- Who knows what for Web etc



Problems with that mixed environment

- Unix admins spend too much time provisioning users
- Hard to keep of track of – no central reporting
- No password policies – force change after 30 days …
- Insecure – NIS hashes on the wire for example
- Fragile – home grown scripts to manage it
- Forgotten passwords
- Shared accounts
- No audit
- Computer & DNS trust

How about Meta-Directory / Synchronization



OpenSSH Host Key Exchange

OpenSSH Key Distribution

- Force users to memorize host key-pairs

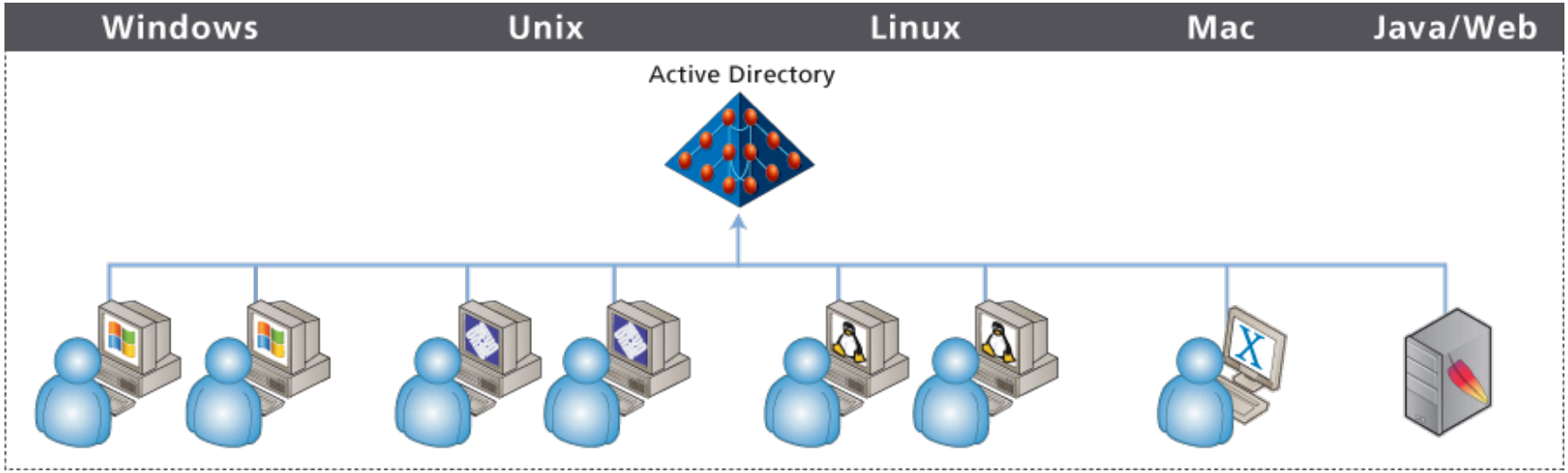
OpenSSH Key Distribution

- Host
  - Automate Public Key Distribution
  - Ignore the problem…
- User

```
client$ mkdir ~/.ssh
client$ chmod 700 ~/.ssh
client$ ssh-keygen -q -f ~/.ssh/id_rsa -t rsa
Enter passphrase (empty for no passphrase): …
Enter same passphrase again: …
client$ chmod go-w ~/
client$ chmod 700 ~/.ssh
client$ chmod go-rwx ~/.ssh/*
client$ scp ~/.ssh/id_rsa.pub server.example.org:
# next, setup the public key on server
server$ mkdir ~/.ssh
server$ chmod 700 ~/.ssh
server$ cat ~/id_rsa.pub >> ~/.ssh/authorized_keys
server$ chmod 600 ~/.ssh/authorized_keys
server$ rm ~/id_rsa.pub
```

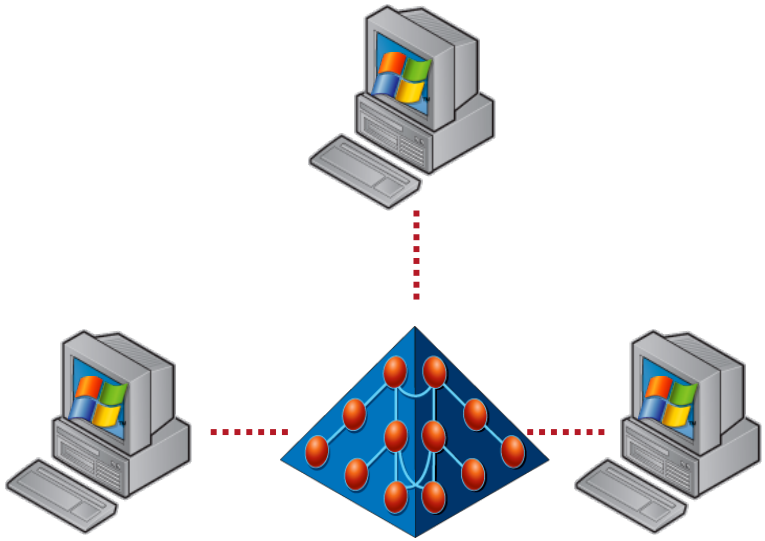
Or you could just use AD

It sure looks simpler!



Microsoft Active Directory

- Released by Microsoft in 2000
- Derived from DCE
  - LDAP instead of DAP
  - Kerberos V instead of Kerberos IV
  - MS RPC developed from DCE RPC
- Ease of Administration
  - User, group and computer administration
  - Automatic DNS configuration
  - Simple multi-master replica deployment



More AD Features

- Multiple separate trees – a 'forest' – that all know about each other.
- Sophisticated Trust configuration
- Secure DNS updates
- Multi-master update and replication
- Global catalog
- Strong password policy (forced change rate, complexity rules, ..)
- Support SASL and SSL security (defaults to SASL/GSS signed data streams)
- Very easy to set up (many users don't even realize they have LDAP and Kerberos)
- Well designed RBAC API and schema (AzMan)

Yes but …

- Is it really LDAP?
  - Fully compliant with LDAP V3 wire protocol RFC2251 etc. For an LDAP client it looks just like any other LDAP server
  - Note that it *really* wants to talk SASL
  - Its not slapd. Doesn't support well known replication systems (slurpd,…)
- Is it really Kerberos?
  - Full RFC1510 implementation. MSFT's own code base
  - Added vendor extensions with varying degrees of publication
    - PAC, no , then yes.
    - S4U, no
    - PKINIT, implements old draft
    - RC4-HMAC, published
    - Admin Password Change - published

What the solution needs to deliver

- Secure Authentication (Kerberos or LDAP)
- Secure User lookup (Encrypted LDAP)
  - User exists, UID, shell, gid, group memberships, …

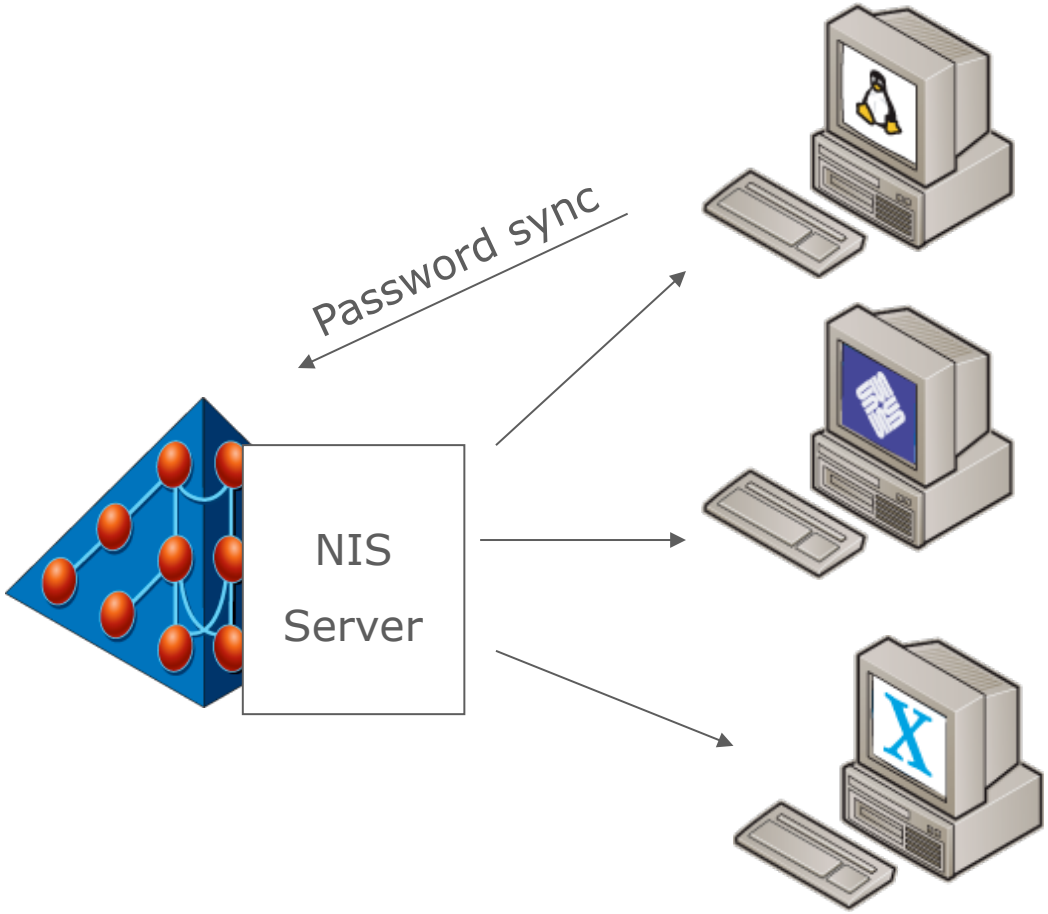
But, wouldn't it be nice to also have..

- Access control
  - Joe exists, knows his password, but which machines can he use?
- Privileged Command Control
  - Centrally managed sudo
- Token based single sign on (Kerberos)
  - Trusted SSH Key-exchange!
  - Eliminate embedded passwords
- Secure Dynamic DNS

Ways to achieve AD integration

- Microsoft's SFU
- Open source
  - Build your own
  - PADL / nss_ldap / pam_ldap
- Vendor supplied (OS, server, App)
- SAMBA
- Commercial products

Services For UNIX



Free

NIS server with password sync (Microsoft code running on Unix!)

Not secure!

Also includes:

- NFS server
- Unix subsystem for windows

Open Source building blocks and challenges

- Build you own with Kerberos and LDAP
  - You have to really understand all the bits *and* AD
  - See Centrify's Paul Moore on MSFT's port25 site (port25.technet.com)
  - It can be done, but not very easy
- Common modules in most distros
  - pam_krb5 – WARNING, not secure unless you have computer account in AD
  - pam_ldap (PADL)
  - nss_ldap (PADL)
- Unix Vendor tools
  - Usually a combination of the above
  - Hard to setup
  - Not consistent between platforms
  - Mac very strong Kerberos support (Add OpenDirectory -> Golden Triangle)

SAMBA

- Primary job is as Windows file server
- Winbind can do AD authentication
- Works but limited functionality (group policy, central management tools, ….)
- Unix Profile
  - Random UID generation
  - RFC 2307 (W2K3 R2)
- No support, poorly documented, tough to deploy on a large scale, not available for all platforms
- Used successfully at workgroup scale

The hard parts…

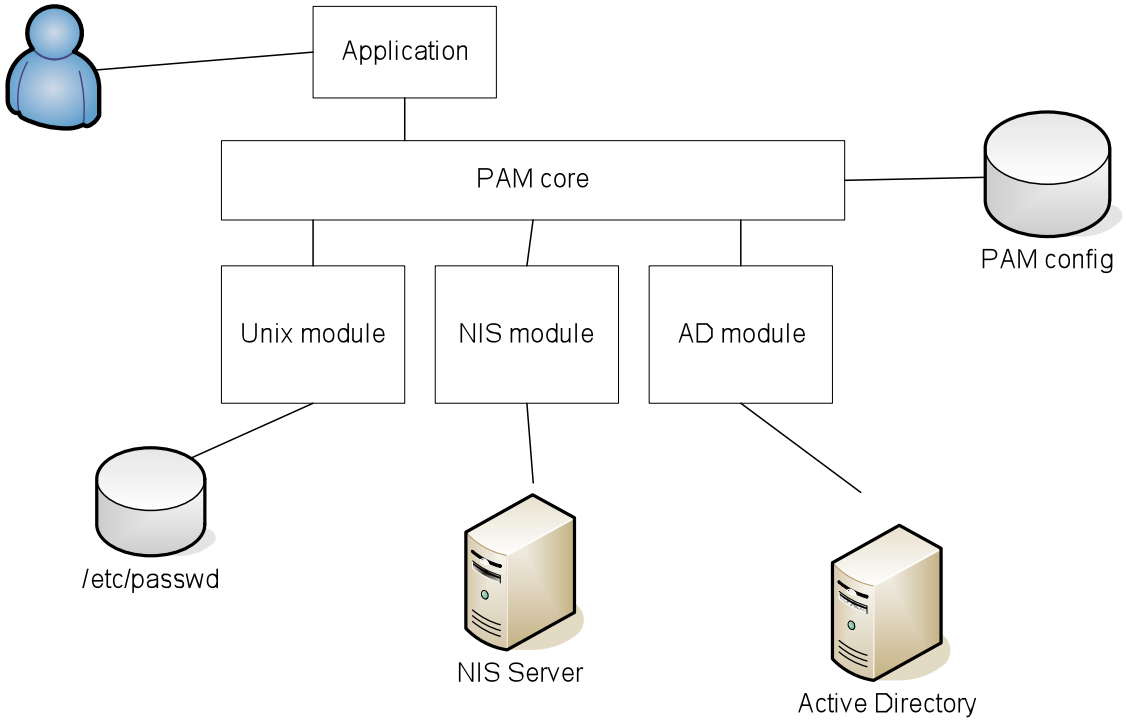
- Disconnected operation
- Cross-forest, one-way trust
  - Lab trusts Production, Production does not trust the Lab…
- Group Membership
  - Universal, Global and Local Domain Groups
  - Kerberos PAC Parsing (S4U)
  - Mixed Mode vs W2K vs W2K3 vs W2K8 vs RODC
- User Migration from NT->W2K->W2K3
- Active Directory Site awareness and fail over
- Active Directory configuration errors

Commercial Products

- Makes your non-windows machines integrate with AD just as though they were Windows
- Support of AD features
  - Password policies
  - Seamless SSO
  - Group Policy
  - Central management of access and privilege (RBAC)
- Supports base platform, servers and applications
- Tested, supported and documented

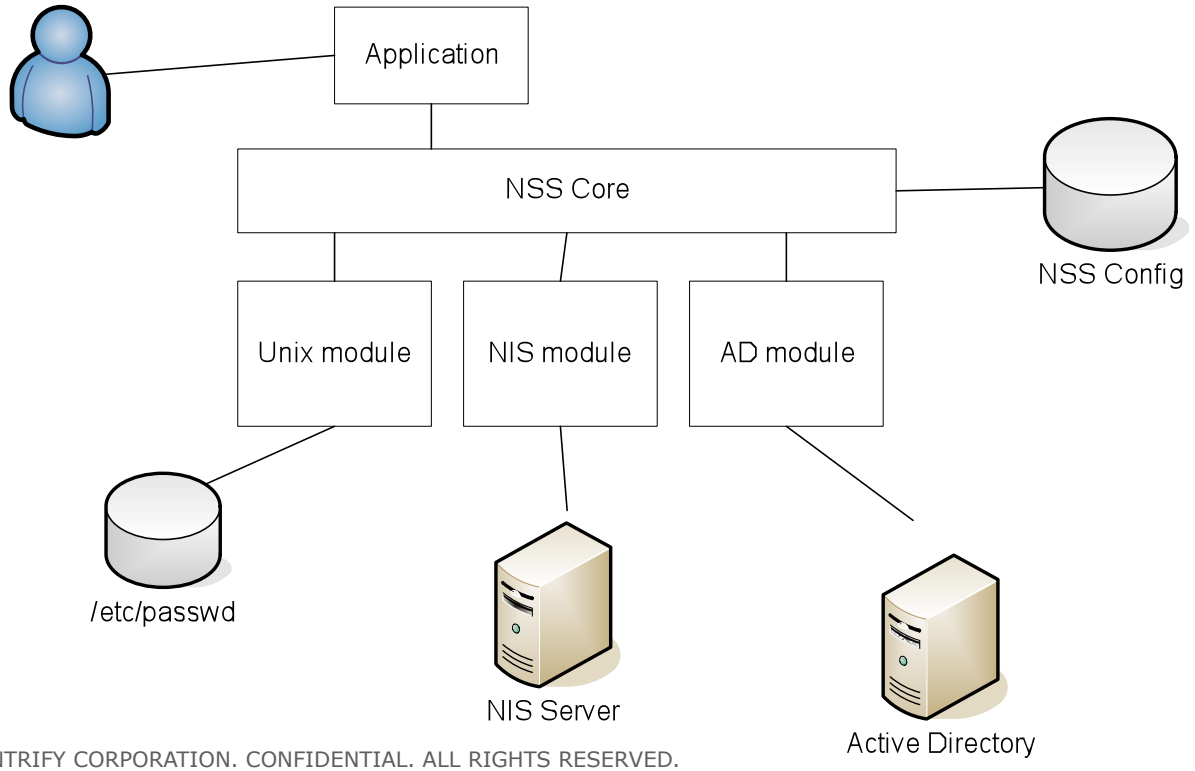
Sidebar: What's PAM

- PAM – pluggable mechanism for doing authentication
- Core sequences through modules till somebody says 'OK'



Sidebar: What's NSS

- Name service switch: pluggable framework for looking things up (users , groups, …)
- Answers API calls such as getpwnam, getgrid,…



Sidebar: what is Group Policy?

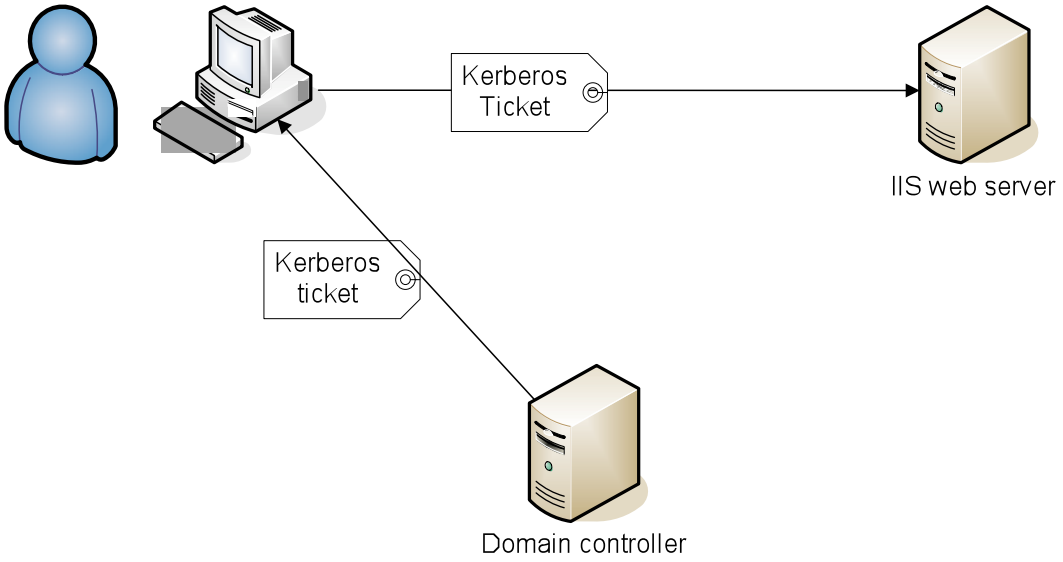
- AD mechanism for bulk configuration of systems
- Based on machine and or user identity
- Desktop
  - Control desktop lockdown
  - Installed applications
- Server
  - Product configuration
  - General file copy
  - Login scripts

What about web

- We want
  - User authentication via password
  - SSO - SPNEGO
  - Authorization
- Apache
  - Mod_pam – punts to the OS
  - Mod_auth_gss - tough to setup
- J2EE
  - Weblogic and websphere do user/password auth via plugins
  - Tomcat has open source SPNEGO support

Sidebar: what is SPNEGO

- Actually a mechanism for negotiating GSS mechanism
- But usually used to refer to IE -> IIS silent Auth – aka Windows Integrated Authentication



Things to look for

- Central reporting, management and access control
  - Windows, web, Unix CLI
- Delegated management
  - You must still be in charge
  - Joe AD admin should not be
- Rationalization of UIDs
  - You don’t want to be forced to choose 1 per user
- Auditing
- Uniform support of many platforms

More things to look for

- Sophisticated Forest and Trust Support
- Non invasive to AD
  - They trust you as much as you trust them
- Migration
  - Tools
  - Clean up what's there – what the heck is this user account from 5 years ago?
- Root Access Control (ldap sudo)
- Web and Application support
  - Apache, J2EE, Database, ERP, etc..

Questions

- Battery Life?