
# P13 - Leveraging Active Directory to Secure and Audit Access to Non-Windows Systems

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# Trust Administrators but Verify Their Actions

In order to establish organization and protect our IT assets:

- Define Rules for the controlled environment
- Identify those who the Rules will apply to
- Authorize a set of Privileges to those to be trusted
- Monitor the use of those Privileges
- Take action on any misuse of those Privileges

These Rules can take many different everyday forms such as:

- Kids are allowed to use the internet – with software and parents monitoring
- We use freeways with speed limits – but Policemen and cameras monitor
- Passports grant access to other countries – Border patrol monitor activities

# Regulations Establish The Rules for IT

Information Assurance Security Controls are based on the same principles: rules, identity, authorization grants and monitoring

Federal Information Security Management Act

NIST Special Publication 800-53

PARTICIPATING ORGANIZATION

Payment Card Industry Data Security Standard

Basel II. FFIEC Information Security Booklet

Health Insurance Portability and Accountability Act

Sarbanes-Oxley Act Section 404

The Rules are well defined:

- Establish separation of duties
- Enforce system security policies
- Enforce network access policies
- Encrypt data-in-motion
- Enforce "least access"
- Require smartcard user login
- Lock down privileged accounts
- Grant privileges to individuals
- Audit privileged user activities

# NIST 800-53 Provides Detailed Security Requirements

There are five identity and access management specific control families which we will look at more closely

- Identity & Authentication (IA)
  - Uniquely identify and authenticate users
  - Employ multifactor authentication
- Access Control (AC)
  - Restrict access to systems and to privileges
  - Enforce separation of duties and least-privilege rights management
- Audit & Accountability (AU)
  - Capture in sufficient detail to establish what occurred, the source, and the outcome
- Configuration Management (CM)
  - Develop/maintain a baseline configuration
  - Automate enforcement for access restrictions and audit the actions
- Systems & Communications (SC)
  - Boundary Protection
  - Transmission Integrity and Confidentiality
  - Cryptographic Key Establishment and Management including PKI Certificates

# Access Governance Starts with Centralization

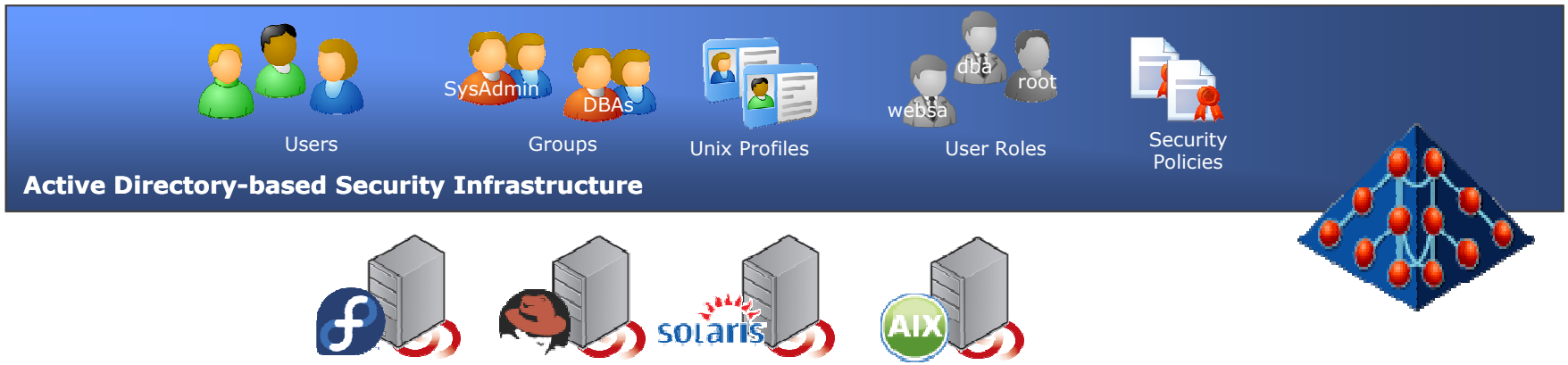
*Centralize Security Identity and Access Management within Active Directory*

## Identity Consolidation

- De-duplicate identity infrastructure
- Get users to login as themselves / SSO
- Single security policy definition
- Single point of administrative control

## Privileged Access Management

- Associate privileges with individuals
- Enforce "least access & least privileges"
- Audit privileged user activities
- Isolate systems & encrypt data-in-motion




Protecting Systems. Authorizing Privileges. Auditing Activities.

# Centralized Management Presents Challenges

## Centralization Goals

- Centralized UNIX Identities
- Establishing a global namespace
- Limited access granted where needed
- Locked down privileged accounts
- Privileges granted to individual users
- Audit privileged activities

## Corresponding Challenges

- Legacy namespace is complex and different across many systems
- Individual system differences make centralization difficult
- Access rights are typically granted too broadly
- Granting privileges requires a simple way to create and manage the policies
- Integration with existing management processes

# Infrastructure as a Service Brings New Challenges

## Adoption of IaaS is growing in the Enterprise

- Yankee Group says 24% are using IaaS, 60% are planning to use in 12 months
- Adoption trends are first in Development, then QA/Test, eventually to Production

## Security remains the primary issue blocking Enterprise use

- Cloud Security Alliance identified 7 threats to cloud computing
- Gartner identified privileged user access as the #1 cloud computing risk

## The Challenges to Enterprise use inexpensive public IaaS are very familiar

- Cloud server security is left to the customer
- Cloud server templates have common privileged accounts and passwords
- Cloud servers are typically deployed on public networks with dynamic IP addresses
- Access controls and activity auditing are left to the customer
- Applications hosted on these servers don't enable end user single sign-on access

# Solution is to Automate Security Enforcement

## Leveraging Active Directory as the centralized security infrastructure

### Protect Systems

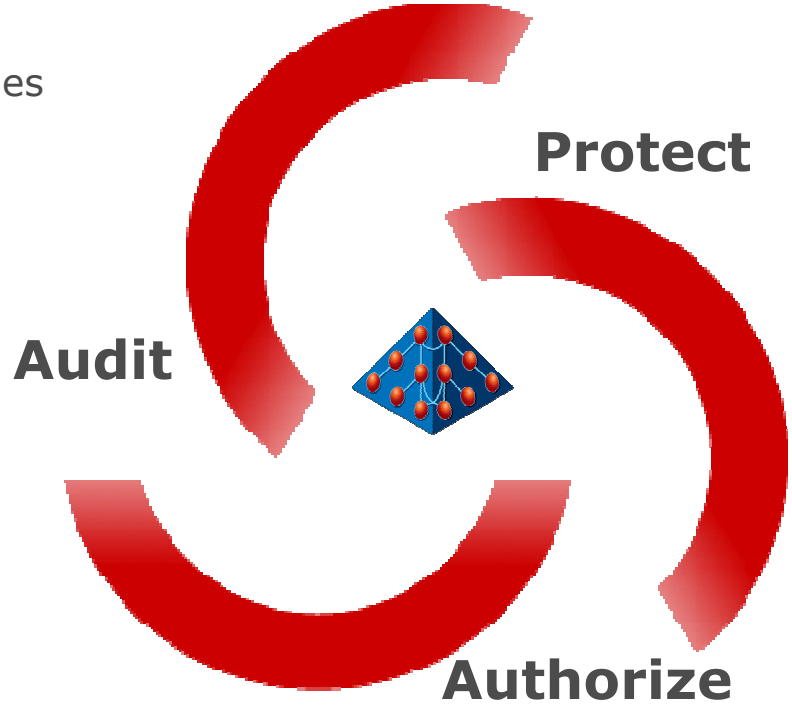
- Group Policy enforces system security policies
- IPsec based network protection policies
- AD management of privileged accounts

### Authorize Privileges

- AD-based unique identity
- Role-based access and privilege
- AD enforces separation of duties

### Audit Activities

- Audit all user activity
- Report on access rights and privileges




*Resulting in automated security for the Enterprise*

Leverage Active Directory to Automate Security Enforcement

# PROTECT SYSTEMS

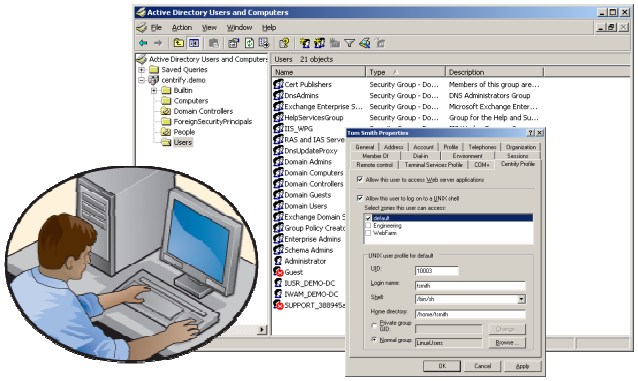
# Active Directory-based Computer Identity

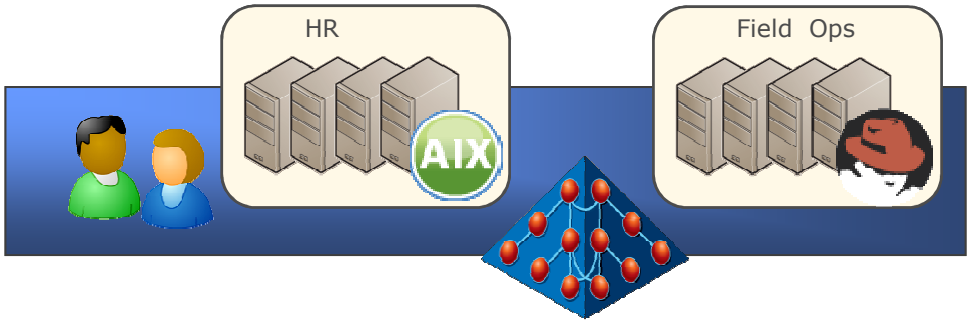
## Active Directory services provide the foundation for Enterprise security

- Highly distributed, fault tolerant directory infrastructure designed for scalability
- Supports large Enterprises through multi-Forest, multi-Domain configurations
- Kerberos-based authentication and authorization infrastructure providing SSO

## Computer systems join Active Directory

- Establishing individual computer accounts for each system
- Automatically enrolling for PKI certificates and establishing Enterprise trust
- Enabling authorized Active Directory Users to login, online & offline
- Controlling user authentication for both interactive and network logins



# Automated Security Configuration Management

Group Policy provides a platform to define standard baseline security settings to be enforced on all systems

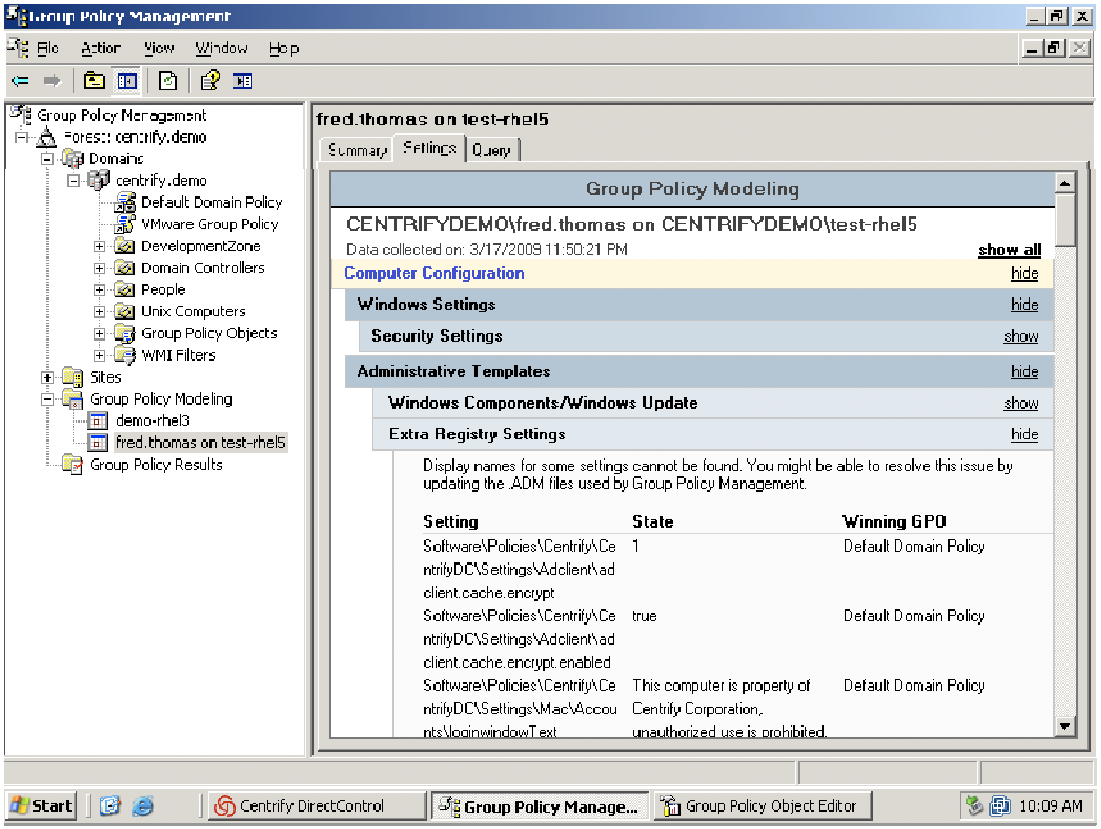
- DirectControl expands Group Policy usage to UNIX, Linux and Mac OS X systems

Mac Group Policies enable central system configuration

- Eliminating the need for OD & Workgroup Manager

Group Policy Management Console provides security baseline management

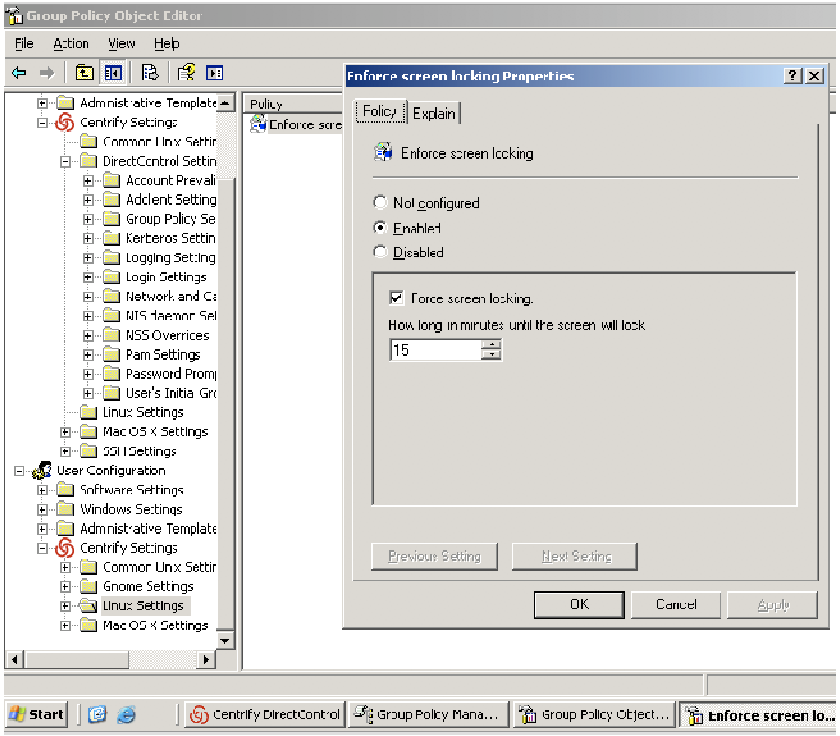
- Backup/Import Settings
- Modeling & Reporting on Policies



# Security Policies Auto-Enforced by Group Policy

Consistent security and configuration policies need to be enforced on all Windows, UNIX, Linux and Mac systems

- Group Policy is automatically enforced at system join to Active Directory
- Group Policy routinely checks the system for compliance, updating as required
- User Group Policy is enforced at user login

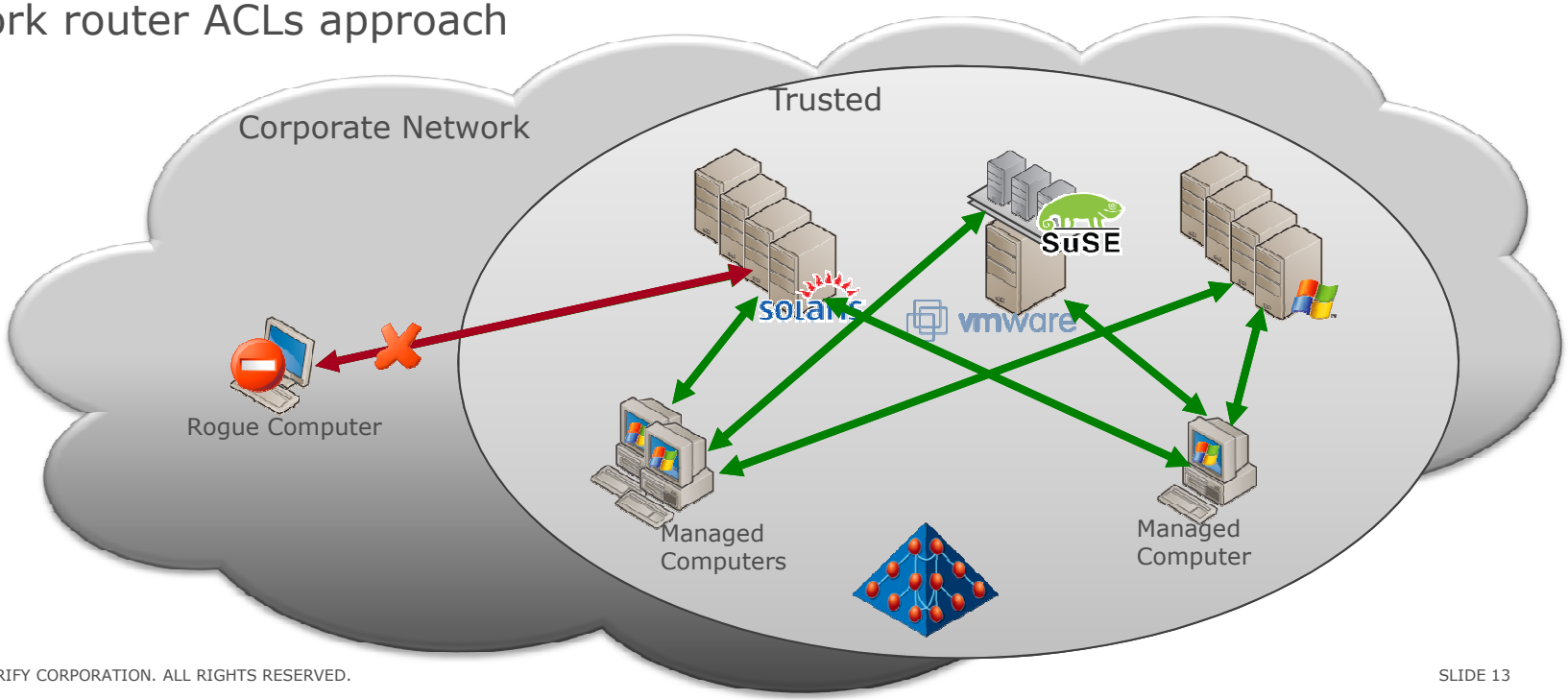



## Group Policies enforce:

- System authentication configuration
- System Banner settings
- Screen Saver & Unlock policies
- SSH policies control remote access security
- Firewall policies control machine access
- Mac OS X specific policies control the system and user's environment

# Prevent Data Breaches from External Threats

- IPsec Transport Mode isolates the entire enterprise, preventing access by rogue or untrusted computers and users — reducing the attack surface
- Network-level access controls are much more important when:
  - Enterprise network boundaries become porous as they include wireless and grow exponentially
  - Users' work becomes more virtual, accessing corporate resources from mobile / remote locations
- Software- and policy-based approach lets you avoid an expensive VLAN and network router ACLs approach



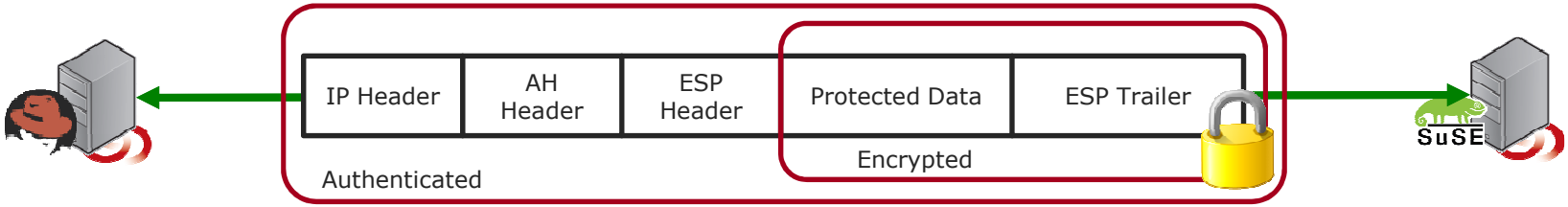
# Isolate Sensitive Servers & Protect Data-in-Motion

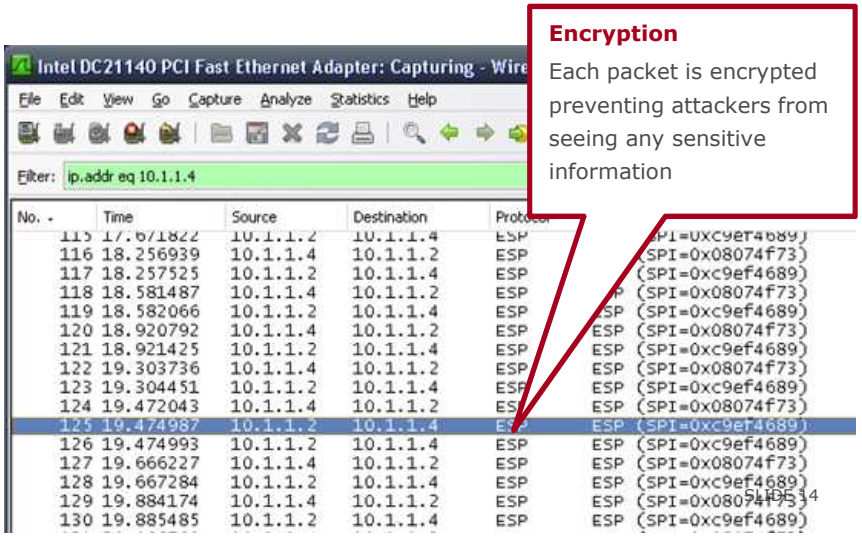
IPsec authentication policies logically isolate sensitive servers independent of physical network location

- Sensitive information systems are isolated based on PKI identities and AD group membership

IPsec encryption protects data-in-motion without modifying older applications

- Enforce peer-to-peer, network-layer encryption for applications that transport sensitive information




**Encryption**

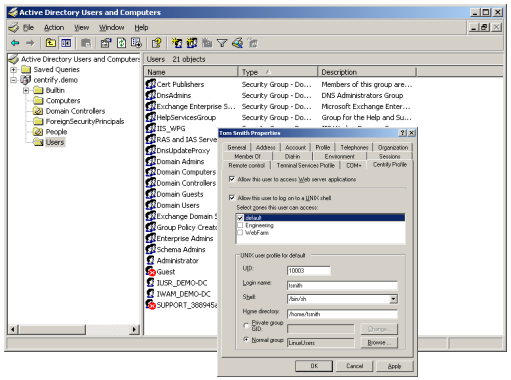
Each packet is encrypted preventing attackers from seeing any sensitive information

Leverage Active Directory to Automate Security Enforcement

# AUTHORIZE PRIVILEGES

# Active Directory Centralizes Account Management

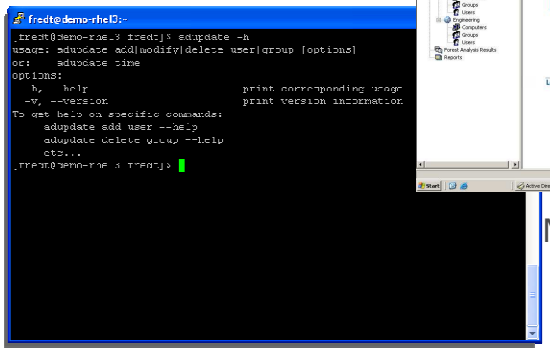
- UNIX Account administration leverages centralized Active Directory processes and automation
- Account and authentication policies are enforced on all systems



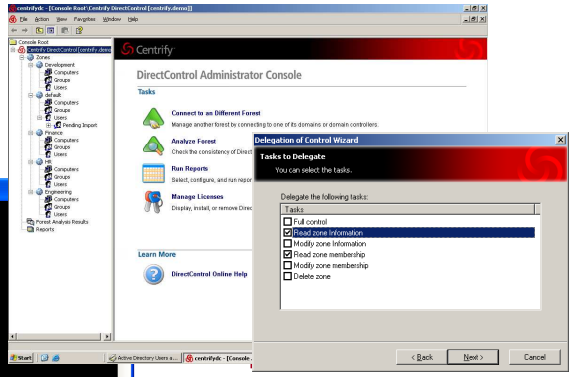

Active Directory Users and Computers

Existing Identity Management Solutions

Provisioning APIs/Tools

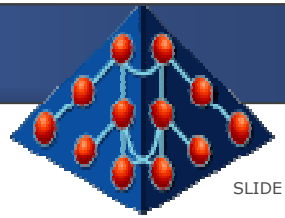


Unix Command Line Interface




MMC Admin Console

**Active Directory-based Security Infrastructure**



# Centralize The Most Complex UNIX Environments

## Zones uniquely simplifies the integration and centralized management of complex UNIX identity and access permissions into Active Directory

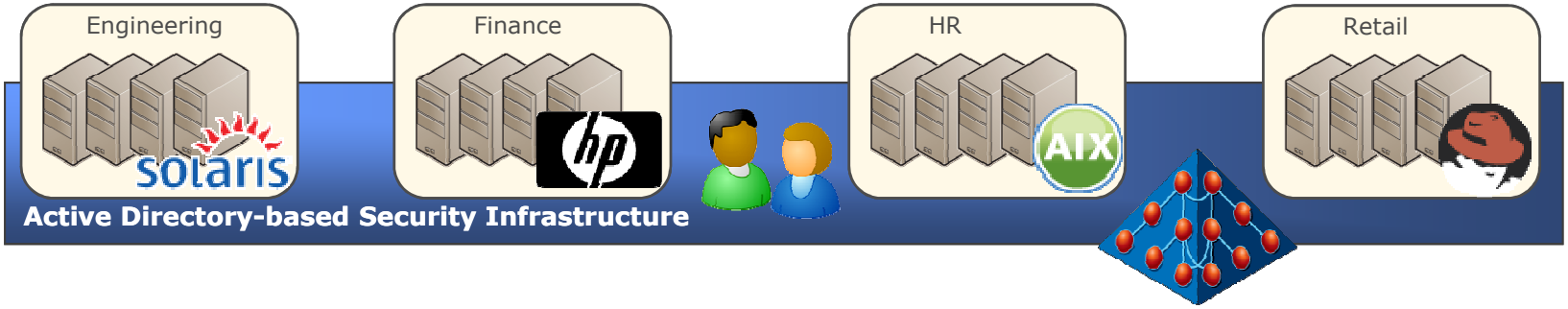
- Only solution designed from the ground up to support migration of multiple UNIX environments and namespaces into a common Directory
- Zones provides unique ability to manage UNIX identity, UNIX access rights and delegated administration

## Centrify supports native AD delegation for separation of duties

- Zones create natural AD boundaries for delegated UNIX administration of a group of systems through AD access controls on UNIX Zone objects

## Seamlessly integrate administration into existing IDM systems

- AD Group membership controls the provisioning of UNIX profiles granting access and privileges
- IDM systems simply manage AD Group Membership in order to control the environment



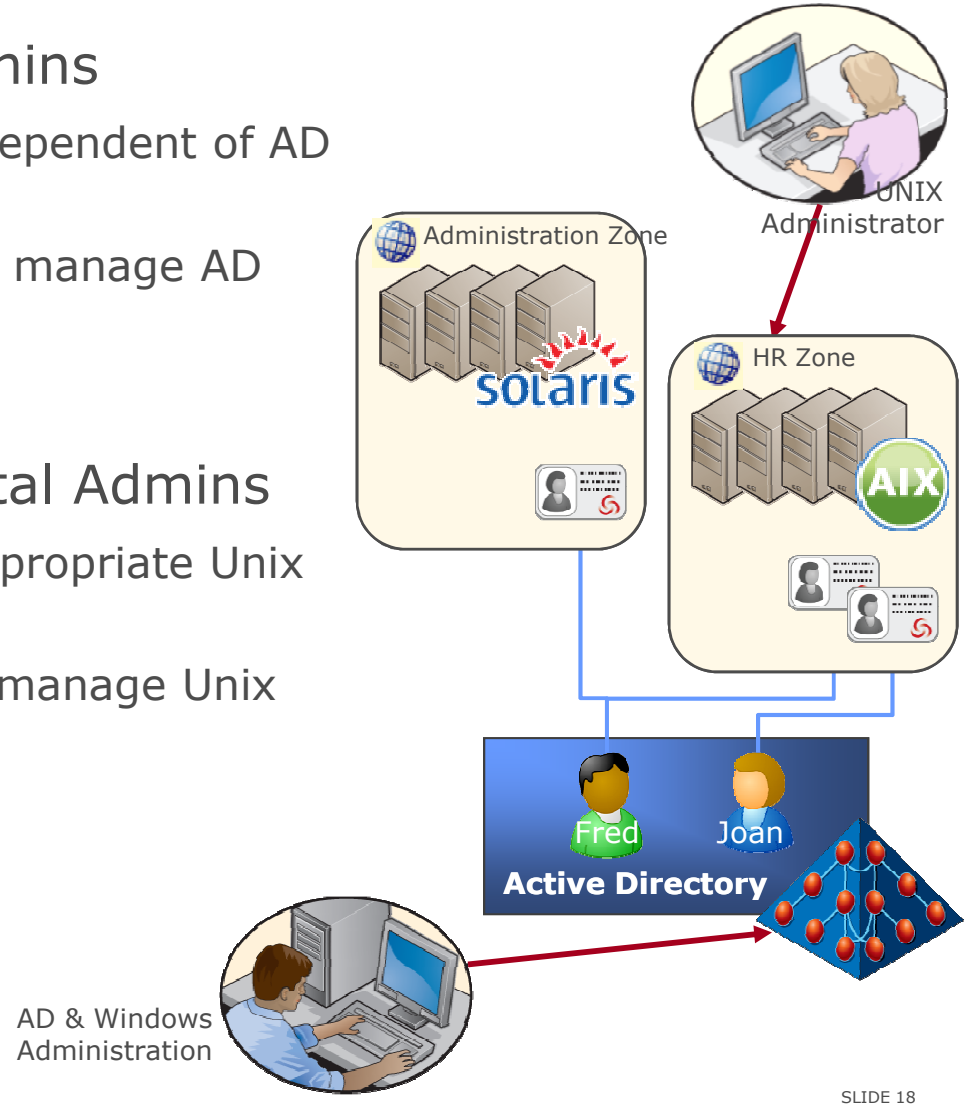
# Ensure Separation of Administrative Duties

## Separation of AD and Unix Admins

- User's Unix profile are stored independent of AD User object
- Unix Admins don't need rights to manage AD User objects, only Unix profiles

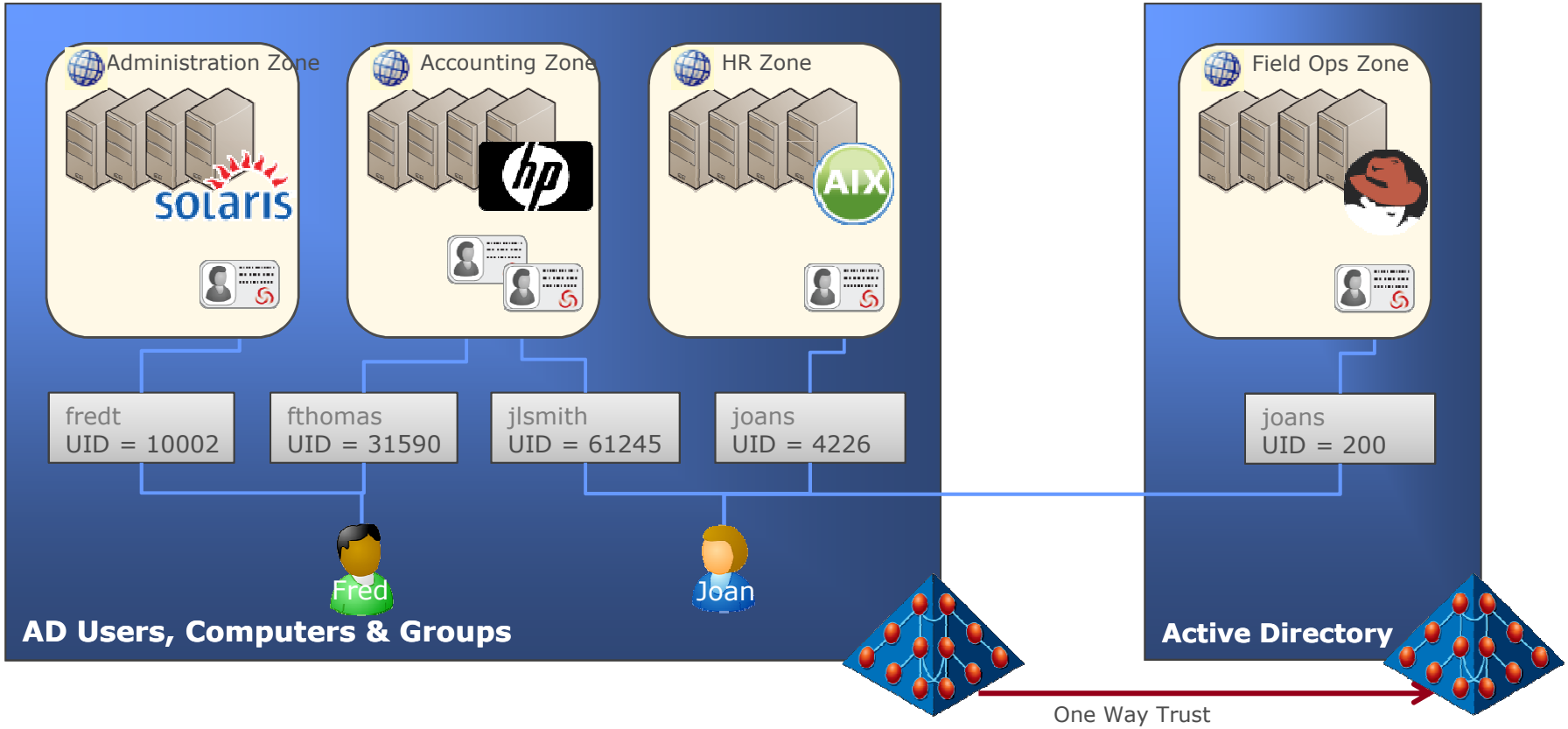
## Separation of Unix Departmental Admins

- Each Zone is delegated to the appropriate Unix Admin
- Unix Admins only need rights to manage Unix profiles within their own Zone



# Least Access is Enforced Through Zones

- System Access is denied unless explicitly granted
- Access is granted to a Zone (a logical group of systems)
- Users' UNIX Profiles within a Zone are linked to the AD User

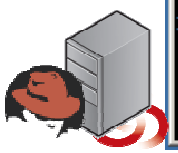


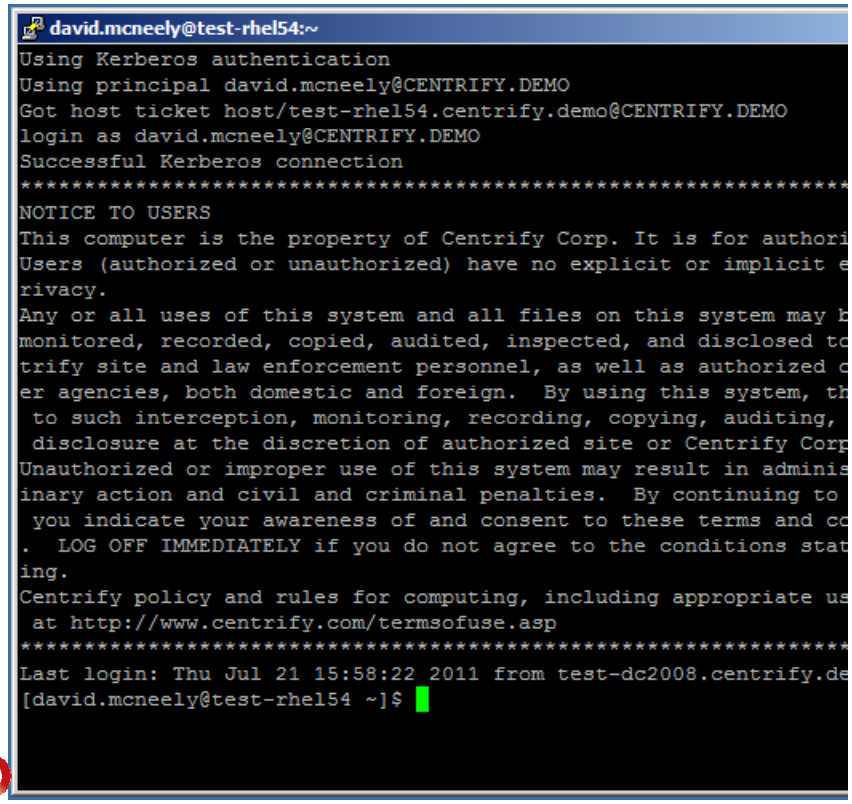
# Active Directory-based User Login

## Smartcard login policies are also enforced

- DirectControl for OS X supports CAC or PIV smartcard login to Active Directory granting Kerberos tickets for SSO to integrated services
- Users configured for Smartcard interactive login only are not allowed to login with a password, however Kerberos login after smartcard is allowed

## Kerberos provides strong mutual authentication to Servers after desktop smartcard login



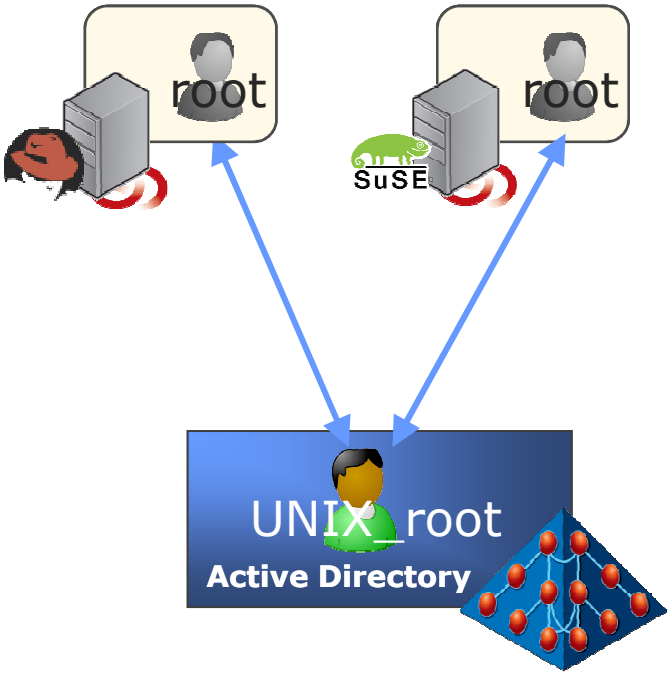
# Lock Down Privileged Accounts

Lockdown privileged and service accounts within Active Directory

- Online authentication requires AD-based password validation
- Offline authentication uses the local cached account
- Passwords are synchronized to local storage for single user mode login

Leverage role-based privilege grants to eliminate risks exposed by these accounts

- Eliminating need to access privileged accounts
- Enables locking down these account passwords



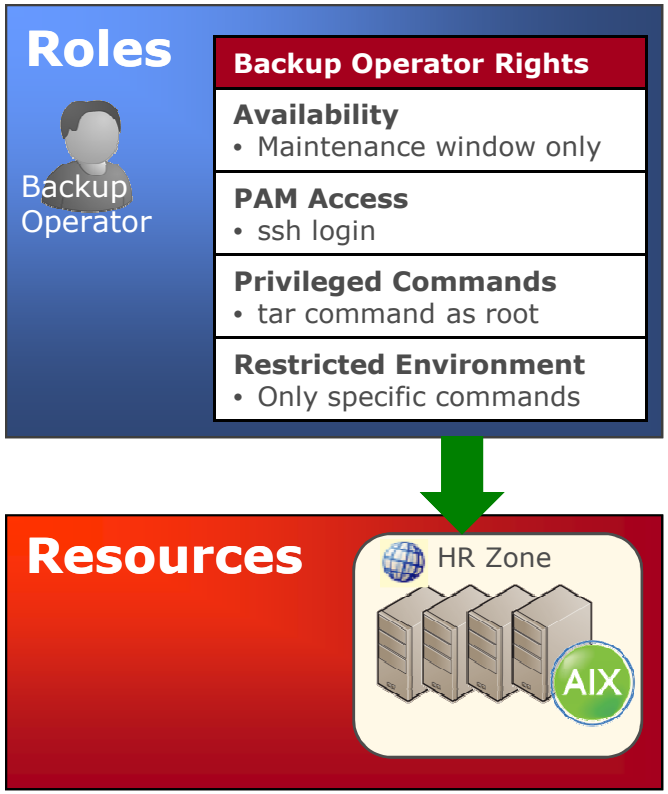
# Associate Privileges with Named Individuals

## Centralized role-based policy management

- Create Roles based on job duties
- Grant specific access and elevated privilege rights
- Eliminate users' need to use privileged accounts
- Secure the system by granularly controlling how the user accesses the system and what he can do

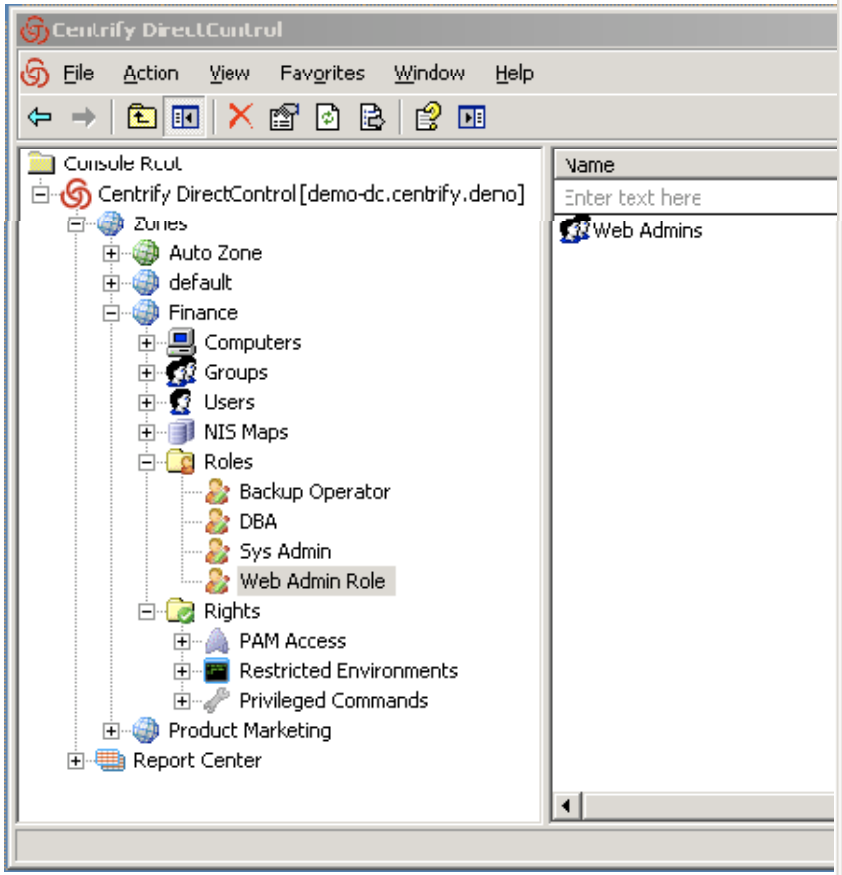
## Unix rights granted to Roles

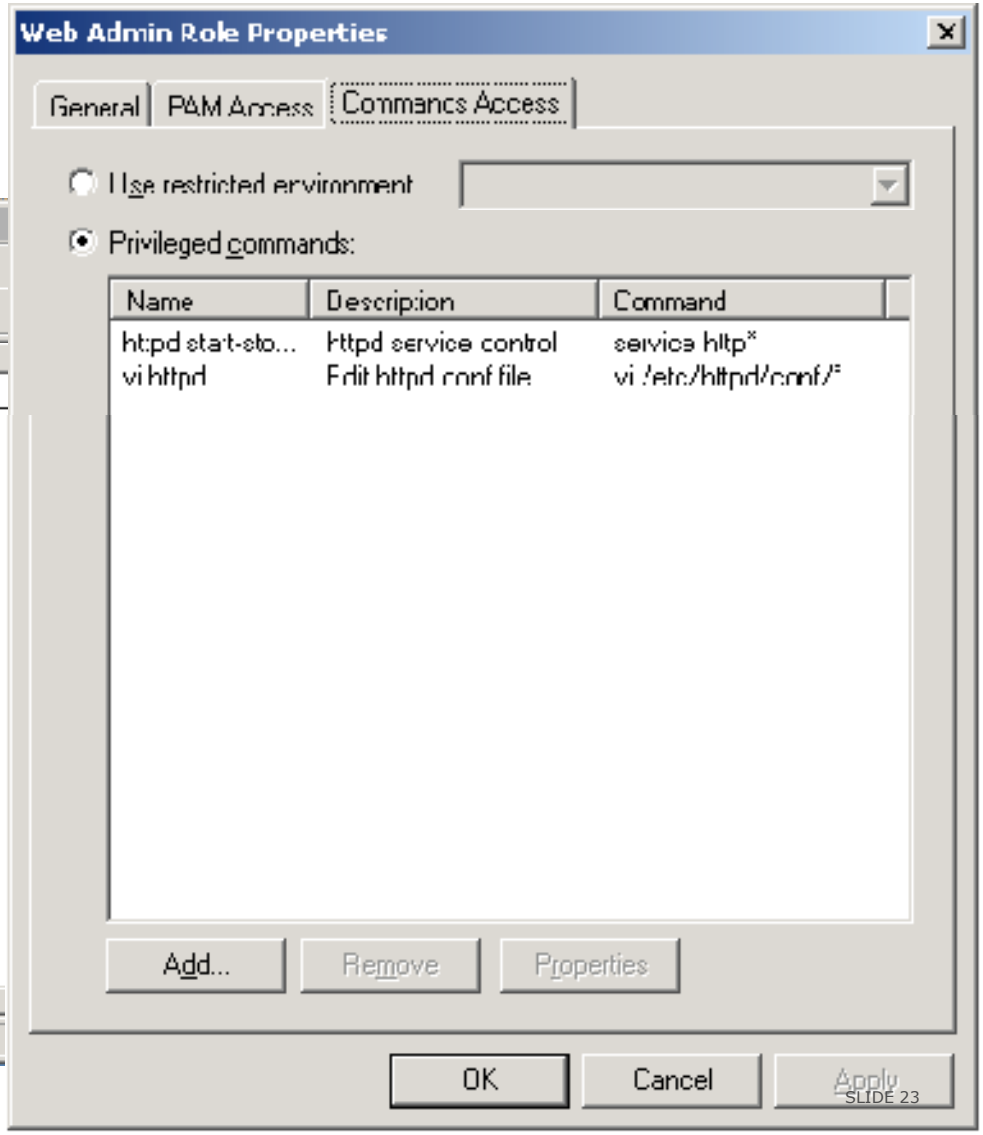
- Availability – controls *when* a Role can be used
- PAM Access – controls *how* users access UNIX system interfaces and applications
- Privilege Commands – grants elevated privileges where needed
- Restricted Shell - controls allowed commands in the user's environment



# Grant Privileged Commands to Roles

- Web Admins need root privileges to manage Apache Services



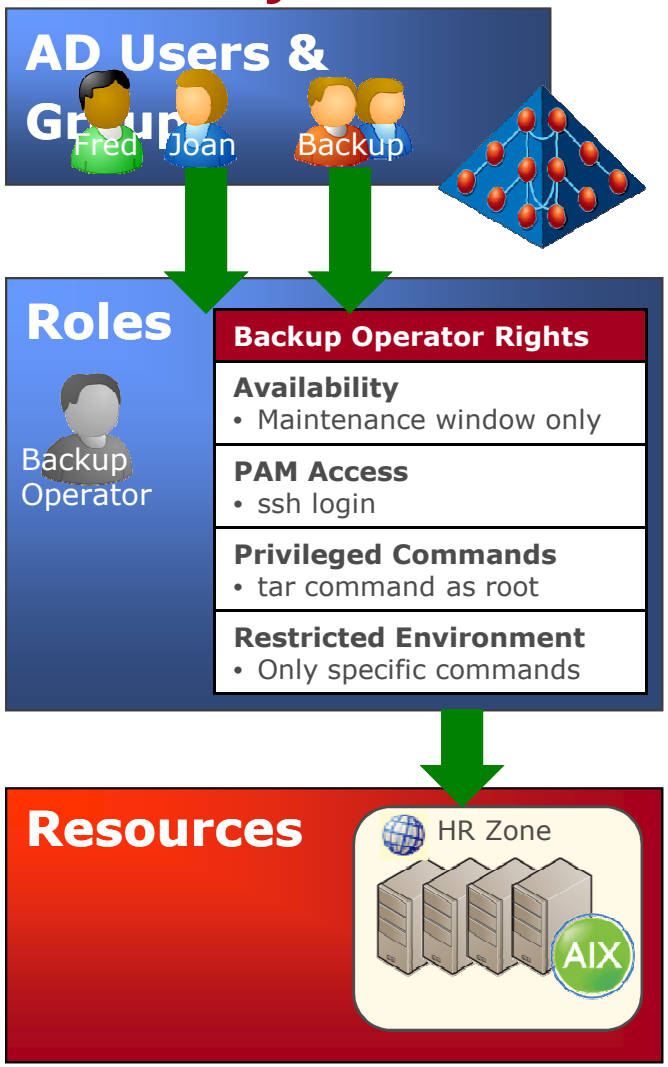
# Role Assignments Ensure Accountability

## Role Assignment

- Active Directory Users are assigned to a Role, eliminating ambiguity, ensuring accountability
- Active Directory Groups can be assigned to a Role, simplifying management
- User assignment can be date/time limited – enabling temporary rights grants

## Assignment Scope

- Roles apply to all computers within a Zone/Department
- Users within a Role can be granted Rights to Computers serving a specific Role (DBA -> Oracle)
- Assignment can be defined for a specific Computer



# Example: Privilege Access in Current Environment

- Web Admin editing the httpd.conf requires root permissions

User Session

```
[twilson@test-rhel5 ~]$ su root
Password:
[root@test-rhel5 twilson]# vi /etc/httpd/conf/httpd.conf
[root@test-rhel5 twilson]# /sbin/service httpd restart
Stopping httpd:                                    [  OK  ]
Starting httpd:                                    [  OK  ]
[root@test-rhel5 twilson]#
```

Security Log (/var/log/secure)

```
Oct 26 10:13:27 test-rhel5 sshd[1786]: pam_unix(sshd:session): session opened for user twilson by (uid=0)
Oct 26 10:14:45 test-rhel5 su: pam_unix(su:session): session opened for user root by (uid=10004)
```

# Example: Rights Dynamically Granted at Login

```
[twilson@test-rhel5 ~]$ id
uid=10004(twilson) gid=10001(unixuser) groups=10001(unixuser)
[twilson@test-rhel5 ~]$ adquery group -a "Web Admins"
centrify.demo/Users/Tim Wilson
centrify.demo/Users/David McNeely
[twilson@test-rhel5 ~]$
[twilson@test-rhel5 ~]$ dzinfo
Zone Status: DirectAuthorize is enabled
User: twilson
Forced into restricted environment: No

  Role Name        Avail Restricted Env
  ---------------  ----- --------------
  Web Admin Role   Yes   None


  PAM Application  Avail Source Roles
  ---------------  ----- --------------------
ftpd             Yes   Web Admin Role
sshd             Yes   Web Admin Role

  Privileged commands:
  Name             Avail Command              Source Roles
  ---------------  ----- --------------------  --------------------
  vi httpd         Yes   vi /etc/httpd/conf/*  Web Admin Role
httpd            Yes   service http*         Web Admin Role
  start-stop-rest
  art

[twilson@test-rhel5 ~]$
```

# Example: Privileged Access with Centrify Suite

- Web Admin editing the httpd.conf using DirectAuthorize privilege elevation

User Session

```
[twilson@test-rhel5 ~]$ dzdo vi /etc/httpd/conf/httpd.conf
[twilson@test-rhel5 ~]$ dzdo /sbin/service httpd restart
Stopping httpd:                                [  OK  ]
Starting httpd:                                [  OK  ]
[twilson@test-rhel5 ~]$
```

Security Log (/var/log/secure)

```
Oct 26 10:25:42 test-rhel5 sshd[1786]: pam_unix(sshd:session): session opened for user twilson by (uid=0)
Oct 26 10:26:03 test-rhel5 dzdo:  twilson : TTY=pts/5 ; PWD=/home/twilson ; USER=root ; COMMAND=/bin/vi /etc/httpd/conf/httpd.conf
Oct 26 10:28:27 test-rhel5 dzdo:  twilson : TTY=pts/5 ; PWD=/home/twilson ; USER=root ; COMMAND=/sbin/service httpd restart
```

Leverage Active Directory to Automate Security Enforcement

# AUDIT ACTIVITIES

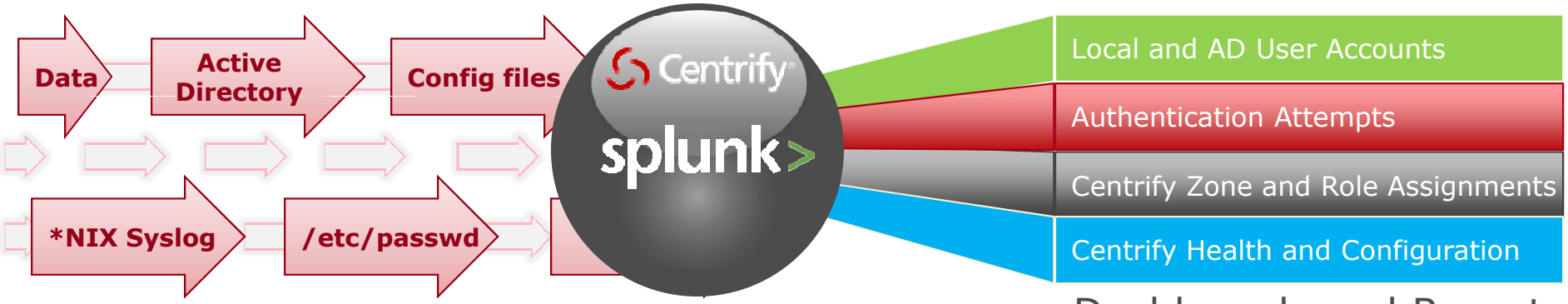
# System Logs and Events Provide Visibility

*Show me accounts not used in last 90 days.*

*Are there any systems where Centrify is not connected?*

*How long was a user in a role?*

- Syslog rollup brings in operational intelligence from other systems, apps, SIEM, security devices, etc.




***I want to see all failed login attempts.***

*Are there any newly created local accounts on my server?*

*Who zone-enabled this user?*

- Shows changes in AD, *nix login attempts, Windows login attempts, Centrify agent health, etc.

# For Monitoring and Reporting of Logged Changes

splunk > Centrify

Logged in as admin | App | Manager | Alerts | Jobs | Logout

Dashboards | Logs and Configs | Search | Support

Help | About

## Search Active Directory and Zones | Actions

Object Type: Group
Activity Type: Altered Membership
Group Type: Global Distribution
Search Text: employees
Search

≥ 2 matching events | 43,097 scanned events

Create alert | Add to dashboard | Save search

### Employees

Added member(s) to this group about a minute ago by **TANGO\IT**

tango.se/Users/Employees

| AD Group | Group Scope | Group Type | Mail | Affected Members |
|---|---|---|---|---|
| Employees | Global | Distribution | employees@tango.se | tango.se/Users/Alpha<br>tango.se/Users/Bravo<br>tango.se/Users/Charlie |

Show all 264 lines for 8 events  DC — WIN-D64N2IVJ19B.tango.se  Windows Event Codes — 4750, 4751, 5136

1

### twamley

Updated 5 minutes ago by **TANGO\Administrator**

**tango.se/Program Data/Centrify/Zones/DMZ/Users/twamley** tango.se/Users/David Twamley

| Centrify Zone | UNIX User | UID | Shell | Home | GID | Enabled | When Created |
|---|---|---|---|---|---|---|---|
| DMZ | david ⇒ twamley | 10001 | /bin/csh | /home/twamley | 10000 | True | 01:53.28 am, Tue 03/29/2011 |

Show all 512 lines for 1 events  DC — WIN-D64N2IVJ19B.tango.se  Windows Event Codes — 5136

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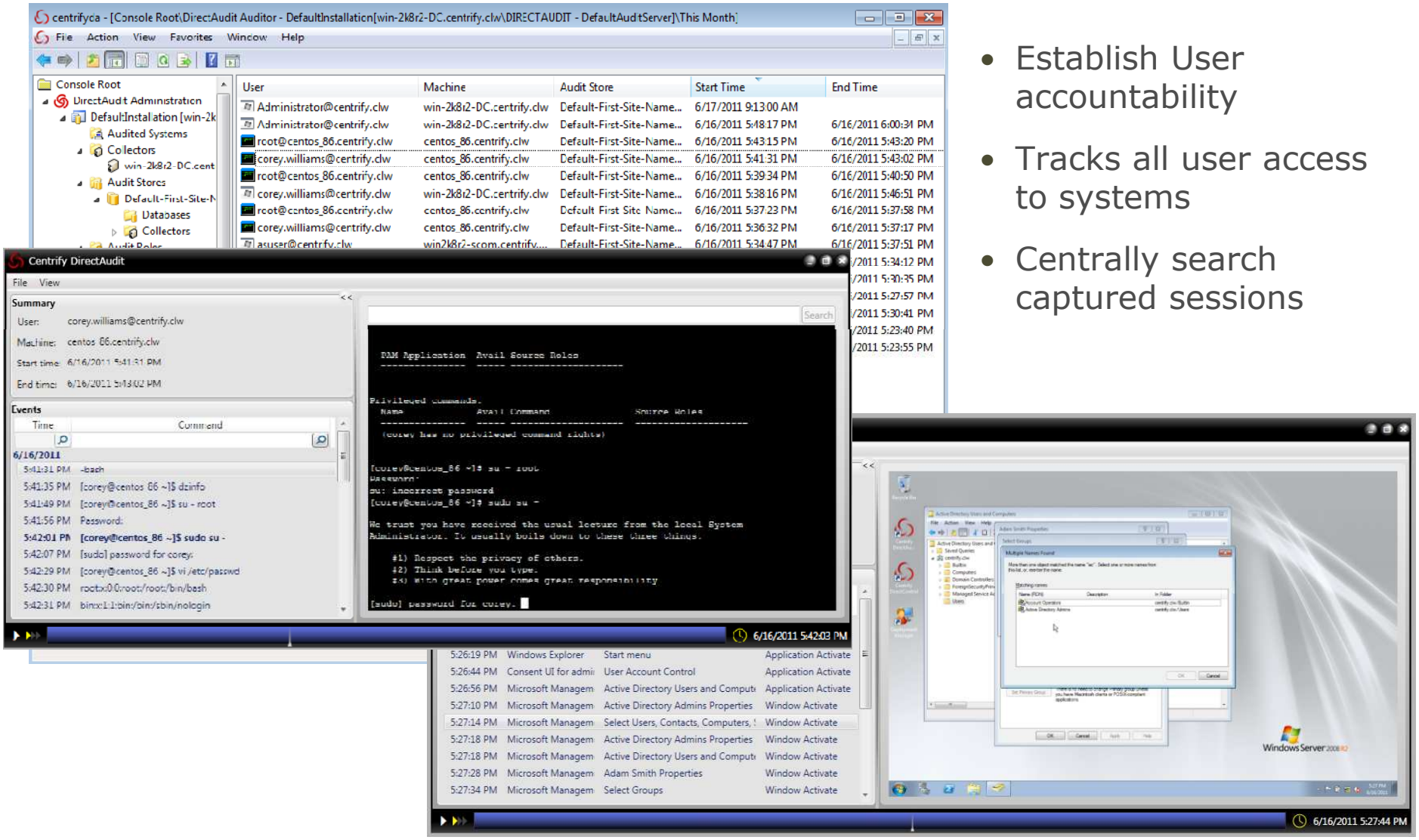
# High Definition Visibility Provided by Session Recording




- Establish User accountability
- Tracks all user access to systems
- Centrally search captured sessions

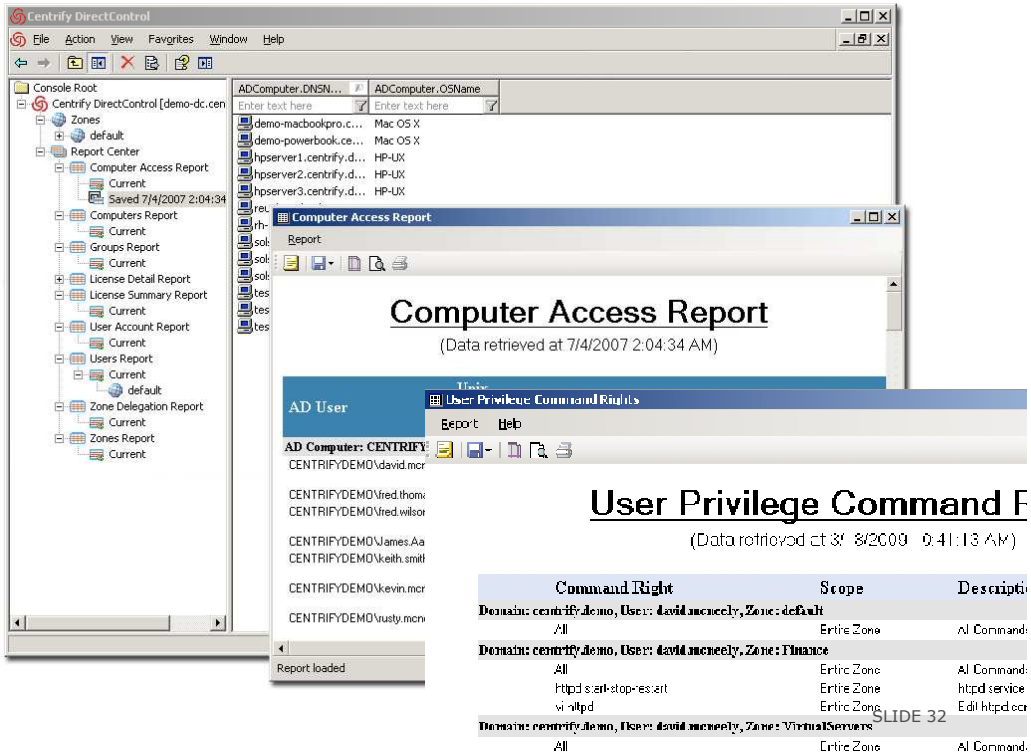
# Reporting Simplified with Centralized Management

Authorization and Access Reports can be centrally created:

- Reporting on user account properties
- Detailing user role assignments and privilege command rights
- Showing user access rights to computers

Active Directory based reporting

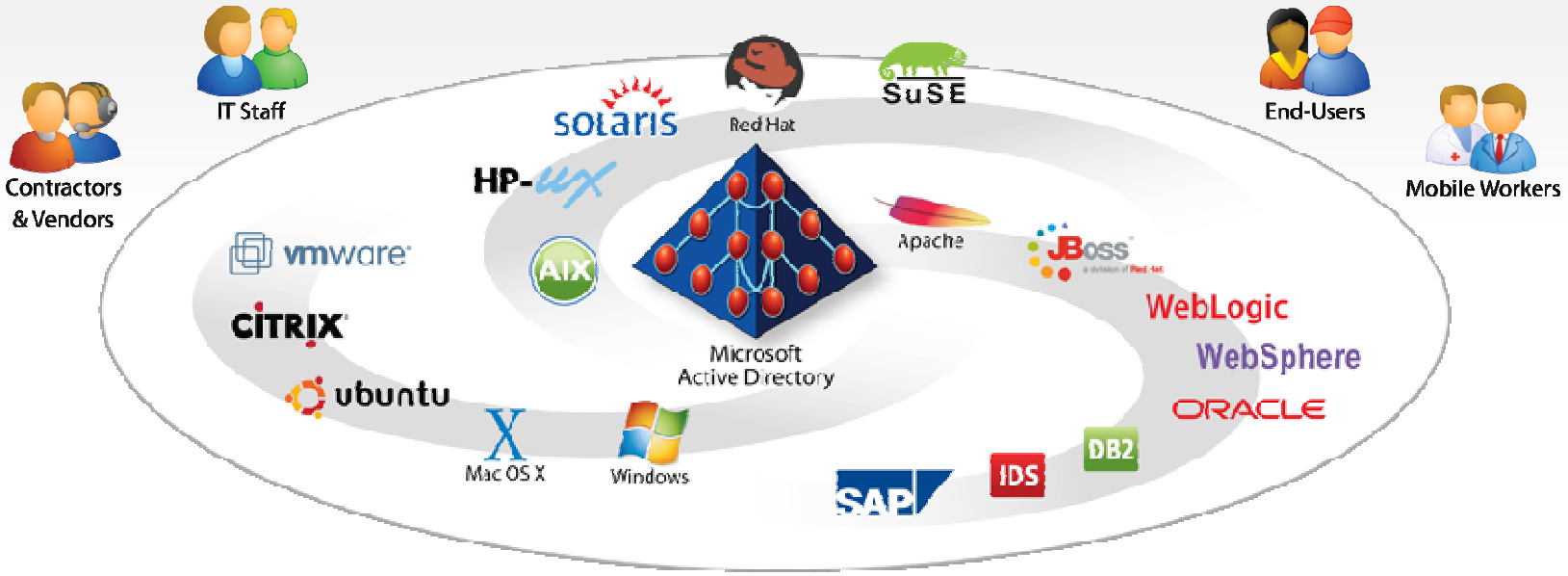
- Reports are generated on live, editable AD information
- Administrators can take snapshots of a report



# Centrify's Vision

Control, Secure and Audit Access to Cross-Platform Systems and Applications

## Centrify the Enterprise




**Leverage infrastructure you already own – Active Directory – to:**

| Control | Secure | Audit |
|---|---|---|
| What users can access | User access and privileges | What the users did |

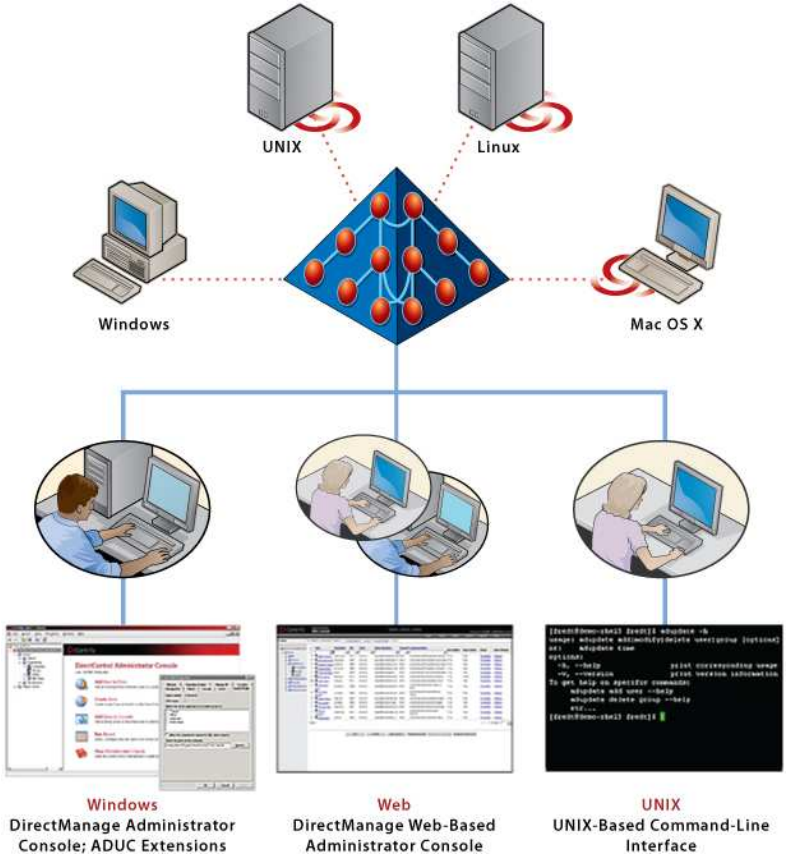
# Reduce Costs Through Identity Consolidation

"Islands of identity" need to be managed and secured

- Locally managed etc/passwd file
- Legacy NIS or hand-built scripting
- High cost & inefficient to maintain

With Centrify:

- ✓ Consolidate disparate UNIX and Linux identity stores into AD
- ✓ Implement least-privilege security
- ✓ Centrally enforce security and configuration policies across UNIX, Linux and Mac systems
- ✓ Instantly terminate access to all systems and applications centrally



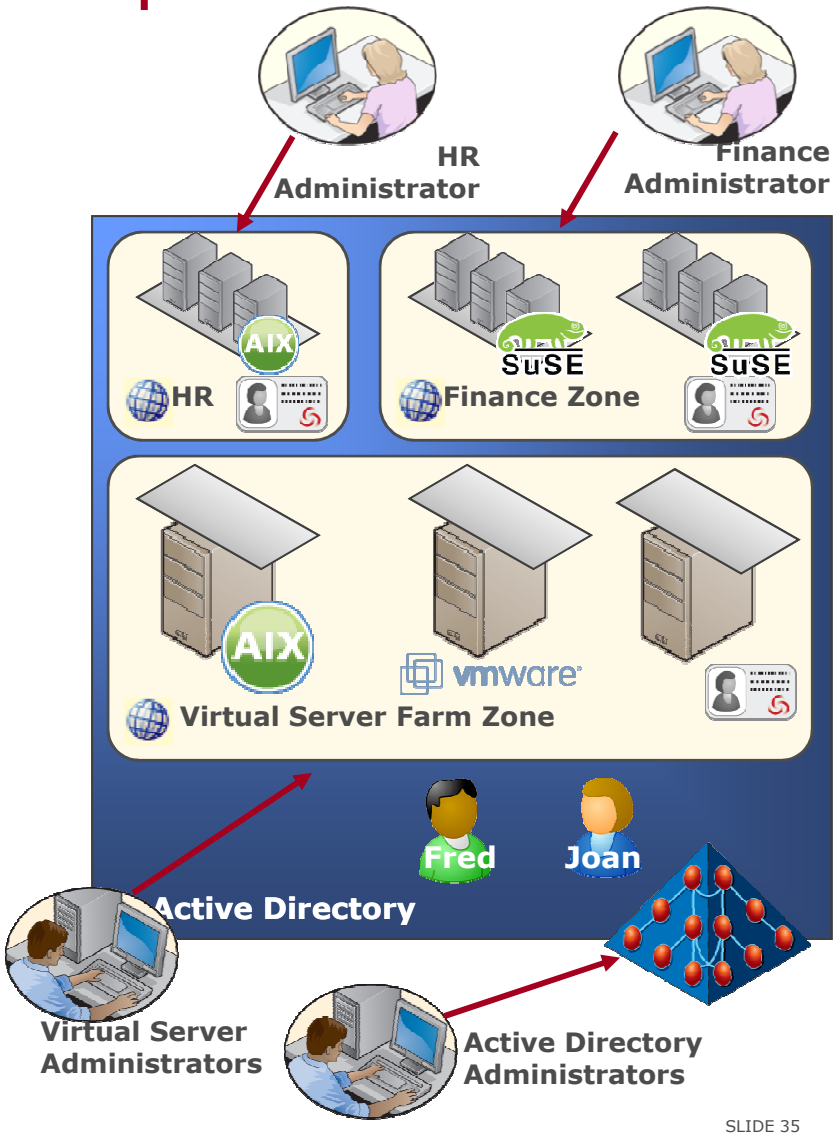
# Mitigate Risks & Address Compliance

## Evolving threat landscape and regulatory environment

- Shared "root" password compromises security & exposes intellectual property
- Anonymous access…
- Audits require reporting that ties access controls and activities to individuals

## With Centrify:

- ✓ Associate privileges with individuals
- ✓ Lock down privileged accounts
- ✓ Enforce separation of duties
- ✓ Isolate sensitive systems
- ✓ Protect data-in-motion
- ✓ Audit all activity



# Why Customers Choose Centrify

Gartner

*Centrify is the "right vendor to choose" for Active Directory integration: Centrify's solution is "mature, technically strong, full featured, and possess(es) broad platform support."* – 2009

*"We recommended that clients strongly consider Centrify … its products can fit well within a multivendor IAM portfolio."* – 2010

## Experience & Expertise

- 3500+ enterprise customers
- Largest dedicated team
- Unparalleled 24x7 support
- Record growth and profitable

## The Best Solution

- Single architecture based on AD
- Comprehensive suite
- Proven success in deployments
- Non-intrusive

Industry Awards

Industry Certifications

# Learn More and Evaluate Centrify Yourself

| | |
|---|---|
| WEB SITE | **www.centrify.com** |
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