



Migrating to a Unified Active Directory 2003 Domain in a Multi-Campus Environment

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Existing Architecture

- Grew from strong local department and campus initiatives, rather than a central organized structure
- Over 60 domains, workgroups and NDS trees
- No coordination of technical support, consistency and availability of services, or documentation or application of practices
- Service reliability varied greatly by location





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Today's Environment - Challenges

- Too complex, too confusing
- 60+ login domains
- Immobility – unable to access resources outside of local department
- No method to authenticate students
- Too insecure, too reactive



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The Strategic Move

- Provide a richer featured, consistent, proactive, and less confusing IT structure, processes, services and support
- Use existing best practices
 - IT Industry
 - Existing Internal




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What is GEMS?

- Computer network application of the “One College” philosophy
- Districtwide design, deployment, availability and support of a number of core information systems technologies




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Project Considerations

- Three campuses
- Five education centers
- Administrative center with data center managing ERP and email; providing district Internet connectivity; and hosting the LMS, specialized business apps, and core websites
- LAN-speed connectivity between four main sites (campuses and data center); T1+-speed to education centers




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Target Architecture

- Unified core services, practices and methods
- Single-forest, single-domain AD2003
- Responsive operations management on all servers and network infrastructure
- Consistent standardized deployments for patches, updates and new software deployments
- Authenticate all users



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College Community Involvement

- A variety of interactions with College leadership, IT leadership, managers, technicians, faculty and supported staff determined the issues, problems and potential solutions



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GEMS Team


- **Project Manager**
- **Project Architect**
- **Server/Domain Administrators**
- **Service Administrators**
- **Instructional Computing Experts**
- **Network Infrastructure Admins**

- **Vice-Chancellor – Technology**
- **Director – End User Computing**




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GEMS Project Drivers

- Single forest, single domain
- Entire administrative side first – instructional side later
- New domain replaces all existing non-instructional domains, workgroups, and NDS trees
- Instructional domains only exist for approved instructional purposes
- Home folders for all employee users
- Accounts for all employees and students
- “One College”
- “Work smarter, not harder” – reduce touch labor, especially at desktop
- “Keep it Simple and Standardized”
- Secure by design; reliable, stable, high-performance, documented
- Effective monitoring and updates
- Provide means to inventory connected hardware and software
- Provide core technologies to support future opportunities
- Include Macintosh platform support




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GEMS Project – Phase 1

- Establish GEMS Team, GEMS Test Lab, and GEMS Project Goals
- New core server and domain infrastructure
- Migration of administrative, staff and faculty accounts and desktops
- Districtwide adoption and support of new technologies and practices (especially for network management tools and structures)




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GEMS Project – Phase 2

- Operations Management (MOM)
- Districtwide managed patching and updates (SMS and other tools), backup management
- Self-service password reset; increasing overall account security
- Exchange migration (5.5 to 2003)
- Automation of employee account provisioning and lifecycle management



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GEMS Project – Phase 3

- Selection and migration of specific instructional workstations, servers and labs
- Districtwide instructional software deployment management
- Employee, department, division and project document collaboration sites (using SPS 2003)
- Automation of student account provisioning and lifecycle management



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GEMS Project – Phase 4

- Enhanced account self-management, empowered users
- “Personal and portable” online experience (targeted content, self-service, mobile)
- Paper-based to online processes and forms
- Complete academic integration of instructional workstations, servers and labs (excluding “sandboxed” labs and systems)
- Document lifecycle management



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“Initial Vision” – End User Experience (Architecture & Infrastructure)

- Single sign-on anywhere
- Roaming User Resources
 - My documents
 - Home folders
 - User data backed up
- Ability for rapid deployment of applications
- Ability for automatic installations of security updates and patches



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“Initial Vision” – Technology Management (Architecture & Infrastructure)

- Remote Diagnostics and Repair
- Proactive System Monitoring
- Asset and software inventory, software usage
- More secure, less vulnerable to risk
- Enhanced fault tolerance
- Reduced touch labor requirements




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GEMS Deployment Overview

- Single forest, single domain, AD 2003
- Cosand Center - 3 DCs, MOM/TechSQL, main SMS/TechSQL, main SAS, main RSA, home folders/dhcp, MIIS/Enterprise SQL
- Each (3) Campus - 2 DCs, SMS/TechSQL, SAS, RSA, homefolders/dhcp
- Education Centers on T1-ish links - DC, homefolders/dhcp
- Hot spare DC kept at an Ed Center




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GEMS Project – Phase 1

- Decision outcomes
- Hardware and software acquisition
- Pre-migration preparations
- Proof of concept test lab pilot
- Migration
- Post-implementation review



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Planning and Testing

- Structure design, schema extensions, server naming standard, roles delegation
- Site inspection of existing infrastructure
- External review of design plans
- Multi-campus tech staff involvement
- Dedicated ongoing testing lab
- Partnering with hardware vendor
- Tools, some not exactly as anticipated



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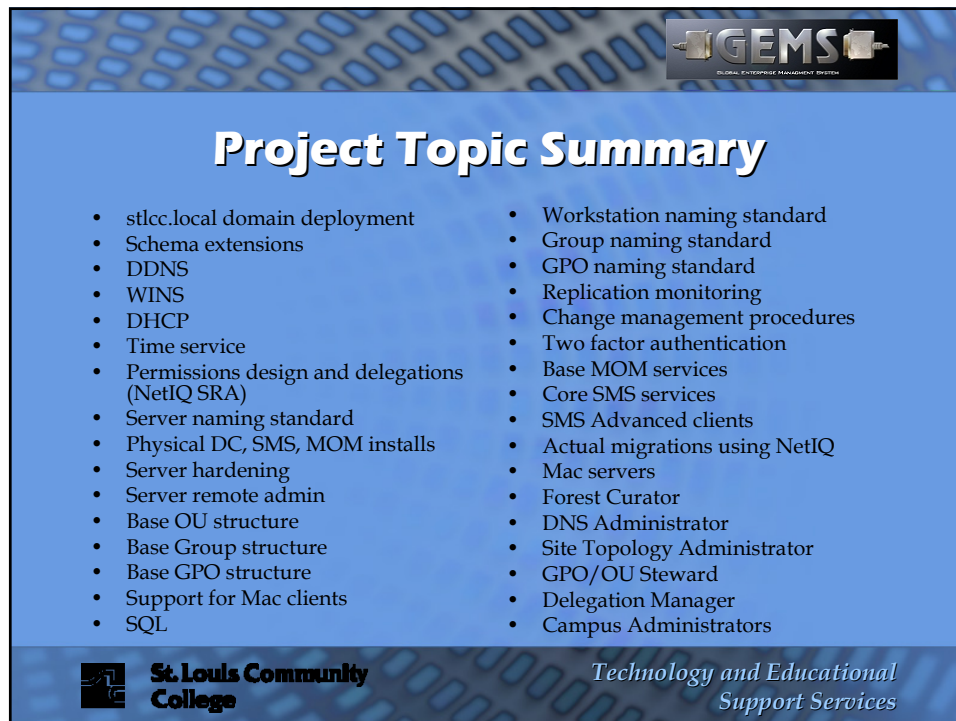
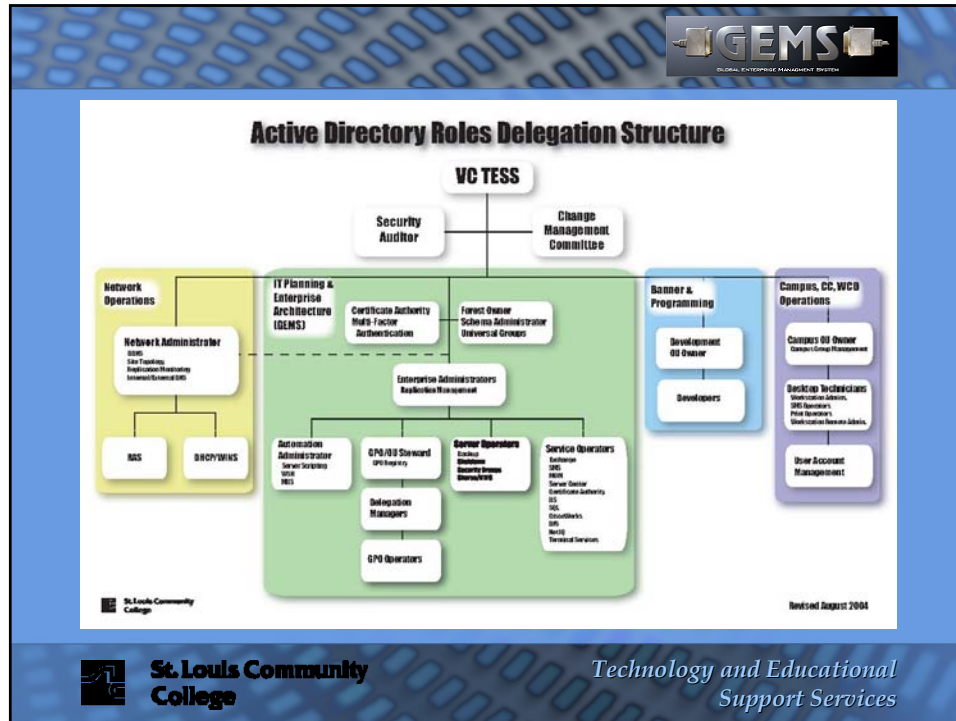
Technologies in GEMS Phase 1&2


- Active Directory (single directory)
- AD Management (NetIQ SAS/SPA & Quest)
- MOM (server performance monitoring)
- SMS (security updates, patches, software version/usage and systems inventory management)
- MIIS (identity integration)
- Exchange 2003 (enhanced email and advanced messaging)



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Communications

- Number of pre-deployment awareness presentations and discussion sessions
- GEMS Intranet site with information on the GEMS deployment, FAQs, and links to articles on technologies being used
- Flyers and handouts
- Campus technicians invited to NetIQ admin tools training



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COMPUTER TECHNOLOGY

GLOBAL ENTERPRISE MANAGEMENT SYSTEM


Coming Soon to a Computer Near You

Starting May 17th the GEMS team will begin migrating computers at the Cosand Center to Active Directory. This change will have a minimal impact on work since each computer will take only a few minutes to migrate. A technician will be conducting the transition and standing by afterwards to ensure everything works afterwards. For more information on the GEMS project, please check out the GEMS link on the CollegeWeb page – <http://collegeweb.stlcc.edu/GEMS>




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Deployment Process

- Migration was managed through the NetIQ Migration Suite
- Enumerate each source domain user account and group and resolve conflicts with stlcc.local accounts
- Only migrating Windows 2000, XP and 2003 and current Mac environments
- Preserve SID History to ensure groups and Exchange mailboxes continue to work until all accounts, groups and mailboxes have been migrated - this works well for home folders and file and print shares except for those using "domain users"




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Deployment Logistics

- Assignment of the local campus techs to work on the migration
- Maps of the campus identifying where are the workstations are to be found
- Training for the assisting campus techs in the NetIQ DRA tool
- Availability of local campus radios for on-site coordination during the migration
- Putting all other campus network changes on hold during the actual migration




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Deployment Technical Issues

- The GEMS Team needed to understand the setup of each campus – names and IPs of WINS servers, PDCs and BDCs, DHCP, etc.
- DHCP scope must direct clients to new AD DCs for DNS
- Windows XP SP2 (and other) firewalls
- Machines with static addresses
- Machines with multi-domain profiles
- Trusts with other, especially student, domains




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Key Issue

- Workstations must be able to properly resolve the stlcc.local domain
- The existing DNS servers won't work because stlcc.local is only designed to resolve inside the firewall
- The DHCP scope was changed to add the new DCs as primary DNS
- Changing each machine as it is migrated can be done, but adds considerable time
- Each campus had two DCs setup with DNS and forwarding for internet usage as the primary and secondary for the site




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AD Management

- NetIQ Security Administration Suite
- Quest Spotlight on AD (watches replication)
- Power was an unexpected issue – we have had unanticipated power failures for each of the 13 DCs spread across the district
- Schema modification to take away access for normal users to join computers to the domain (ms-ds-MachineAccountQuota)




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Operations Management

- Single MOM (Microsoft Operations Manager) server to monitor all GEMS project servers (and other file, print and application servers as they are able to participate)
- Targeted alerts
- Web interface and reporting for districtwide tech access of status and alerts
- Benchmark “normal” operating parameters to compare with suspected abnormal statistics




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Districtwide Patching & Updates

- Microsoft SMS (Systems Management Server) central software deployment and reporting server at the data center with three (local deployment) campus servers
- We are only supporting advanced clients (2000, XP, 2003, Mac)
- Various approaches for patching are being used, evaluated and considered
- Imaging is still used extensively for many desktop and lab deployments



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Account Lifecycle Mgmt

Retire User

- Delete/Freeze Accounts
- Delete/Freeze Entitlements

Password Mgmt

- Strong Passwords
- "Lost" Password
- Password Reset

Synchronize Identity

- Extend lifecycle information across all identity stores

Privileges Reporting


- Audit/log any ILM changes
- Keep track of privileges


Account Changes

- Promotions
- Transfers
- New Privileges
- Attribute Changes

New User

- User ID Creation
- Credential Issuance
- Access Rights





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MIIS Sequence of Events

- HR or student database staged to the CS
- Object projected to the MV
- Provision objects to AD, Exchange and SharePoint in the CS
- Export objects to the CD

The diagram illustrates the MIIS sequence of events. A central circle is divided into two halves: a blue half labeled 'Metaverse (MV)' and a white half labeled 'Connector Space (CS)'. A 'User' icon is located in the MV. Arrows point from the User to the CS. From the CS, arrows point to icons representing 'SharePoint', 'AD', 'Banner', and 'Exchange'.

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MIIS-Based Group Management


Address <http://localhost/miisGroupManagement/default.aspx>

Specify Search Criteria:
All

MIIS Group Management Include attribute based groups


Group Name	Group Type	Enabled	Mail	Clause	Exceptions		
Active UK Employees	Sec Group - Univ	✓	✓	✓		Edit	Delete
Contractor Request Approvers	Sec Group - Univ	✓	✓	✓		Edit	Delete
Full Time Employees	Sec Group - Univ	✓	✓	✓		Edit	Delete
Last Name Starts with S	Sec Group - Univ	✓	✓	✓		Edit	Delete
Palo Alto Residents	Dist Group - Univ	✓	✓	✓		Edit	Delete
Started after Jan 2000	Sec Group - Univ	✓	✓	✓		Edit	Delete

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Technologies in GEMS Phase 2+

- Exchange 2003 (enhanced email and advanced messaging)
- SharePoint 2003 (team websites, advanced functionality replacement for file shares)
- GEMS technology advantages extended to support instructional environment
- Advanced Identity Management (self-service user password resets, credential sharing between applications, online realtime data)




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GEMS Phase 2+ Opportunities

- Student Authentication
- Academic Integration (enhanced reliability and functionality of classroom technology)
- Personalized Experience
 - Targeted content
 - Self-service
 - Mobile Access
- Empowered Users




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Lessons Learned: Technical Staff

- Critical to backfill positions of techs working on the project team
- We selected good team members
- Other techs are dissatisfied on who was selected for the project team
- Many techs will be unhappy they no longer have the “keys to the kingdom”
- Many techs want project updates personally sent to them with personal explanations - checking a website for updates wasn't “good enough”
- Many non-project techs were not confident, nor had good understanding, until it was actually deployed
- More training on the management tools was needed



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Lessons Learned: Divide & Conquer

- Really needed multiple teams working on parts simultaneously:
 - AD migration
 - MOM
 - SMS
 - Exchange migration
 - MIIS




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Lessons Learned: Planning

- Good design before starting is key
- Architect role balances what leadership and management wants/should want with how techs would do it on their own
- We had a 3rd party (Microsoft) check our design looking for issues
- We now know we have a good design – although we still have pieces to complete
- Clean up old domains before migrating
- Need a long-term (5 year) plan




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Lessons Learned: Hardware

- Our selections worked very well and have lots of growth potential for the future
- Politics plays a part – multiple servers at multiple locations
- Partnering with a vendor is helpful
- Delayed vendor deliveries seriously impacts the morale of the technical staff and their enthusiasm for the project
- Plan for power issues, and automated IP-based UPS management of those issues, upfront
- Use Mac servers to connect Mac clients to AD




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Lessons Learned: Software

- Make schema changes, such as those for Exchange and SMS, upfront
- Windows 2003 SP1 – still finding new incompatibilities – even after having dealt with those for NetIQ, ePO, MOM, McAfee, Microsoft’s own schema tools, and others
- NetIQ migration tool made the work easier, quicker, and better documented over the native tool
- NetIQ administration allows easier and quicker deployments of custom admin consoles, plus roll-back capabilities and audit trails
- After migration – don’t make changes in old domain




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Lessons Learned: Test and Practice

- Have a test lab when you simulate the actual environment – all of the accounts
- The test lab needs to be ongoing, not just for the start of the project
- Test everything in the test lab first – even “minor” changes – there are always unanticipated consequences
- We now have migration “down” to a “science” – each location’s migration went quicker and smoother
- Still things we could have tested more



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Lessons Learned: Migration Prep

- Clean up old domain first
- Eliminate baggage – NT, 98, other legacy clients – update the workstations before the migration
- Train the techs doing the desktop migrations before the actual migration
- Determine what will cause problems/delays:
 - Services running as users
 - Users with lots of files
 - Users connecting to multiple domains



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Lessons Learned: Actual Migration

- Take a flexible approach to scheduling – let the project techs have time for other tasks between migrating major sites
- Get it done without impacting the production environment
- Need to reboot each workstation
- NetIQ tool exceeded expectations – made it easier and decreased touch labor time



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