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Banner on Dell at Temple University

Presented by:

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Introduction

- Temple University, in Philadelphia, is in the middle of a large Banner/Luminis rollout for its 35,000 students, 3000 faculty members, and 7000 staff members
- When complete the installation will include Financials, HR, Advancement, Financial Aid and Student Registration
- For its platform Temple chose the scalable and cost effective Oracle RAC on Red Hat Linux on Dell servers and storage
- This presentation will cover the background behind the project, why Temple chose the platform it did, implementation details, and information on Banner on Dell

Agenda Slide

- **Project Background – Frank Azuola, Temple U.**
- **Implementation – Charles Edamala, Temple U.**
- **Banner on Dell – Dave Jaffe, Dell**

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Project Background – Frank Azuola

How Temple chose to run Banner UDC on the Dell platform

Choosing the Platform

- **Two options**
  - Sun Microsystems / Solaris – The de facto platform for Banner at the time
  - Dell / Linux – New kid on the block
- **Sun**
  - Pros: Track record, many sites running on Solaris
  - Cons: Proprietary architecture, cost
- **Dell**
  - Pros: Solid company, Temple a Dell/Linux shop, good price/performance
  - Cons: Newcomer in the Banner arena (at the time, agreement between Dell and SunGard Higher Education had just been made public)

Choosing Platform

- **Deciding Factors**
  - Reputation of Dell
  - Prior experience with Dell/Linux
  - Agreement between Dell & SunGard Higher Education
  - Solid relationship between Dell & EMC
  - Visit to other sites that like Temple had decided in favor of Dell/Linux
    - Pace University
    - Texas Tech University
  - Favorable Cost/Performance
  - Commitment from Dell to promptly resolve any issues that may surface

Oracle Support

- **Choices**
  - Oracle through Oracle
  - Oracle through Dell
  - Oracle through SunGard

- **Chose Oracle Through Oracle:**
  - Oracle services both Banner & Non-Banner Oracle environments
  - Dell has offered to help address any issues with Oracle.

Architecture

Components

- 2 storage area networks: Dell/EMC CX3-80, CX4-480
- 120+ servers (blade & standalone) – but migrating some to virtualized environment.
- DR – replication between two sites (buildings)

Planning

- Dell helped put together a phased out acquisition plan.
  - Purchase equipment only as needed.
- Unfortunately, initial architecture was over-engineered.
  - Boot from SAN was originally considered, but later dismissed.
  - However, some of the equipment had already been purchased.

Ongoing Involvement

- **Banner is a multi-year project**
  - Dell committed to the success of the project for the long-haul
  - There have been some gaps (mostly due to Dell's newbie status) along the way
    - Over-engineering of the initial architecture
    - Disconnects between Dell and the Banner teams
  - Dell has made it a point to address any issues promptly and to the satisfaction of the Temple team.

Future

- **Within the next 2 years, the core of Banner will go into production – Finance, HR, Students**
- **The architecture continues to evolve**
  - **DR solution has been included – 2nd SAN replication based**
  - **Virtualization has been embraced for the non-production environment**
- **We expect the relationship between Temple and Dell continue to strengthen**

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Implementation – Charles Edamala

Project

Date	Milestones	Resources
Nov 2007	Dell Design finalized Network design finalized SunGard Contract signed	Temple, Dell
Dec 2007	Dell hardware arrives; set up of Non-Prod, Pre-Prod, Prod infrastructures begin	Temple, Dell
Jan 2008	Dell Oracle Non-Prod RAC install and configuration Non-Prod and Prod fsaATLAS install and configuration Non-Prod Luminis install begins	Temple, Dell SunGard
Feb 2008	Non-Prod Banner INB, SSB, Workflow, ODS install begins (several environments)	Temple, SunGard
Mar 2008	Banner training begins Luminis developer training begins Luminis Production install	Temple, SunGard
Jul 2008	Luminis Portal Load testing Luminis Go Live	Temple, SunGard
Aug 2008	Banner Document Imaging set up	Temple, SunGard
Sep 2008 ->	Virtualization	Temple

Overall Timeline

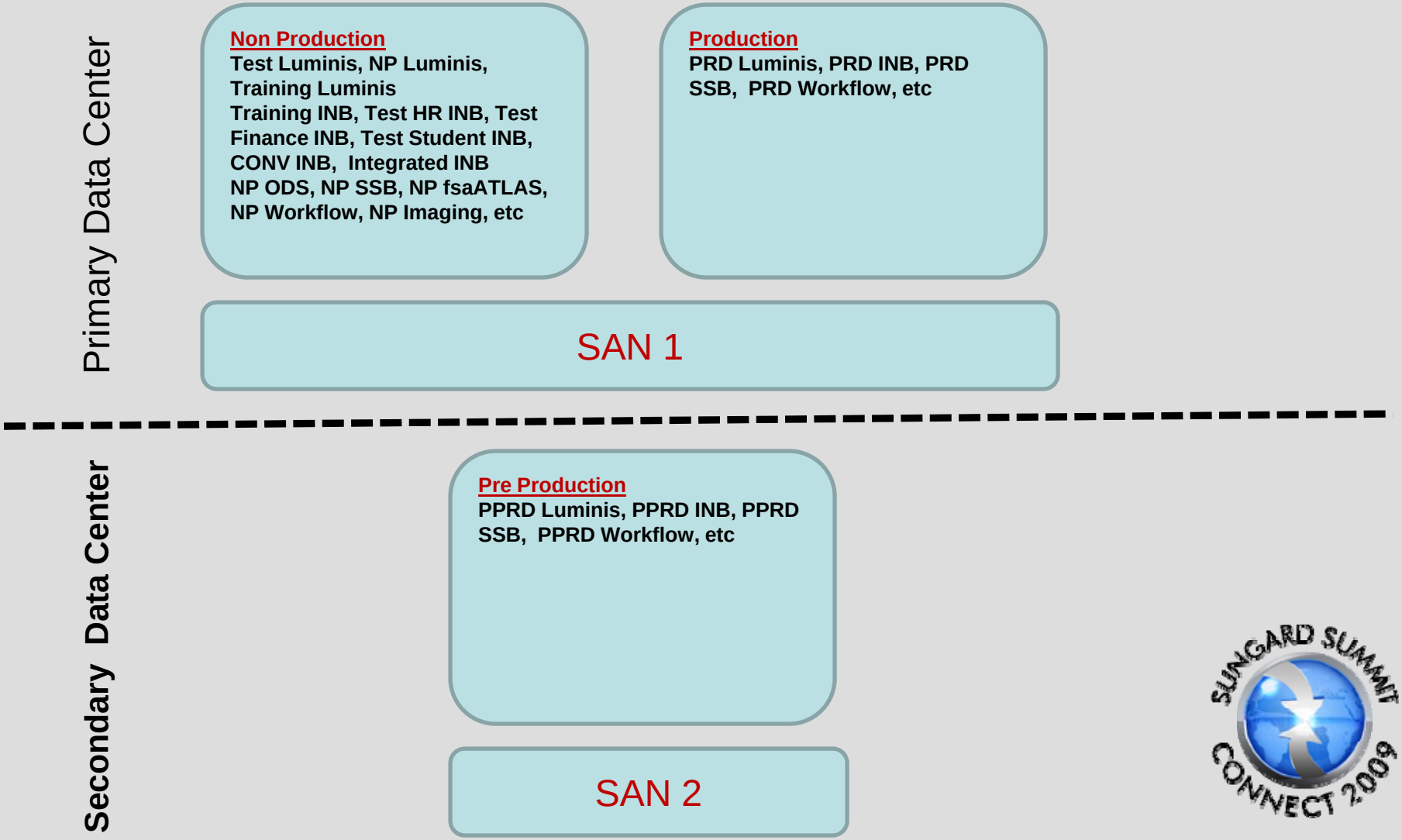
Date	Milestones	Resources
Aug 2008 – Dec 2008	Overall DR strategy completed Banner Identity Management design started	Temple
Mar 2009	Production install of Banner INB, SSB, Workflow, etc completed Identity Management implementation begins	Temple
Apr 2009	End user training for Finance	Temple
Jul 2009	Banner Finance go live	Temple
Dec 2009	Banner HR go live	Temple
2010	Banner Student go live	Temple
Jan 2011	Banner Advancement go live	Temple

Architecture: Infrastructures and Environments

- ***Infrastructure*: The collection of servers, SAN, network, and other hardware components that the application environments are installed on. Each infrastructure will have one or more Application Environments**

- ***Application environments:* These are separate installations of each ERP application used for different purposes. Each application will have one or more Application Environments such as Banner INB Training, Banner INB Conversion, etc**

Architecture: Infrastructures and Environments



Architecture: Oracle Real Application Clusters (RAC)

Primary Data Center

Non Production

Production

SAN 1

Dell PE6850 4U
4x 3.4GHz DC
16MB Cache
32GB RAM
4x146GB HDDs
2 FC HBAs
Dual NIC
RHEL 4.5

Secondary Data Center

Pre Production

SAN 2

Architecture: Production INB/SSB/ Workflow

Load balancing		Big-IP load balancer
Oracle Application Server Tier		Dell PowerEdge1955 2x 2.66GHz QC 4MB Cache 6GB RAM 2x146GB HDDs RHEL 3.4
RAC		Dell PowerEdge 6850; 4 x3.4GHz DC 16MB Cache; 24GB RAM; 4x146GB HDDs; 2 x HBAs RHEL 4.5
SAN		Dell/EMC CX3-80 SAN Storage

Architecture: Production TUportal

Load balancing		Big-IP load balancer
Luminis Web Tier		Dell PE1955 2x 2.66GHz QC 4MB Cache 6GB RAM 2x146GB HDDs RHEL 3.4
Luminis Resource Tier		Dell PE6850; 4 x 3.4GHz DC 16MB Cache; 24GB RAM; 4x146GB HDDs; 2 x HBAs RHEL 3.4
RAC		Dell PE6850; 4 x 3.4GHz DC 16MB Cache; 24GB RAM; 4x146GB HDDs; 2 x HBAs RHEL 4.5
SAN		Dell EMC CX3-80 SAN Storage

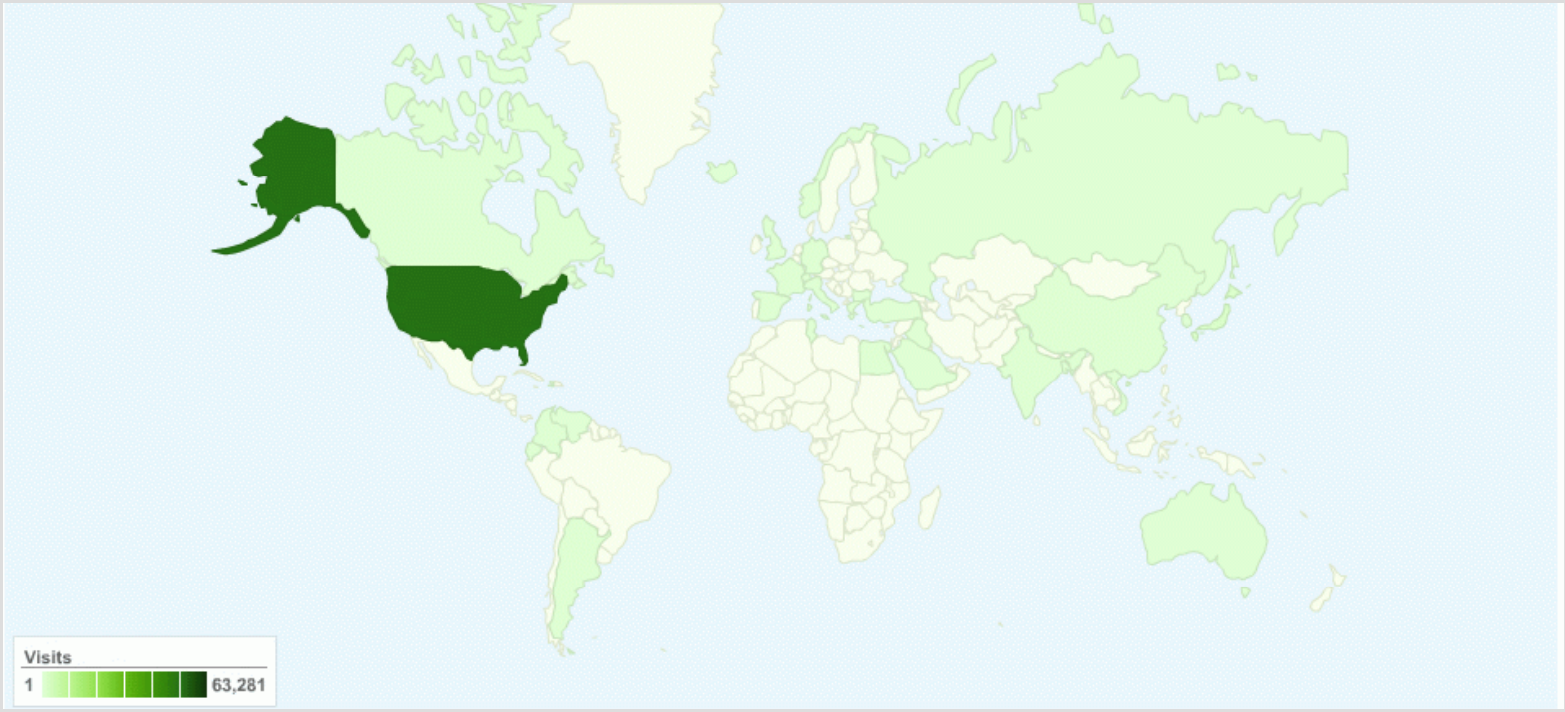
Load Testing TUportal

- 1,000 concurrent session validation
- 3,500 concurrent session validation
- 4,500 session including every 15th user adding and removing a channel and a bookmark (150 logins/minute)

TUportal Current Usage

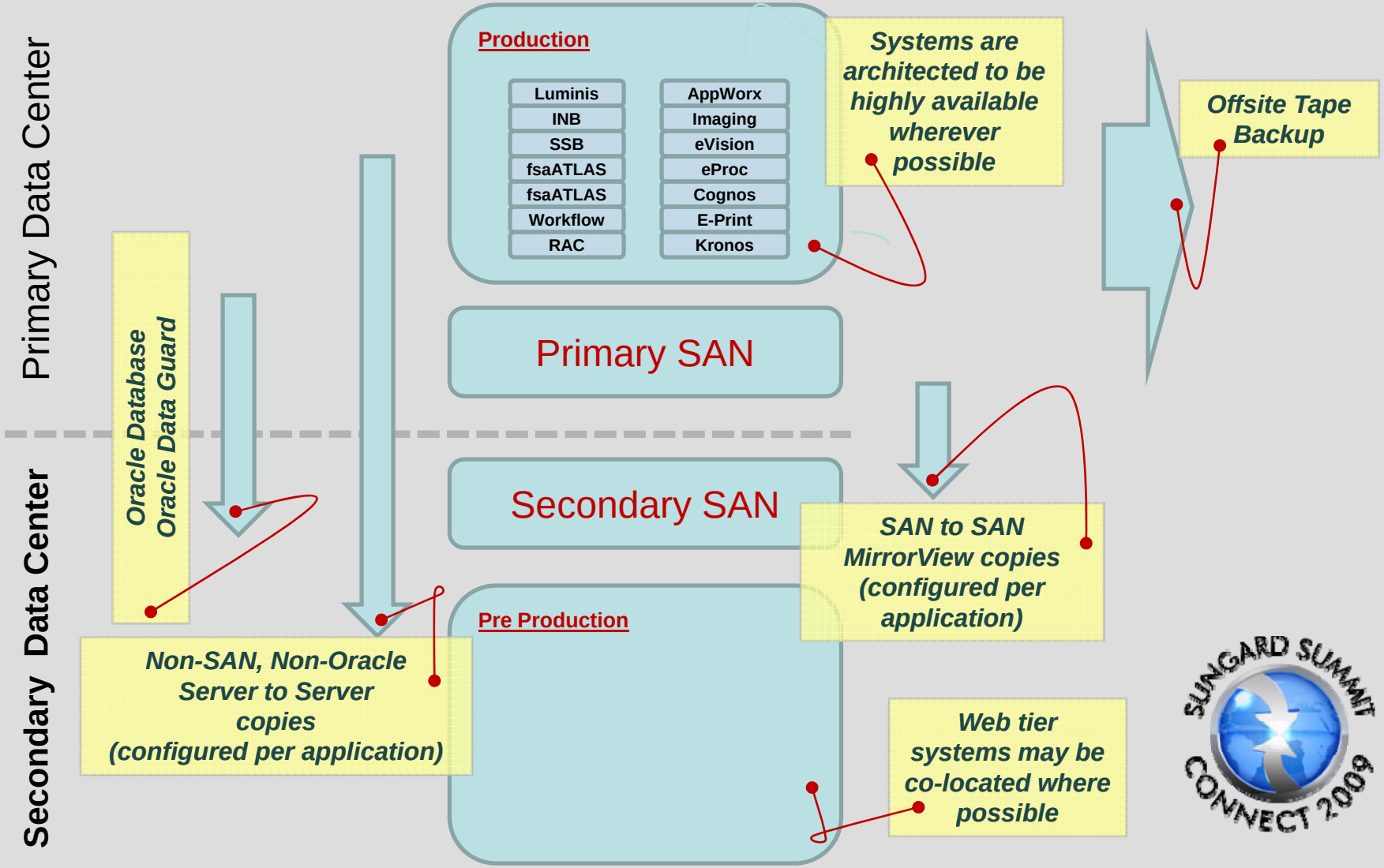
- **Overall Average (includes weekends which are much lower than weekdays): 34,359 logins/day**
- **Adjusted Average excluding weekends: 40,646 logins per day**
- **Daily peaks of around 2,500 - 3,000 concurrent user sessions**
- **93% of portal users visit at least once a week; 88% once a day.**

TUportal Current Usage

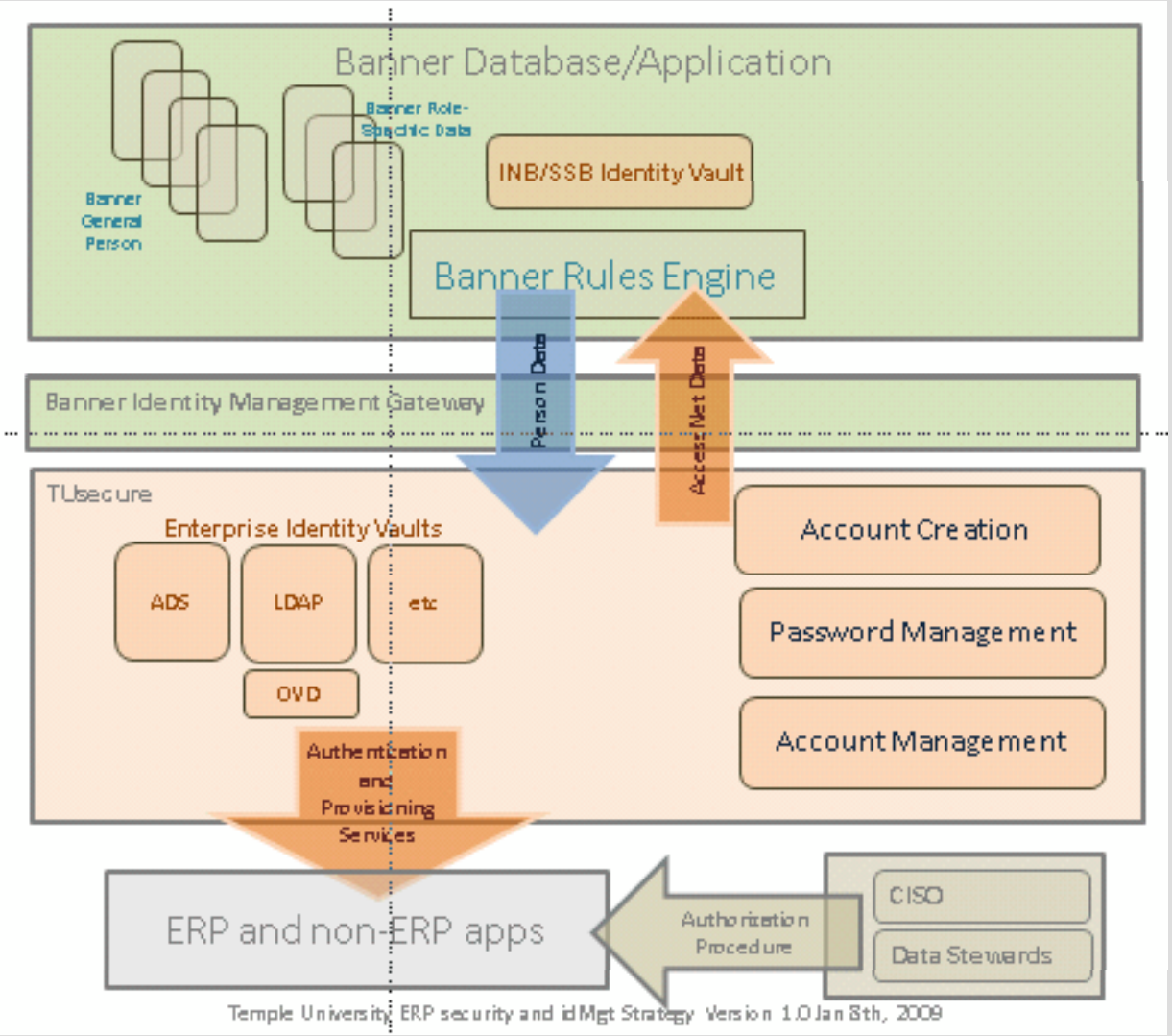


For Jan 30th to March1st, 2008, there were 1,216,261 visits from 110 countries/territories

Architecture: Overall Disaster Recovery Strategy Toolkit



Identity Management



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Banner on Dell – Dave Jaffe

Dell is SunGard Higher Education's Reference Platform for Banner UDC Running on x86 Servers

Banner on Dell

- **Dell is SunGard Higher Education's Reference Platform partner for X86 (32- and 64-bit) architectures running Linux and Windows**
- **Dell and SGHE will develop, test, validate, record and publish results on Dell servers and storage**
- **Numerous Banner on Dell deployments happening now**

Unified Digital Campus Test Center

- **Announced Nov 5, 2007 by SunGard Higher Education, Dell and Sun®**
- **Moves beyond existing product and performance testing to assess full-scale configurations that reflect current IT environments and interoperability challenges facing higher education today**
- **Dell PowerEdge™ servers constitute UDC Test Center reference platform for Windows and Linux**
- **John Mullen, Dell VP, Higher Ed:**

  "Dell's goal is to simplify IT for its customers and through this UDC Test Center, we believe we will be able to make it easier and more affordable for universities to manage their administrative computing"

Dell Banner reference Platform

- **Reference Platform = proven hardware stack with published data points**
  - Sizing recommendations
  - High availability configurations
  - I/O requirements
- **Configurations tailored to university's requirements**
  - Number of students, which Banner modules
- **Guidance on system choices**
  - Dell PowerEdge servers: # of procs, # of cores, memory
  - Dell Storage: fibre channel vs iSCSI
  - Dell Networking: switches, load balancing
  - Dell and partner management tools
  - Virtualization

Dell Servers

- **Two Socket – PowerEdge 2950 III**
  - 2U Rack Mount
  - Up to two Quad-Core Intel® Xeon® 3.16 GHz CPUs
  - Up to 64 GB memory

- **Four Socket – PowerEdge R900**
  - 4U Rack Mount
  - Up to four Six-Core Intel® Xeon® 2.67 GHz CPUs
  - Up to 256 GB memory

- **Blades**
  - M1000e blade chassis
    - 10U Rack Mount
    - Supports up to 16 blades
  - M600 Blade
    - Up to two Quad-Core Intel® Xeon® 3.16 GHz CPUs, 64 GB

Dell Storage

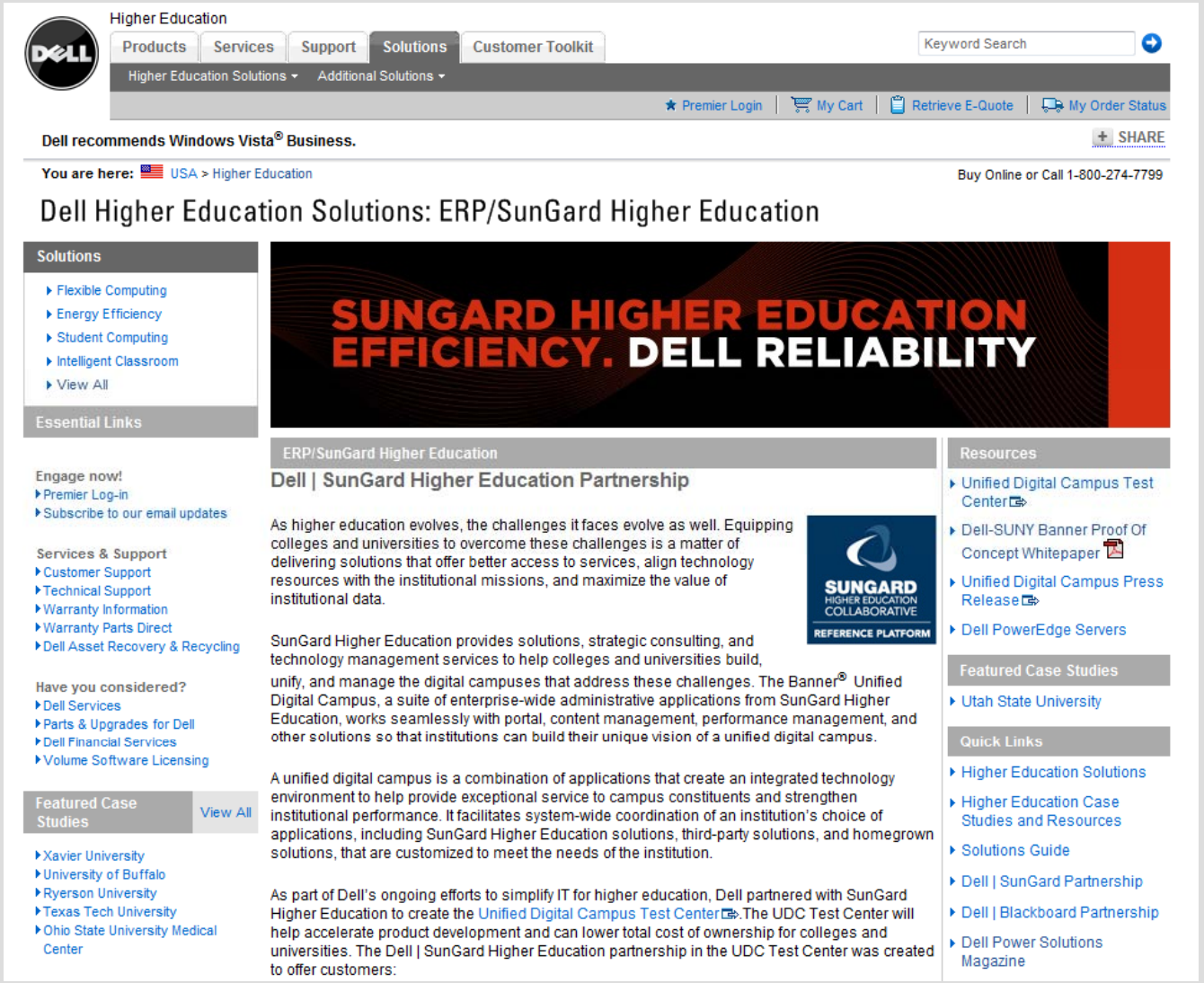
- **Fibre Channel – Dell|EMC CX4 Series**
  - FC4 (4 Gbps)
  - Up to 15 15K 300 GB FC disks per shelf
  - Up to 64 shelves per array (CX4-960)
  - Up to 512 hosts

- **iSCSI – Dell EqualLogic™ PS**
  - Uses standard Gigabit Ethernet network
  - Up to 16 15K RPM SAS drives per array (PS5000XV)
  - Disks up to 300GB
  - Supports up to 512 hosts

Dell Engagement Process

- Contact your Dell account representative
- They will work with you to fill out a form to define your requirements – modules needed, user load, etc.
- Dell rep will forward to Dell Enterprise Reference Architecture team and arrange follow up call or visit
- Dell ERA team will develop detailed sizing guide and review with you
- Account team will then work with you to order and deploy necessary hardware
- Dell ERA team remains involved throughout installation of hardware/SAN, coordinates with SunGard Higher Education Banner installers

One URL to remember – dell.com/hied/sungard



Summary

- Temple chose Dell for large Banner implementation because of Dell's non-proprietary architecture, Linux experience, price/performance and partnerships with SunGard Higher Education, EMC and Oracle
- Implementation is going well after some initial missteps
- Portal is up and handling 40,000+ logins a day from around the world
- Dell's partnership with SunGard Higher Education means a better tested and deployed Banner solution

Questions & Answers

Thank You!

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