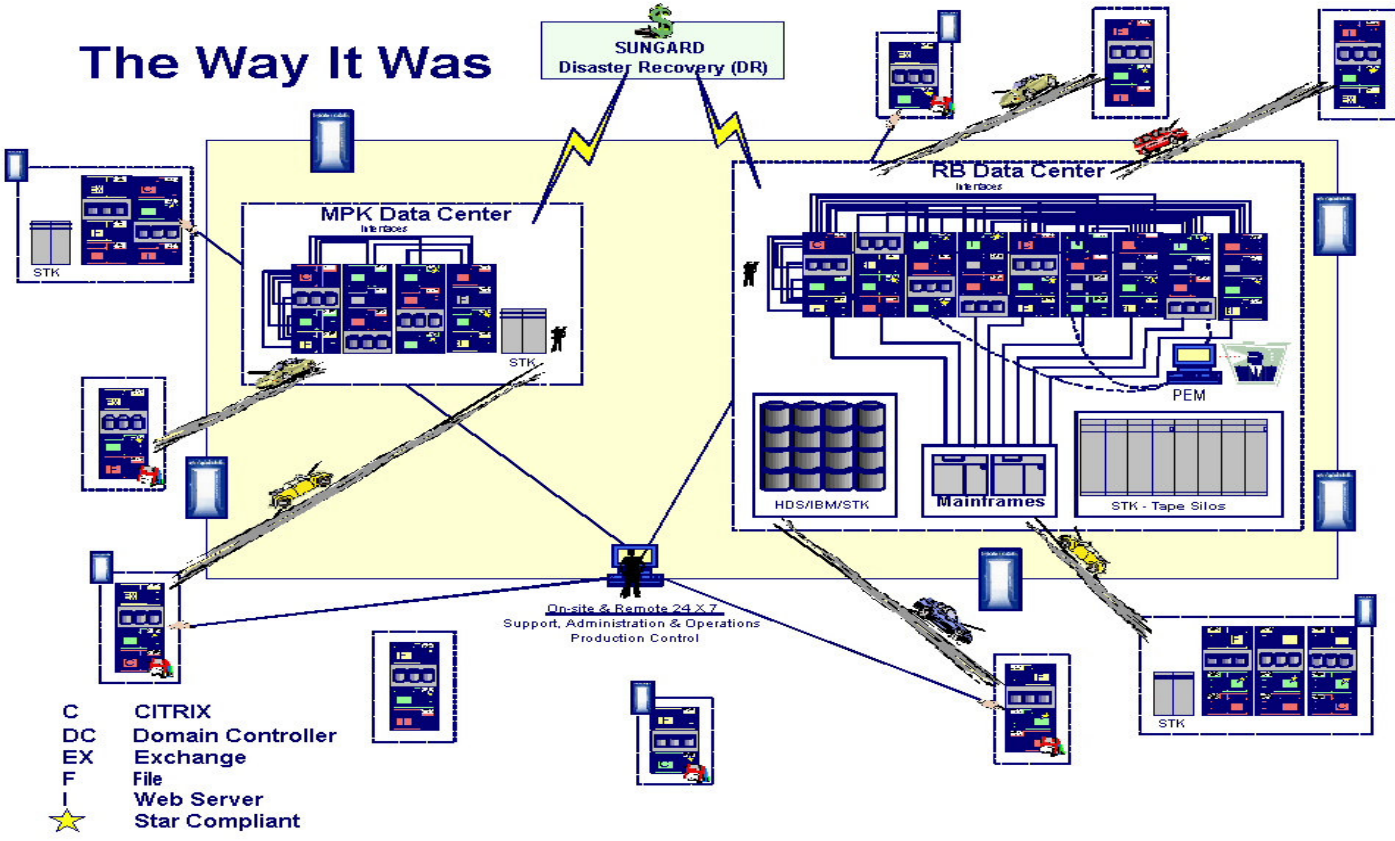




Distributed Server Team Sempra Energy Utilities CEE Presentation

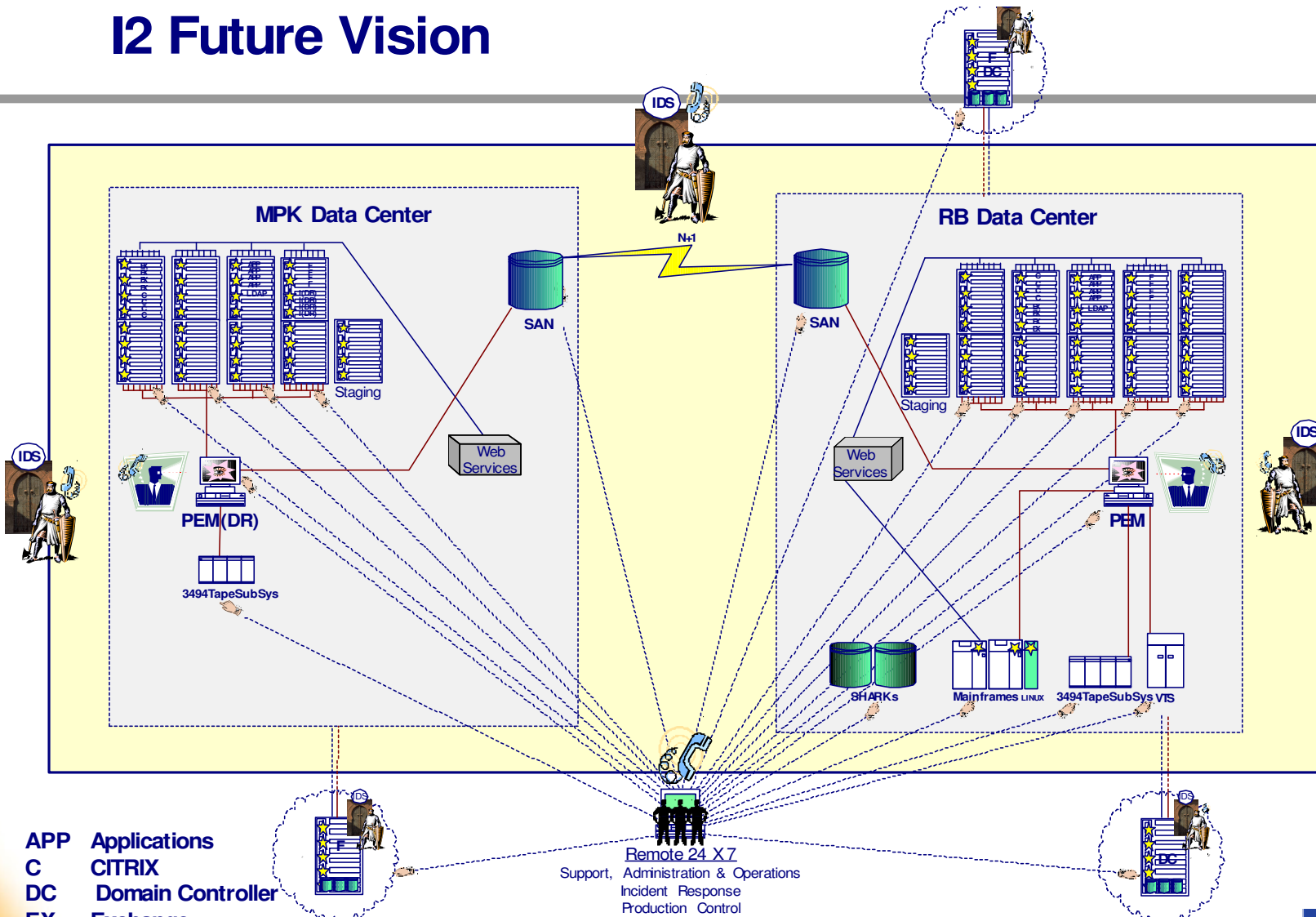
...and that's ...



The Way it Was

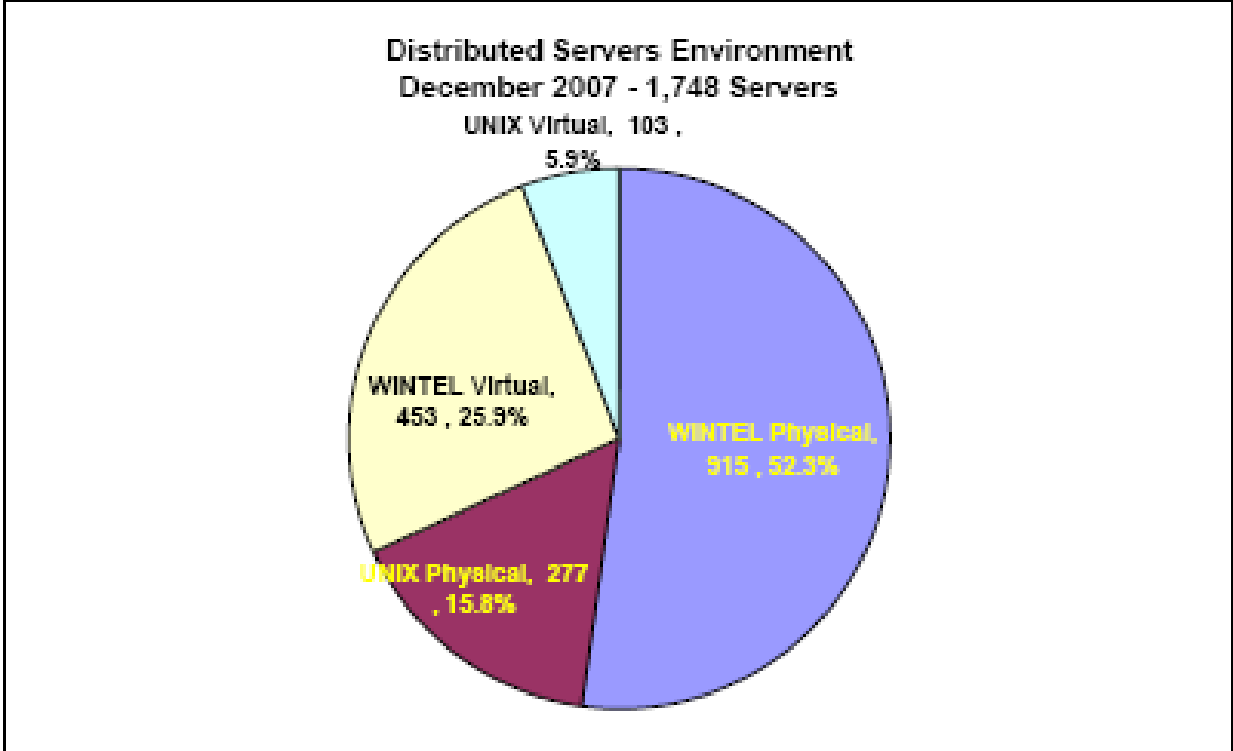
- Critical infrastructure components geographically dispersed across many sites.
- Limited or inadequate:
 - Infrastructure standards
 - Monitoring and management capability, desktop touch often required.
 - Security
 - Power capacity versus server demand
- High DR costs for all DR requirements.
- Complex organizational structure that clients had to navigate on their own.

I2 Future Vision



- APP Applications
- C CITRIX
- DC Domain Controller
- EX Exchange
- F File
- I Web Server
- ★ Star Compliant

Current Distributed Server Break-down



Current State

- Lower Operating Cost - over 20% reduction
- Reduced energy consumption - between 1/2006 - 12/2007 :
 - 15% reduction of energy usage in RB Datacenter
 - While increasing distributed server count by 27% (648 to 826)
- Improved service levels and availability
 - 27 high impact outages with duration 86 hours a month in 2002
 - 5 high impact outages with duration 16 hours a month in 2007
- Enhanced system management and control
- Better physical and logical security
- Improved Disaster Recovery and fail over technology
- More effective use of server resources



How Did We Get There?

- Study the Environment
- Document the Environment - Where do you ultimately want to go?
- Develop Best Practices and Procedure - before you start
- Update People, Processes, Tools and Behavior
- Implement Slowly to Change Organization over time and gain support
- Build for flexibility to embrace new technologies
- Learn along the way - always improving on things that work and adjusting things that don't.



How Did We Get There? - The Projects

- **Server Optimization - 8/2000 - 12/2002**
 - The project developed a server data repository application to facilitate server asset management and consolidation implementation.
 - The project also developed a consolidation strategy that enabled the reduction of the total number of application and infrastructure servers within the Sempra computing environment.
- **Server Documentation and Certification - 5/2001 - 12/2002**
 - Developed, documented, and tested configurations for new server-based hardware and applications to be distributed within Sempra Energy.
 - Developed best practices for server configurations and ensured that all configurations were tested, certified, and documented prior to being deployed and supported by IT.



How Did We Get There? - The Projects

- **Wintel Refresh Phase 1 - 12/2002 - 12/2003**
 - Replaced 100 aging servers with new hardware and physical consolidation
- **Wintel Refresh Phase 2 - 1/2004 - 9/2005**
 - Began Virtualization via VMWare for Test, Dev, and QA Environments
 - Created Consolidated SQL Database Environment
 - 95 physical refreshes / 23 virtual refreshes
- **UNIX Refresh Phase 1 - 6/2004 - 2/2005**
 - Tested Virtualization of IBM AIX Servers
- **Wintel Refresh Phase 3 - 10/2005 - 12/2006**
 - Began Virtualization via VMWare of Production Environment
 - Redeploy of servers consolidated for stand-alone use
 - 125 virtual server conversion/deployments
- **UNIX Refresh Phase 2 - 6/2005 - 6/2006**
 - Consolidation of Oracle and Business Warehouse Applications



How Did We Get There? - The Projects

- **UNIX Refresh Phase 3 - 6/2006 - 9/2007**
 - Consolidated SAP and Backup Infrastructure on virtualized environment
- **Wintel Refresh Phase 4 - 4/2007 - 12/2008**
 - Updating VMWare farms with Blade Technologies
 - 175 virtual and 50 physical replacements in scope
- **UNIX Refresh Phase 4 - 10/2007 - 3/2009**
 - Expanded to AIX virtual farms - Migration of Dispatch Infrastructure
 - Build out of new LINUX farm on Blade technologies





Distributed Server Team Sempra Energy Utilities Strategies

The Future - Strategic Drivers

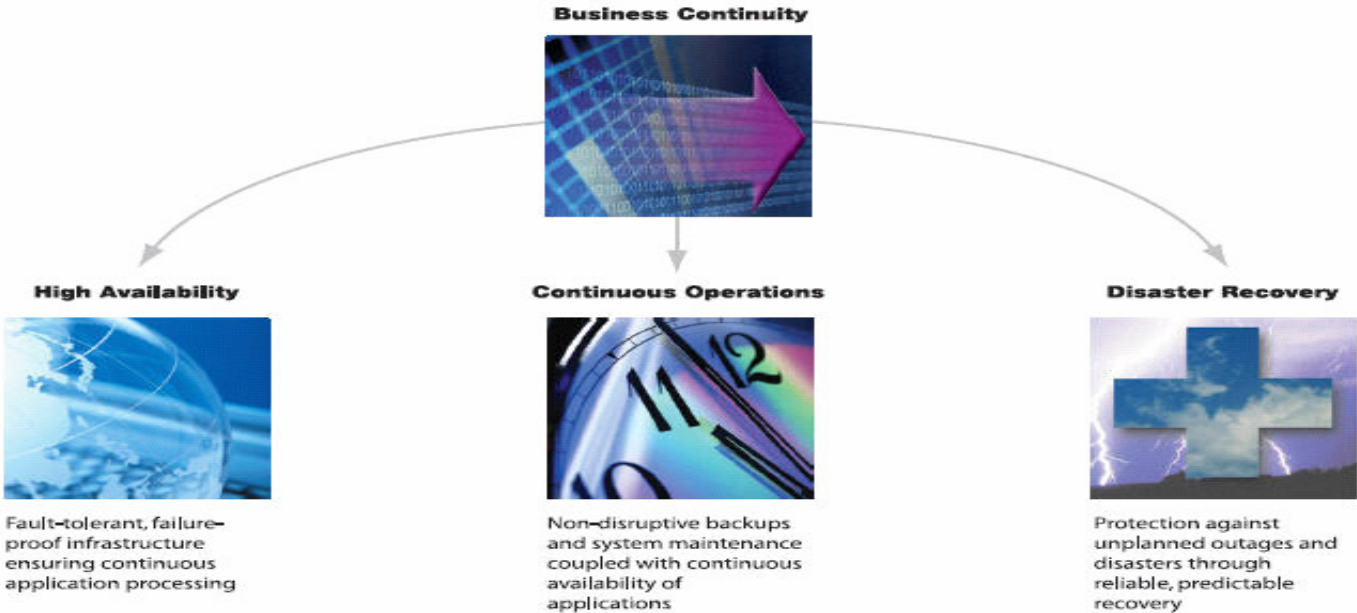
The Distributed Server Strategy embraces critical business drivers; our strategy provides technology-based infrastructure solutions that will enable overall business success.

- Better Utilization - New requirements do not always equal new physical Hardware.
- Capacity Management - Quickly, efficiently and cost-effectively shifting demand across available IT resources.
- Rapid Deployment - Responding to business needs for new infrastructure in days instead of weeks.
- Business Continuity - high availability, disaster recovery and continuous operations
- Security - To manage identities, protect data, and secure networks and transactions in an infrastructure that can help protect itself.
- Compliance - Stay prepared to meet different standards from one year to the next as the environment changes and internal controls are updated.
- Advances in Technology - Solutions to meet business needs



Strategic Drivers

Business Continuity - critical systems must be available to employees, partners and customers who depend upon them. To keep our business competitive – we need a comprehensive strategy that addresses the three primary aspects of business continuity: high availability, disaster recovery and continuous operations.



Strategy - Standardization

- Move toward standard vendors for all server platforms will greatly simplify the operation and support of the environment.
- Standards for server images, patch management, change management, etc can be greatly simplified.
- Support staff can become better trained on a single vendor solution, rather than trying to support multiple solutions.
- Greater volume discounts and additional value-added support can be realized through leveraging a single vendor relationship.
- We will source platforms for new applications and refreshes of existing applications from a single vendor during a refresh cycle.



Strategy - Virtualization

- Business decisions trigger events within IT - As SEU's business requirements change, IT must be adaptive and responsive.
- IT's success will be measured on how we respond and adapt.
- A consumption model based on user demand must drive our distributed server infrastructure.
- Processors and memory can be reassigned based on demand from test to production partitions without disruption. Similarly resources can be released back for reassignment or for creation of a new partition.
- Reserve processing capacity, affording quick deployment of resources based on business needs.
- Spare capacity can be used in the event of a hardware failure, affording immediate recoverability.



Strategy - Adaptive

Autonomic Computing Systems will:

- Manage complexity
- “Know” themselves
- Continuously tune themselves
- Adapt to unpredictable conditions
- Prevent and recover from failures
- Provide a safe environment



Strategy - Workload & Capacity Management

- Monitoring services with the ability to pre-empt service disruptions and take corrective action prior to impacting service levels.
- Modeling capabilities to assess the impact of changes and adapt the infrastructure accordingly to meet client expectations without disrupting their operations.
- Application environments that include a migration path of test/development, QA, and production.
- Non-disruptive change management both for application and system modifications will be maintained.
- Performance management and capacity planning tools and methodologies.



Strategy - Security

It is essential that the Distributed Server Team be dedicated to work directly with the Information Protection Group to effectively manage vulnerability management.

- Future computing systems will be subject to all the security, privacy, and trust issues that traditional computing
- Future (autonomic) will need to both establish and abide to security policies.
- Eliminating vulnerabilities will require a coordinated effort between IP and the Distributed Server group:
 - Defining security configuration policies and exceptions
 - Evaluating and auditing the environment with respect to those policies
 - Marshaling resources to fix configuration errors and eliminate their root causes

Strategy - Standard Refresh

- A predictable technology refresh cycle allows clients to plan for application upgrades to ensure their systems are running on supported infrastructure.
- Refresh cycles will be driven by introduction of new product generations by our vendor.
- For all defined category tiers, the operating system refresh cycles will not exceed N-1 major releases.
- For all defined category tiers, hardware refresh cycles will not exceed N-2.

Strategy Roadmap

Current (2008)

- Consolidation of server environment
- Stream-line of tools
- Server provisioning product allows for automated installation of servers via centralized console.
- Centralized management of entire distributed server environment.
- Migrate applications to true 64-bit processing as support is available.
- Implementation of Linux for production use.
- Implementation of blade technologies.
- Homogenous OS workload management with some automatic dynamic capabilities.
- Centralized account management, including UNIX.

Future State (2009 +)

- Automated server self-provisioning based on utilization and/or application criticality.
- Heterogeneous OS (Wintel/UNIX) workload management.
- Grid-like technologies with autonomic dynamic infrastructure.
- System of componentized, automated, hot swappable services (Data Center becomes the "Server").
- Fully SOA Compatible



Questions

