



IT@NORTEL

What Color is your Data Center?

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Topics



What will we learn today?

- **How working towards Green is an ongoing journey**
- **The Data Center is more than the four walls**
- **The Challenges to becoming Greener**
- **What kind of results are we seeing**

Nortel's Global Environment

Fact Sheet:

- 177 locations in 60 countries**
- 24,000 Desktops/Laptops**
- 548 Business applications**
- 1950 Servers**
- 1.2 Petabytes stored data**
- 4995 Switches and Routers**
- 1340 Wireless LAN access points**



Traffic per Month

- 34 million emails
- 2 petabytes routed data traffic
- 1.3 million UC video conferencing
- 34 million voice minutes (70% UC)
- 20 million minutes audio-conferencing

Laptop usage >70%

- 84% use VPN access
- 78% use MCS / VoIP client
- 100% wirelessly enabled

Benefits from Environmental Impacting Efforts... *why do Green*



G&A Cost Savings

- Increased asset utilization, more efficient equipment & use of
- By providing employee mobility/flexibility
- By understanding and cutting our energy consumption

Corporate Social Responsibility

- Solutions enabling our reduction of Carbon emissions
- Minimize impact of disposal & promote recycling

Risk Preparedness

- On Resource Supply, Availability, and Reliability

The things you do to be greener are good business and are deeply embedded in our Nortel DNA

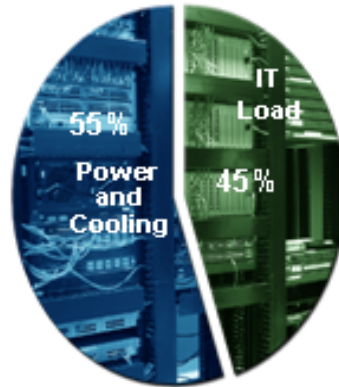
Eco Efficiency Best Practices

Where is the Opportunity

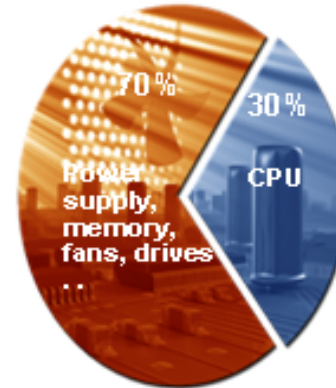


Improving the IT footprint

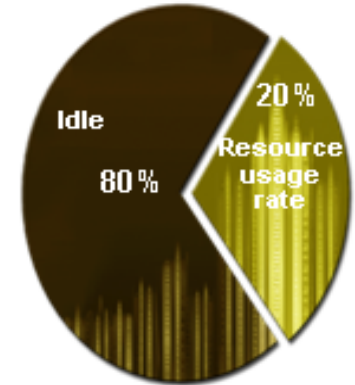
Data Center



Server, Storage, Network hardware



Compute resources



Data source: Creating Energy-Efficient Data Centers, U.S. Department of Energy, Data Center Facilities and Engineering Conference, May 18, 2007

Using IT to change business footprint



...Each requires a focus and results contribute to Greening IT

Internally what have we been doing to Green our IT Environment



- **Infrastructure Optimization & Transformation**
 - ✓ Server/Storage Elimination, Consolidation and Virtualization. Application rationalization
 - ✓ Data Center Centralization & selective upgrade for efficiency
 - ✓ Voice Consolidations & Network Consolidations
 - ✓ Use of increasingly capable while energy friendly products
- **Communication Solutions for location transparency and travel minimization**
 - ✓ Single presence and communication capability traversing many devices
 - ✓ Tele-working, Video Conferencing options, & other Multi-media Services
- **Office Solutions**
 - ✓ Multi-Function Print/Fax/Copier devices
 - ✓ Desktop Energy Management
 - ✓ Laptop Computing for Mobility/BCP
- **Use of Investment Recovery Centers for E-waste**

Realization there is no single solution and no forklift approach to getting more Eco-Friendly

The Data Center Strategy

A Core Element towards a Greener Environment



Centralize and Standardize

- Recognized set of strategic and global centers which implement best practices
- Plans drive improved efficiency, reduced cost, or mitigate risk
- Application placement in locations best suited for service needs, lifecycle, and DR

Increase Location Transparency

- Smaller sites less dependant on having local infrastructure
- Expand virtualization services and hosting environments

Build Operational Excellence

- Driving alignment across organizations, responsibilities, and budgets
- Data based decisions, capacity models for planning and management



...more than the 4 walls approach

Managing the Data Center

Placement & Consolidation Challenges



There are Business reasons for distributing data centers:

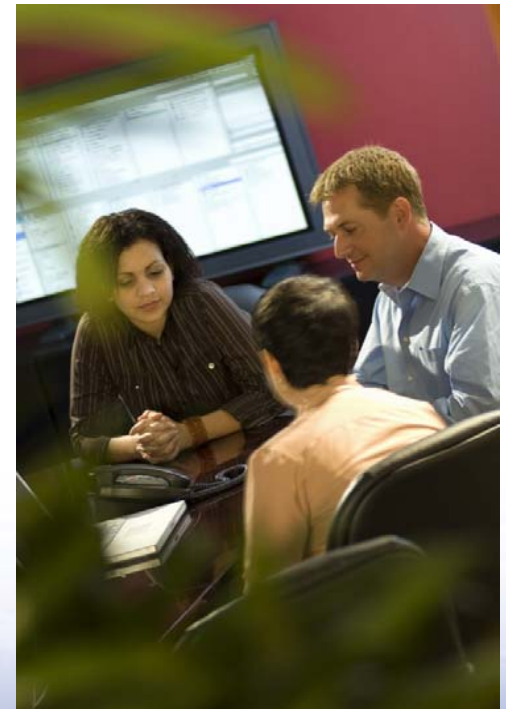
- Disaster Recovery & Business Continuance Planning
- Regulatory requirements
- Latency sensitive applications
- High bandwidth requirements
- Connection to local devices

Consolidation is not always easy

- Cost of application re-architecture/relocation
- Resource availability
- Cost of bandwidth

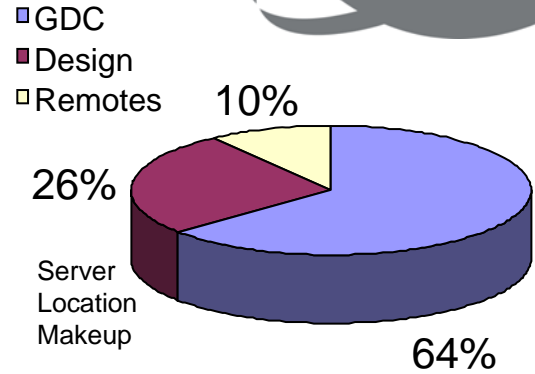
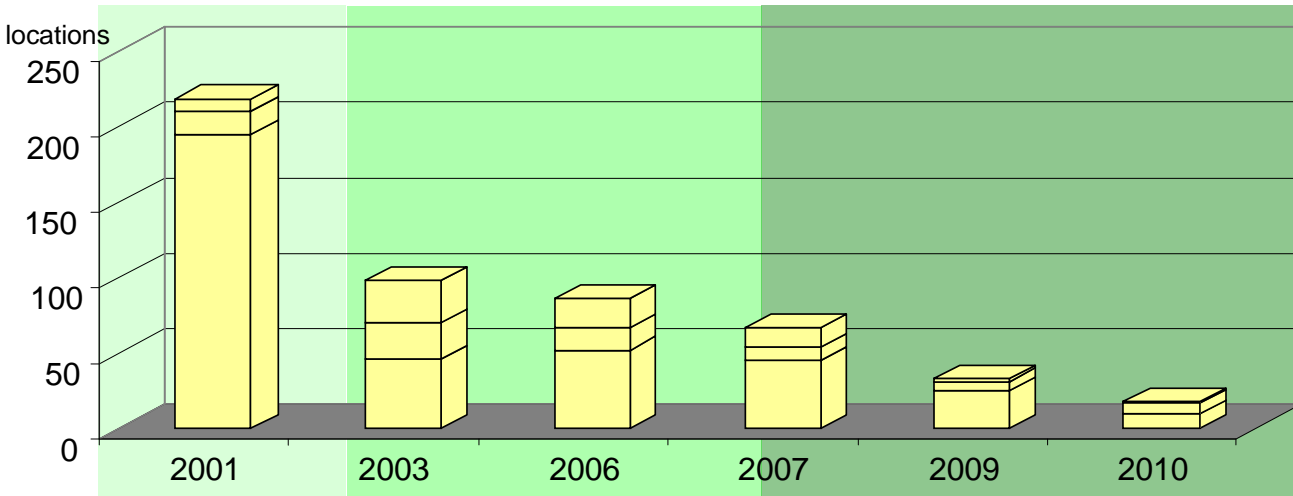
Opportunities help you get there

- Business Transformation CxO objectives
- Technology Refresh
- Alternate Cost Reduced services
- Incentive programs providing Rebates/Credits



Managing the Data Center

Obtaining Results Is a journey



Regionally based proliferation of server rooms

Decentralized approach

Inadequate view of inventory

High Circuit costs

Dark Fiber use

Applications close to users

DS3 & DS1 speeds typical

Centralization Theme i.e.

- Simulation/Build pools
- Web Env
- SAP/CRM
- Citrix based on demand hosting

Circuit cost optimization gets more bandwidth per \$

WAN optimization products emerge and put in place

OC3/OC12/OC3/OC48 speeds typical.

Low Latency Network designs. Appl Performance investigation/improvement

Centralization with transparency

Selective external Appl hosting

Virtualization taking off. Awaiting better Unix capability

Carrier Capabilities enables Voice consolidations to start

Circuit cost optimization gets more bandwidth per \$

Core Applications into GDC and Design into designated sites

Results:

- ✓ **64% of servers are now located across 3 cities**
- ✓ **Application Strategy a Key component**
- ✓ **Engineering discipline and Standards key**
- ✓ **Many front approach to reducing cost and environmental footprint**

Server Optimization

What did we have... Too many and little standards



Maximize their business value

- Review of environments for opportunity and understand their constraints
- Eliminate or consolidate servers starting with higher cost areas
- Switch to lower cost alternatives
- Drive increased asset utilization (i.e. use of virtualization)

Streamline and simplify processes

- Establish Solutions Roadmaps to set direction and standards
- Sweet Spot cost basis part of Catalog choices
- Server & Application inventory/process
- Formal Capacity forecast with Usage tracking
- Diligence in approvals process

Server Base



Physical Servers

3886



1950

We discovered:

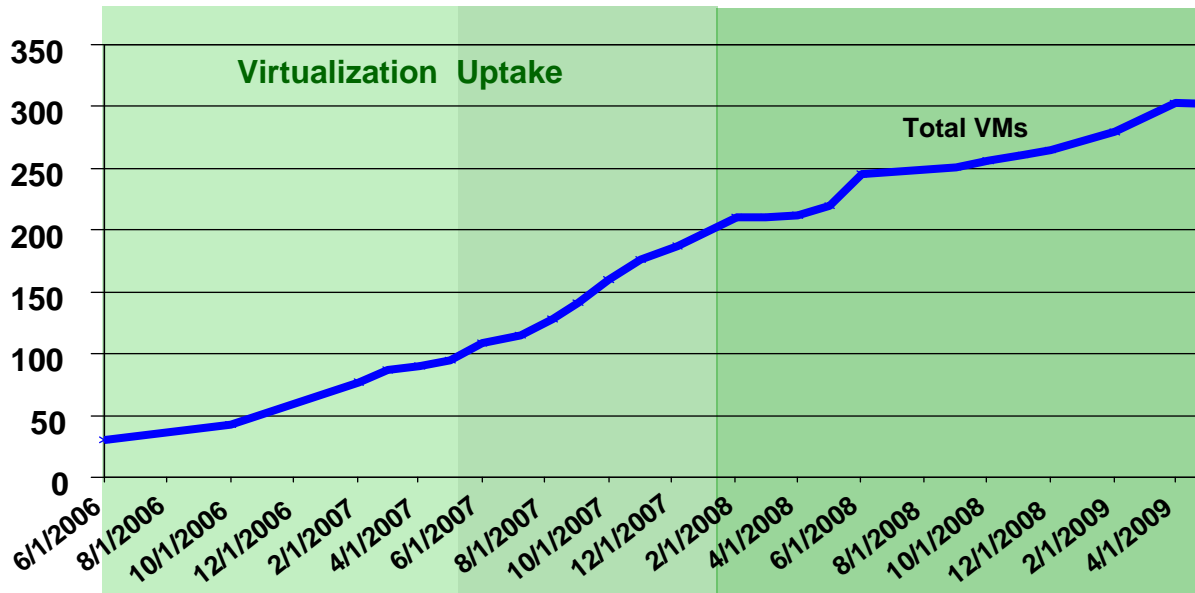
~15M kWh of energy eliminated G&A Savings valued at ~\$530K.

Equivalent to operating ~465,000 compact fluorescent bulbs 4 hrs/day for a year

Base Consumes Less Energy, Less Floor Space and are more Capable

Server Optimization

Virtualization a critical enabler



- Early Product Maturity, but works
- Oversold to IT Leaders
- Application Support Worries
- Established a target list to migrate

- Product Maturing but still has key limitations
- VM enabled HW
- Stability helped it become a Standard catalog item
- Managing VMs and capacity routine
- Application support getting better, but still worried

- VMware Product adding great capability & lifting some limitations
- Cross DC migration & power mgmt capability tests
- Even some database now on VMs
- Application support still worried, but not gating

Key Learnings

- ✓ Business case plus People, Process, Tools are key elements in New Technology adoption into operations.
- ✓ Consolidation rates range from 10:1 to 15:1
- ✓ Good Capacity Mgmt avoids sprawl
 - Memory planning is key to hosting rates
- ✓ Positive G&A effects
 - HW spend avoidance >\$950k
 - Estimated Energy avoidance is >\$107K/year
- ✓ Environmental impact
 - >300 servers not acquired or need to be disposed of
 - Beneficial CO2 footprint

Storage Optimization

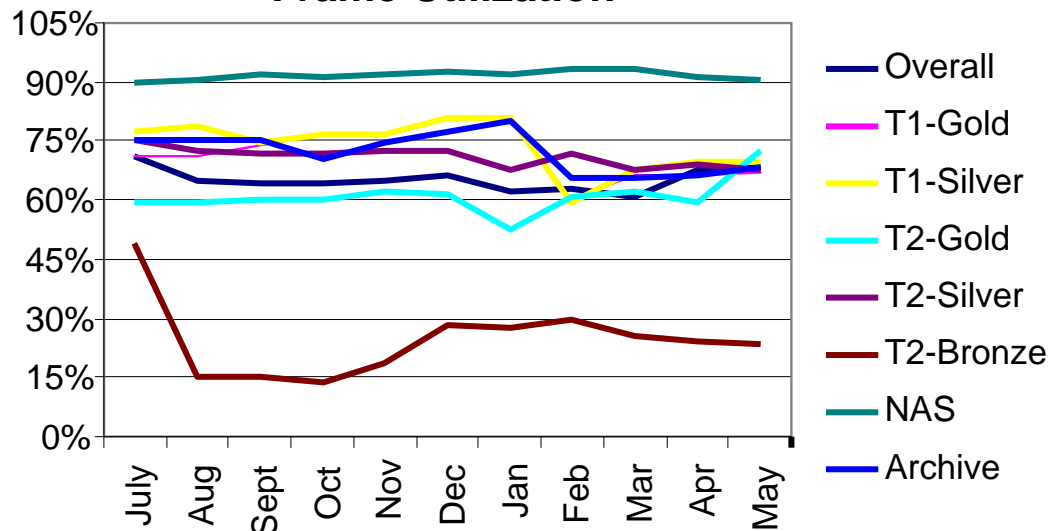
Managing Capacity, Demand, and Lifecycle



Best Practices

- Adopt a tiered storage architecture matching storage to business and performance need
- Review low utilization and aged file systems with ongoing oversight/action
- Institute a Capacity Plan to Improve forecasts & approval process
- Match Storage protection to real need; Use RAID conversion to free up storage
- Conversions from high end expensive to lower cost and more energy efficient storage
- Use Thin Provisioning where possible
- Data de-duplication to use less storage
- Wide Area File approaches for centralization and real time collaboration
- Deploy archiving technology

Frame Utilization



Key Takeaways

Tremendous efficiencies and savings are possible but requires a strategy and strong transformational focus over a period of time

Storage Vendors continue to improve their products enabling alternatives; up to 50% reductions seen per TB energy use.

Left unmanaged results in unsustainable CAPEX and OPEX levels

Unified Communications

The UC GREEN Advantage



Before UC

Separate fax, email, and voicemail systems

Distinct voice and data platforms and maintenance

Multiple voice and data protocols with customized desktops

Expensive and inflexible hosted conferencing

High % of failed communications

Inefficient information sharing and inter-team communication



After UC

Unified messaging on Nortel's Call Pilot integrated with Microsoft Outlook

Converged platform and services with centralized architecture

Standardization around SIP and converged desktop

Reservation-less, personalized, on-premises audio/video/web conferencing

Presence & Instant Messaging applications mean timely communication with reduced voicemail and email

Real-time file sharing and web collaboration

Nortel Unified Communications Benefits



Communications

- **\$5M/year** savings from MCS audio-conferencing
- **\$5M/year** estimated travel avoidance savings from video conferencing
- **55%** reduction in calling card, long distance and telephone charges

Mobility

- **\$24.5M/year** real-estate savings from home-based working
- **20,000** employees equipped with laptops for secure remote access
- Full time and Casual teleworkers avoiding travel save a projected **24.3K metric tons** of CO2/year

New sites

- **40-70%** reduction in move/add/change costs
- **60-75%** lower cabling costs
- **30-65%** lower communications room footprint

Applications

- **\$100K/year** savings from web collaboration
- **1 year payback** by introducing secure IM instead of public IM
- **15%** employee productivity gain

\$12M/year direct savings with 10 month ROI

In summary



- There is no single “Green” to attain. It is a continuing journey.
- Business cases must extend beyond Departmental boundaries
- Innovation advances will continue to provide new enablers to get to the next level of “Green”
- Adoption rate will continue to be driven by
 - Affordability & Opportunity
 - Solution Maturity & Risk level
 - Resource Availability and Capability
 - Regulation Expansion

Existing

Emerging