



Stop the data train: return to the data center

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Aging Infrastructure

■ Problem

- Aging remote work stations need refreshing

■ Solution

- Returning to the data center

□ Method

- Visualization (sending 2 and 3 D images) instead of data

■ Benefits

- Reduce network traffic
- Improve application performance as data and application are closer
- Reduce infrastructure costs by consolidation of servers, increased utilization
- Increased security as data stays in data center

Data

■ Problem

- Moving Large data locally, regionally, and globally
 - Between workstations and data centers and between data centers

■ Solution

- Returning to the data center

□ Method

- Visualization (sending 2 and 3 D images) in stead of data

■ Benefits

- Reduce network traffic
- Improve application performance as data and application are closer
- Reduce infrastructure costs by consolidation of servers, increased utilization
- Increased security as data stays in data center

Facilities and Workspace

■ Problem

- Power & Cooling through out the workspace to accommodate office-wide distribution of high-end systems

■ Solution

- Returning to the data center

□ Method

- Visualization (sending 2 and 3 D images) instead of data

■ Benefits

- Reduced facilities cost and improved user workspace environment
- User workspace has more room, is quieter, easier to cool
- Reduced power demand in the user workspace
- Increased security as data stays in data center

Collaboration

■ Problem

- Collaboration between remote users
 - both internal team mates and external partners

■ Solution

- Work remotely using the shared 2 & 3 D images
 - Method
 - Visualization (sending 2 and 3 D images) instead of data

■ Benefits

- Faster decisions reducing time to project completion
- Decreased travel costs
- Decreased bandwidth cost
- Increased security

Our Environment

■ Our environment

- EnginFrame 2010 Enterprise w/ LSF scheduler
 - 60+ Linux Visualization & Compute Nodes (and growing)
 - ~15 dedicated compute cluster nodes
 - ~10 dedicated 1-to-1 high-end 3d visualization nodes
 - ~10 Shared 2d visualization nodes (5 concurrent users)
 - ~25 Shared 3d visualization nodes (single user nodes, shared pool)
 - 10+ Windows Nodes (quickly expanding)
- Dual 30” monitors for everyone
- Various protocols (RGS, DCV, VNC)
- HP Z workstations, HP Blade Servers, and HP Workstation Blades with Graphics Expansion
- Remote users (remote data center to office, international branch office users, and home users)

Examples of Applications

Linux applications:

- * ANSYS Fluent
- * Decision Space Desktop
- * Voxel Geo
- * 3D Canvas
- * Gocad
- * GeoProbe
- * OpendTect
- * OpenWorks 5000 suite
- * Powerview
- * Paraview
- * Paradigm
- * SeisWorks
- * Floviz
- * ArcGis
- * Hampton-Russell

Windows applications:

- * ArcGis
- * Floviz
- * Petrel
- * Floviz
- * OpenSpirit

Windows with GPU sharing:

- * ANSYS WB & Fluent
- * Petrel
- * OpendTect

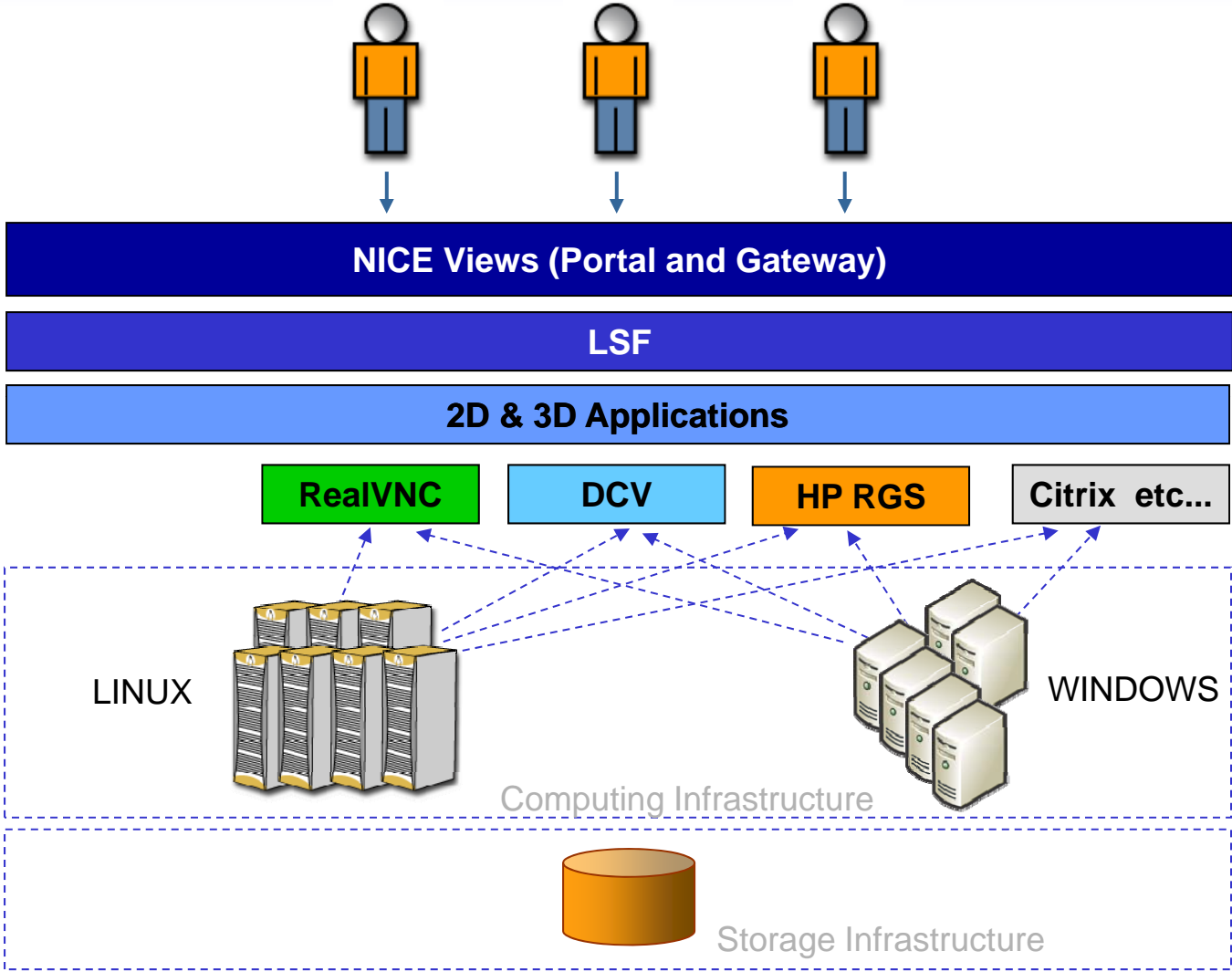
The Approach

- What we did
 - Introduced users to remote visualization & access to their compute nodes via EnginFrame
 - Migrated the users off of their “under the desk” workstations to 100% EnginFrame
 - Setup new and/or moved compute nodes and vizulization workstations in to the remote data centers
 - Replaced standalone work stations with thin clients, laptops, and business class desktops and users adopted the remote approach.
 - Reduced interoffice deployment of Linux and high-end 3d workstations

Added Benefits of the Web Portal

- HPC & Interactive (2d/3d) web portal
 - Allowed administrators to manage & monitor utilization
 - Facilitated collaboration of remote users

Software Stack for 2D/3D Applications



The roadblocks

- Cost
 - Spend on better technology vs spend on facilities to accommodate better technology
- Apprehension to change / technology aversion
 - What I have works fine
 - This comes from both users and vendors
- Complacent with existing solution
 - Many of our users are very high-end users who did not want to give up their “power button”
 - Perception that the nearer themselves the processing power and with data on local disk it would work best
- Numerous & various applications to validate
 - Nearly 100 applications, plug-ins, modules, and features to test and validate

The results

- Moved all data and compute resources into the data center, closer to the back-end data
- Moving all high-end workstations to the data center
- Established DR facility
- Enable international collaboration and access to centralized data
- Reduced physical infrastructure by 30%
- Reduced power/environment needs through-out the entire office
- Improved productivity by larger more robust connection between compute and visualization nodes and the back-end data
- Easy administration and visibility of the compute/visualization resources via the web portal
- More precise visibility and monitoring of compute solutions using enterprise monitor solutions

Questions

Would we do it again?

In a heart beat!

Thank you

