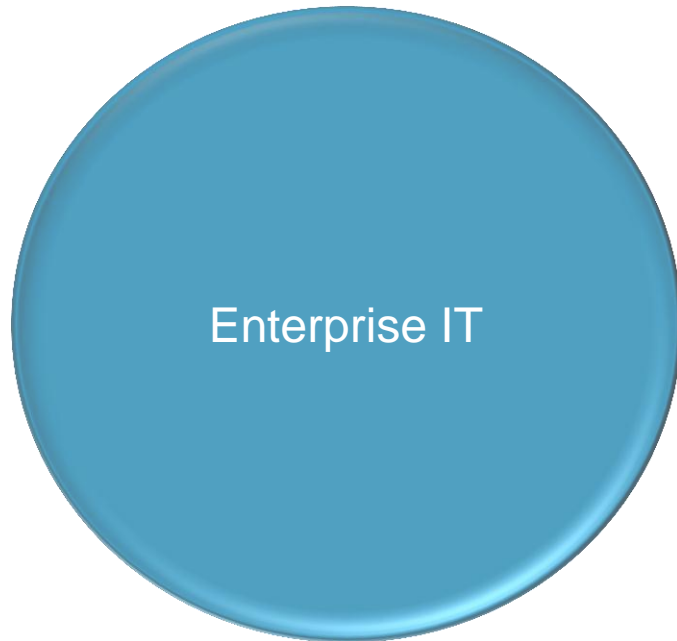


Enterprise / HPC Convergence

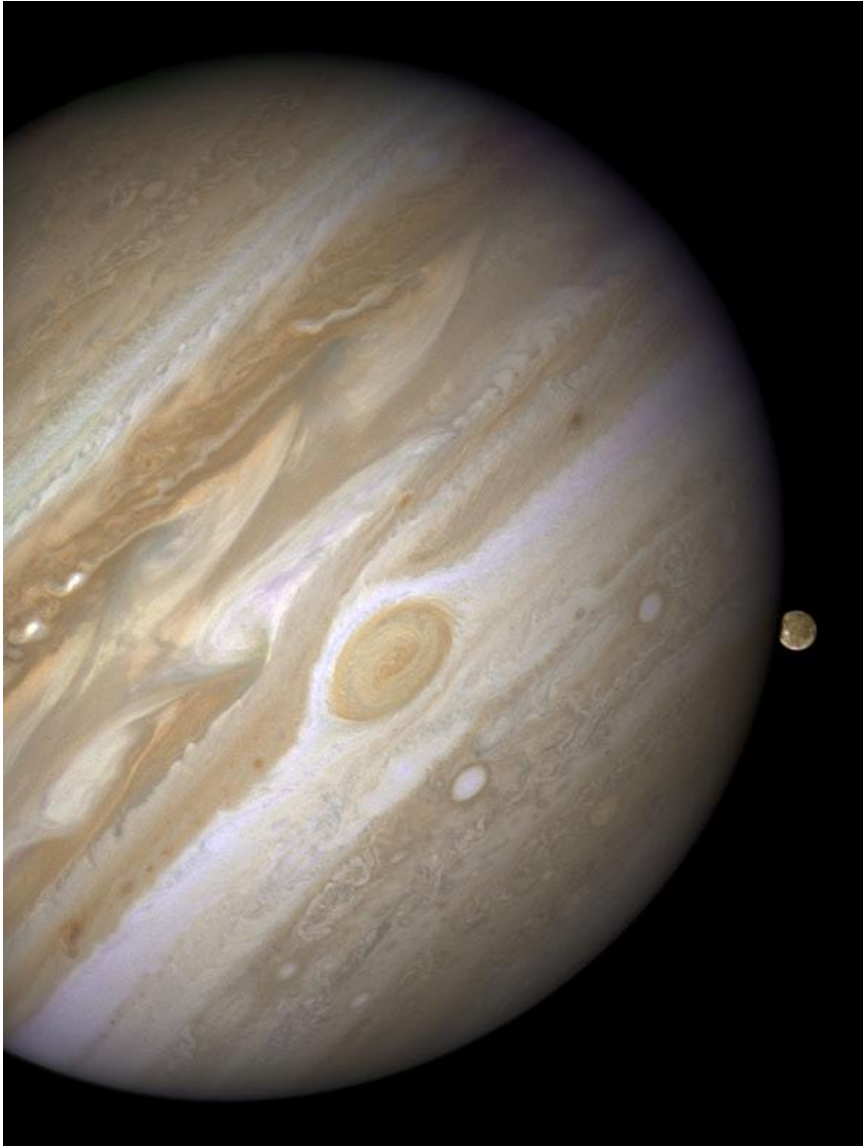
A (Mostly Positive) Disruptor

Josh Simons, Office of the CTO, VMware

Post-Beowulf Status Quo

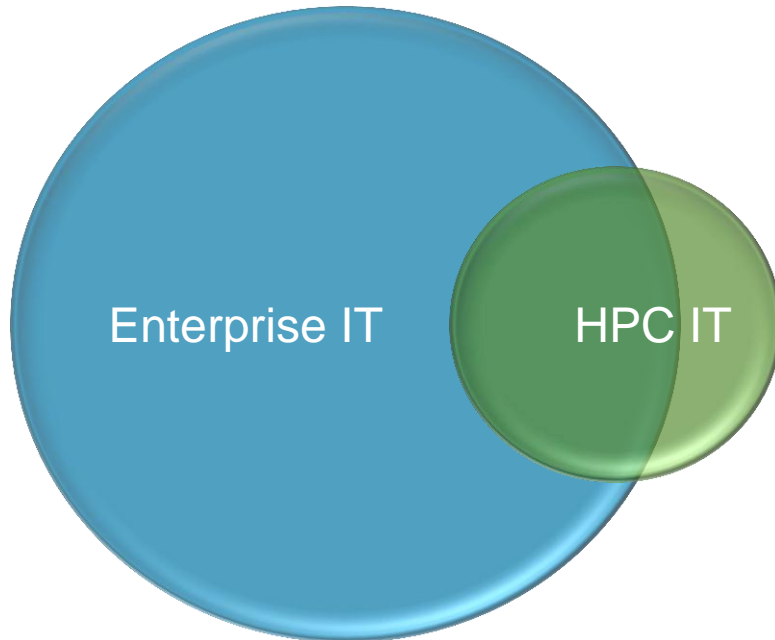


Closer to True Scale



(NASA)

Convergence driven by increasingly shared concerns, e.g.:



- **Scale-out management, provisioning, monitoring**
- **Power & cooling costs**
- **Parallelization for multicore**
- **Big Data Analytics**
- **Low latency interconnect**
- **High-bisection fabrics**
- **Cloud computing**

Virtualization

- **Not just a pool of remote Virtual Machines (VMs) to extend your physical cluster or handle transient computing requirements!**
- **For organizations offering private or community clouds to their customers**
 - BYOS (Bring your own software stack)
 - Secure multi-tenancy
 - End-user root access
 - Fault isolation
 - Self-service virtual clusters
 - Virtual desktops
 - Dynamic, cross-node load balancing (via live migration)
 - Fault tolerance: reactive and proactive
- **Performance within ~5% of native for many throughput workloads and MPI performance dependent on messaging characteristics**

Winners and (Potential) Losers

■ **Winners**

- HPC end-users
- HPC service providers

■ **Potential Losers**

- HPC-specific software infrastructure providers
 - Value erodes as equivalent offerings continue to mature in the Enterprise
- High-end Computing
 - Risk of becoming an increasingly small market with commensurate investment reductions