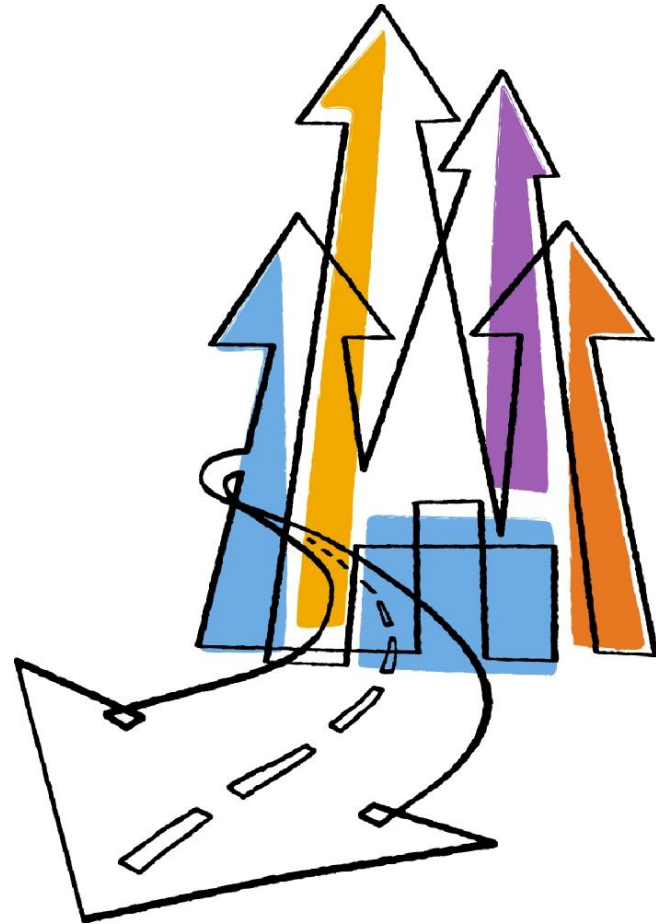




Go further, faster®

# Scaling Storage from Seismic Depths to Sequoia Heights

HPC Advisory Council  
December 2011





# Agenda

- Who are we?
- What keeps you up at night?
- What will let you sleep?
- Achieving scalability





# Big Data ABC's

**A** *Analytics*

**Gain Insight**

Real-time analytics  
for extremely large  
data sets

**B** *Bandwidth*

**Go Fast**

Performance for  
data intensive  
workloads

**C** *Content*

**Keep Everything**

Boundless secure  
scalable data  
storage

- Purpose-built solutions for demanding workloads
- Real-time results accelerating business success
- Confidently store, retain and access data at scale



NetApp®

# Broad and Deep Customers And Partners

## Enterprise Customers

## HPC Customers

## OEM Partners

Logos for Enterprise Customers include: LPL Financial Services, Wells Fargo, Kingfisher, China Telecom, Coca-Cola, Bank of America, Verizon, BMW, Sabre, JCPenney, Web.DE, Walmart, PetroChina, Mercedes-Benz, HCA, and BlueCross BlueShield Association.

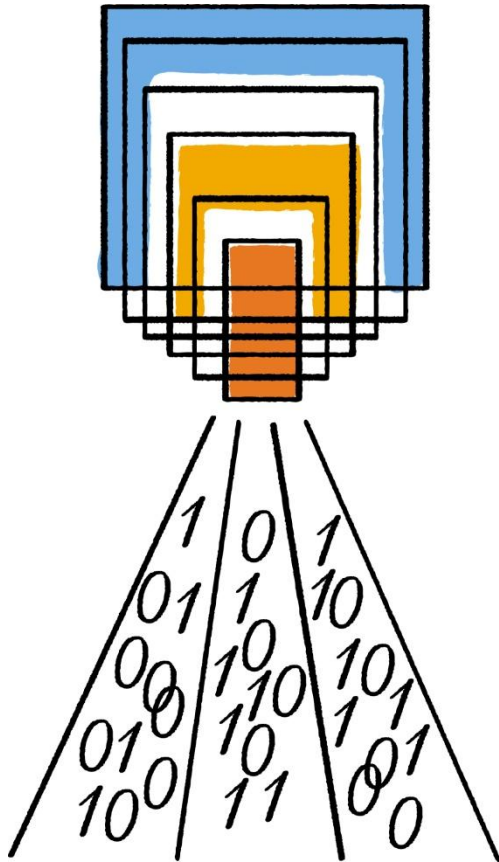
Logos for HPC Customers include: Jülich Forschungszentrum, NASA, Raytheon, NOAA, Oak Ridge National Laboratory, ERSC, bp, HLRN, Los Alamos National Laboratory, CGGVeritas, INES, METEO FRANCE, BAE Systems, Lawrence Livermore National Laboratory, University of Groningen, Sandia National Laboratories, and General Dynamics.

Logos for OEM Partners include: SGI, Cray, IBM, Dell, Bull, Verari Systems, Fujitsu, Sun, Oracle, BlueArc, TeraScale, Teradata, Acer, and Panasas.

## Alliance Partners

Logos for Alliance Partners include: Lustre, OpenFabrics Alliance, FCIA, SBB, InfiniBand Trade Association, QLogic, Storage Performance Council, Mellanox Technologies, SNIA, and IBM EMULEX.

# Lawrence Livermore National Lab

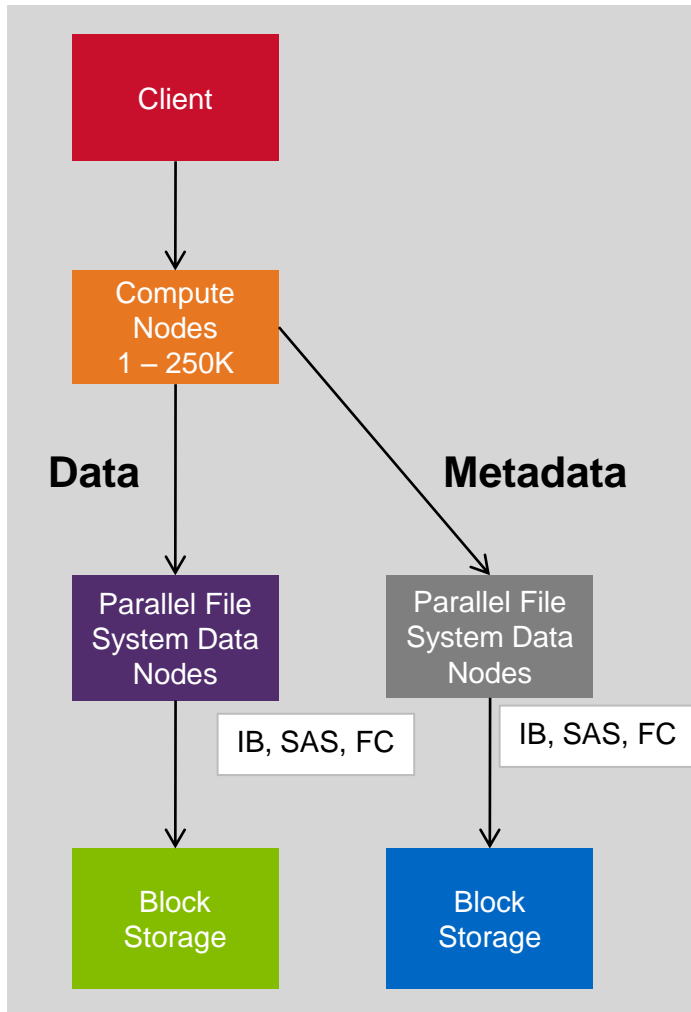


**Sequoia** - designed to be the fastest supercomputer and storage combination on the planet

- Supercomputer storage to support twenty thousand trillion arithmetic operations per second with access speeds up to 1 TB/sec
- 55PB of usable storage
- Science in the national interest
  - Nuclear weapon viability simulations
  - Counter Terrorism
  - Energy Security
  - Understanding Climate Change

Press Release: <http://www.netapp.com/us/company/news/news-rel-20110928-990734.html>

# What keeps you up at night?



## ■ Performance

- Get bigger jobs done in a shorter amount of time
- Get more jobs done in the same amount of time
- Address widening gap between compute & storage

## ■ Reliability

- Minimize system downtime
- Enable data integrity and availability

## ■ Storage efficiency

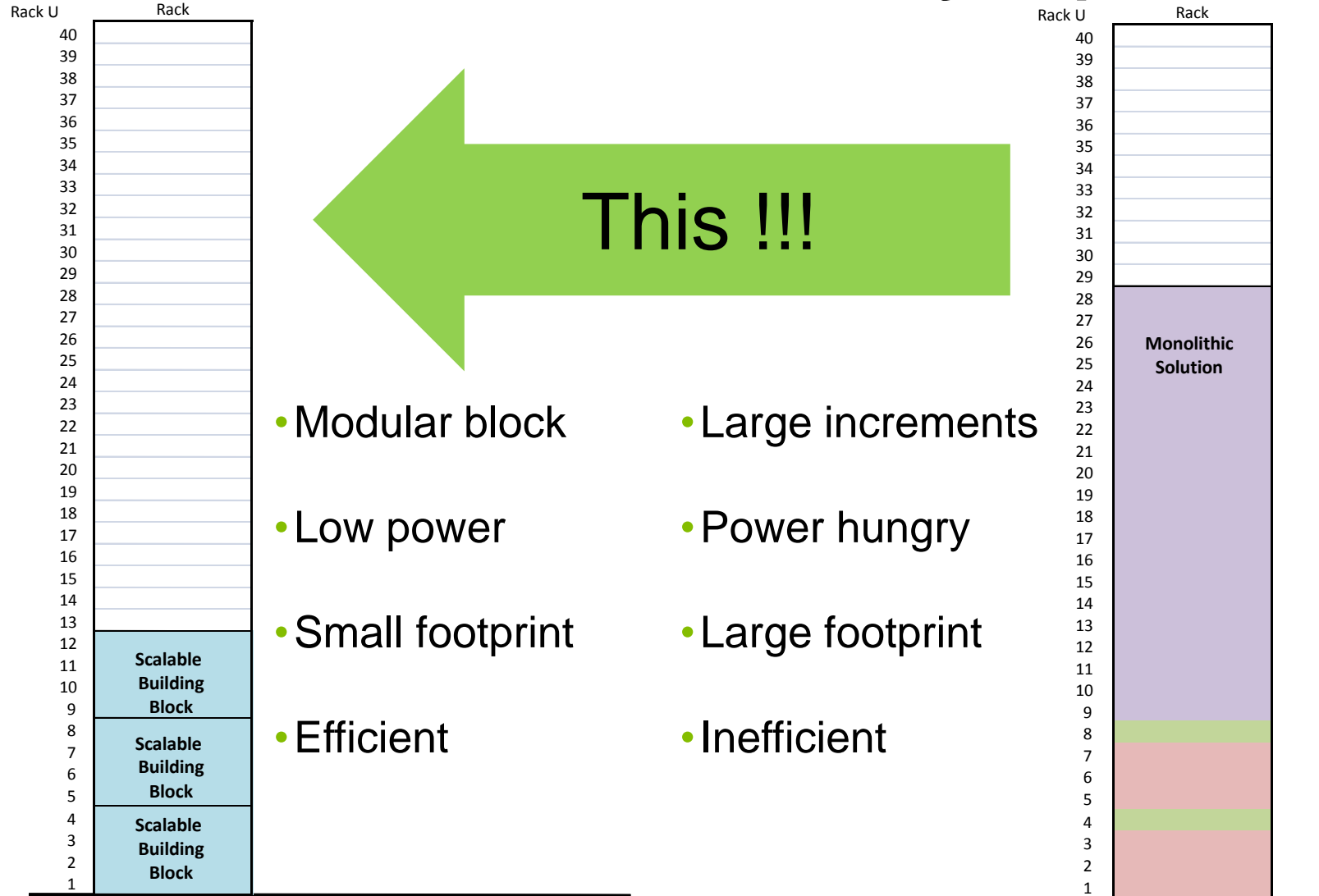
- Performance density, capacity density, power density

## ■ Cost

- Acquisition cost
- Operating expense

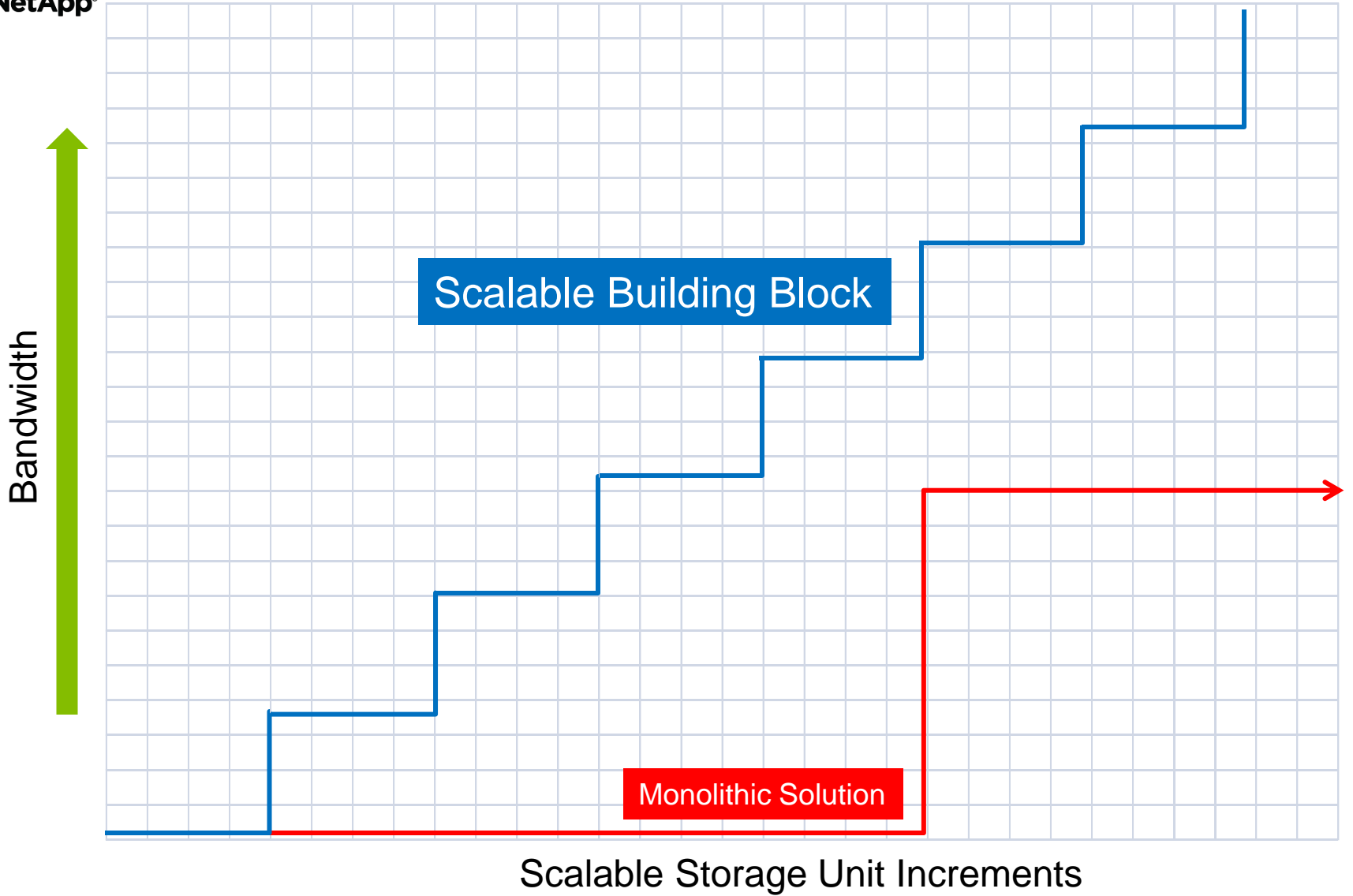


# What will let you sleep? How to Solve – which would you prefer?



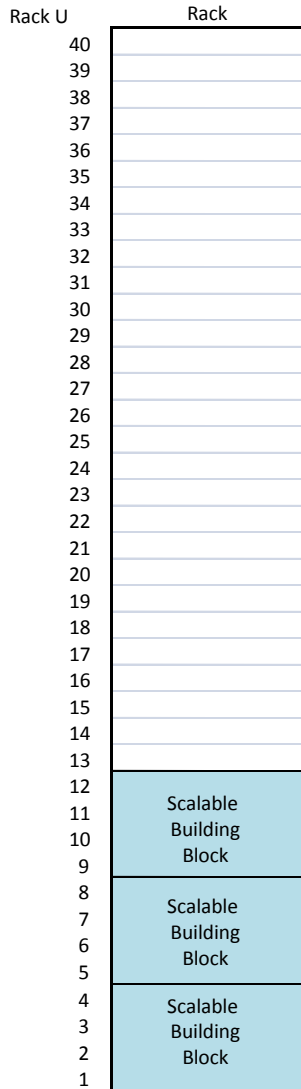


# Flexible Scalability



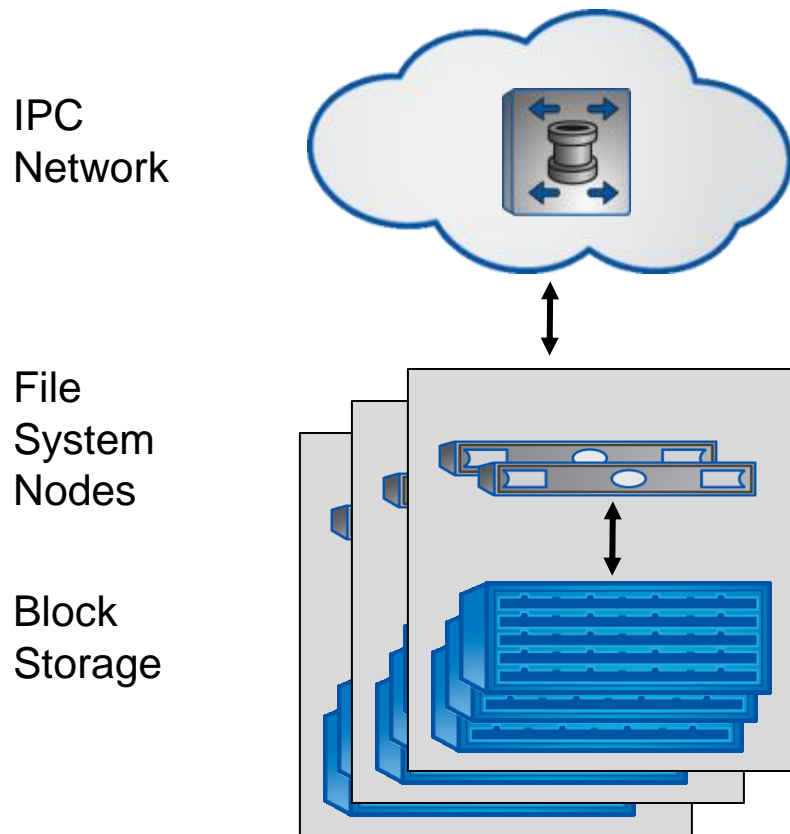


# Measurable Benefits



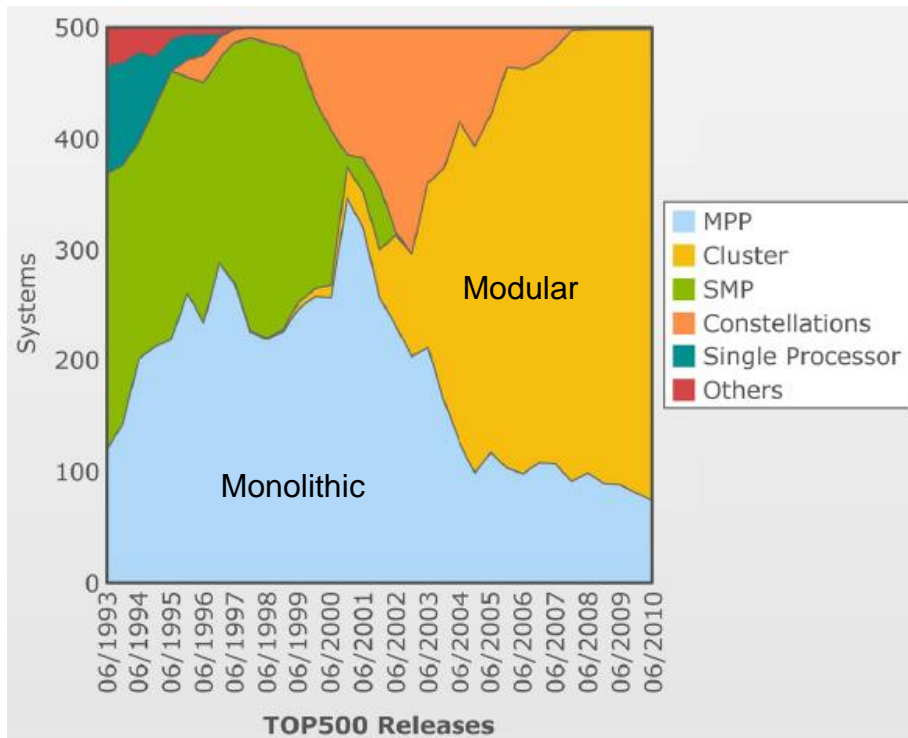
- Up to 40% fewer drives
- 50% vertical space
- 50% the power
- Dramatically better write density
- Dramatically better read density
- Improved performance under controller failure

# Achieving Scalability



- IPC Cluster Connect
  - IPC  $\leftrightarrow$  file System Nodes
  - InfiniBand
- High performance, low latency block IO
  - InfiniBand
  - SAS
- Purpose built storage
  - Robust
  - Resilient

# Not the first time



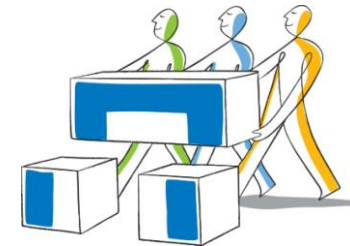
Top500, June 2010

- Compute tipped from monolithic (MPP) to modular (Clustered)
- Storage is now

# Closing Thoughts



- Intelligent, reliable performance is paramount
- Modular is optimal
- Purpose built a must





# “Open Benchmark for Lustre” (OBL) Initiative



- A Lustre performance benchmark for HPC community!
- HPC industry invited to participate in completing initiative and benchmark definitions
- Repeat webinar Thursday Dec 8, 8:00am pdt, for details contact [info@openbenchmarkforlustre.org](mailto:info@openbenchmarkforlustre.org)

*Thank you*

