Cray Vendor Update

Barry Bolding
VP Marketing and
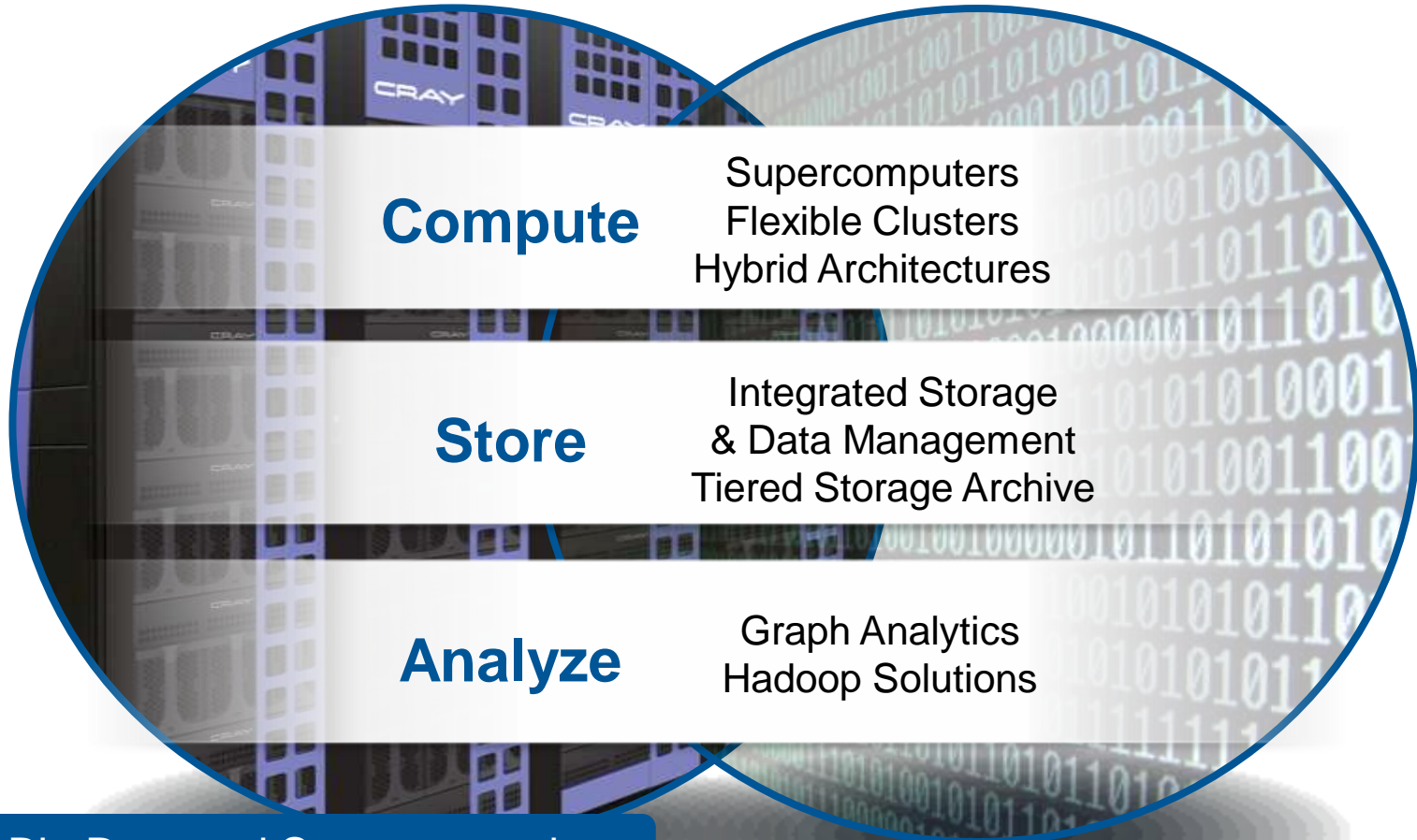**Business Development**

We Build Computational Tools That Help Change The World
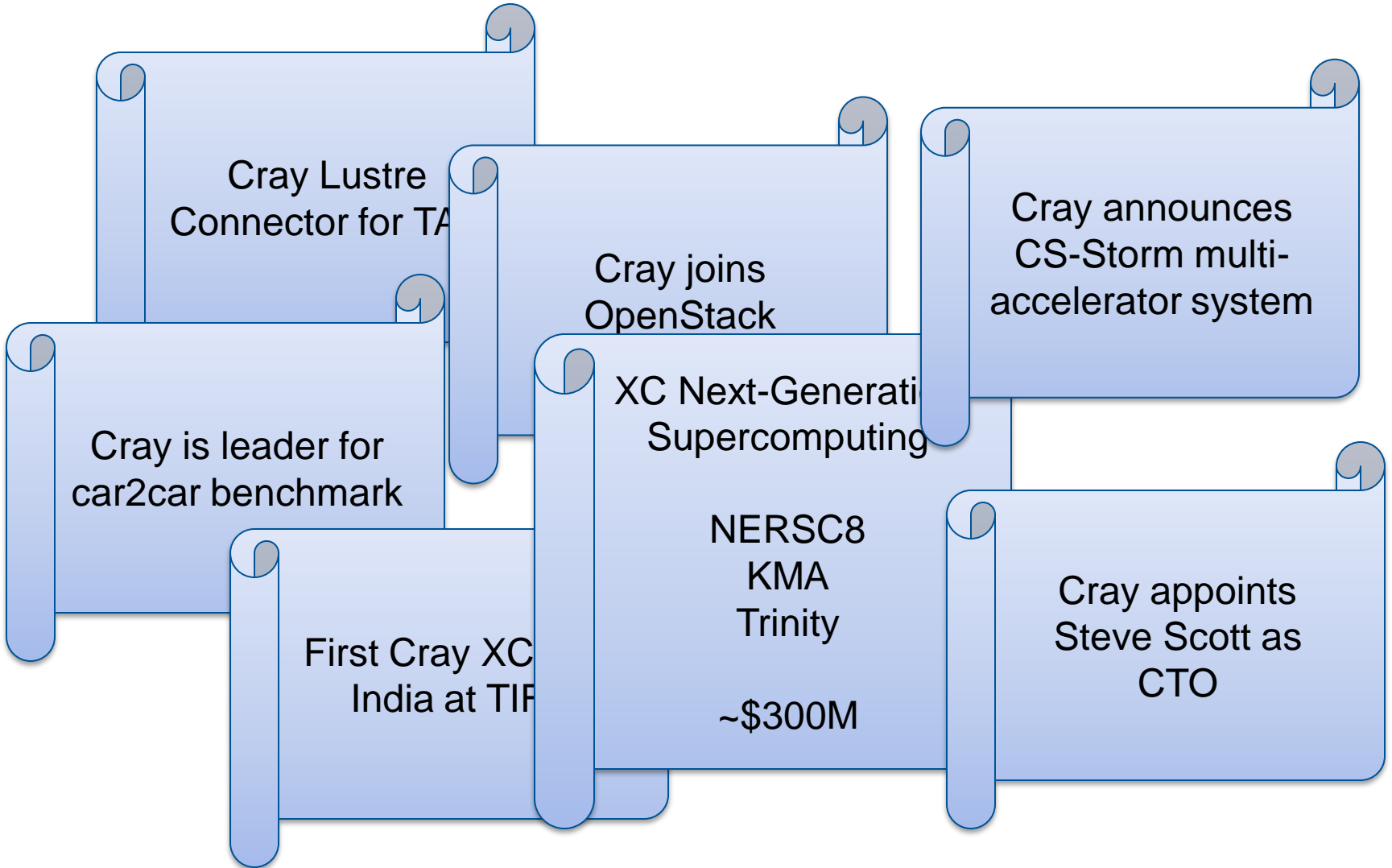
CRAY®

Supercomputing   ## Big Data

Compute

Supercomputers
Flexible Clusters
Hybrid Architectures

Store

Integrated Storage
& Data Management
Tiered Storage Archive

Analyze

Graph Analytics
Hadoop Solutions

Merging Big Data and Supercomputing

COMPUTE | STORE | ANALYZE

Cray Momentum

Cray Lustre Connector for TA

Cray joins OpenStack

Cray announces CS-Storm multi-accelerator system

Cray is leader for car2car benchmark

XC Next-Generati Supercomputing

NERSC8
KMA
Trinity

~$300M

First Cray XC India at TIF

Cray appoints Steve Scott as CTO

A Next Generation Supercomputer Architecture

Cray Infrastructure for Trinity

Cray Compute and Storage Infrastructure for "Trinity"

Very-Very Fast Burst Adapted Tiering SW Tightly coupled to Applications

CRAY XC Family Supercomputer

| Compute (Intel "Haswell") >9500 nodes | Compute (Intel Xeon Phi) >9500 nodes |

42PF Total Performance and 2.1PiB of Total Memory

Gateway Nodes | Lustre Routers | Burst Buffer

Cray Development & Login nodes

2x 648 Port IB Switches

41PB file system

41PB file system

82 PB Usable ~1.7 TB/sec - 2 Filesystems

Cray Sonexion® Storage System

40 GigE Network

GigE Network

Haswell and KNL Adaptive Infrastructure 42PF

TRINITY

Big Fast Data Lustre Parallel FS (82 PB & 1.7TB/sec)

And a powerful, productive and efficient infrastructure with a complete software and programming environment

CS-Storm is a Performance Whirlwind

What is it?
- An Cray CS System with 8-GPU Nodes.
- Cray Programming Env. and Management
- A performance and productivity leader

Performance and Efficiency
- 176 NVIDIA® Tesla® K40 GPUs in a rack.
- >250 Tflops/rack. *>1PF in 4 racks!*
- 4.1 Tflops per kW & 24.7 Tflops per sq. ft.
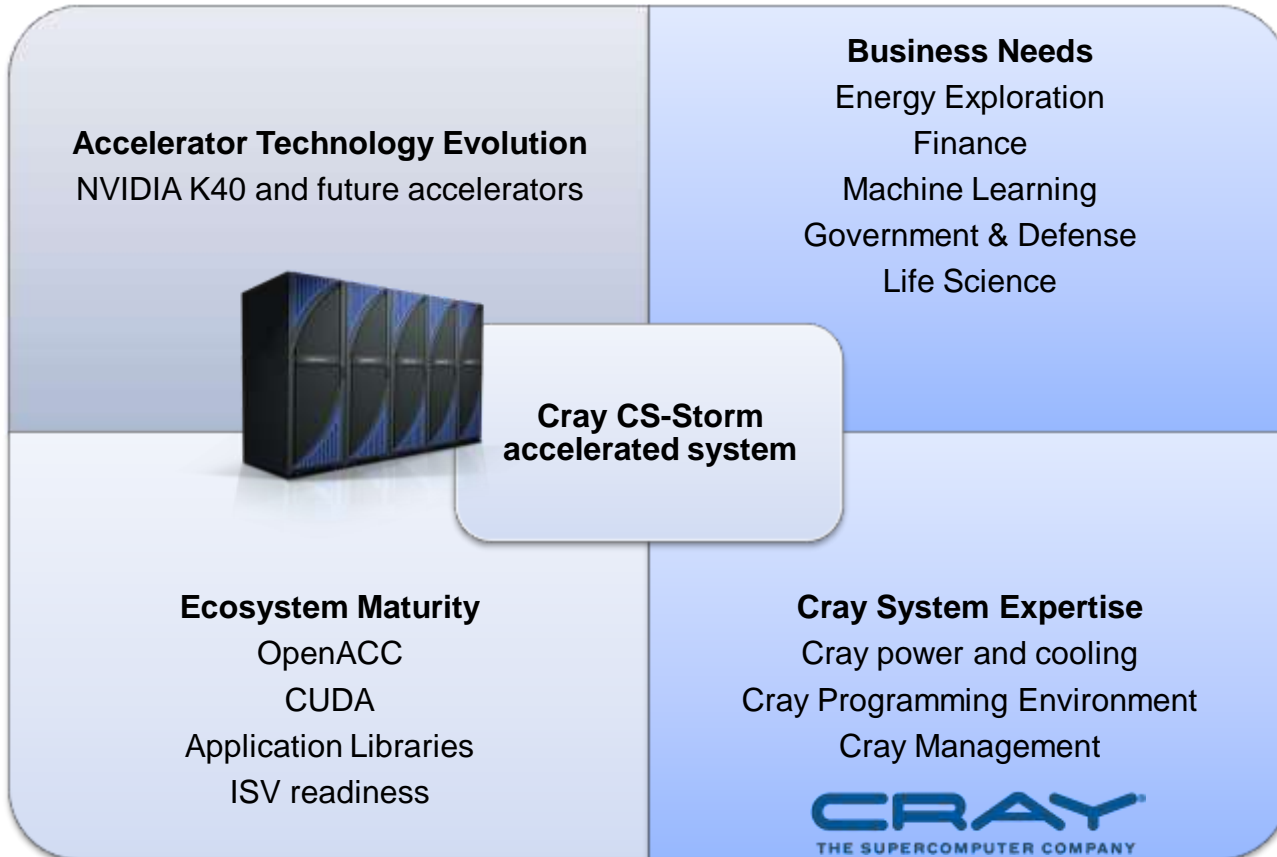- Maximize bandwidth to accelerators

Advantage vs conventional CPU-only systems
- Up to 4.7x more performance density
- Up to 4.4x more power efficiency
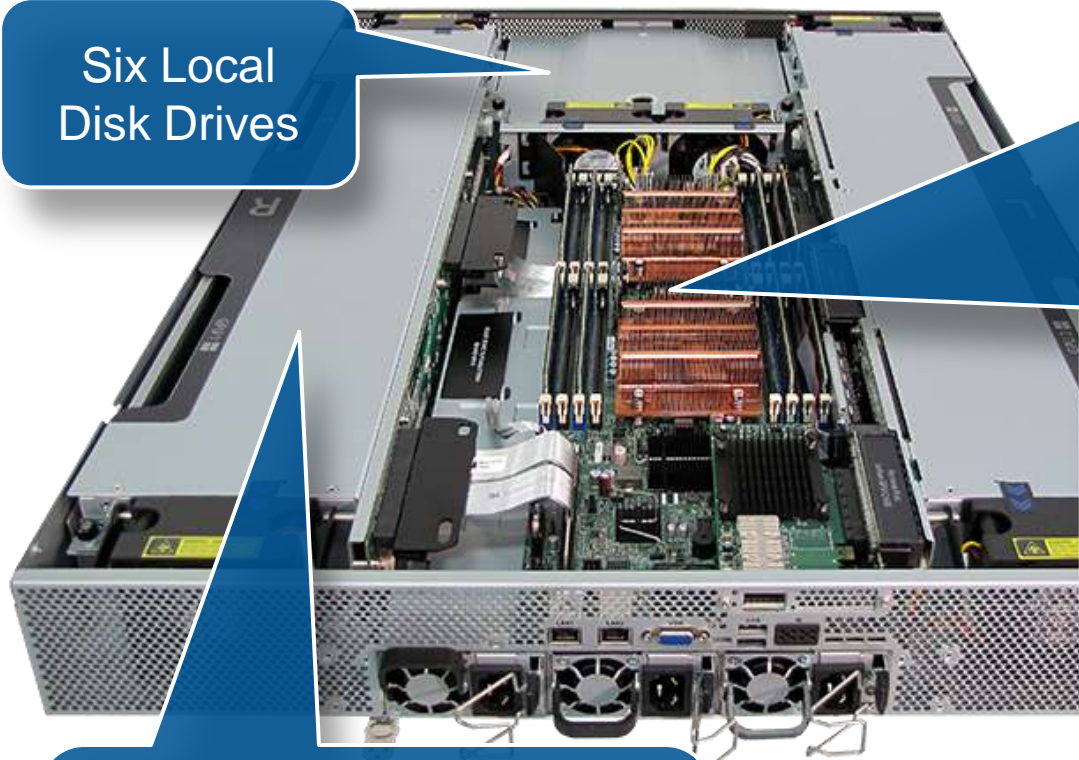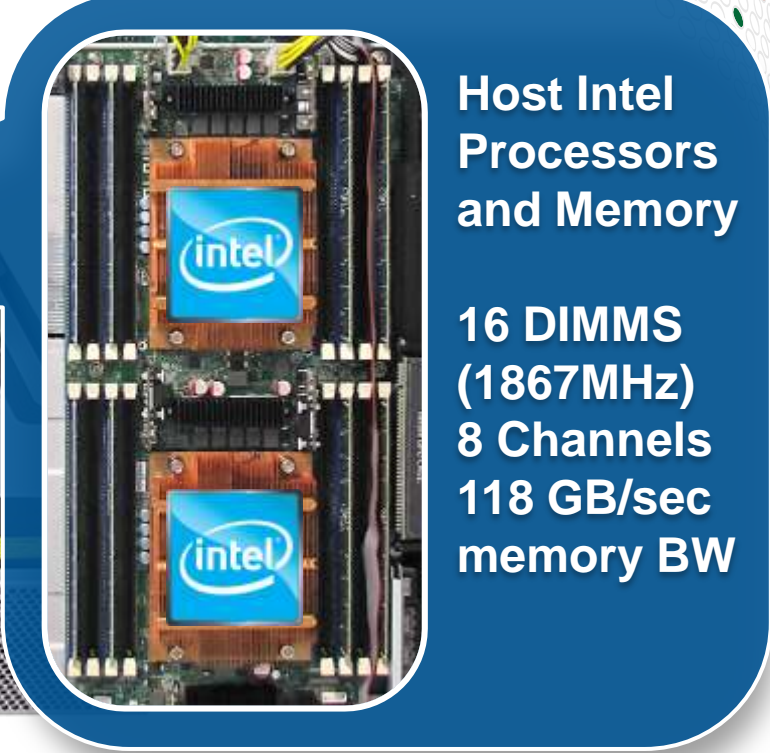- Maximize floorspace and power efficiency

22 x 2U servers per 48U rack

COMPUTE | STORE | ANALYZE

A Perfect Storm for Today's Business Needs

Accelerator Technology Evolution
NVIDIA K40 and future accelerators

Business Needs
Energy Exploration
Finance
Machine Learning
Government & Defense
Life Science

Cray CS-Storm accelerated system

Ecosystem Maturity
OpenACC
CUDA
Application Libraries
ISV readiness

Cray System Expertise
Cray power and cooling
Cray Programming Environment
Cray Management

CRAY
THE SUPERCOMPUTER COMPANY

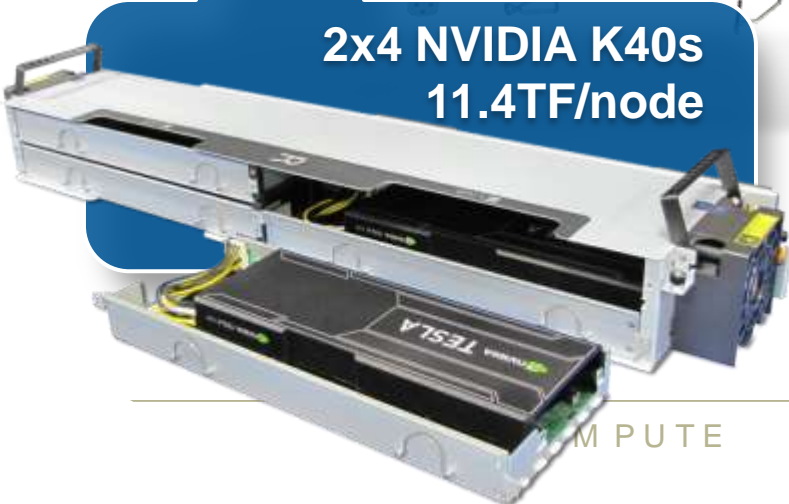COMPUTE | STORE | ANALYZE

Cray CS-Storm Innovative Design

Six Local Disk Drives

Host Intel Processors and Memory

16 DIMMS (1867MHz) 8 Channels 118 GB/sec memory BW

2x4 NVIDIA K40s 11.4TF/node

2U form factor
- 22 Nodes/rack
- 176 GPUs/rack

Cray Software Environment for the CS-Storm

Cray Advanced Cluster Engine (ACE™)

- Complete Cluster, Server, Network & Storage Management
- Cluster Partitioning
- Job Scheduler support
- Revision System with Rollback
- Automatic network and server discovery and failover

Cray Programming Environment on CS

- Cray Compiling Environment
- C, C++, Fortran Compilers
- Cray Scientific and Math Libraries
- LibSci with GPU accelerated routines
- Cray Performance Measurement and Analysis Tools

Complete SW Ecosytem

- Open Source and Partner Tools

COMPUTE | STORE | ANALYZE

Cray CS-Storm: Uncompromising Performance

Powerful and Efficient

- Uncompromising performance in a single-rack system
- Full system solution featuring Cray management and programming environment.
- Maximum efficiency for scalable GPU applications

Performance by Design

- Power and cooling to spare, allows GPUs to run at full power.
- Designed for upgradeability to protect your investment

Cray Service and Reliability

- Redundancy, data protection and serviceability
- Cray expertise

Simply, CS-Storm was designed to be the best GPU system for the most demanding customers

COMPUTE | STORE | ANALYZE

Thank You!