Tiering Storage (around Lustre) for Big Data and Supercomputing
Jason Goodman, Cray
Safe Harbor Statement

This presentation contains forward-looking statements that are based on our current expectations and/or expectations at the time the statement was made. Forward looking statements may include statements about our financial guidance and expected operating results, our opportunities and future potential, our product development and new product introduction plans, our ability to expand and penetrate our addressable markets and other statements that are not historical facts. These statements are only predictions and actual results may materially vary from those projected. Please refer to Cray's documents filed with the SEC from time to time concerning factors that could affect the Company and these forward-looking statements.
About Cray

Seymour Cray founded Cray Research in 1972
• 1972-1996, Cray Research grew to leadership in Supercomputing
• 2000 - present, Cray Inc.
• Cray Inc. formed in April 2000

Cray Inc.
• NASDAQ: CRAY
• Over 1,200 employees – in over 30 countries

Financials
• 2015: 725M (15% in commercial)
• 2016: 825M goal

Three Focus Areas
• Compute – Supercomputers and Clusters
• Storage – High Performance Storage and Data Management
• Analytics – Big Data and Graph Analytics

Seven Major Development Sites:
• Austin, TX
• Bristol, UK
• Chippewa Falls, WI
• Pleasanton, CA
• San Jose, CA
• St. Paul, MN
• Seattle, WA

Cray at LUG 2016
“The Supercomputing Company”

Supercomputing

$4B Market
Growing at 7-9%
(CAGR through ‘19)

Big Data

Storage: $2B at 8-10%
Analytics: $1B at 20-25%
(CAGR through ‘19)
Our Vision

Modeling The World
Convergence of Supercomputing with Big & Fast Data

Analytics Models

Data-Intensive Processing

Scientific Models
Focus Areas

A Workflow Approach for a Data-Intensive World
Recent Highlighted Systems

- **$174M Next-Gen Cray XC**
  - 8X perf increase
  - 82PB Sonexion
  - 1.7 TB/s I/O

- Cray/Intel partnership
- Cray XC & Next-Gen Cray “Shasta”
- 180PF (18x increase)
- Next-Gen Storage

Petroleum Geo-Services
Cray Growth in Weather, Climate and Oceanography over the Last Two Years

Feb 2014
April 2014
April 2014
June 2014
June 2014
Oct 2014
Jan 2015
July 2015
Aug 2015
Sept 2015
Nov 2015
Dec 2015
Jan 2016

Cray at LUG 2016
Today Show on Weather Models

TODAY'S WEATHER

SAY IT AIN'T SNOW!
SNOW FORECASTED FOR THE FIRST DAY OF SPRING

TODAY.com
Data Tiering

Beyond Lustre HSM
Cray Storage Offerings

I/O Acceleration
- Pure performance
- Breakthrough efficiencies
- Balanced and cohesive design

High Performance Storage
- Efficiently scale
- Innovate faster
- Be confident

Efficient Long-term Storage
- Protect and store
- Access data forever
- Easily sustain long-term storage
Cray Storage for Big Data and HPC - Span Entire Data Lifecycle

**Sonexion Tier:**
- Fast throughput
- Fully parallel access
- True scalability

**TAS Tier:**
- Best cost efficiency
- Data fully accessible
- Extensive scalability

Cray at LUG 2016
Automated Coordination Across Storage Tiers

Scheduler Directives

Cray HPC
DataWarp

Cray Sonexion Storage

Persistent Namespace

Automated Policies

Cray TAS
Archive Storage

Data
Loosely Coupled

Data
Tightly Coupled

HDD Pool

Tape Pool
Questions?
The future is seldom the same as the past

Seymour Cray
June 4, 1995