CUG 2008 HELSINKI • MAY 5–8, 2008
CROSSING THE BOUNDARIES

State of XT Software:
The Year in Review

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CRAY
THE SUPERCOMPUTER COMPANY

XT Year in Review

- Accomplishments over the last 12 months
- Brief Glimpse of Future

2007 ACCOMPLISHMENTS

UNICOS/lc 1.5 updates

Revision	Release Date
1.5.45	03-MAY-2007
1.5.47	11-MAY-2007
1.5.52	29-JUN-2007
1.5.55	20-JUL-2007
1.5.57	10-AUG-2007
1.5.59a	08-OCT-2007
1.5.60	02-NOV-2007

UNICOS/lc 2.0 Release and Updates

Revision	Release Date
2.0.LA	02-JUL-2007
2.0.14	30-JUL-2007
2.0.17	13-AUG-2007
2.0.20	10-SEP-2007
2.0.GA	10-OCT-2007
2.0.33	06-DEC-2007
2.0.35	20-DEC-2007
2.0.36	08-JAN-2008
2.0.39	24-JAN-2008
2.0.40	01-FEB-2008
2.0.41	21-FEB-2008
2.0.44	10-MAR-2008
2.0.49	18-APR-2008

Accomplishments: Service support

- Completed joint CNL assessment with NERSC
- Helped support the Army HPCRC migration to Compute Node Linux (CNL)
- Engineering and managerial support of CNL bring-up on NERSC and ORNL machines
- Customer STREAMS performance analysis for NERSC
- Spent a significant amount of time on analyzing OS jitter
  - Wrote analysis paper and implemented improvements.
- Assisted Service organization on most system acceptances
- Committed to working with the Xtreme group

Accomplishments

- In field today or undergoing field trials
  - Unified Boot
  - Ldump
  - Linux Kernel
    - support for QC, HD
    - Family 0x10 support
    - patches
  - Quad Core
  - Compute Node Health Daemon (Phase 1)
- In upcoming 2.1 release
  - SLES10 SP1 on SIO nodes
  - **Great improvements to XTInstall tool!**
  - Perfmon 2.3 2.6.5X
  - Comprehensive System Accounting
  - Cray Data Virtualization Service
  - Service node failover and warmboot (Phase 1)
  - Affinity/pinning with SDB support (segment tables)
  - Restructuring of the software build/RPMs
  - Portals performance optimizations on CNL
  - Kernel Huge page support
  - Improvements to Out-of-Memory (OOM) killer on the XT Compute Nodes
- Common Kernel Source Repository in place for XT and X2

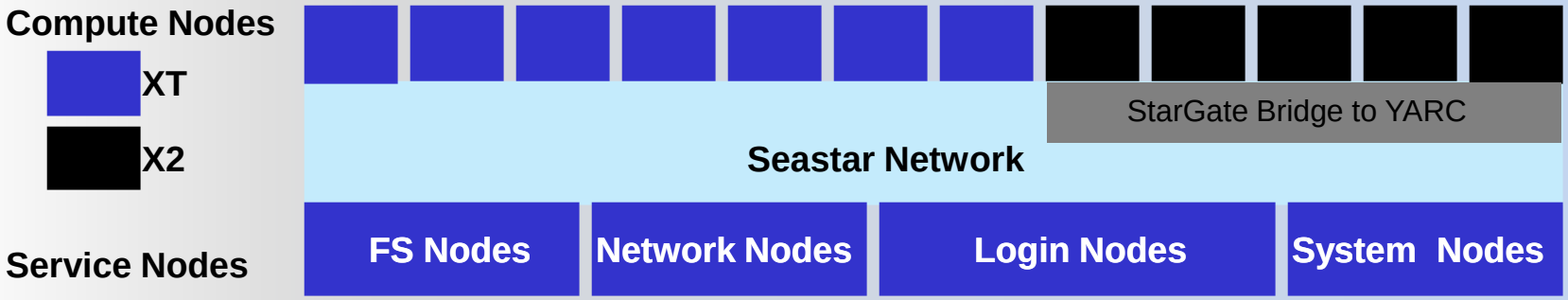
Accomplishments

- OS support for XT4 Quad Core and XT5
  - Introduced new kernel (Linux 2.6.16.53)
    - **Completed qualification on all platforms**
      - Single core
      - Dual core
      - Quad core (incomplete)
    - Integrated into 2.0.30 (no regressions!)
  - Integrated NUMA kernel into 2.1
    - Completed qualification on all platforms
    - Extensive performance testing
- Added support for PCI-Express
- Support for SPR 740520

Accomplishments:

- Integrated XMT with XT
  - Booted 128P Threadstorm 2.0 system in July 2007
  - Delivered 4P Threadstorm 2.0 system to PNNL in September 2007
  - Switched XMT to use XT 2.0 December 2007
  - Booted 64P Threadstorm 3.0 system in January 2008
  - Delivered 2 16P Threadstorm 3.0 systems in April 2008
- Integrated X2 with XT
  - Programming Environment 6.0 released in September 07
  - UNICOS/lc for Cray X2 released in December 07
    - Currently running on 744 Cray X2 processors (six cabinets)
    - Supporting mixed Cray XT and Cray X2 workload

Hybrid User Environment



OSTs & MD Servers

Network Interfaces

Common Environment
- SUSE SLES Env.
- Batch package
- ALPS
- Debug Manager

System Admin
- **Mazama**

XT Environment
- 3rd part compilers
- 3rd party libraries
- Cray scientific libs
- Cray comm. libs

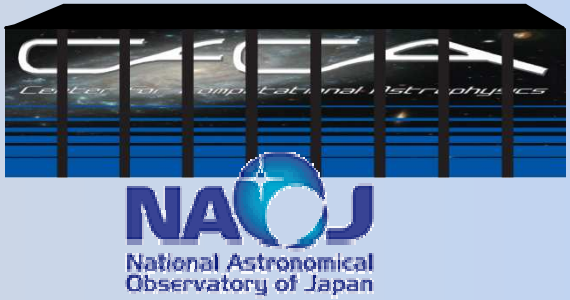
X2 Environment
- X2 compiler
- X2 libraries
- Cray scientific libs
- Cray comm. libs

Accomplishments: SPR Reduction

- Goal: to reduce the Customer SPR Score by 40% (from 100% to 60%)
  - Goal achieved!
- Scoring
  - SPR scores are calculated from 3 factors. SPR age, SPR severity and OS factor.
  - Severity - SPR severity is 50 for Critical, 20 for Urgent, 5 for Major, 1 for Minor, Design, etc.
  - Age - SPR age is calculated from SPR days_in_assign field - converted to weeks.
  - OS Factor - OS factor is 1.0 for current OS generation (for example UNICOS/lc), 0.1 for previous generation (UNICOS/mp, MTA) and 0.01 for UNICOS, UNICOS/mk, etc.
  - Internal SPRs for BWOS/X2OS and EMTX (XMT) were added and weighted 1.0.

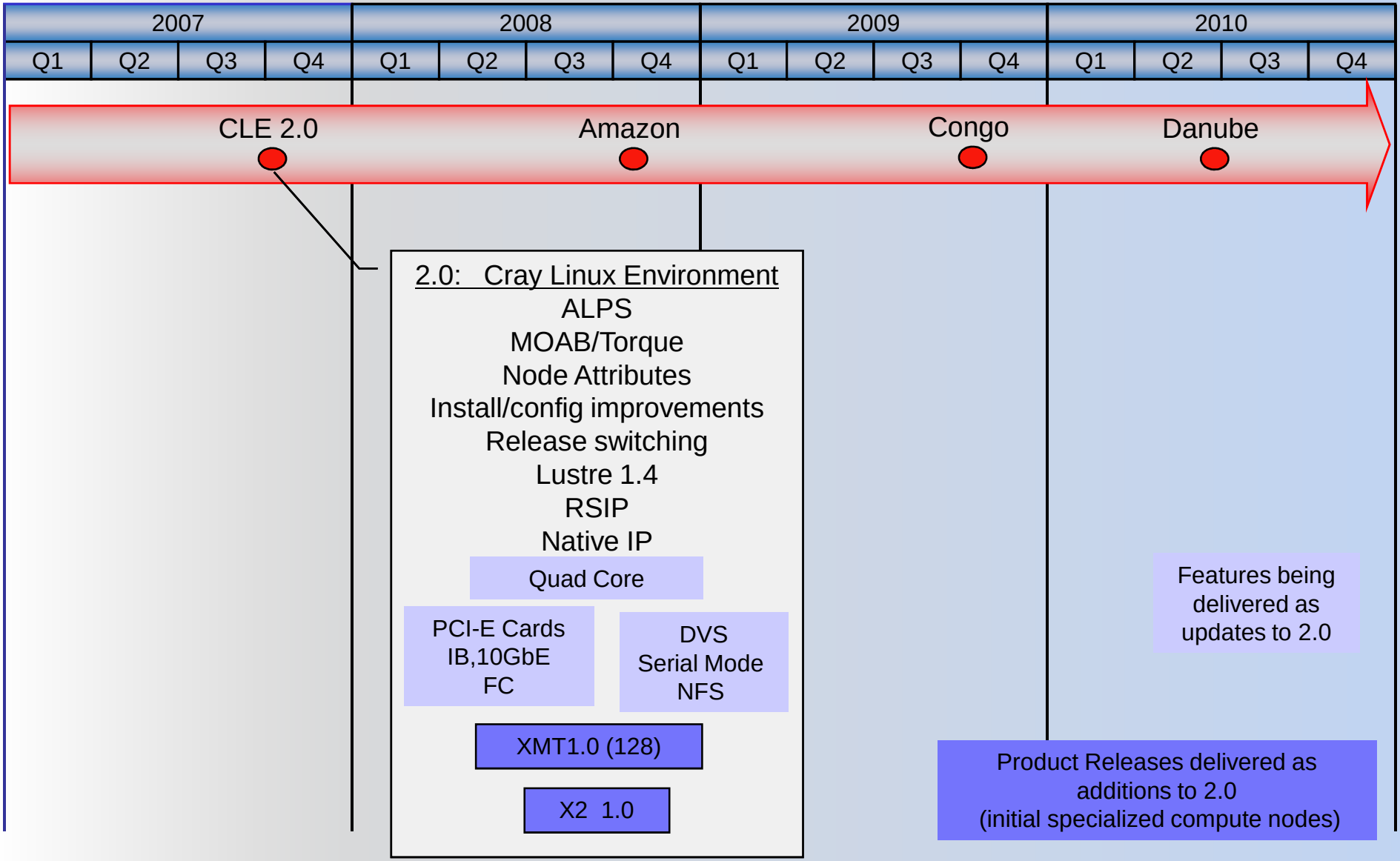
Accomplishment: New XT Customers

- CASA
- Danish Meteorological Institute
- HECToR
- National Astronomical Observatory of Japan
- University of Bergen
- Yokohama City University

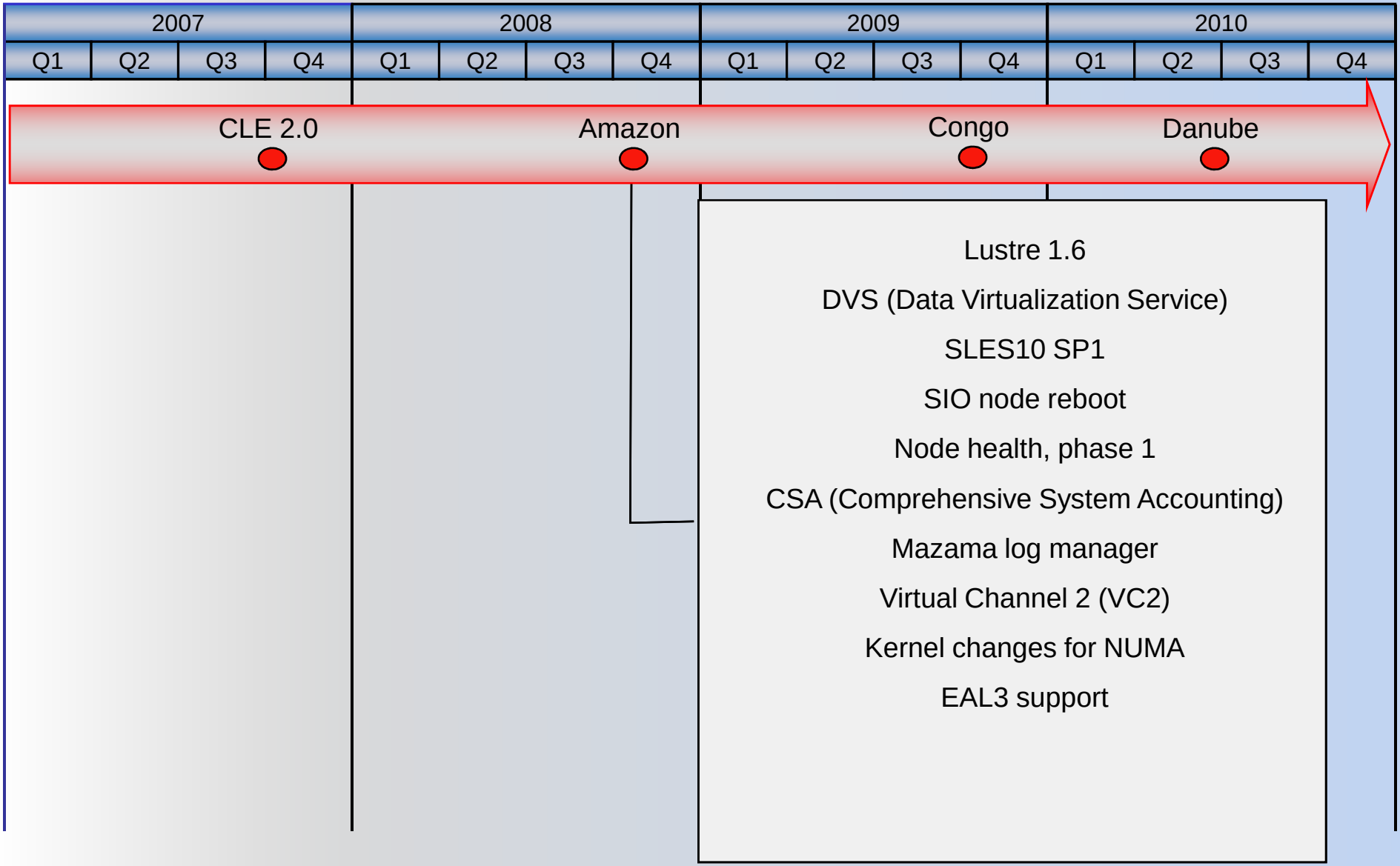


SOFTWARE FUTURES

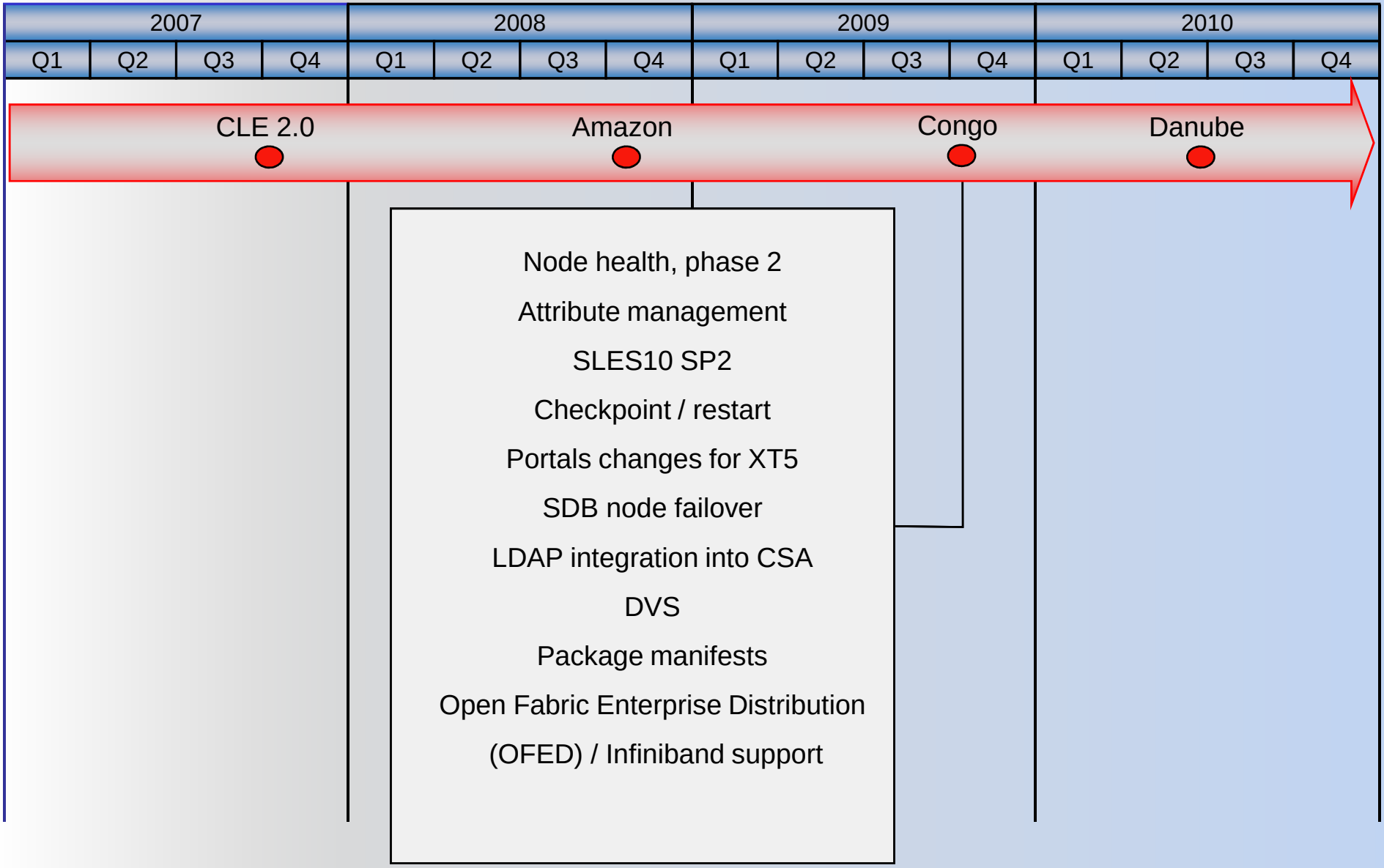
Cray Linux Environment (CLE) 2.0



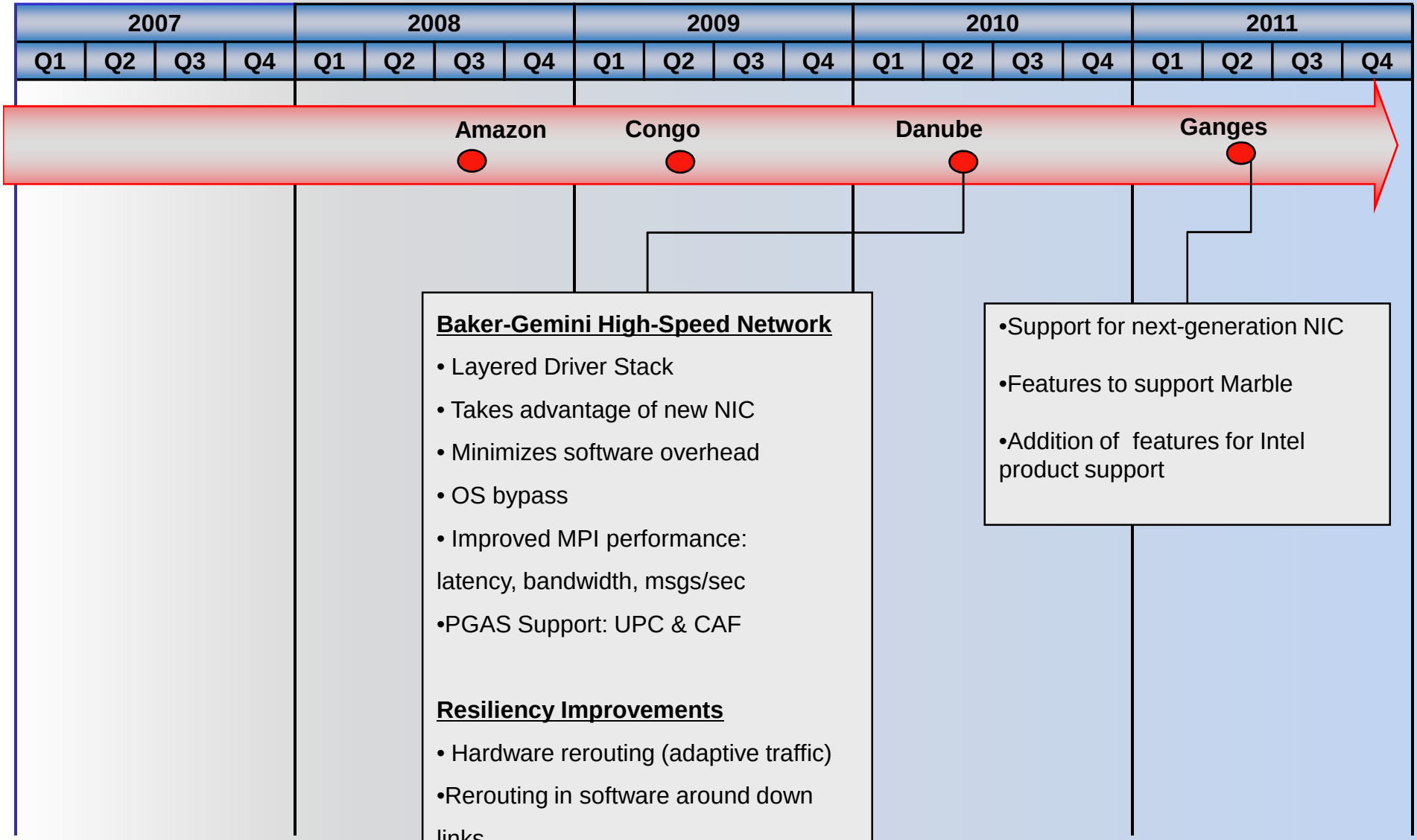
CLE Roadmap: Amazon



CLE Roadmap: Congo



CLE Roadmap: Danube & Ganges

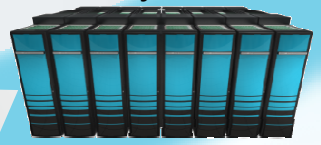


The Cray Roadmap

Realizing Our Adaptive Supercomputing Vision

"Granite"
"Baker"+
Nile
"Marble"
Ganges
"Baker"
Danube
2011+
2010
Congo
Cascade Program
Adaptive Systems
Processing Flexibility
Productivity Focus
Cray XT5 & XT5$_h$

Amazon
Cray XMT

2009
Rainier Program
Hybrid Systems
Integrated Infrastructure
High Efficiency
Cray XT4

Scalar
Vector
Multithreaded
2008

5/8/2008

CRAY XT5
Thank You
PetaScales