CISL Update
Operations and Services
CISL HPC Advisory Panel Meeting
9 October 2008

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Computational and Information Systems Laboratory

Outline

- *IBM POWER6 bluefire*
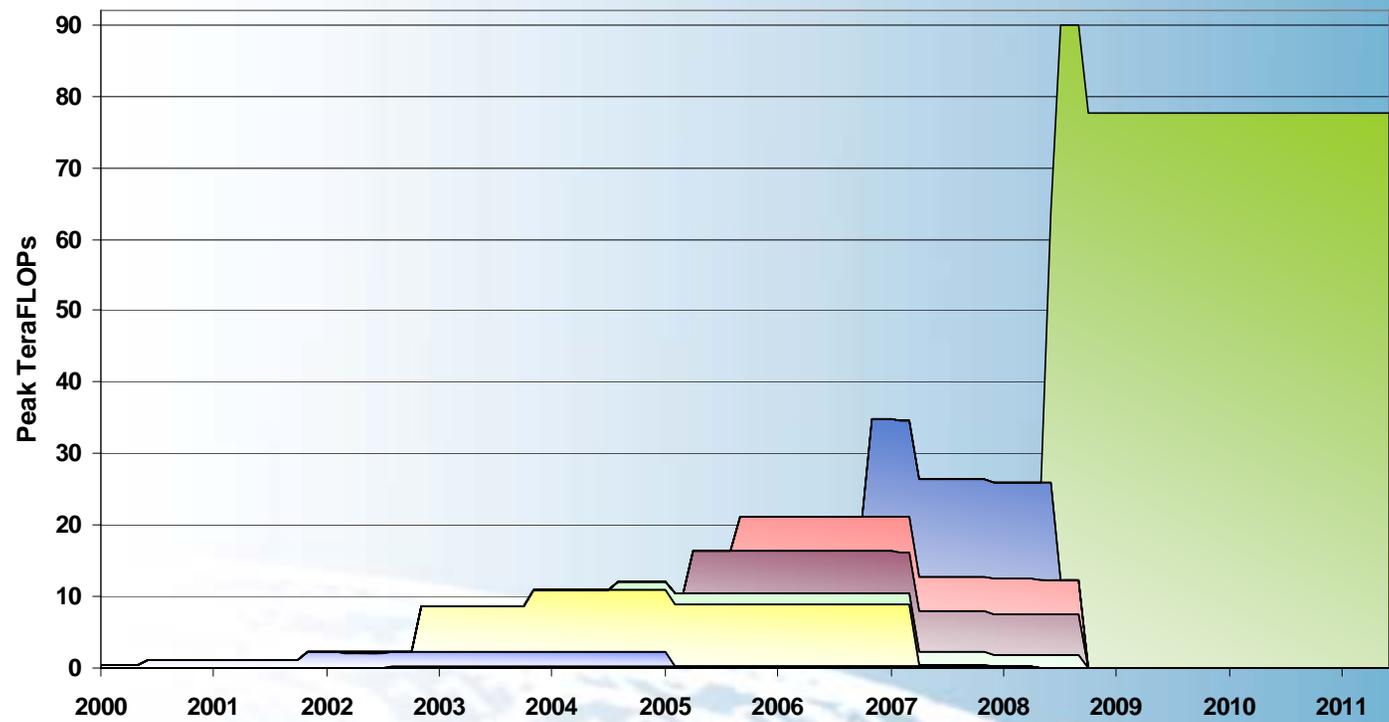- *Accelerated Scientific Discovery*
- *AMSTAR Status*

bluefire Installation/Deployment

- **24 April 2008:** *bluefire* **Delivered**
  - *First P6 Delivery/Installation Worldwide*
  - *117 compute nodes delivered*
    - 60+ TFLOPs peak   76 TFLOPs peak
      →

- **8 June 2008:** *bluefire* **Stage 1 Accepted**
- **14 June 2008:** *blueice* **Decommissioned**
- **16 June 2008:** *bluefire* **Stage 2 Power-up**
- **18 June 2008:** *bluefire* **Debuts at #30 on Top500**

- **30 June 2008:** *bluefire* **Accepted**
  - *NCAR and IBM staff worked tirelessly to achieve this goal*

- **29 Sept 2008:** *bluevista* **Decommissioned**

Peak TFLOPS at NCAR (Production Systems)

Supercomputing Power at NCAR

Legend:
- All Others
- POWER3
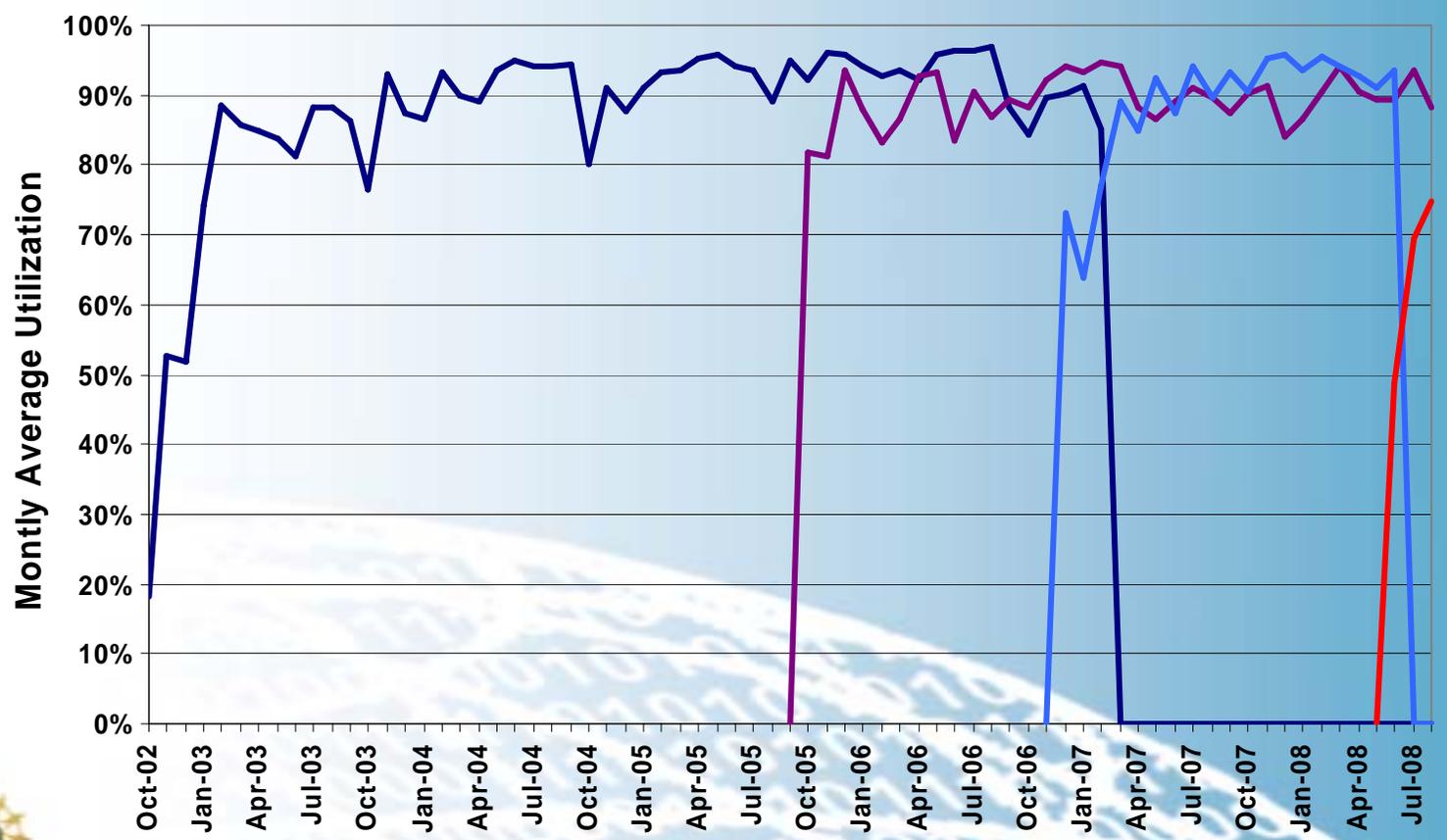- POWER4
- Linux
- BG/L
- POWER5
- POWER5+
- POWER6

Y-axis: Peak TeraFLOPs (0, 10, 20, 30, 40, 50, 60, 70, 80, 90)

X-axis: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011

WRF 1.0
WRF 2.0 WRF 2.1 WRF 2.2
CCSM 2.0
CCSM 3.0
CCSM 4.0
NRCM Simulations
IPCC AR4 Simulations
IPCC AR5 Simulations

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NSF

NCAR

CHAP Meeting
9 October 2008

Utilization

Average % Utilization of Production Systems

Legend: bluesky, bluevista, blueice, bluefire

Accelerated Scientific Discovery (ASD)

- **September – November 2008   3.2M GAUs**

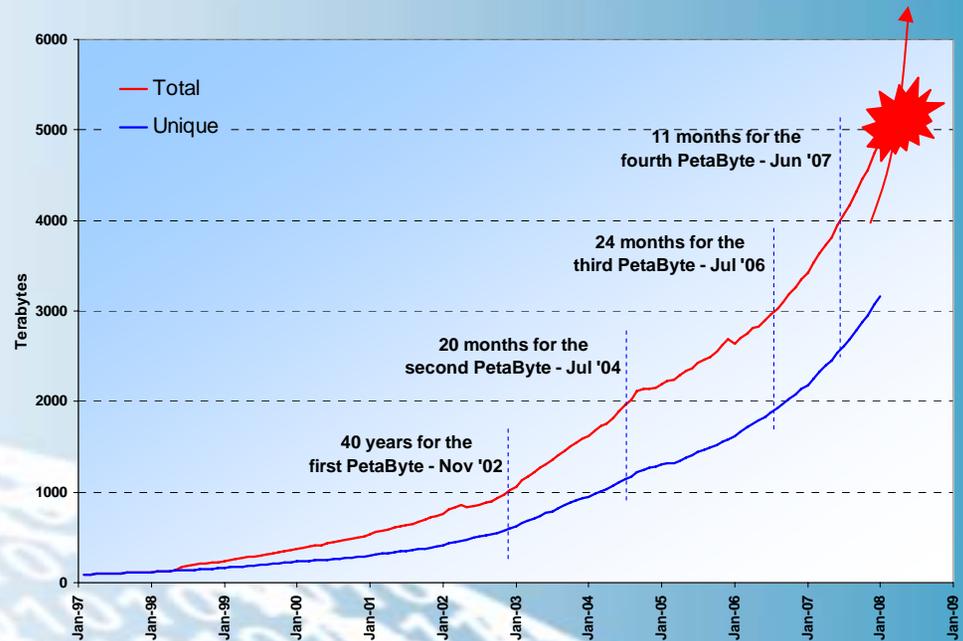| PI	Institution	Title	GAUs Allocated
Tulich	CU	Convection-Wave Interactions	360,000
McClean, et.al.	Scripps	Eddy-Induced Tracer Variability	489,000
Trapp	Purdue	CC Radiative Forced Convective Storms	399,000
Ridley	Univ of Michigan	Small-scale Processes – Corona, Magnetos, and Ionosphere..	645,000
Shay	Univ of Delaware	Collisionless Magnetic Reconnection in Magnetosphere	336,000
Rasmussen	NCAR	Modeling Winter Precip Processes	500,000
Holland	NCAR	Nested Regional Climate Modeling	500,000

AMSTAR
Augmentation of the Mass Storage Tape Archive Resources

- **Current MSS total capacity is (nominally) 6 PetaBytes**
- **Current MSS will be "full" in 3Q calendar 2008**

- **3 October 2008:**

  AMSTAR contract awarded to Sun Microsystems!

NCAR MSS - Total Data in Archive

Legend:
— Total
— Unique

11 months for the fourth PetaByte - Jun '07

24 months for the third PetaByte - Jul '06

20 months for the second PetaByte - Jul '04

40 years for the first PetaByte - Nov '02

Y-axis: Terabytes (0, 1000, 2000, 3000, 4000, 5000, 6000)

X-axis: Jan-97, Jan-98, Jan-99, Jan-00, Jan-01, Jan-02, Jan-03, Jan-04, Jan-05, Jan-06, Jan-07, Jan-08, Jan-09

AMSTAR Contract

- **Facts and Figures**
  - *New libraries to replace silos– SL8500*
  - *Expansion to over 30 PB by end of 2012 in six phases into <u>three</u> 10,000 slot SL8500s*
  - *Immediate expansion from 200 GB capacity tapes to 1 TB tapes*
  - *Two-year move of data from silos to SL8500s*
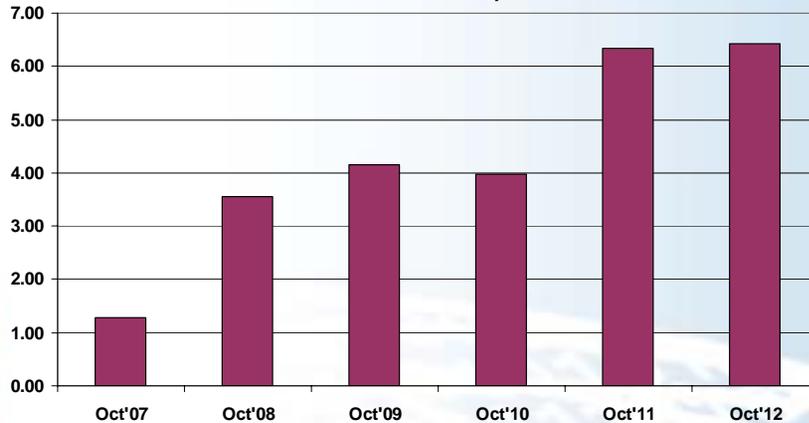
- **Schedule**
  - *1 Dec 2008   Production Deployment 8 PB*
  - *1 Sep 2009   Capacity increased to 12.2 PB*
  - *1 Sep 2010   Capacity increased to 18.2 PB*
  - *1 Sep 2011   Capacity increased to 24.5 PB*
  - *1 Sep 2012   Capacity increased to 30 PB*
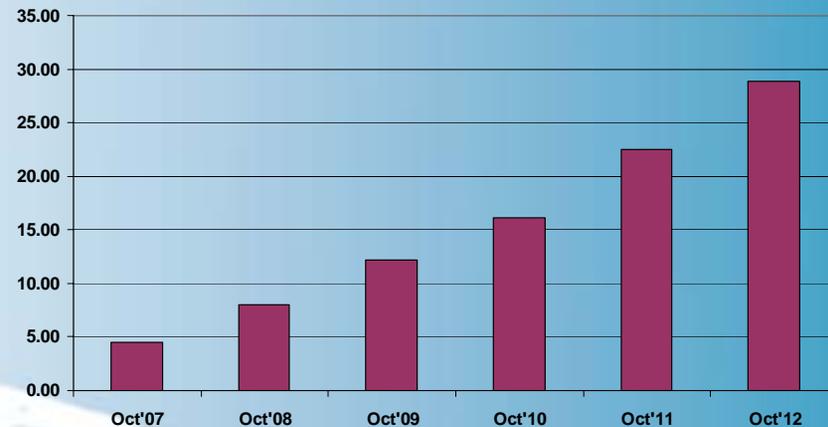   - *With compression, etc., could be > 37.5 PB*

AMSTAR

- **Project total holdings of the MSS will approach 30 PetaBytes before redeployment in the NSC**
- **New tape libraries, tape drives and (much) higher density media**
- **Maintain/improve current reliability and access times**

Projected Annual Growth (Pbytes in year preceding indicated date)

Total PBs Stored (w/ DSS Stewardship & IPCC AR5)

Questions and Discussion

Sustained GFLOPs

Sustained GFLOPs Reserved (% Utilization)

Legend: bluesky, bluevista, bluefire, tempest-chinook, blueice

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