

NCCS Hardware

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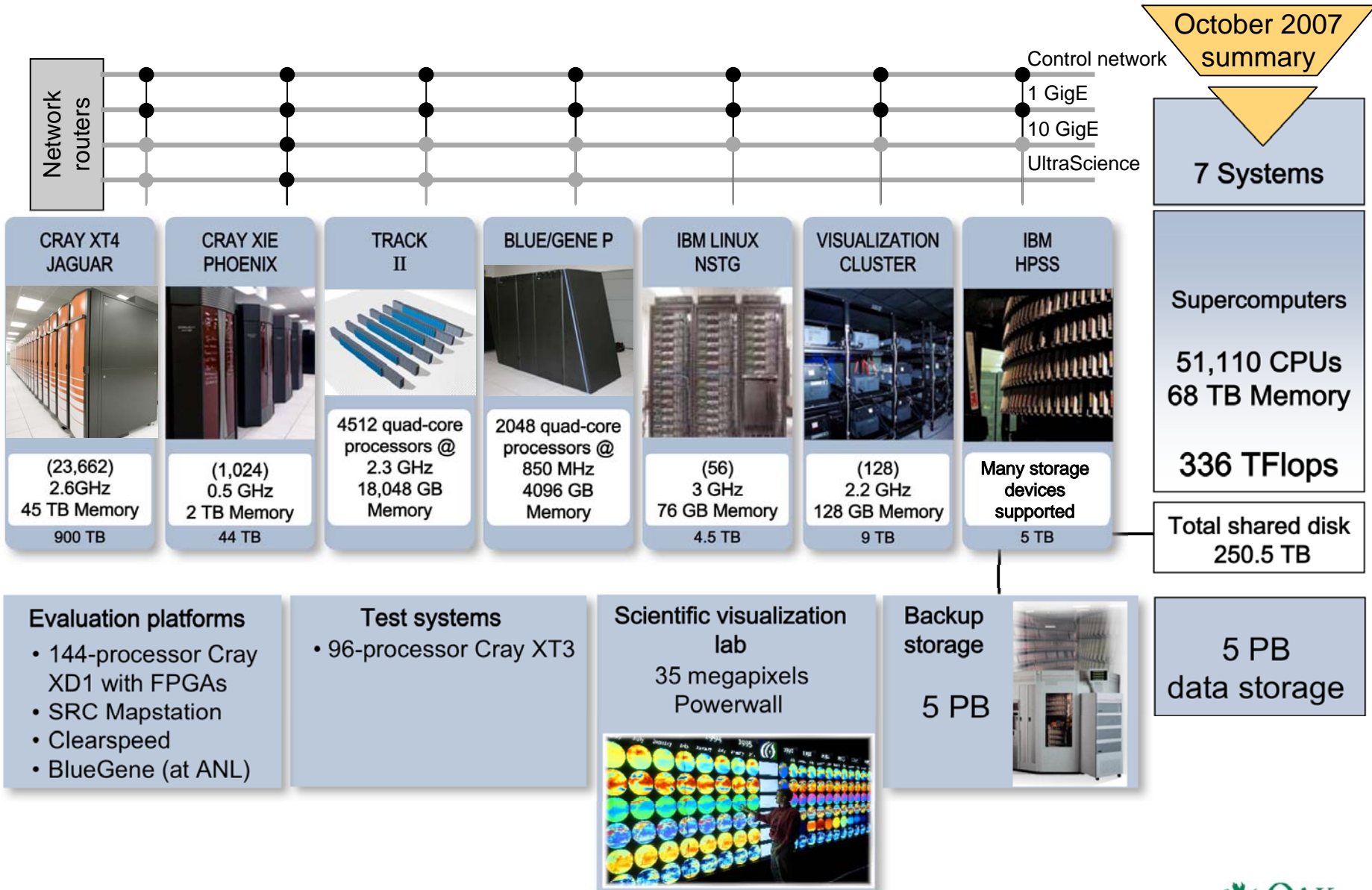
Jim Rogers

Director of Operations

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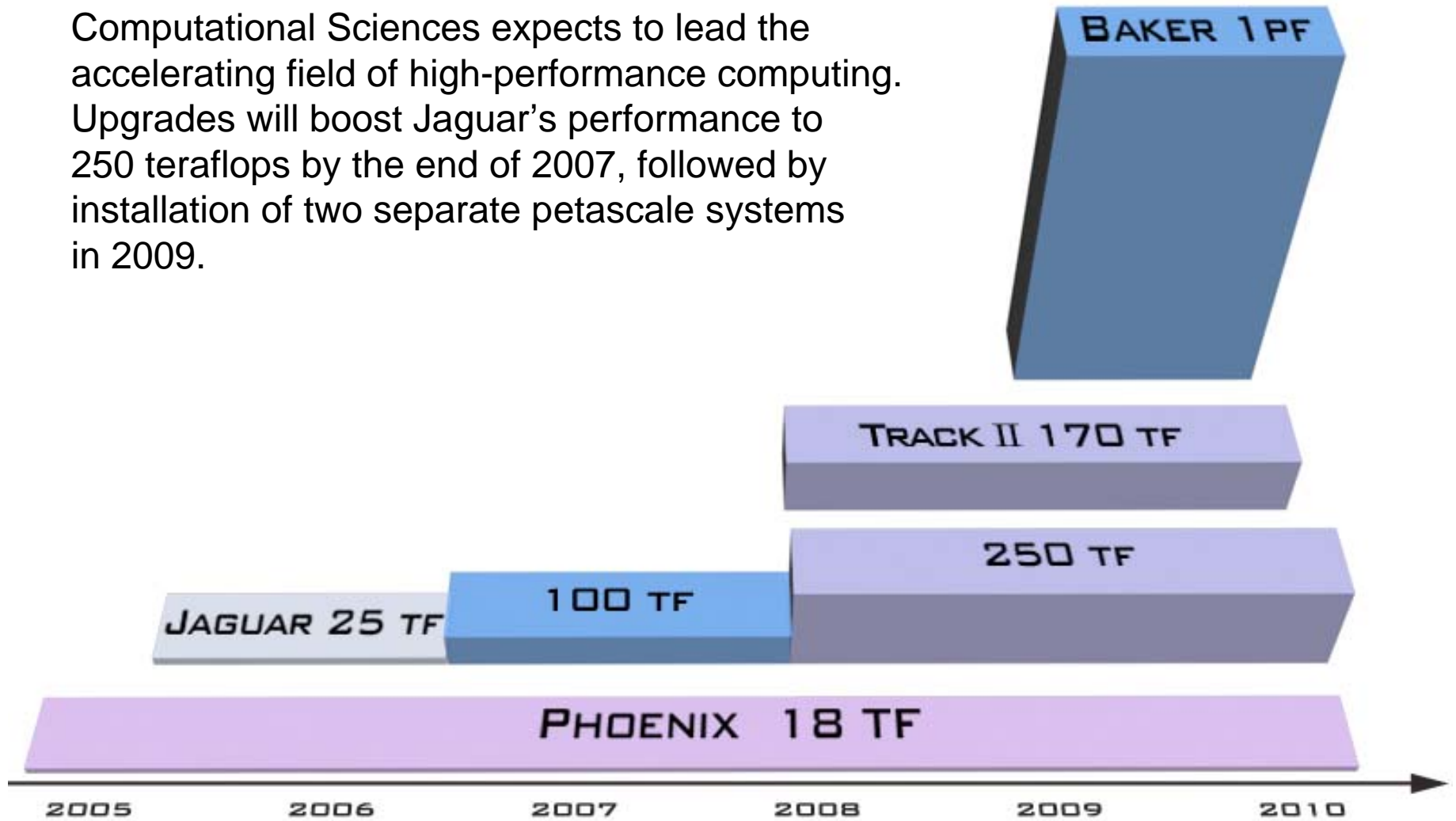


NCCS resources



Hardware roadmap

As it looks to the future, the National Center for Computational Sciences expects to lead the accelerating field of high-performance computing. Upgrades will boost Jaguar's performance to 250 teraflops by the end of 2007, followed by installation of two separate petascale systems in 2009.



Jaguar system specifications

	54 TF	100 TF	250 TF	1,000 TF
Compute processors	5,212 Dual-core 2.6 GHz Opteron	11,508 Dual-core 2.6 GHz Opterons	7,816 Quad-core Opterons	24,000 Multi-core Opterons
SIO processors	82 Single-core 2.4 GHz Opteron	116 Dual-core 2.6 GHz Opteron	124 Dual-core Opteron	544 Quad-core Opteron
Memory per socket/total	4 GB / 20 TB total system	4 GB / 45 TB total system	8 GB / 63 TB total system	32 GB / 768 TB total system
Interconnect bandwidth per socket	Seastar 1 1.8 GB/s	Seastar 2 4.0 GB/s	Seastar 2 4.0 GB/s	Gemini
Disk space	120 TB	900 TB	900 TB	5-15 PB
Disk bandwidth	14 GB/s	5 GB/s	Total 55 GB/s	240 GB/s

Phoenix – Cray X1E

CRAY X1E: 1,024 vector processors, 18.5 TF

- Ultra-high bandwidth
- Globally addressable memory
- Addresses large-scale problems that cannot be done on any other computer



Jaguar – Cray XT4

Today:

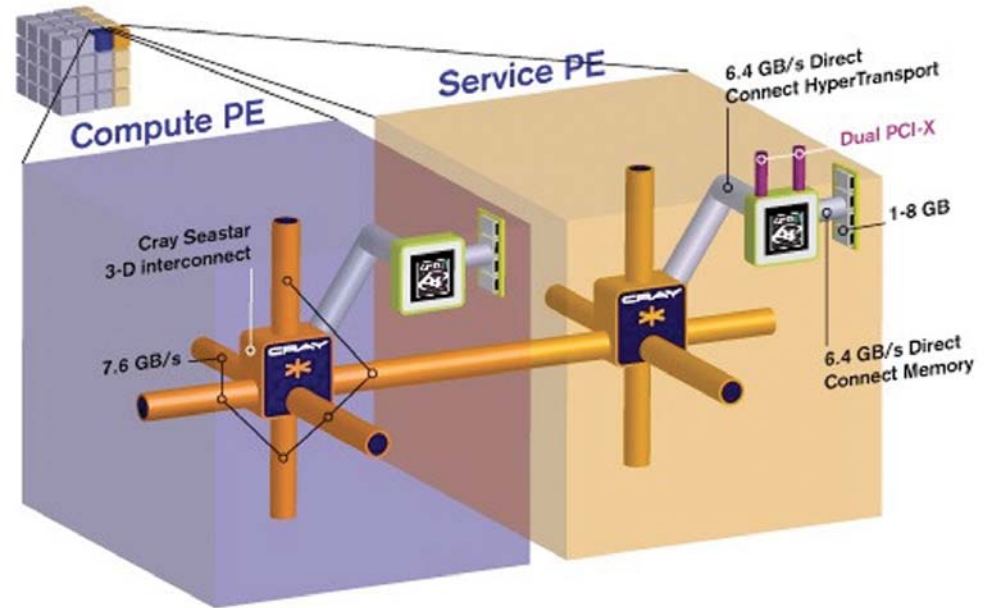
- 120 TF Cray XT4
- 2.6 GHz dual-core AMD Opteron processors
- 11,508 compute nodes
- 900 TB disk
- 124 cabinets
- Currently partitioned as 96 cabinets of catamount and 32 cabinets of compute node linux
- November 2007: All cabinets compute node linux



Jaguar – Cray XT4 architecture

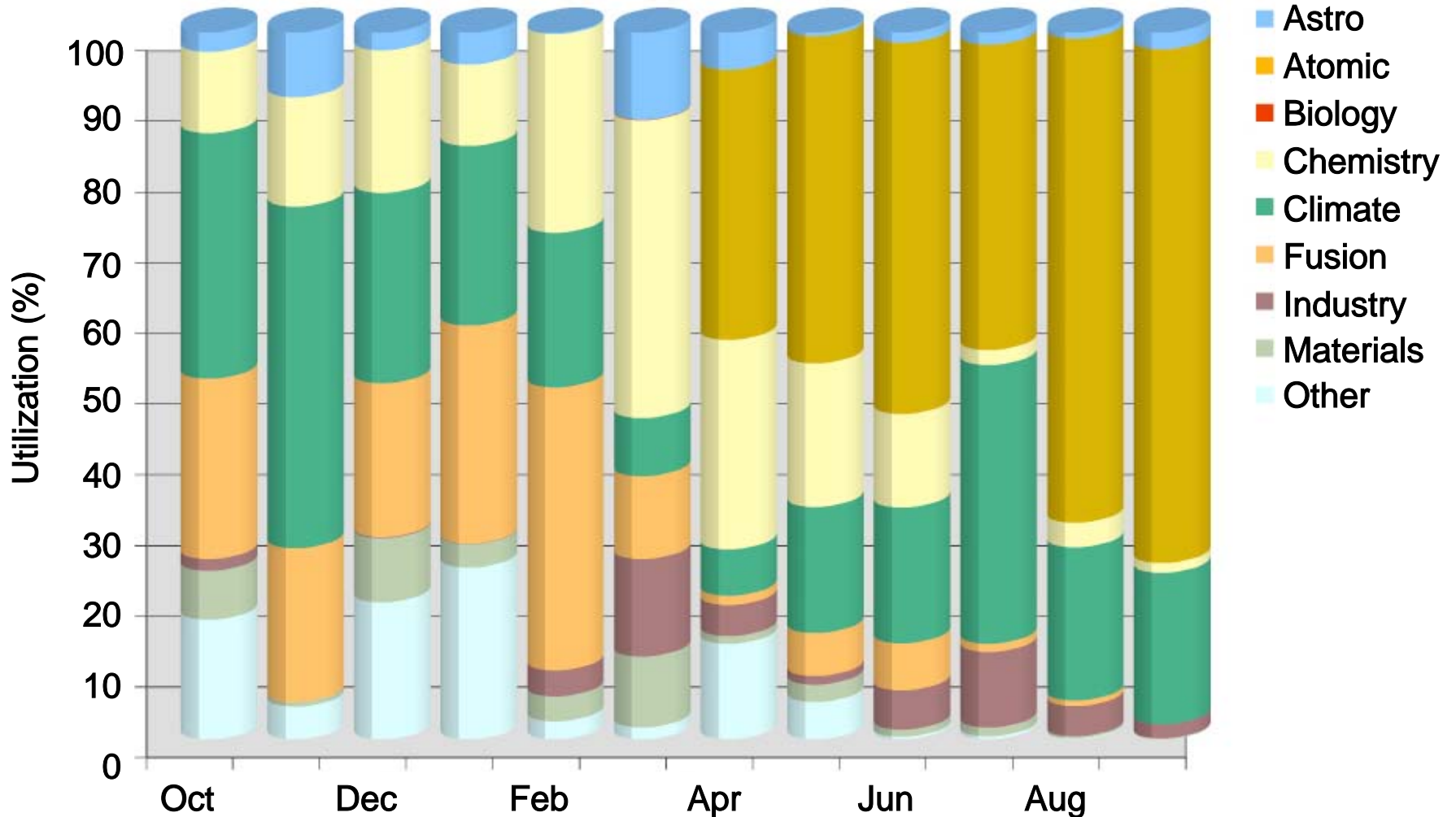
Cray XT4 scalable architecture

- Designed to scale to 10,000s of processors
- Measured MPI bandwidth of 1.8 GB/s
- 3-D torus topology



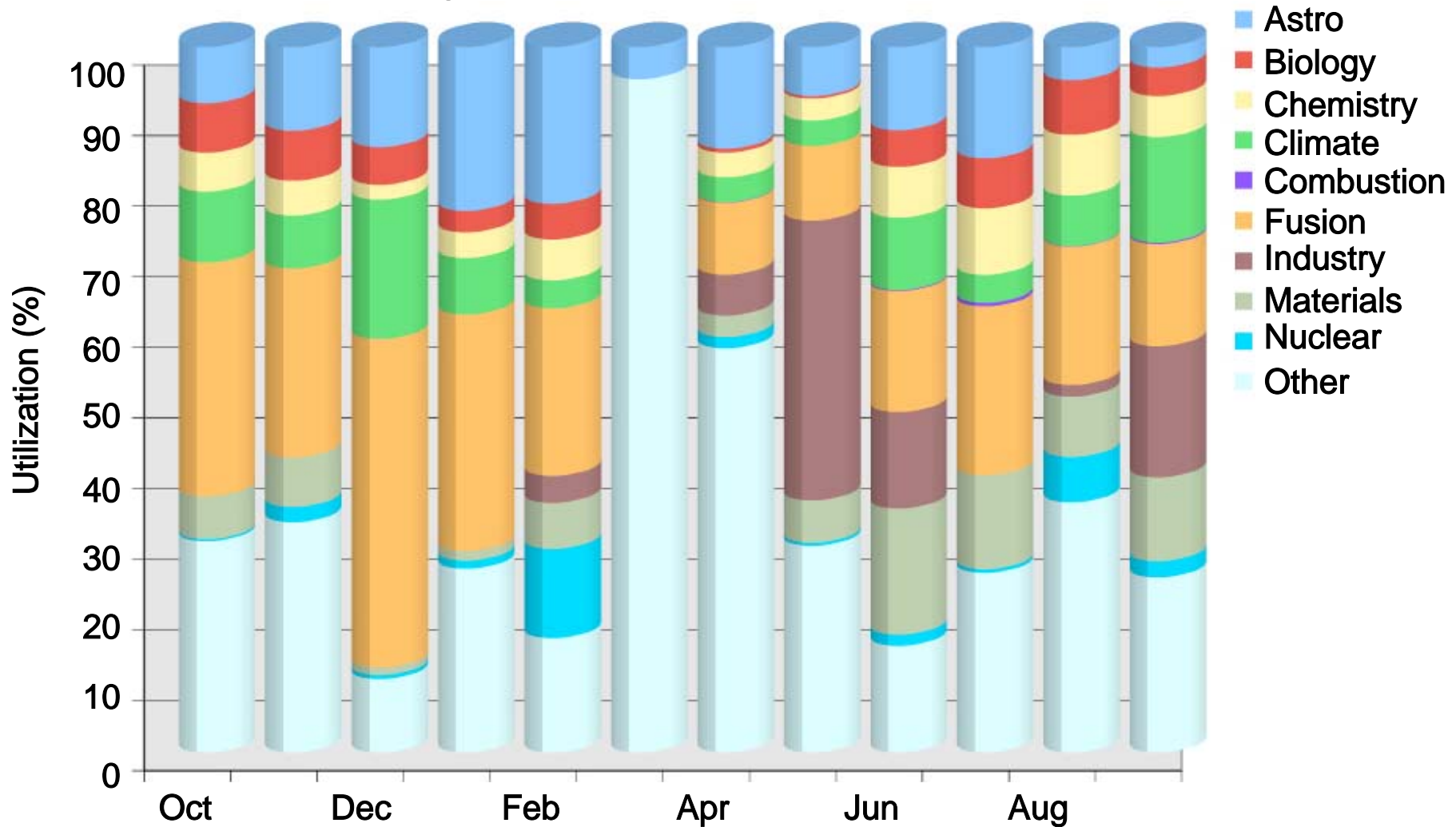
Phoenix - Cray X1E

Phoenix Utilization by Discipline



Jaguar – Cray XT4

Jaguar Utilization by Discipline



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