LA-UR-15-27869
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Title:	HPC - Platforms Penta Chart
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Issued:	2015-10-08

HPC Platforms

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Providing the Massive Scale Computing Platforms our Weapons and other Science Missions

Technology Drivers

Continuing need for more and higher fidelity physics and innovation in computing technology drives the need for constant change in computing platforms. Computing hardware, memory/in system storage, interconnects, OS Software, run times, tools, systems management, monitoring, and more all are under continuous change and that change must be managed at larger and larger scales.

DESCRIPTION

Strategy, Planning, Acquiring- *very large scale computing platforms come and go and planning for immensely scalable machines often precedes actual procurement by 3 years. Procurement can be another year or more.*

Integration- *After Acquisition, machines must be integrated into the computing environments at LANL. Connection to scalable storage via large scale storage networking, assuring correct and secure operations.*

Management and Utilization – *Ongoing operations, maintenance, and trouble shooting of the hardware and systems software at massive scale is required.*

Current Fleet (2015)

Name	Compute Nodes	Peak TF/s	Linux OS	Built	Use
Cielo	8894	1370	CLE/CNL[1]	2010	ASC capability
Luna	1540	473	TOSS[2]	2011	ASC capacity
Typhoon	416	106	TOSS	2010	ASC capacity
Viewmaster	200	26	TOSS	2011	ASC Visualization
Cielito	68	10	CLE/CNL	2010	ASC regression test
Conejo	620	53	TOSS	2010	IC capacity
Hobo	272	38	TOSS	2014[3]	IC data intensive
Mapache	592	50	TOSS	2010	ASC capacity
Mustang	1600	353	TOSS	2011	IC capacity
Moonlight	308	488	TOSS	2012	ASC advanced
Pinto	154	47	TOSS	2012	IC capacity
Wolf	616	205	TOSS	2014	IC capacity
Lightshow	28	3.6	TOSS	2011	ASC visualization
Kugel	96	6.8	TOSS	2013	Virtual machines
Glome	96	6.8	TOSS	2013	Hadoop
Bonanza	2	1.2	TOSS	2014	Research runs, large memory
SCI 1	34	8.3	TOSS	2012	Special purpose
SCI 2	18	6.6	TOSS	2012	Special purpose
SCI 3	80	11.7	TOSS	2009	Special purpose

Software Path Forward

- Efforts with Cray on Trinity Platform for next generation system mgmt, rolling upgrades, power management etc.
- Efforts to understand how to use containers, user specified OS/stack per job, and other improvements,
- "Software Defined System Administration)
- Integrated monitoring being developed to correlate facilities, environments, systems and even app monitoring.

Next Gen Systems Inbound (2016-17)

Trinity:
20,000 node, about 40 PF, 2 PB dram, 4 PB flash, 80 PB scratch storage, Cray Linux
Commodity System Secure:
1800 Node, greater than 1 PF Linux/TOSS,
Commodity System Open:
1600 Node, greater than 1 PF Linux/TOSS,
Quantum Computing testbed:
Dwave System
Crossroads (2020):
200-400 PF in design now

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