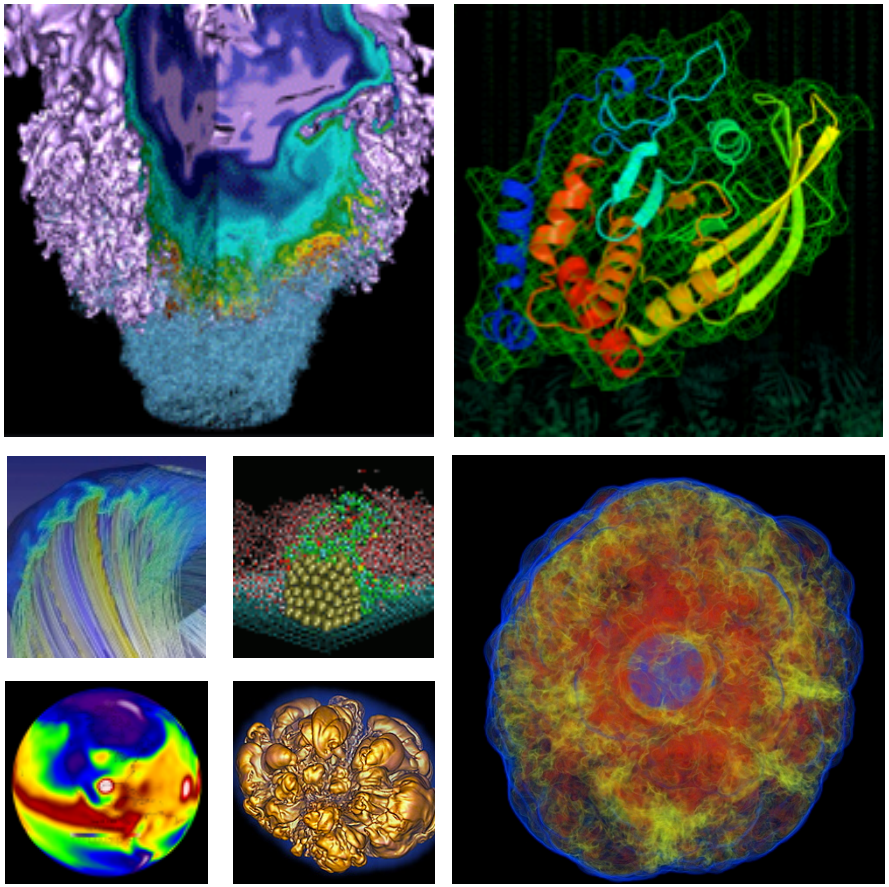
Edison Overview



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Edison Phase I is Here!

From a User Perspective Edison is very similar to Hopper!

Edison Addresses the NERSC Workload Needs

Characteristic	Description	Comment
Processor	Intel Ivy Bridge (Phase 1: Sandy Bridge)	Fast, cutting-edge, commodity processor
Node	Dual-socket, 64 GB 1866 MHz memory	Large memory per node Excellent memory bandwidth
Interconnect	Cray Aries, dragonfly topology	Excellent latency & bandwidth Excellent scaling Adaptive routing eases congestion
Storage	6.48 PB 140 GB/sec I/O bandwidth, 3 file systems	Large, dedicated scratch storage High bandwidth; better metadata

Edison - Cray XC30 Phase 1 [Phase 2]

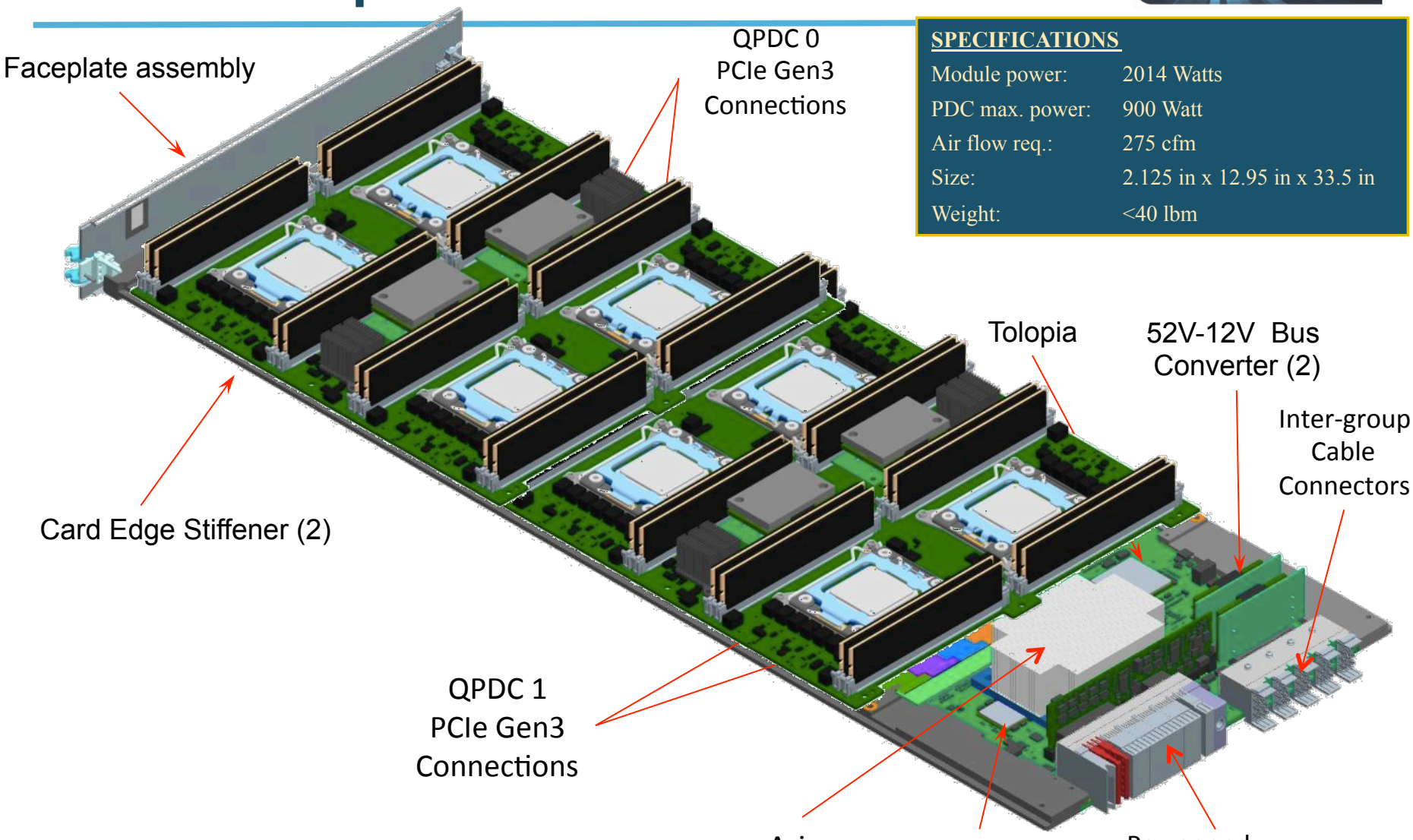
- 10K [104K] compute cores
- Cray "Aires" interconnect
- Two 8-core Intel 'Sandy Bridge' 2.6 GHz processors per node [Phase 2: Ivy Bridge]
- 16 [TBA] processor cores per node
- 64 GB of memory per node @1866 MHz
- 42 [333] TB of aggregate memory
- Edison Phase 1 access Feb. 2013 [Phase 2 in Summer or Fall 2013]

- 4 [TBA] GB memory per core for applications
- 1.6 / 6.4 PB of scratch disk
- CCM compatibility mode available
- Intel, Cray, GNU compilers

Installation Timeline

- **Phase 0**
  - 6 login nodes ✓
  - 1 file system (35GB/s, 1.6PB) ✓
- **Phase 1 (Now)**
  - 4 cabinets with ~10K Sandy Bridge processors ✓
  - Start Phase 1 acceptance test in February ✓
  - Start DARPA Mission Partner Access ✓
  - Add 2 file systems (105GB/s, 4.8PB)
- **Phase 2 (early July)**
  - Add 24 cabinets with Ivy Bridge processors
  - Upgrade first 4 cabinets with Ivy Bridge
  - About 100K cores total
  - Will require downtime of a few weeks

Cascade Compute Blade



SPECIFICATIONS

Module power:	2014 Watts
PDC max. power:	900 Watt
Air flow req.:	275 cfm
Size:	2.125 in x 12.95 in x 33.5 in
Weight:	<40 lbm

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Aries Network

- **Dragonfly Architecture**
- **Configured in 3 ranks:**
  - Rank-1 is chassis level
  - Rank-2 is cabinet level
  - Rank-3 is system level
- **Global bandwidth tuned by number of optical cables (rank-3)**
- **Within a 2 cabinet group**
  - Minimal routing – 2 hops
  - Non-minimal routing – 4 hops

Edison Network Configuration

- **Phase 1**
  - 4-cabinet system consists of 2 fully-populated two-cabinet groups
  - Rank-3: 42-wide bundles of optical cables (42 Optical Cables)
- **Phase 2**
  - 28-cabinet system consists of 14 fully-populated two-cabinet groups
  - Rank-3: 6-wide bundles of optical cables (546 Optical Cables)

Edison Scratch File System (March)

3 Scratch File Systems

2 - 1.6 PB @ 35 GB/sec
1 - 3.2 PB @ 70 GB/sec

- Multiple file systems to reduce contention, improve metadata performance
- One 2X Hopper's size & performance for I/O intensive applications

Cray Sonexon 1600
Lustre Appliance

Edison is also connected to NERSC Global Homes, Global Scratch and Project file systems

External Login Nodes

- Phase 1: 6 nodes, Phase 2: 12 nodes
- Quad processor Sandy Bridge @ 2 GHz
- 512 GB DDR3 memory
- 2 dual-port 10GB ethernet
- 2 dual-port FDR InfiniBand (storage)

Application and Development Environment

- **Edison programming environment is remarkably similar to that of Hopper**
- **Supports production software applications, libraries, and tools needed by the entire NERSC workload**
- **Enables effective application performance at scale, single node (high-throughput computing), and everything in between**

Quick Status

- **Edison Phase I is up and running**
- **Added first early users on Feb. 4**
  - We'll add you now if you're not on yet. Just ask.
- **System has been extremely stable**
  - Batch system software issues persist (not Cray software)
- **Early tests: about 2X Hopper performance per core**
- **Compute**
  - Meeting or exceeding expectations
- **I/O**
  - Not completely there yet (mostly reads and metadata)

Open Issues

- **Intel programming environment is still being configured.**
  - LibSci is not available and users need to use MKL to access LAPCK, SCALAPACK routines.
- **Batch queue issue (Moab)**
  - Some completed jobs stay in the queue long time

Please let us know if you find anything is missing in the Intel programming environment

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