

Xeon E5 series overview

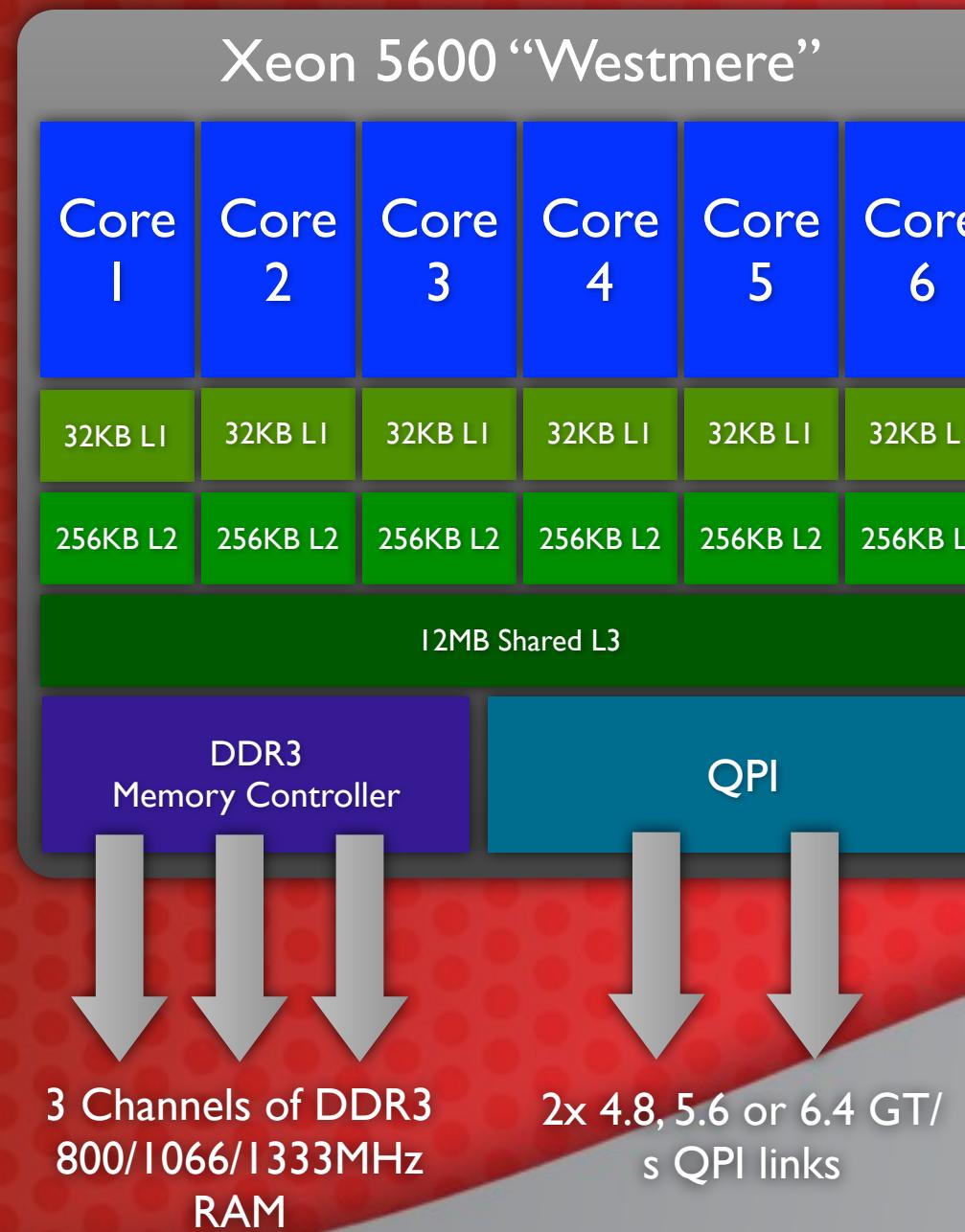
details of the new Intel Xeon E5 “SandyBridge” systems



Overview

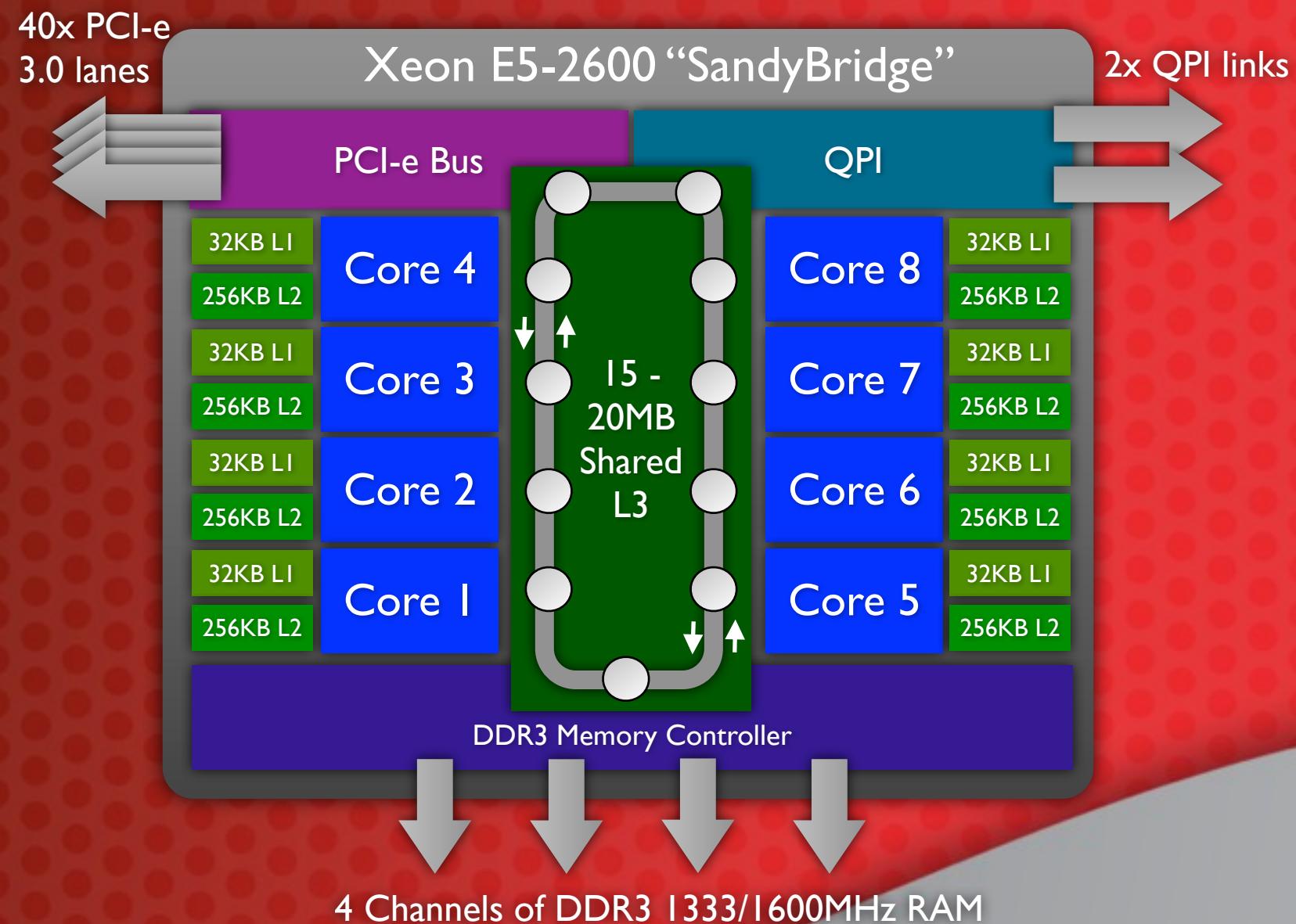
- Architecture
 - CPU / system design
 - Floating point
 - Memory performance
 - Expansion bus
 - Processor SKUs
- Advanced Clustering Systems
 - Compute Blade (IBX260I)
 - 2U 8x hot-swap (2X260IH8)
 - 3U 16x hot-swap (3X260IH16)

Existing Xeon 5600 series CPU



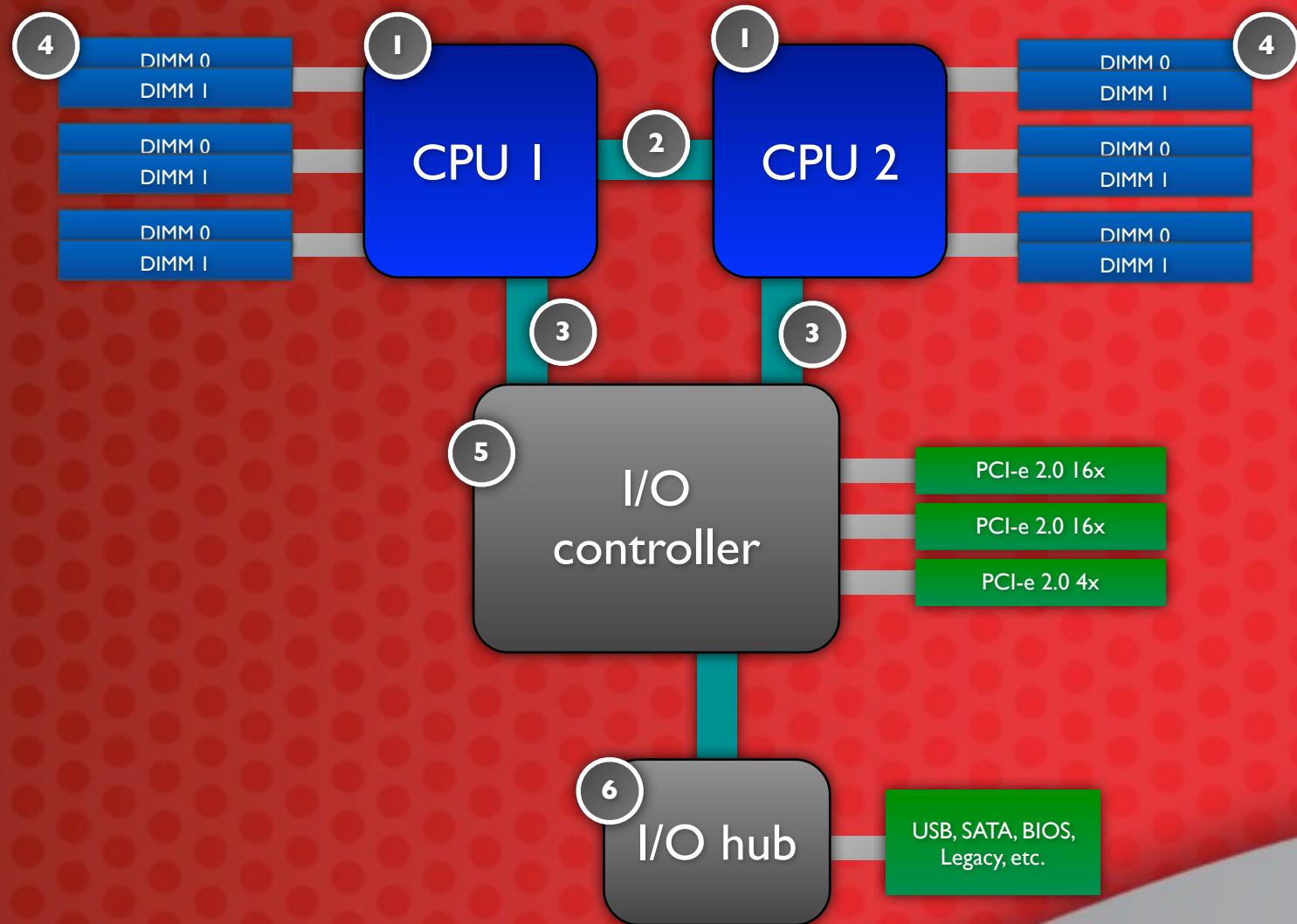
- Processor launched in Q1 of 2010
- Small changes from previous generation 5500 series
- Available in 4 or 6 core variants
- Tri-channel memory controller
- 128bit floating point unit, 4 FLOP/s per cycle

New Xeon E5-2600 series CPU

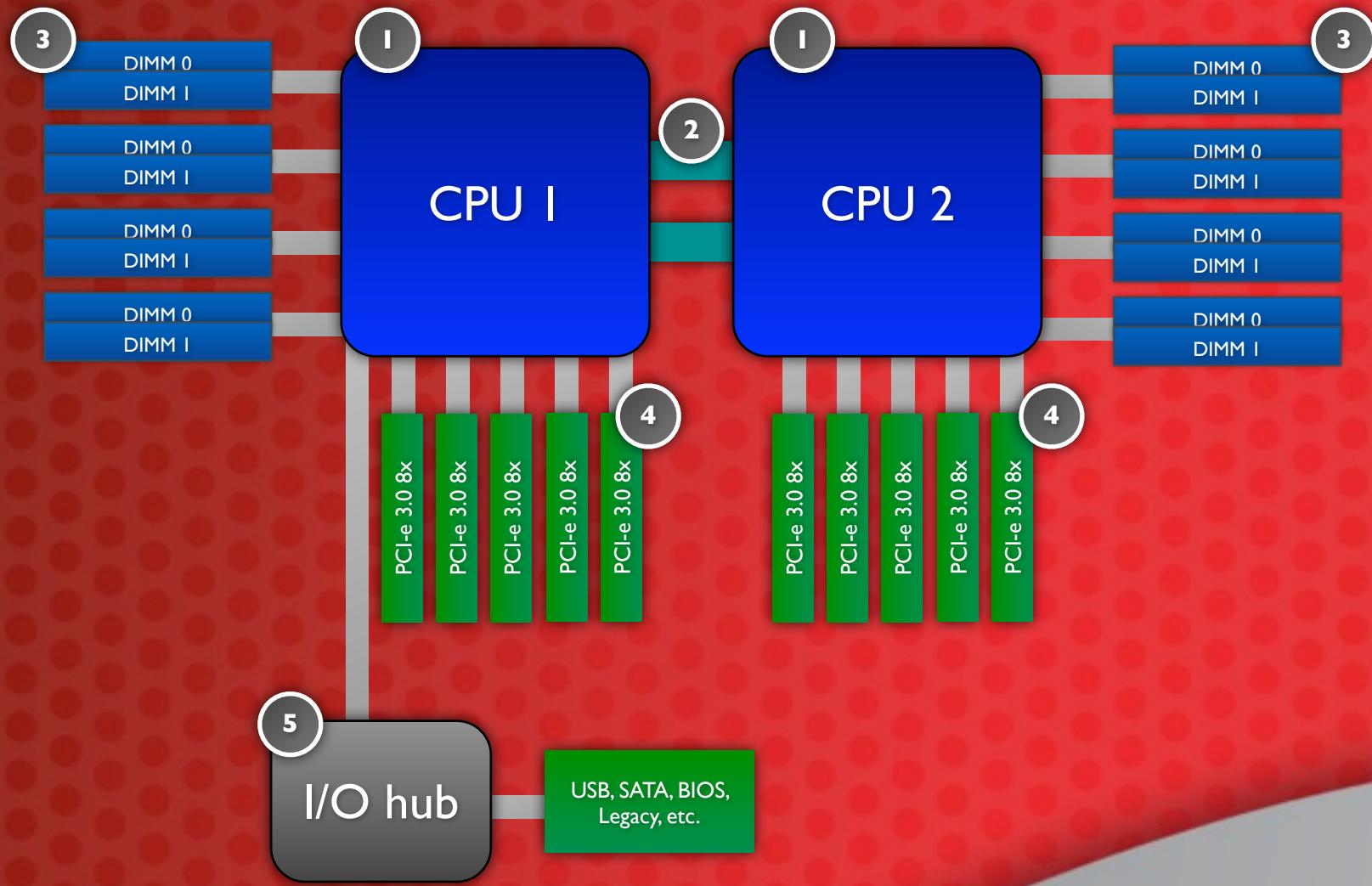


- Expected launch Q1 of 2012
 - Available in 6 or 8 core variants
 - Scalable ring interconnect
 - Quad-channel memory controller
 - 256bit floating point unit, 8 FLOP/s per cycle
 - PCI-e bus integrated into CPU

Existing Xeon 5600 architecture



Xeon E5-2600 architecture

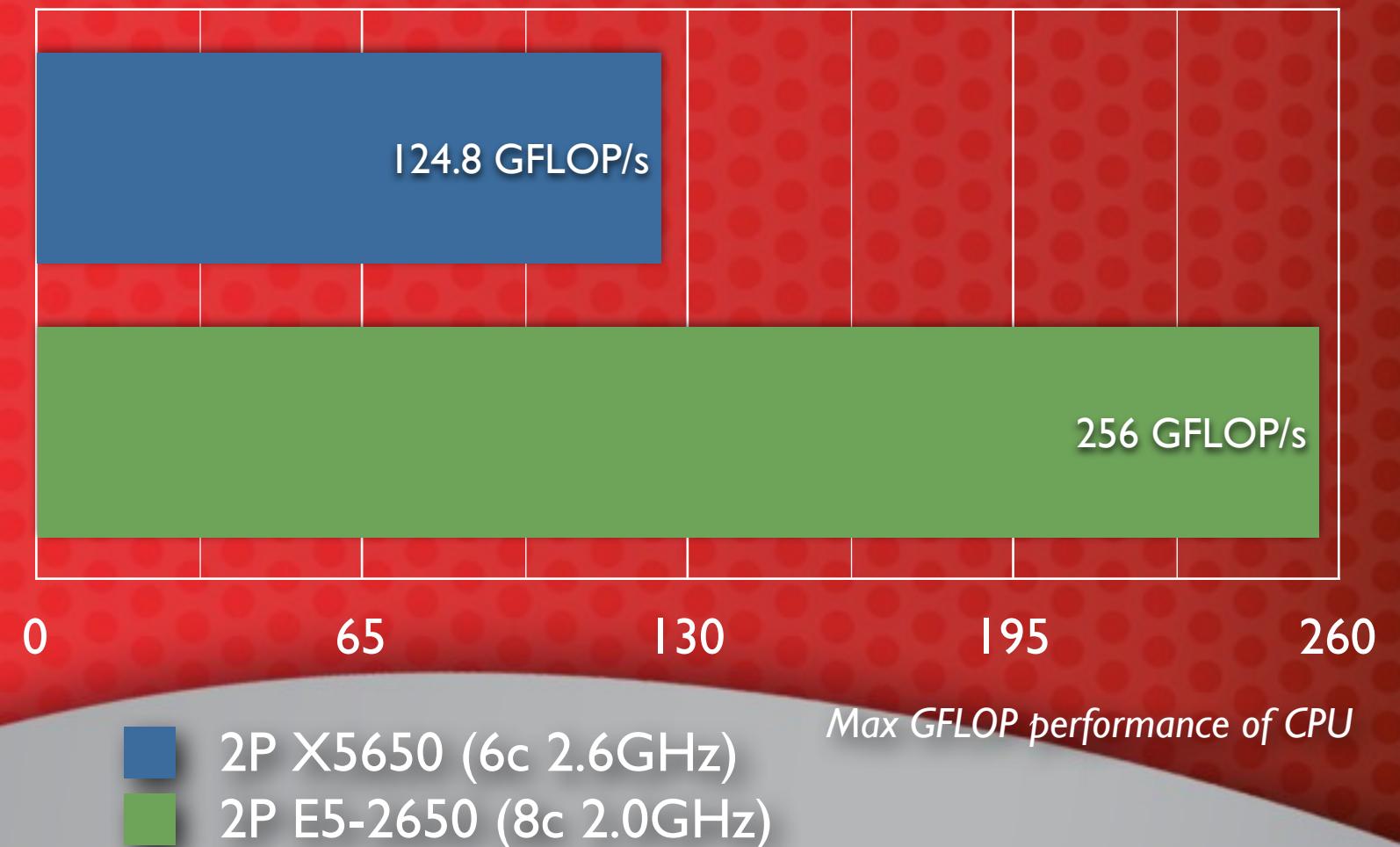


1. 2x Intel Xeon E5-2600 Series Processors “SandyBridge”
2. Dual channel 8.0GT/s QPI link between processors
3. Dedicated quad-channel memory controllers per CPU with 1600MHz max speed
4. Integrated I/O controller per CPU, each provides 40 lanes of PCI-e Gen 3.0 expansion
5. I/O Hub to connect to storage, legacy PCI bus, USB, and more

Floating point

- New 256-bit floating point unit, and AVX instructions **double** floating point performance
 - Previous 5600 can do 4 FLOP/s per cycle
 - New E5-2600 can do 8 FLOP/s per cycle
 - Even with lower clock speeds more floating point performance

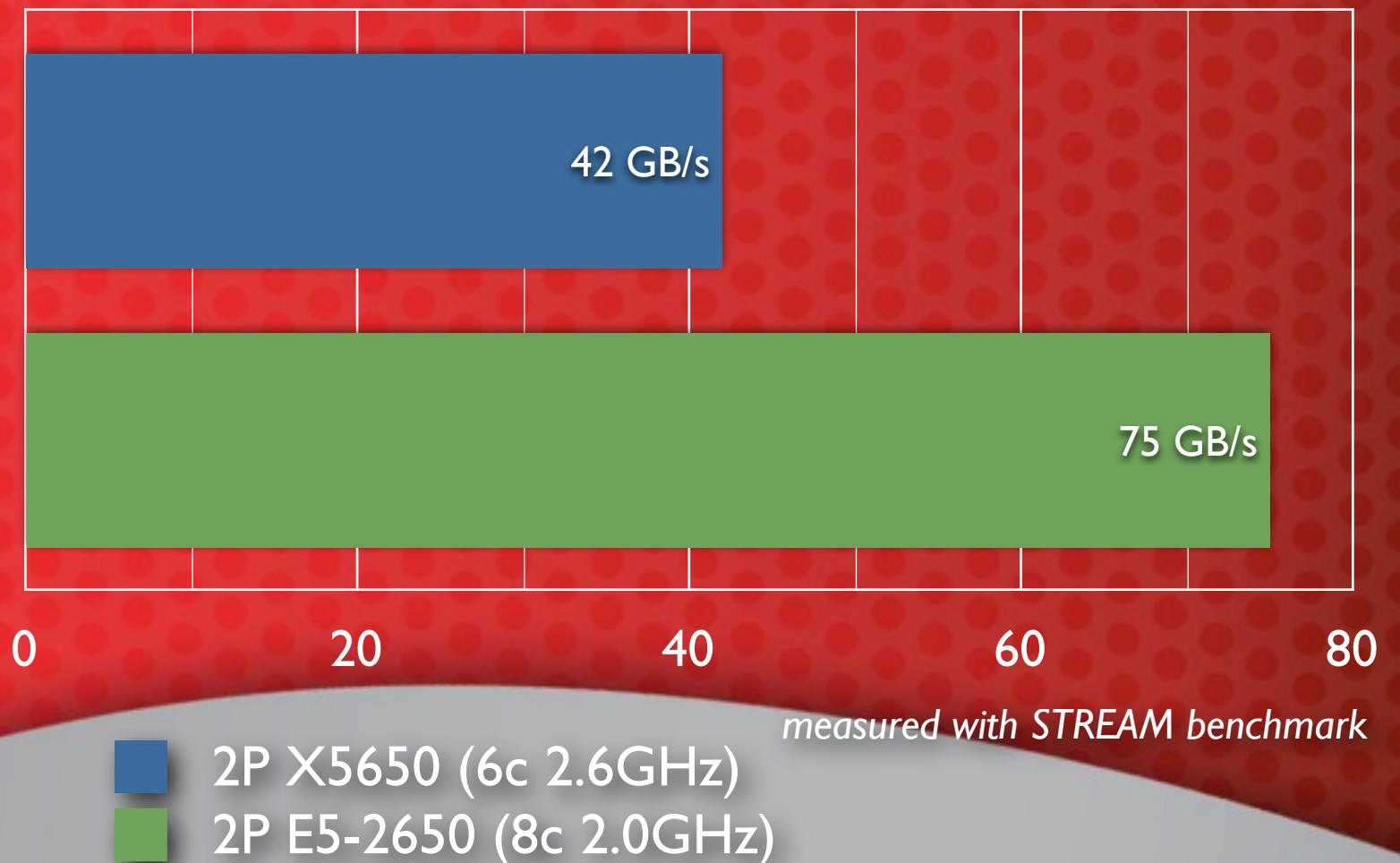
Xeon X5650 system vs E5-2650 system



Memory Performance

- E5-2600 provides quad-channel memory controller per CPU, with 1600MHz RAM support
- Previous 5600 series only tri-channel and 1333MHz
- More DIMM sockets, 16 per server instead of 12 - maximum of 256GB on E5-2600 series
- Support new DIMM technologies for larger capacity in future

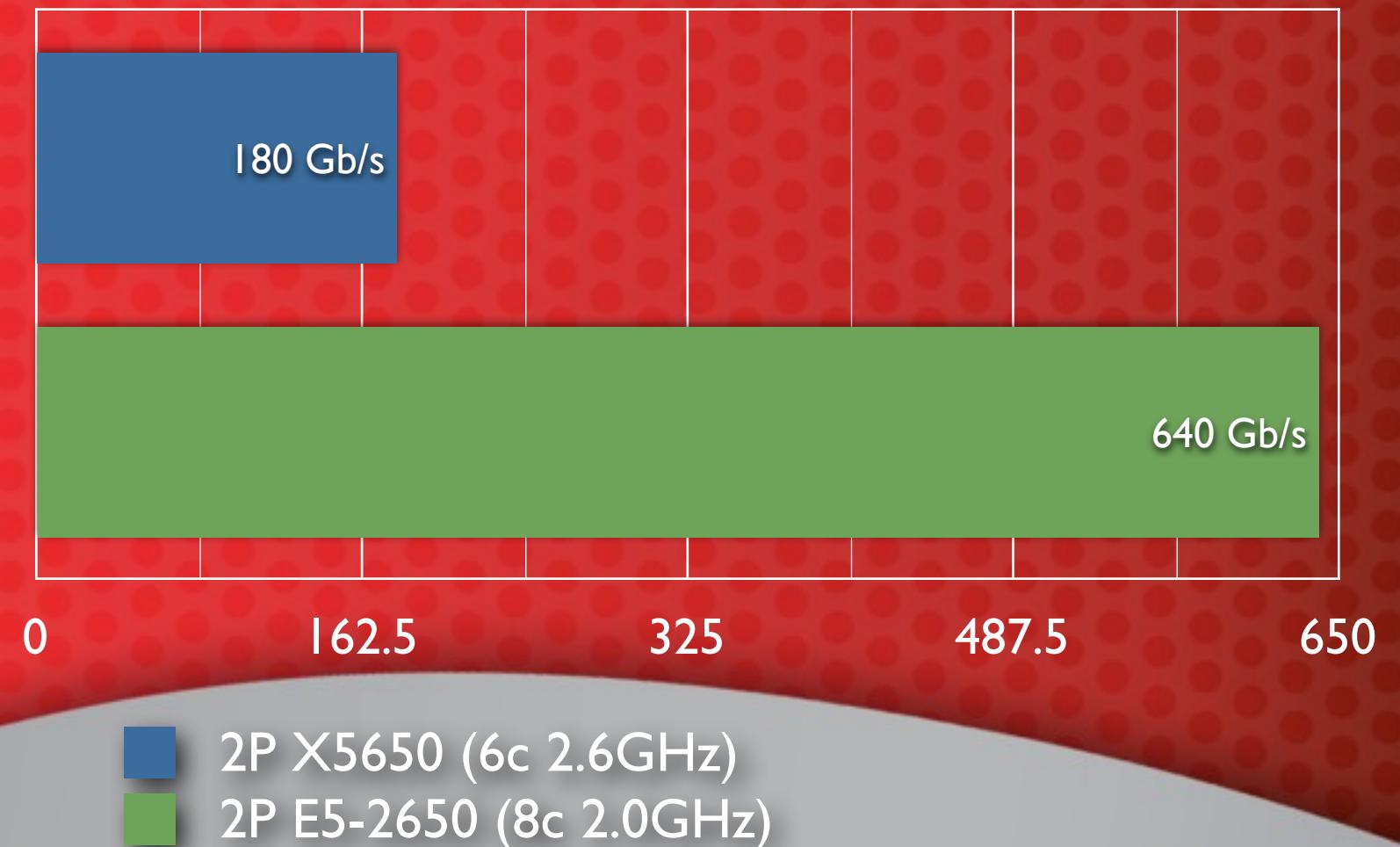
Xeon X5650 system vs E5-2650 system



Expansion Bus

- PCI-e integrated into the CPU lowers latency and increases performance
- 40x PCI-e Gen3.0 lanes per CPU, total of 80x available per system (number and type will vary based on motherboard and chassis)
- Gen 3.0 runs at 8GT/s vs. 5GT/s for PCI-e 2.0

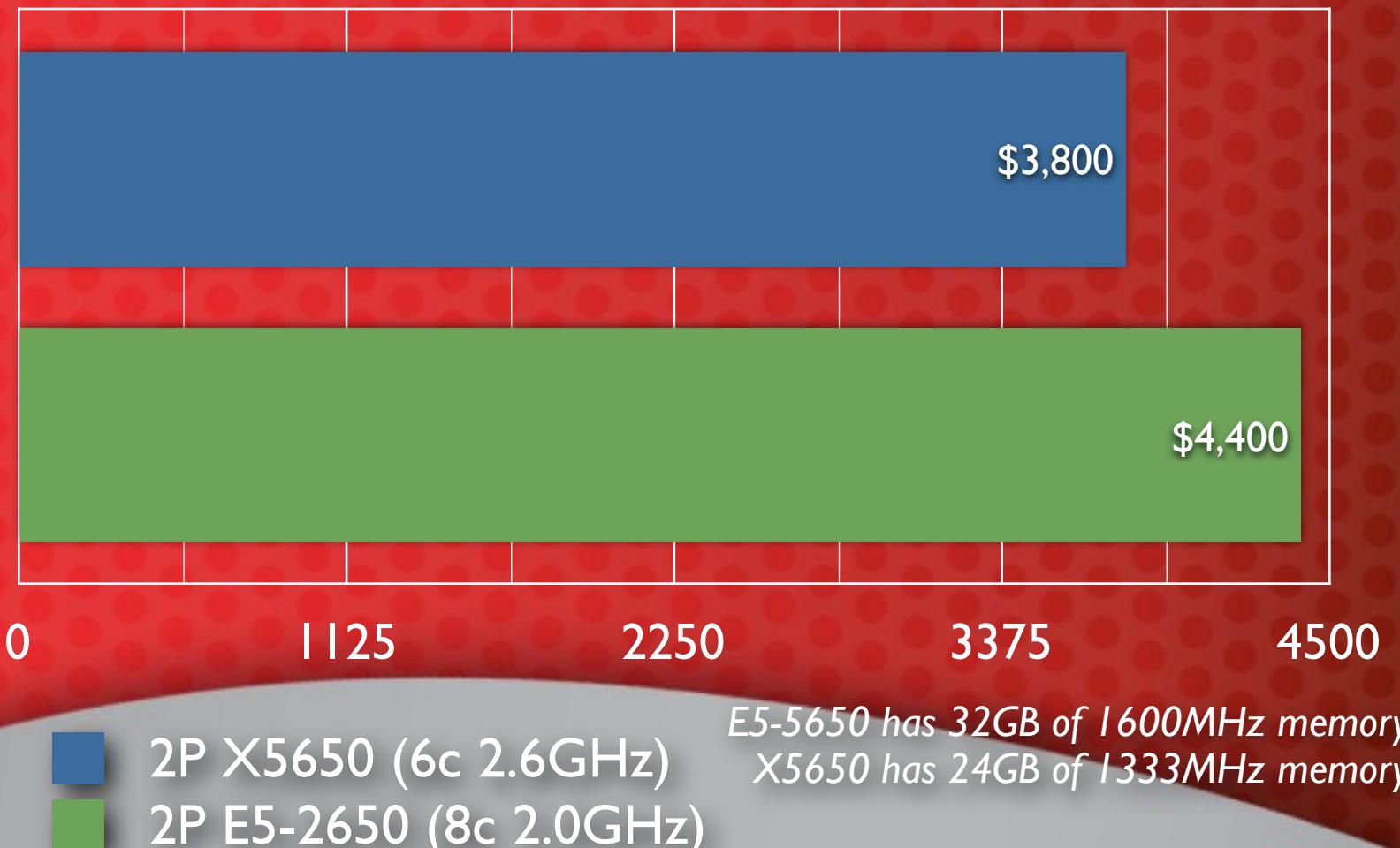
Xeon X5650 system vs E5-2650 system



System Cost E5-2650 vs X5650

- Performance gains for using E5-2650 vs. X5650
 - 106% more FLOP/s
 - 78% more memory bandwidth
 - 255% more PCI-e bandwidth
 - For only 15% more cost

Xeon X5650 system vs E5-2650 system



5600 vs. E5-2600

	Xeon 5600	Xeon E5-2600
Number of CPUs	2	2
Number of Cores CPU/System	6/12	8/16
FLOP/s per cycle	4	8
Symmetric Multi-threading	Yes	Yes
Clock speeds	2.3 - 3.2GHz	2.0 - 2.6GHz
QPI speed	5.6 - 6.4GT/s	7.2 - 8.0 GT/s
L1/L2 cache	32KB / 512KB	32KB / 512KB
L3 cache	12MB	20MB
Integrated memory controller	Yes	Yes
Memory support	DDR3 1333MHz ECC Registered	DDR3 1600MHz ECC Registered
Memory channels CPU/System	3/6	4/8
Maximum DIMMs	12	16
Integrated PCI-e controller	No	Yes
PCI-e Gen 2.0 lanes	36	0
PCI-e Gen 3.0 lanes	0	80
Power draw	95W or 115W	95W, 115W, 135W

Processor SKUs

Standard

E5-5620
6c 2.0 GHz (95W)

E5-5630
6c 2.3 GHz (95W)

E5-5640
6c 2.5 GHz (95W)

- 6 core, 15MB L3 Cache
- 7.2 GT/s QPI
- DDR3 1333MHz

Advanced

E5-5650
8c 2.0 GHz (95W)

E5-5660
8c 2.2 GHz (95W)

E5-5665
8c 2.4 GHz (115W)

- 8 core, 20MB L3 Cache
- 8.0 GT/s QPI
- DDR3 1600MHz

E5-5670
8c 2.6 GHz (115W)

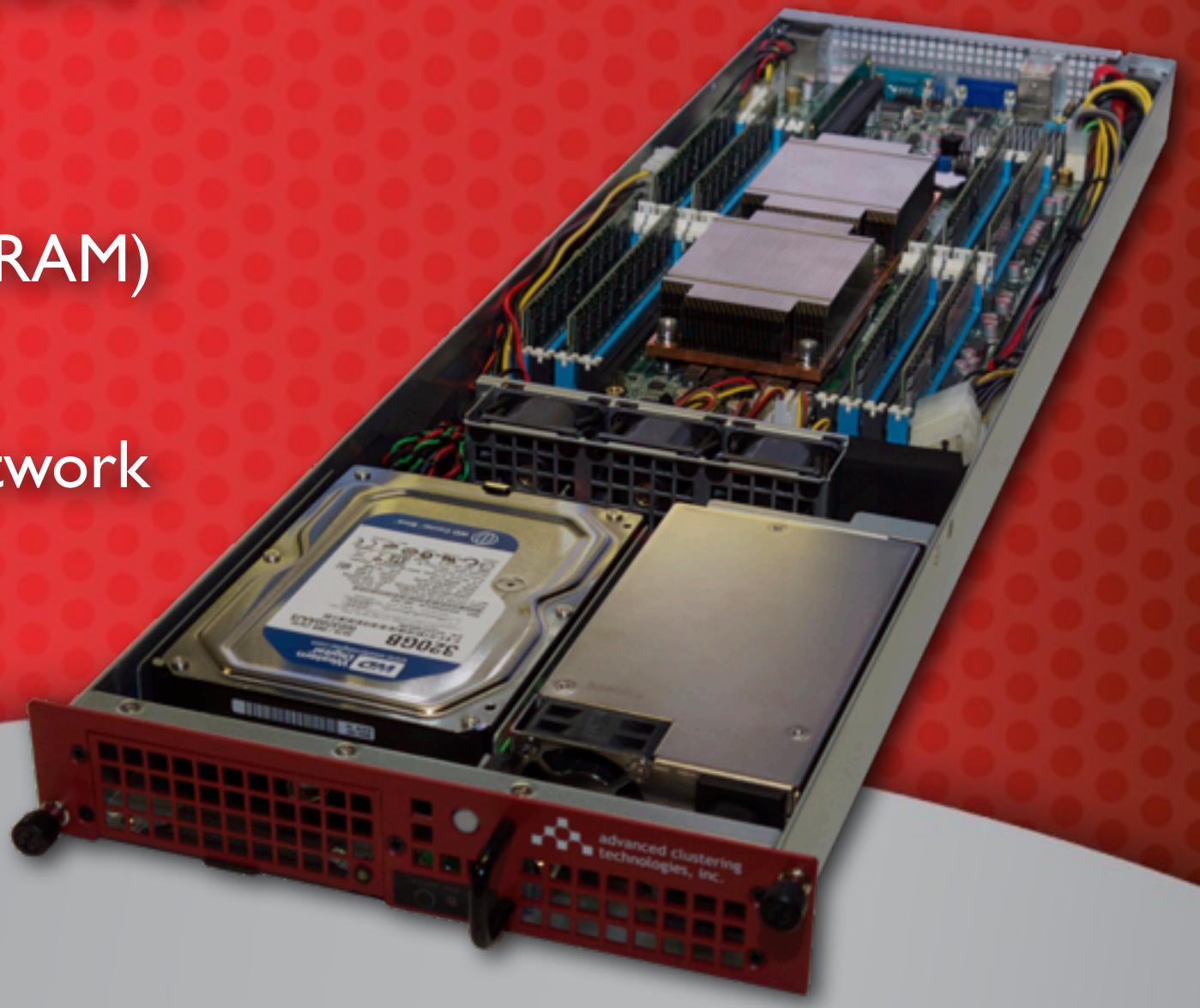
E5-5680*
8c 2.7 GHz (130W)

E5-5690*
8c 2.9 GHz (135W)

* power draw more than 115W could limit server form factor

Pinnacle IBX260I

- Innovative high-density form factor, 2 complete systems in one rack unit (1U)
- 2x E5-2600 series CPUs (6 or 8core) 115W max
- 16x DDR3 DIMM sockets (max 256GB 1600MHz RAM)
- 1x fixed 3.5" drive or 2x 2.5" hot-swap drives
- Dual Gigabit LAN & dedicated IPMI with iKVM network
- Optional Connect-X 3 QDR or FDR InfiniBand
- One free PCI-e Gen 3.0 16x expansion slot



Pinnacle 2X260 | H8



8x hot-swap version



4x hot-swap version

- 2U form factor with 4 or 8 hot-swap drive bays
- 2x E5-2600 series CPUs (6 or 8core) 135W max
- 16x DDR3 DIMM sockets (max 256GB 1600MHz RAM)
- 4x or 8x hotswap SATA/SAS or SSD drives
- Dual Gigabit LAN & dedicated IPMI with iKVM network
- Single or redundant power supplies
- 3x PCI-e Gen 3.0 16x and 3x PCI-e Gen 3.0 8x expansion slots
- Tool-less sliding rails for easy rack installation

Pinnacle 3X260IH|6

- 3U form factor with 16 hot-swap drive bays
- 2x E5-2600 series CPUs (6 or 8core) |35W max
- 16x DDR3 DIMM sockets (max 256GB 1600MHz RAM)
- 16x hot-swap SATA/SAS or SSD drives (optional 2x 2.5" hot-swap in rear of chassis)
- Dual Gigabit LAN & dedicated IPMI with iKVM network
- 3x PCI-e Gen 3.0 16x and 3x PCI-e Gen 3.0 8x expansion slots
- Tool-less sliding rails for easy rack installation



Model comparison



	IBX260I	2X260IH8	3X260IH16
Rack Units	0.5U (2x in 1U)	2U	3U
Number of CPUs	2	2	2
Max CPU wattage	115W	135W	135W
Memory slots	16	16	16
Max memory	256GB	256GB	256GB
Drive configuration	1x 3.5" or 2x 2.5"	4 or 8x 3.5"	16x 3.5" + 2x 2.5"
Max diskspace	2TB	24TB	48TB
Hot-swap drives	2.5" only	Yes	Yes
Networking (std)	2x GigE	2x GigE	2x GigE
InfiniBand support	QDR or FDR onboard	add-in card only	add-in card only
Management	IPMI 2.0 + iKVM	IPMI 2.0 + iKVM	IPMI 2.0 + iKVM
Power supply	500W fixed	600W fixed or 660W redundant	840W redundant

Coming soon...

- Intel Xeon E5-4600 series
 - 4 socket, 6 or 8 core per socket (24 or 32 core system)
 - 40x PCI-e Gen 3.0 lanes per socket (160 lanes per system)
 - 512GB of 1600MHz RAM per system
 - Much lower cost than previous 4 socket Intel systems
 - Launch Q2 2012

