










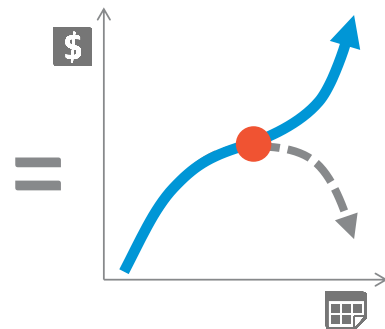
The Machine: The future of technology

DeiC Konference 2015

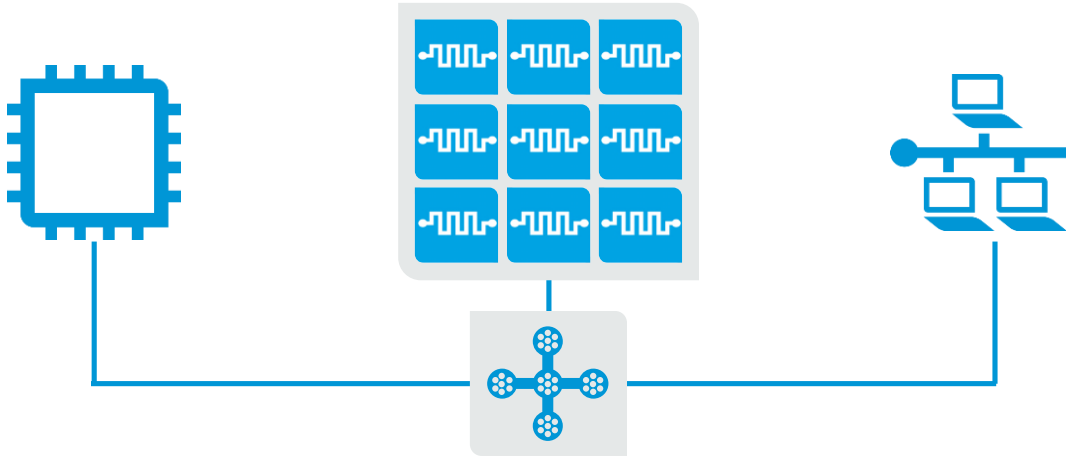
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What are the questions you can't ask today?

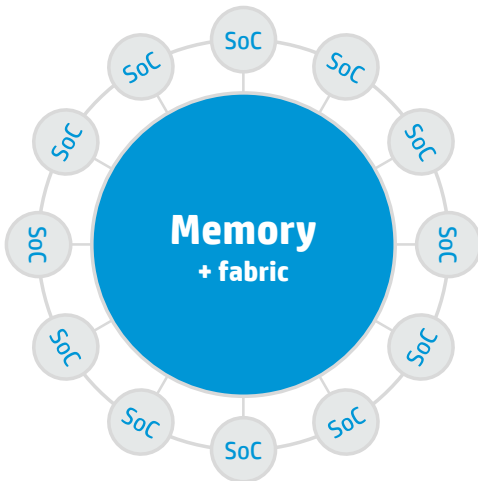
- Magnitude of the data 
- + Flash flooding of legacy data bases 
- + Unable to secure 
- + Time consuming data integration 
- + Real-time insight needed 
- + Insufficient resources 
- + The end of cheap hardware 



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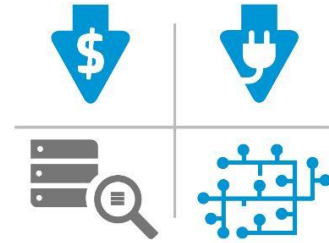
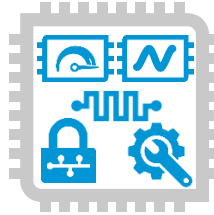
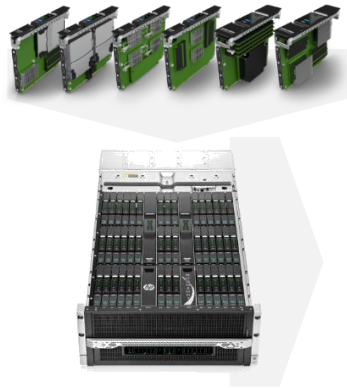


Memory-Driven Computing

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Special purpose cores 

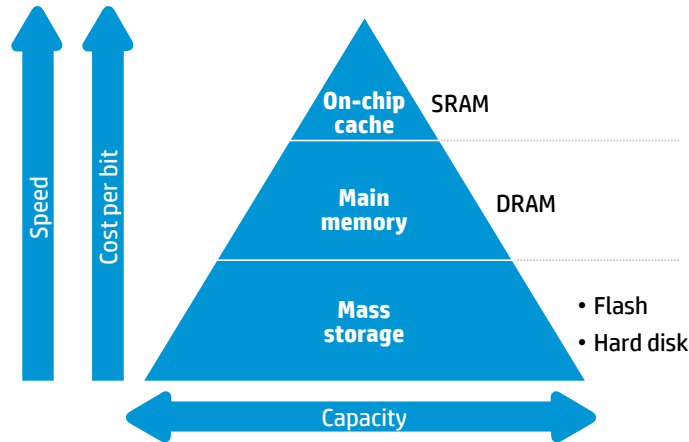


Customize the hardware to the workload



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Massive memory pool 



Universal memory obsoletes this hierarchy



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Imagine if a computer ran at human speed ...

Processor cycle  1 second

Time to retrieve a byte from ...

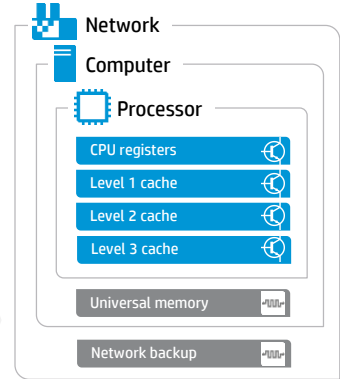
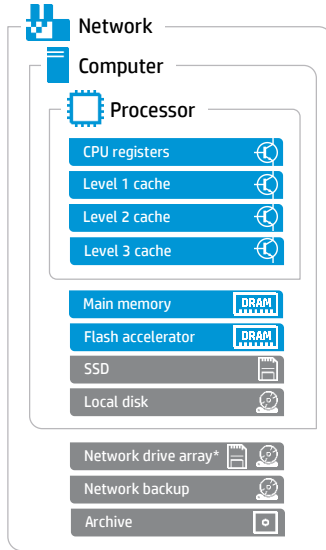
SRAM  5 seconds

DRAM  2 minutes

Flash  1 day

Hard drive  2 months

Tape  1,000 years!



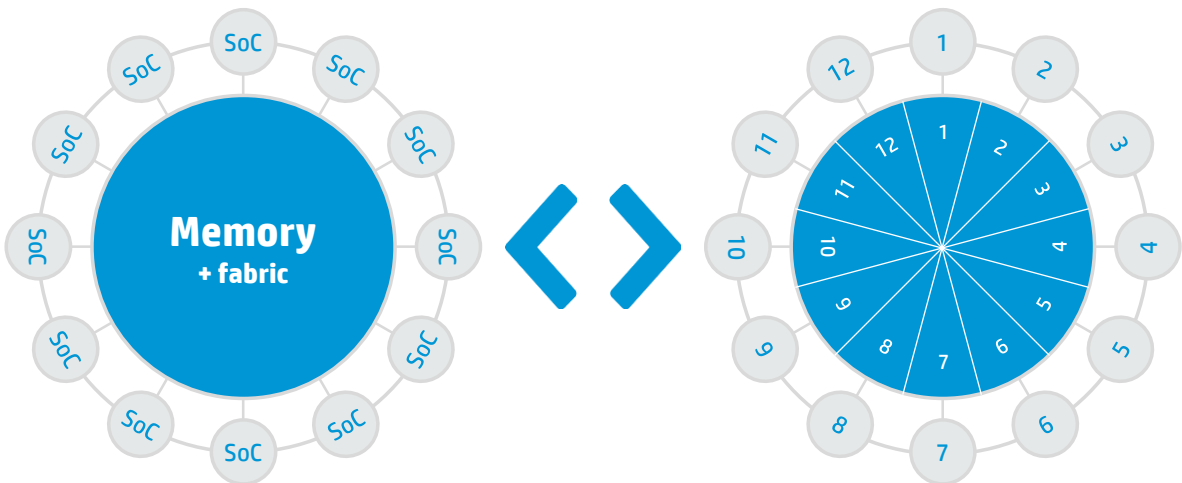
Volatile
Non-volatile

* actually an entire computer system with its own hierarchy

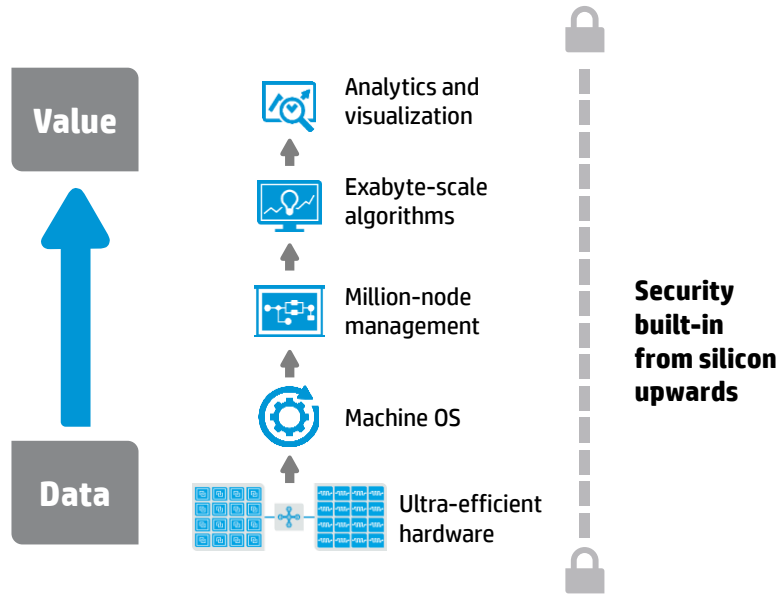


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Scale up and out simultaneously



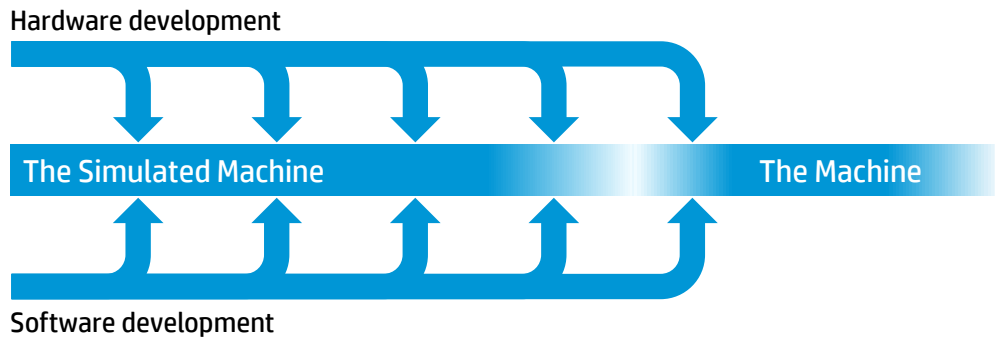
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Hardware/software co-development

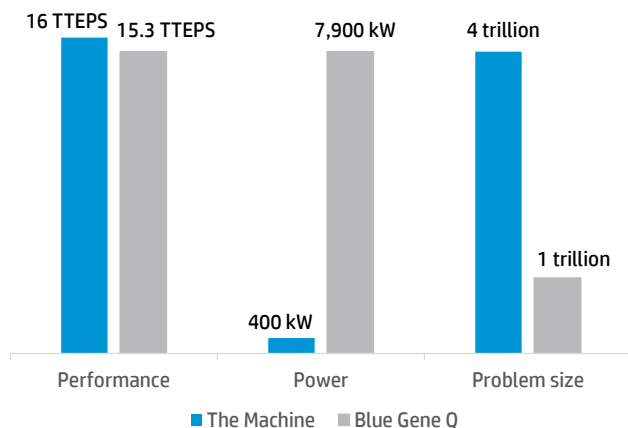


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Performance estimates – graph traversal

What could you do if you could traverse 16 trillion graph edges per second?



Graph 500-like workload

Sequoia, Blue Gene Q at Livermore

64,000 nodes, > 1M cores total

HP – The Machine

20 racks, 256 SoCs / rack, 122k cores total

256 GB NVM per SoC, 1.3 PB total

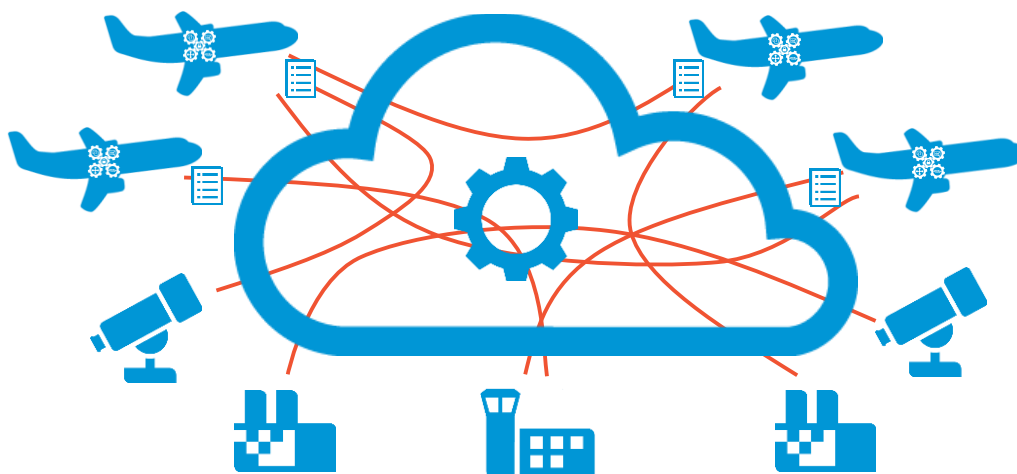
256 NICs per rack, 2*100 Gbps links / NIC

Utilization < 70%



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A mesh of connected aircraft ...



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Future History



- Physical infrastructure of Core prototypes established
- Open Source Machine OS SDK and emulators released
- ISV Partner collaborations begin
- Edge devices begin sampling
- Machine OS enters public beta
- Core devices at volume
- Machine available as product, service, and as a business process transformation

2014

2015

- Memristor media controller, protocols and standards established
- SoC Partners selected for co-development
- Machine OS development begins
- Fast NVRAM DIMMs available
- Integrated core technologies demonstrated
- Edge devices ship in volume
- Core Machines running real-world workloads at scale
- Machine OS released
- Distributed mesh cloud goes mainstream

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This changes everything

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