HP Project Moonshot

Market defining innovation & technology

Chung, Suk Won – 1st Oct

Hyperscale BDM

HP Korea
HP Moonshot System

Designed for the data center, built for the planet

The world’s first software defined server accelerating innovation while delivering breakthrough efficiency and scale
A new era of accelerated innovation

Forever changing how consumers and businesses interact, enabling new opportunities

Growing Internet of Things (IoT)

Pervasive Connectivity | Smart Device Expansion | Explosion of Information

2013
- 416,340 tweets
- 23,148 apps downloaded
- 400,710 ad requests

60 sec
- 2000 lyrics played on Tunewiki
- 1,500 pings sent on PingMe
- 208,333 minutes Angry Birds played

By 2020
- 30 Billion Devices
- 40 Trillion GB
- Mobile Apps
- 10 Million

A new style of IT required for IoT solutions

(1) IDC Directions 2013: Why the Datacenter of the Future Will Leverage a Converged Infrastructure, March 2013, Matt Eastwood ; (2) & (3) IDC Predictions 2012: Competing for 2020, Document 231720, December 2011, Frank Gens; (4) http://en.wikipedia.org

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New style of IT required for IoT solutions

Extreme scale and optimal efficiency needed for unique, differentiated IoT solutions

Virtualized & predictable

<table>
<thead>
<tr>
<th>IT</th>
<th>Hundreds Apps</th>
<th>Thousands Devices/Users</th>
<th>Support Business</th>
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<tbody>
<tr>
<td>Specialized &amp; unbound</td>
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Today’s Servers Per Year

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<th>Source: HP internal analysis</th>
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- **$10-20 Billion** (1)
  - Datacenter build costs

- **8 to 10** (2)
  - New power plants

- **2 Million** (3)
  - US Homes of power used

Source: HP internal analysis

(1) Datacenter build costs
(2) New power plants
(3) US Homes of power used
The world’s first software defined server
A modern architecture engineered for the new style of IT

Moonshot Architecture
8:1 Scaling*

Software Defined Servers
8x Efficiency*

Innovation Pace
3x Faster*

HP Moonshot System

*Source: HP internal analysis
Faster innovation and unprecedented efficiency

Moonshot architecture - the essential foundation for the new style of IT

**Scale**

- 80% Less space
- 77% Less cost

**Efficiency**

- 89% Less energy
- 97% (1) Less complexity

**Managed as one**

- Max work/watt
- Integrated fabrics

$195M (2)

Infrastructure savings per year

18,000 (3)

Less cars per year (CO2 equivalent)

Source: HP internal research
HP Moonshot 1500 Chassis front view

The essential foundation for the new style of IT

45 hot-plug cartridges
- Single-server = 45 servers per chassis
- Quad-server = 180 servers per chassis (future capability)

Compute, Storage, or Combination x86, ARM, or Accelerator

Dual low-latency switches
- HP Moonshot-45G Switch Module (45 x1Gb downlinks)
- HP Moonshot-180G Switch Module (180 x1Gb downlinks) - future availability
Servers tailored and tuned for specific workloads
Delivering on the promise of software defined servers

Workloads
- Dedicated Hosting
- Web Front End
- MemCache
- Big Data
- Desktop Infrastructure
- Accelerators
- And more...

Optimized

Revolutionary cartridge design enabling business breakthroughs

Advanced

77% (1) Lower TCO for dedicated hosting

Source: HP internal analysis
Redefining customer and partner programs

Moonshot delivers breakthrough innovation, solutions and support

**HP Pathfinder Innovation Ecosystem**
- 3x Faster Time to Innovation
- Customer Need
- Analyze Application
- Launch Solutions
- Optimize Server
- 4x the Solutions

**Leading technology partnerships**
- Couchbase
- ubuntu
- CALIX
- Texas Instruments
- ARM
- Citrix
- Vertica
- SUSE
- AMD
- Red Hat
- Applied Micro
- Intel
- Cloudera

**Solution Builder program**
- Reference Architectures
- Expertise
- Community

**Moonshot Concierge Support**
- HP Discovery Lab
- Service & Consulting
- Acquire on your terms

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Faster innovation unlocking new opportunities

Upcoming software defined servers

**Today**
- **Atom x86**
  - 1x2C/2GHz•8GB
  - Web & Hosting
  - Analytics
  - NoSQL/NewSQL

**Near future**
- **GPU/x86**
  - 4x4C/1.5GHz•8GB
  - Content delivery
  - Client & Gaming
  - Video processing

- **DSP/ARM32**
  - 4x4C/1 GHz•8GB
  - Voice recognition
  - VoIP/LTE
  - Seismic proc'ing

- **ARM32**
  - 4x4C/1.4GHz•4GB
  - Web & Hosting
  - Analytics
  - NoSQL/NewSQL

**Future**
- **Dedicated / Virtual Hosting**
- **Web Front End**
- **Analytics**
- **Telco**
- **Financial Services**
- **FPGA**
History of HP innovations with proven leadership

Defining new markets and business opportunities

Proven HP engineering

- SystemPro
- ProLiant
- BladeSystem

x86

x86 Rack

x86 Blade

Software Defined Server

1st

Leading partnerships

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More Information

- www.hp.com/go/moonshot
- www.hp.com/go/moonshot/videos
What’s Next?
NREL Selects Partners for New High Performance Computer Data Center

Cross section view into ESIF and the high performance computing data center. Photo courtesy of SmithGroup JJR.

NREL to work with HP and Intel to create one of the world’s most energy efficient data centers.

September 5, 2012

The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) has selected HP and Intel to provide a new energy-efficient high performance computer (HPC) system dedicated to energy systems integration, renewable energy research, and energy efficiency technologies. The new center will provide additional computing resources to support the agency’s mission to develop more efficient and renewable energy solutions.