Connected devices are changing business processes and people’s lives
Intelligence everywhere…
Everyday devices are infused with intelligence that is updated in real time.

...constantly connected.
Everything we own is connected to the Internet.

Enable Business to create entirely new value propositions
Intelligence everywhere…

Everyday devices are infused with intelligence that is updated in real time.

…constantly connected.

Everything we own is connected to the Internet.

The “Consumer” IoT

- Smart Home
- Wellness
- Home Security

The “Industrial” IoT

- Smart Grid
- Smart Building
- Support Automation
- Demand-Driven Supply Chain
Connected Printers: Instant Ink
Example Turning Printers into Connected Devices.

Connected Printer
Printers work seamlessly in both standard and Instant Ink modes

Ink cartridges
Larger cartridges. Lower intervention

Cloud solution
Fraud prevention, account management, supplies triggering, usage tracking, fault tolerance

E-commerce
Seamless integration from customer billing to Retail partner compensation

Supply Chain
Optimized supply chain designed to ensure ink is delivered before customer runs out

Never Run Out of Ink
$600 annual savings*
For frequent printing

Higher Satisfaction
More Eco-Friendly

Your printer tells us when to send ink

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Connected HealthCare

IT considerations

1. Security/privacy issues
2. Wireless networks insufficient for volume
3. Sensors may not work as advertised
4. Enterprise service bus
5. Data storage capacity was insufficient (speed, volume, cost)
6. Analytics and dashboards required
7. Cross-enterprise/ partner access

Existing systems
- Patient Data
- Employee Data
- Scheduling

Dashboards and analytics
Mobile access
Operational
Partner access

Analytics solution

Sensors

Security/privacy issues
Wireless networks insufficient for volume
Sensors may not work as advertised
Enterprise service bus
Data storage capacity was insufficient (speed, volume, cost)
Analytics and dashboards required
Cross-enterprise/ partner access
Data explosion outpacing technology

Next-generation competitive advantage delivered through:

- Business insight at real-life speeds
- Personalized content that follows you
- Questions that arise automatically from data


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The value will come from the information that’s hardest to manage

<table>
<thead>
<tr>
<th>Wearable</th>
<th>Type of data generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headband</td>
<td>Brain sensing headband</td>
</tr>
<tr>
<td>Glasses</td>
<td>Augmented reality</td>
</tr>
<tr>
<td>Ear-mounted cameras</td>
<td>Live streaming of select content</td>
</tr>
<tr>
<td>Mood sweater</td>
<td>Projects my mindset in advance</td>
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<td>Gait-sensing shoes</td>
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10% structured data

90% human interaction data
The value will come from the information that’s hardest to manage

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<table>
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<tr>
<th>Challenge</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Privacy/Security</td>
<td>A view into what is actually going on</td>
<td>Passive oversharing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data protection</td>
</tr>
<tr>
<td>Identity</td>
<td>Knowing what is what</td>
<td>Loss of ‘identity’, people become a network address</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Speed</td>
<td>Unemployment</td>
</tr>
<tr>
<td>Decisions</td>
<td>Automation takes latency out of response</td>
<td>Loss of freedom and understanding</td>
</tr>
<tr>
<td>Culture</td>
<td>Gamification</td>
<td>Big Brother</td>
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10% structured data

90% human interaction data
"We can't solve problems by using the same kind of thinking we used when we created them."

Albert Einstein
Distributed Mesh Computing

Scale and Performance at the Core, Ultra Efficiency at the Edge, Analytics Throughout

Content consumption

- Analytics and visualization
- Exabyte-scale algorithms
- Million-node management
- Distributed data sources
- Ultra-efficient hardware

Physical

Value

Data

Digital

Security built-in from silicon upwards

• Mobile
• Context-aware

Ultra-efficient hardware

Scale and Performance at the Core, Ultra Efficiency at the Edge, Analytics Throughout
Key Principles for Distributed Mesh Computing

Different Design Patterns Require Different Architecture Priorities

Key Principles:
- Distribute compute and storage everywhere
- Move data and/or the analysis as needed
- Assume intermittent network connectivity
- Ultra low power requirements

- **Low Latency.** Data and processing close to customers
- **Cheap Devices.** Many devices with “some” processing power
- **Always On.** System Survives Failure
- **Radically Eco.** Less Energy, Less Space
Distributed Mesh Computing in the Skies
Simple example of power from collecting and sharing up-to-date information

On a routine flight
A 737 archives just 31kB of data: everything that happened is thrown away because it’s “normal”

Put a Multi-PB Cloud Node on Every Plane
And capture everything

Enter the Connected Airplane
Build a graph of everything – planes, people, gates
• Disruption avoidance
• AutoRoute around turbulence
• Save fuel
What did the Web teach us about Open Source?

- **Operating systems**
  - Windows: 27%
  - Linux: 60%

- **Web servers**
  - Nginx: 16%
  - Microsoft: 23%
  - Apache: 45%

- **Server side languages**
  - ASP .NET: 21%
  - PHP: 75%

- **Content management systems**
  - Word Press: 75%

The Cloud is Next
Distributed Mesh Computing Platform

HP Helion – Open Source, Dev-Ready Cloud Platform

IT Pros
- Shared Nothing
- Service Catalog
- Data Locality
- Rolling Upgrades

Global Manageability

Open Source

Distributed Compute, Networking and Storage

On demand resource pooling

End-User self-service

Pre-packaged services through service catalog

User identity and accounting

IoT Developers
- Source Control
- Configure
- Test
- Deploy

Simple Programmability

Integrated dev experience

Marketplace for apps and add-ons

Application Portability

One-click app deployment

Zero touch services

Polyglot runtime
Developers want the simplicity and user experience of the public cloud.

Developers want to be abstracted from hardware config, scaling and operations.

IT Operations want a high-available architecture that survives failures.

IT Operations want support for massive scale growth without massive cost growth.

IT Pros seek:
- Shared Nothing
- Service Catalog
- Data Locality
- Rolling Upgrades
- Global Manageability

Developers seek:
- Source Control
- Configure
- Test
- Deploy

Simple Programmability
HP Helion OpenStack Everywhere

22 existing HP data centers for developers to build and deploy apps

- AMERICAS
  - Las Vegas
  - Tulsa
  - Orlando
  - Alpharetta
  - Alphaville, Brazil

- EMEA
  - Wynyard / Doxford
  - Roosendaal, NL / Belgium
  - Isle d’Abeau / Grenoble
  - Frankfurt / Russelheim
  - Spain
  - Milan / Inverno

- ASIA-PACIFIC
  - Bangalore
  - Shinsuna
  - Keppel DigiHub
  - Eastern Creek
Building the World’s Largest Open Cloud with Partners

HP Helion Network – HP Helion OpenStack Everywhere

- Member-Governed
  Shared Risk and Reward
- Open Standards
  Reduce Cloud Vendor Lock-In
- Enterprise Applications
  Built for New and Existing Workloads
- Workload Interoperability
  Deploy Locally and Globally
Built for the Core – HP MoonShot

Special purpose cores

* Based on HP internal analysis of HP Moonshot with ProLiant Moonshot Server Cartridges.

** Based on HP internal estimates of total cost to operate HP Moonshot with ProLiant Moonshot Server Cartridges as compared to traditional servers.
Compute framework for the edge

IoT Data Sources

“Expensive to Measure”
MFISES (Multi-Functional Integrated Sensors)¹

“Hard to Detect”
HP’s Inertial Sensing technology

IoT Data Platforms

“Small-Scale for Smart Cities”

Distributing a fleet of Proliant Microserver G8 systems
(footprint ~ 9.15" h x 9.06" w x 9.65" d)

Early Prototype  Recent Prototype
Ultra Efficient Hardware – The Machine

Next Generation of Hardware Designed for the Edge and the Core

- **Electrons** → **Compute**
- **Photons** → **Communicate**
- **Ions** → **Store**
Building the Mesh

- We are thinking holistically about the infrastructure required to scale IoT
- We are proving IoT at scale with our own connected devices and our cloud
- Open Source is a critical enabler of next gen capabilities
- HP is “all in” on OpenStack and Cloud Foundry to deliver the distributed and the programmable cloud for IoT
- Our hardware innovation is optimizing both the core and the edge
- We are deploying HP Helion throughout the world to build a distributed mesh for the consumer and industrial IoT propositions

Enabled by a $1 billion cloud commitment by HP