Hewlett Packard Enterprise

The Internet of Things

Turning ordinary things into extraordinary business outcomes

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"One-third of enterprises report using IoT, with another third planning to do so."[1]

– Forrester Research

Resources:
View the IDC infographic to learn its
Predictions on IoT

View the ESG infographic on
Developing an IoT Strategy

There's something in it for everyone:
- **Creators** improve design and operations, enhance field performance, and increase customer value.
- **Enablers** differentiate their services, increase customer value, and generate new revenue.
- **Operators** increase revenue, improve operations, reduce operational risk, and enhance productivity.

The Internet of Things (IoT)—billions of devices connected and communicating with each other and with businesses—promises dramatic enhancements in efficiency, opportunities for new products and business models, and the potential for greater customer intimacy.

This brochure will help you see how your business might apply the IoT technology to create innovative new offerings, increase business efficiency, enhance decision making and reduce risk. We'll show you why Hewlett Packard Enterprise is the partner you need to help you turn the potential of IoT into positive business outcomes.

What is the Internet of Things?

The Internet of Things is a network of physical devices with embedded technology that can communicate their status, operation, location, and environment. The key elements of IoT are:

- **Devices**—that collect and communicate data and actuators that can act upon the data
- **Data**—information collected by devices that enables monitoring, automation, and analysis
- **Connectivity**—to move data to where it can best be acted upon by other devices or people and analyzed for predictive insights

Analysts predict tens of billions of sensors will be installed within the next five years. Simple applications use sensors to detect and report movement, temperature, or utility consumption and perform other basic monitoring tasks. More robust applications can perform real-time monitoring and response. Advanced systems might enable interaction among devices, so they can dynamically adjust to changing conditions. Data can be analyzed at the sensor, network edge, data center, or in the cloud. And the data can drive a range of applications from simple status to predictive models that provide new insights.

Apply IoT to your business

IoT solutions can connect you to customers, business operations, and the environment to a degree never before realized. Here are some things IoT could do for your business.

Enable innovative new offerings
IoT technology can turn products into services and sales transactions into subscriptions. For example, HPE Instant Ink service integrates sensors into printer ink cartridges to automatically resupply ink when customers run low.

Increase business efficiency
Connected sensors and actuators provide data that can reduce waste and adjust operations to changing conditions. Labor-intensive monitoring and meter reading can be delegated to Internet-connected smart meters. In the energy industry, for example, operators use data from in-pipeline sensors and aerial surveys—integrated with operational databases—to increase the efficiency and safety of employees and the community.

Enhance decision making
IoT solutions can provide the data to make data-driven decisions based on what's really happening. Product developers can design smart, connected products that report exactly which features their users are using and how. Utilization and wear data for assets lets managers determine where they should be deployed for best return and when they should be retired and replaced. Manufacturers can measure process yields and reject rates and make corrections quickly.

[1] Forrester Research, "Forrester Predictions 2016: IoT's Impact Inside Companies," Frank E. Gillett and Michele Pelino, November 16, 2015.

Manage and reduce risk
Sensors can monitor environmental factors and alert facilities and operations managers when unsafe conditions develop. They can spot security threats and speed response. And they can monitor compliance regulations to protect companies from non-compliance.

The elements of an IoT solution

While similar applications have been possible, IoT leverages convergence of low-cost sensors, Internet connectivity, analytics, compute platforms, security and applications, that can now be scaled and interconnected in new ways. A successful IoT solution requires all of the following elements:

IOT REQUIREMENT	HPE OFFERS
Ubiquitous, reliable, secure connectivity IoT must be underpinned by reliable, secure network connectivity, location-based services analytics, and flexible gateways. Connectivity must support both legacy and new infrastructure including cellular, wired, and Wi-Fi networks. They also need location-based services and gateways to extract contextual information to accelerate decision making.	**Aruba** wireless and wired LANs, ClearPass Network Access Control, AirWave Operation Management, Meridian Beacons, **HPE Universal IoT Platform**, Edgeline Gateways.
End-to-end, proactive, defense-in-depth security Data must be protected from theft, modification, and exploitation from creation, in transit, at rest, and while in use. Developers must ensure code is free of vulnerabilities that could be exploited. Security surveillance systems must monitor all elements of IoT services to detect & block breaches in real-time to enable rapid remediation.	**HPE Enterprise Security solutions** including HPE Atalla and Voltage data protection solutions, HPE Fortify application security, and HPE ArcSight Security Information and Event Management solution Aruba Secure Connect and Protect Architecture ensures continuity of security from edge devices.
Contextual, insightful, at-scale data IoT technology can produce data in volumes that defy traditional storage and processing techniques. It requires new approaches to extract the business insight it hides. Data from things is one of the major factors driving the new technology and analytics approaches of big data.	Purpose-built, proven, best-in-class **analytics and compute platforms** integrated with our services and partner ecosystem (HPE Vertica, HPE IDOL, Hadoop, SAP HANA, HPE ProLiant, HPE Apollo)
Distributed, deep, edge-to-the-cloud compute To store and process data in the volumes produced by IoT, especially in real-time applications, processing must be distributed between the data center and where the data is generated. IoT developers must find the right balance of cloud, core, and edge computing to enable each IoT solution.	**HPE platforms** including HPE Edgeline, HPE Moonshot, HPE Apollo, HPE ProLiant, and HPE Helion Cloud System.
Advise, transform, integrate, operate, and managed services Successful IoT implementations require a wide-reaching strategy to achieve results. All facets of the organization should be assessed, from technical to business, people and processes.	**HPE Transformation Workshops for Internet of Things.** Network, Big Data discovery & Infrastructure, information management and Security services. Managed Services and Customizable Support.
Open, extensive, partner-driven ecosystem IoT solutions depend on the availability of innovative, secure, analytics-based applications that across many industries. Many applications will be enabled by open technology platforms designed to get applications to the market quickly, to enable integration between applications, managed with standard deployment and administration tools. This requires an ecosystem enabled by standards, tools, and support from major technology providers like HPE.	Intel®, **IoT development and integration labs**, participation in Industry 4.0, the Industrial Internet Consortium, the oneM2M standard, and the IP for Smart Objects (IPSO) alliance.

"We're at the dawn of a connected world that will enable firms to use software to monitor customers' real-world experiences and respond across the full range of consumer and business-to-business scenarios."[2]

– Forrester Research

Our IoT expertise and experience can make you successful

HPE brings decades of experience in computing, networking, and security spanning the entire IT landscape—from the data center, through the cloud, across hybrid infrastructures, and on any device. HPE consultants have cross-industry experience in computing and networking as well as deep experience in big data analytics, technology integration, and other fields central to IoT. We're helping organizations like yours use the Internet of Things (IoT) services to become more competitive and more efficient, all with reduced integration risks and accelerated time to value. Here are a few examples:

We helped **Auckland Transport** increase usage of public and shared transportation while reducing emissions and congestion. Our solution captures more than 2000 video feeds and analyzes 200 of them in real time. The result is improved public safety and security and enhanced quality of life for citizens.

Kaeser Compressors, a leading innovator in compressed air systems technology, needed real-time data feeds from globally distributed customer equipment to identify potential failures before they happened. Our solution with SAP HANA is expected to result in $10 million annual savings and a 60 percent reduction in down time.

DS Virgin Racing Formula E Team sits at the forefront of new technology development and deployment within the FIA Formula E Championship using trackside sensors and video analytics to optimize its performance. HPE Vertica and HPE Autonomy help enable live and post-race data analysis around energy management, regenerative braking, temperature, throttle and brake pressure, as well as timings and race strategy.

Learn more

We hope this brochure has jostled your imagination, and you're beginning to see the possibilities for the Internet of Things in your business. There are no IoT point solutions. Enabling extraordinary business outcomes requires the components we describe, integrated and working together.

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Become a Data-Driven Organization with IoT-Whitepaper

How to Choose an IoT Platform-Whitepaper

Securing the Internet of Things-Whitepaper

With one of the broadest technology portfolios in the industry, we can provide the components for you to build your own IoT, or we can create a platform for you to build your solutions on. In either case, we provide guidance and consulting from vision through execution. Visit the **hpe.com/IoT** to learn more. Or contact us to learn how to turn the possibilities into positive business outcomes.

[2] Forrester Research, "Brief: The Internet Of Things Will Transform Customer Engagement," Frank E. Gillett, May 11, 2015.

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