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# Transcending the Hype: A Transformative IoT Emerges



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# Transcending the Hype: A Transformative IoT Emerges

By Adithya Sastry

Despite the disappointment of overblown predictions, the Internet of Things is finally taking shape at companies across industries. Initial pilots offer a glimpse of how a tightly interconnected physical and virtual world can drive breakthroughs in worker productivity, organizational efficiency, and entirely new product and service models that radically alter customer experience and competitive dynamics.

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As social, mobile, analytics and cloud technologies, or the SMAC Stack, emerge as the catalyst for today's wave of digital business innovation, the so-called Internet of Things (IoT) is beginning its transition from buzzword to breakthrough status at organizations willing to take the plunge.

After years of unrealistic prognostications and unfulfilled reality, the IoT's potential is being proved in early trial and pilot projects. The insights gained from ambient data acquired from smart, connected and instrumented objects and infrastructure are illuminating the path for businesses to enhance employee productivity, increase operational efficiency and create new business ecosystems across nearly every product and production process that can be made Internet Protocol (IP) addressable.

Certainly the IoT landscape has yet to settle out, as evidenced by the lack of technical standards (see Quick Take, page 5), concerns over data privacy, and typical worries over "operationalizing" proofs of concept at production scale or monetizing data streams that result from IoT investments. However, technologies and tools are emerging from third-party vendors and integrators to make products and services smart and secure, and organizations are beginning to work through the many challenges of where to begin, how to build a secure and scalable infrastructure, and what the ROI could eventually be.

Leading companies are staring down the risks and exploring the possibilities, moving briskly from ideation to prototyping. They believe that previous waves of Internet innovations are merely a prelude to the unprecedented changes that the IoT will bring to the way we live and work, particularly as

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smart objects are embedded into everyday consumer experiences and production value chains.

## Making IoT a Reality

In fact, experimentation is beginning to give way to pilots that progressive organizations are undertaking to advance their digital business agendas. Typical use cases include:

- Manufacturers, consumer goods and industrial equipment makers are establishing remote monitoring and maintenance capabilities.
- Energy and utility companies are instrumenting production equipment to improve operational and capital efficiency.
- Healthcare, consumer goods, travel and hospitality companies are creating new customer experiences that differentiate their brands and improve customer engagement.
- Heavy equipment manufacturers, insurers and transportation and logistics companies are improving worker safety and productivity.
- Retailers and financial services firms are extending product and service experiences to new platforms, such as wearables.

In many cases, the initiatives aren't even cast as IoT projects per se but simply as product or process improvements that happen to use the Internet as the central platform in a solution employing sensors, network, cloud and analytics technologies.



## Remote Monitoring and Management of Beverage Vending Machines

One example is a major food and beverage maker that needed to better manage and monitor its fleet of expensive beverage coolers and vending machines scattered across the developing Asian markets. Because coolers were subject to rampant pilfering, the company experienced a high loss rate. Some machines literally went missing (as much as 20% internationally), while many mom-and-pop retail partners used their coolers for competitors' soft drinks. Still others did not keep their machines full, which caused numerous out-of-stock situations. At the same time, the soda vending experience was changing, as consumers were developing a taste for custom-flavored drinks that they could custom-mix at the kiosk.

As part of a revamped strategy, the company sought to roll out three different kinds of smart soft drink machines: a customized beverage dispenser equipped with a touch-screen for customers to combine syrups for their own personalized soda; large, glass-door coolers found in retail environments; and automated vending machines dispensing cans and bottles.

The company partnered with us to create a connected vending network that provided a track-and-trace capability, along with

an integrated view of machine inventory, delivering consolidated insights on what customers were choosing to consume. By combining our expertise in logistics and warehousing with our knowledge of IoT technologies, and using Microsoft Azure, we delivered a pilot of a scalable platform that could be extended to new geographies.

During testing, our approach helped decrease truck rolls and out-of-stock situations, improve warehousing operations and cut costs – all with the added benefit of enhancing the customer experience. Warehouse managers received alerts before customers needed new supplies, and customers were automatically notified before running out of syrup. At one site, out-of-stocks were reduced by 88%, and delivery drivers were able to work more



## Improving Operational and Capital Efficiency in the Energy Industry

In another case, a global oilfield services giant wanted to help customers reduce their production costs, using a connected ecosystem. The company provides petroleum companies with the capital equipment, services and know-how to manage oil wells and petrochemical sites, often in harsh

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efficiently, as they needed to stop only at locations on their routes that needed replenishment. Although closed-loop improvements and proprietary logistics networks have existed for decades, the opportunity to use the public Internet to create a secured network of smart vending machines allowed the company to drive new efficiencies at a sharply reduced cost.

What began as a small pilot of fewer than 400 machines is now rolling out as a solution at scale, targeting up to 2,000 machines by the end of this year.

environments such as the North Sea, Alaska, the Middle East and the Gulf Coast. With the price of oil in recent years dropping from a high of more than \$120 a barrel in 2011 to less than \$50 a barrel by mid-2015, petrochemical companies have been under significant pressure to reduce costs. We partnered with the company to prototype a smart, connected submersible pump to help combat cost pressures in the oil business and improve capital efficiency.

While submersible pumps are already available that are connected to proprietary networks, they are expensive, difficult to update and reliant on costly satellite data. Updating this type of submersible pump

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### In Search of IoT Standards

For the IoT to really work as envisioned, smart devices, smart buildings and all the smart things inside them need to speak a common language, eventually interconnecting with other ecosystems. But the industry is not there yet.

Multiple industry groups, consortia and standards bodies are working to introduce standards for device connectivity, management and application development. Some of these alliances will compete with each other, while others may complement each other's efforts. Additionally, vendors such as Microsoft, Apple and Oracle also have their own approaches to IoT connectivity.

Here is a sampling of the more prominent players:



#### Allseen Alliance

**Purpose:** A nonprofit consortium focused on developing a software connectivity and services framework that enables device-to-device interoperability in business and home settings, using the AllJoyn open-source framework. The framework consists of modular services that enable discovery of adjacent devices, pairing, message routing and security, regardless of transport layer, device type, platform, operating system or brand.

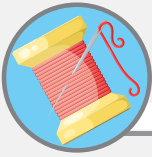
**Prominent members:** AT&T, Qualcomm, Microsoft, Sony



#### Industrial Internet Consortium

**Purpose:** An international nonprofit consortium focused on influencing the global development standards process for the Internet and industrial systems by defining and developing the reference architecture and frameworks necessary for interoperability among industrial machines in the enterprise.

**Prominent members:** AT&T, Cisco Systems, General Electric, IBM and Intel



## Thread Group

**Purpose:** An alliance of vendors, led by Google's NEST Labs, focused on developing a mesh wireless networking protocol intended to interconnect low-bandwidth devices around the home using the IPv6 protocol. Using Thread, developers and consumers can connect more than 250 devices into a low-power, wireless mesh network that also includes direct Internet and cloud access for every device.

**Prominent members:** Google's NEST Labs, Samsung, ARM Holdings



## Zigbee Alliance

**Purpose:** A nonprofit association focused on driving development of ZigBee, a specification for a suite of high-level communication protocols used to connect, sense and control smart devices on a wireless network.

**Prominent members:** Comcast, Freescale, Philips, Texas Instruments, Itron



## Open Interconnect Consortium

**Purpose:** A group of industry leaders formed to develop a common communication framework based on industry-standard technologies that wirelessly connects and intelligently manages the flow of information among devices, regardless of form factor, operating system or service provider. The framework, called Iotivity, is intended to enable device-to-device interoperability, including device discovery, communication, data exchange and other functions.

**Prominent members:** Cisco, GE Software, Intel, Mediatek, Samsung Electronics, Broadcom, Dell

required a manual software update and forced the company to manage the equipment one device at a time. The company asked us to create a “smart pump” proof-of-concept, which we did through a pilot of 200 submersible pumps connected to the Internet. Because it gave the company a single view of its fleet of deployed pumps and the ability to perform software updates remotely, the smart pump helped the oil business avoid the use of costly satellite data connections and manual, one-at-a-time software updates.

This example reveals how the IoT is displacing older forms of proprietary networking that are inflexible, prohibitively expensive to maintain and extend, and complex to manage and operate. In the digital world, simplicity and intuitive ease of use is the difference between market leadership and also-ran status.

After the pilot proved successful, the company extended the solution to a total of 2,000 submersible pumps, and is looking to test it on other types of oilfield equipment.



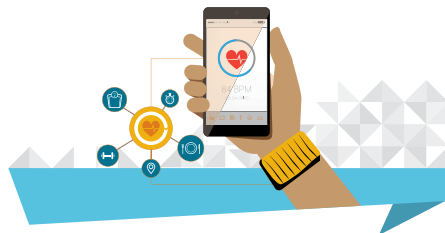
## Remote Monitoring and Management in the Fast-Food Sector

Like most restaurant chains, a major fast-food operation was concerned about food waste across thousands of its outlets, globally. In fact, cooking at too low (or high) a temperature was translating into millions of dollars of unnecessary cost. In addition, the restaurant chain faced challenges introducing new seasonal recipes, managing consistent execution of batch cooking, and controlling exposure to the variable cost of consumables across its corporate and franchisor-owned outlets.

Applying our industry experience, we worked with the company on innovative ways to establish a “connected kitchen” that raised the visibility of batch cooking processes and gave corporate decision-makers additional control over cost and quality.

Our initial idea was to develop a “smart fryer,” deploying sensors to measure cooking attributes such as temperature, oil consumption and power usage. We envisioned smart fryers that could sense, learn and predict demand, self-optimize temperature and power consumption, and be remotely managed. Given the sunk cost in traditional fryer equipment at thousands of locations around the world, however, we quickly learned that the investment in new equipment would be prohibitive.

Within six weeks, we came up with an alternative solution to retrofit existing fryers with an inexpensive electronic sensor board and software that could provide smart fryer capabilities. We implemented the solution at four locations as a proof-of-concept, and the client is now considering extending it at scale across regions.



## Empowering Patients and Improving Clinical Care with Remote Patient Monitoring

With over nine million health plan members and 180,000 employees, this non-profit organization is the largest integrated healthcare provider in the U.S. It has also been one of the most successful in finding innovative ways to reduce costs and increase the convenience of patient care. As part of these efforts, the organization wanted to explore how to improve connectivity between hospitals, clinics and medical devices to empower clinicians with remote, real-time access to patient data.



We worked with this health plan to create a remote patient-monitoring system prototype that uses smartphones to connect medical devices such as blood pressure monitors, glucose meters and wearable “bracelet” monitors in patients’ homes. The system integrates the data with an existing analytics program used in the organization’s hospitals and gives clinicians a central dashboard for a holistic, near-real-time view of a patient’s health and activities.

In this pilot, patients such as expectant mothers, diabetics and people with Alzheimer’s disease could choose to participate in remote monitoring from their homes, which reduced the number of clinic visits and, as a result, the cost of care. Not only did the health plan save on the cost of manually taking and recording visits, but the system could also send automated patient alerts. The remotely collected data provided clinicians with a broader set of vitals across time, giving them better insight into patient care.

As a result of the successful pilot, the healthcare organization is looking to expand the program as it continues to explore how digital technologies can transform the delivery, quality and experience of healthcare.



## Increasing Worker Safety and Productivity in the Insurance Industry

Insurance claims adjustors are often called upon in times of crisis to do their jobs amid great stress and calamity, such as in the aftermath of major storms or accidents. A large insurance company wanted to explore how to make the job of claims adjustment safer and more productive with a hands-free wearable solution that would transform the claims adjustor workflow process.

The company asked us to help prototype a solution based on the Google Glass platform

(which, not coincidentally, Google is shifting from a consumer device to a specialized, industry-specific platform). Our solution included real-time connectivity to colleagues with specialized auto and real estate expertise, a video and image capture tool, legacy system integration to file reports, and a voice-recognition capability that allowed adjustors to do their job without the typical pen-and-paper survey process. This hands-free option would give adjustors the ability to inspect damaged property and traverse harsh environments freely. (For additional insight on this type of application, read our white paper “[Google Glass: Insurance’s Next Killer App](#)”<sup>1</sup> or watch our video series on our [YouTube](#) channel.<sup>2</sup>)

## Getting Started with the IoT

While we believe it’s important to think big, it’s also critical to start small. A successful approach is to incorporate a rapid ideation and fast prototyping process to explore business opportunities, quickly discard those that don’t work and scale the ones that do.

In these early days of the Internet of Things, it can be valuable to experiment, especially in the absence of standards or tried-and-true frameworks. Therefore, we suggest companies work initially to identify two types of opportunities: “smart process” refinements in which the IoT is used to improve on existing business activities, and “smart product” opportunities that offer the potential to radically alter conventional business models within their own market, as well as in adjacent industries.

Depending on the complexity of the project, some companies will benefit from starting with a smart process to prove the concept, while others will see quicker success pursuing a smarter, more connected product initiative.

To develop a smart process, we recommend asking the following questions:<sup>3</sup>

- How can we exploit location data?
- What other machine state or environment data would be valuable, especially when aggregated, to the value chain?

- Can we benefit by adding remote monitoring and control? Would adding a user interface to the process lead to greater insights and opportunities to reduce cost?
- What third-party data, if introduced, would make the process more informed and capable of self-optimizing?

The following questions can help generate strategies for pursuing smart products and longer term industry disruption:

- Would real-time information add value to the customer experience of the product or service?
- Can we expand sales by charging for our product in a metered, as-a-service way?
- Would crowdsourced customer sentiment help us prioritize the product roadmap or benefit customer service?
- Which aggregated sensor information has value to our customers or partners? Could we be part of a new ecosystem, or potentially even create and own a new one?

- How would customers' social and virally shared experience of the product increase traction for the brand?

These are just some of the questions managers can ask when trying to get past the bluster of the IoT and get started on a workable strategy. Establishing a baseline experience, and sanctioning a continuous ideation and prototyping cycle, can help create the mindset and governance model needed to take advantage of the connected-things evolution of the Internet.

As the aforementioned examples reveal, leading companies are transcending the hype and are delivering business results by not only thinking big, but also starting small. Already, they are seeing improvements in worker productivity, operational effectiveness, and new product and service models that, when scaled, promise to alter the dynamics of competition in their industries.

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## Footnotes

- <sup>1</sup> "Google Glass: Insurance's Next Killer App," Cognizant Technology Solutions, December 2013, <http://www.cognizant.com/InsightsWhitepapers/Google-Glass-Insurances-Next-Killer-App.pdf>.
- <sup>2</sup> "Google Glass: Transforming the Insurance Industry," Cognizant Technology Solutions, July 31, 2014, <https://www.youtube.com/watch?v=Y7bbHiZhuT0&list=PL-Okbzovwrrw5SvNT-5Kput1UyJky9sT2>.
- <sup>3</sup> These recommendations build on presentations made during a Gartner IoT webinar <http://www.gartner.com/webinar/3000719>, and are reinforced by our client work.

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## Author

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## Acknowledgments

*This white paper would not have been possible without the diligent research and writing contributions of Vivek Asija, a Product Marketing Director within Cognizant's IoT Practice. He can be reached at [Vivek.Asija@cognizant.com](mailto:Vivek.Asija@cognizant.com).*



# COGNIZANT

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