

Plugging into the Internet of Things

How Independent Software Vendors Can Anticipate and Overcome Key IoT Challenges



TECHNOLOGY WHITEPAPER

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WHAT IS THE INTERNET OF THINGS, AND WHAT COULD IT BECOME?

The Internet of Things (IoT) is a technological concept with truly transformative potential. Basically defined, IoT is the network of physical objects (things) connected to the Internet that provide data for collection, storage and analyses. IoT is enabling the convergence of IT and Operational Technology. By harnessing the information of tens of thousands of sensors and feeding them into big data analytics, we can realize the collective efforts of nearly a century's worth of technological development. When IoT achieves full market penetration, we can expect major insights to emerge as well as iterative shifts towards a more integrated future. The world's most significant challenges—resource sustainability, emissions control, urban growth planning, logistical efficiency—can finally have their resolute answers.

Basic IoT Architecture

But how do we get there? How do we realize the full potential IoT offers? With incremental advances towards more and more refined methods of interconnection. Today's current solutions will be met with new players and conceptual frameworks, forging a more sophisticated and integrated version of the IoT systems we see today.

Industry pioneers, like Intel and Dell EMC, have already hammered out the basic architecture of the IoT ecosystems that will continue to shape our future:



SENSORS

Sensors compile data from external sources. Use-cases include movement tracking, temperature monitoring, mechanical diagnostics, power consumption metering and more. From the wrist of a fitness-conscious jogger to the assembly line of a major auto manufacturer, IoT sensors are already in place all around us.



GATEWAYS

Gateways simplify and organize the data collected by sensors. They can selectively cut down on the volume of data broadcast to IoT networks while assigning qualities like a hierarchy of which details are most critical to analysis.



NETWORKING

Whether broadcasting sensor data over the cloud or sending it along connected Ethernet wires, the way data travels from sensors to servers is crucial for preserving speed, accuracy and security.



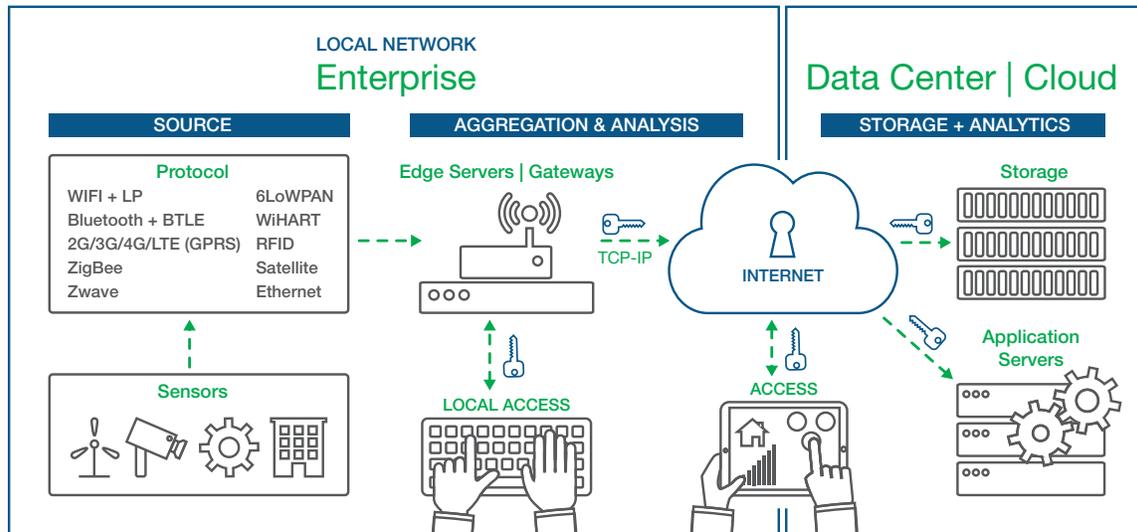
EDGE SERVERS AND APPLICATION SERVERS

Edge servers provide direct action at the site based on sensor inputs, such as when to cycle different air conditioning compressors in a building to achieve peak energy efficiency. Application servers deployed in powerful data centers handle the data sent by gateways and apply analytics methods in order to gain critical insights. These servers can help us find out how to make better cars, how to have more restful sleep or simply how to keep the assembly lines running as efficiently as possible.

The Importance of Connectivity and Gateways

Critical to this ecosystem is the unrestricted communication between dozens of different sensor types and networking languages. Sensors using connectivity methods like LAN, Wifi, LTE Cat 0, zWave, Zigbee or any of the other potential signal languages must all be processed to arrive on the same application server.

This myriad of signal and language options makes processing and translating all of them like trying to bake a cake with hundreds of ingredients, most of which are still in their packages. Each ingredient must be prepared to go into the batter so that everything can be consistent and seamlessly blended. Only with a smooth batter can our application servers transform all the raw ingredients into something uniquely pleasing.



Gateways have emerged as a primary method for managing much of these “data packaging” duties. Their job is to ensure that the most valuable sensor data is readily available to analytics-side servers and not left by the wayside. By processing and filtering the data obtained by sensors, more efficient network utilization can be achieved.

Even with the advent of gateways and other solutions, connectivity remains a huge hurdle, especially for ISV players just entering into the IoT fray. A myriad of programming languages and signal types can create high levels of latency and place unnecessary burdens on network processing power. Along with these connectivity concerns, other key challenges have emerged.

Key Challenges

We already have the conceptual framework and most of the technologies available to implement large-scale IoT networks today, so why aren't they ubiquitous yet? IoT systems are still emerging as a standard market practice because of the challenges associated with implementing such a complex, disconnected system. **The key challenges IoT technology developers and system managers face include:**

- Standardizing languages among sensors, gateways and other devices
- Creating an efficient data-sharing architecture; defining roles of key components like gateways
- Conflicting solutions, confusion and redundancy; general challenge of creating a completely integrated system
- Addressing system updates and maintenance needs
- Anticipating that systems can quickly become obsolete
- Misuse of data and overall data security along with the control of information flow—perhaps the most critical challenges of all

In addition to IoT concerns, key players are still refining Big Data analytics solutions to turn IoT sensor data into something uniquely useful.

- Information overload potential; defining what's important
- Monetizing the convenience IoT brings
- Using data to inform future business infrastructure and decisions

Plugging In: How ISVs Can Make Sense of It All

The area of IoT with the most potential for innovation lies in ISV companies with the vision to create application servers that take sensor data and do unique things with it. Perhaps your company wants to:

- Use machine diagnostics data to predict potential servicing needs long before they become critical
- Analyze traffic patterns in busy cities to help develop better traffic light schedules
- Optimize performance of industrial air conditioners to get the most energy efficiency, even during peak cooling load times
- Coordinate data from thousands of bring-your-own-device signals to optimize business network performance and functionality

In order to bring novel ideas like these to market, you are going to need a way to clear past all of the IoT roadblocks while still maintaining profitability and agile responsiveness to market signals. By enlisting the right industry partner, you can bring your ideas to market while sailing past these obstacles. Such a partner can help you grow the marketplace of ideas while maintaining a healthy bottom line the entire time. This is the vision of major industry deployment partners like UNICOM Engineering, and we are making it a reality every day.



HOW THE INTERNET OF THINGS IS EMERGING

The key components for IoT have been in place for years. Only recently have the right advancements been occurring to set all of the pieces into motion:

- A shift from technology's potential to practical realization; moving away from "gimmicks" to legitimate useful functionality
- Evolving network capabilities (like SDN and NFV) that can send, receive and process massive amounts of data with low latency
- COTS-based hardware that offers lower cost and faster time to market
- Industrial sensor devices like RFID scanners, Bluetooth Low-Energy beacons and onboard vehicle diagnostics sensors that are amassing field data and sending it along to application servers at unprecedented rates
- Consumer-end appeal of IoT devices like fitness trackers, smart watches and "learning" thermostats

What's Standing in Our Way

Even with all of these developments, we are still not quite at the level we need to be in order to realize IoT's full potential. Consider that the ecosystem partners are coming together to deliver solutions, not components. This type of model is a departure from their traditional business process. A few growing pains are still expected, but the learning curve is being compressed. Global Value Integrators like UNICOM Engineering that have ecosystem partner relationships and affiliations with the Dell EMC OEM Premier Partner and Intel IoT Solution Alliance help bridge the gap. Still, put in the simplest terms, the IoT ecosystem needs to evolve, refine and become better adapted to specific use-cases.

There are several IoT areas with potential for the most improvement:

- Device gateways must be designed and implemented to more intelligently share data with less burden on networks
- ISVs need to consider field support for hardware solutions deployed in large enterprises
- Data security and data transfer oversight remains a critical issue, especially considering the rate at which data volume grows
- Lifecycle management is becoming a growing priority from day one of system launches; application system designs must aim for painless updates, maintenance and support of their products

Businesses working on addressing these issues push the market forward more so than anyone else. Together with innovators of unique IoT applications and use-cases, they are helping make IoT a more viable and prevalent economic force for driving progress.

GETTING PAST THE ROADBLOCKS

None of the important areas of improvement highlighted above can occur if ISVs or other innovators get stuck in the quagmire of challenges that prevent novel IoT products from making it to market. Creating solutions to these challenges can often be more resource consuming for ISVs than developing the product in the first place. Without outside help or time-consuming problem solving, only a small portion of the best ideas will make it to market.

No Need to “Reinvent the Wheel”

Teams who put themselves in this position have essentially built a solid piece of application software like a manufacturer builds a car, only to have to “reinvent the wheel”. In reality, there is no need since plenty of other people have already learned how to solve these problems and optimized the process.

By enlisting the help of companies like UNICOM Engineering who specialize in application deployment and integration, bringing amazing ideas to market does not have to involve a lengthy and painful learning process. Finding the right integration partner can be like speeding past roadblocks and bumper-to-bumper gridlock.

Together with a global value integrator, ISVs can:

- Dramatically increase their product’s speed-to-market
- Eliminate costs associated with “reinventing the wheel” —developing solutions that are already out there
- Attain better market position and monetization potential
- Grasp industry standards, expectations and regulations more adeptly
- Ensure compatibility with IoT language standardizations and performance expectations
- Create a more cohesive yet flexible product that can be implemented across a wider range of business IoT ecosystems



Applications as Appliances: Putting Your Ideas in a Marketable Package

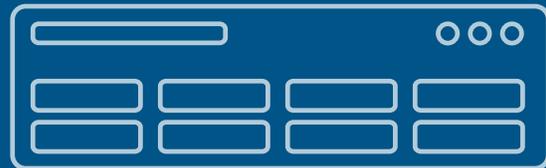
From the perspective of your customers, IoT products and solutions should provide seamless functionality and offer a true advantage rather than an incremental upgrade with more problems than it's worth.

One way that application deployment and integration partners can help ISVs achieve this goal is by packaging their applications in stand-alone hardware known as an appliance. These pre-built server devices include everything they need to do the job for which they were designed. Appliances generally include an ISV's software application, the necessary supporting applications, the required operating system and the hardware platform. These elements are all contained in one convenient and ready-to-go device. By developing and shipping applications as a hardware appliance, your clients and customers can install your application quickly without having to reconfigure their network system to do so. A holistic approach means offering value-add services and less maintenance or usability hassles for clients.

For instance, UNICOM Engineering streamlines application deployment with as defined system to overcome key challenges associated with installation on enterprise-level networks. The result is the ability to deliver repeatable end-product results that comply with stringent industry standards, regulations and expectations. Support costs are lowered, and shipping can be achieved through efficient distribution and logistics models.

When an application is deployed as a purpose-built appliance, you can:

- 1** Create stable builds that isolate the application's needed OS and resources, avoiding conflicts found on general server installations
- 2** Streamline the installation process your customers use to integrate your product onto their IoT network
- 3** Avoid problems associated with end-user-level OS tinkering
- 4** Lower support costs associated with maintenance, updates or servicing since fewer touchpoints are needed to ensure operability
- 5** Increase customer satisfaction by decreasing the chance your application could be blamed on downtime, poor server performance or inoperability
- 6** Simplify lifecycle management through the use of secure OS and stable, holistic product builds designed with maintenance and updates in mind
- 7** Focus on core goals with less peripheral concerns



Deploying your software as an appliance or a virtual appliance is just one method among many, but it illustrates how an industry partner can quickly overcome typical challenges while adding value to your products from a client perspective. As a Dell EMC OEM Premier Partner and Intel IoT Solutions Associate Member, UNICOM Engineering solves deployment challenges, accelerates time-to-market, reduces ownership costs and increases business efficiencies.

FINDING THE RIGHT INTEGRATION PARTNER

Whether your aim is to provide a new method of processing IoT sensor data or to create a unique ecosystem using your own sensor products, having an industry partner with the knowledge, expertise and resources to fast-track your deployment can have many benefits, such as the ones described above.

The only problem is deciding what the right partner might look like. Here is a list of criteria that can help you identify and compare companies that might be qualified to serve your needs:

- 1 Experience** — Being familiar with both the IoT market and its technology as it has evolved can provide needed perspective and knowledge to overcome challenges.
- 2 A Bespoke Consultation Model** — Applications set out to do many different things. Likewise, ISVs and their customers can occupy a huge range of possible roles. Only with a custom, bespoke consultation model can an integration partner identify your unique needs and concerns and then respond accordingly with the appropriate services. Too many partner firms disregard their clients' needs or are unable to provide tailored services, instead trying to utilize a "one size fits all" service model that does anything but.
- 3 Attentive Quality Control** — Quality inconsistencies can severely harm an ISV's reputation, damaging their client relationships. An industry partner who abides by standards like ISO 13485, ISO 9001, ISO 14001 and TL 9000 can use objective measures and proven best practices to circumvent quality issues.
- 4 Customer Service Expertise** — With service models increasing, "set it and forget it" is no longer an option for application products. An industry partner can go above and beyond typical services to provide high-quality support functions that make your firm look good even when things go wrong. These services also provide your company with additional revenue streams.
- 5 Familiarity with Common Hurdles** — Going back to experience, an industry partner who has been around the block can help you avoid problems before they occur, decreasing the need for field service calls.
- 6 Project/Program Management Guidance** — Experience and knowledge of best practices mean that an industry partner can help you make the right decisions and craft a winning IoT business model or product strategy aimed at profitability and agile responsiveness.
- 7 Lifecycle Management Knowledge** — Take the pain and guesswork out of support by considering all stages of a product's service life.
- 8 Access to Logistics and Trade Compliance Resources** — Climbing your way to the top of the application market means finding the right logistics and compliance connections while avoiding mistakes. A great industry partner has these resources at their fingertips so you don't have to.
- 9 Up to the Minute Knowledge of Security and Best Practices** — Never come across as naive or unprepared when you have an intelligent industry partner who helps you recognize vulnerabilities and use the latest best practices for security.
- 10 OEM Capability** — Using recognizable brands provides assurance to end-user clients while boosting the prestige of the ISV through association.

In short: The above qualities represent the right integration partner who can help you deploy your application or security solution efficiently and across a wider range of scenarios. They also help you use less resources and provide support functions, letting your company stay focused on what it does best.

CONCLUSION

The Internet of Things could bring us the gleaming, efficient future society we once envisioned. By putting all of the collective development of devices, sensors and networking to good use, we can gain true insights on how to produce the results society expects with less negative consequences. “Better living through data” can be the philosophy that drives mankind towards incredible achievement in the upcoming century. This ecosystem is only possible through secure, logical and stable sharing of information across massive networks. By focusing on genuine solutions, we can enable true insight and advancement, not just tacked-on product “gimmicks.”

Much of the groundwork is already here for this evolution to take shape. All we need is individual innovation for technology to deliver on the future we were promised.

However, these consumer-end vendors won’t make it to market without a way to address common challenges. The right IoT integration and deployment solutions partner fast tracks these projects, avoiding or mitigating typical challenges. They also provide the support and expertise needed to let technology companies focus on scaling and innovating. After all, they should be dreaming up completely new futures rather than worrying about the minor nagging details that plague us in the present.

Those who seek out the help of partnerships in this way will be driving true IoT progress rather than forcing themselves to grapple with issues that others have already solved. Let partners like UNICOM Engineering be your key to making the dreams of society a reality, one amazing product at a time.

ABOUT UNICOM ENGINEERING

UNICOM Engineering is a leading provider of server-based application platforms and lifecycle support services for software developers and OEMs worldwide. Through its expertise and comprehensive suite of design engineering, system integration, global logistics, trade compliance, support and business intelligence services, UNICOM Engineering is redefining application deployment solutions to provide customers with a sustainable competitive advantage. More than a decade of appliance innovation and strong technology partnerships make UNICOM Engineering one of the most trusted, capable software deployment partners in the industry.

Founded in 1997, UNICOM Engineering has facilities in Canton, Massachusetts; Plano, Texas; and Galway, Ireland. For more information, visit www.unicomengineering.com.

Contact Us

To discuss your IoT strategy, UNICOM Engineering’s broad range of appliance platforms or deployment services, please contact us by telephone +1 (800) 977-1010 or by email at info@unicomengineering.com.

