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Tips, tricks and techniques for **successful IoT deployments**



The internet of things (IoT) continues to stand as a huge opportunity for a wide range of players across the telecom and technology spectrum. The notion of connecting monitors, machines and other objects to a network, thus granting them some level of intelligence, could well revolutionize industry sectors ranging from agriculture to manufacturing.

And indeed, a wide range of players have already

invested in this vision. But, with deployments accelerating, now is the time to review what it takes to implement a successful IoT system. How can service providers, integrators, vendors and others best meet customer requests? And how might those customer requests differ across market sectors?

This Fierce ebrief will look at these issues and more in two parts. Read on:

5 pointers on IoT deployments

By Kendra Chamberlain

IoT deployments can be complex, intricate systems, leveraging several partners, myriad technologies and multiple moving pieces. Early deployments in the space have served to underscore the steep learning curve companies face bringing solutions to market, scaling those solutions, and managing them throughout the lifecycle.

One of the first steps in developing an IoT strategy is to know where to play, said Steve Szabo, head of global products and solutions of IoT at Verizon. “It’s such a vast space that knowing where to play is critical,” he said. “Understand what you’re great at, and then how you can leverage that into an IoT solution.”

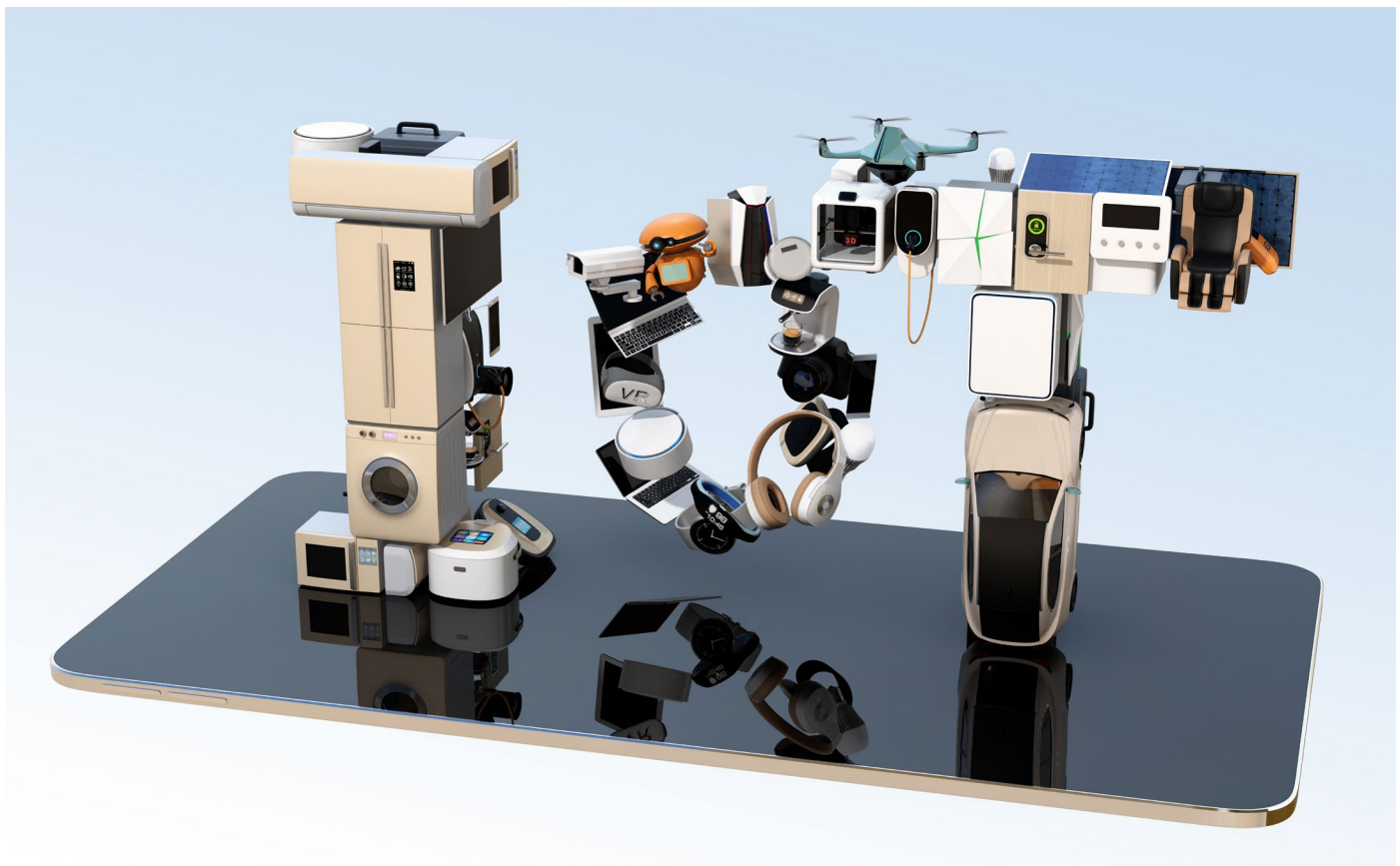
For companies just beginning to devise an IoT strategy, that means understanding not only their own strengths, but also how best they can leverage

those strengths in an IoT deployment. Experts seem to agree that the companies that spend time planning the what, where, how and why of their deployments up front are more likely to succeed. But even the best laid IoT plans can go awry in the field.

Below are five key tips from top IoT solution providers—gleaned from years of experience in the space, billions of data points transmitted and analyzed, and thousands of IoT deployments brought to market—that can help inform IoT strategies and help players position for success:

1. UNDERSTAND OPERATIONAL COSTS AND HAVE EXECUTIVE SPONSORSHIP

Companies developing initial IoT strategies often focus first on the hardware and software





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—Steve Szabo, head of global products and solutions of IoT, Verizon

components—the nuts and bolts of the IoT deployment—without properly preparing for the ongoing support and maintenance required to manage the deployment, according to Theresa Bui-Revon, director of IoT strategy at equipment vendor Cisco. “What I think most companies don’t realize is that your support costs can go up,” she said.

For one thing, the devices themselves are prone to problems. “It’s never as easy as you’d like it to be,” said Syed Zaeem Hosain, CTO and founder of Aeris, an IoT solutions and analytics provider. “People tend to think these devices work perfectly day in and day out, out of the box. Well, the answer is, they don’t.” Device problems can range from connectivity issues to software bugs to hardware failures. Those hiccups can translate into service disruptions and other issues that require operational support.

Depending on the IoT vertical, and the pace of scale, deployments can take months to even years to roll out, with the potential for long stretches of time without any revenue generation. That means companies need to prepare for long sales cycles—and executive leadership should be patient for revenue.

“These are complicated solutions with complicated needs,” Verizon’s Szabo said. “Make sure you’ve got complete executive sponsorship, so that they’re not just going to build and fund the product, they’re going to actually invest in it, and support it for

the long run. That’s important. The ones that are successful have that kind of sponsorship. The ones that don’t typically end up dying on the vine.”

2. DESIGN FOR END-TO-END SECURITY

Security is a critical piece of any IoT deployment and should be given an early role in the planning process to ensure end-to-end security. “Going back afterwards to try to make sure your device is secure or your application is secure is a bad thing,” Aeris’ Hosain said. “If you can do the design work for security up front, it’s going to be a heck of a lot easier to maintain the design down the road.”

For larger deployments with multiple partners, Cisco’s Bui-Revon said companies should create clear guidelines around security responsibilities for each member of the deployment. “There are so many different players in the ecosystem that are responsible for security at different stages,” she said. Clearly delineating responsibilities among hardware manufacturers, network providers, software applications, data centers and cloud providers can help ensure security is maintained end-to-end.

“At the very least, you have a checklist of the players that are involved in the IoT deployment,” Bui-Revon said. “Companies understand that they need an end-to-end security model, and assign the right responsibilities to the right partners that they’re working with.”

3. GET THE MOST OUT OF YOUR DATA BY UNIFYING IT

The success of any IoT deployment is tied, in part, to the data that’s collected and the insights gleaned from that data. Consequently, it’s crucial that companies prepare for a tsunami of data and implement effective strategies for getting the most value from the data. That means companies need to devise a data unification model from the start.

“The data is much more powerful and can be serviced across many products and many services if it’s all aggregated through a single point and standardized,” said Szabo. “When you’re not

standardized, it makes it real difficult to advance these solutions to the next level when new uses cases are introduced or new products and services are introduced.”

This can be particularly challenging in deployments that work with multiple hardware providers and use distinct edge devices, as hardware manufacturers can vary dramatically in their data models and schemas. “If you want to correlate and analyze and use that data, you’ve got to figure out how to extract it and put it into a unified data model,” said Bui-Revon.

4. ARCHITECT FOR FLEXIBILITY AND PREPARE FOR SCALE

IoT deployments can have steep learning curves, especially as a company begins to scale up beyond the initial trial phase. Companies that plan to roll out their IoT solutions over a number of phases should begin planning for scale early in the process.

“What worked well in a pilot may not work well at scale. Most companies we’ve worked with have learned that the hard way,” Bui-Revon said. Companies should plan for scale—both operationally and organizationally—by incorporating flexibility into their deployment architecture. Doing so will help ensure that lessons learned in one deployment phase can be leveraged in a later deployment phase.



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Hosain agreed. “The biggest problem that people encounter is that they fail to recognize that they might have a product that has a very unusual escalation requirement,” he said. “Maybe it’s going to require hand holding from a technician to get it done in the field. ... If you want to do 10 units, 100 units, yes, you can get away with that. If you want to start doing 10,000, or 100,000 units, you’re going to have to think through the issues of what it takes to scale.”

5. KNOW WHEN, AND HOW, TO PARTNER EFFECTIVELY

Providers must know when to build a solution and when to partner for a solution. Executives from Verizon, Cisco and Aeris all agreed that companies should stay within their respective expertise areas when developing their IoT strategies, and seek outside help when needed.

“Partnerships can occur in any stage of the game: the device, the communications, the storage of the data, the analytics, and alerts,” Hosain said. “Find the right integrator to develop your end-to-end solution, if that’s not a capability you have in house.”

Companies faced with a build-or-buy decision should be very careful building beyond their wheelhouse of expertise, Szabo agreed. “There’s a lot to be said for bringing in folks who have deployed a lot of these IoT solutions globally and in various, different environments,” he said.

And in today’s market, there’s no shortage of providers offering a variety of solutions in the IoT space.

“There is a huge ecosystem out there to support IoT deployments,” Bui-Revon acknowledged. “There are solutions out there for you that are either pre-packaged and ready to go, or take very little customization. From my own observations of looking at our customer deployments, most companies who are doing it really well are partnering versus building,” she said. ●

The Dallas case study

By Tracy Staedter

In the city of Dallas, the West End Historic District found its origins more than 175 years ago, when a log cabin trading post opened for business. Since then, the area has grown into a bustling tourist destination, now home to restaurants, stores and historical sites.

But its latest initiative is looking toward the future.

In March 2017, the Dallas Innovation Alliance (DIA), a nonprofit public-private partnership interested in advancing innovation, launched the “Living Lab” smart city pilot. The test site, a four-block corridor that runs down North Market Street, integrates AT&T’s cellular network with a scattering of IoT devices to improve traffic and parking, monitor air quality and water use, and improve safety, mobility and digital connectivity.

The vision, according to DIA’s executive director Jennifer Sanders, is a city that optimizes its technological and social infrastructures to drive economic development, conserve natural resources and energy, and improve the quality of life for those who live there or visit. Although such a project is not without its challenges, the area’s latest quarterly report indicates general movement in the right

direction: Business revenue in the area is up 27%, and crime has decreased 6% in the past year.

“Government is honing its attention to the quality and responsiveness of services as perceived by those it serves. This is motivating cities to innovate and become incredibly proficient in everything around data to make smarter decisions,” said William Finch, the city’s chief information officer.

For any urban center considering an IoT deployment that relies on a cellular network, the West End pilot serves as an example of what can be done with a wide variety of devices deployed in a compact area.

At the moment though, separate servers analyze the data from different sensors. Finch said that fragmented approach to bringing IoT devices online poses a challenge, as different technologies require varied approaches. But Dallas is preparing to publish a roadmap that will unify the technology, data and delivery of smart solutions, he said. As a result, this summer citizens will have access to a web-based dashboard to check everything from lighting to air quality to parking availability.

As Dallas moves into the future, here’s a look at its IoT smart city efforts so far:

LED STREETLIGHTS

Partners: Current by GE, AT&T Digital Infrastructure, Phillips

Two different city blocks host two LED lighting systems—one from Philips and one from GE. Each of the vendors’ 23 light poles have intelligent sensors and controls that allow technicians to use a 4G cellular connection to remotely adjust light levels and track usage and outages. Photocells on the poles sense ambient light to automatically switch the streetlights on before dusk and off after dawn. The latest tally of energy savings shows that the 23 LED



Dallas’ smart city efforts have centered on the city’s historic West End



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—William Finch, chief information officer, Dallas

streetlights saved 2311 kW hours of energy over a nine-month period, or about the same amount of energy it would take an electric dishwasher to run 1150 loads.

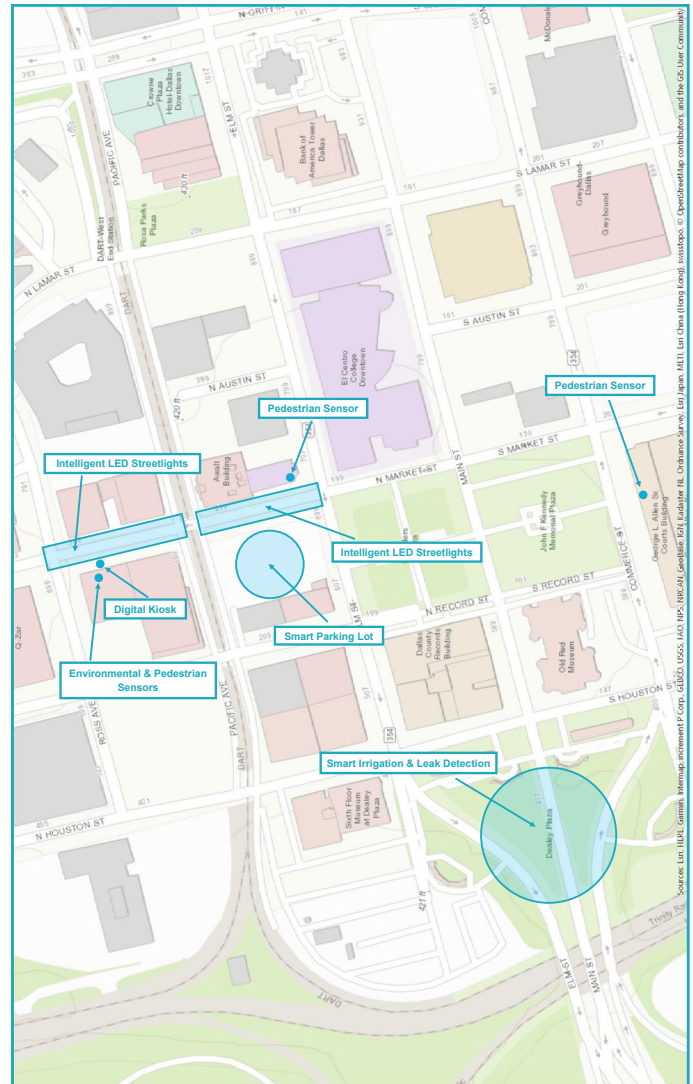
TRAFFIC AND PEDESTRIAN FLOW

Partners: ParkHub, EB Systems, AT&T Digital Infrastructure

Smart cities don't happen in a vacuum. Knowing who uses a space and how is fundamental to understanding how to improve it. In the West End, three pedestrian beacons detect a phone's unique identifier, called a Media Access Control (MAC) address. This anonymous signal shows where people congregate and when. Over the time, the trends can help local businesses adjust their staff and hours of operation, help real estate developers with the sale and purchase of properties, and alert transportation employees to respond to a spike in activity.

So far, pedestrian beacons have counted nearly 1.4 million unique visitors along the Living Lab corridor. Businesses in the area have seen a 10% increase in customers and a 26.2% increase in revenue.

Further, four light poles on North Market Street have been equipped with digital infrastructure nodes from GE CityIQ. The nodes serve as an all-in-one hub to not only send and receive info using a range of signals, including Wi-Fi, cellular and Bluetooth, but they can also accommodate a host of sensors. In the West End, four poles have been equipped with video cameras to monitor street parking availability,



The city's efforts stretch across a number of blocks.

collect data about the number of cars and the flow of traffic, and to improve public safety.

In any dense urban area, parking is key. Four hockey-puck-size sensors embedded in the asphalt in a lot between North Market Street and North Record Street track when cars come and go. Two of the sensors monitor the entrance into the lot and two monitor the exit. The data, which is transmitted to nodes using cellular connectivity, indicates whether the lot is full or available. Future lots will track the availability of individual parking spaces in order to allow drivers, via a phone app, to locate and reserve parking ahead of time.

Sanders said one challenge DIA faced setting up the smart parking was coordinating with the parking lot

owners, a mix of private operators, as well as those from the city and the county. In time they were able to collaborate, and now they have multiple lots and garages on the roadmap for smart city expansions.

CONSERVATION

Partners: *HydroPointData Systems, Itron*

On the roof of the Dallas Innovation Alliance's headquarters, located at 311 North Market Street, six solar-powered sensors individually monitor temperature and humidity as well as levels of carbon dioxide, nitrogen dioxide, ozone and particulate matter. The sensors send data to the cloud using a 3G cellular signal. Information gathered will help researchers understand the correlation between the flow of vehicle traffic, parking occupancy and air quality. DIA has plans to share the air quality data, including zones that may be hazardous to children with asthma, with the public.

In the public park in Dealey Plaza, across Elm Street from the Sixth Floor Museum, a "smart watering" system makes the most efficient use of an increasingly scarce commodity in the Southwest. In four different zones in the park, a cluster of four solar-powered sensors monitor the soil around plant roots and keep tabs on the weather for rain or even freezing conditions. Others track water usage and detect leaks. Sensor data is transferred to the cloud using cellular connectivity and is used by city officials to precisely control irrigation needs.

Unseen in the water pipes beneath the West End, 40 water sensors track usage and detect leaks and

water loss. The details they gather are sent to smart meters that Dallas Water Utilities technicians can read remotely, via a wireless signal. Over time, the information will be analyzed to understand water use and alert them of needed repairs.

CONNECTIVITY

Partners: *CIVIQ Smartscales*

Dallas provides free public Wi-Fi in the Living Lab via access points positioned at different locations in the West End. A large touchscreen kiosk located near the corner of North Market Street and Ross Avenue provides passersby searchable information about local restaurants, shops, museums, attractions and public transit schedules. Software in the kiosks tracks individual interactions with the information, what users request the most, how long sessions last, and whether people access multiple features in a single visit. During the last three months of 2017, almost 1,200 unique users accessed the kiosk, with nearly 25% using it to access more than one kind of information.

Dallas and its partners hope to use what they learn from the project to expand smart city technology to the rest of the metropolis. The public-private partnerships formed now will improve future initiatives, said Finch. The idea is to connect "people and organizations, acquiring the knowledge about how well a technology can improve city operations and citizen experiences, without a significant burden of financial risk on local government," he said. ●



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Aeris strives to fundamentally improve businesses by dramatically reducing costs, accelerating time-to-market, and enabling new revenue streams. Built from the ground up for IoT and road tested at scale, Aeris IoT Services are based on the broadest technology stack in the industry, spanning connectivity up to vertical solutions.