

Seven Steps Toward Comprehensive IoT Services

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Consider this description of Mark Twain - *humorist, publisher, author of one of the "Great American Novels"...and Internet visionary*. If the last claim seems rather outlandish, then consider this: In 1898 he published a [short story](#) about a crime surrounding a new device called the Teleelectroscope. This technology rendered the "daily doings of the globe... visible to everybody, and audibly discussable, too, by witnesses separated by any number of leagues." In short, Twain envisioned a connected world, one that is now a reality.



What is the Internet of Things?

The Internet of Things (IoT) goes beyond machine to machine (M2M) connectivity. As defined by the Internet of Things Global Standards Initiative ([IoT-GSI](#)), it is "a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies." In short, it is a comprehensive network that links our computers, mobile devices, cars, homes, health services, city infrastructures – and even, through micro-chipping, our pets.

Steps to a Comprehensive Internet of Things Service

The Internet of Things challenges the ways we have traditionally thought about connectivity. Yet, at the same time, such a service promises a great many opportunities and benefits, both for providers and their customers. With this in mind – and particularly considering the Internet of Things for business – it's worth looking more closely at the steps on the road to providing IoT services.

Step 1 – Recognize the Possibilities of the Internet of Things

Internet of Things connectivity means that, as a user, you can control Smart Home devices from the dashboard of your car. It means you can get Smart Shopping notifications about offers tailored for you, based on your location. And, with Connected Car, it means your vehicle can become a mobile device in every sense. These are just a few of the benefits of the Internet of Things, and they all represent opportunities for providers who embrace this technology.

Step 2 – Understand Vertical Specifics to Harness the Internet of Things for Business

For business, the Internet of Things is a potentially world-changing phenomenon, the impact of which relies on its practical applications for various and specific industry verticals. These days, this means end-to-end solutions offering functionalities built with the end user in mind.

Step 3 – Understand the Requirements of Truly Comprehensive Internet of Things Services

Smart Cities, Smart Homes, Connected Cars... these are among the Internet of Things applications with which end users interact. In each vertical, though, true Internet of Things services consist of much more than the application. They require multi-level connectivity, interfaces not just with the human end user, but also between devices, as well as functionalities such as intuitive dashboards

and graphic representatives of data, and APIs to external systems.

Step 4 – Build IoT Services

It should be clear from the above that creating true IoT services is a complex process. The first of the Internet of Things challenges to be faced by a service provider is always IoT service building. This comprises a number of different sub-steps.

The first relates to buying or hiring equipment and devices. For a service provider contemplating the development and manufacture of their own device, factors such as prototyping, fine-tuning, connectivity, module building and, finally, production should all be taken into consideration. An alternative is to consider hiring equipment, with a hybrid step of partial outsourcing bridging the gap between the two approaches. Obviously, such a financial decision should be taken with a close eye on all potential costs.

Device testing and certification is another important process, which may even be the subject of legislation in some verticals. These include the automotive and healthcare industries, which require stringent safety testing and certification of devices. Such rigorous controls will influence the ways in which the Internet of Things applications can operate.

Security is a key factor to address when considering IoT service building. Issues surrounding access and user identification affect physical devices, as well as the storage of data, cloud control, and network connectivity. High quality Internet of Things services are hallmarked by high-level security which guarantees peace of mind to clients.

Knowing how a device is used can help providers to improve and monitor services, so API exposure must be taken into account. In the automotive vertical, a Connected Car might return data about distance traveled; for Smart Home, it means the possibility to track and optimize energy use; on a factory production line, data delivered about the operating speed and temperature of a piece of equipment can help identify problems before they arise. Establishing the correct API at the start is the key to understanding how a specific vertical is using a particular device.

Only when the above mentioned matters have been addressed should you think about creating, or buying, an application for a specific vertical. Yet the IoT services build stage doesn't end there. To have practical application from the business perspective, there must be a degree of data insight. An Internet of Things service should allow remote management actions based on data returned from a given device. Has a car exceeded its mileage limit? The insurance will be changed. Is a device somewhere it shouldn't be? It will be disconnected. Has there been unusual activity involving a device or account? The registered user will be notified by email and SMS.

Step 5 – Deploy IoT Services

With IoT service building complete, it's time to move on to deployment. And, just as for IoT service building, this is a process that can be broken down into several sub-steps.

Service creation and selling is the first of them. Strong customer focus means there is no one size fits all rule for the particulars of this stage, and they will differ from vertical to vertical. The fundamentals, though, such as marketing, advertising, client presentations, pricing, contracts, after sales support, warranties, and so on, remain constant. The differences are in how they are applied for a given vertical.

Service activation might sound too obvious a process to mention here, but it is worthy of inclusion because it is not as simple as it sounds. For example, should it be manual (carried out by the end user or the operator), or is automatic activation better? If the latter, what should the trigger be? A fixed time of testing or level of use? A pre-determined distance travelled by a car? A given volume of data returned by a smart meter? The systems underlying the application should ensure that, whether triggered automatically or manually, activation should require no further human intervention after the instruction to "go" has been given.

In IoT service deployment, every aspect of all commercial relations between, partners, developers, device manufacturers and end users should be taken into account in a billing process that will

result in the efficient creation of invoices.

Finally, API plays a role in service deployment, just as important as the one it plays at the service building stage. Data can be exposed to customers who want to reuse their own systems and require secure access to API data with filtering and correct pricing – but multitenancy must be taken into account to ensure data exposure.

Step 6 – Remember that Fools rush in where angels fear to tread

Carefully focused market research, development and deployment can simplify many of these steps for most verticals. A slow start, followed by steady growth and an end-to-end proposal can provide more sustainable commercial success than leaping feet first into the IoT and attempting to take on all Internet of Things verticals and their attendant challenges in one go.

Step 7 – Maximize Partnerships

Closely connected to step 6, this means making the most of available external resources. Take advantage of outsourcing companies, work to mutual advantage with partners, select the most cost-effective manufacturers for the Internet of Things elements that you require. The effort will be reflected in your profit margins.