A Complete Guide to Choosing the Right IOT Platform

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Abstract

In the recent years Internet of Things has reached its peak in hype cycle where many business and enterprises have started to invest in IOT products and solutions. As the name suggest Internet of things is the bridge for connecting the Physical Things to the Internet. The connected Things market is growing at exponential rate. It is estimated that by 2020 there will be around 25 billion connected devices.

The backbone to the growing IOT market is the IOT platform which is the infrastructure that enables creating and deploying connected product or solution feasible. The IOT platform market is an emerging landscape expected to grow at 35% per annum and attain a size of $1.16B by 2020. Lot of players big and start up alike are creating platforms that can help in building IOT products.

In this whitepaper, we discuss the IOT platform, the need for an IOT platform, and key elements that make a true IOT platform. We will also look at how PAASMER’s IOT platform scales against these features.
Introduction to Internet of Things

Internet of Things

The IOT is the network of dedicated physical objects (things) that contain embedded technology to sense or interact with their internal state or external environment. These physical objects are connected to the Internet. Gartner estimates that Connected things will grow from 5B in 2015 to around 25B by 2020.

Slowly most of the everyday objects are turning into connected things, from connected LED bulbs, cameras, coffee machine, tooth brush and other appliances in the home to connected machines in factories. New uses cases are emerging everyday transforming our lives and bringing about a digital revolution.

The growth in IOT is just not because it’s creating cool product but also because it bringing real values like convenience, efficiency and safety.

Every research estimates that IOT is going to grow incredibly and is poised to become the digital disruption. McKinsey estimates at the top end that IoT will be an aggregated $11 trillion business opportunity over the next ten to fifteen years – equaling about 11% of the world economy.
Before we jump into the IOT platform and what it offers, let's look at what are the fundamental building blocks that are needed to create IOT system.

✔ **Hardware:** This is essentially the IOT end-point and this where the data is generated. The hardware end of the IOT includes the sensors, actuators, the communication hardware and the gateways.

✔ **Communication:** This is where data gets transported. This part of the technology infrastructure ensures the hardware is connected to the network, via proprietary or open-source communication protocols.

✔ **Software backend:** This is where data is managed. The software backend manages all connected devices and networks and provides the necessary data integration as well as the interface to other systems (e.g., ERP-system).

✔ **Applications:** This is where data is turned into value. In the application layer, IOT use cases get presented to the user (B2C or B2B). Most of the applications run on smartphones, tablets, PCs or other devices/things and “do something valuable” with the data.
IOT Platforms

IOT platform provides the underlying architecture that helps build the IOT application and services. IOT platform is a suite of components that

- Provide connectivity to the end points.
- Data Collection from the end points.
- Monitor, Manage and control the end points.
- Data storage and processing
- Data insights and control.
- Securing the data path.
- Integration with 3rd party.

Need for IOT platform

IOT platform has gained lot of significance in the recent years since it is the platform that connects the IOT endpoint to the applications and analytics needed to generate business outcomes. It is essentially the anchor in building an IOT solution as it enables the data generated at the endpoints to be processed and meaningfully used by end users.

For any company looking to build an IOT product or service will need all the underlying block to create a successful product. But the key question for any organization is whether they create the platform from the scratch or use an existing platform.

1. Building an IOT platform from the bottoms up require significant amount of time. It could take anywhere up to 3 years to build an IOT platform.
2. The skillset needed for the whole platform development is expensive and rare.
3. IOT projects themselves are complex and building a complete platform could shift the focus from the product

Using an existing end to end IOT platform could be efficient and time saving for companies newly trying to enter in to the field of IOT.

End to End IOT platform

The IOT platform market is huge and there are variety of players who offer IOT platform ranging from industry leaders to start-ups. And all these platforms claim that they provide the vital component for building IOT solutions. However, the truth is that many of these players focus their platform on one or two elements of the entire platform. Most of the players either offer hardware sensors/gateways, connectivity, application management, Cloud infrastructure, Analytics and even in some cases the enterprise software.

A true IOT platform should be providing the complete end to end infrastructure to build an IOT solution or service, in other words it’s a single stop backend infrastructure to build the IOT solution.

In real essence, a true IOT platform includes Device Management, Device Connectivity, Data Storage, Rule Engine, Analytics, Data Visualization and enterprise software integration.
**IOT Platforms**

**Device Management:**

The key requirement in any IOT platform is device management. This feature defines the ability of the platform to receive and send data from and to the IOT end points. It manages the gateways and end point. There are few key functionalities needed to be done by the platform to perform this activity, device discovery, provisioning, configuring and providing software updates. Most of the sensors or the IOT end points are out in the field. So the platform should be capable of providing provisioning and over the air updates (POTA & OTA) to the devices.

**Device Connectivity:**

Device connectivity refers to managing the data movement upstream and downstream the IOT infrastructure that is the connectivity of the IOT end point (sensors and gateways) to the rest of the Infrastructure like the Cloud. The platform should have capability to communicate over different network and should support the various protocols. This includes cellular as well as non-cellular connectivity. Connectivity management include bulk provisioning, remote troubleshooting, authentication and security, flexible billing and rating, management of thresholds and alerts, management of the connection directly by the customer (e.g. connection turn-on, turn-off, suspension, etc.), and integration of the platform’s functionality into the customer’s existing enterprise management systems via application programming interfaces (APIs) as well as web-based user interfaces.

**Data Storage:**

The data Storage could be primarily through cloud and could also be done near the end point (gateway). Data storage supports combining the IOT data from Sensors / endpoint with other internal and external data to offer insights.

**Application Management:**

Application Management entails tools that assist IoT developers and implementers in rapidly and efficiently prototyping, building, integrating, and managing IoT applications. Application enablement platforms (AEPs) are often offered on a standalone basis in addition to being part of a larger IoT platform. They essentially provide business logic, such as the ability to define rules and alerts, which are common to most IoT applications, enabling the developer to focus on the differentiating aspects of the application that are unique to the market.

**Analytics:**

The data aggregated from the sensors and stored in gateway or cloud as is does not provide any efficiency or business value. This data run through an analytics engine provides the valuable insights that could provide disruption in business process and help in real time decision making.
**IOT Platforms**

The role of analytics is to provide an understanding of what happened and based on the history predict what are the potential events in the future.

The analytics of the IOT data can be real-time, batch, predictive, and interactive analytics. Real-time analytics conduct online (on-the-fly) analysis of the streaming data. Example operations include window based aggregations, filtering, transformation and so on.

Batch analytics runs operations on an accumulated set of data. Thus, batch operations run at scheduled time periods and may last for several hours or days. Predictive analytics is focused on making predictions based on various statistical and machine learning techniques. Interactive analytics runs multiple exploratory analysis on both streaming and batch data. The last is real-time analytics, which weighs heavier on any IoT software platform.

**Data Visualization:**

The data accrued from the sensors should be made available to the end user through dashboard and reporting tools. Data Visualization puts the data in context to help the user to analyses the data and its consequence. This should enable normalization of data and create a report that helps in the decision making process.

**Security:**

Security is another key element in an IOT platform. In an IOT deployment there are millions of devices being connected and transferring data upstream and downstream. This means that the whole system is prone to numerous vulnerability. A multi-layered security approach would be needed to ensure the whole system is not compromised. A Strong IOT platform needs to ensure the security is fundamental foundation in its complete architecture. Starting from Device level authentication at the end points and gateway for access, data encryption during data transport from end point to gateway and to cloud, Creating private network for IOT traffic.
PAASMER is the only platform that can be configured to all the 5 IOT architecture models like Thing-Centric; Gateway-Centric; Smartphone-Centric; Cloud-Centric; Enterprise-Centric. PAASMER is also only platform that provides superior tools to configure an Edge-Centric architecture with its Edge-Operating; Edge-Analytics and Edge-AI for future. Because of this, some PAASMER’s customer have chosen to use only a light-weight cloud that can resulted in huge cost savings for them.

PAASMER is a simple, elegant and affordable solution that has all the components needed to launch a smart, connected, automated and control based IOT products in the market. Our partnership with the hardware vendors and our alignment with various Industry standards allow the client to choose the right hardware for their IOT product and our ready-to-use, easy-to-deploy software for various components like IOT Gateway, Connection software, Mobiles applications, Cloud and Analytics gives the flexibility to launch an IOT product within months.
An Overview of PAASMER IOT Platform

The PAASMER IOT platform is true IOT platform that allows integration of various IOT devices and provides a channel for seamless information flow from the devices to the application. It provides a reliable and secure connectivity, device management, storage, analytics and Machine Learning.

**PAASMER Edge Device:**
Connectivity agents that harness the data from sensors.

**MISTY:**
PAASMER gateway operating system for Intel & ARM hardware that has built-in agents to ensure secure connection between the edge and external components of the solution architecture.

MISTY’s Component overview is depicted in the picture below:

PAASMER Cloud:
Cloud Database and GUI to manage the connected devices. A component snapshot of PAASMER Cloud is shown in the picture below.

PAASMER Cloud is a simple implementation of all essential IoT components required for IoT use cases. It is completed pre-configured cloud system that comes with everything build-in and ready. It tightly integrated with PAASMER BI and it can also be easily integrated with other third party service providers for analytics, machine learning or Artificial Intelligence.
**An Overview of PAASMER IOT Platform**

**PAASMER BI:**

IOT analytics can be grouped into 5 key benefits:

1. **Product & service feedback** – manufacturers use product usage feedback to assess product quality and monitor behaviour thereby focusing on their R&D spend

2. **Usage behaviour tracking** – understand how customers are interacting with the connected product and enhancing the experience to match the customer’s behaviour

3. **Operational analysis** – optimize service offerings based on usage segmentation analysis and reduce the costs associated with providing that service

4. **Contextual analysis** – enrich the sensor data with external data (weather, geolocation, etc) to provide greater context on how the physical objects are behaving in relation to their surroundings

5. **Predictive analysis & maintenance** – use previous patterns and the knowledge of the current usage to predict future trends and behaviour

PAASMER BI Provides data intelligence and visualization to improve performance and analyse patterns. A component snapshot of the PAASMER BI based analytics is shown below.

**Mobile Application:**

Framework that allows quick and easy way to build smart application with rich UX to manage the edge devices from the smartphone in secure way. A sample snapshot of the mobile application with analytics based prediction and rich security hooks can be seen below:
An Overview of PAASMER IOT Platform

PAASMER Security:

PAASMER IOT Platform started with security as the fundamental building block on which the whole platform architecture evolved. Hence PAASMER defines robust security layers for each release in multiple phases of the platform roadmap.

A Robust Security Framework that is implemented and enabled through PAASMER 1.0 which the released version and first generation of the platform is show in the Pic.1

Each block in the picture represents and ensures that from device to cloud everything from hardware, communication and software interactions are secured.

Secure Boot, Secure Update and Crypto Key blocks are typically combined with a Crypto management technology called TPM. TPM can be implemented either as software layer or a hardware layer. A hardware TPM provides a more secure implementation over a software TPM. However, hardware TPM implementation comes at an additional cost.

The TPM, a secure cryptographic integrated circuit (IC), provides a hardware-based approach to manage user authentication, network access, data protection and more that takes security to higher level than software-based security. Perhaps surprisingly to many IT and operations staff, the TPM can be combined with widely used enterprise hardware such as network policy enforcement points, including Checkpoint firewalls, Cisco switchers and routers, and other 802.1x-compatible devices.

Using this security technology of PAASMER three aspects of IOT security can be ensured.

- Devices Must Not Have Open Inbound Ports.
- End-to-End Encryption.
- Token-Based Access Control.

These security components are built into MISTY – PAASMER’s Fog Operating system for End Devices.
**About**

MoboDexter, Co-Founded by Ex-Intel veterans in 2013 is based out in New York, Bangalore and Singapore. We are rapidly establishing itself as an innovative platform leader in the world of enterprise Internet of Things. In the booming and evolving Internet of Things market, MoboDexter has created a unique IoT platform to enable businesses to build their IoT products and solutions. *PAASMER is a software suite that bundles all the elements needed to connect sensors, gateways, mobile application, cloud and analytics to develop, build and deploy connected IoT products quickly and efficiently.* PAASMER’s end goal is to enable Artificial intelligence to “Things” so that Things are enabled with their own intelligence to act in the best interest of the user. Hence Machine learning and Deep learning are integral choices in the platform for our clients to leverage.

The unique aspects of PAASMER platform that differentiates our platform from other IoT Platforms in the market are

- **Best In Class High Speed Edge Database**
- **Innovative Edge Analytics**
- **Modular Edge OS**
- **Innovative Edge & Cloud Security**
- **Dynamic Cloud Management**

MoboDexter is advised by Gartner Inc. In a recent Gartner survey, top 4 verticals seeing steep growth in IoT implementations are HealthCare, Connected Home, M2M & Retail. These are the same 4 verticals that are growth focus for PAASMER and has signed up clients across the world in each of these verticals. Our client implementations case studies are [here](#).

**Raconteur Online wrote** - “MoboDexter’s IoT Platform as a Service, named PAASMER, and has been built with an inside-out approach from gateway upwards or downwards that makes it more versatile and flexible to integrate than existing platforms”

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References