Who pays whom for what in Industrial IoT?

In the third article of this series, Alan Griffiths of Cambashi looks into how different technology companies work together to provide Industrial IoT solutions and how the money flows. In other words, 'Who pays whom for what'.

Doing the jigsaw

Given a basic understanding of the market for the Industrial Internet of Things (Industrial IoT, or IIoT) and who the main players are – as described in the previous articles – it's important to know which companies are capable of providing each part of the solution and how they work together.

Even if an organisation works through one 'umbrella' company (a system integrator) it's sometimes useful to understand how the cost roll-up works so that it can consider buying some or all the pieces separately – in the same way that an airline can decide the paint scheme and which engines are to be fitted on the aircraft they choose. However, do remember that an organisation will be taking on more risk and contractual complexity if it chooses to deal with each supplier individually.

Finding out who's involved in providing a 'solution' is not as straightforward as it sounds. To function effectively, many solutions require an ecosystem – a collection of providers offering different products and services that are designed to knit together seamlessly.

For a complex IIoT solution, instead of 'doing it yourself', a company can employ a prime contractor such as KPMG who will use PTC's ThingWorx technology to develop the solution, the GE Predix IoT platform to run it and Microsoft's Azure cloud for hosting. IoT sensors may come from a variety of suppliers, such as Texas Instruments or Qualcomm, and edge ('fog') computing could be provided by HPE or Cisco. In other words, different suppliers could be involved at each level of the stack (the six layers of IIoT discussed in the first article).

Some providers, such as IBM and Oracle can provide most if not all the stack, but there is still the option to involve other suppliers. For example, if a company already has a PLM (product lifecycle management) system from Siemens or Autodesk and wants to include its IoT capability in their total solution, then most providers will be glad to consider this in their solution design.

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As the IoT industry matures, different use cases (templates) are being developed for different vertical applications, so it may be possible to find an existing one that is a good fit to a company's requirement. For example, Cisco is currently analysing over 100 use cases from which they will define a number of standard models in different vertical industries.

How providers work together

Let's examine a couple of use cases to see how various providers work together in different industries.

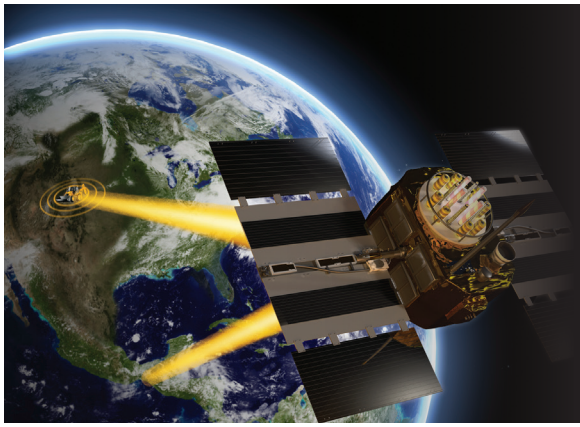
Use case 1: GreenQ – Self-designed and built

GreenQ is an Israeli start-up that provides smart residential waste collection to municipalities – the 'Internet of Garbage' as they call it (see box).

Shlomy Ashkenazy, CEO and GreenQ founder (https://greenq.gq) explained in a recent presentation how their system monitors data and optimises collection for a city of 500,000 residents with less than 100 hardware installations (they install their system on the trucks – not on the bins).

They realised the garbage collection process was inefficient because – like most other cities – the bins were always collected on given routes at certain times, regardless of how full they were. This meant that the trucks would usually have spare capacity at the end of a run, or else risk being too full to collect the last few bins.

GreenQ's sensors on the garbage trucks measure each bin's capacity. With every lift of a waste bin, the system on the



IIoT systems such as JCB's LiveLink allow companies to monitor the health, condition and location of assets anywhere in the world.

truck measures the amount of waste inside the bin and monitors the time and location of the pickup. The data is analysed and sent through the cloud directly to the end user's mobile device, along with notifications of any unusual event and recommendations for optimisation of the collection process.

The system installed on the trucks can work on IBM infrastructure, both OpenWhisk or Bluemix IoT service, and uses the MQQT (MQ Telemetry Transport) messaging protocol.

The generated data is analysed and transformed in real-time using IBM Watson analytics to plan the optimal collection process, based on what has been 'learned' from previous collections and according to the client's needs.

GreenQ has delivered a 50% cost reduction for a municipality in Israel, mainly by cutting truck mileage, leading to significant fuel savings and a major reduction in emissions. Although GreenQ worked closely with partners, they essentially designed and built the system themselves.

GreenQ's Internet of Garbage – optimising mass waste collection

Solution

- Monitoring devices on trucks
- Waste monitored and measured with big data analytics

Main components

- Cloud – Watson Data Platform with Bluemix PaaS (Platform as a Service)
- Compute and development platform – OpenWhisk FaaS (Function as a Service)
- Analytics – Watson IoT Platform
- Connection protocol – MQQT

"JCB's Livelink telematics system allows the company to remotely monitor the real-time health and performance of their assets in the field.

Case study 2: JCB India and system integrator Wipro – Working in Partnership

A different model has been followed by JCB India, where Wipro has designed and installed a system called 'LiveLink', which connects over 10,000 JCB construction machines, such as backhoe loaders, excavators and compact wheel loaders, which are operated by its customers across India.

The LiveLink IoT solution was designed and deployed on Wipro's cloud-based industrial asset platform by a consortium of specialist partners such as IBM and Cisco. Wipro's After Markets solution team, a part of their manufacturing and hi-tech business, provides the turnkey solution and is responsible for ongoing deployment and support.

JCB's LiveLink telematics system allows the company to remotely monitor the real-time health and performance of their assets in the field. Data analytics allows prediction of maintenance needs and service before failure, increasing the operational availability of the equipment. The geo-fencing feature prevents misuse and theft of assets, and allows asset owners to enforce contract compliance.

Who pays whom?

As the IIoT market evolves, a variety of customer payment models are used. The revenues are generally collected through a combination of fees, such as: traditional software licences (plus annual support and maintenance); annual subscription; pay-per-use;

and pay-per-item. Other innovative pricing models such as 'percentage of profit accrued' are also being developed, and all these payment models will evolve as the industry matures.

When it comes to paying for the creation of an IIoT solution, there are two steps – development and operation – and different payment models apply.

Designing and developing the solution
There are two main requirements for designing (architecting) and developing (coding) an IIoT solution. First, systems engineering software, which is used to design the systems; and second, software development tools, which create the IoT applications.

Systems engineering software is provided by companies such as Sparx Systems and IBM, as well as engineering software providers Dassault Systèmes, PTC and Siemens.

Software development tools are used to design, create and test the software that goes inside devices, as well as the software to which these devices connect. Providers include companies such as Mathworks, Microsoft, Oracle, and PTC/Thingworx.

Both the systems engineering software and software development tools are used once to create an IIoT solution, which is then modified as changes are required. They have sophisticated user interfaces and rich capabilities, so an individual licence is expensive – but not many are needed. Some suppliers offer free access to development tools and collect royalties on production units.

Operating the Industrial IoT system
An operational IIoT system involves some combination of the six layers described in previous articles, including the smart connected devices, the connectivity and the servers. These components are in continuous use once the system is operational and are triggered by unpredictable events or conditions. A wide range of payment models are available, such as $0.01 per transaction, and they may even be free up to a certain number of transactions, devices or server capacity required. Where ongoing analytics are required, suppliers such as Wipro are even offering 'pay-per-insight'.

In an example like the team at GreenQ, who designed and built the solution themselves, some of the components, such as sensors, may have been bought outright by the end-user company (e.g., the city of Tel Aviv). GreenQ may have paid for the development environment as an SaaS (software as a service) subscription and the Watson learning component through a compute-based payment model. The day-to-day operation and support of the system in the cloud will usually be an annual subscription based on the amount of storage, compute power and number of transactions.

Many IIoT implementations are projects rather than off-the-shelf solutions, so in many cases, a system integrator is used to analyse the need, and then design, implement and possibly support the solution. In this type of arrangement the system integrator (e.g., Wipro) would act as the prime contractor. Their client (in this example JCB India) would usually have a single contract with the system integrator, which would be responsible for all sub-contracts. Often, the finished solution is handed over to another organisation for support and maintenance – Wipro's After Markets solution team commercially manages both the delivery and support of the solution for JCB India.

Further information
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