Six IoT models

Which should telcos choose?

IoT for enterprises is breathing new life into carriers' operations – an opportunity that's come at the right time given the saturated consumer market and dwindling revenues.

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New opportunities and challenges

Vodafone's *The IoT Barometer 2017-2018* reports that the number of companies implementing large-scale IoT networks with over 50,000 connected devices doubled between 2016 and 2017.

In China, 20 percent of cellular connections are IoT connections. The sharing economy and mobile payments have helped IoT applications thrive, like bike sharing services, which now has almost 1 million connected devices. We forecast an explosion in the IoT market over the coming three years so that by 2020, the number of IoT connections will account for the majority of mobile connections.

Carriers must shift focus from connecting people to connecting things, and access the industry vertical market via IoT to open up new revenue sources. On top of market competition from other telcos, carriers face many challenges.

These include how to avoid devolving into a mere pipe provider (pipefication), incubating high-value customers and applications across a fragmented industry, building IoT platforms suitable for industry, and monetizing value.

Pipefication

Industry customers still regard operators as mere providers of pipes and SIM cards. When competing for industry customers, they need to beat competitors that provide unlicensed spectrum-based connection technologies and solutions like LoRa. They also need to deal with the fierce price competition, as operators offer undifferentiated pipe services.

Attracting large clients and a high market share is the only viable option carriers have. For example, revenue from one IoT SIM card accounts for just 10 percent of the revenue a single consumer generates. Moreover, the value of pipe connections represents just 2 percent of the entire IoT industry chain; for example, gas and water companies make it clear that they can afford communications fees of only 6 yuan/year per meter.

Fragmented scenarios

The IoT industry is extremely fragmented and doesn't benefit from economies of scale. Incubating applications calls for deep integration with the production and service processes of individual industries and enterprises, meaning carriers need expertise in and expert personnel from many verticals to become trusted enablers. But before they can develop large-scale industry applications, operators need to resolve the tricky questions of what industries to choose and how to generalize common industry requirements based on individual requirements.

Monetizing the value of IoT platforms isn't easy

Once things are connected, operators hope to become the key enablers of these devices through IoT platforms and complete the transition from M2M to IoT. They face two problems here.

First, do industry players need operators' IoT platforms? Many indicate that they've built their own end-to-end applications and only need operators to provide pipes.

Second, how should operators determine what to and what not to offer if strong demand exists for IoT platforms and thus truly act as enablers?

After all, platforms have to attract and retain industry players, build an active partner ecosystem, and also generate their own value and control points.

Break into the market with new business models

A general trend we're seeing with how leading operators have implemented IoT is that during initial implementation, operators break into the upstream and downstream ends of the value chain with application services and devices. They then extend from the two ends to tap value from ICT industry customers and avoid pipefication. The typical model for operator IoT implementation is "1+N+X", where:

1 = IaaS + Connectivity management platform

(CMP): infrastructure and connection management services, where operators have inherent expertise.

N = Device management/Application enablement platform (DM/AEP): construction of enablement platforms with partners.

X = SaaS: opening up capabilities and tapping value from ICT industry customers.

IaaS and CMP are the basis of 1+N+X, with PaaS capabilities enabling the connection and management of devices in scenarios with a high number of connections or high concurrency. This is expanded to enablement platforms, SaaS applications, and industry solutions. At each successive layer, value from IoT increases.

Traditional models of network construction, service rollout, and selling data traffic cannot be applied to developing IoT services. So, the issue is how to reconstruct the business model.

Six typical business models

Smart devices and upper-level applications are higher value, comprising about 60 percent of the industry chain, while the value of connections and platforms yields just 20 percent. Moreover, industry data generated by high numbers of connections also create opportunities for big data applications.

As a result, all ecosystem players wish to use their existing strengths to move into upstream and downstream sectors and occupy leading positions on the value chain. There are six connectivity-based business models for doing so, with more services provided and greater value obtained from each successive type of model.

Model 1 – IaaS: This model is the traditional M2M market. Operators sell SIM cards, but don't know where or in what scenarios they're used, and provide only general network guarantees and billing functionality. This very simple approach uses a data package sales model.

Model 2 – PaaS: The operator constructs a CMP for the IoT market, providing SIM card management services and offering customer-facing services like self-service allowance queries and top ups, and volume activation/shutdown. At this stage, the operator can also adopt a message-based billing method as well as the traditional one based on data usage. Because CMP provides a link to industry customers, operators can package cloud services on top of connectivity services and also move into the module market.

Model 3 – PaaS+: This typical platform model includes building an AEP that lets operators integrate Communications as a Service (CaaS) capabilities, like voice, SMS, video calls, and data storage, with third-party capabilities, such as voice semantic identification/control, image recognition, and maps. The operator can open these capabilities to developers and industry customers through cloud APIs. In addition to a billing model based on data usage or messages, customers can be billed according to API invocations or functions packages.

Model 4 – SaaS: The operator builds

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general-purpose industry suites by refining solutions for common industry requirements. Customers just need to do a small amount of development and customization to meet specific needs for different scenarios like smart homes, smart metering, or warehouse management. The billing model can be based on either the number of connected devices or the industry suite.

Model 5 – SaaS+: Similar to Model 4, but with an extra layer. The carrier provides connectivity as well as device and upper-layer application platforms, realizing the E2E integration of upstream and downstream ends of the chain. It participates in industry back-end O&M through service provision. By generating value for industry customers, the operator can acquire even higher returns and participate in value distribution through revenue sharing. This model suits new application scenarios in small-scale industries that are easier to enter but offer high value.

Model 6 – BaaS: This is the most advanced form of industry application. The operator obtains a business license and operates in a cross-sector manner.

Models 1 to 3 are horizontal models – the operator only needs to offer standardized products rather than differentiated products or services designed for different verticals. Profits derive from economies of scale. Models 4 to 6 involve operators more deeply in the vertical industry, expanding from connectivity/platforms to either end of the chain. As involvement increases, so does service complexity and value returns.

Looking at how leading operators around the world have implemented IoT services, we recommend the following three classic business models: Model 2 (connection specialist), Model 3 (platform provider), and Model 5 (solutions provider).

Model 2 – connection expert: Connectivity and cloud are the core here. The operator provides bundled basic cloud services, meeting industry cloud service requirements, increasing service stickiness, avoiding price wars, and increasing average revenue per connection (ARPC). It suits operators that are new to IoT and have a strong network foundation, but lack IT service capabilities and experience. SingTel is an example of an operator that has adopted this model.

Model 3 – platform provider: Focused on platforms, it offers rapid integration and TTM as well as the cross-selling of products such as carrier cloud and big data. It provides open APIs, creating an IoT ecosystem with development tools for industry developers, operating environments, device management, data aggregation, data processing, business analysis, and smart decision-making. There's vast potential for future development with this model. Model 3 is currently a popular choice among operators with ecosystem capabilities. AT&T and Telefonica both follow this model.

Model 5 – solution integrator: This model focuses on service integration – SaaS and devices – and value sharing with industry players. The operator must have high capabilities in multiple areas and be able to offer customers package

solutions including terminals, software apps, and integrated services. Operators need strong network and IT capabilities and a deep understanding of the target industry. Vodafone and Deutsche Telekom are two operators that have adopted this model.

IoT development with business models

Typically, there are three steps for operators to develop IoT services. The first involves providing connectivity services for verticals and then quickly scaling up. The second step involves providing platform services to companies that want to build IT capabilities and enabling industry players step-by-step on the IoT platform. In the third step, the operator provides E2E solutions for three to five vertical industries, first refining, then optimizing, and finally standardizing the solutions to replicate them at scale.

Connectivity is the area in which operators are strongest and platforms are the key for them to achieve future success in IoT. In the initial phase of establishing an IoT service, many industries and application developers demand reduced development costs and fast TTM. The first to provide cloud-based open platforms, low-cost IaaS (connections and cloud), open access management, and extensive pre-integration capabilities will have a head start in building IoT ecosystems and obtaining a wealth of applications from industry partners and massive amounts of accompanying data.

How should operators leverage IoT platforms to bring together ecosystem partners and tap value from industry and applications based on existing connections? There are three models to follow:

CMP and industry enablement platforms to lure partners: This model focuses on building a CMP on which multiple industry enablement platforms can coexist. Industry DM or AEP is operated in partnership with partners and revenue is shared. China Telecom, for example, focuses on public services, IoV, and home appliances as its key verticals, with infrastructure/cloud services and CMP at its core. To attract partners to co-construct service enablement platforms in IoV, China Telecom built an IoV cloud enablement platform with its partners using IaaS and a CMP that provides services for auto makers and after-market companies. China Telecom has also developed the market by working with them to expand into pre-installation and after-sales services, sharing revenue and value.

CMP + SI: This involves building a CMP, G-PaaS capability decoupling, and multi-vendor co-construction, focusing on SaaS and integration services. For example, Deutsche Telekom built its Multi-IoT Service Platform with open, universal platform capabilities, bringing a raft of platform providers such as Huawei, SAP, and Microsoft onto the G-PaaS. The carrier also focuses on its own SaaS, providing rapid integration service capabilities, IoT ecosystems, and consultancy services for industry players.

Centralized CMP + SaaS operations: China Mobile's IoT subsidy, OneNet, carried out top-down planning, service standardization, and whole-network centralization operations. Underpinned by its network, it moved into downstream development, launching its own brand of communications modules to carry out upstream development, build an IoT platform, (called OneNet) and collaborate with others to provide vertical industry applications. At present, China Mobile has sold close to 2 million own-brand IoT modules that are used in areas like public utilities, cars, and consumer electronics.

The IoT sector is a very close match for operators' strengths and resources. However, if they want to avoid pipefication and exploit the coming explosive growth in IoT, they must get out of the comfort zone and into areas of high-value with strong strategies and new capabilities. H