IoT-centric Business, Technology and Billing Challenges for CSPs

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CSPs must embrace rapidly evolving IoT marketplaces, technologies and services to drive new revenue and stay competitive. Whether sold directly to consumers and businesses, or through partnerships, solutions like connected cities and cars, telemedicine, utilities and agriculture, and "pureplay" connectivity solutions (LTE-M, LPWAN, 4/5G) are complicated endeavors. This is particularly true when coupled with their respective ecosystems, bundling, and partnering challenges. Considerations like the cost to serve, configurability and scalability are especially challenging in light of the numerous legacy systems deployed in many CSP environments.

Complex New Business Models

Cloud-connected assets and customers with real-time information and decision-making capabilities form the basis for enhanced business models. Businesses can deploy more customer-centric, outcome-based models and respond quickly to evolving markets. When businesses can scale immediately upon demand, they can allow consumers to purchase incremental amounts of a subscription, opening new consumer options and revenue streams. New business models means more flexibility in the options offered to consumers, for example, the ability to purchase self-monitoring products and services, or to support automatic reordering and maintenance for roadside assistance with dispatch (including vendor settlement), windshield replacement, among other options.

Consider how Rolls Royce, as covered recently in IoT Business News, provides jet engines "as a service" for airlines. They own the engine and its care and maintenance, while the airlines pay a fee per-engine-flying-hour for an engine in which thousands of sensors are embedded to track real-time engine conditions and monitor upcoming maintenance needs using predictive analytics. Airlines reap the benefit of simplified operations, and Rolls Royce increases its revenues.

Continued Technology Growth and Adoption

The number of connected devices is growing at a rapid pace, generating massive amounts of real-time information that enables deep insight about the devices and the environment around them. All these devices require connectivity. IoT-centric examples include LTE for Machines (LTE-M), low power wide area networks (LPWAN, i.e., Ultra Narrow Band) and spread spectrum connectivity. These technologies do not require power and provide five to 10-year battery life.

Monetization Challenges: Key Questions to Ask

Where does this lead from a billing and monetization perspective? How do you cost-effectively sell $1.49/month or $16.00/annual plans for LTE-M connectivity (based on AT&T's publicly-stated low-end pricing)? And what about cases where CSPs also sell additional services layered on top of connectivity, and provide partner services requiring settlement with multiple parties? How can they

cost-effectively bill, support, recognize revenue and provide partner settlement for enterprise accounts with thousands or millions of devices per account? For IoT services, CSPs must also frequently factor in multicurrency, personally Identifiable Information (PII) and data localization on a global basis.

Historically, many CSPs have in-country or regionalized billing systems. They haven't necessarily needed to address consolidated global billing. When organizations evaluate the "cost to bill" for services with legacy systems, the billing costs alone can exceed ARPU, as in the "connectivity alone" example above. Several Tier-1 CSPs have mentioned this as a factor in driving a need to look at alternative solutions. Additionally, most legacy systems are expensive to scale and configure — many requiring coding — and an installation to address a new region due to data localization. This is all highly cost prohibitive.

Another complex billing and monetization challenge is the OEM Connected Car. The use cases include transition of payment for the services and scenarios where multiple parties have payment responsibilities at the same time. This use case potentially has millions of devices per account on an inter-country basis and requires complex hierarchy management from both a billing and reporting perspective. For example, the OEM pays for services until the dealer accepts delivery of the car. The manufacturer may then only pay for diagnostic data, and the dealer pays for all other services. When the car is sold, the dealer pays for core services for a fixed period, but the user may pay for additional services available via CSP or third party. Hence, you could have payment by three parties on one device and require settlement of third-party services. If a CSP wants to address OEM global business, its billing system must solve the "cost to serve" issue and consolidated billing challenges mentioned above.

Smart Cities are a good example of a non-global use case. Most CSPs have allied services and capabilities that provide competitive advantage in many circumstances. While there is no global element, the ability to bill, recognize revenue, handle third-party settlement, and track advertisement, click-through, and purchase data are all critical.
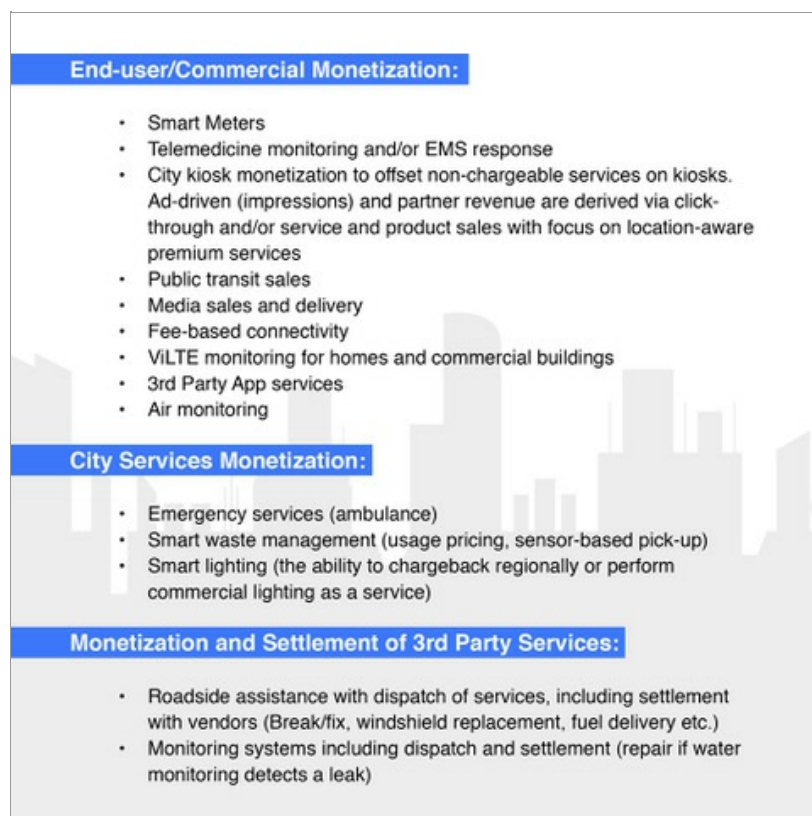
Smart City Monetization Models:

Figure 1: Smart City Monetization Models

Privacy, Data, and Product Catalogue

Challenges

Other key challenges involve the PII and data localization evolution. Increasingly, privacy and data localization issues are requiring data to be highly secure and frequently kept in the country of origin. This is especially challenging for enterprises where clients require homogenous offers, management and support for their users on a global basis (pooled and shared usage, ordering, hierarchy management, consolidated billing, etc. across geographies and time zones). The data may be disparate, and languages and currencies will typically be localized. Adding legacy resources may be too slow and costly for new markets.

How do you address international sales, marketing, provisioning, and customer support, especially with the services landscape rapidly changing? How do you manage a global portfolio with your product catalog(s) (PCAT) without proliferation, master-and-slave issues, and other variables that directly or indirectly relate to billing and account data?

Many IoT deployments are fundamentally complex ecosystems. They are comprised of multiple vendors' services and products. To support this PCAT, data structures and CRM should logically segment key system elements. This would allow cloning of PCAT objects and unique pricing per region, marketplace and sales organization, as well as support for separates orders, CRM users, and accounts, so only that group's users can access their accounts or data. Systems should also possess the ability to support the selling and provisioning of third-party services and provide configurable commissioning or settlement.

Cloud Benefits and Pitfalls

When CSPs are looking for alternative solutions, cloud-based solutions are typically at the top of their list. After years of hesitation, cloud technology is recognized as a mainstream business platform and growth engine. But not all SaaS cloud billing companies support the key capabilities that will help keep cost to serve as low as possible.

Consider if the solution has true cloud capability, and whether it is containerized and data center agnostic. This is especially important for global CSPs requiring multiple geographic instances. Also consider whether the system is natively elastic. The solution should scale up and down based on demand, and clients should only pay for what they use. True elasticity affords a far less expensive initial rollout since CSPs do not need to size the infrastructure for future loads.

When reviewing Cloud/SaaS vendors, it's important to look closely at their rating capabilities, and especially their configurability and flexibility — no coding being optimal. While legacy systems handle sophisticated multi-variable rating, do not assume Cloud/SaaS raters were designed to natively support telco-grade rating. For example, many do not support segmentation for usage. If a single usage event has QoS, time of day, class of service, night or weekend rating variables, their raters would need to maintain every combination of attributes. This leads to usage type proliferation and burdens the client to assess the type of usage it is outputting to identify and tag the usage unit.

If going with traditional legacy vendors that now claim to offer a cloud product, it's important to ask the same questions that would be asked of a SaaS/cloud provider, as mentioned above. The answers might be surprising.

TM Forum provides a great overview of the capabilities to expect from a native cloud solutions [here](#).

The Solution

There is no one "right answer" for all CSPs, as the answer may be as much about process as it is about technology. The IoT landscape has challenges that CSPs tend not to encounter when operating billing systems on a property or regional basis. CSPs need agile, highly configurable, scalable, cost-effective monetization for IoT services and products.

We suggest evaluating current cost-to-serve and reviews of what new processes and configurations will look like. From there, CSPs should factor in potential changes such as having to operate in new countries where data localization requirements force a local store of data. Consider also factors that address issues like OEM Connected Car and related costs. For example, is there a need to migrate to a distributed data structure if a client wants to sell fleet connected cars with pooled mileage allocations and overages across geographies, or will there be a need for another instance due to data localization?

In many cases, the addition of new cloud-based services will be far less expensive than modifications and licenses to existing legacy engines. The answer may lie in something as simple as adding a standalone Cloud/SaaS engine, or utilizing the system as an adjunct rater in concert with legacy systems.

After internal teams have thoroughly reviewed anticipated and current requirements, it's important to ask prospective vendors the tough questions outlined above so as to future proof solutions. The landscape is evolving rapidly and billing vendors will be critical to uninterrupted growth curves.