The business support system (BSS) of operator X involves multiple rating and charging systems. Prepaid voice services are rated through an intelligent network (IN) system; content services are rated through a dedicated content rating system; post-paid voice services are rated through the billing system; while multimedia messaging services (MMS) are rated through the MMS center.

Operator X is left chasing the rising tides of stiff competition. A new rating system is constructed when each new service is added and the existing billing system has to be reconfigured and interconnected. The separated rating systems not only increase operational expenditures, but also make it more difficult to provide diversified tariff packages.

It appears to be high time to change the billing support architecture. During recent meetings on operations, they discussed this topic at length and came up with some solutions.
Four advantages of convergent billing

Convergent billing has become a hot topic in the telecom industry. The 3rd Generation Partnership Project (3GPP) defines in the R6 specification, the framework and interfaces of the online charging system (OCS) for convergent charging support.

Huawei, with more than 10 years experience in the IN, BSS, data services and charging systems, has developed a complete convergent billing solution (CBS) offering high flexibility and open characteristic of IT systems, plus carrier-class reliability. Based on the core engine and modular design, the Huawei CBS supports step-by-step implementation according to network status and future evolution strategies.

Rule-driven engine shortens the TTM

The Huawei CBS adopts a telecom platform and an IT core, based on a rule-driven engine for online and offline charging. Rule-driven means that during system implementation and operations, an operator or others can compose new rating or billing rules with simple language, such as IF...THEN..., AND, OR, >, <, and ==.

The rule-driven engine covers three functional fields: rating, charging, and charging off. These fields are frequently changed in a billing system. Through the rule-driven engine, operators can respond to new requirements more quickly with the help of hierarchical configuration interfaces that are encapsulated for different operation personnel. Instead of deployment taking several days to several months, in some cases implementation time can be cut to several minutes, resulting in a significant improvement in market competitiveness.

Real-time billing, real-time care

Traditionally, the prepaid service adopts a real-time billing mode, while post-paid service is not in real time. The CBS gives the operator a choice of implementing real-time or non-real-time billing for both prepaid and post-paid services. In the real-time billing mode, post-paid subscribers can get real-time service navigation, balance prompts and tariff notices, and get answers to queries about usage and their account balance. Real-time billing can improve customer satisfaction, and more importantly, help the operator to minimize the bad debt risks.

Convergent management reduces costs

The traditional separated billing systems require a high overhead in terms of configuration of human resources, equipment investment, and operations and maintenance (O&M). When all these are integrated, operational costs are significantly reduced and management simplified. The Huawei CBS supports a full collection of mobile and fixed infrastructure networks, including GSM/GPRS, CDMA, UMTS, CDMA2000, PSTN, NGN, IP multimedia subsystem (IMS), WiMAX, WLAN, xDSL network, and also future supports the long-term evolution (LTE) network. Convergent operation and management can lead to a better segmentation of customer groups, multi-service bundling, and cross-service bonus to remain competitive and gain market share.

Open architecture, flexible integration

The CBS has four layers: the service control and mediation layer, convergent rating and charging layer, convergent billing layer, and the unified customer care and marketing layer. The solution supports all interface types commonly adopted between the service control and mediation layer and the network. It includes the intelligent network application protocol (INAP), CAMEL application protocol (CAP), wireless intelligent network (WIN), mobile application protocol (MAP), session initiation protocol (SIP), Diameter, and file transfer protocol (FTP) interfaces.

The convergent rating and charging layer and the convergent billing layer are both supported by the rule-driven engine and can be used in either the loosely coupled mode or the tightly coupled mode. In the tightly coupled
mode, the two layers can provide high-performance, flexible rating, charging and billing functions. In the loosely coupled mode, it is possible to deploy the convergent rating and charging layer only. This layer integrates with the third-party billing system on top, and with core network or service enablers on the bottom, which complies with the OCS framework defined by the 3GPP. Furthermore, the convergent rating and charging layer or the convergent billing layer can be integrated with upper-layer customer care and the marketing layer through common interfaces like the web service interface.

Based on open architecture, the operator can deploy modules step-by-step to fulfill the evolution towards end-to-end full convergent billing. For example, the operator can first deploy the OCS and integrate the OCS with the existing BSS. Then the operator can implement replacement of the billing system or the customer care system.

**Two leading products**

The launch of the Huawei online charging system (OCS) and the convergent billing solution (CBS) has made it much easier to customize products according to different application phases, existing network conditions and the current status of the billing field.

**OCS**

Huawei’s OCS is in the same position as the OCS defined by the 3GPP. The OCS is the first phase of the operator’s evolution towards end-to-end convergent billing. The OCS enables rating and charging based on transactions and events. It offers some traditional IN functions, such as announcement playing, number collection, and voucher management. However, it does not offer the billing function. The OCS is able to offer Web-based customer care itself or integrate with the external customer care system or the customer relationship management (CRM) system through the web service interface.

The Huawei OCS is proposed to operators who serve both prepaid and post-paid subscribers in similar proportions but do not have a pressing need for convergent billing on prepaid and post-paid services. By using the Huawei OCS, operators can provide abundant tariff plans or packages to prepaid subscribers and shorten the time-to-market for new charging features.

**CBS**

The Huawei CBS supports end-to-end convergent billing for online and offline charging, for prepaid, post-paid and hybrid subscribers, and for all networks. The Huawei CBS provides a rich variety of functionalities, including charging access, rating, balance management, charging off, account receivable, IVR, voucher management, partner relationship management (settlement), service provisioning, customer care, and CRM. It does not offer business intelligence (BI) or operation support system (OSS) functions. To meet project requirements, however, the Huawei CBS can integrate with third-party systems such as the existing customer care or CRM system.

The Huawei CBS is proposed to operators who are constructing whole-new networks, newly licensed, or those needing convergent billing on prepaid and post-paid services. It is also proposed to operators who expect to reduce their OPEX through end-to-end convergent billing.

By using CBS from the beginning, an operator with a new network or new license can have a much stronger BSS than their competitors and support flexible marketing strategies. For other operators, the adoption of the CBS in the entire network can avoid the formation of multiple “stovepipe” billing systems and significantly decrease the OPEX.

Previously, an operator whose prepaid subscribers were above the 90 percent might have the need to construct a BSS to support the remaining 10 percent of post-paid subscribers, and despite heavy investment, the operator still might not get good post-sale service. Now operators using the Huawei CBS can have one unified system to meet all subscriber requirements, improve their experiences and cut the OPEX.

**Successful implementation**

The Huawei OCS/CBS has been a resounding success for China Mobile Guangdong, Mobile-8 in Indonesia, and Novator in Iceland. AIS in Thailand and KPN in the Netherlands are also deploying the solution.

The OCS has enabled China Mobile Guangdong to offer their customers number portability (NP) between prepaid and post-paid mode while keeping balances and counters. The real-time credit control function decreases bad debt risks among post-paid subscribers, and the convergence of online charging and offline charging facilitates system integration.

Mobile-8 has decreased their network OPEX with an end-to-end CBS and offers many customer-centered operations and services, such as unified settlement and unified top-up. The OCS/CBS systems of China Mobile Guangdong and Mobile-8 have been running stably and smoothly since implementation. Collectively, with over ten million satisfied subscribers, these success stories offer a true testament to the high performance and reliability of the systems.

CBS construction is now included in the aforementioned operator X’s annual plan. By constructing the new system, operator X can expect to remove any barriers to state-of-the-art BSS development.

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