

Why Huawei is going to be the number one telecom manufacturer in the world.

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ABSTRACT

It is a common assumption that China is a copier of technology and not one of the world's leaders in terms of technical innovation. China's Huawei Technologies Company Ltd. (*Huáwei Jíshù Yǒuxiàn Gōngsī*) is rapidly becoming one of the world's largest telecom manufacturers and one of the key innovators in the telecom field. For example, Huawei is the world's largest supplier of Softswitch products, the software based solution that is the backbone for VoIP switching and is also being used in mixed PSTN and VoIP networks. Huawei also plays a leading role in the standards committees for developing Next Generation Network (NGN) solutions and has over 300 engineers working on international standard committee bodies. One of the core technologies of NGN is a group of standards grouped together under the title of IMS (IP Multimedia Subsystem) that makes possible multimedia solutions across a wide number of platforms: cell phone (both GSM and CDMA), land lines, and television. Huawei's marketing literature lays out a growth path from SoftSwitch to IMS; however, this paper argues that proprietary middle ware and APIs (Application Programming Interfaces), such as Huawei's, are here to stay.

Keywords

China, Huawei, NGN, IMS, SoftSwitch

INTRODUCTION

Huawei Technologies Company Ltd. had revenues US\$ 16 billion in 2007, a 45% increase from 2006 (see Table 1) (Huawei, 2007a). Optical Keyhole (2008) rates it as the fourth largest supplier of communications equipment and possibly the largest outside North America. Huawei is one of the world's largest supplier of softswitch, the software based solution for switching within and between VoIP (GSM, CDMA, WiFi, WiMax, and others) and PSTN networks (In-Stat, 2007).

Huawei's ranking among softswitch providers is determined by whether you are counting the global number of users supported or whether you are using total softswitch revenues. Because China Mobile, the largest VoIP network in the world, uses Huawei's SoftSwitch, Huawei garners first place in terms of number of users supported globally.



Table 1: Huawei's Revenues (Huawei, 2007a)

NGN AND IMS

Huawei is a leader in the development of a new regime of telecommunications standards that fall under the rubric of NGN (Next Generation Networks). Huawei actively participates in 83 international standardization organizations including ITU, 3GPP, 3GPP2, OMA, ETSI and IETF (Huawei, 2007b). It often plays a leadership role in these organizations and chairs many of their working groups. At the core of NGN is a group of standards known as IMS (IP Multimedia Subsystem).

The goal of IMS is to provide a switching system for multimedia that can support quality of service to applications regardless of the platform (PSTN, Television, wireless, or others). The IMS standards, driven primarily by 3GPP, represent an immense amount of work to develop standards that allow any telecommunications platform to communicate with any other platform (3GPP, 2008). IMS has been one of the hottest buzz words in telecommunications over the past five years as it is envisioned as the basis for a wide range of applications that the telecommunications carriers can sell in addition to raw bandwidth. These applications include presence, chat, push to talk, and others. Unfortunately, for the telecommunications carriers, companies, like Skype, have been able to provide low cost alternatives to these services by building intelligence at

the edge of telecommunications infrastructure. The IMS standards efforts have also been stymied by the difficulty of writing application standards that work over IMS because of the complexity of writing standards that all stakeholders at this level can buy into.

SOFTSWITCH¹

Softswitch is a solution that replaces hardware telecommunications switchboards (such as ones based on SS7) with software based solutions that run on computers.² As such, they take up much less space, are easily customizable and cost significantly less. Softswitches are being chosen by telecommunications companies, particularly who are trying to build on legacy systems.

Softswitch is conceptualized as having a Call Agent and a Media Gateway (MG) (see Figure 1). The Softswitch Call Agent is responsible for signaling, call services, and routing. A Call Agent may control several different Media Gateways. Media Gateways can have interfaces for connecting different types of transport protocols such as IP (Internet Protocol) and the PSTN transport protocols. The Call Agent and Media Agent communicate via the IETF's SIP (Session Initiation Protocol) standard which is responsible for setting up and tearing down voice and video calls.

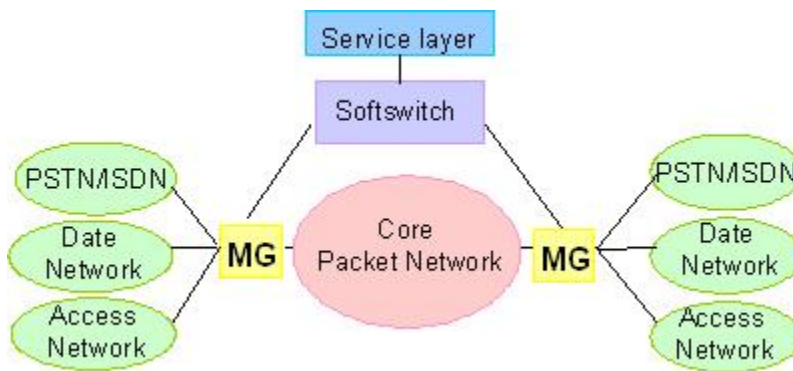


Figure 1 The position of SoftSwitch in the network (Huawei, 2001)

The Call Agent provides services that we are familiar from POTS (Plain Old Telephone Service) such as dialing a

¹ In this document we use the capitalized “SoftSwitch” for Huawei’s proprietary softswitch offering and “softswitch” for generic solutions provided by all vendors.

²

number, causing a phone to ring, and providing a busy signal. With Softswitch however it is possible to customize a user's communication experience. For example, a user could decide to have his number ring to his landline, then to his secretary's land line, then to his mobile phone, and then to voice mail. Softswitch offers the opportunity to customize each user's experience, something that is not possible with a hard wired switch.

HUAWEI'S SOFTSWITCH SOLUTION

Huawei is also part of an effort to develop softswitch standards at the International Telecommunications Union (ITU). Figure 2 shows the role of the ITU's H.248 to set up calls between the media gateway and the media gateway controller. Huawei's SoftSwitch also supports ISUP which it uses to setup calls with the PSTN. H323, is also supported, which is a group of products that links audio video into the SoftSwitch.

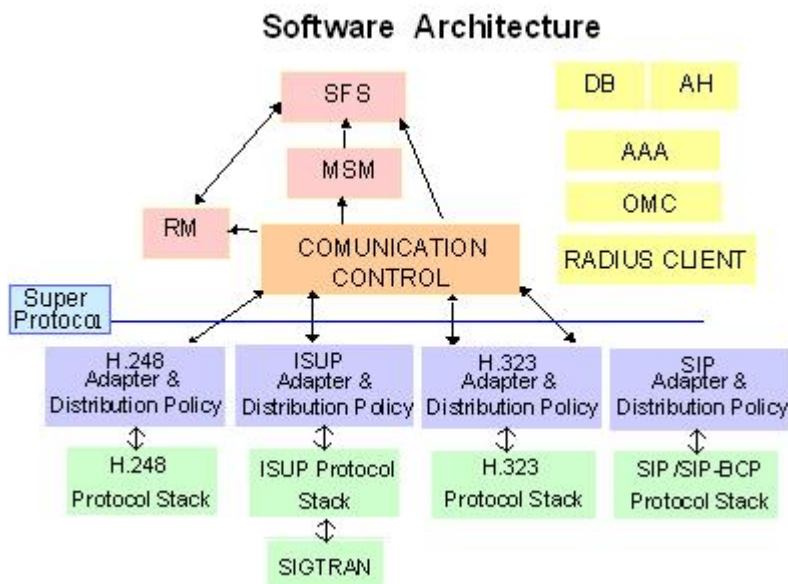


Figure 2 The architecture of a general SoftSwitch (Huawei, 2001)

The challenge of this standards effort is to keep pace with the rapid evolution of Softswitch as vendors of proprietary softswitch solutions rapidly innovate. Huawei, itself, has become known for providing, at a relatively low cost, customization of its SoftSwitch application to meet the needs of individual telecommunications providers. It should be noted that in Figure 2 between the international communications standards and the Communication Control, there is what is called

a “Super Protocol”. This “Super Protocol” is middleware that is proprietary to Huawei.

INNOVATION AND CONTROL IN STANDARDS ARCHITECTURE

It is widely recognized that companies can by having their APIs (Application Programming Interfaces) a *defacto* standard they can develop a significant competitive advantage over their rivals. (Shapiro and Varian, 1999) For instance, NEC had a large advantage over Microsoft in Japan in the mid-1990s in terms of DOS based applications. However, this advantage was neutralized by the introduction and acceptance of Microsoft Windows’ APIs as a *defacto* standard in between applications and DOS (West and Dedrick, 2000). Since API’s in the softswitch world are proprietary, the company which has its APIs adopted by third party application developers, will have a huge competitive advantage.

SOFTSWITCH TO IMS PATHWAY

Huawei’s marketing strategy is to provide a state of the art SoftSwitch solution to its customers with the understanding that there will be an upgrade path to IMS if and when it becomes a reality (Huawei, 2008c). In this scenario, Huawei’s SoftSwitch will evolve into IMS’s AGCF (Access Gateway Control Function) and MGCF (Media Gateway Control Function).

IMS, like softswitch, uses SIP to set up and tear down multimedia sessions. IMS also provides a mechanism for providing, and selling, quality of service. This is important if telecommunications providers want to provide users with the type of experience that they have come to expect from the PSTN and be able to charge them for this service .

In a world in which there is significant uncertainty about whether GSM, WCDMA, WiMax, Wifi will become the underlying communications technology, IMS holds the promise of making the underlying communications technology irrelevant to users. IMS allow users to roam between different technologies without even a disconnect.

WILL HUAWEI’S SOFTSWITCH EVOLVE INTO IMS?

Though Huawei’s marketing strategy is to promote IMS, its SoftSwitch provides many features that have not been standardized through 3GPP’s IMS standard making. It is our argument that IMS will never catch up with the features and flexibility offered by Huawei’s SoftSwitch. In addition, because Huawei’s cost of customizable programming is significantly less than that faced by Western companies such as Cisco, Alcatel-Lucent, Nokia, and Ericson, it can be predicted that Huawei will continue to be at the leading edge of softswitch evolution and customization.

WIKINOMICS AND HUAWEI?

Tapscott and Williams (2008) argue that over the past couple years, companies that are succeeding are opening themselves up to rapid large-scale distributed innovation in which the boundaries between a company and its customers is disappearing. They point to IBM's, SAP, and Proctor and Gamble's willingness to allow outsiders access to core technologies. SAP for example has published API's (Advanced Programming Interfaces) to its best-selling ERP solutions.

Huawei also provides API's to its SoftSwitch technology to allow third parties to write applications that can run on top of Huawei's SoftSwitch solution. Companies have the potential to take advantage of this opportunity to carve out their own niche in the global telecommunications infrastructure by collaborating with Huawei. The question remains as to whether outside companies can out-innovate Huawei's own vast team of low-cost and highly talented programmers.

In the IMS space, Huawei has over 100 partners who have built applications on its IMS solution. As Huawei's IMS and SoftSwitch offerings converge, it will become apparent whether Huawei will embrace open systems like IBM or keep its innovation, for all practical purposes, proprietary. This is not to imply that Huawei's SoftSwitch will not incorporate all relevant international standards, only that at its heart SoftSwitch and its APIs are proprietary.

CONCLUSION

China's bureaucrats in Beijing have become convinced that participating on international standards committee's is the way for China to achieve the high margins associated with American companies such as Microsoft, Qualcomm, and Cisco. Huawei is going down this lane, but at the same time it has learned from these companies how to develop a sustainable competitive advantage. By providing significantly lower cost hardware than its Western competitors and making it relatively easy to integrate its solution into existing systems, Huawei will continue to gain market share.³

There is no way that the IMS standards will be able to keep up with the pace of rapid innovation in the application layer of the telecommunications space. Innovation will take place on the edge of the "Network". However, there is a role for intelligence in the switching fabric of the network given the networks heterogeneity and the need for middle ware. Huawei has the opportunity for providing this intelligence. If it is both the low-cost provider and the technology leader, no one will be able to stop Huawei from becoming the number one telecom company in the world.

³ Huawei has had difficulty penetrating the US market. Its 2008 effort to use the 3Com brand to open up the US market was stymied by the US Government which raised concerns about the national security implications of a Chinese company controlling 3Com.

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