MOVING UP THE STACK WITH CLOUD COMPUTING AND SAAS

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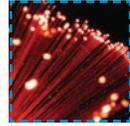
Application service providers (ASP), software as a service (SaaS), on-demand applications, hosted or managed services, cloud computing—each of these concepts is similar in nature. Regardless of what buzz word you choose, the same general principle emerges: the movement of applications from the desktop or server further back into the network, or the cloud. The product or application is then delivered to the end user via the Internet.

With the advent and prevalence of IP technology and network bandwidth, cloud computing might enable broadband service providers to move further up the stack, away from simply delivering a high-speed pipe, to offering new and innovative applications, and potentially creating new revenue streams.

Cloud Computing

Cloud computing, the IT industry's buzz word de jour, is a vague term which has disparate meanings. Most agree that cloud computing can be loosely defined as computing resources which are hosted remotely (in the Internet "cloud") and can serve multiple users on-demand. These resources may include hardware, processing, storage, and virtual servers and databases, and can be accessed from any device and location. Resources are scalable, allow-

ing for optimum utilization. A service level agreement governs the relationship between the cloud user and provider, and users are billed strictly for what they use each month, similar to a metered utility.

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The definition of cloud computing becomes confusing when you move beyond this basic framework. You might hear cloud computing referred to as synonymous with hosted applications and SaaS. Some industry heavy weights contend that cloud computing enables the remote delivery of services: SaaS (email, security, mobility apps), communications as a

service (hosted IP PBXs), infrastructure as a service (utility computing), data as a service (remote databasing), platform as a service (PaaS, development platforms utilized by programmers), and the list goes on and on. Perhaps the most important thing to remember is that the real value in cloud computing is the ability to seamlessly and securely access your computer, from any device, network and/or browser on the fly.

Cloud computing, and the technologies that it facilities, affect the entire IP network and value chain, including residential consumers, business and enterprise users, ISPs, software developers, application providers and electronics manufacturers.

It's clear that with this wide reaching scope, there are many different angles to explore. Perhaps the most applicable to rural telcos is the notion that cloud computing will enable a wide range of on-demand services or SaaS offerings.

Software as a Service (Saas)

With SaaS (pronounced sah-s) an application is licensed to end users on-demand. The application is networked based and managed, and the customer accesses the application remotely through a Web browser. SaaS utilizes a single instance,

multitenant architecture and a subscription-based pricing model.

With SaaS the customer saves upfront investment in servers and software licensing costs, and benefits from increased flexibility. When viewed from the end user's perspective, SaaS represents a shift from purchasing a software license and installing software on a PC, and instead accessing applications and stored files hosted in the cloud via a "dumb terminal." With the movement to an all-IP or converged network, this information can be accessed from any mobile or stationary device.

It's important to keep in mind that SaaS focuses on the storage and delivery of applications, but as with the traditional software model, the application is how rural telcos will monetize the technology.

SaaS also offers advantages for application developers (see sidebar "SaaS Assists Developers with New Applications"). The current focus of SaaS is cost-effective delivery of stand-alone applications, but as the IP transformation marches on, the technology might further assist with converged communications and collaboration.

Residential Users Adopt SaaS

Although residential consumers are unfamiliar with the term, they are quite familiar with the SaaS model. More than 69% of online users have engaged in at last one cloud computing activity, and 40% have engaged in more than one activity, according to the September 2008 study

"Use of Cloud Computing Applications and Services" released by the Pew Internet & American Life Project.

Anyone who has accessed email via a Web service, such as Gmail, Hotmail or Yahoo,

has utilized SaaS. Other SaaS offerings include office applications, such as Google office and Zoho Office, and Web storage/sharing applications such as Flickr and Youtube. The opportunities are endless, and new market entrants are popping up

SaaS Assists Developers with New Applications

IP technologies, including SaaS, are decreasing the barriers to market, allowing vendors to create and distribute new applications on the fly.

"Standard APIs [application programming interfaces] are enabling new applications to be built quickly and efficiently," said Warren Lee, CEO of NeoNova Network Services. "With very little to no programming the application provider can piece together a set of widgets [a portable chunk of code] to create a new application."

When you combine the concept of standard APIs with open source software (OSS), it further decreases the amount of programming required. (For more on OSS, see NTCA's October 2007 ePaper: "Open Source Software: Collaboration Promises Improved Services.") These new applications then can be hosted in the cloud, and distributed via SaaS.

SaaS offers key financial differentiations when compared with the traditional software development model. With just one instance of the application to maintain with product updates and software maintenance, developers experience economies of scale in the deployment, management and support of their products.

Lee offered the example of a VoIP provider that created a new application. With this new app, the subscriber presses *69 to switch the call between his residential VoIP line and mobile phone. Another CLEC in Las Vegas provides an application which translates voicemail into short message service (SMS), i.e. text messaging. This application could be offered to the telco's customers, or re-sold as a stand-alone offering. Lee also speculated on an application, targeted at rural consumers, that pulls information from a Web feed, such as a really simple syndication (RSS) feed, and translates it into SMS format to text subscribers vital weather alerts.

"Your competition can use SaaS to deliver very specific services, targeted to your unique environment or customers, and they don't even have to be a local company anymore to accomplish this," said Lee.

all the time. In fact, in late March 2009, OnLive introduced a groundbreaking cloud computing gaming technology. OnLive plans to offer subscribers a selection of video games that are hosted online and can be played at any time, on any television or computer—Macintosh or PC—including low-cost computers without sophisticated graphics chips.

Terry Sticka, industry veteran and director of business development for SafeDesk Solutions, envisions a movement away from personal computers, where the user is responsible for the purchase, maintenance, virus protection and storage of all files and applications. "The vast majority of residential users, 75%-80% of us, don't need a high amount of computing power. Instead, the user desires a simple, easy-to-use, low-cost interface."

SafeDesk Solutions is partnering with independent telecommunications companies to provide a SaaS product. The company has created a remotely ManagedPC which supports multimedia, streaming video and audio conferencing, office applications and traditional Web surfing. There are no persistent files (word docs, music, pictures, bookmarks, etc.) stored on the device. Instead, files and the applications are maintained in the cloud, and accessed via the Web.

The business model is similar to the cellular phone model, where the user will sign a contact with the telco and the price of the equipment will be re-paid over the course of the contract. Of course the ManagedPC offering will be bundled with the telco's broadband connection, creating a value-added service for the

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customer and increasing monthly average revenue per user (ARPU) for the telco. Sticka envisions the cost around $40–$45 per month, somewhat higher than standalone broadband service but more affordable than a traditional PC.

"SaaS is posed to take off in the next year and half to two years," Sticka said. "People are tired of paying for services and applications they rarely use. Just like the light bulb in your home, the technology industry is moving toward a utility model where customers will pay for only the services they use."

The SMB Market

Businesses and enterprises were early adopters of cloud computing technology and SaaS. As resources are flexible and available on an ad-hoc basis, enterprises benefit from reduced capital and operating expenditures. With SaaS, as needs

ebb and flow, another application seat can be easily added. Further, SaaS applications utilize IP technology, and as such typically enable increased collaboration and productivity. Businesses utilize SaaS for managed security, customer relationship management software, enterprise resource planning, accounting programs and other applications.

Currently, the small and medium-sized business (SMB) market is overwhelmed with cloud computing and SaaS options (see sidebar "Market Entrants Explore Cloud Computing Products"). Many SMBs recognize the value in SaaS, but they don't know where to start. Jamcracker wants to help telecommunications carriers fill this market need.

"As the solution space has evolved, so has the need for a trusted advisor or channel partner to help businesses determine which services to deploy," said Steve Crawford, vice president of marketing for Jamcracker. "Rural telcos are ideally positioned to serve as this advisor. They already provide the on-ramp to the Internet; it's an easy jump to provide software applications that utilize the broadband connection."

Jamcracker started as an ASP aggregator in the late 1990s. In late 2007 the company began partnering with network operators with the release of its Jamcracker Service Delivery Network (JSDN) platform. Jamcracker aggregates a variety of popular applications, including collaboration, security and mobility. The company has developed vendor relationships, negotiated reseller agreements, developed licensing and billing systems, and offers in-house

support capabilities. Jamcracker enables service providers to brand the offerings, and also mash-up new applications with existing telco services such as VoIP and broadband. The company is targeting Tier 2 and Tier 3 cable companies and ISPs, and recently expanded its focus to regional carriers.

"Broadband is increasingly being viewed as a commodity service," said Crawford. "SaaS enables ISPs to offer a unique bundle of services to move away from simply competing on price."

The cloud computing forecast is sunny, but not surprisingly there are several barriers to adoption. Security is an issue which has taken center stage, both for business and residential users. Before cloud comuting and SaaS technology is fully embraced, the industry will need to assure users that the security of their data and personal information will not be comprised.

Likewise, some users who have invested in a powerful PC and home device, along with accompanying software licenses, may resist moving to the cloud and paying for what they view is an unnecessary service. On the other hand, moving into the cloud is a way to increase the longevity of the end user's device.

From the telco's perspective, cloud computing, and the technologies that it facilitates, require server infrastructure to store user data and host applications. This is an expensive undertaking. This upfront

Market Entrants Explore Cloud Computing Products

Many global tech companies and startups have entered the cloud computing fray, offering a wide variety of products and services, each targeted at perhaps a different audience. Here are a few of the market leaders.

Amazon was a trailblazer in the cloud computing field. In March 2008, Amazon launched a large-scale cloud computing product. Amazon's Elastic Compute Cloud (a.k.a. Amazon EC2) offers processing, storage and other IT services over the Web on a pay-per-use basis. It is designed to make web-scale computing easier for Web-based application developers. EC2 is priced by the hour and the total bandwidth used.

Microsoft released its Azure cloud computing strategy in October 2008. The goal of Azure is to provide developers with a platform and set of tools, which perhaps could be classified as a PaaS development environment. Google App Engine is a similar tool that allows software developers to run Web applications on Google's infrastructure. Developers, of course, only pay for the resources they consume.

Verizon Business is planning to roll out a new "on-demand" cloud computing service in the summer 2009. The service will enable large enterprise customers to pay-as-they-go for core computing

resources. In May 2009, AT&T announced its Synaptic Storage as a Service offering for enterprise customers. The service will let business users save and access their data via laptops, smartphones and other Web-enabled devices.

Salesforce.com is one of the largest SaaS providers which offers customer relationship management (CRM) applications to businesses over the Web. The company boasts 55,400 customers and more than 800 applications in 16 languages. Salesforce.com's PaaS product, Force.com, allows external developers to create add-on applications that integrate into the main Salesforce application and are hosted on Salesforce.com's infrastructure. In January 2009, the company announced that it would enable developers to build applications on its platform that also tie to Web services offered by Amazon, Facebook, Google and other sites.

Also of note, Verizon Wireless announced in March 2009 that it would begin selling Netbooks directly to end users. Primarily designed for Web browsing and e-mailing, netbooks rely heavily on the Internet for remote access to Web-based applications, and are targeted at cloud computing users who require a less powerful client computer. AT&T already offers netbooks for the subsidized price of $99, bundled with the telco's $60 per month data plan. Could SaaS applications from these tier-one operators be far behind?
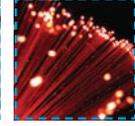
cost must be carefully weighed against potential new revenue streams, including increasing ARPU.

Moving up the Stack

This paper has explored the tip of the iceberg. In fact, the types of applications delivered via the cloud are rapidly evolving and proliferating, from simple desktop processing and security applications to virtual computing environments that can be rented by the month or project. All of these services are delivered to businesses and residential users via the rural telcos's broadband network.

Telcos are well versed in providing on-demand services—VoD, network DVR, VoIP, even Internet access. Cloud computing and SaaS are simply extensions of this service concept.

The rural service provider is wise to explore new avenues to move up the stack, and closely examine new business opportunities posed by cloud computing technology. SaaS might be a way to retain customers, and, in doing so, create a new monthly revenue stream. Developing a cutting-edge service now will set you apart from your competitors, and prevent your service from being scene as a "me-too" offering in the future.

Additional Resources

The experts explain cloud computing: http://www.youtube.com/watch?v=6PNuQHUiV3Q

Amazon EC2: http://aws.amazon.com/ec2

AT&T netbooks: http://www.wireless.att.com/cell-phone-service/specials/mini-laptops.jsp

Google App Engine: http://code.google.com/appengine/docs/whatisgoogleappengine.html

Jamcracker: http://www.jamcracker.com/

Microsoft's Azure Platform: http://www.microsoft.com/azure/default.mspx

Microsoft white paper on PaaS: http://www.davidchappell.com/CloudPlatforms--Chappell.pdf

Pew Internet & American Life Project, "Use of Cloud Computing Applications and Services": http://www.pewinternet.org/~/media//Files/Reports/2008/PIP_Cloud.Memo.pdf.pdf

SafeDesk Solutions: http://www.safedesk.com/

Salesforce.com: http://www.salesforce.com/