Reaching Into The Home Network

With the maturing of TR-069 technology, service providers can support subscribers' home networks easily and inexpensively. Service providers can offer better customer service for lower cost – and tap new revenue streams.

By Masha Zager ■ *Broadband Communities*

Once upon a time, edge-of-network devices – also known as telephones – belonged to telephone companies, and life was simple. In 1968, the FCC opened up telephone networks to user-owned devices, paving the way for a new era of faxes, modems, answering machines and high-tech phones. Life was still simple, at least for phone companies, because subscribers were responsible for their own devices.

Today, with broadband services proliferating, providers are placing many pieces of equipment at customer premises. A telephone company that may once have supplied only a DSL modem to a customer may now also install a broadband router, IPTV set-top boxes, a DVR, a femtocell and more. The costs of installing, configuring, activating and troubleshooting all this equipment can be substantial.

In addition, subscribers install multiple devices of their own on home networks – and most don't have the technical knowhow to configure or troubleshoot them. When problems occur, they often assume the service doesn't work and call their providers. Service providers that want to satisfy their subscribers often spend a great deal of time and money fixing problems that originate with user equipment.

TR-069 TO THE RESCUE

To enable phone companies to manage customer-premises equipment remotely, the DSL Forum (now called the Broadband Forum) published a technical specification for the TR-069 CPE

> *The Broadband Forum's TR-069 protocol enables service providers to remotely provision, diagnose and troubleshoot equipment on home networks.*

WAN Management Protocol, generally referred to as TR-069. The specification, first published in 2004, has been enhanced and amended several times. In the last several years, electronics vendors have built support for it into most new connected-home products, including residential gateways, set-top boxes, femtocells, IP phones, network-attached storage, home automation devices and a host of other "smart" devices.

The research and analysis firm Ovum recently estimated that, at the end of 2011, more than 147 million TR-069–enabled devices were in use worldwide – mainly residential gateways but other devices as well – and the number was growing fast. As home equipment goes through the natural cycle of obsolescence and replacement, the proportion that is TR-069–enabled should rise dramatically.

Though TR-069 was originally designed for traditional telephone networks, operators of FTTH, cable and wireless networks now use it as well. The standard is medium-agnostic and can operate over any IP-based network.

Cable's adoption of TR-069 is fairly new. As Chris Busch, chief technical officer for Incognito Software, explains, cable operators initially relied on DOCSIS for provisioning devices, but "DOCSIS doesn't have the ability to … reach into the customer premises. That's the next holy grail. As operators move more into IP-based services, what's inside the premises becomes imperative." For example, Busch says, if a customer needs help making a TV Everywhere service work on an iPad, "With DOCSIS, all a customer service rep could say is 'Your modem looks fine.' When you add TR-069, you're giving the customer service rep the tools to interrogate what's going on in the home network."

THIRD-PARTY TESTING

In addition to sheer numbers, there are other signs that TR-069 has reached

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maturity as an industry standard. One is that the Broadband Forum, which is the keeper of the standard, recently designated the University of New Hampshire InterOperability Laboratory (UNH-IOL), a premier third-party testing lab, as the official laboratory for all Broadband Forum TR-069 testing.

Erica Johnson, the director of UNH-IOL, says the lab is "envisioning a world when every device manufactured for the home can easily be brought online and managed remotely by the resident or provider as needed. In the future, these devices may support home energy management, climate control or security systems, but today the focus is on devices that facilitate telecommuting and home entertainment."

Conformance and interoperability testing by UNH-IOL and certification by the Broadband Forum are expected to help service providers select devices for customer premises. They will also reduce the time providers spend testing devices in their own labs and ease the burden on manufacturers as well. Robin Mersh, CEO of the Broadband Forum, says, "If you're the service provider, your choices are to go to the expense and time of testing devices for TR-069 compliance. If you're a vendor, you have to justify your claims of compliance. This is an effective way of answering both of those issues."

NETWORK MANAGEMENT SOLUTIONS

Yet another sign of maturity is the increasing number of software products that incorporate TR-069 to help service providers provision and manage end-user services. Two recently introduced products are Incognito Software's Auto Configuration Service 2.0 and Calix's Consumer Connect.

Auto Configuration Service 2.0 enables zero-touch provisioning to support services such as Wi-Fi management, parental controls, VoIP, storage, IPTV and more. The software can automatically discover new types of vendor devices on a network and create device models for them on the fly.

Calix's new TR-069–based auto-provisioning product, Consumer Connect, also performs dynamic device discovery.

Both products complement pre-existing bandwidth analysis tools. Auto Configuration Service 2.0 complements the company's Bandwidth Activity Reporter, which helps providers monitor subscribers' bandwidth usage nonintrusively, evaluate adherence to service-level agreements, develop new services and billing options and plan the growth of network capacity. Consumer Connect complements Calix's Flow Analyze, which perfoms similar functions to Incognito's Bandwidth Activity Reporter.

Geoff Burke, senior director of corporate marketing for Calix, explains that Flow Analyze and Consumer Connect provide a common ID that allows analysis across the entire access network. He says, "If you have an issue, you can start from Layer 1 and reach all the way to the set-top box or other consumer device and have visibility into everything. If you combine that with Flow Analyze, you can track all the way back to the data center and beyond. It gives you a large and comprehensive view of what's going on in the network."

Consumer Connect, along with Flow Analyze, is cloud-based, which enables affordable pricing for small service providers – there are no up-front hardware costs – and allows providers to add subscribers without having to upgrade their systems. The software scales easily to support millions of subscribers.

Burke says that by enabling remote device management, Consumer Connect not only makes customer service reps more efficient but also gives service providers a "very powerful tool" to enter the home IT space. "Service providers have lost revenue streams from line erosion and new regulations, and they need new frontiers to drive new opportunities for revenues," he says. "Taking over home networking is one of these opportunities."

Some service providers now charge $5 to $10 per month to maintain and provision subscribers' home wireless networks. Instead of following the original Geek Squad model, which involved sending agents to subscribers' homes, they can perform most operations remotely with TR-069 capabilities.

Burke adds, "As service providers transition from voice to broadband, there's also a clear shift in where the end of the network is. It used to be that … for regulatory or logistical reasons, service providers wanted the termination point to be outside the home. New technology such as TR-069 and the empowering of subscribers has really drawn the access network into the home – it ends at the device.

"It creates a challenge. If you do it incorrectly, you're rolling more trucks. If you do it correctly, you're finding new opportunities for revenue and customer satisfaction and a whole new business model." ❖