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ARCHITECTING THE **MEDIA GATEWAY OF THE FUTURE**

Today there are full featured set-top boxes that distribute content throughout the home. In the future, those functions will likely be handled by a gateway that exists in an all-IP environment.



By Jim Barthold

Consumers don't know a media gateway from a cable modem but that doesn't mean that they don't want what a media gateway provides.

"Consumers didn't say they wanted a media gateway; they said they wanted a DVR that works seamlessly across the house," said Vivek Khemka, senior vice president of product management for Dish Network.

Operators responded to that demand with "headed" gateways, full-featured set-top boxes that receive and decode incoming IP and QAM/QPSK content, connect to the TV through HDMI cable for traditional pay TV services then reconstitute that content into IP and distribute it throughout the house via MoCA or Wi-Fi. Right now a "headless" gateway that is not attached to any TV but contains the necessary intelligence to feed all devices in the home is a blip on the future radar screen because such a device would work best in an all-IP environment and, with the exception of OTT providers, streaming IP is not part of a managed service provider network.

THE GATEWAY CONFIGURATION

The basic gateway configuration depends on the network feeding the residence.

Dish, without access to a land-based high-speed broadband network, installs a set-top box with a 2 terabyte hard drive DVR to store thousands of programming titles for replay and on-demand viewing. Dish media gateways also include Sling technology—which Dish owns—to allow content consumption outside the home.



Cox, with access to a broadband IP network, deploys a six-tuner DVR whole-home host connected to the television and its user interface from which content and box capabilities are piped out to remote units throughout the house via MoCA.

Comcast uses a combination of a home wireless gateway and an advanced X1 set-top box for whole-home IP connections and traditional pay TV. This approach “leverages the power of the Internet as well as the power of traditional QAM video,” said Eric Schaeffer, Comcast’s senior vice president of communications, mobility and data services.

IP is the technology of choice to deliver content over in-home wireline MoCA wireless Wi-Fi networks. Even the way the Wi-Fi is configured varies, again depending on the way the service provider wants to use that technology.

Dish, which doesn’t own the broadband network coming to the residence, builds a private Wi-Fi network from the gateway to deliver video and other IP content to thin client wireless set-top boxes and more conventional “connected devices.” The Dish network has “automatic frequency hopping and a couple other technologies ... to guarantee video quality of service without having to worry about the devices the consumer has in the home,” Khemka said.

Comcast’s media gateway, on the other hand, taps the incoming DOCSIS signal and uses a separate Comcast wireless gateway to manage an authorized residential Wi-Fi network with an SSID provided by the service provider. Comcast recently added 802.11a/c Wi-Fi capabilities to enhance the network’s ability to wirelessly deliver video.

Cox also uses its own broadband network and Wi-Fi inside the home but, as of yet, has not deployed thin client wireless set-tops which are “clearly a bright spot on the future radar screen,” said Steve Necessary, vice president of video product development and management at Cox.



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is definitely within the realm of probability in those not-too-many years to come.”

Steve Necessary, vice president of video product development and management at Cox

The gateway is the anchor that pulls together an increasingly complicated home network of wired and wireless devices. That whole-home network is part

of an ever-changing consumer electronics space, and is a moving target that can include smart TVs that connect directly to IP networks and bandwidth-hungry 4K video.



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Vivek Khemka, senior vice president of product management for Dish Network

Cox, in cooperation with CableLabs, is working on nascent Digital Living Network Alliance (DLNA) consortium specifications that would allow televisions to leverage a gateway and a Remote User Interface (RUI) and wrest some control from the set-top. Called VidiPath, the specification would be “another way in which a smart TV can access the cable operator-provided content without requiring a set-top box,” Necessary said.

PREPARING FOR 4K VIDEO

There’s no easy solution for 4K because, to date, with a dearth of content, there’s no problem. The wired in-home network will easily handle multiple streams of 4K content but how a Wi-Fi network will deal with this bandwidth demand remains a mystery because, said Khemka, “unless we can get enough 4K content to test, I’m not going to say that’s going to work or not going to work. We just know for sure that our wired network using the coax cabling in the home will support 4K.”

It’s a given that today’s media gateway won’t resemble the one being installed three to five years from now. It is possible the gateway won’t even be located near the television.

“The notion of a gateway product being in the basement or the garage or even outside on the side of the home is definitely within the realm of probability in those not-too-many years to come,” Necessary said. “There have been definitions that include all the video functions, all the MTA (multimedia terminal adapter) functions, all of the DOCSIS functions, all the routing functions, all the Wi-Fi within the home functions. It becomes kind of the uber box ... that will probably become business as usual in a few years.” ■

UNRAVELING THE MEDIA GATEWAY: **HEADLESS, HEADED AND IN THE CLOUD**

Media gateways offer many options for service providers that need to distribute content to several different types of devices in the home

by Jim Barthold

For a service provider, buying a media gateway is like choosing a new car. There are three basic models—headed, headless and in the cloud—and a bunch of features that can be added later.

It's up to vendors to configure those features to please customers who "constantly want to upgrade their hardware for whatever reasons," said Mike Pulli, CEO of Pace.

A media gateway is an all-in-one device that supplants the traditional set-top box or cable modem by performing all the necessary data and video reception and delivery for a service provider.



"It's all about touching the subscriber. The big tier one operators don't want to be dumb pipes; they want to touch consumers."

Charles Cheevers, CTO of Arris CPE Business

"There's so much you can do and it's not limited by the technology but limited by the actual logistics of delivering a service to a customer," said Jay Kirchoff, vice president of product marketing for chipmaker Broadcom. "I don't think operators truly know what they want it to look like yet."

HEADLESS OR HEADED?

Vendors have some suggestions starting with the choice between a remotely located headless unit that terminates all the conditional access and services in a single box and then connects that data to IP set-



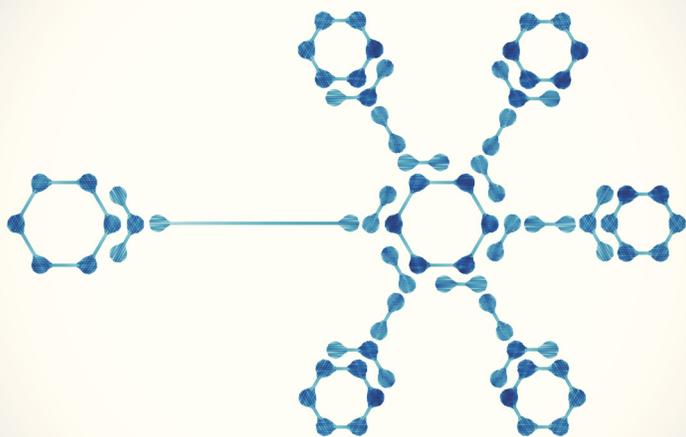
tops connected to TVs, wireless devices connected to Wi-Fi and any of the other growing number of residential connected devices and a headed device that performs essentially the same functions but doing so while connected to the primary TV via an HDMI cable.

A headless device can come in two flavors: a hybrid video gateway where incoming video is either RF-based QAM or IP. This unit converts all that content into IP for transit throughout the home. An intrinsically simpler version is an all-IP unit that takes incoming IP content then delivers it to multiple in-home networks.

The headed unit, which Jim Crammond, director of cable strategy within Intel's service provider division called "the most complex of the configurations," is akin to a high-powered combination of set-top box and cable modem because it receives and transcodes

traditional QAM video as well as receiving and transmitting IP for in-home data networks.

Once service providers choose a model, they begin to add features to fit their home networks. Most gateways are configured with multiple tuners, outputs for MoCA (Multimedia over Cable Alliance) to take advantage of in-residence coaxial networks, Wi-Fi, and perhaps HomePlug powerline to deliver content over home electrical circuits. On the horizon, gateways will have Bluetooth capability.



MAKING WAY FOR MORE SERVICES

The gateway's responsibility is to take an incoming broadband signal, deliver it to the television/s and sate consumers' growing demand for connected devices. Increasingly, operators also want gateways to handle revenue-enhancing tasks such as home security or home healthcare.

No matter where the gateway is located, there are generally holes in the Wi-Fi coverage that are filled by devices called Wireless Ethernet Coaxial Adapters (WECA) that attach to the MoCA network and strategically boost Wi-Fi signals.

"We've seen a big push for WECAs," said Roger Gregory, vice president of marketing for Entropic.

"They're providing your whole home coverage by connecting to your wired broadband to allow you the means to cover your entire house with your broadband solution."

"There's a much bigger demand for Bluetooth-enabled devices. First generation boxes didn't do Bluetooth and now they (service providers) want it."

Mike Pulli, CEO of Pace

That's important as the number of connected devices, many of which are wireless, continues to expand with some estimates that there will be as many as 60 connected devices in the home within the next five to seven years.

"It's all about touching the subscriber," said Charles Cheevers, CTO of Arris CPE Business. "The big tier one operators don't want to be dumb pipes; they want to touch consumers."

That's not the easiest proposition and it's why there is some much complexity around the media gateway, even when it comes to naming the device. While the most common terminology is media gateway, Pace calls them media servers and Cisco prefers unified gateways.

By any name, the devices have one primary responsibility: sit somewhere within the residential environment and "enable voice, video and data services with options to enable connected life solutions as well," said Jon Cave, director of product manager for Cisco Cable Service Provider Gateways.

As if servicing MoCA, Wi-Fi and even powerline is not enough, "there's a much bigger demand for Bluetooth-enabled devices. First generation boxes didn't do Bluetooth and now they (service providers) want it," Pulli said.

GATEWAY IN THE CLOUD

Imagine Communications offers a media gateway model for service providers by removing the device from the residence and putting it in the cloud.

“You have to have some ability to connect to the devices in the home and deliver services that aren’t just data, voice or video but services to enable home automation, energy management, home health and more.”

Jon Cave, director of product manager for Cisco Cable Service Provider Gateways

Ron Gutman, vice president of technology for Imagine, argues that this approach is a cost-saver that also provides a better level of service for both the service provider and the consumer. Cablevision Systems, he said, is the most visible of “10 big and

mid-sized operators around the world that are going to do a full media gateway in the cloud.”

The reason, he maintained, is straightforward. Once it’s in the cloud it provides better service and a better return on investment,” Gutman said.

Imagine’s scheme is to gather and store all content in a single format in a cable network and deliver it to the residence to be transcoded by different devices. In-house technology would be minimized because the heavy lifting would take place off-premise and operators would be able to support existing customers with existing residential infrastructure and new customers “with a lot less expensive technology.”

Regardless of how the gateway is configured and where it is configured, the primary purpose is to be an application server in the home, said Cisco’s Cave.

“You have to have some ability to connect to the devices in the home and deliver services that aren’t just data, voice or video but services to enable home automation, energy management, home health and more,” he said. “The gateway can enable that.” ■

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