



Upgrading the HD Video Experience with a MoCA-based Home Network

By Dr. Stephen Palm, Technical Director, Broadcom and MoCA Member

The outstanding picture and audio quality of digital HD video does much more than simply transform the home entertainment experience. When implemented in parallel with innovations in home networking technology, it becomes possible for consumers to enjoy HD video content in new and exciting ways. For example, connecting the various set-top boxes, video players, game consoles, media centers and computers in the home allows for the distribution of multiple HD video streams simultaneously while enabling new services such as multi-room digital video recording (DVR). In this way, users can record and store content delivered from multiple sources and play it back on any monitor in the home, creating an entire new realm of consumer applications.

Evolution of Home Networks

The home network originated from a need to distribute Internet data throughout the home. Over time, it has become possible to support voice and video distribution as well, and most home entertainment system designers and installers have recognized the opportunity to provide more than one service to their customer base. The home network can provide Triple Play services – data, voice, and video – to Triple Screens; that is, delivering video content to TVs, PCs and mobile devices such as personal media players and mobile phones. The home network is the most practical and cost-effective means to distribute these services.

The challenge that most designers and installers will encounter when trying to stream HD video over a home network is degraded quality. Specifically, installers need a reliable way to enable their customers to enjoy stored and streamed content that meets the high bandwidth and latency demands of HD. Consumers' expectations of high quality is apparent because of their willingness to adopt HD ahead of the rest of the market, and any upgrade to a home network that fails to deliver outstanding image quality will disappoint these consumers and potentially stall market growth. The only way for a home network to meet their quality expectations is for the home network to provide uncompromised reliability and throughput.

Quality through Reliability

Consumers, installers and designers have heard of a number of potential technologies available to them to build a home network with sufficient bandwidth to support streaming HD video. Wireless technologies, such as Wi-Fi Certified 802.11n, are appealing to many users because they offer the ability to connect anywhere in the home without running new wires and speeds that support HD video. Service providers, on the other hand, have traditionally chosen to deploy wired technologies to help ensure reliable delivery of video as well as to limit the effects of radio interference from common appliances such as microwave ovens, cordless phones and Bluetooth devices.

A variety of wired approaches have been proposed to serve as a foundation for home networks. Many of these, however, were only designed to carry low-throughput and latency-insensitive data throughout the home for applications such as email and web page downloading, and therefore, do not provide the type of infrastructure that can reliably stream high bandwidth video. Further complications include the wide range of competing and non-compatible specifications that appear when creating reliable powerline networks. Even a neighbor's choice of powerline technology might impact a nearby home connected on the same transformer.

MoCA®

The Multimedia over Coax Alliance (MoCA®) was formed to create a simple home networking technology that could transport multiple HD streams and other multimedia content in a reliable manner while providing the best consumer experience possible. To keep networks simple and cost-effective, MoCA digitally distributes real-time HD video and audio using the existing coax cable already installed in most homes.

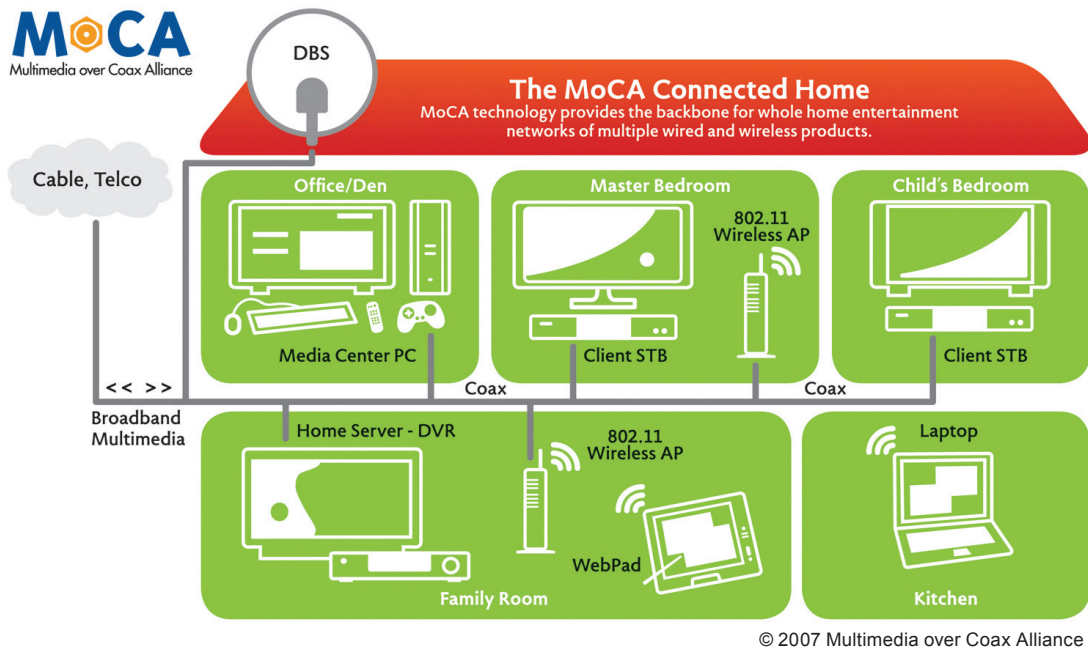
MoCA was designed from the ground-up to exceed the rigorous requirements of video networking. During its early design stages, the alliance conducted extended studies characterizing coax in real-world home environments to ensure that MoCA's actual performance in real homes – not just its theoretical performance under perfect laboratory operating conditions – would be more than enough to transport multiple HD video streams. MoCA can stand as the digital backbone of the home, serving to connect all entertainment appliances and devices (see Figure 1). MoCA is also complementary to other network technologies such as Wi-Fi and Ethernet, thus enabling consumers to bring their wireless and other digital devices into the home entertainment network.

Along with Wi-Fi support, many entertainment devices currently integrate Ethernet jacks, but unfortunately, many living rooms and bedrooms (where the entertainment devices are installed) do not have Ethernet jacks. However, these rooms do often have coax jacks. This enables installers to deploy MoCA coax to Ethernet bridge products that allow Ethernet devices to be reliably connected to each other using MoCA over the existing coax cable. Additionally, some devices already include MoCA inside. Device software such as Digital Living Network Alliance (DLNA) and Media Center continues to operate as if it were connected via Ethernet, and no new drivers need to be installed, enabling installers to connect both Wi-Fi and Ethernet devices to the MoCA network. A MoCA network is also incredibly easy to install since MoCA technology uses the same RF connector, splitters and coax already used with existing video equipment. MoCA devices automatically locate other MoCA devices on the network.

With ease-of-use and deployment, MoCA is ushering in a new way to store, access, and enjoy digital content reliably throughout the home without installing new wiring. Designed specifically for video with the mechanisms needed to reduce latency and eliminate collisions with other types of data (such as large audio downloads), MoCA helps ensure that HD video is delivered to the user without imperfection. Serving as the digital backbone of the home, MoCA prevents any interruption of the enjoyment of the entertainment experience by avoiding interference from neighboring networks fighting for the same limited bandwidth.

The fact that MoCA runs over coax – which is already in place in most homes and located next to TVs – means installers are just a simple and inexpensive step away from completely transforming their customer's entertainment experience. No longer will users be limited in how or where they watch video based on whether it is on a hard disk drive, set-top box, PC or the Internet. For example, users can be sitting in bed to watch a show saved on a set-top box in another room, view photos stored on a computer in the office, or stream videos from the web. With a MoCA-based home network, consumers can enjoy an enhanced entertainment experience with seamless access and unparalleled HD video quality.

Figure 1:



The MoCA Connected Home

Designed to serve as the digital backbone of the home, MoCA provides the bandwidth and reliability necessary to transport quality HD video while offering the ultimate in flexibility by enabling consumers to access any content from anywhere in the home.

For more information on MoCA, visit www.mocalliance.org.