



## GoBackTV's CMTS-Bypass Solution for Cable IPTV

The GoBackTV Cable IPTV Solution consists of three components:

- GigaQAM® IP (CMTS core, timing synchronizer, plus upstream channels)
- GigaQAM 3000 (DOCSIS® encapsulator and 24-channel edgeQAM)
- RetroVue® Application Server (IPTV service and resource manager)

It is a stand-alone video-centric implementation that uses CMTS Bypass technology<sup>1</sup> to deliver both multicast and unicast IPTV over cable via IP set top boxes attached to DOCSIS 1.1, 2.0, or 3.0 cable modems.

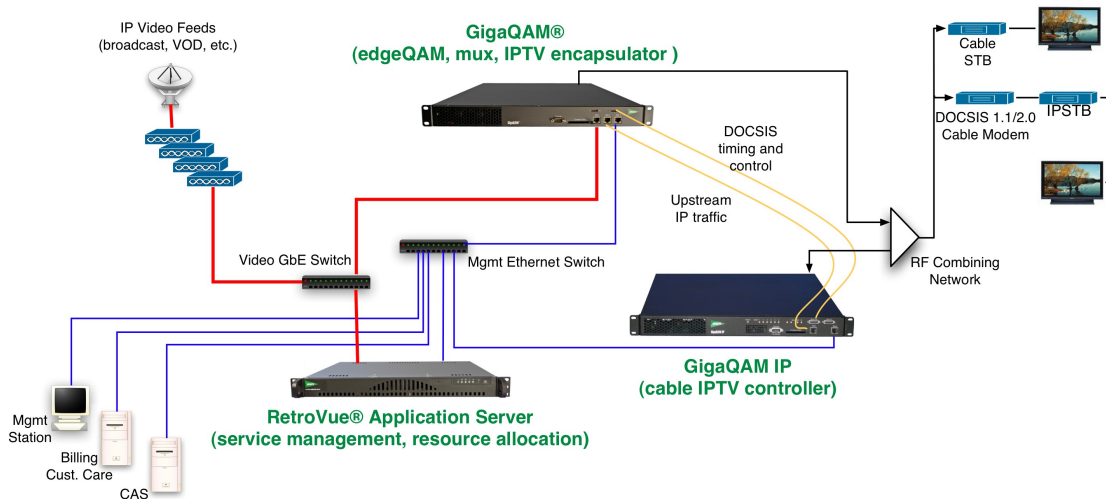
Our solution allows the DOCSIS core in a single GigaQAM IP to support up to 6000 cable modems spread across up to eight GigaQAMs-worth of downstreams (192 QAM channels), which share the GigaQAM IP's upstream channels (currently 2, 4, or 6). The resource manager controls the dynamic allocation of video content across the configured QAM channels, and triggers the DCC (dynamic channel change) commands that move cable modems to the QAM that is carrying the video requested by its attached set top box.

Three significant ways in which our solution differs from other CMTS Bypass architectures are:

1. Our solution is a standalone video solution that includes the CMTS core as well as the bypass QAMs and the IPTV resource manager. This solves the dual-homing problem for unicast video, creates signaling efficiencies, and also means that you don't have to touch an existing data CMTS service. It can be installed in parallel with existing data, voice, or video services.
2. Our solution works with DOCSIS 1.1 and 2.0 cable modems. It does not need DOCSIS 3.0 CMTS or cable modem, or any other M-CMTS/DOCSIS 3.0 infrastructure.
3. Our solution is a released product, working in the field, with live IPTV conditional access, middleware, and as many as 130 channels.

---

<sup>1</sup> "CMTS Bypass" is simply a technique to optimize the usage of expensive CMTS core processors and valuable upstream resources by allowing video payload to bypass the CMTS core and go straight to the QAM(s). There are multiple vendor-specific CMTS bypass architectures, each with different features and pre-requisites.



GoBackTV's CMTS Bypass Solution is a field-proven, cost-effective platform for delivering cable IPTV, and enables cable operators to tap into the wealth of innovation and resources of the IP industry while leveraging the benefits of existing cable infrastructure.

Other benefits of GoBackTV's Cable IPTV implementation include:

- Switched broadcast. Only viewed channels consume bandwidth
- Cable modem cost and availability. By supporting standard, CableLabs-
- Certified DOCSIS 1.1/2.0 cable modems as well as wideband cable modems, we offer MSOs more flexibility in CM choice; they can even re-use modems that were displaced by eMTAs or wideband cms for data/voice applications.
- Simplified in-home networking. In a typical house, there is already cable at each TV, so it's simple to just put an inexpensive DOCSIS 2.0 cable modem and an IP STB at each TV; you don't have to worry about networking the IP video from a single wideband CM around the house on wireless/moca/ethernet. You also don't have to pay for the networking infrastructure (ethernet switches, wireless access points, etc).
- Faster channel change. Since all the cable modems are acquired and registered to a single CMTS core and set of upstreams, when a cable modem changes downstreams in order to access a new television channel, it only needs a DCC initialization technique option 4, without having to re-register; this can save hundreds of milliseconds.
- No dual-homing problems for unicast traffic. With our solution, we switch a cable modem's upstream packets to the edgeQAM associated with the modem's downstream channel, and thereby preserve IP routing integrity.
- No wasted upstream spectrum. No matter how many downstream channels are associated with the GigaQAM IP core--1 up to 192--, they all share the upstreams associated with the core. Operators only have to

provision as many upstream channels as are needed to support the upstream needs of the STBs. (A traditional CMTS would require at least 1 upstream for every downstream).

- Already capable of supporting increasing levels of unicast video. A GigaQAM IP's DOCSIS core supports up to 6000 cable modem/IP-STB pairs. The amount of bandwidth delivered to those cable modems is controlled by the number of QAM channels (1 to 192) deployed with that GigaQAM IP; for traditional linear television, 12 QAM channels could deliver 100-200 MPEG2 television channels, but in order to support VoD or timeshift services like Startover, extra QAM channels could be added, up to a total of 192.
- Simple priority/QoS structure--multicast video has top priority.
- VBR support; because the resource manager has the option of "filling the gaps" with unicast traffic, it doesn't have to pack the multicast video to exactly fill the channel in order to fully utilize the bandwidth. The resource manager can undersubscribe a QAM with multicast traffic in order to accommodate VBR rate swings, and then use the dynamically changing remainder to deliver unicast video and STB data. This eliminates the need for expensive rate clampers or statistical multiplexers.
- Simpler capital equipment planning. When deploying IPTV using GoBackTV's CMTS Bypass solution, an operator deploys one GigaQAM IP and associated downstreams (1 to 192) for every 6000 TVs. With a traditional CMTS, the operator not only deploys CMTS cores to support the subscriber population, but also deploys extra cores to expand the channel lineup beyond the 1, 4, 8, or other channel-bonded capacity. (For example, if a certain DOCSIS 3.0 vendor's CMTS supports 1600 cable modems per core, and the core controls a 4-downstream bonded channel, then that core can deliver approximately 40 MPEG2 television channels to 1600 subscribers; in order to deliver 80 television channels to those 1600 subs, a second core would have to be provisioned; 120 channels-->a third core, as so on.