



C-COR Switched Broadcast Solution Creates a Personal Viewing Experience

Application Note

Switched Broadcast (SB) is a new technology enabling cable operators to achieve the next major milestone in cable TV services—creating the personalized broadcast viewing experience. SB dramatically increases the number of programs that can be provided over cable networks versus existing fixed broadcast techniques today. Cable operators can offer virtually a limitless number of sports, ethnic, and recreational programming, taking full advantage of the HFC broadband transmission spectrum.

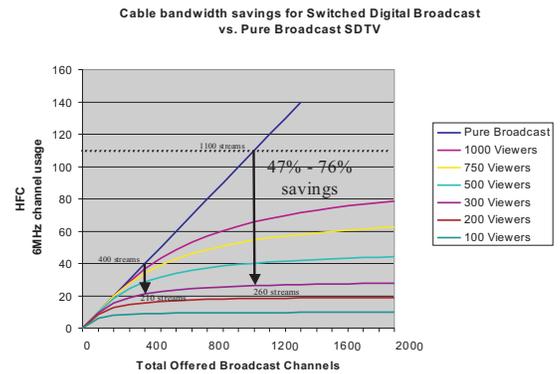
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The most popular application for SB is in the delivery of a wider variety of live sporting events. With switched broadcast, operators can provide all NFL, NBA, NHL, MLB, and international sports season's games. The key differentiator between SB and VOD technology is these events can be distributed live. Subscribers can watch their favorite teams and games while the games are being played. SB retains the excitement factor that comes from watching live sports. Alternatively, SB can be used to offer multiple camera views for premier games, exploiting new consumer display capability with dual-/tri-tuner picture-in-picture capability. The ability to offer a limitless variety of live programming, along with allowing users to create their own custom views of their favorite venues, enables cable operators to maintain their competitive advantage over satellite and Telco video services.

SB works by providing dynamic program management to live broadcast video signals. Only the programs actively being viewed within a particular node group are transmitted over the cable plant. Unlike VOD, SB is a multicast delivery technology. Only a single copy of the program is distributed over the cable network allowing all of the subscribers viewing that particular program to share the same program stream. In a VOD delivery system, program streams are not shared. A unique program stream is transmitted to every user. Bandwidth requirements for multicast stream delivery scale in terms of number of programs viewed as opposed to number of viewers.

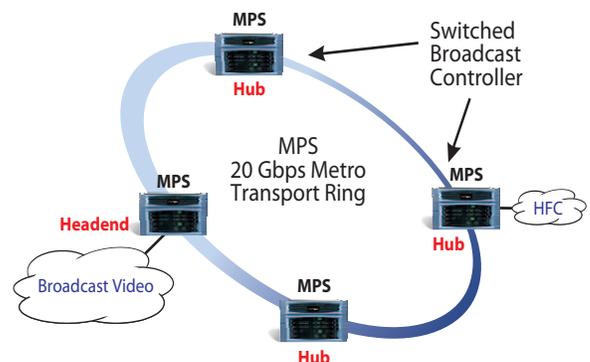
This substantially reduces the total cable network bandwidth (and spectrum) requirements from access to core, while scaling to offer an unprecedented level of content. Bandwidth savings in SB is dependent on the number of active viewers per node segment and number of programs offered. A 40% to 70% savings over conventional broadcast can be realized. Unused HFC bandwidth is recycled allowing it to be used to offer additional broadcast programming or higher revenue generating services.

Figure 1
Spectrum Savings for SB vs. Pure Broadcast (SDTV)



The optimal SB delivery system is shown in Figure 2. Live SB program content is delivered from the headend over a protected digital transport network to remote hubs. A 20Gbps resilient metro-core transport network can be used to provide simultaneous delivery of up to 2,000 standard definition programs (SDTV) or about 400 high definition (HDTV) active programs. All programs are fully protected.

Figure 2
Switched Broadcast Metro-Core Distribution Network



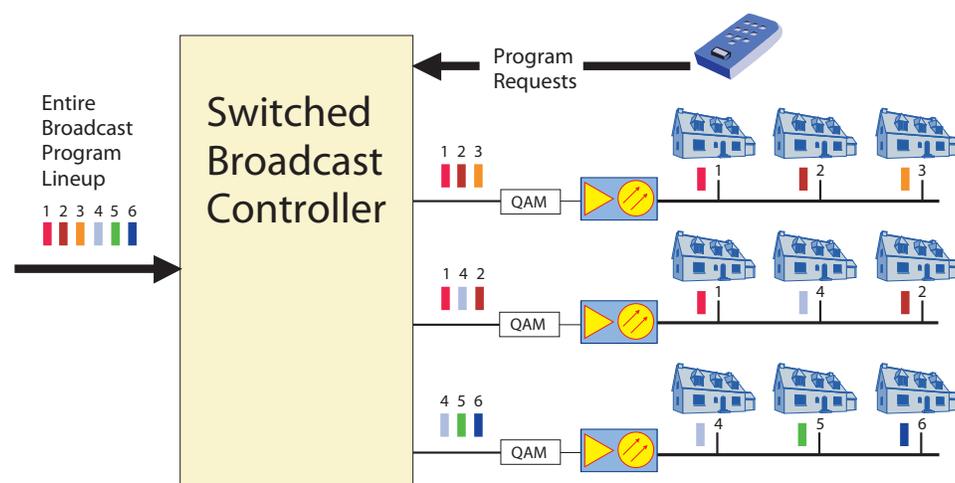
The SB architecture is realized by coupling the SB metro-core distribution network with intelligent broadcast program stream switching in the hub. Intelligent program switching is performed by the SB control system. The SB controller receives live broadcast program channel change signaling requests from residential STBs. The SB controller is responsible for selecting incoming live broadcast streams and performing real-time dynamic program replication.

Programs are played out to only those node groups where they are actively being viewed. The SB controller is a highly efficient multiprocessor engine, able to process high program request volumes with low channel change latency.

The SB controller operates with edge QAM devices. The edge QAM is responsible for translating base band digital programs from the switched broadcast controller to RF for delivery over the cable plant.

Figure 3

C-COR Switched Broadcast Solution



The C-COR Switched Broadcast solution consists of the following elements:

nABLE Switched Broadcast Operations Manager

The nABLE Switched Broadcast Operations Manager has several functions associated with overall management of the SB service:

- Configuration of the IP multicast addresses associated with SB feed sources.
- Configuration of components that make up the SB controller.
- Retrieval and aggregation of channel change operation information from the SB controller.
- Real-time reporting of usage statistics to external applications

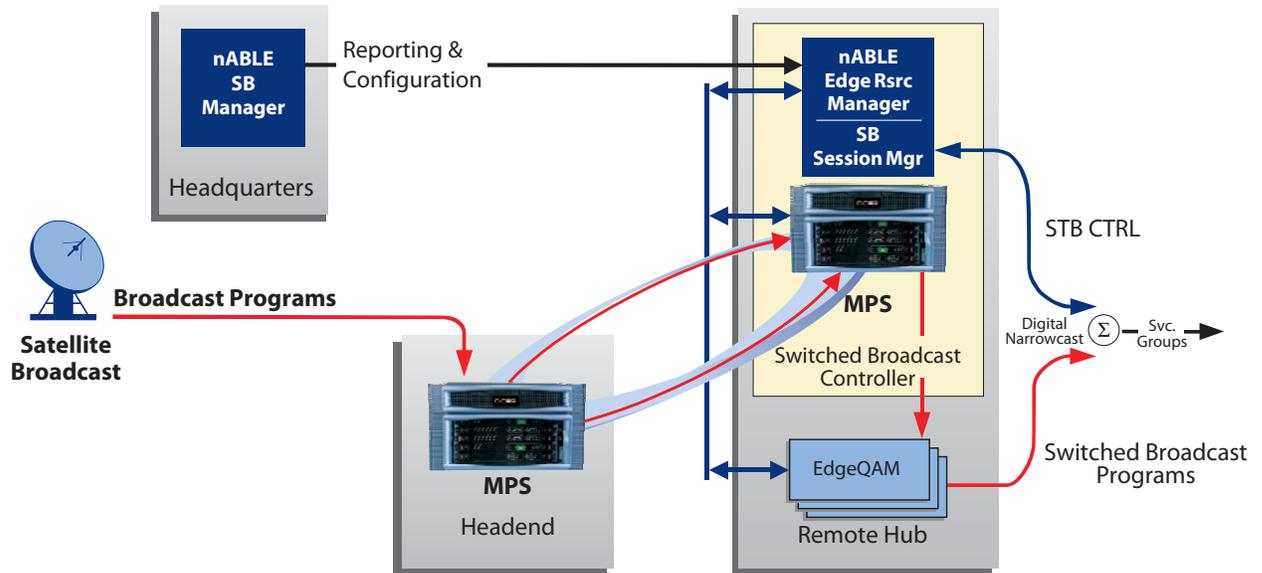
nABLE Switched Broadcast Session Manager

The Switched Broadcast Session Manager provides the core functionality of the SB architecture:

- Receipt and response to channel change requests originated by subscribers using STBs in one or more service groups.
- Request to the Edge Resource Manager to allocate QAM resources for switched broadcast service.
- Request to the transport network resources to provision a new subscriber session, as needed, to deliver the broadcast program through the transport network.
- Real time logging of all channel change operations for the purpose of reporting to the Switched Broadcast Operations Manager.

Figure 4

C-COR Switched Broadcast Solution



nABLE Edge Resource Manager

The Edge Resource Manager (ERM) maintains a pool of access network (QAM) resources dedicated to multiple services including SB, VOD, and nPVR. From this pool, the ERM allocates resources for SB service at the behest of the Switched Broadcast Session Manager.

Multi-Service Packet Switch (MPS)

The MPS routes broadcast feeds reliably over the metropolitan area network from one or more satellite downlinks to all hub sites. Within each hub site, the MPS performs dynamic broadcast program switching to the access network under the direction of the ERM.

C-COR's Integrated Approach to Switched Broadcast

C-COR's modular approach to switched broadcasting follows the company's strategy of simplifying infrastructure decisions through a range of interoperable access, transport and OSS products, and network services. By enabling real-time management of services, resources, and bandwidth, C-COR provides its customers with a safe technology investment that meets the latest demands of subscribers.

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