Broadcaster Builds Efficient Digital Terrestrial Television Network

Broadcast Service Danmark used an IP statistical multiplexing solution to consolidate from 12 to three multiplexing locations.

EXECUTIVE SUMMARY

BROADCAST SERVICE DANMARK

- Broadcasting
- Høje Taastrup, Denmark
- 75 employees

CHALLENGE

- Upgrade existing digital terrestrial television (DTT) infrastructure
- Meet deadline for Analog Switch Off
- Build four new multiplexes

SOLUTION

- Deployed Cisco Digital Content Managers for remote IP statistical multiplexing
- Established several playouts at different customer locations
- Re-used existing management platform

RESULTS

- Consolidated from 12 sites to three, reducing multiplexing equipment by 80 percent
- Significantly increased picture quality
- Integrated four new multiplexes into existing management system

Challenges

Broadcast Service Danmark (BSD) is responsible for distribution of TV and public radio across Denmark. The company is a wholly owned subsidiary of Danish public service broadcasters DR and TV 2|DANMARK.

BSD provides both analog and digital transmission. The company began transmitting digital terrestrial television (DTT) in 2006, using one MPEG-2 multiplex with four channels, from Cisco Scientific Atlanta. On October 31, 2009, the date for Denmark's Analog Switch off, BSD would need to begin broadcasting in digital format only. The company also needed to build three new MPEG-4 multiplexes for Boxer, the Swedish company that had been awarded the license for DTT in Denmark, and one for DR, the public broadcaster.

"We needed a solution that would enable us to quickly grow from one multiplex with four services to five multiplexes with 40 services," says Karsten Madsen, team leader for digital systems, BSD. In addition to building four new MPEG-4 multiplexes, BSD wanted to increase picture quality on the existing MPEG-2 multiplex. The company sought a solution that would minimize capital and operational expense. And it needed to be ready in time for Analog Switch off.

Solution

BSD achieved its goals using Cisco solutions for IP statistical multiplexing, encoding, and management. "Over the years, we have had an excellent experience with Cisco people and technology," says Madsen. "We knew we could count on Cisco to help us meet our requirements in a short timeframe, and we like that Cisco sells an end-to-end solution rather than point products. Cisco truly acts as a trusted advisor."

In the planning phase, Cisco consulting engineers advised on the IP statistical multiplexing technology needed to meet the requirements for higher picture quality. Then Cisco and BSD collaborated to develop a proof of concept, which has been successfully completed. Cisco began development even before the contract was finalized. "Cisco's willingness to adapt its solution for our requirements shows its flexibility," Madsen says.

In the new solution architecture, Cisco Digital Content Managers perform remote IP statistical multiplexing in conjunction with MPEG-2 encoders in different locations. BSD's broadcast customers were able to keep their encoders in their own locations while sharing the same bandwidth pool. The Cisco Digital Content Manager allocates variable-bit rates to the encoders, which produces higher picture quality than constant-bit-rate encoding.

Results

Cost Savings

Using Cisco Digital Content Managers, which support 40 inputs and/or outputs, BSD was able to consolidate from 12 sub-muxing sites to three. Factors contributing to cost savings include:

- 80 percent fewer multiplexers
- 75 percent fewer locations where equipment must be serviced
- Lower spare parts requirements
- Fewer equipment outages

More savings result from services aggregation, enabled by the cost-effective IP-based video transport within BSD's facility. The video transport solution, based on Cisco Catalyst switches, reduced the need for ASI routers, ASI aggregation multiplexers, and cabling.

Higher Picture Quality

Remote IP statistical multiplexing increases picture quality for the existing MPEG-2 multiplex. "We've received positive feedback from our broadcast customer," says Madsen.

Ease of Management

Personnel who work in BSD's broadcast operation center use their existing skills to manage the new Cisco multiplexers and encoders. No special training was required.

PRODUCT LIST

Routing and Switching

- Cisco Catalyst 3560 and 2950 for IP statistical multiplexing for MPEG-2 and MPEG-4
- Cisco Catalyst 4948 for transporting MPEG-4 signals over IP

Encoders and Decoders

- D9900 Digital Content Manager
- D9032 Encoder SD MPEG-2
- D9034 Encoder AVC MPEG-2/MPEG-4
- D9054 HDTV Advanced Compression Encoder
- D9854 and D9850 decoders for monitoring

Services

- SciCare Project Management Services
- SciCare Installation and Commissioning
- SciCare Technical Support Services

Rapid Deployment

BSD took advantage of SciCare project management and installation services to reduce risk and meet project deadlines. Cisco delivered the solution, which consisted of 330 devices, in just five weeks. "We were impressed with the rapid delivery," says Madsen.

Next Steps

On November 1, 2009, BSD Digital Switch Over will occur throughout Denmark, and BSD will begin transmitting digital multiplexes exclusively.

BSD has already installed the Cisco ROSA® Video Service Manager and plans to use it for service assurance. Using the graphical user interface, BSD will create service profiles that contain configuration parameters for the network and appropriate devices. Operators will be able to apply the profiles on demand, or the profiles can be invoked automatically according to a predefined schedule.

"We have an excellent relationship with Cisco," says Madsen. "We can collaborate on new ideas, and we benefit from Cisco's experience with other global customers."

Technical Implementation

Danish broadcasters DR and TV2|DANMARK transmit 24 hours a day from different locations. Previously, BSD could not combine their signals to provide variable-bit-rate encoding for all services. Cisco's remote IP statistical multiplexing technology, operating in conjunction with the Cisco Digital Content Manager and Cisco D9032 MPEG-2 encoders, now multiplexes the two broadcasters' signals from different locations. This is possible because the included software can handle the different delays in the network and still allocate variable bit rates. One of the

MPEG-4 multiplexes contains HD and SD content in a single statistical multiplexing pool, enabling dynamic allocation of bandwidth to either type of content.

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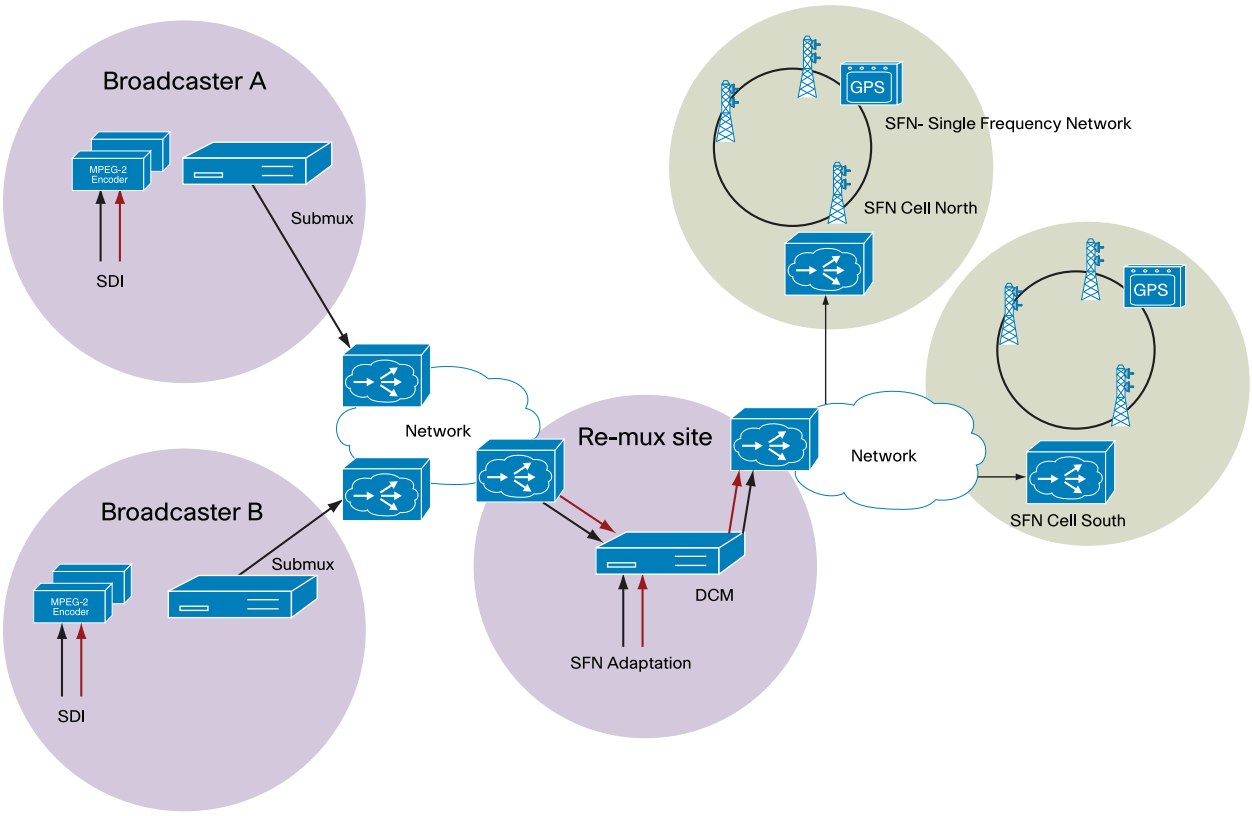
> **— Karsten Madsen, Team Leader for Digital Systems, Broadcast Service Danmark**

BSD also needed a single frequency network (SFN)-adapter solution for insertion of megaframe initialization packets (MIPs). Cisco offered to integrate an SFN adapter into the Cisco D9900 Digital Content Manager. This saved BSD from having to purchase separate SFN adapters from a third party, which would have increased capital and operational expense and required more rack space. At the request of one of BSD’s customers, Cisco also upgraded its encoder to handle HP@L3 encoding.

Figure 1. DVB-T Remote Statistical Multiplexing



For More Information

To read about Cisco solutions for the broadcast industry, visit: http://www.cisco.com/go/msb.

To read about the Cisco ROSA® 4 VSM suite, visit: http://www.cisco.com/go/rosa.

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