nevion

Upgrade of a countrywide DTT network to DVB-T2/SFN

When one of its key customers needed to roll-out HD broadcasts, the UK's Arqiva turned to Nevion to provide the equipment to ensure the reliable transport of streams to the transmitters

Background

Arqiva provides much of the infrastructure behind television, radio, satellite and wireless communications in the UK and has a significant presence in Ireland, mainland Europe and the USA. Its customers include major broadcasters such as the BBC, ITV, BSkyB and the independent radio groups, as well as major telco providers including the UK's five mobile network operators, and the emergency services.

Arqiva is also a partner (alongside the BBC, ITV, Channel 4, Sky) in the joint venture that operates the UK's free-to-air digital terrestrial television platform, Freeview. Initially supporting SD channels only, Freeview was due to begin carrying some HD channels nationwide in 2011, starting with the BBC's offering.

This meant that Arqiva needed to update its distribution network. In particular, it required a move to DVB-T2/SFN to accommodate the extra bandwidth needed for HD transmission. It also involved operating in Single Frequency Mode, SFN, to save UHF frequencies.

Finding reliable technology to meet the specific requirements of DVB-T2/SFN network operation was crucial to Arqiva given the importance of the service to customers, and the high stakes involved in broadcasting the upcoming London 2012 Summer Games in HD.
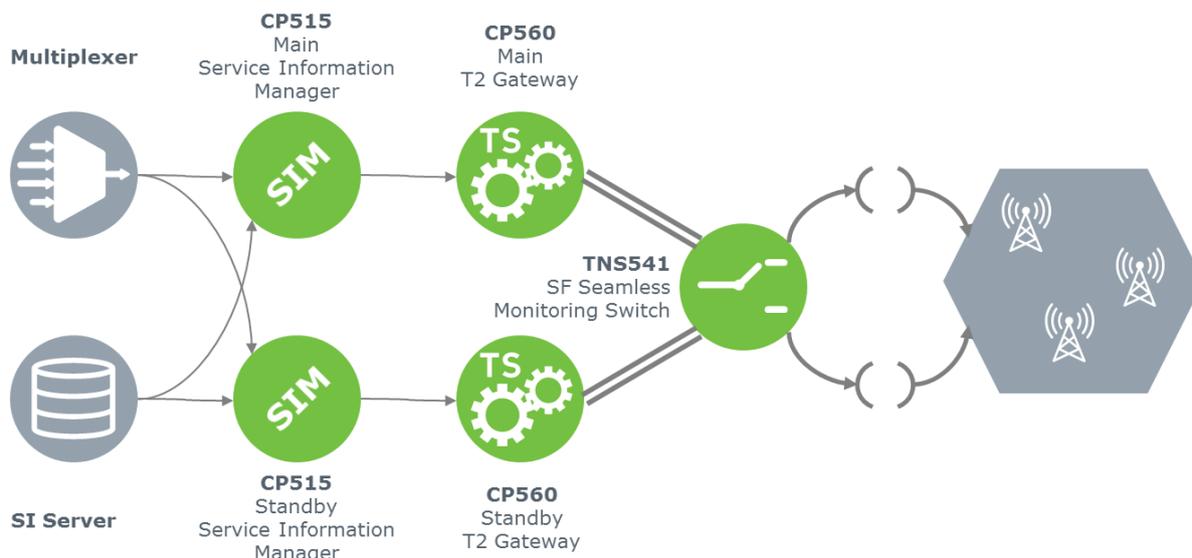
The requirements

Arqiva required a solution that could be deployed quickly and efficiently to meet its strict deadlines.

Arqiva also put a great emphasis on ensuring a robust SFN operation. In particular, it was keen to avoid the loss of DVB-T2 modulator synchronization, if errors occurred upstream in the distribution.

This point was crucial as the resynchronization of modulators affects all modulators in the SFN region and can take minutes, creating potentially lengthy outages in the transmission. With such high-profile broadcasters relying on the service, this was absolutely unacceptable.

To deliver the solution, Arqiva picked Nevion because of its superlative track record in DVB deployments and the unique functionality of its equipment – particularly in terms of transport protection.

Multiplexer

CP515
Main
Service Information
Manager

CP560
Main
T2 Gateway

SIM

TS

TNS541
SF Seamless
Monitoring Switch

CP515
Standby
Service Information
Manager

SI Server

SIM

TS

CP560
Standby
T2 Gateway

The solution

The solution provided to Arqiva by Nevion offers a full 1+1 redundancy from end-to-end.

The multiplexed channels and system information are fed into two CP515 Service Information Managers (SIMs), a main and a standby, which handle the insertion of the service information into the transport stream.

Each SIM feeds its TS on ASI into separate CP560 DVB-T2 gateways (again main and standby), each of which create two T2-MI on ASI transport streams to provide protection during the transport to the transmission sites.

These streams are designed to optimize the utilization of the RF spectrum. Firstly, the CP560 and CP515 are rate locked to ensure the transport stream from the CP515 is running at the maximum rate for the T2-configuration, thereby requiring an absolute minimum number of dummy cells to fill up the RF signal. Secondly, the CP515 can replace any null-packets with packets containing service or event information.

The CP560 gateways protect the four streams (two mains and two standbys) using the Reed-Solomon RS 204/188 FEC. This improves the reliability and resilience of the T2-MI transport over the radio links.

Before these steams reach the radio links though, they are passed on to a TNS541 SFN Seamless Monitoring Switch. This key piece of equipment makes it possible to switch between the two streams in such a way that the T2-MI stream structure and timestamps at the output is unaffected. This prevents service outages caused by DVB-T2 modulator resynchronization. This is a dual (ganged) switch, meaning that if the TNS541 detects a problem on the main double-streams, it automatically switches to the twin standby streams.

The TNS541 also provides "fail-to-wire" support, allowing streams to simply flow through the unit in the unlikely event it should fail.

Benefits

Arqiva began the phased roll-out of the Nevion solution in April 2011, and the project was completed in time for the London 2012 Summer Games.

Nevion's solution answered Arqiva's need for robustness and matched the specific operating demands of their DVB-T2/SFN network. Nevion's TNS541 stood apart from other solutions based on its ability to safeguard the delivery of high-quality video content, by providing 24/7 monitoring, advanced analysis and intelligent 1+1 redundancy switch-over between two MPEG-2 transport streams. When combined with the CP560 DVB-T2 Gateway, which enables more efficient spectrum utilization, the solution enabled Arqiva to deliver HD services with increased reliability.

Nevion offered Arqiva a quick and easy path to ensuring the uninterrupted delivery of the Freeview HD service in the UK.

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