

# How to Future-Proof Your DAB Network

Optimal digital radio network operation requires getting it right, from contribution through to transmission

## GUEST COMMENTARY

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The digital audio broadcasting standard has been on the industry's mind for a very long time. Many manufacturers didn't believe it would ever be an active part of the broadcast world but now it is. The speed in which DAB is implemented around the world depends mostly on a country's government. National broadcasters must then follow the call for digital switchover where it's been decided.

In Norway this happened for national stations in December 2017, and it's planned for Switzerland in 2024. For Germany, Denmark, Italy, France or Australia, Belgium, Netherlands and Australia, commitments have been stated or roadmaps finalized. This means present and future efforts as regards budget and organization of the various parts of a infrastructure are in place. It also means broadcasters need to organize themselves accordingly to ensure adequate operation of their entire network — from contribution to studio and from headend to transmitter sites.

### STUDIO TO HEADEND

Industry professionals need to keep in mind that it's important to "feed" the headend via AoIP using suitable codecs in the studio as well as a multimedia over IP server at the headend. Separating the audio portion from the DAB multiplexing system provides a number of benefits.

All studios of a network have the capacity to fall back on a unified solution and keep their flexibility. Connection configuration allows for independent selection of the best-suited audio codec format, e.g. ACC profiles, E-aptX or linear PCM audio.

From a budgetary point of view, a system setup as described above provides the chance for all studios of



a network to rely on existing AoIP system setups. It also allows the multimedia over IP network server at the headend to prepare the signals for DAB transmission, and for further distribution via IP or satellite or for storage in media archives.

Moreover, it ensures a "non-locked-in" arrangement. The multiplexer system and audio system are separated from each other, thus it's possible to

replace one or the other if needed. For this purpose, it's indispensable to consider a few aspects to ensure a generic audio setup, independent from the multiplexer system.

On the studio side, the choice of an AoIP codec should meet at least three key requirements. First, it must be stable when operating in WANs. This can be achieved by providing features for transmission robustness like two internal or external power supplies or software redundancy e.g. forward error correction, dual streaming or parallel streaming in different audio qualities.

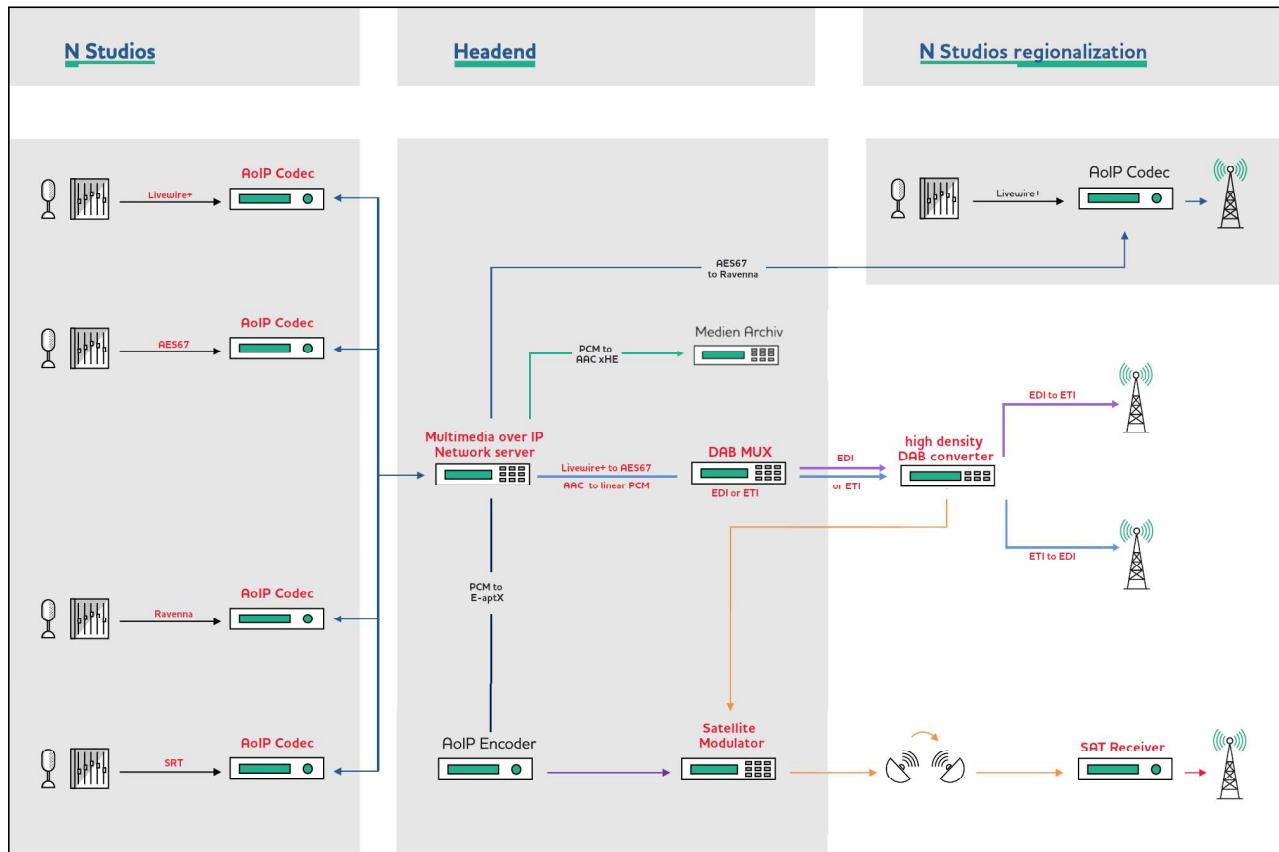
Second, it must provide all audio formats normally used in a studio, like E-aptX, most ACC profiles or MPEG formats, Opus, Ogg Vorbis or PCM.

Third, all common protocols as well as standards for internet interoperability such as Livewire+, Ravenna, Dante, AES67, EBU Tech 3326 or SMPTE ST2110 full stack must be supported.

At the headend, a multimedia over IP network server that collects the forwarded station programs to make them available to the MUX for final DAB+ signal assembling before distribution is indispensable. For DAB+, the multimedia over IP network server should offer the transcoding of any codec the studio forwards to linear PCM and in addition protocol transforming to AES67.

Also, in order to distribute other broadcast technologies (in addition to DAB), this server solution offers solid network connections by providing protocols and standards for unicast, multicast and multiple unicast IP

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An example of a DAB setup that ensures adequate operation of the entire network.

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streaming like elementary stream (UDP, RTP/RTCP), MPEG transport stream or SRT. Moreover, it also supports all previously mentioned codecs as well as standards for internet operability.

### HEADEND TO TRANSMITTER SITES

In some cases broadcasters have to deal with distinct challenges. For example, when operating DAB in expanded networks, including EDI and ETI multiplexers as sources, or when operating legacy ETI and EDI transmitters in parallel or operating DAB in already existing infrastructures originally not intended for DAB, e.g. DVB-S/S2 or ASI.

To cope with these obstacles, operators require solutions that are able to provide a well thought-out concept and equipment like a high-density DAB+ converter to enable the use of new and already existing infrastructures at the same time.

These kinds of devices allow users to receive data signals from legacy ETI and EDI multiplexers simultaneously and to convert the signals respectively to the EDI/ETI transmitters in the field. As high-density solutions, the converters offer at least four EDI and ETI I/Os. In addition, bidirectional ETI interfaces (I/O) increase the number of ETI outputs if for example ETI mirroring is needed.

Moreover, they provide a sufficient number of Ethernet data interfaces in and out. A satellite tuner and ASI interfaces facilitate integration into cost-efficient, already existing satellite distribution systems or ASI networks.

They also let users optimize coverage and distribute programs to regions that are still lacking broadband IP.

To ensure synchronization of all sites, the converters offer PTPv2 or an external 10 MHz signal and in case of failure, an internal recovery from the EDI stream by jitter removal ensures ongoing synchronized transmission.

For transmission robustness, the devices provide the possibility of seamless switching between two EDI or ETI sources (PFT Dual Streaming).

Finally, to reach the best compatibility, the chosen solution must accord with specifications such as ETSI EN 300 40, ETSI TS 102 563, EN 300 799 or ETSI TS 102 693 and supports Uni Multicast (IGMPv2/v3) as well as EDI, UDP, IGMP, ICMP, DHCP, HTTPS, FTPS, NTP and PTPv2.

This will allow for smart management and control of all settings and configuration via a web interface or remotely via SNMP. In addition, operators will benefit from real-time statistics and monitoring of main DAB+ parameters. And while not mandatory, it's also advantageous to have a DAB tuner that offers on-air monitoring at the transmitter sites. ■