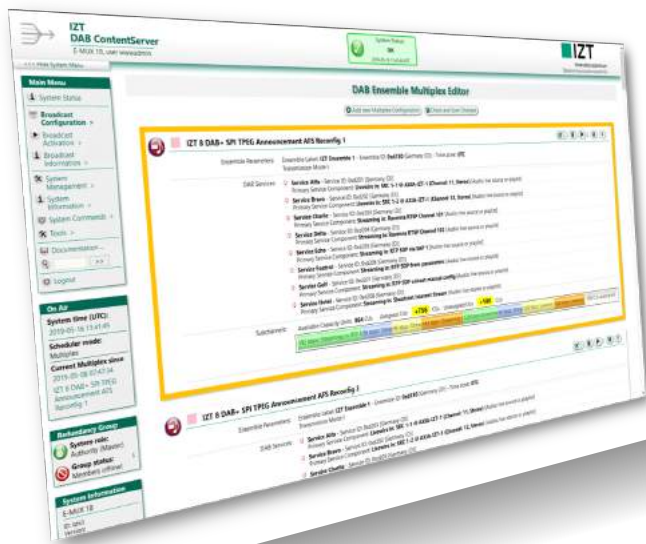
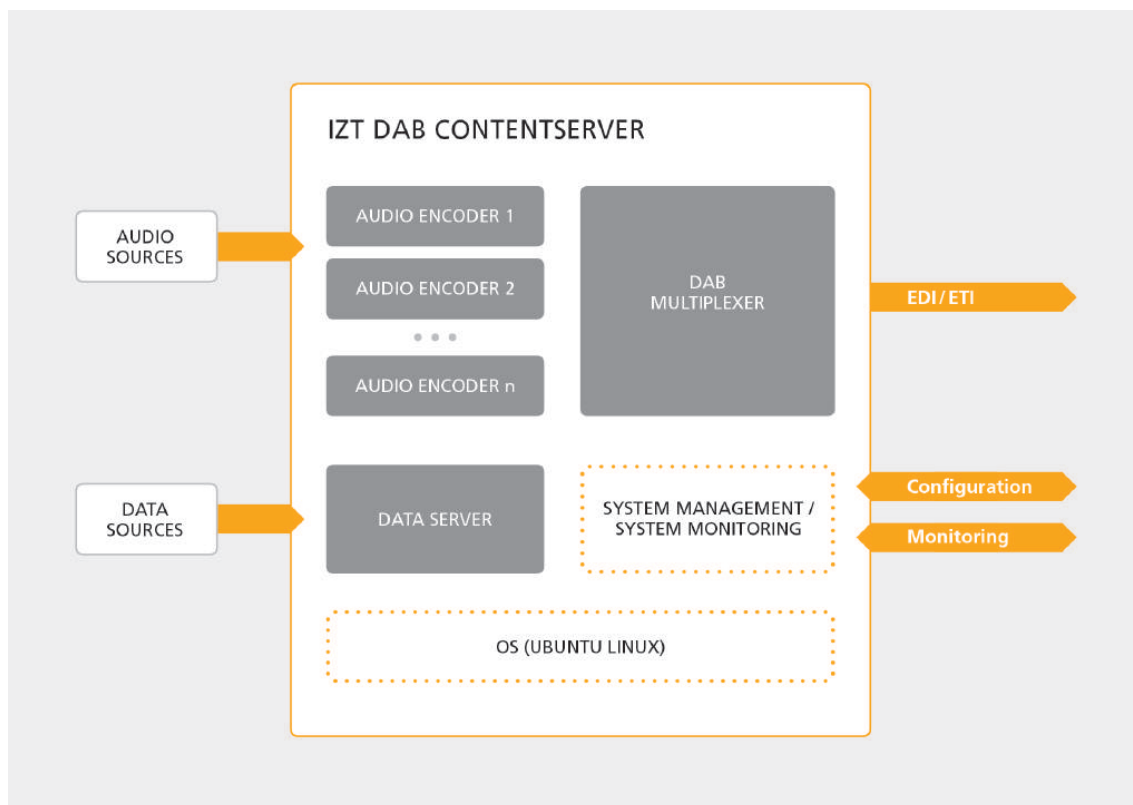


# DAB ContentServer Developer Edition



- Audio encoding, data service handling and multiplexer in one box
- Flexible configuration via remote web interface
- Perfect match with the IZT S1000/S1010 Signal Generator

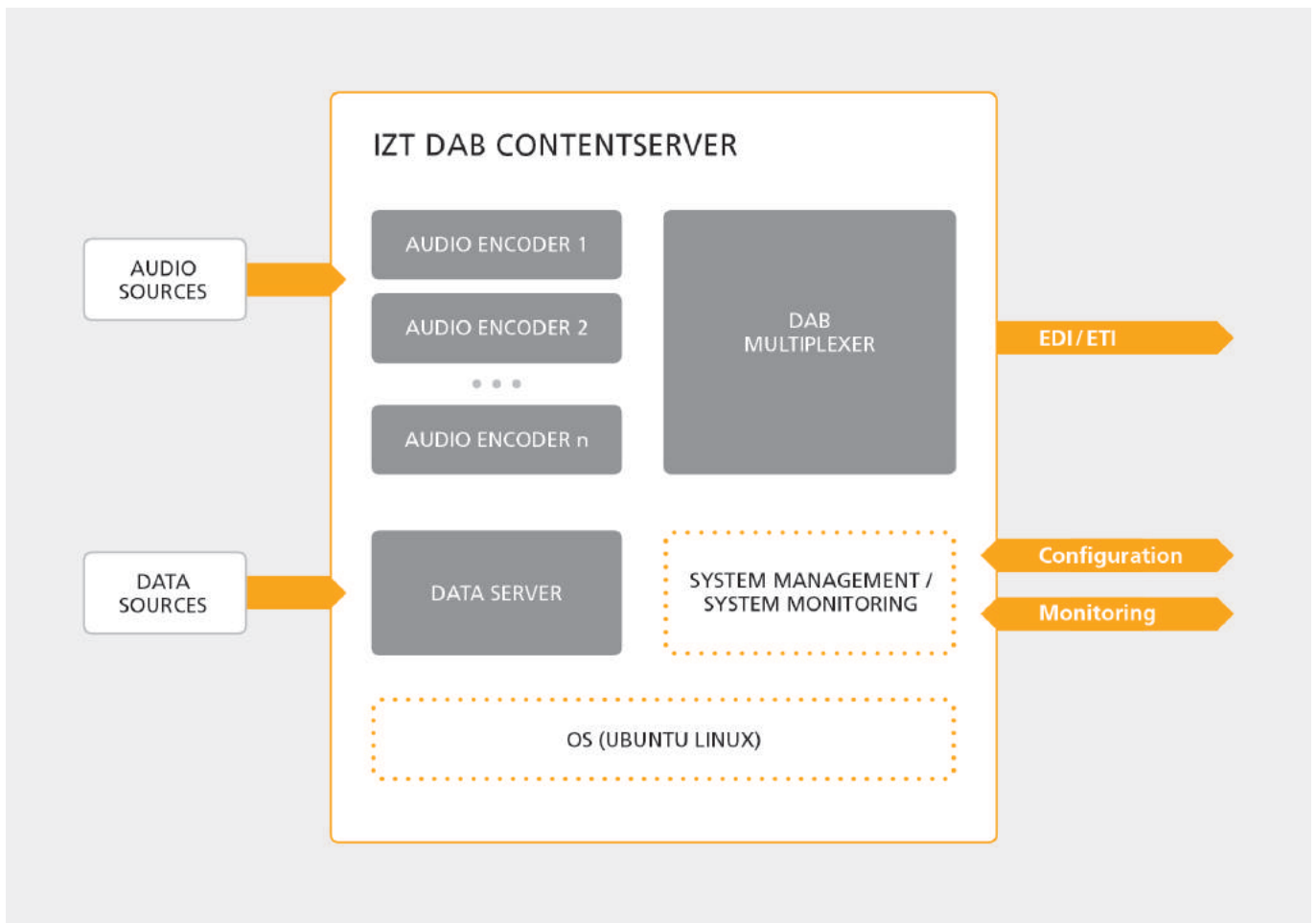


The IZT DAB ContentServer is a versatile professional multiplexer system for DAB and DAB+. Combining audio encoding, data service management und multiplex generation, it forms a powerful tool for the generation of DAB test signals. The IZT DAB ContentServer is a software system and can be operated on standard server hardware.

# Key Features

The IZT DAB ContentServer is a powerful solution for efficient development and testing of DAB devices such as chipsets, receivers or broadcast equipment. It makes the complete functionality (signalling and transmittable

content) of DAB available for laboratory use. This includes dynamic reconfigurations to switch between different multiplex configurations.



**FIGURE 1:** AUDIO ENCODING, DATA SERVICE HANDLING AND MULTIPLEX CONFIGURATION IN ONE BOX

## AUDIO ENCODING

The system embodies encoding of multiple simultaneous audio streams in real-time. It supports MPEG Audio Layer-2 for DAB as well as MPEG-4 HE-AACv2 as used in DAB+ and DMB. While one DAB+ encoder is included in each edition, additional encoders are available as

options.

Audio content can be imported as wav or mp3 files, including playlists. If required, it is possible to upgrade live audio inputs via audio over IP including external converters from analog or AES3 audio.

## MULTIMEDIA AND DATA SERVICE MANAGEMENT

This system component supports all standardized and broadcaster-specific data applications. It includes collection, import, merging of data as well as conversion, processing and broadcast encoding.

The range of standardized DAB applications includes Dynamic Labels (with UTF-8 encoding and control commands), Journaline®, EPG, Slideshow and TPEG/TMC. Open interfaces enable the transmission of any custom-tailored and broadcaster-specific applications.

## DAB MULTIPLEXER

The Multiplexer component manages all DAB signalling capabilities and generates the complete DAB multiplex. An unlimited number of multiplex configurations can be defined. Reconfigurations between multiplex configurations are performed seamlessly, i.e. continuous

output frames are provided and no bit errors or audible artifacts occur.

The ETI output signal is provided via standard EDI via UDP/IP. In addition, the multiplexer output can be recorded as ETI file for further use.

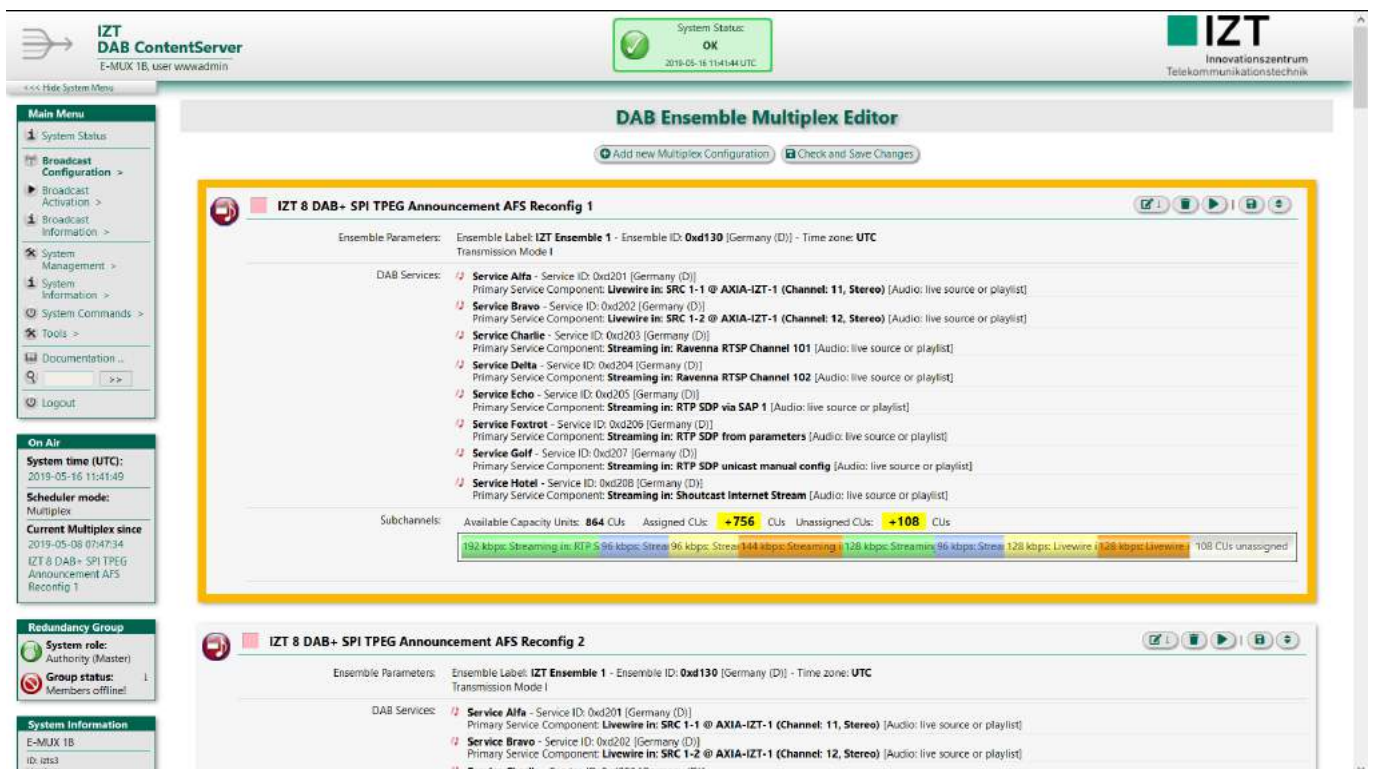


FIGURE 2: MULTIPLEX CONFIGURATION VIA THE WEB INTERFACE

## ETI ANALYZER

The ETI Analyzer is a very powerful tool for the file-based processing and analysis of DAB ensembles. This includes ETI files recorded from the output of the DAB ContentServer as well as uploaded files. The ETI Analyzer allows to:

- Analyze multiplex and service components – the ETI Analyser will point at many erroneous or suspicious data in the DAB signalling and the broadcast data
- Extract and download subchannels and FIC from a DAB ensemble - it is for instance possible to extract a subchannel, apply some well defined errors to the subchannel file and then create a new DAB ensemble with this special subchannel file
- Download audio and PAD
- Convert ETI/EDI/RDI/STI to ETI(NI) file format

The screenshot shows a web browser window titled "Ensemble MUX A - ETI Ana...". The address bar shows the URL "https://172.16.65.150/cgi-bin/el". The main content area is titled "Description of DAB Ensemble 1" and contains a table with the following data:

Ensemble	'Östafjells' (Eid: 0xf901)
Ensemble length	4960 frames, 119.040 seconds
Ensemble start	2015-06-29 07:58:05 UTC, local time 2015-06-29 09:58:05 (LTO +02:00), got 30 FIG0/10 (long form), 0/0.0/0 (min/avr/max) ms time jitter (first date/time in ensemble)
Transmission mode	I
Services	16

Below this is a section titled "Description of carried services" which contains a table with two columns: "Service" and "Used sub channel".

Service	Used sub channel
<b>Data service 'NRK EPG' (Sid 0xe2f30010)</b> Primary Service component (Enhanced Packet Mode, DSCTy: Multimedia Object Transfer (MOT)); SCIdS 0x0 SPI (Service and Programme Information) / EPG (Electronic Programme Guide); User Application data is 01 02: Basic profile; Advanced profile	Enhanced Packet Mode sub channel 54, packet address 1 (SCId 0xfef)
<b>Audio service 'NRK P1' (Sid 0xf201), PTy 12: Easy Listening Music</b> Primary Service component (Audio); SCIdS 0x0 MOT Slideshow	Audio sub channel 57; Foreground sound (MPEG Audio Layer II) Audio sub channel 57; X-PAD AppType 12; DSCTy: Multimedia Object Transfer (MOT)
<b>Audio service 'NRK P2' (Sid 0xf202), PTy 7: Culture</b> Primary Service component (Audio); SCIdS 0x0 MOT Slideshow	Audio sub channel 50; Foreground sound (MPEG Audio Layer II) Audio sub channel 50; X-PAD AppType 12; DSCTy: Multimedia Object Transfer (MOT)
<b>Audio service 'NRK P3' (Sid 0xf203), PTy 10: Pop Music</b> Primary Service component (Audio); SCIdS 0x0 MOT Slideshow	Audio sub channel 51; Foreground sound (MPEG Audio Layer II) Audio sub channel 51; X-PAD AppType 12; DSCTy: Multimedia Object Transfer (MOT)
<b>Audio service 'NRK SÁMI RADIO' (Sid 0xf205), no PTy code indicated</b> Primary Service component (Audio); SCIdS 0x0 MOT Slideshow	Audio sub channel 4; DAB+ audio Audio sub channel 4; X-PAD AppType 12; DSCTy: Multimedia Object Transfer (MOT)
<b>Audio service 'NRK NYHETER' (Sid 0xf206), PTy 1: News</b> Primary Service component (Audio); SCIdS 0x0 MOT Slideshow	Audio sub channel 5; Foreground sound (MPEG Audio Layer II) Audio sub channel 5; X-PAD AppType 12; DSCTy: Multimedia Object Transfer (MOT)
<b>Audio service 'NRK mP3' (Sid 0xf208), PTy 10: Pop Music</b>	

FIGURE 3: ANALYSIS OF A DAB ENSEMBLE WITH ACCESS TO SUBCHANNELS, FIC AND PAD

## DAB MULTIMEDIAPLAYER ADD-ON

The MultimediaPlayer is a PC software for direct decoding of audio and data content from EDI streams. Hence, it can be used as a very powerful monitoring solution. Along with reproducing radio programs in stereo

and 5.1 surround sound, the MultimediaPlayer offers unique features – including the parallel presentation of album covers, text messages and traffic information directly in the player.

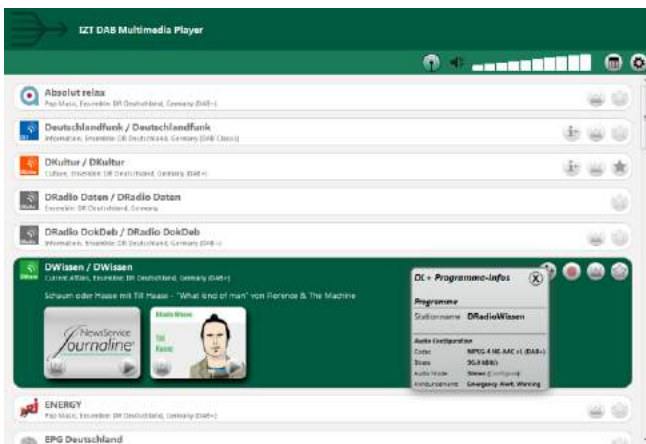


FIGURE 4: THE IZT DAB MULTIMEDIAPLAYER DECODES DAB SERVICES ON A PC

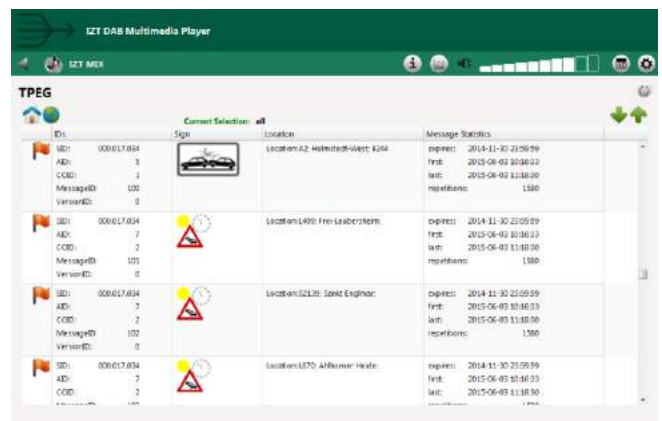


FIGURE 5: DETAILED ANALYSIS OF DAB DATA SERVICES

# Editions for Receiver Testing

For development purposes, the IZT DAB ContentServer is available in two editions: Embedded Edition and Developer Edition. Both include one DAB+ audio encoder. Additional DAB, DAB+ and DMB audio encoders are available as options.

## DEVELOPER EDITION

The IZT DAB ContentServer Developer Edition makes the complete range of DAB functionality available for development. All specified and proprietary data services can be added to the DAB multiplex as PAD or non-PAD, including Dynamic Labels, Dynamic Labels Plus, Slideshow, TPEG and EPG/SPL. The Developer Edition includes editors for Alternative Frequency Signalling (AFS), TII and Region Definitions. It supports the insertion of raw data as Transparent Data Channel (TDC) as well as FIC Data Insertion for custom signalling.

The Developer Edition includes the ETI Analyzer as well as the IZT DAB MultimediaPlayer.

The IZT DAB ContentServer Developer Edition can be provided as a turn-key solution installed on cost-efficient and reliable server hardware. Alternatively, installation and operation on the S1000 Memory Extension, S1000 Memory Extension+ or S1010 can be a convenient choice if the ContentServer is used in combination with the S1000/S1010 Signal Generator.

## EMBEDDED EDITION

Compared to the Developer Edition, the IZT DAB ContentServer Embedded Edition provides limited functionality for basic receiver testing. This includes encoding of DAB or DAB+ audio, Dynamic Labels and Journaline. Other features can be added as individual upgrades.

The IZT DAB ContentServer Embedded Edition is only available in combination with the S1000/S1010 Signal Generator, installed on S1000 Memory Extension, S1000 Memory Extension+ or S1010.

# Your Benefits

## FULL RANGE OF DAB FUNCTIONALITY

Exploit the complete range of functionality of the DAB standards, including all variants of data services, announcement signaling, DAB-DAB and DAB-FM service following and dynamic reconfigurations. Use the software implementation developed by the renowned Fraunhofer IIS and benefit from 30 years of experience in Digital Broadcasting.

## COMPLETE TESTING SOLUTION

The DAB ContentServer is the right choice to complement your IZT testing solution based on the S1000/S1010 Signal Generator. With the S1000/S1010 DAB modulator options, DAB signals can be modulated from ETI files created by the DAB ContentServer. With the EDI format, a direct link for real-time modulation can be set up between DAB ContentServer and Signal Generator. The S1000/S1010 is a powerful choice to test DAB-DAB and DAB-FM service linking. By applying power level profiles to the RF output signals, it is possible to simulate a "drive" through different coverage areas. The powerful impairment simulation makes it possible to simulate multipath reception, doppler and antenna diversity.

## ALWAYS UP-TO-DATE

Continuous software maintenance ensures to cover all additions and changes to the DAB specifications. Two years of Software Update Support (SUS) after initial purchase are included. After this period, SUS can be extended annually. Changes to the DAB specifications will be adopted instantly, so that receiver developers can verify implementations proactively. Since the major revision of the DAB standard ETSI EN 300 401 V2.1.1 in 2017, the user may configure whether the DAB ContentServer shall comply to the new version or the previous V1.4.1. Hence, it is possible to test receivers against the new version while it still possible to check the compatibility to many DAB ensembles in the field still using the old version of the standard.



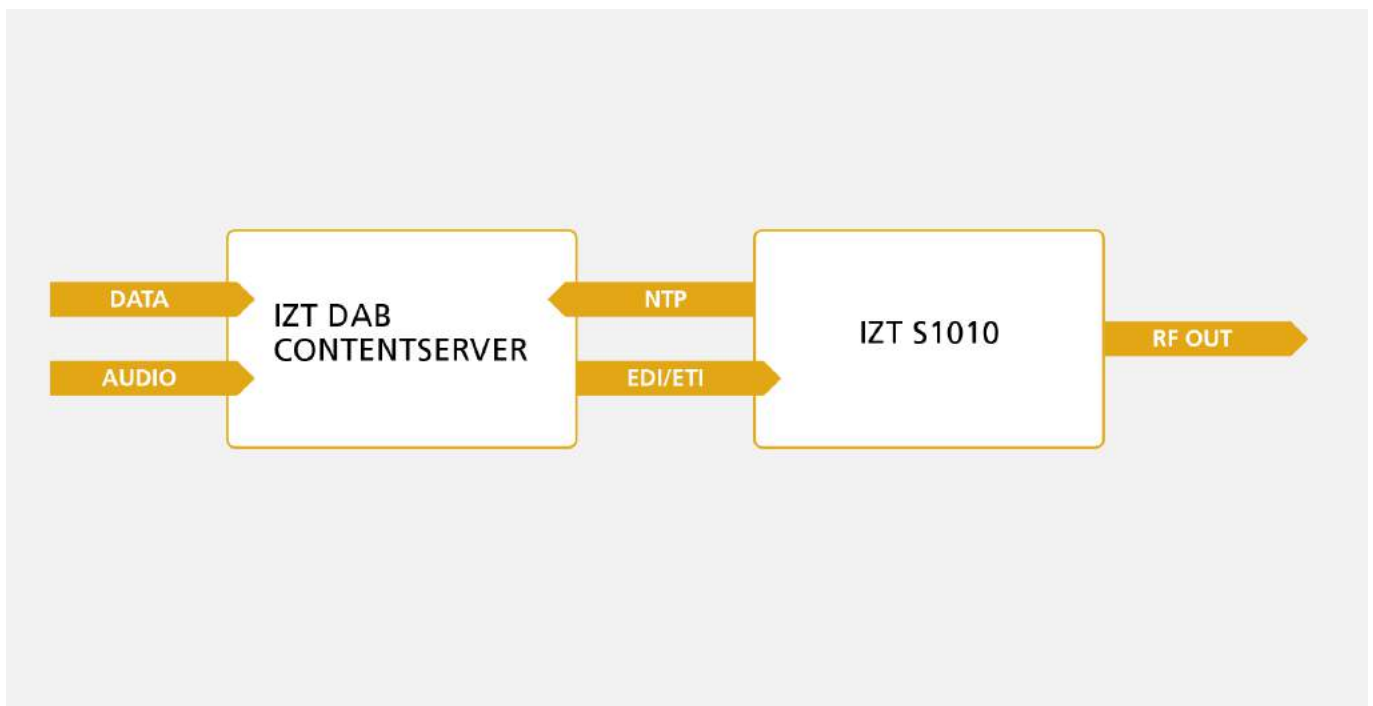
# Applications

## GENERATION OF ETI TEST FILES

The IZT DAB ContentServer can be used to create ETI test files which can be used with a DAB player and/or modulator. The IZT DAB ContentServer Developer Edition allows to produce a collection of ETI files covering the complete range of DAB functionality. The IZT S1000/S1010 Signal Generator is the right addition to create complex test scenarios, for example playing out several DAB and FM signals at the same time to simulate service following scenarios. Powerful features such as fading simulation and power level profiles make it possible to simulate various real-world scenarios in the laboratory.

## REAL-TIME TESTING

EDI real-time streaming between the DAB ContentServer and S1000/S1010 Signal generator allows setting up a complete real-time chain. The DAB ContentServer handles DAB/DAB+ audio encoding, data service generation and multiplexing while the S1000/1010 modulates the RF signal. The optional Live Audio Input upgrade of the DAB ContentServer can complete the real-time chain.



**FIGURE 6:** SYNCHRONIZED SETUP TO MULTIPLEX AND DEMODULATE DAB SIGNALS IN REAL-TIME

# Specifications

Multiplex Configuration and Management	Embedded Edition	Developer Edition
Unlimited simultaneous multiplex output configuration definitions	○	●
Broadcast Scheduler (weekly/calendar)	○	○
Announcement support (via UECP, Funkhaustelegamm, Leitungsprotokoll, HTML interface)	○	●
AFS – Alternative Frequency Editor	○	●
TII and Region Definitions Editor	○	●
Extended broadcast info (Ensemble configuration, FIG Layout)	●	●
Multiplexer Output Live Monitoring (audio/subchannel HTTP streaming; Slideshow, Dynamic Label decoding, Journaline)	○	●
Multiplexer Output EDI / ETI / Subchannel Recording	●	●

DAB Audio Server	Embedded Edition	Developer Edition
Audio input live analog/digital/Livewire	○	○
Audio input as mp3/wav, playlist	●	●
Silence/clipping detection and configuration	○	○
Audio input signal amplification/mp3 normalization	○	○
DAB Classic encoders (Layer II) [max. 64]	○	○
DAB+ encoders included [max. 64]	1	1
DAB Surround option incl. SX Pro (SX Pro enhances stereo signals on-the-fly to 5.1 for surround broadcast)	●	●
Support for external audio encoders (MuxEnc)	○	○

Data Application Types	Embedded Edition	Developer Edition
Dynamic Labels	●	●
Dynamic Labels Plus (DL Plus), Intellitext	○	●
Journaline®	●	●
MOT Slideshow (incl. categorized/interactive SLS)	○	●
EPG – Electronic Programme Guide	○	●
MOT Broadcast Website/Transparent File Transmission	○	●
Filecasting	○	●
TPEG Traffic Information	○	●
TMC – Traffic Message Channel	○	●
IP Insertion	○	●
TDC – raw data (broadcaster-specific data on various protocol level; incl. FIC signaling)	○	●
FIC Data Insertion (FIDC, SI, CA)	○	●
Support for multiple transmission priority classes	●	●

Data Import Methods	Embedded Edition	Developer Edition
Import via HTML interface (Web-GUI)	●	●
Import via file FTP upload	●	●
Import from existing RSS/Atom sources (Journaline®)	●	●
Import from existing RSS/Atom sources (Dynamic Labels)	○	○
Import via HTTP/FTP mirroring	○	○
Import via live socket connection (API)	○	●
Import from Funkhaustelegramm, UECP, Zenon, Leitungsprotokoll (Dynamic Labels + Journaline®)	○	○
Automatic Scheduled Mirroring option	○	○

Additional Software packages	Embedded Edition	Developer Edition
ETI/STI/EDI/RDI Analyzer/Converter	○	●
IZT DAB Multimedia Player	○	●

# Ordering Guide

Option	Description
<b>IZT DABCS-060</b> DAB ContentServer Developer Edition	Full-featured development and testing of DAB equipment (includes one DAB+ Encoder license). Option Package according to feature table.
<b>IZT DABCS-061</b> DAB ContentServer Developer Edition Upgrade	Full-featured development and testing of DAB equipment (includes one DAB+ Encoder license). Upgrade from IZT DABCS-070 (ContentServer Embedded Edition).
<b>IZT DABCS-070</b> DAB ContentServer Embedded Edition	Limited functionality for DAB/DAB+ encoding and multiplexing (includes one DAB+ Encoder license). Option Package according to feature table. Only available as S1000/S1010 option.
<b>IZT DABCS-071</b> DAB ContentServer Embedded Edition upgrade	Upgrade from existing S1000 multiplexing functionality (discontinued options IZT S1000-404, -405, -406). Only available as S1000/S1010 option.
<b>IZT DABCS-201</b> Additional DAB Classic Encoder	MPEG Audio Layer-II audio encoder license
<b>IZT DABCS-202</b> Additional DAB+ Encoder	MPEG-4 HE-AAC v2 audio encoder license
<b>IZT DABCS-302</b> Live Audio Input Upgrade	Adds live audio input via sound card and Audio over IP
<b><i>Additional option upgrades on request</i></b>	
<b>IZT DABCS 902</b> Software Update Support 1 Year	Extension of Software Update Support by one additional year. Starting 24 months after system delivery.
<b><i>Server hardware and peripherals will be selected and quoted according to customer demand</i></b>	

# DAB ContentServer Developer Edition

**About IZT** The Innovationszentrum fuer Telekommunikationstechnik GmbH IZT specializes in the most advanced digital signal processing and field programmable gate array (FPGA) designs in combination with high frequency and microwave technology.

The product portfolio includes equipment for signal generation, receivers for signal monitoring and recording, transmitters for digital broadcast, digital radio systems, and channel simulators. IZT offers powerful platforms and customized solutions for high signal bandwidth and real-time signal processing applications. The product and project business is managed from the principal office located in Erlangen/Germany. IZT distributes its products worldwide together with its international strategic partners. The IZT quality management system is ISO 9001:2015 certified.

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