PANEDA KEY FEATURES

DAB Multiplexing System version 2020-11-06

Summary

Paneda develops DAB head-end systems and is today a world leader in the area. The flexible generic system is developed with the most modern technology and has several unique features, such as state-of- art redundancy mechanisms using the unique Paneda SMART content switching. Another important area is security, which means that all connections internally and externally are encrypted using TLS/HTTPS. The security has been tested by third party security companies and is graded as A+, the highest possible security level. Easy integration with third party products for contribution, meta data and distribution are also in focus. Paneda uses open API's such as JSON based RESTful API.

Subject for changes without further notice

ABOUT THE PANEDA DAB MULTIPLEXING SYSTEM

General

Paneda has developed a completely new head end system from scratch, based on almost 20 years' experience and based on customer's feedback from over 200 installations worldwide. The system is using the most modern architecture and using restful API's with highest security in focus. The system was released in its first version during 2015 and have been further developed according to new requirements in the DAB standard and input from customer needs.

The Paneda DAB software solution has many advantages vs. a hardware solution, such as generic, further development and expansion of the system with possibility to install on any hardware platform, OS independent, which means a non-vendor lock-up.

Focus areas

SECURITY

The system supports;
- Encrypted connections where applicable, for example when using metadata. It will not be possible for unauthorized party to manipulate metadata such as text or picture
- Usage of a secure user database, all registered users must use real email addresses with a password selected by themselves. The passwords are individually salted and hashed for storage according to best practice.
- Defined custom user rights and different roles in the system, no limitations to number of users
- 2 factor authentications
- Web interface for management support HTTPS/SSL with valid certificates
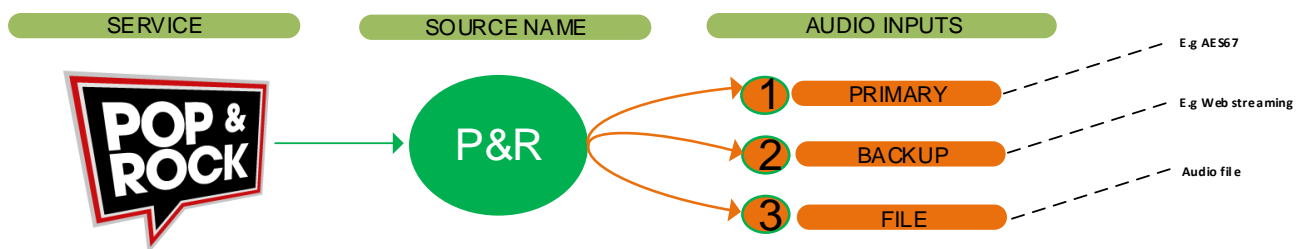- Security level A+ ranked

PANEDA Tech AB
Universitetsvägen 14, S-58330 Linköping
Sweden
+46 15 0054
www.paneda.se

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REDUNDANCY

Broadcast systems requires a very high availability and much focus has been on redundancy and back-up. Paneda has developed new features that offers a new and higher level of redundancy.

AUDIO:

The Paneda audio handling is service oriented where a service refers to a matrix of selectable audio sources, and in combination with redundant audio sources this ensures a more fault tolerant audio handling.

- A service points to an audio source rather than an audio encoder, providing best flexibility without changing encoder when changing audio source
- Each audio input can be defined with multiple audio sources, as web streams, as fallback or playing an audio file
- All defined audio inputs are "hot" and monitored. An audio switch-over will not be performed to a non-working audio.
- A service can at any point referring to any available audio source.

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Sweden
+46 15 0054
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SMART CONTENT SWITCH

- The unique Paneda system has a smart content switching using "patching" of two faulty signals. One audio error in one mux, another audio error in the redundant mux, generates an error free output
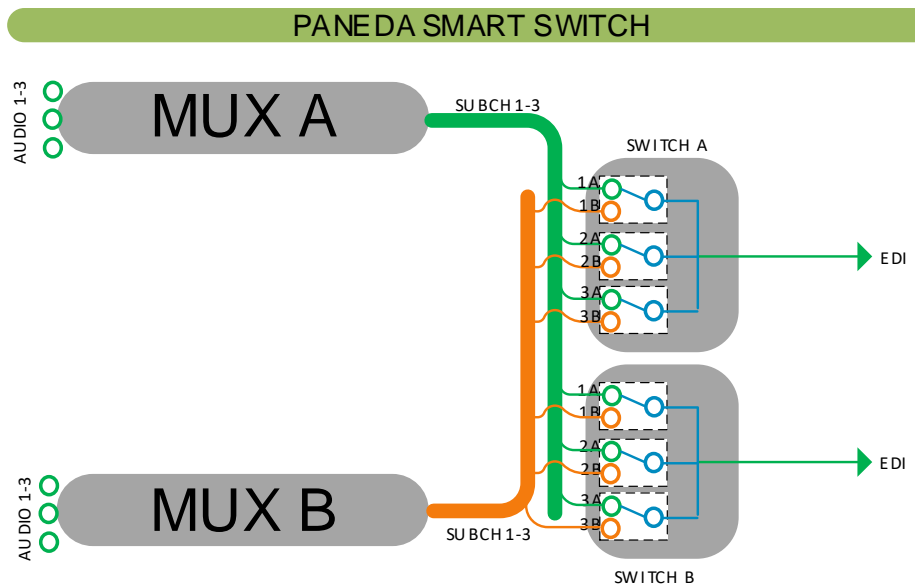

Paneda subchannel switch, example with 3 subchannels.
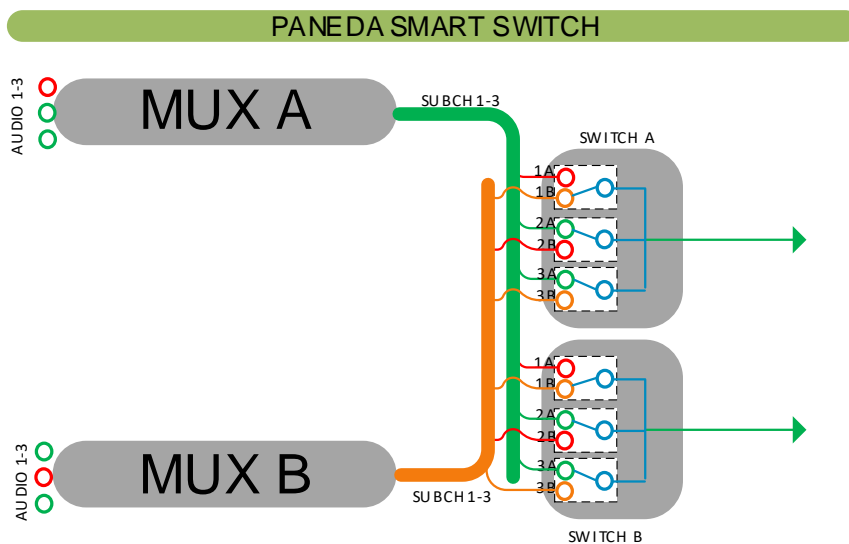
Picture showing multiple errors, service 1 has failed in the main system, service 2 has failed in the redundant system. Both services OK on output of both systems

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**SYNCHRONIZATION with PFT (Protection, Fragmentation and Transport)**

- Multiplexer redundancy including PFT synchronization of configuration AND multiplexer output frame synchronization. Multiplexers in redundant mode are 100% synchronized to enable seamless switching on EDI level in the transmitters or in the IP network.
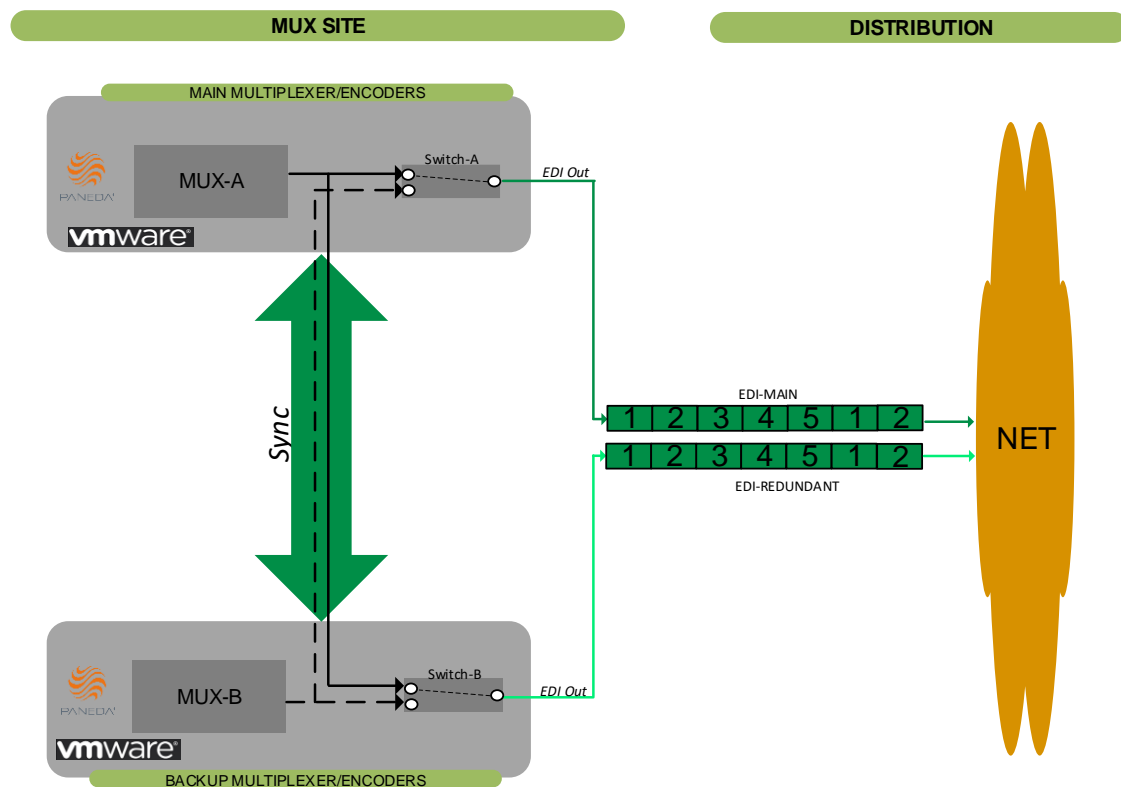

*Paneda output are synchronized and PFT aligned, means that each PFT fragment contains the **exact** same data.*

SYNHRONIZATION WITH TIMESHIFT

- In addition to PFT synchronization, the Paneda also supports time shifting of the outputs, this provides a higher level of redundancy on the distribution network.
- On a network drop-out, a time shifted output ensures that different data is affected at the same time.
- A receiver supporting PFT handling can cherry picking fragments from either stream.
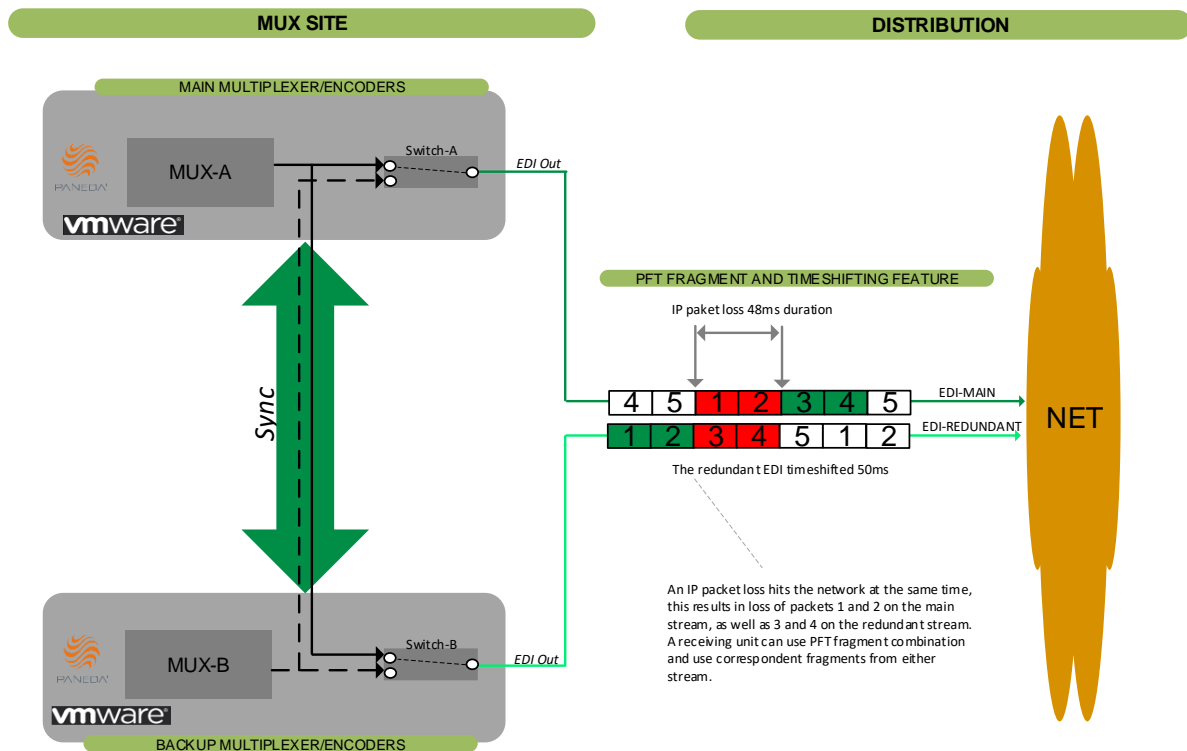
Network drop out affect different data content on the two streams.
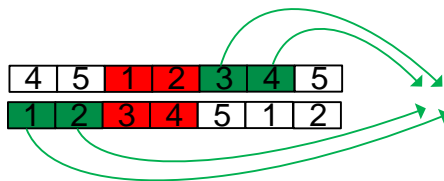
An EDI receiver can cherry picking individual PFT fragments from either stream

PROVIDERS

- The system supports a flexible way to handle different providers. Each provider may login to the system and manage their own specified capacity range. This handling replaces the older service multiplexer handling and have eliminated the disadvantages of such setup.
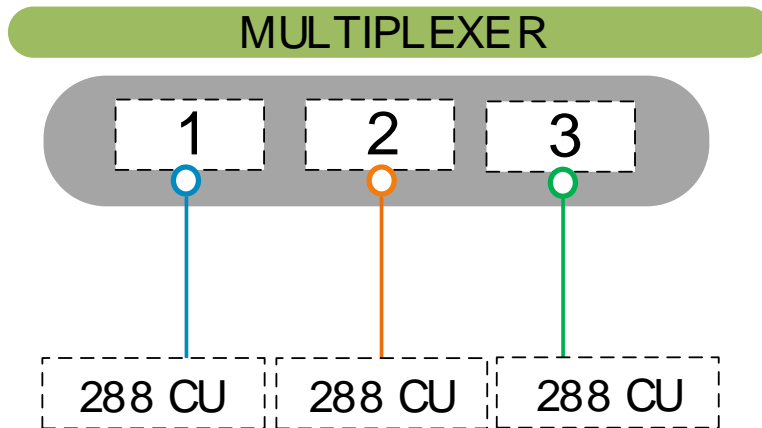
The multiplexer can be divided into capacity slots, one for each provider. Each provider has access to their own capacity slots. Each provider uses their own web interface for managing the system. Each provider is 100% isolated from the other.

METADATA

- The system supports adding text/pictures directly in the web interface
- Insertion of metadata as text and picture easy integrated, using web-based API as JSON
- Insertion of metadata is encrypted and requires an access code to prevent manipulating of metadata
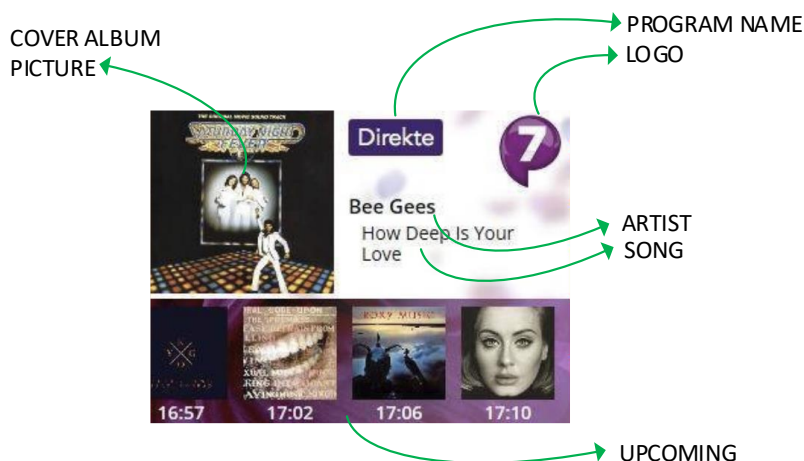
SLS Example showing a dynamic information of artist, song and more.

VIRTUALIZATION

The Paneda system is designed to be virtualized. Using a server with VMware its possible to install several DAB multiplexer systems and encoders in the very same hardware. Each system is independent and installed in its own guest operating system.

Supported features

Audio/Metadata

- The system supports 64kbps with PS+SBR (only Fraunhofer codec supports this feature)
- A service points to an audio source rather than an audio encoder providing best flexibility without changing encoder when changing audio source.
- Each audio input can be defined with multiple audio sources, as web streams as fallback or even playing an audio file.
- Supports an easy way to insert audio from remote sites
- Insertion of metadata as text and picture easy integrated, using web-based API as JSON.
- Supports adding text/pictures directly in the web interface
- Alarms if no metadata is present

Monitoring

- Custom defined SNMP channels
- Monitoring via the Paneda API, support for major monitoring systems like DataMiner and more.
- The web interface supports real-time status overview of the system, including real-time VU meters
- All activities in the system logged in an audit log

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General system support and functions

- Only web-based interface is required for settings/controlling and monitoring no config files or other methods required
- The system (web interface) use and support TLS (SSL) for highest security including 2factor authentication.
- Supports multiple languages
- Support for local language in the web interface
- Remote support in an easy way
- The complete system is built to be realized in a VMware setup
- The system uses Linux as operating system (non-Windows OS)
- The system is scalable in the way that a new service/new provider or even a new complete system can be started without hardware investments
- Supports service following between DAB-FM, and supporting the latest standard "linkage actuator"
- Support for measurement of audio levels (VU meters) in the web interface
- Custom FIG signalling supported
- Support for other codecs (as Open source codec)
- Seamless changing of bitrate of a service as well as changing codec
- Support for using Web radio streams as audio source like shoutcast/icecast and other commonly used formats for web radio
- EDI input support including support for "re-multiplexing" and subchannel based extraction.
- Support for using mobile phone for controlling/monitoring in such way that the web interface is developed to be scalable for mobile devices.
- Support for the All-In media "RAPID" content system
- 1+1 redundancy including synchronization of configuration AND multiplexer output frame synchronization
  (Multiplexers in redundant mode 100% frame synchronized to enable seamless switching on EDI level in the transmitters or in the IP network)

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TECHNICAL FEATURES

AUDIO ENCODER	INCLUDED	OPTION
Open source codec MP I/II & AAC	●	
Support for AES67/Livewire	●	
Support for AES/EBU		○
Support for streaming formats, Icecast/Shoutcast e.tc	●	
Audio input redundancy, multiple sources		○
Support for Fraunhofer PRO AAC codec	●	
Support for external encoders	●	
Audio input as file, mp3 or wav	●	
Drift compensation for web streams	●	
Silence detector	●	
Gain control	●	
VU meter real-time	●	
Seamless changes of audio parameters	●	
Hardware external encoder		○

MULTIPLEXER	INCLUDED	OPTION
EDI Input re-multiplexing	●	
Full EDI standard implementation	●	
Multiple EDI outputs	●	
Individual settings of EDI outputs	●	
EDI PFT synchronization	●	
EDI PFT address field support	●	
Advanced Configuration Scheduler	●	
Service following FIG 0/6	●	
Linkage actuator	●	
Frequency Information FIG 0/21	●	
Other Ensemble FIG 0/24	●	
FIG editor	●	
ETI recording at output		○
Virtual Service Provider	●	
SMART Content Switch		○
Seamless built in EDI switch		○
Graphical performance monitor	●	
Announcement support	●	

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SECURITY	INCLUDED	OPTION
Built in firewall	●	
HTTPS (SSL) encryption	●	
Certificate handling	●	
2 factor authentications	●	
Internal and external connections encrypted	●	
User database with custom user rights	●	
User audit log	●	

DATA	INCLUDED	OPTION
DLS	●	
DL+	●	
SLS	●	
EPG		○
TPEG		○
Support for external content systems as Rapid	●	
Alarm on no metadata	●	
Backup metadata on no content	●	

GENERAL	INCLUDED	OPTION
All language support	●	
Mobile friendly GUI	●	
JSON web API	●	
SNMP custom defined	●	
100% web interface for setup and management	●	
Remote tunnel for support and upgrades	●	
Backup&restore from GUI	●	
Virtualization support for VMware	●	
Realtime status monitoring in web interface	●	
Support for manage 3rd party system web interface	●	
Realtime status monitoring in web interface	●	
Graphical event log overview	●	
Unlimited number of users	●	

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