



ABOUT  
PANEDA

DAB  
SYSTEMS

NEW  
FEATURES

WARNING

THX

# LARS-PEDER LUNDGREN

working with DAB since 1997



PANEDA



PANEDA®



# AREAS



**OWNS AND OPERATE A NATIONAL DVB-T2 NETWORK IN NORWAY WITH 165 TRANSMITTERS**



**Paneda has provided over 200 DAB Emergency Break-In systems in Norwegian road tunnels.**



**Leading supplier of DAB multiplexing system with over 100 systems on-air worldwide**



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# DAB HEAD END SYSTEM

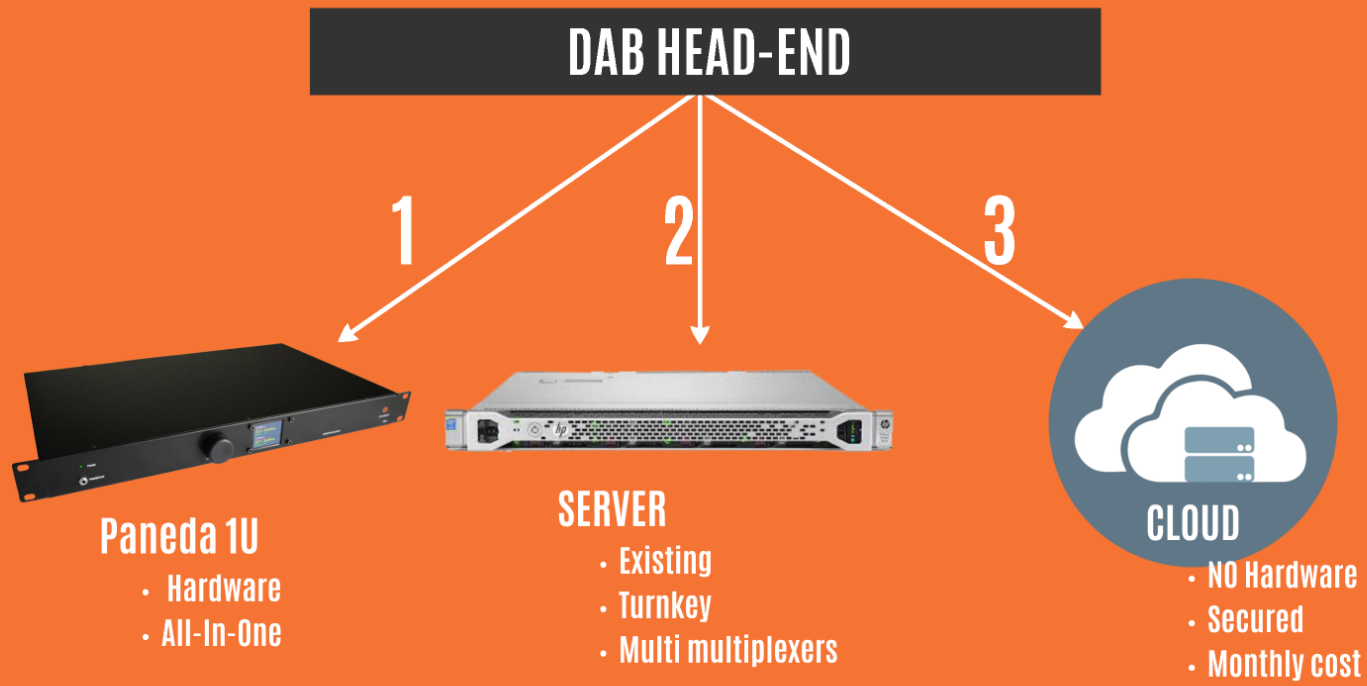
OVERVIEW

- MULTIPLEXER
- AUDIO ENCODER
- DATA

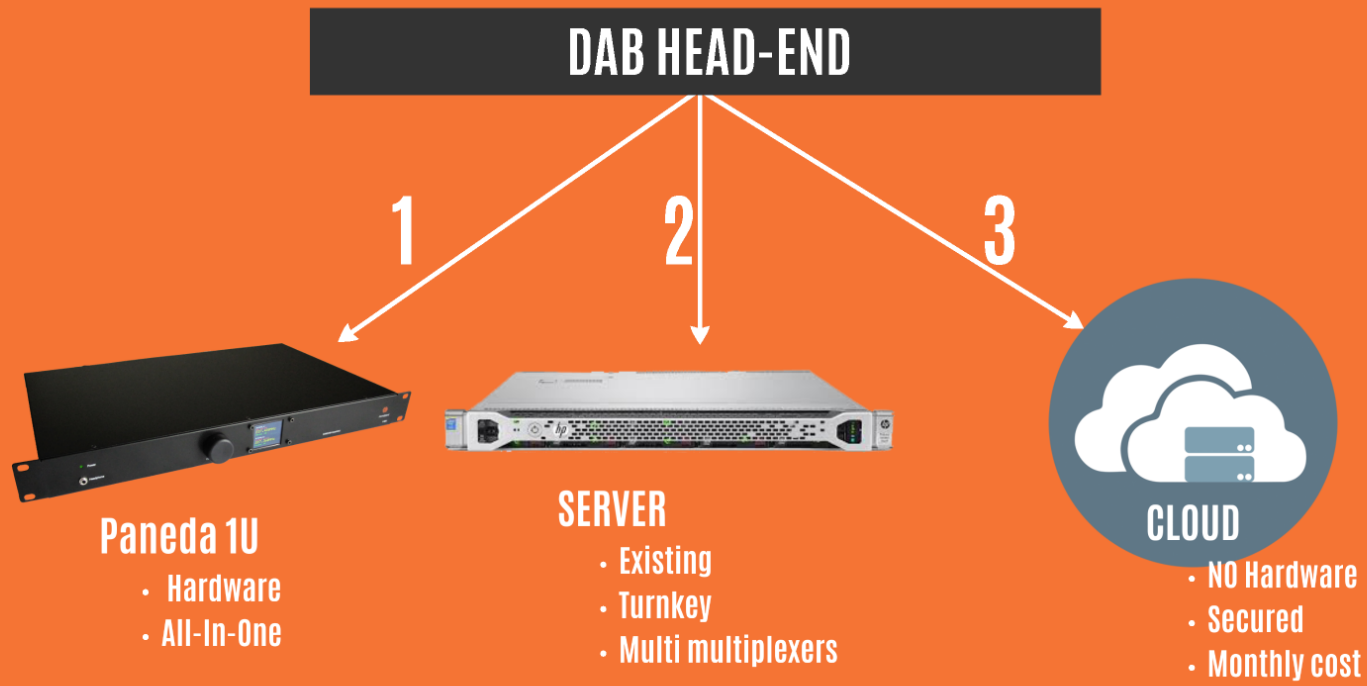


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# OPTIONS

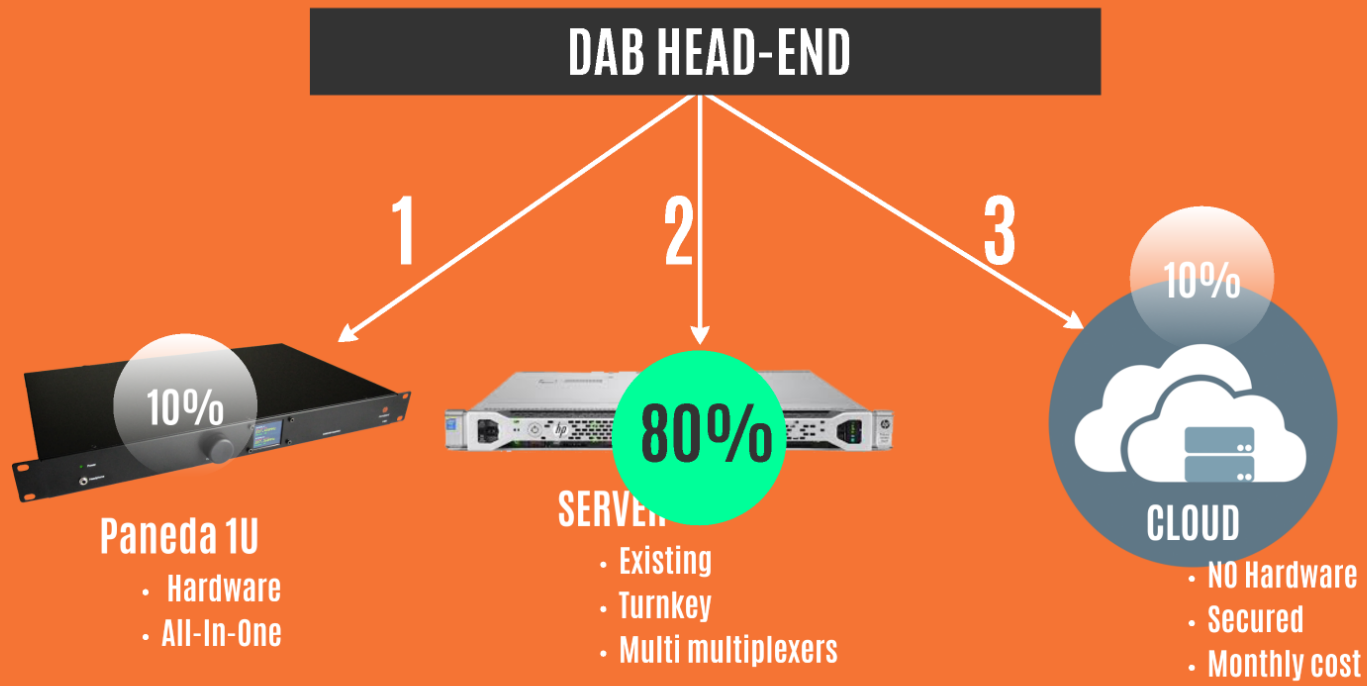


# OPTIONS





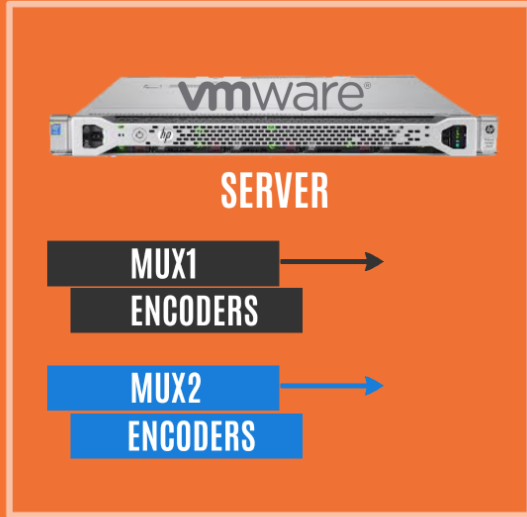
# OPTIONS



# PANEDA SERVER SOLUTION

80%

## PANEDA DAB HEAD-END SOFTWARE



- VIRTUAL
- VMWARE
- 10x MULTIPLEXERS
- 100x AUDIO ENCODERS
- EXISTING SERVER
- PROVIDED BY PANEDA TURNKEY
- EXPAND without additional hardware
- 100% WEB BASED





# CLOUD

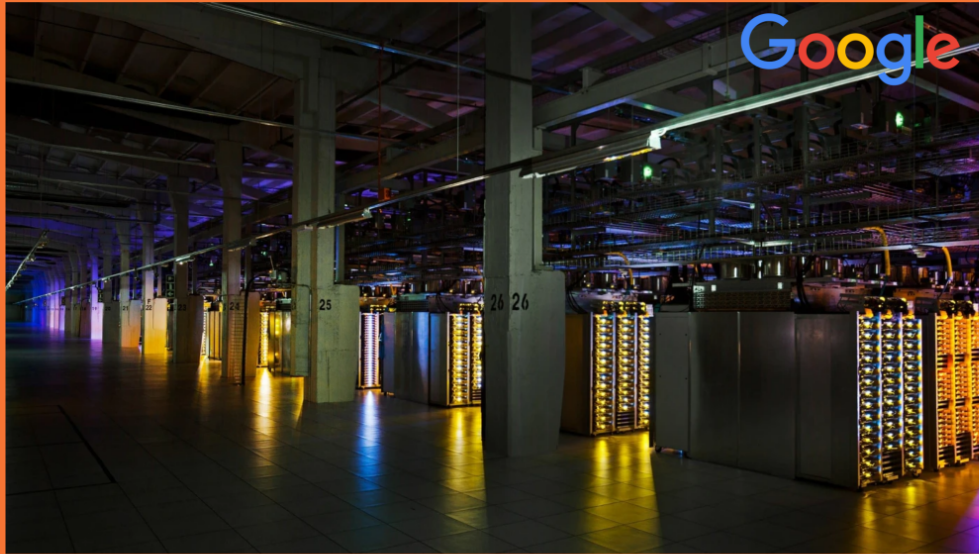
the future is here..

# 3.

- NO HARDWARE
- NO SKILLS
- NO MAINTENANCE



# DATACENTER



# DATACENTER



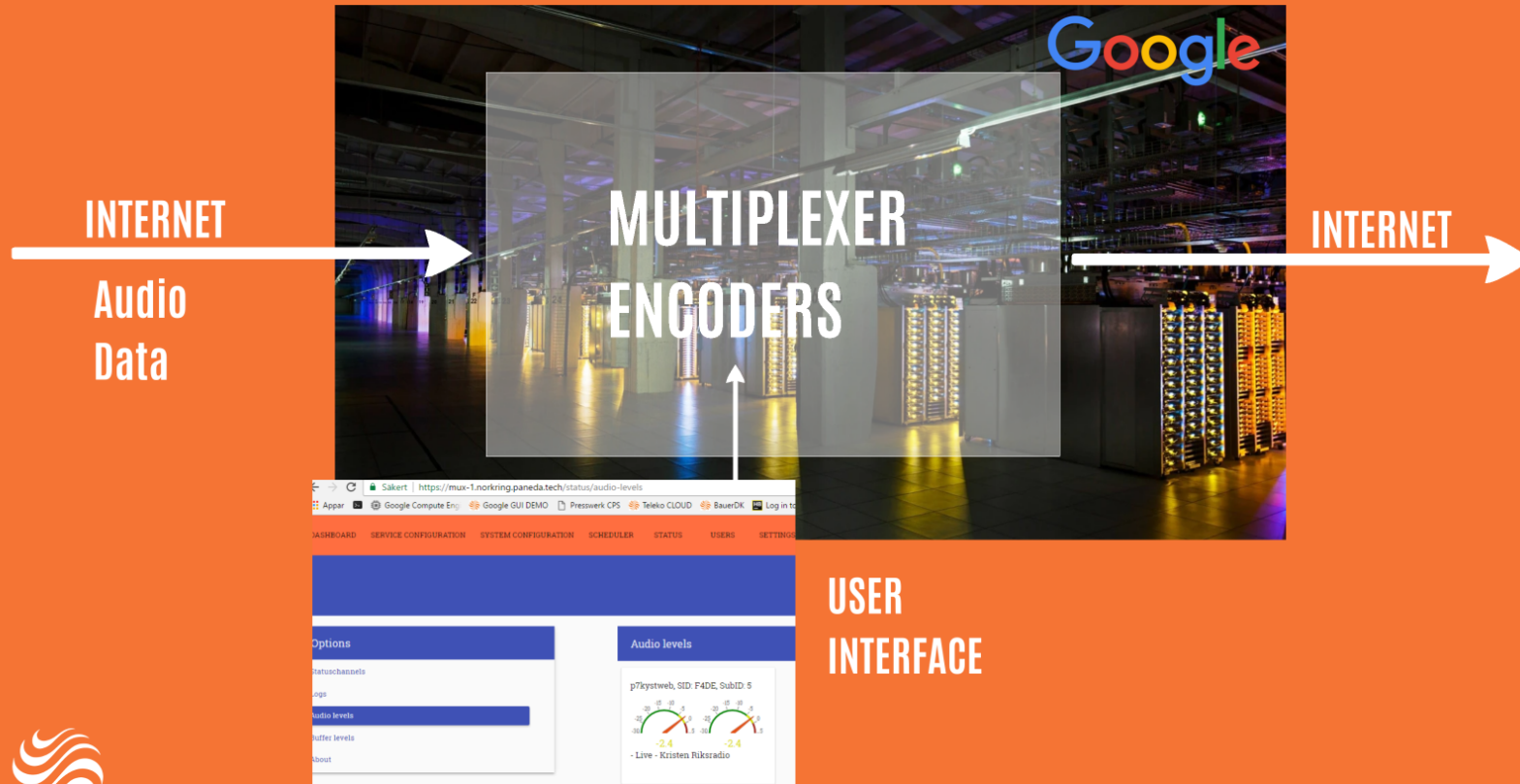
# DATACENTER



# DATACENTER

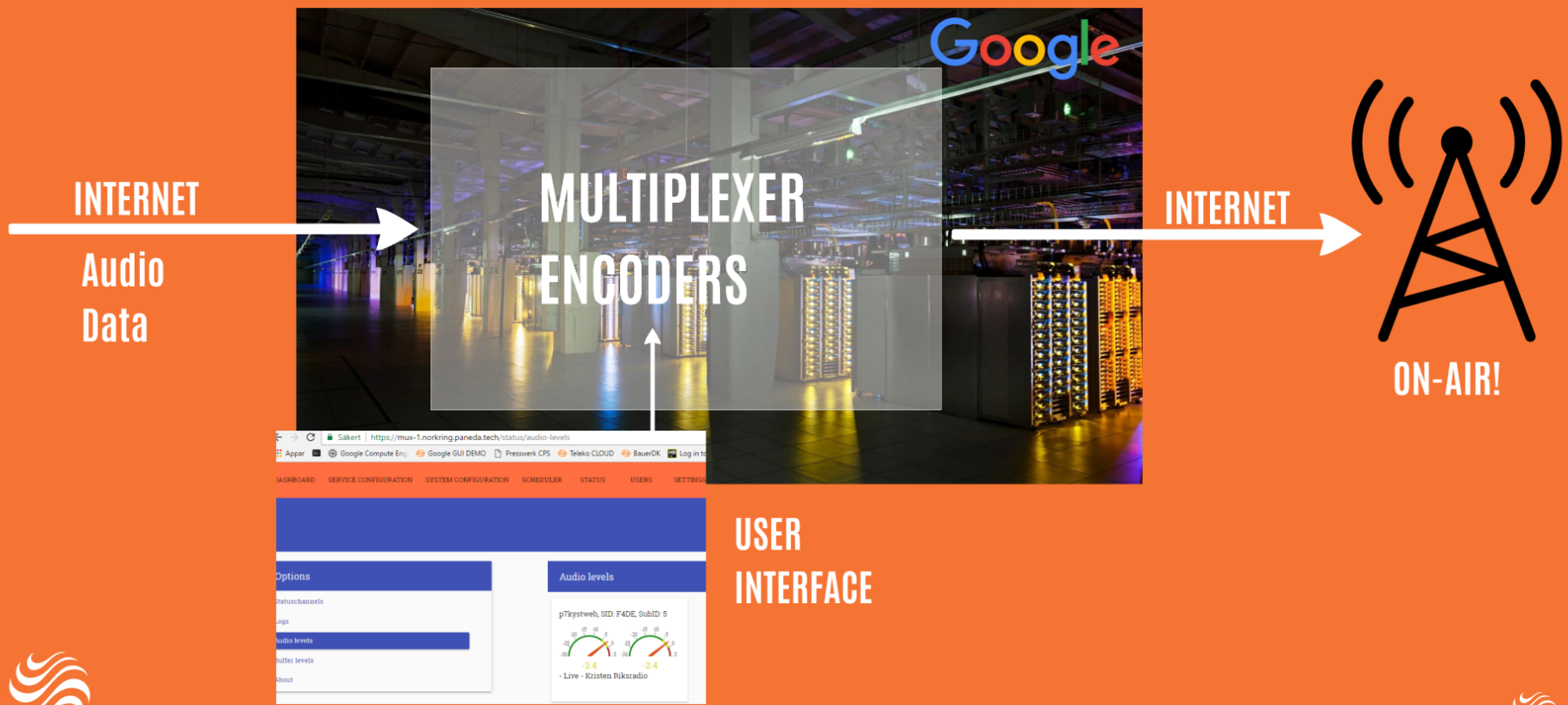


# DATACENTER





# DATACENTER



# Cloud Connector

Built for usage of Internet



# Cloud Connector

Built for usage of Internet

Connects to the multiplexer



# Cloud Connector

Built for usage of Internet

Connects to the multiplexer

Receives the complete DAB stream



# Cloud Connector

Built for usage of Internet

Connects to the multiplexer  
Receives the complete DAB stream



# Cloud Connector

Built for usage of Internet

Connects to the multiplexer  
Receives the complete DAB stream



EDI



# Cloud Connector

Built for usage of Internet

Connects to the multiplexer  
Receives the complete DAB stream



EDI



## ON THE AIR!



# PANEDA APPROACH





# PANEDA APPROACH



**ZERO COMPLICATED!**

# DAB HEAD END SYSTEM

OVERVIEW

- MULTIPLEXER
- AUDIO ENCODER
- DATA



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# LARS-PEDER LUNDGREN

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# New features

A growing market forces improvements





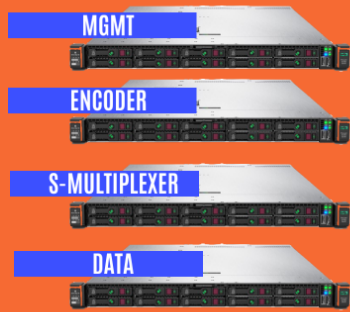
# New features

A growing market forces improvements

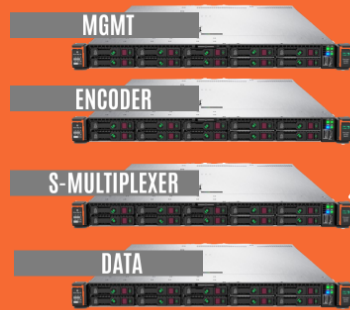


# YESTERDAY Service Multiplexer (Cascade multiplexing)

RADIO1



RADIO2



Ctrl

Data

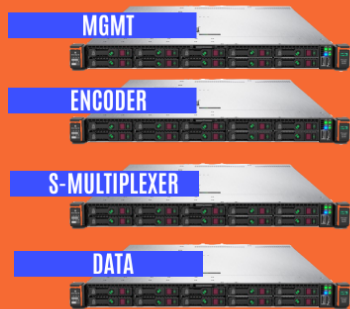


E-Multiplexer

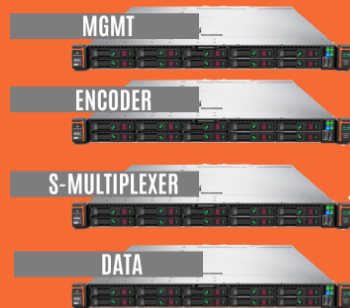


# YESTERDAY Service Multiplexer (Cascade multiplexing)

RADIO1



RADIO2



Ctrl

Data

E-Multiplexer



- ADDS LATENCY
- COMPLEX SETUP
- NON STANDARDIZED COMMUNICATION PROTOCOL

# PANEDA VIRTUAL PROVIDER

---

**Multiplexer**

→ 2304 kbps





# PANEDA VIRTUAL PROVIDER

---

- SHARING PLATFORM
- SAME MUX MANY PROVIDERS
- SELL CAPACITY
- OFFERS USER BENEFITS
- INDEPENDENT

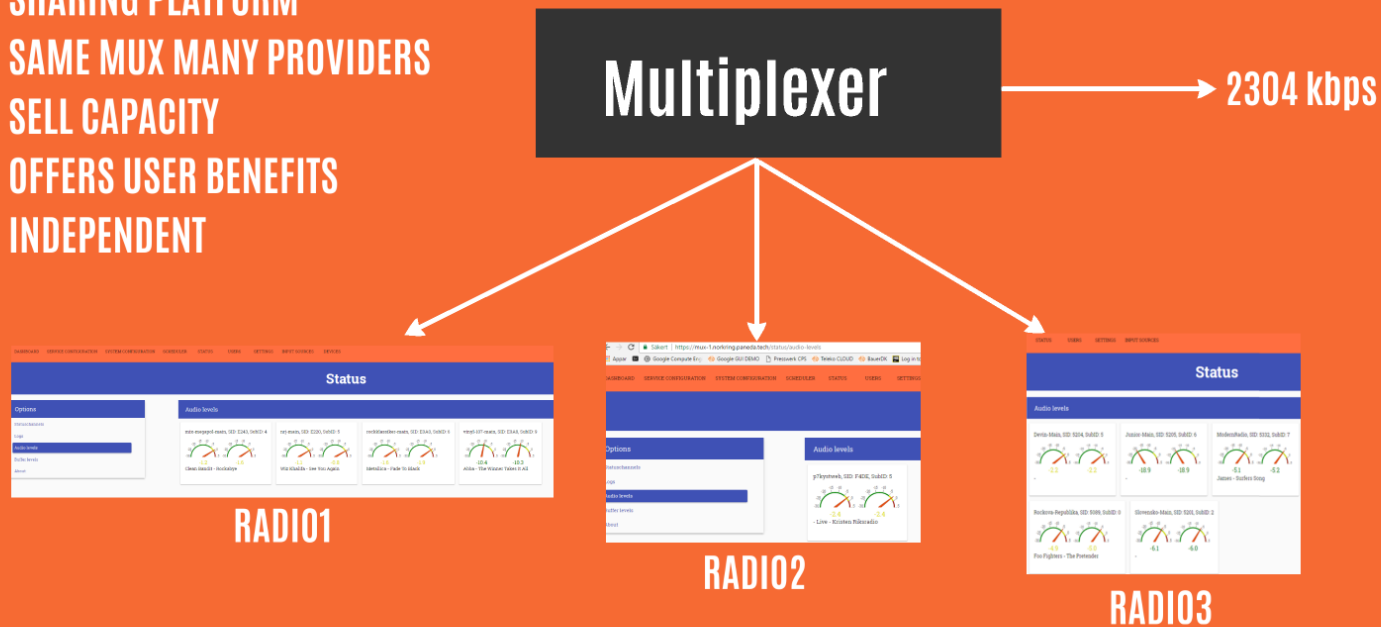
**Multiplexer**

→ 2304 kbps



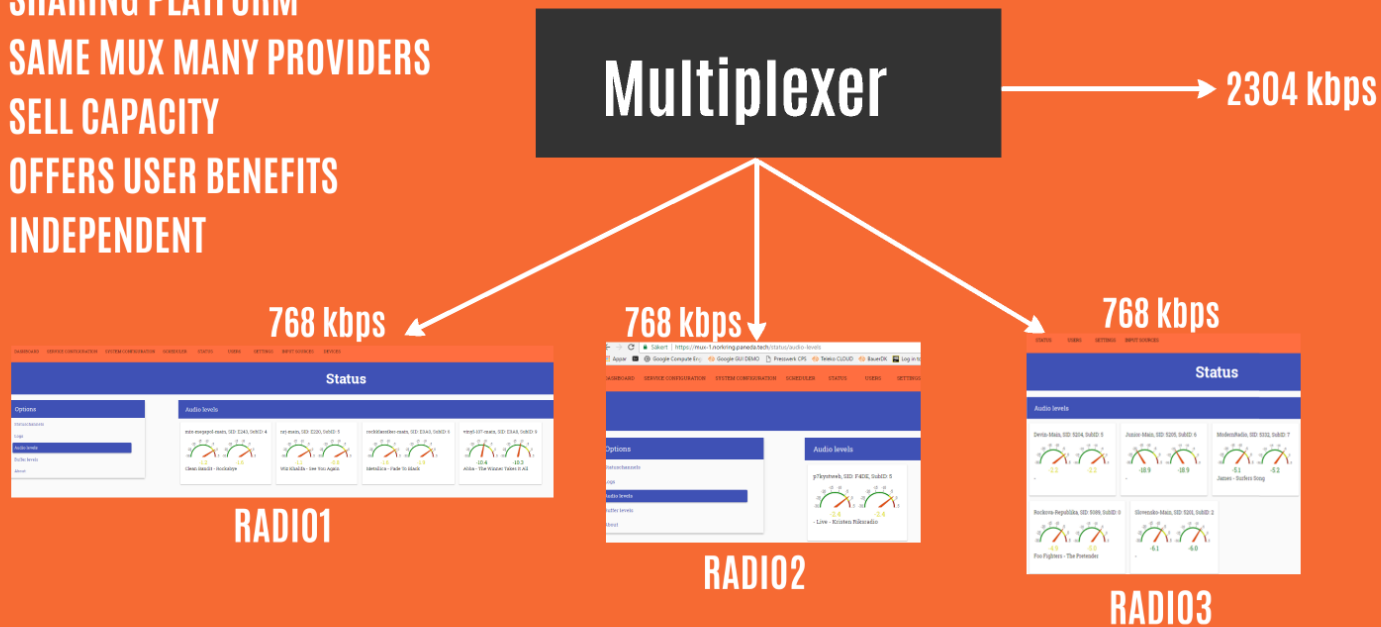
# PANEDA VIRTUAL PROVIDER

- SHARING PLATFORM
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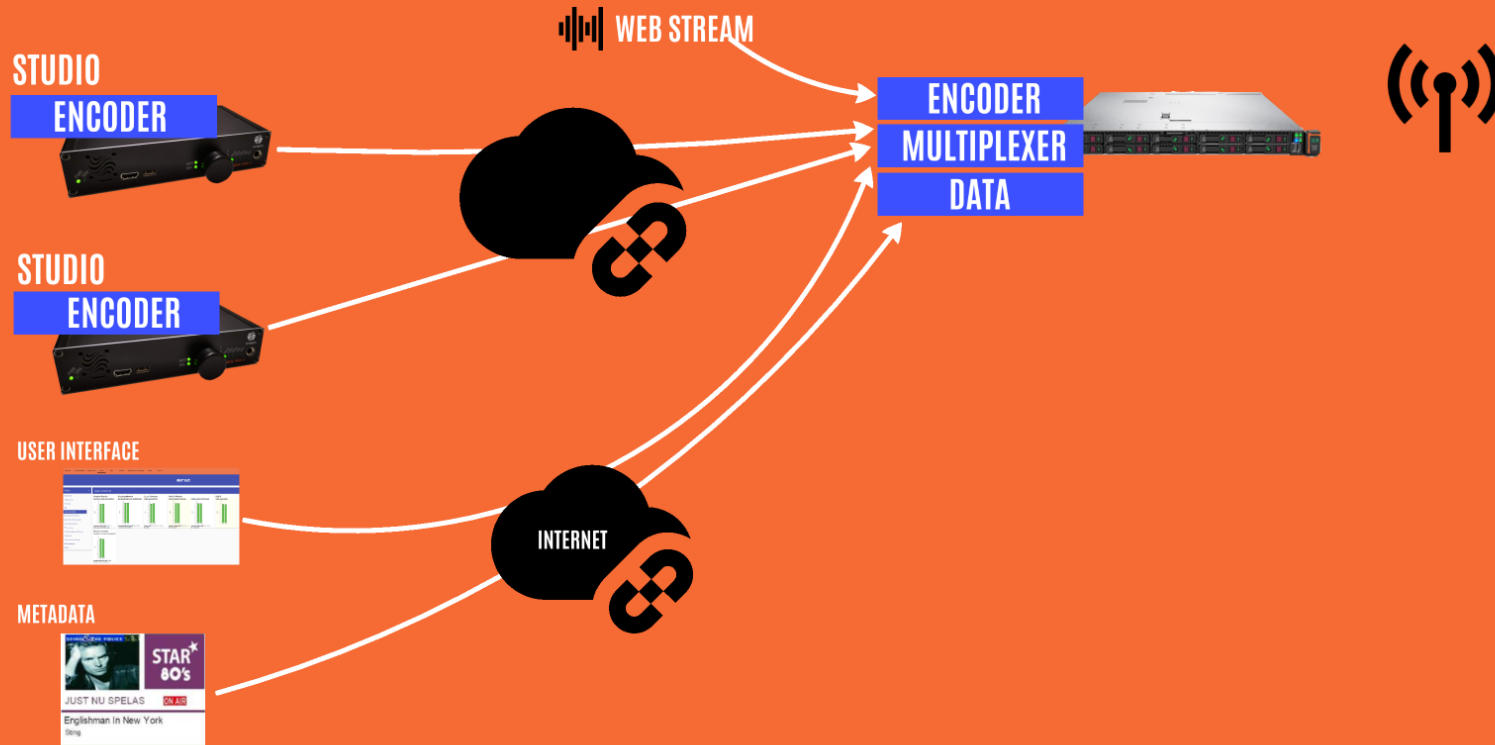


# PANEDA VIRTUAL PROVIDER

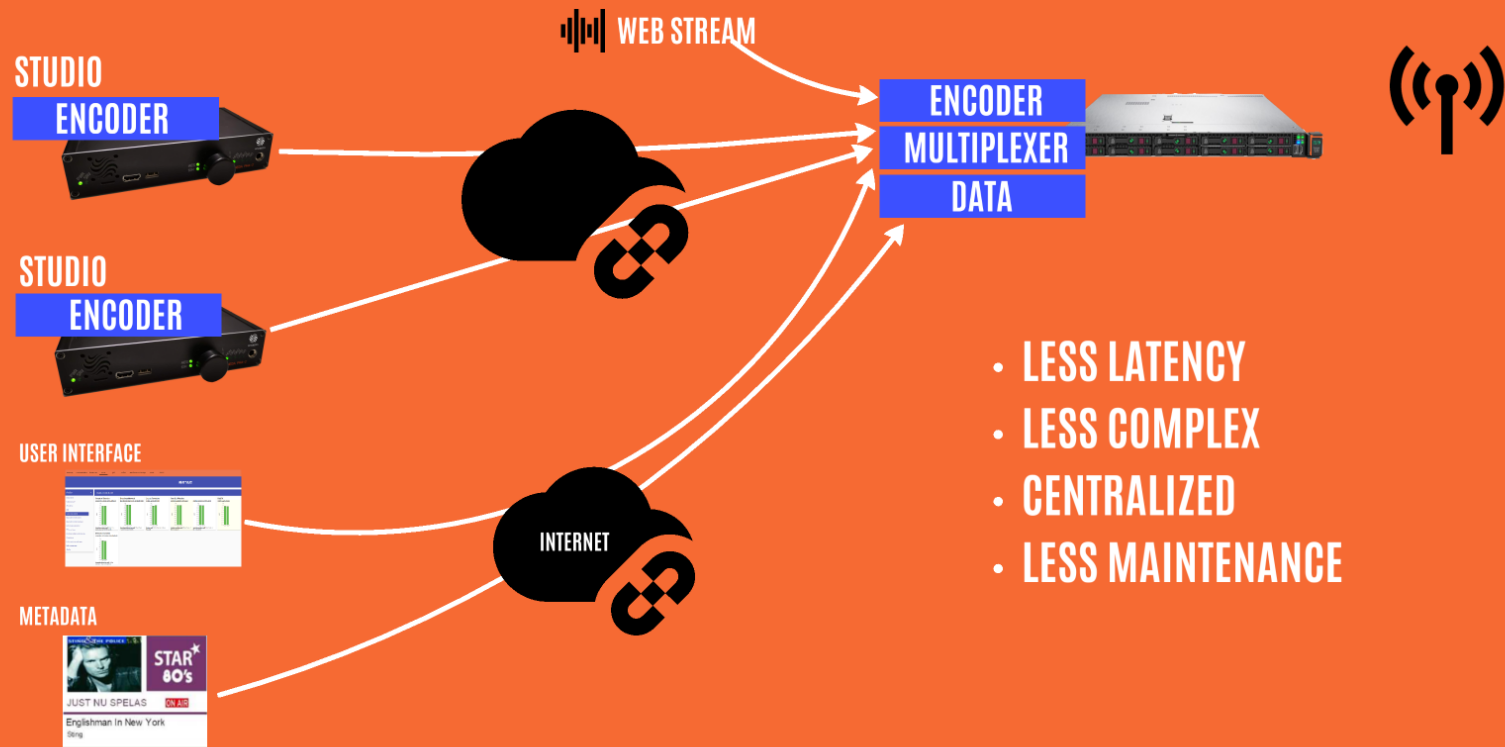
- SHARING PLATFORM
- SAME MUX MANY PROVIDERS
- SELL CAPACITY
- OFFERS USER BENEFITS
- INDEPENDENT



# COMPLETE SOLUTION OVERVIEW



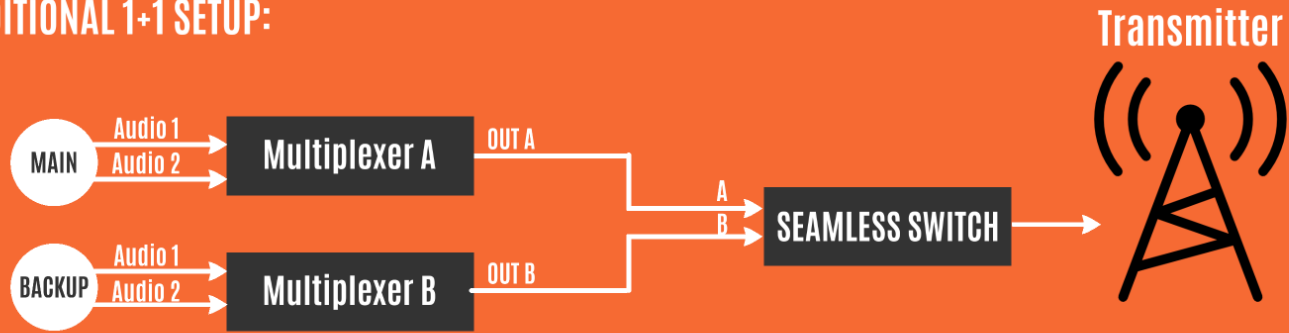
# COMPLETE SOLUTION OVERVIEW



- LESS LATENCY
- LESS COMPLEX
- CENTRALIZED
- LESS MAINTENANCE

# REDUNDANCY

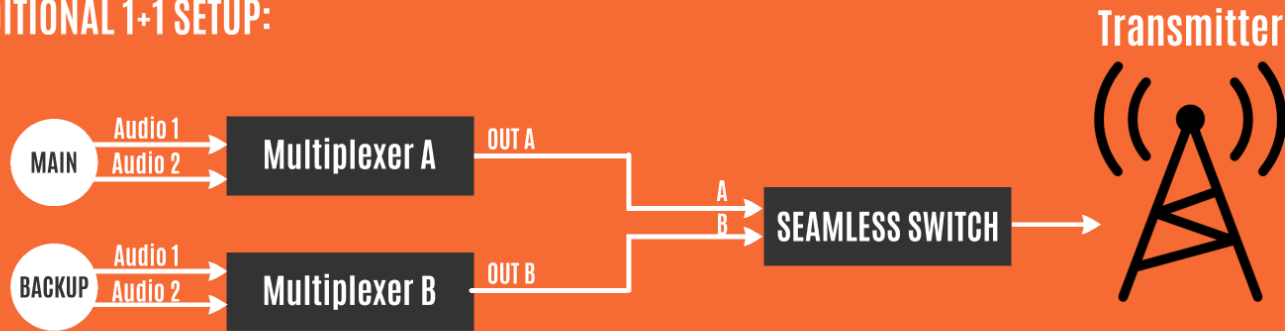
TRADITIONAL 1+1 SETUP:



1+1 Redundancy with seamless switching between A <--> B

# REDUNDANCY

## TRADITIONAL 1+1 SETUP:



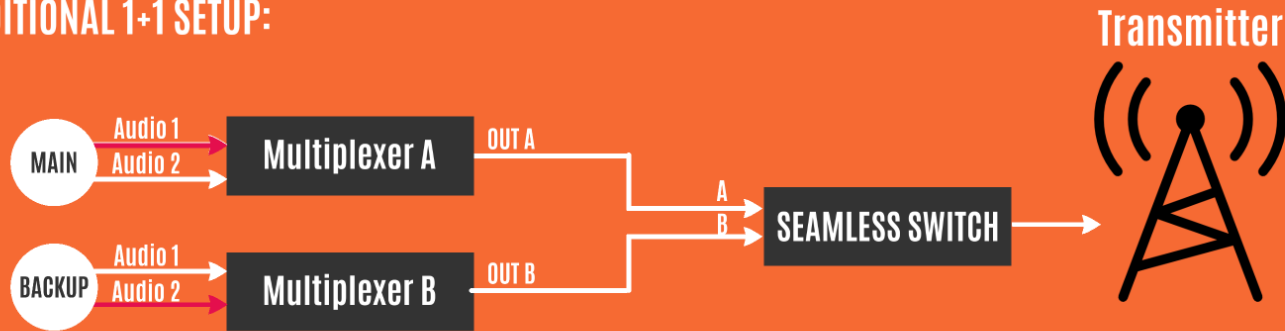
## 1+1 Redundancy with seamless switching between A <--> B

### Disadvantages:

- If only one service fails in a system, the switch will choose the other source (mux) and ALL sources from backup will be used
- Each switching causes an audio glitch
- Not protected against dual errors

# REDUNDANCY

## TRADITIONAL 1+1 SETUP:



## 1+1 Redundancy with seamless switching between A <--> B

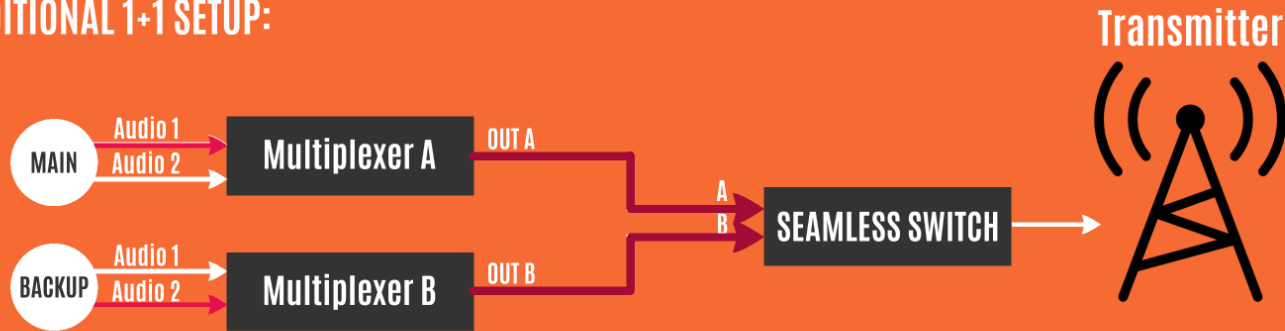
### Disadvantages:

- If only one service fails in a system, the switch will choose the other source (mux) and ALL sources from backup will be used
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# REDUNDANCY

## TRADITIONAL 1+1 SETUP:



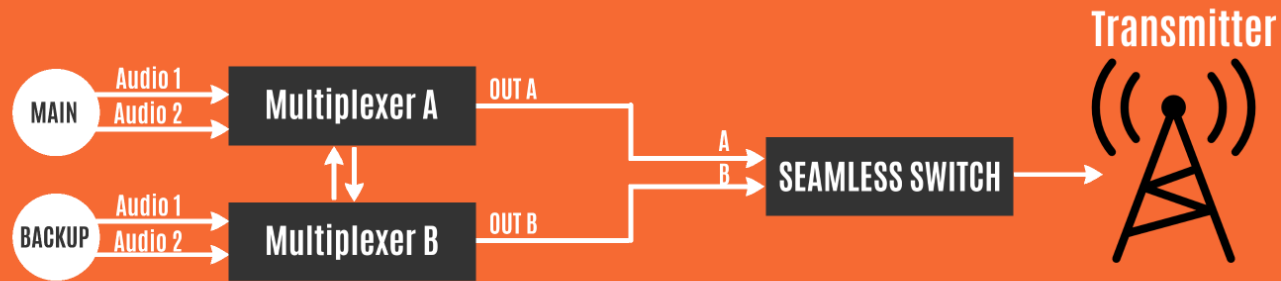
## 1+1 Redundancy with seamless switching between A <--> B

### Disadvantages:

- If only one service fails in a system, the switch will choose the other source (mux) and ALL sources from backup will be used
- Each switching causes an audio glitch
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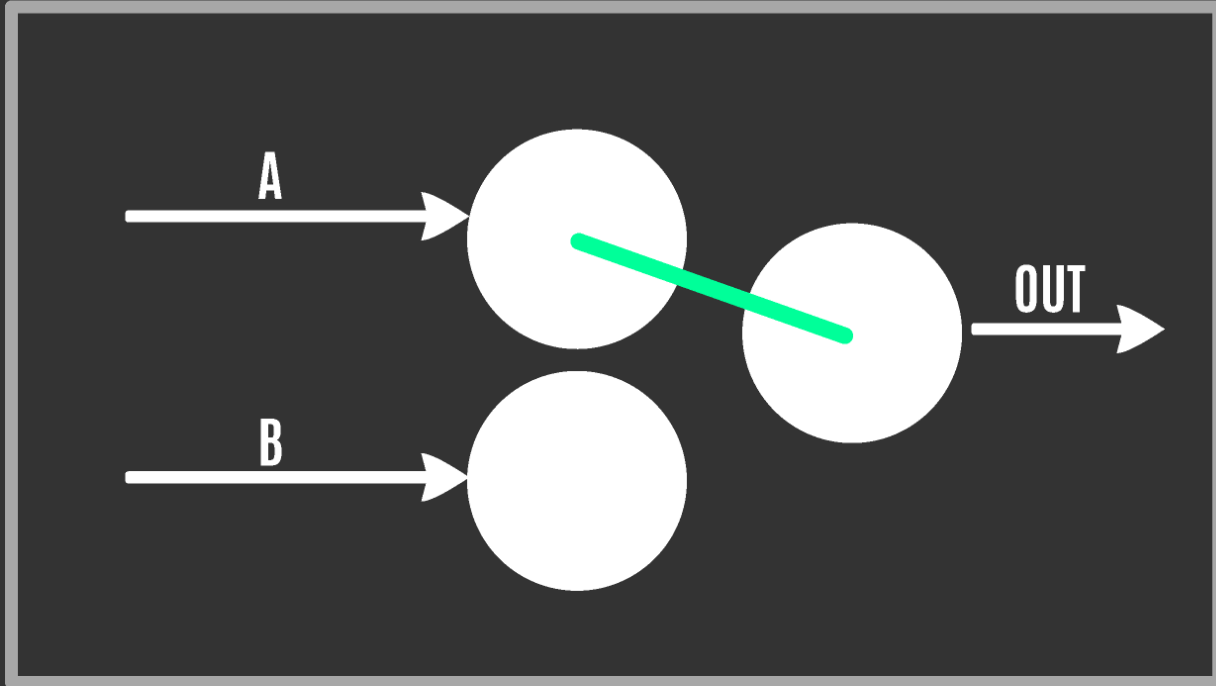
# PANEDA SMART SWITCHING

CONTENT AWARE!



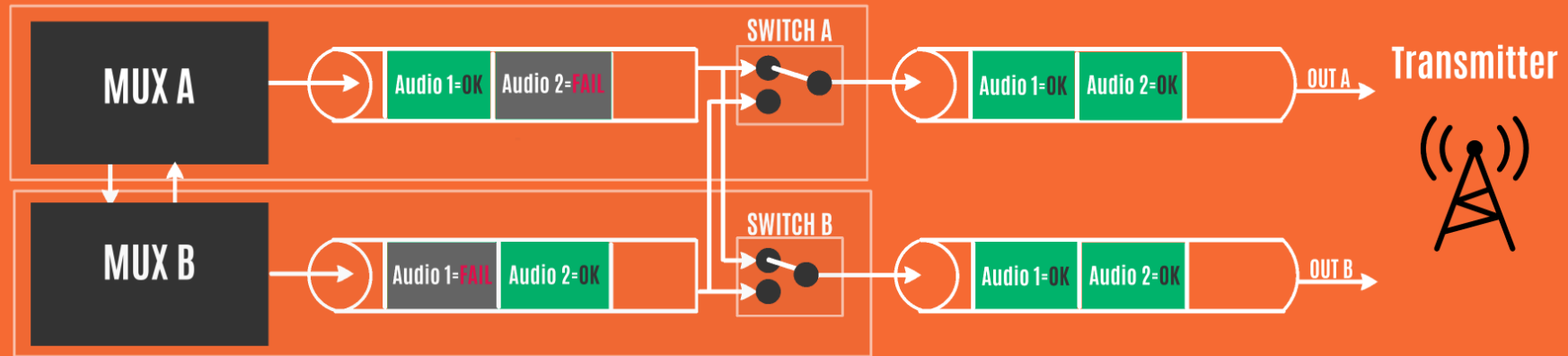
## DESCRIPTION:

- A built-in software switch in both multiplexers
- If one service fails in the MAIN system, the smart switch can use the same service from the BACKUP, (given that its OK)
- No switching will occur as long the multiplexer is working



# PANEDA UNIQUE SMART SWITCHING

## EXAMPLE:



## DESCRIPTION:

- A built-in content aware software switch in both multiplexers
- Can combine faulty inputs to an error free output
- If one service fails in the MAIN system, the smart switch can use the same service from the BACKUP, (given that the same service is OK)
- No MUX switching will occur as long the multiplexer is working
- Preferred A, B mode



# PANEDA AUDIO HANDLING

---

Principle:



# PANEDA AUDIO HANDLING

---

Principle:

SERVICE



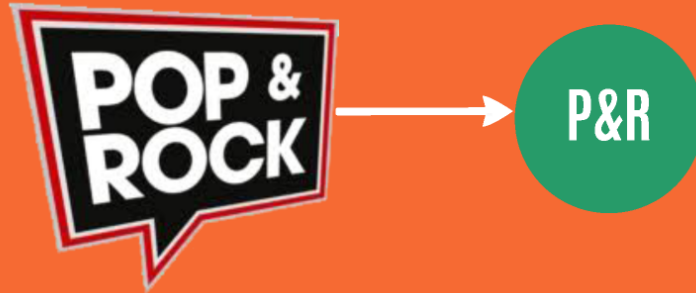
# PANEDA AUDIO HANDLING

---

Principle:

SERVICE

AUDIO SOURCE



# PANEDA AUDIO HANDLING

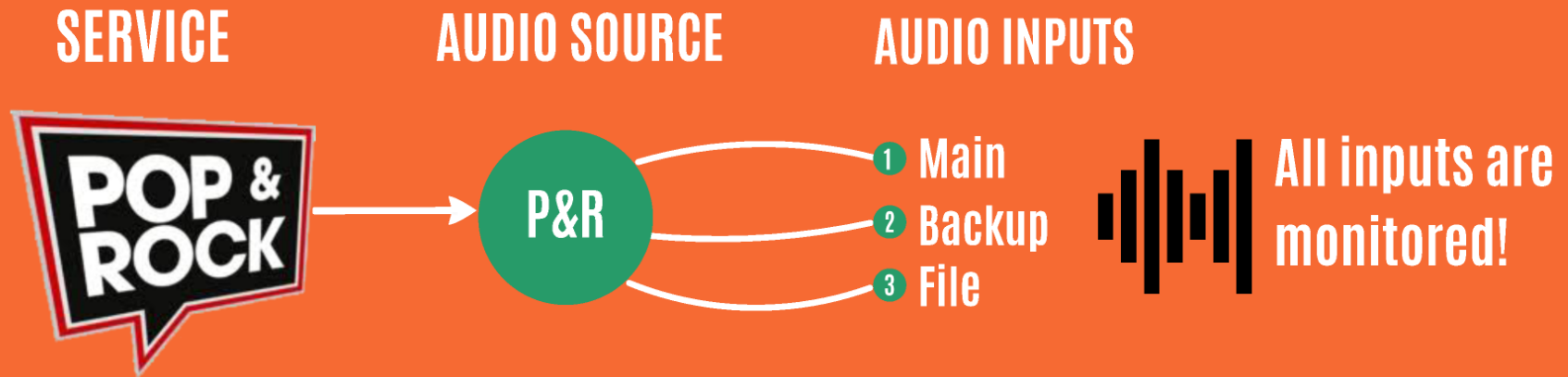
Principle:





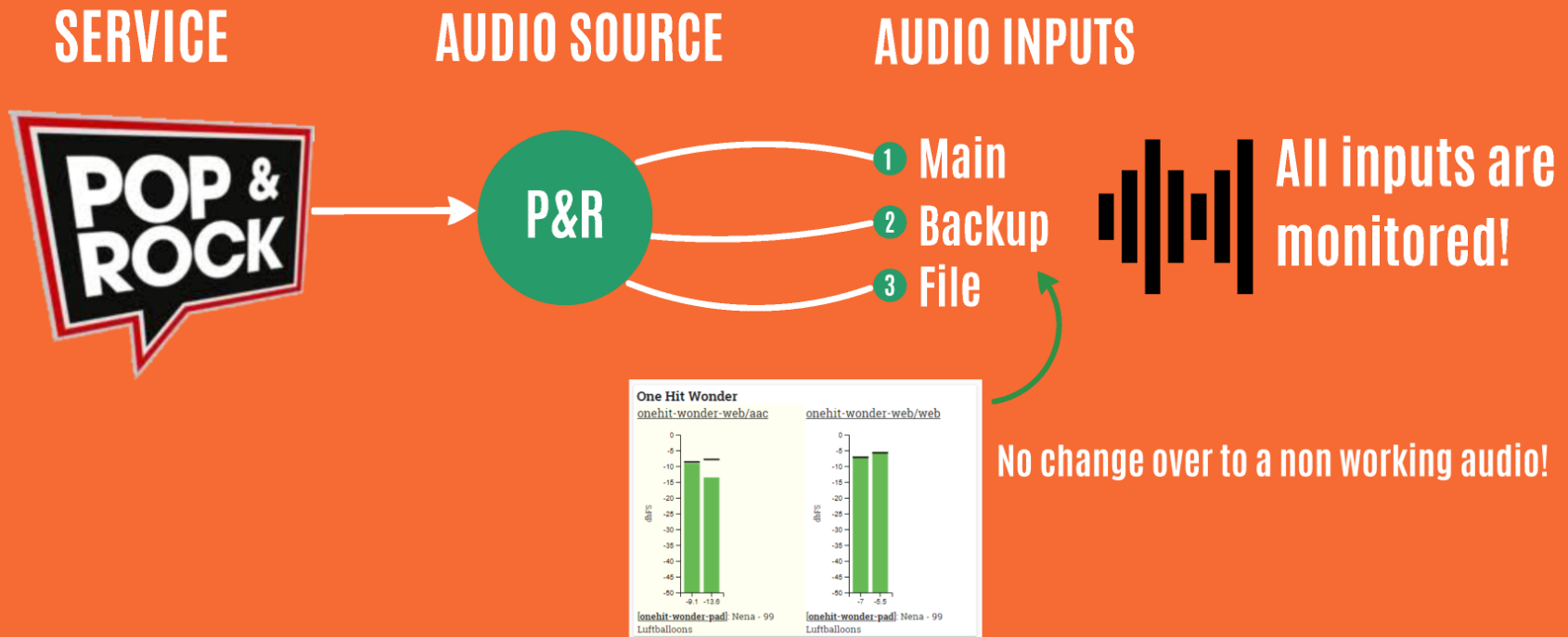
# PANEDA AUDIO HANDLING

Principle:



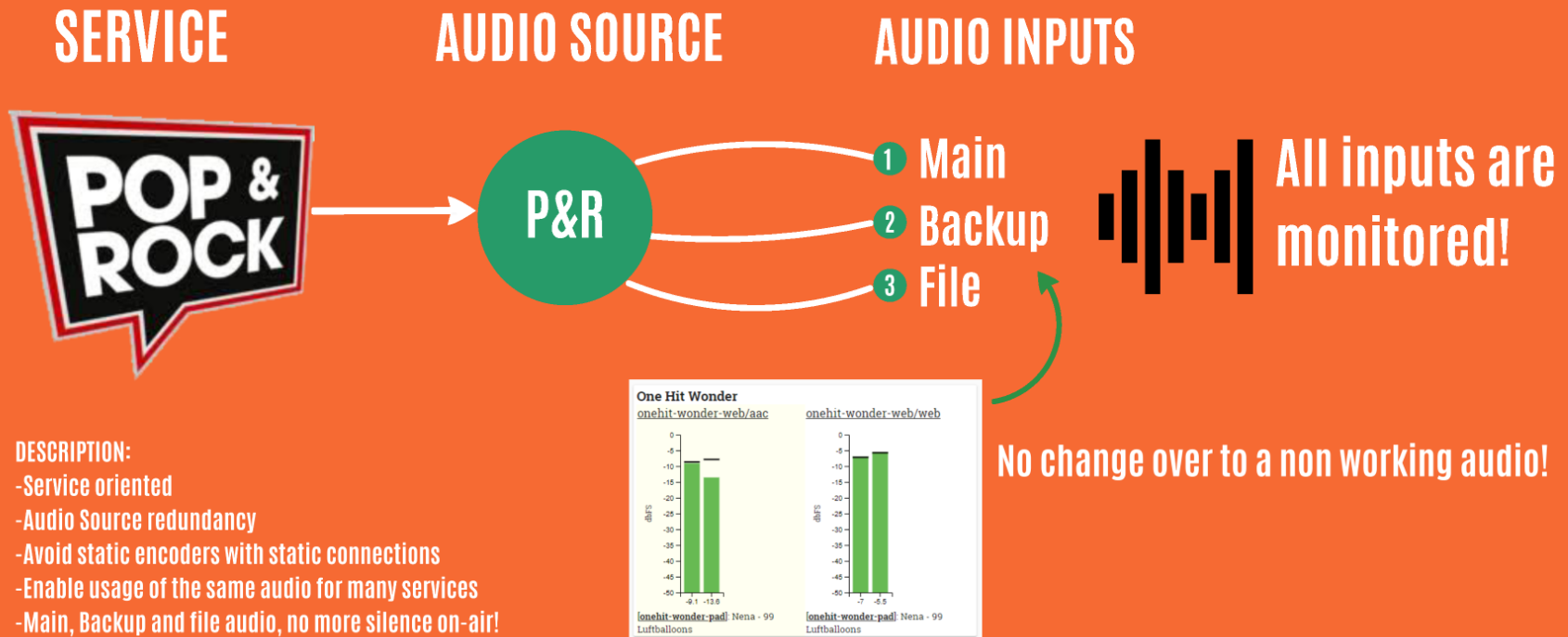
# PANEDA AUDIO HANDLING

Principle:



# PANEDA AUDIO HANDLING

Principle:



# SECURITY

---



Encrypted connections where applicable, including insertion of metadata. Its shall not be possible to unauthorized party to manipulate metadata such as text or picture.



Secure user database, all registered users must use real email addresses with a password they have selected themselves, passwords encrypted in the database.



The system supports 2 factor authentications

**SSL**

The web interface for management support HTTPS/SSL and use valid certificates.



Users can be defined with custom user rights and different roles in the system, no limitations to number of users

# SECURITY



Encrypted connections where applicable, including insertion of metadata. Its shall not be possible to unauthorized party to manipulate metadata such as text or picture.



Secure user database, all registered users must login with addresses with a password they have selected and encrypted in the database.



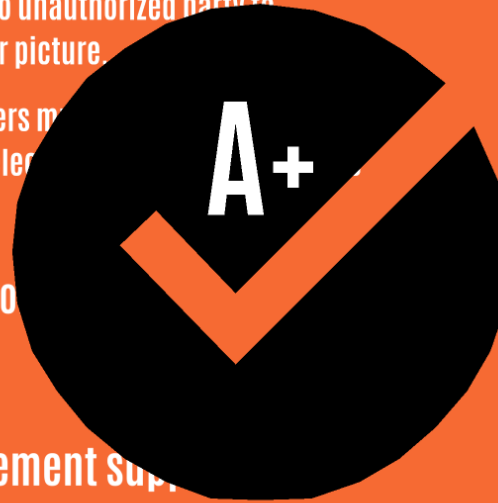
The system supports 2 factor authentications

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The web interface for management supports HTTPS/SSL and use valid certificates.



Users can be defined with custom user rights and different roles in the system, no limitations to number of users



# TREND

CENTRALIZE



**TREND**  
CENTRALIZE



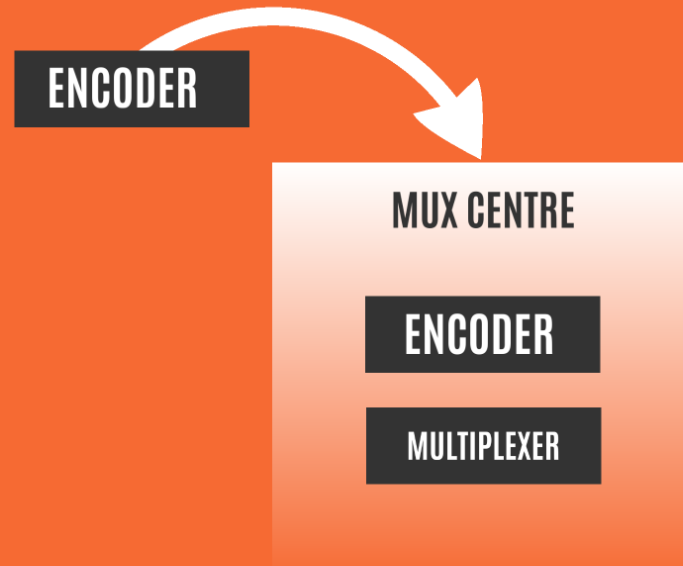
# TREND

CENTRALIZE





**TREND**  
CENTRALIZE



**TREND**  
CENTRALIZE

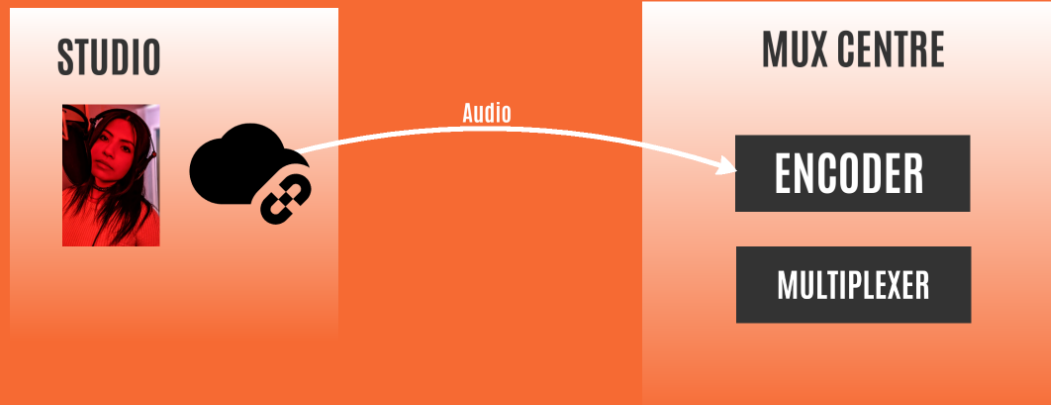
**MUX CENTRE**

**ENCODER**

**MULTIPLEXER**

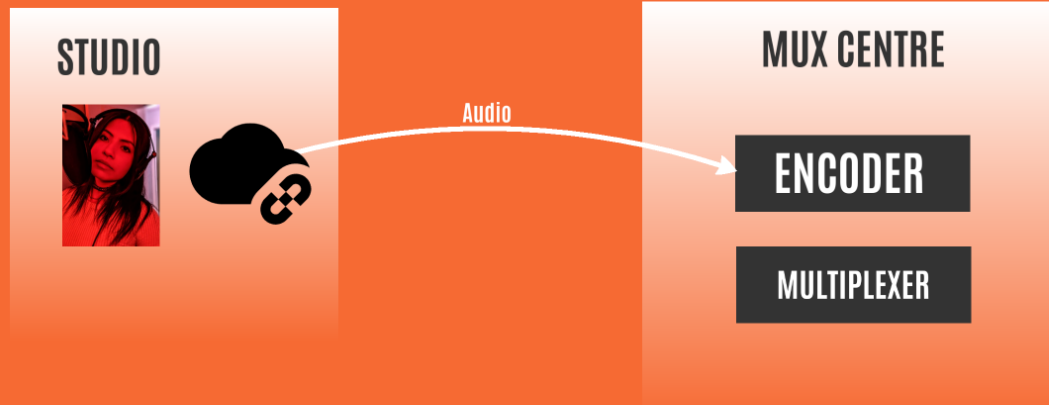


# TREND CENTRALIZE



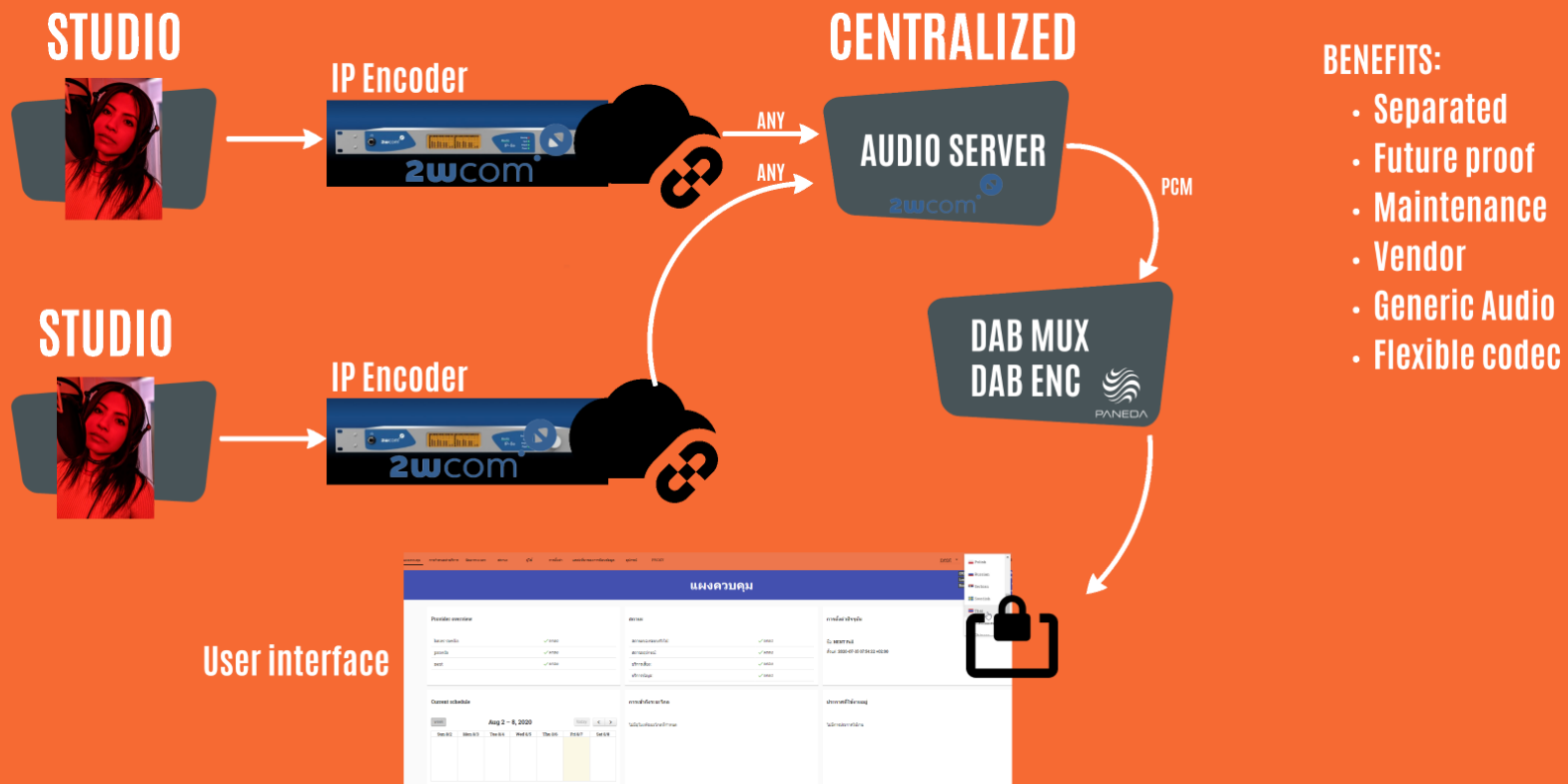
# TREND

## CENTRALIZE



- SIMPLIFIED
- CONTENT FOCUS
- CENTRALIZED
- INDEPENDENT
- IP INFRASTRUCTURE

# AUDIO Audio Contribution System

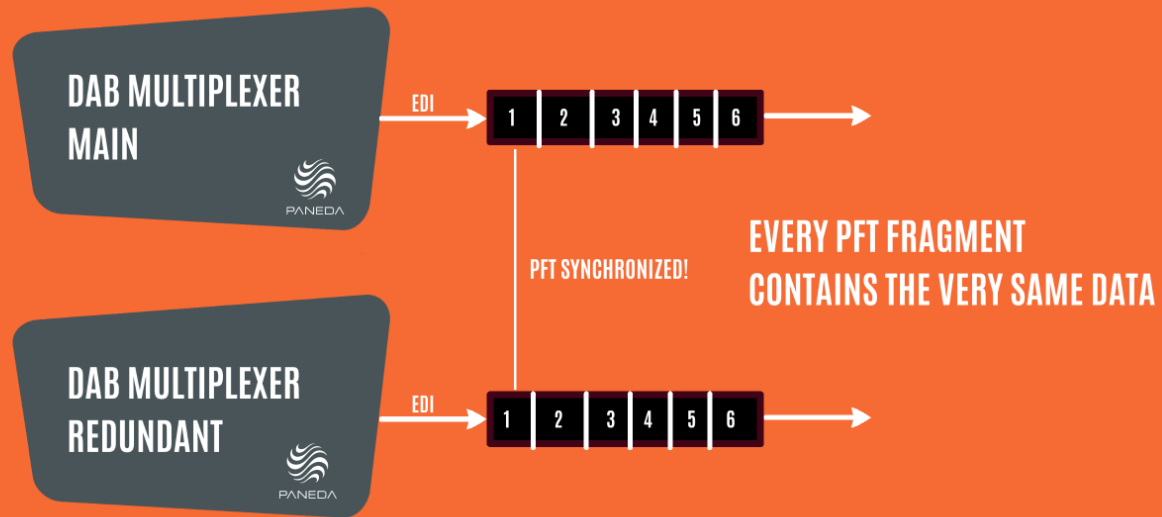


## BENEFITS:

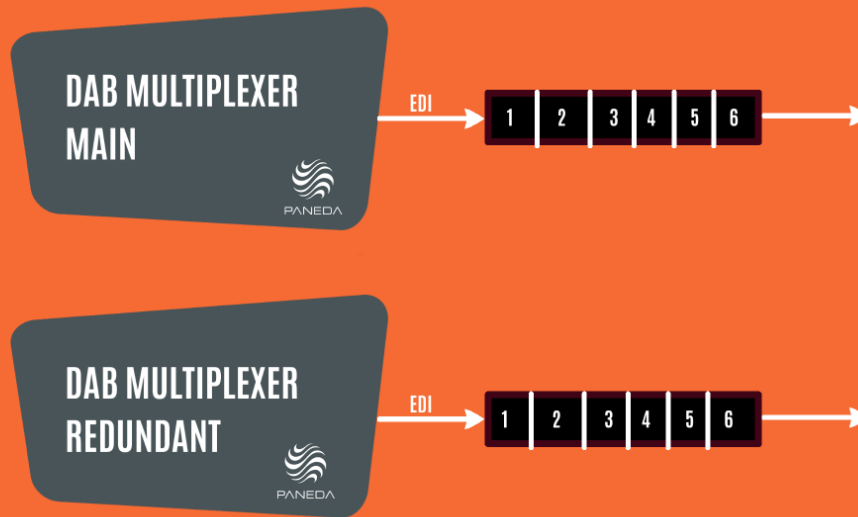
- Separated
- Future proof
- Maintenance
- Vendor
- Generic Audio
- Flexible codec



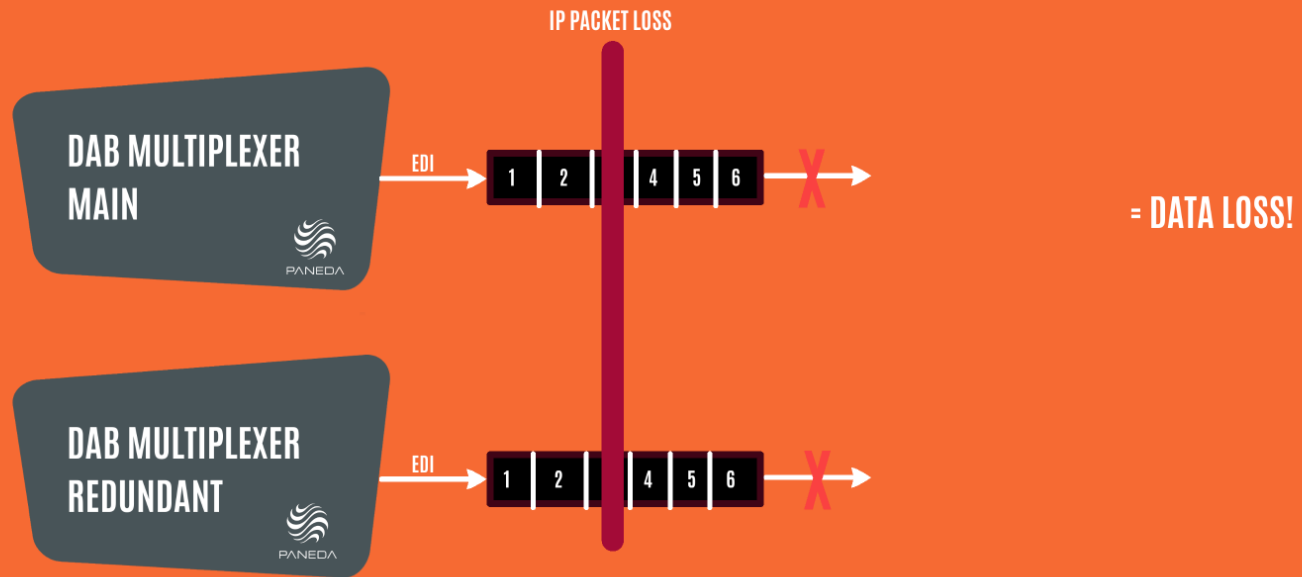
# PFT



# PFT

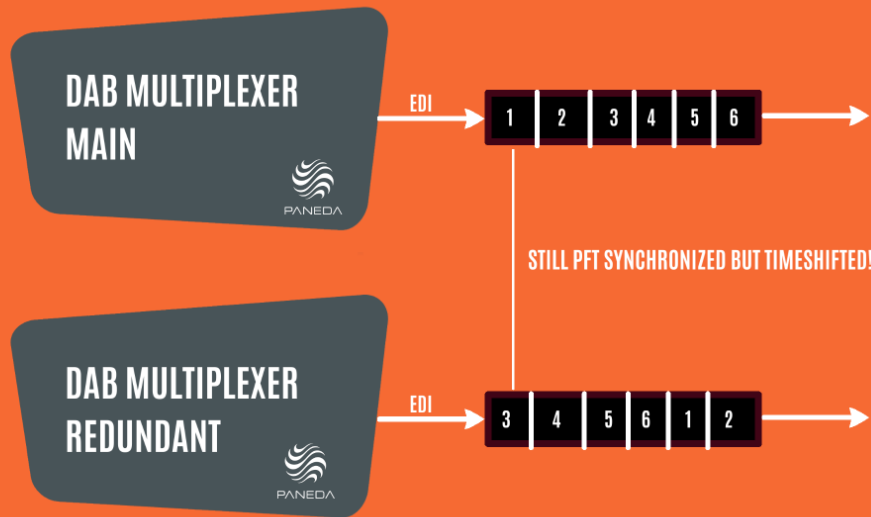


# PFT

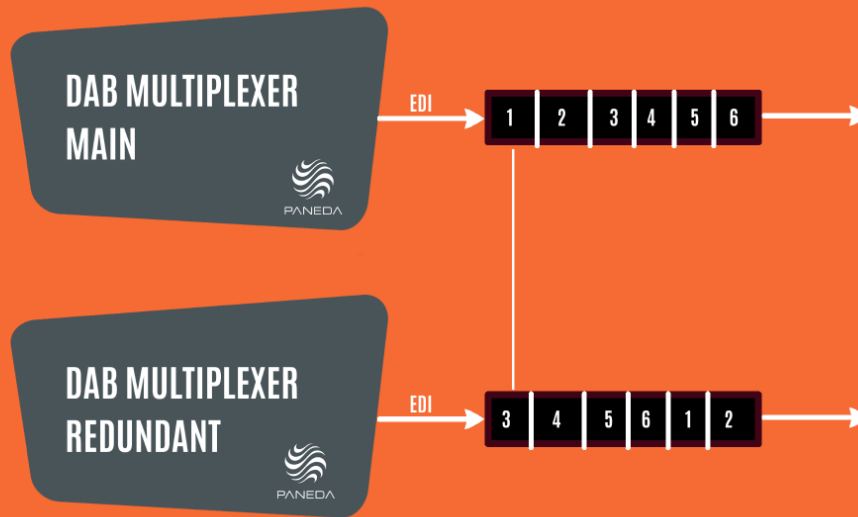




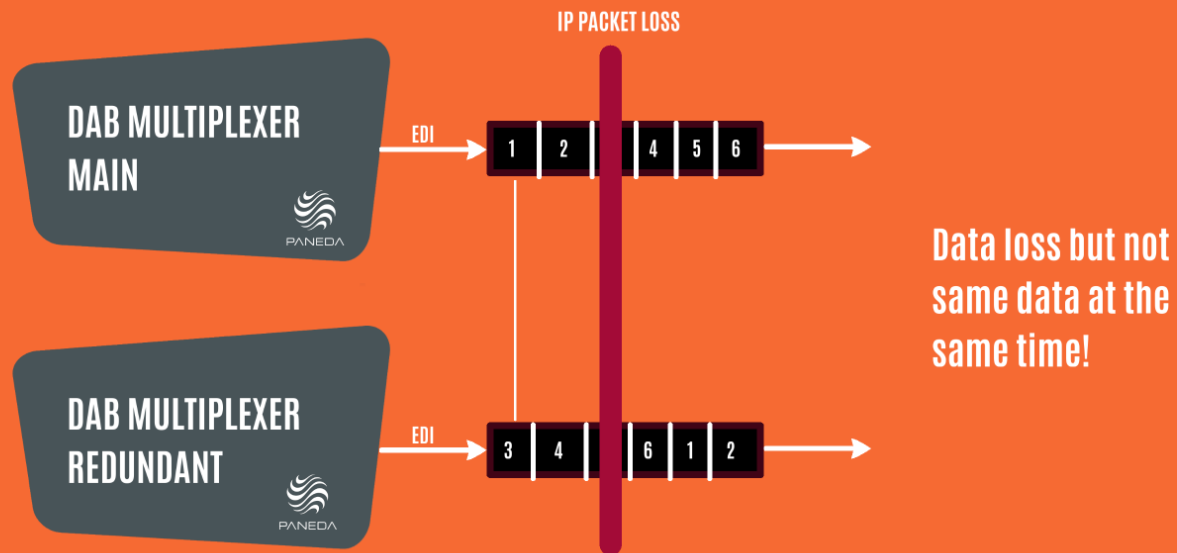
# PFT+Timeshifting



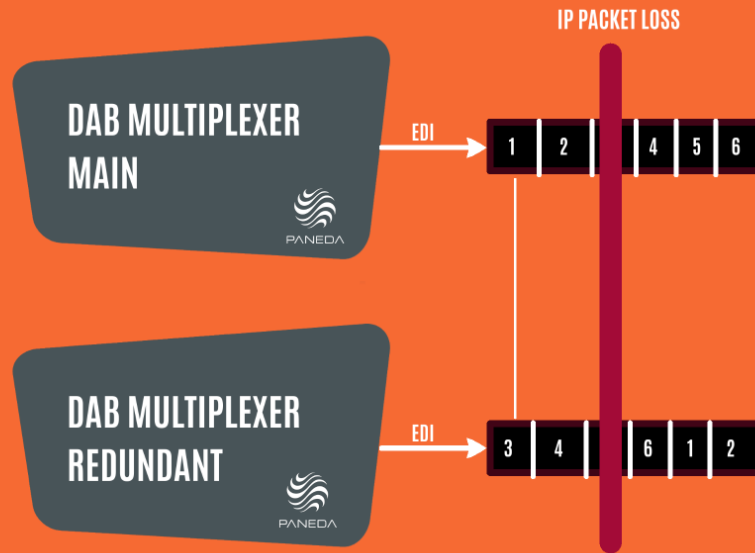
# PFT+Timeshifting



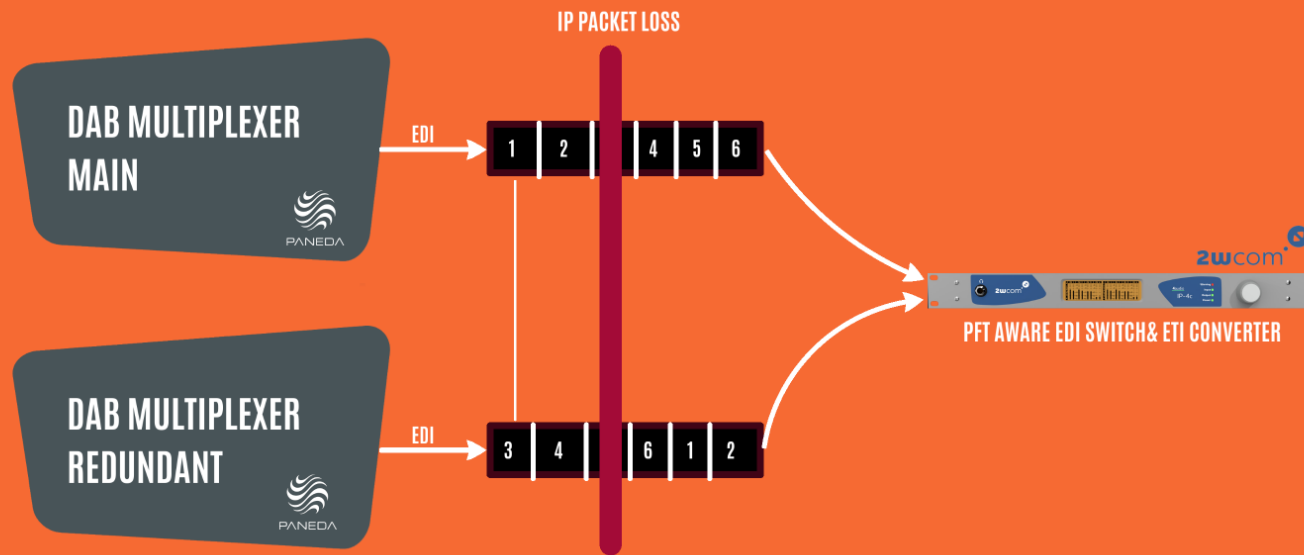
# PFT+Timeshifting



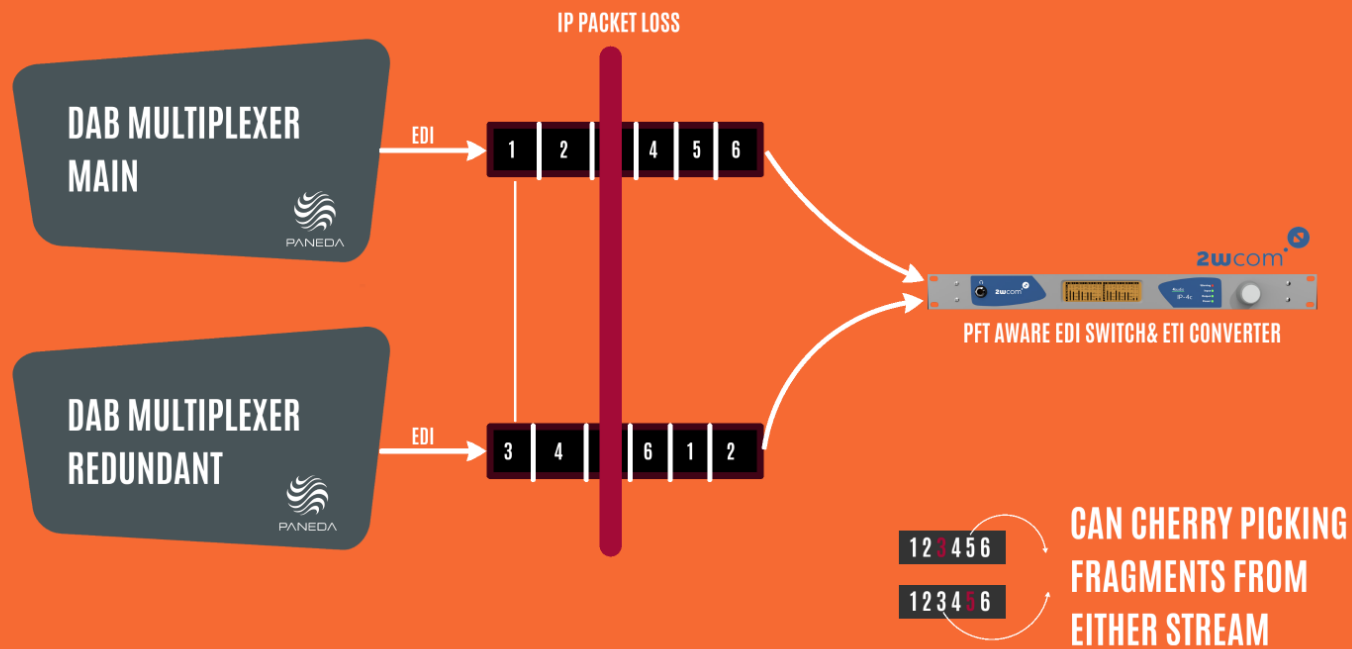
# PFT+Timeshifting



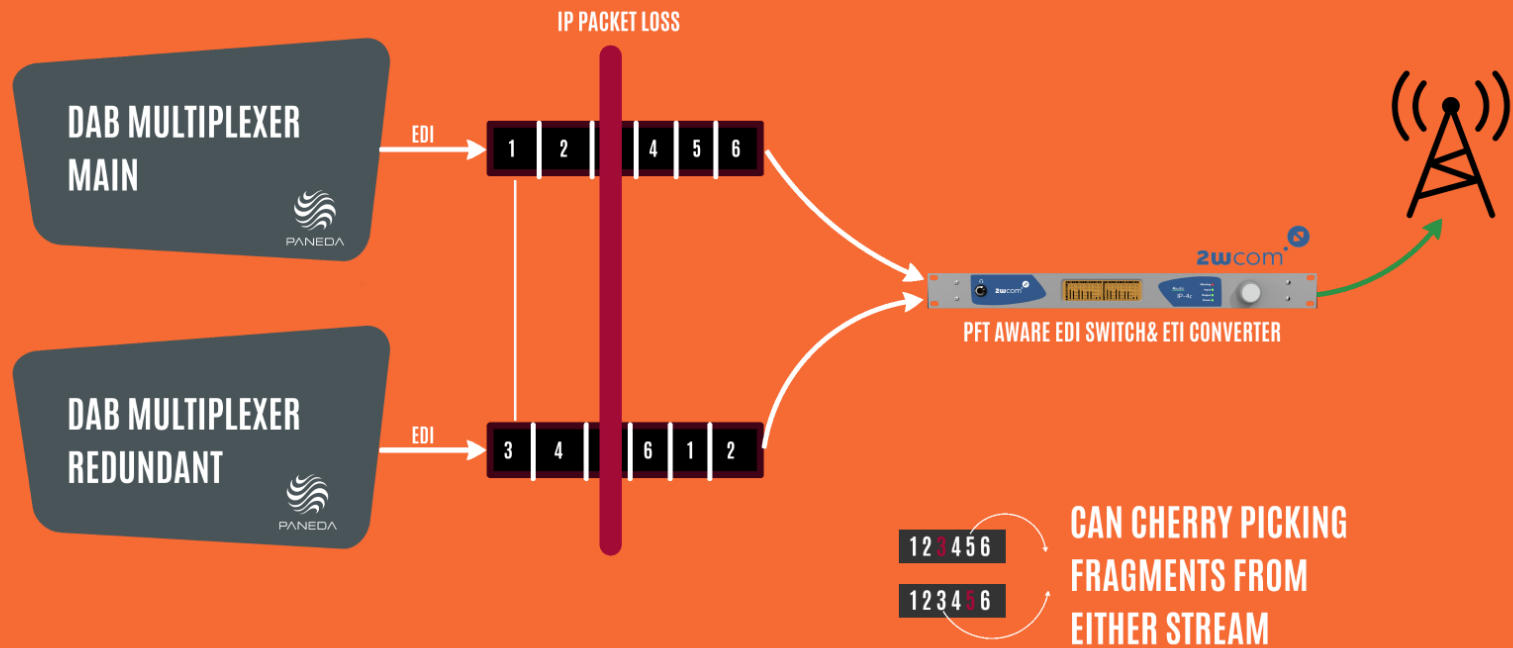
# PFT+Timeshifting



# PFT+Timeshifting



# PFT+Timeshifting



# LANGUAGE

## ANY LANGUAGE SUPPORT

เมนูระบบ การกำหนดค่าบริการ เวลาว่าง สถานะ ผู้ใช้ การตั้งค่า แหล่งที่มาของการเชื่อมต่อ อุปกรณ์ PROXY nent

### แพงควมคุม

#### Provider overview

bauer-media	✓ คคอง
paneda	✓ คคอง
nent	✓ คคอง

#### สถานะ

สถานะของระบบทั่วไป	✓ คคอง
สถานะอุปกรณ์	✓ คคอง
บริการเสียง	✓ คคอง
บริการข้อมูล	✓ คคอง

#### การตั้งค่าปัจจุบัน

ชื่อ: NENT Full  
ตั้งแต่วันที่: 2020-07-15 07:54:22 +02:00

#### Current schedule

week Aug 2 – 8, 2020 today < >

Sun 8/2	Mon 8/3	Tue 8/4	Wed 8/5	Thu 8/6	Fri 8/7	Sat 8/8

#### การเข้าถึงระยะไกล

ไม่มีลิงค์ระยะไกลที่กำหนด

#### ประกาศที่ใช้งานอยู่

ไม่มีการประกาศใช้งาน

- Polish
- Russian
- Serbian
- Swedish
- Thai
- Vietnamese
- Chinese





# PANEDA APPROACH



# PANEDA APPROACH



**ZERO COMPLICATED!**



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# LARS-PEDER LUNDGREN

working with DAB since 1997



PANEDA

OVERVIEW

## Paneda Warning System

- A new concept
- Triggered via DAB
- Addressable
- Machine to Machine



# DAB Digital Audio Broadcasting

Audio, yes, but is also a digital carrier of any data!



# DAB Digital Audio Broadcasting

Audio, yes, but is also a digital carrier of any data!



# DAB Basic Structure

**MSC**

**FIC**

**AUDIO**

**DATA**

# DAB Basic Structure



FAST INFORMATION CHANNEL



# DAB Fast Information Channel

**USED**

**UN-USED**

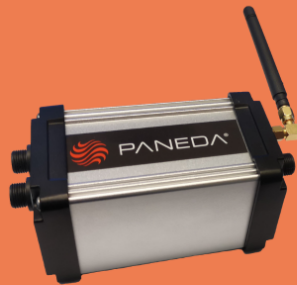
# DAB Fast Information Channel

**USED**

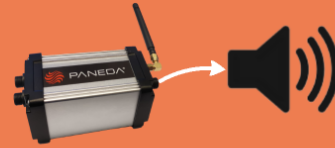
**UN-USED**

**PWS**

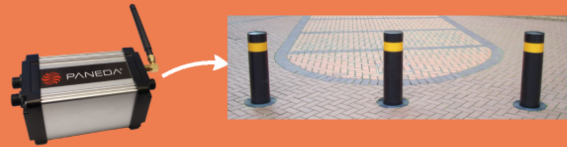
# PWS Receivers



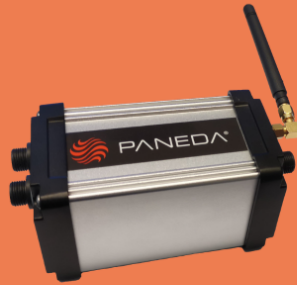
- IP67
- MULTI PURPOSE
- ADDRESSABLE



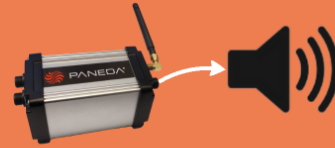
"Emergency, go inside and seek shelter, wait for further instructions, listen to radio!"



# PWS Receivers



- IP67
- MULTI PURPOSE
- ADDRESSABLE



"Emergency, go inside and seek shelter, wait for further instructions, listen to radio!"



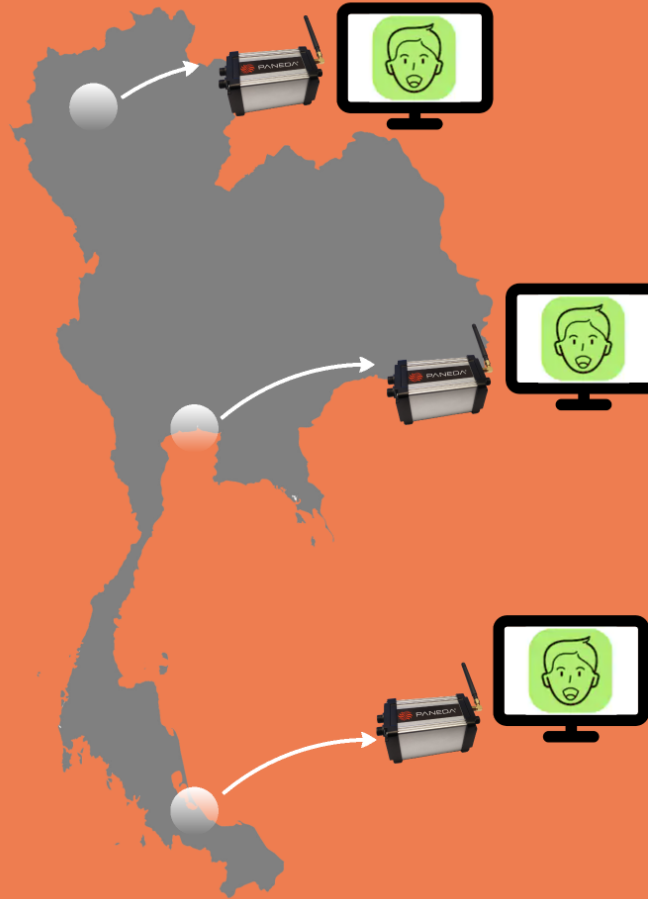
# AIR QUALITY

- AIR QUALITY INDEX FORECAST
- EXISTING SCREENS
- ADDRESSABLE



# AIR QUALITY

- AIR QUALITY INDEX FORECAST
- EXISTING SCREENS
- ADDRESSABLE

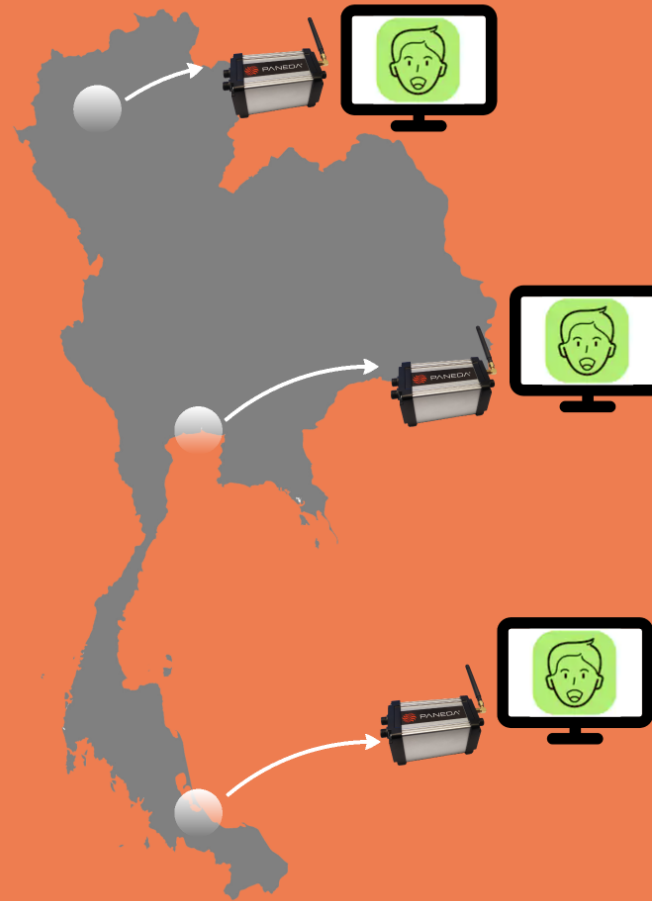


# AIR QUALITY

- AIR QUALITY INDEX FORECAST
- EXISTING SCREENS
- ADDRESSABLE

## AIR QUALITY REAL-TIME DATA

- BANGKOK 80
- CHIANG MAI 87
- HAT YAI 72



# AIR QUALITY

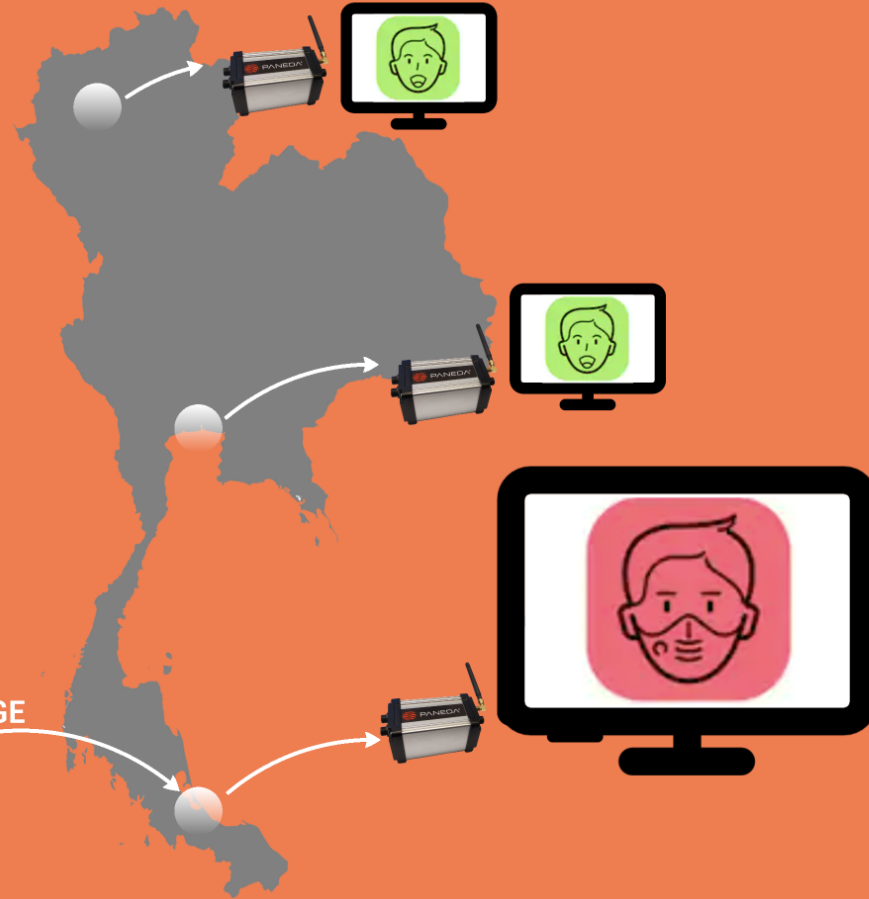
- AIR QUALITY INDEX FORECAST
- EXISTING SCREENS
- ADDRESSABLE

## AIR QUALITY REAL-TIME DATA

- BANGKOK 80
- CHIANG MAI 87
- HAT YAI 120

DAB MULTIPLEXER 

MESSAGE





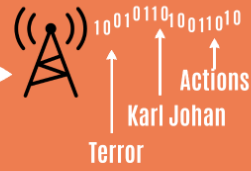
# Scenario Example

## Terror attack "Karl-Johan"



# Scenario Example

## Terror attack "Karl-Johan"

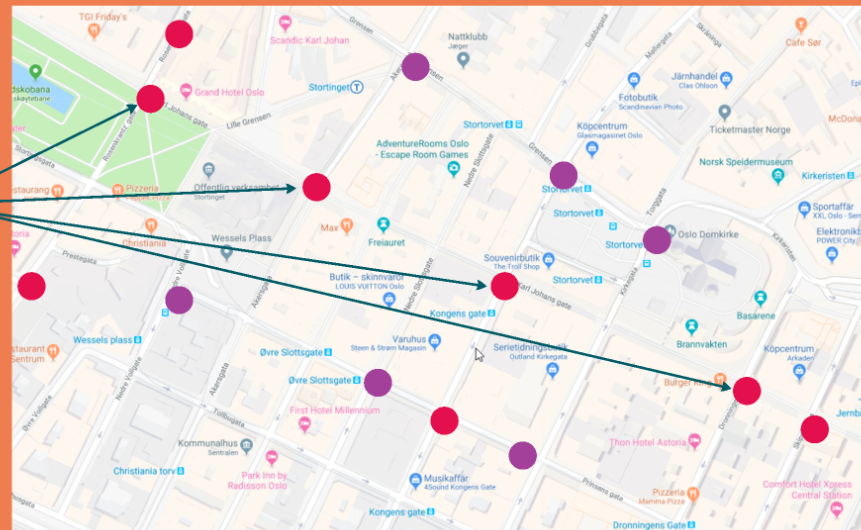


# Scenario Example

## Terror attack "Karl-Johan"



"Emergency, seek shelter!"  
Information on screens



# Scenario Example

## Terror attack "Karl-Johan"

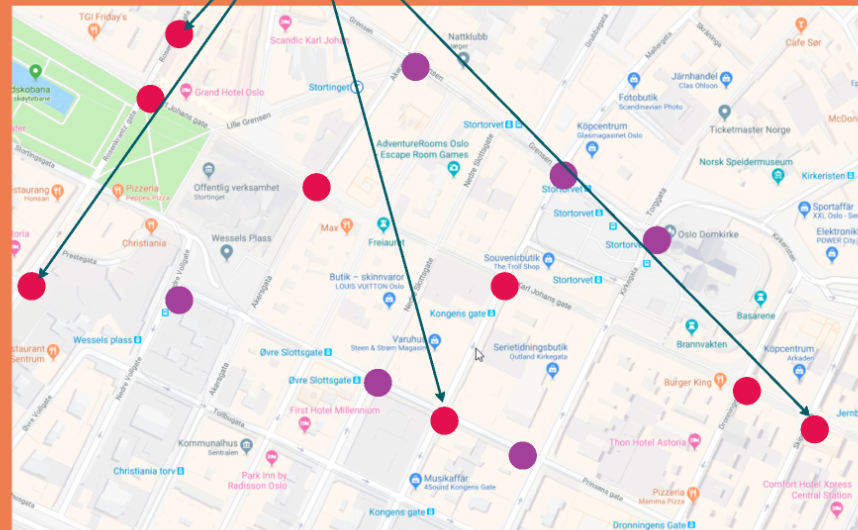


# Scenario Example

## Terror attack "Karl-Johan"

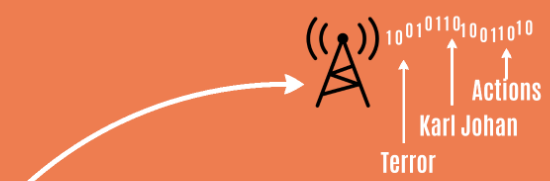


Activate road blocking



# Scenario Example

## Terror attack "Karl-Johan"

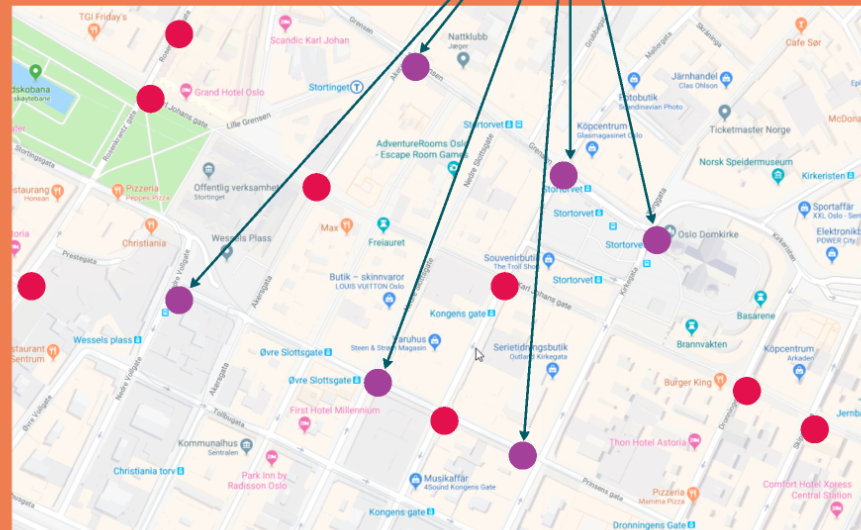


# Scenario Example

## Terror attack "Karl-Johan"



Speaker icon  
"Incident at Karl Johan, don't go in that direction"



# Scenario Example

## Terror attack "Karl-Johan"





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