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**Применение технических  
решений Ateme для  
доставки и  
распространения 4K  
контента**

**ATEME**  
Captive your audience

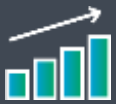
# 01

# О компании Ateme

# THE VIDEO DELIVERY LEADER



Public since 2014



81.1 M€ in 2021



1.96M€ (Jan 2022)



+490 people in 20 countries



1000+ clients in 100 countries



62 patents  
Winner of multiple awards

Ateme enables **content providers** and **service providers** to captivate their audiences with a superior **Quality of Experience**, so they can **boost viewership** engagement, acquire **new customers**, and unleash **new monetization** potential.



# WHY ATEME CONTRIBUTION



## Best Video Quality

- High compression fidelity
- Best High motion content handling
- Best subjective quality
- Best objective quality
- Continuous VQ enhancements roadmap



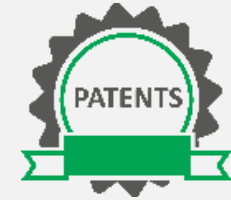
## Complete Interoperability

- Acclaimed interoperability with other vendors
- Universality: MPEG-2 to MPEG-4 and HEVC
- Goes beyond compliancy with stream recovery techniques



## Operational Efficiency

- Most complete & intuitive web interface and front panel
- Proven robustness  
Advanced SLA offer
- Fully integrated with majors third party NMS



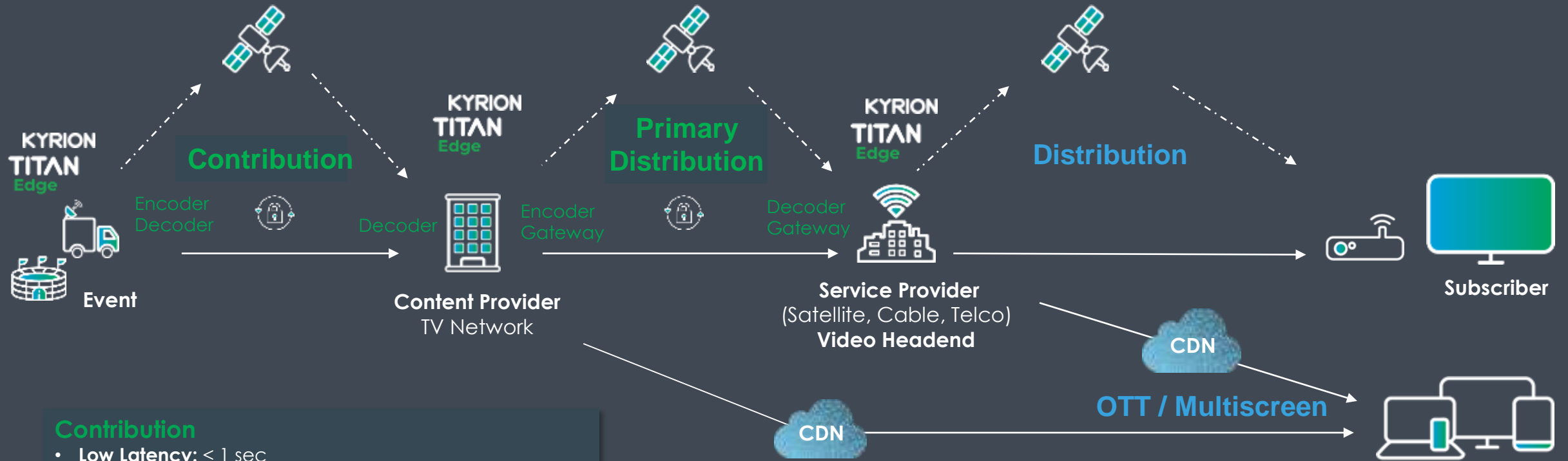
## Technology Leader

- 4:2:2 12-bit leader – always innovating – most advance in HEVC
- Best-in-class Video Quality
- HEVC standardization
- Advanced Compression tools and patents

**Как мы можем помочь**



# In Contribution and Primary Distribution



## Contribution

- **Low Latency:** < 1 sec
- **High Video Quality:** High-bitrates/chroma/bitdepth
- **Density:** DSNG & ruggedized
- **Reliability:** redundancy, front panel, failover
- **Encryption:** High valuable content
- **Ancillary data** compressed & uncompressed

## Primary Distribution

- **No downtime:** Live 24/7
- **Encryption:** High valuable content
- **Authorizations:** Affiliates control
- **Regionalization:** Blackout, ad replacement
- **Remote Control:** update partners sw remotely
- **Ancillary data** compressed & uncompressed

# Линейка Kurion

## Kyrion CM5000e Encoder



- SD/HD/UHD HEVC, H.264, MPEG-2
- H.264 10-bit 4:2:2 / HEVC 12-bit 4:2:2
- Ultra low latency mode
- Confidence Audio / Video input monitoring
- Daisy-chain services re-multiplexing
- Contribution over Internet streaming
- FEC Pro MPEG and BISS - 0/1/E/EBU support
- Redundancy without AMS support
- Modularity / DVB-S2x Built-in modulation
- DVB / ATSC / ISDBTb standards compliant

## Kyrion DR5000 IRD



- SD/HD/UHD HEVC, H264, MPEG2
- H.264 10-bit 4:2:2 / HEVC 12-bit 4:2:2
- Ultra low latency mode
- Confidence Audio / Video input monitoring
- DVB-Common Interface option
- Service filtering with remuxed output
- Contribution over Internet support
- UHDLOCK™ Synchronization for 4K H264 reception
- Hitless failover support



# KYRION CM5000E ENCODER



## Key Features

- Full dual channel SD / HD / UHD (+ HD 1080p)
- H.264 10-bit 4:2:2 / H.265 12-bit 4:2:2
- Ultra low latency mode
- Confidence Audio / Video input monitoring
- Daisy-chain services re-multiplexing
- Contribution over Internet (Zixi/SRT/RIST)
- FEC Pro MPEG and BISS - 1/E/CA EBU support
- 1+1 Redundancy without NMS support
- Modularity / DVB-S2x Built-in modulation
- DVB / ATSC / ISDBTb standards compliant

## Benefits

- Low OPEX link with high VQ at low bitrates
- Ease of use with front panel and web GUI
- Pay as you grow – future proof investment
- Ensures content fidelity
- Streamlined Encoder– Modulator configuration
- Immediate service with ultra-fast-boot and low latency

# KYRION CM5000 SPECIFICATIONS

	Feature	Spec
1	I/O connectors	<ul style="list-style-type: none"> <li>• 2 x SD/HD/3G-SDI with synch Genlock, 3x 100/1000 Mbps Gbe</li> <li>• 2 x ASI outputs per Video Channel, 1 x ASI input for daisy-chain service re-multiplexing</li> <li>• L-Band RF SMA 50 Ohms output (950-2150MHz), IF Band RF BNC 75 Ohms output (50-180 MHz)</li> <li>• Audio analog</li> </ul>
2	Video	<ul style="list-style-type: none"> <li>• HEVC (Main, Main 10, Main 12, Main 422 10, Main 422 12) 100 Mbps max</li> <li>• H.264 (4:2:0/4:2:2 8-bit, 4:2:0/4:2:2 10-bit)</li> <li>• MPEG-2 (4:2:0/4:2:2 8-bit)</li> </ul>
3	Resolutions	<ul style="list-style-type: none"> <li>• UHD 3840 x 2160</li> <li>• PIP, 704 x 480, 704 x 576, 1280 x 720, 1920 x 1080</li> <li>• Frame rate 24p, 50i, 59.94i, 50p, 59.94p</li> </ul>
4	Video Processing	<ul style="list-style-type: none"> <li>• CABAC, CAVLC, MBAFF, PAFF, Resize &amp; Noise Reduction filters.</li> </ul>
5	Audio CODECs	<ul style="list-style-type: none"> <li>• MPEG1 L2: 1.0, 2.0.</li> <li>• AC3/AC3+: 2.0, 5.1, DolbyE decode, Dolby Pass-Through.</li> <li>• AAC LC/HE (v1/v2): 2.0, 5.1.</li> </ul>
6	Ancillary data	<ul style="list-style-type: none"> <li>• AFD, WSS, WST, VPS, VPI, VITC, ATC, CC, DPI, DVB, TELETXT, Vchip, SMPTE2031, OP47, SCTE35 insertion via SCTE104 triggers, DVB-subtitles ASI/IP multiplexing</li> </ul>
7	Output	<ul style="list-style-type: none"> <li>• MPEG-2 TS over UDP/ Unicast / Multicast /DVB-ASI</li> <li>• ATEME ARQ streaming , BISS 0/1/E encryption</li> <li>• Daisy-chain service re-multiplexing</li> </ul>
8	Modulation	<ul style="list-style-type: none"> <li>• DVB-S (QPSK, FEC 8PSK) DVB-S2/S2X (QPSK, 8PSK, 16APSK, 32APSK, 64APSK)</li> <li>• Roll-off: 0.05, 0.10, 0.15, 0.20, 0.25, and 0.35</li> </ul>
9	Power & Noise	<ul style="list-style-type: none"> <li>• 90w/channel, 42dB</li> </ul>

# UPDATE CM5000E

Front panel

> Look and feel



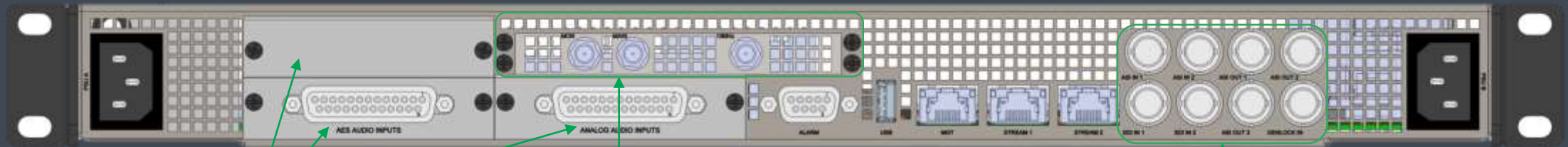
> More interfaces flexibility (1 slot for PCIe board)



> Reduced depth (17 in), and reduced consumption

# KYRION CM5000E REAR PANEL

Enables any video link



3 x Extension slot available for:  
Audio boards (AES or ANL)  
SMPTE-2110 input board (Q1 2023)  
3 x 4G SDI input board (Q2 2023)

DVB-S/S2/S2X  
Modulator  
L-Band & IF

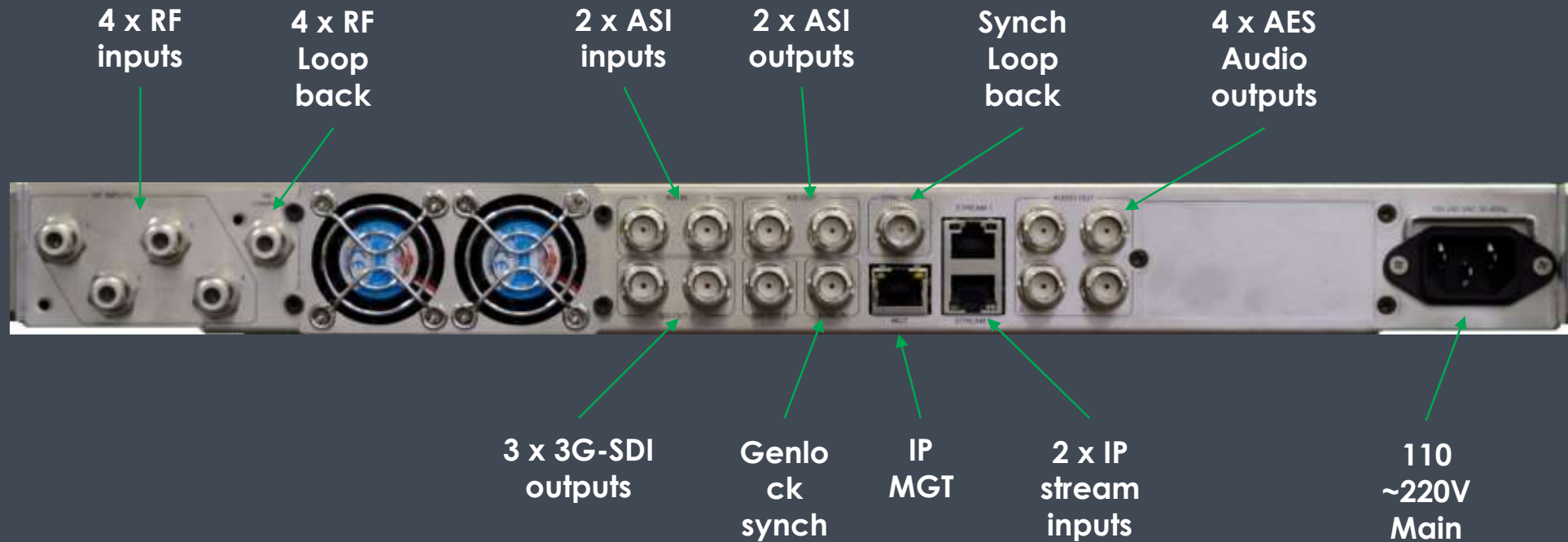
2 x IP Outputs  
1 x Management IP

2 x 12G SDI inputs  
2 x ASI Inputs  
3 x ASI outputs  
1 x Genlock Input

# KYRION DR5000 SPECIFICATIONS

	Feature	Spec
1	I/O connectors	<ul style="list-style-type: none"> <li>• 2 x ASI inputs, 2xASI outputs</li> <li>• 3 x SD/HD/3G-SDI outputs</li> <li>• 3x 100/1000 Mbps Gbe</li> <li>• Audio and video analog</li> <li>• 1 RF demodulator with 4 selectable RF inputs</li> </ul>
2	Video	<ul style="list-style-type: none"> <li>• HEVC (Main, Main 10, Main 12, Main 422 10, Main 422 12) 60 Mbps max</li> <li>• H.264 (4:2:0/4:2:2 8-bit, 4:2:0/4:2:2 10-bit)</li> <li>• MPEG-2 (4:2:0/4:2:2 8-bit)</li> <li>• H.264 Bitrate: 1 to 80 Mbps</li> <li>• TS VBR support</li> </ul>
3	Resolutions	<ul style="list-style-type: none"> <li>• UHD 3840 x 2160 ( with 4x DR5000 )</li> <li>• PIP, 704 x 480, 704 x 576, 1280 x 720, 1920 x 1080</li> <li>• Frame rate 24p, 50i, 59.94i, 50p, 59.94p</li> </ul>
4	Audio CODECs	<ul style="list-style-type: none"> <li>• MPEG-1 Layer II, AAC : 2.0, 5.1</li> <li>• Dolby Digital E, DD, DD+, AC3, AC3+, PCM pass through</li> <li>• Dolby Digital / Dolby digital Decoding</li> </ul>
5	Descrambling	<ul style="list-style-type: none"> <li>• BISS 0/1/E/ (EBU R139)</li> <li>• DVB-CI Common Interface</li> <li>• Multi services descrambling: Conax, Irdeto, NDS, Viaccess</li> </ul>
6	Demodulation	<ul style="list-style-type: none"> <li>• DVB-S (QPSK, 8PSK) DVB-S2/S2X (QPSK, 8PSK, 16APSK, 32APSK)</li> <li>• Roll-off: 0.05, 0.10, 0.15, 0.20, 0.25, and 0.35</li> </ul>
7	Power & Noise	<ul style="list-style-type: none"> <li>• 36w/channel, 37dB</li> </ul>

# KYRION DR5000 REAR PANEL



# Линейка Titan Edge

# Key differentiators



## High Density

- > Lower OPEX
- > Composition of SD, HD, UHD
- > Encoding (up to)  
**13x SD 6x HD 1x UHD**
- > Decoding (up to)  
**30x SD 16x HD 3x UHD**
- > Gateways up to 80
- > Integrate last CPU generations



## Low Latency

- > ~1sec E2E in low latency for HEVC and H264
- > Preserved Quality
- > 4 Latency modes
  - Best Quality
  - High Quality
  - Reduced Latency
  - Low Latency



## Modularity

- > Composition of applications
  - > Gateway
  - > Decoder
  - > Encoder
- > I/O board modularity:
  - > RF in/out
  - > CAM
  - > ASI in/out
  - > SDI in/out
  - > SDI over IP in/out



## Future-proof

- > Software Based
- > Run on COTS server
- > Support of INTEL and AMD
- > Last encryptions (BISS-CA)
- > Licensed features
- > Interoperability
- > Last Lib integration

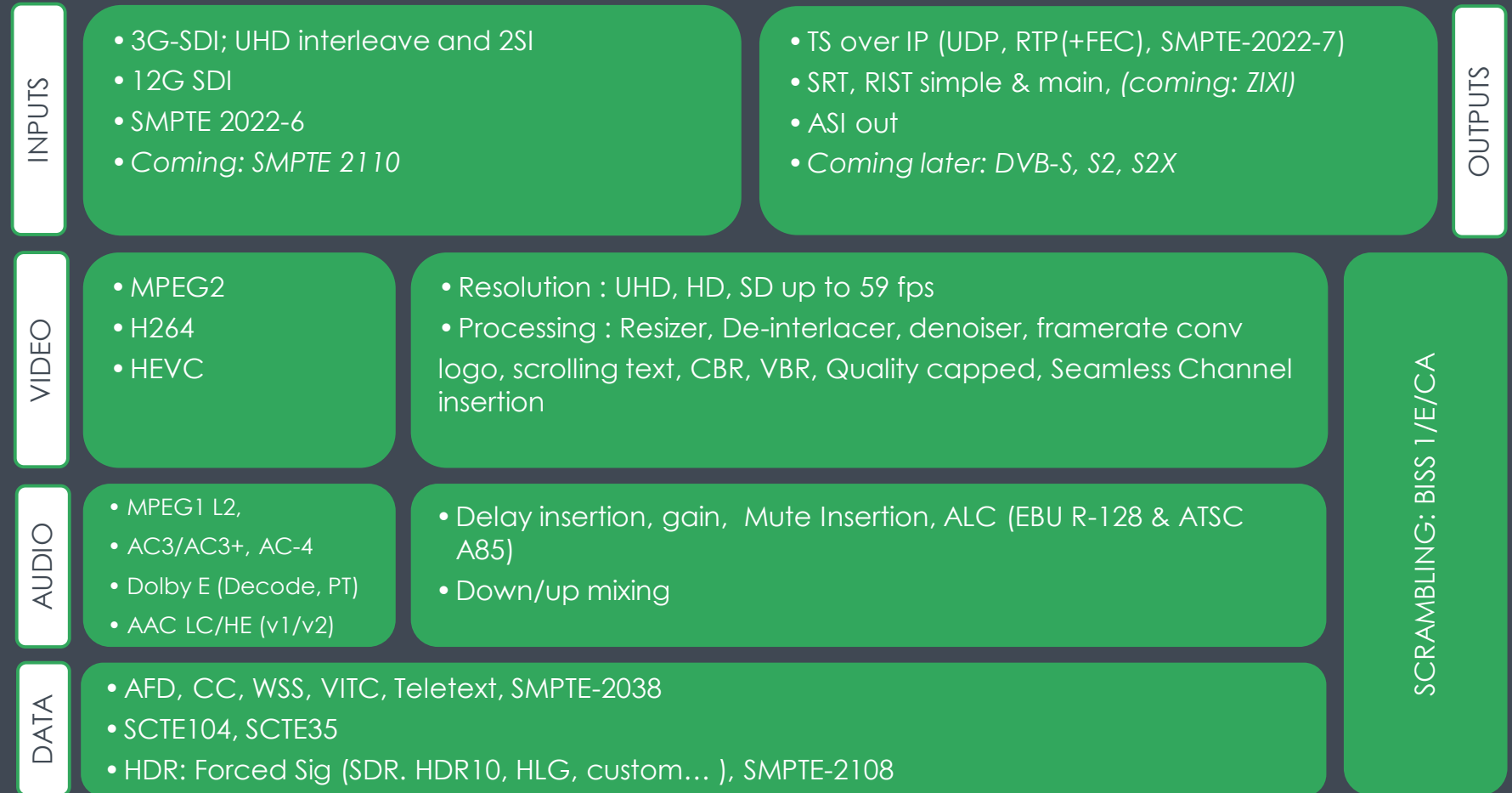


# TITAN Edge Encoder

TITAN  
Edge

## TITAN Edge Enc

Encode Latency: 4 modes.  
~800ms in LL for H264 and HEVC

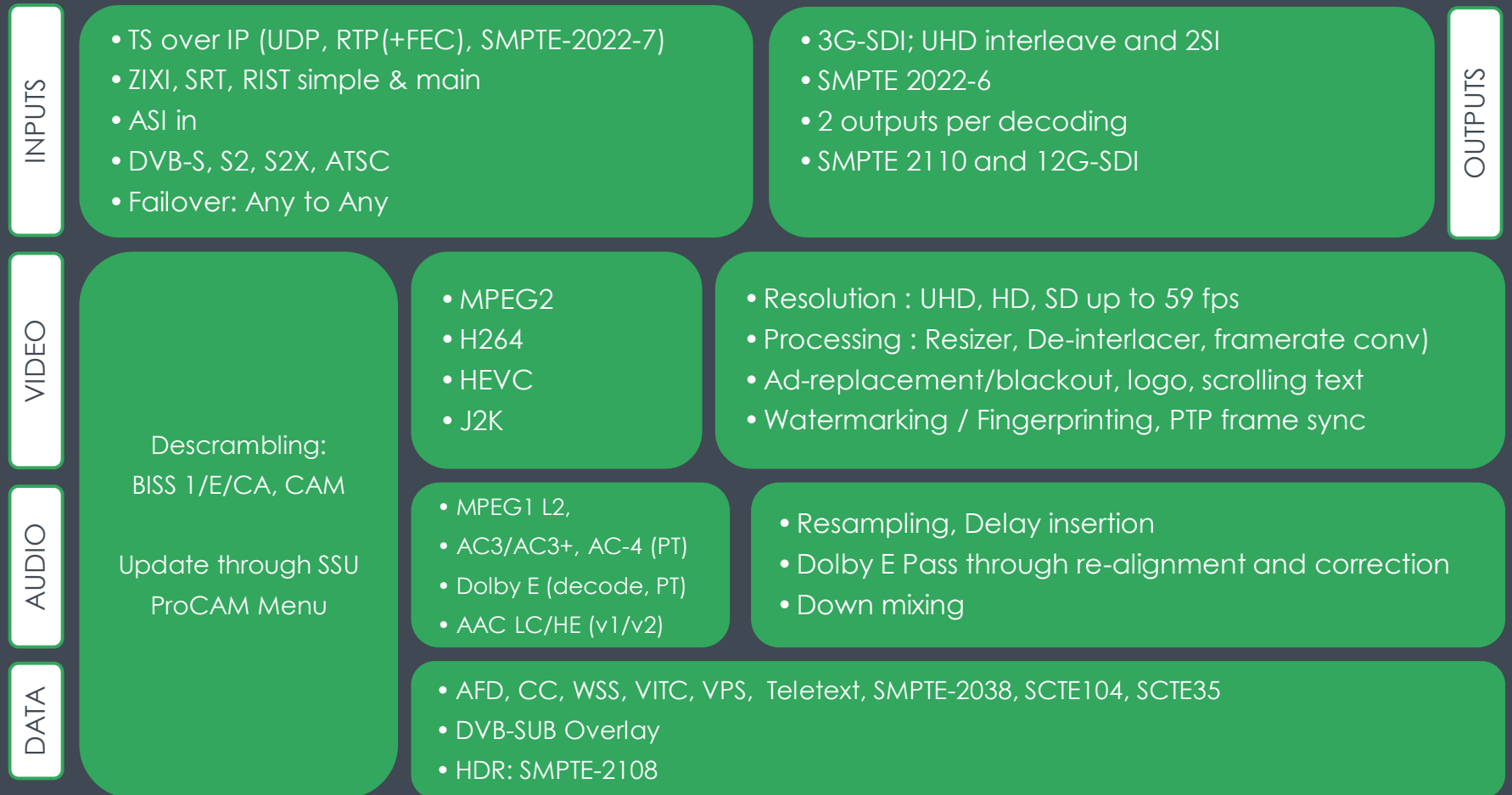


# TITAN Edge Decoder



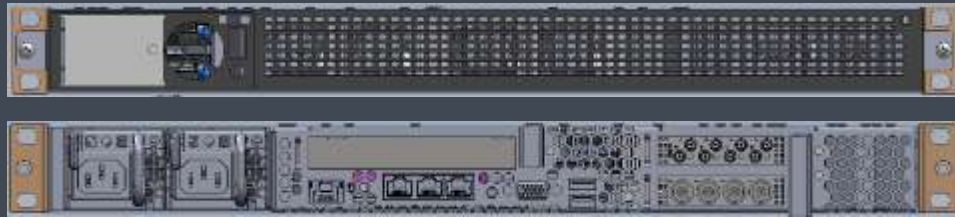
## TITAN Edge Dec

Decode Latency:  
< 300ms for H264 and HEVC



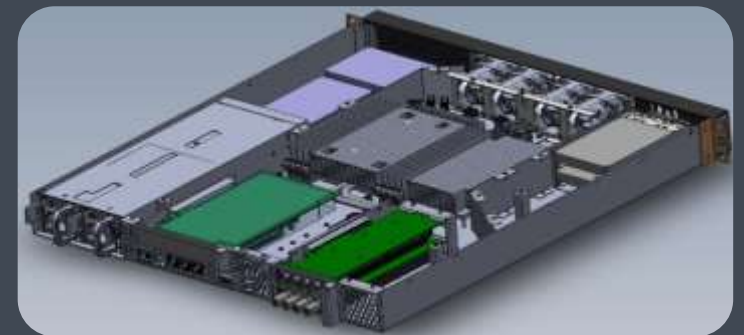
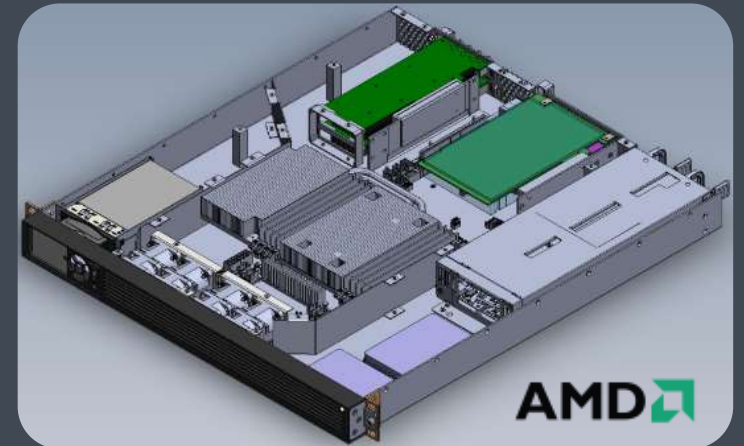
# ATEME AMD Rugged Server - OEM Design

TITAN  
Edge



## ADLINK TITAN Edge T-Rug One

- AMD 7502p or AMD 7702p
- 3 PCIe Slot for I/O extension cards (1xHP + 2xLP)
- 2 PCMCIA slot for CAS descrambling of front panel
- New OEM modulation board for L-Band/IF (same as CM5k)
- Programmable Front Panel
- Chassis Depth : 520mm
- Hot Plug Redundant PSU, HDD, Fans
- Thermal (obj. +45°C)/Chocks/Vibration/Noise certified
- Production Center in NAM/EMEA/APAC

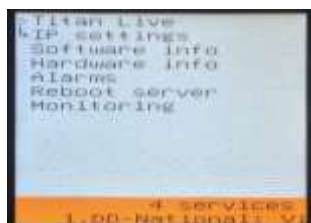


ATEME

# ATEME front Panel on COTS Server for Field Operations



IP settings



Settings



Service check

- > General Menu :
  - > Display calibration : Brightness and contrast
- > System Menu :
  - > Configure the IP settings
  - > Display SW information (versions...)
  - > Display HW information (fans; internal temperatures)
  - > Display raised alarms (only critical alarms. Change color to easily see when there is a critical alarm)
  - > Rebooting the server

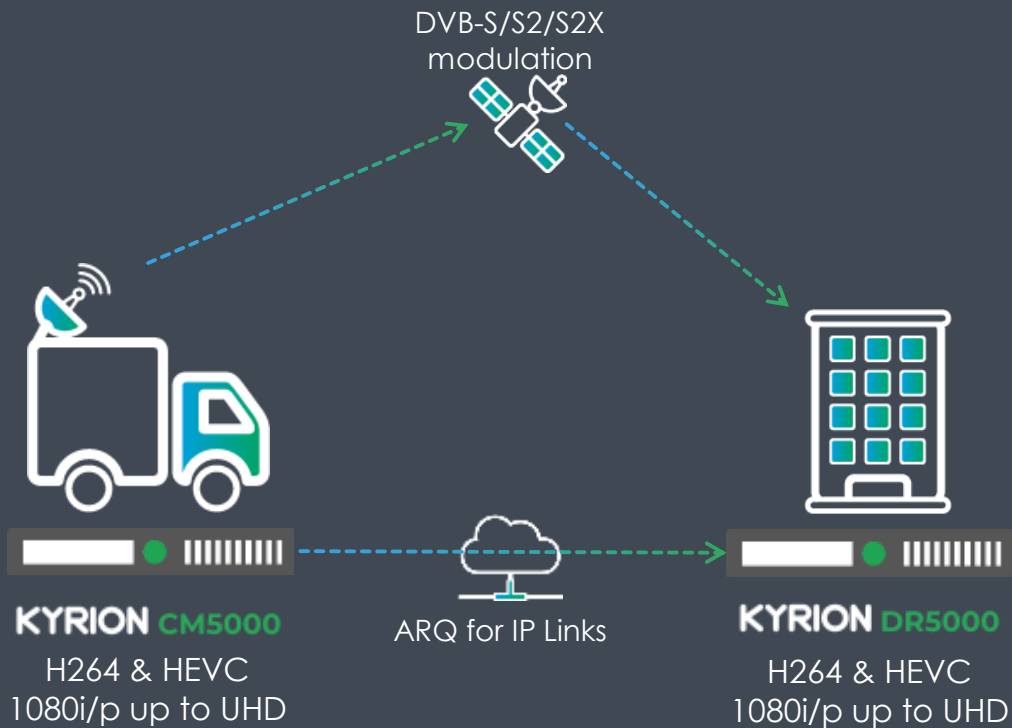


Details
Aluminium injected FP
Assembly bracket (from Dell data)
PMMA adhesive bezel (OEM ready)
Elastomer keypad
Dust filter behind the FP
Dell extended existing ON/OFF button

# Как мы работаем с 4K

# HEVC

SW Upgrade, Higher Bandwidth Efficiency, Better VQ



Use case	H.264	HEVC
Sports	25 Mbps	16 Mbps
Live Concert	12 Mbps	7 Mbps
News report	6 Mbps	3.5 Mbps

## > ATEME's Kyrion facts:

- Software upgrade on Kyrion CM5000 and Kyrion DR5000
- Support for 1080i and 1080p
- Up to 60 Mbps, up to 4:2:2 12-bit
- Low end to end Latency (100 ms)
- 35 % bandwidth gain compared to ATEME's H.264

> Uplink more channels in the same capacity → Lower OPEX

> OR Video Quality increase for the same capacity → Increase Revenue with Better Services

# KYRION CM5000 – KYRION DR5000

## End-To-End Latency

Profile	Ultra Low Latency <sup>1</sup>				Low Latency <sup>2</sup>	Reduced Latency <sup>3</sup>	High Quality <sup>4</sup>
Format	ASI + Audio pass-through	ASI + Audio encoding	IP + Audio pass-through*	IP + Audio Encoding*	All configurations	All configurations	All configurations
480i29.97	100 ms	155 ms	105 ms	160 ms	300 ms	600 ms	1200 ms
720p59.94	100 ms	155 ms	105 ms	160 ms	300 ms	600 ms	1200 ms
1080i29.97	105 ms	170 ms	110 ms	175 ms	300 ms	600 ms	1200 ms
576i25	120 ms	165 ms	125 ms	170 ms	300 ms	600 ms	1200 ms
720p50	120 ms	165 ms	125 ms	170 ms	300 ms	600 ms	1200 ms
1080i25	125 ms	190 ms	130 ms	195 ms	300 ms	600 ms	1200 ms

<sup>1</sup> Field mode for Interlaced/Frame mode for Progressive, max B-frames = 0, LookAhead = 0, CPB = 75ms

<sup>2</sup> Field mode for Interlaced/Frame mode for Progressive, max B-frames = 0, LookAhead = 0, CPB = 125ms

<sup>3</sup> Field mode for Interlaced/Frame mode for Progressive, max B-frames = 2, LookAhead = 2, CPB = 250ms

<sup>4</sup> All encoding modes, Max B-frames = 3, LookAhead = 6, CPB = 500ms

\* Ultra IP input HW option on DR: end to end latency of 3 frames + 10ms.

# CONTRIBUTION OVER IP - ATEME'S ARQ SOLUTION

## Challenges

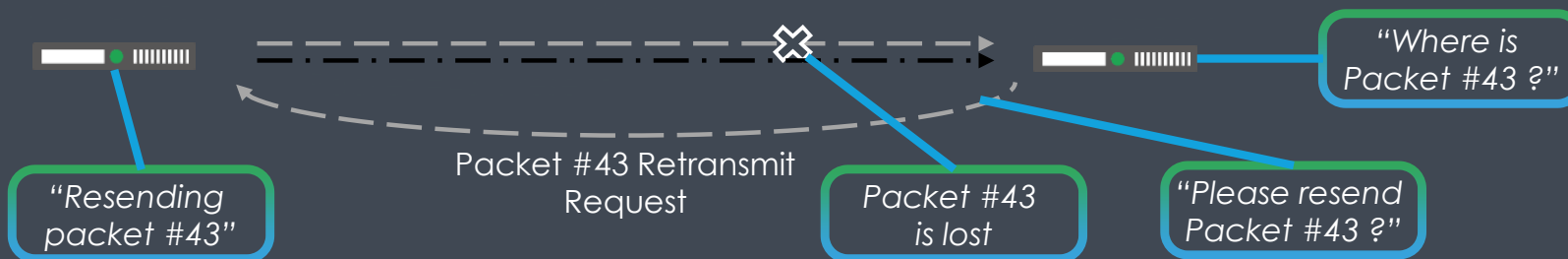
- > Unmanaged network conditions
- > Congestion & Packet loss
- > Quality of Service Assurance

## Solution

- > Packet re-transmission and Forward Error Correction
- > Dynamic bitrate adaptation to maximize usage of the available network bandwidth
- > Advanced features : AES encryption (128, 192, 256 bits), link bonding

## Benefits

- > Uninterrupted high quality, high availability service.
- > Easy-to-use Any IP network is as stable as traditional methods but significantly less expensive
- > proven solution lowering OPEX

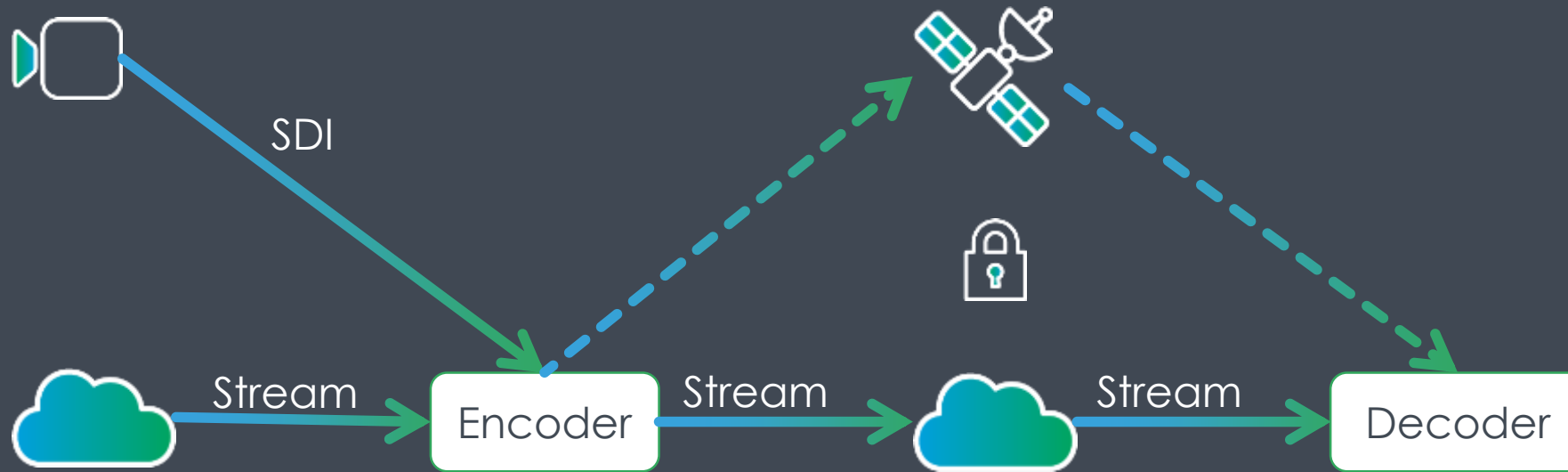


Bitrate is reduced when there are network congestion and bandwidth limitations



# BISS-CA

Market need alternative to proprietary protection



- > Some deployed solution for encryption are proprietary
  - Ericsson's Director 5
  - Cisco's PowerView
- > Prevent from future-proof solution, limit your flexibility

# BISS-CA: GROUP MANAGER OF DECODER PARK

**IRD Monitoring**

Filter on a service (channel)      Filter on station number

Service:       Station:       Service state:       Action:       Clear filters

**Selected**

Station: KGGN

**Services:**

- ▶ Channel 1
- ▶ Channel 2
- ▶ Channel 3
- ▶ Channel 4

# 1+1 BUILT-IN REDUNDANCY

- > 1+1 no NMS IP redundancy



- > Each encoder watches the other
- > Slave encoder is a configuration mirror of the Master encoder
- > Mute time is between 500ms and 750ms. Unmute time is between 1s and 1.25s.

# CASCADING REMUX (1/2)

> CM5000 can daisy chain ASI SPTS to create one MPTS

## > Features

- > ASI inputs and outputs
- > Build MPTS up to 200 Mbps
- > Independent encoder settings
- > Enable by software license

## > Benefits

- > Reduce OPEX by saving bandwidth
- > Reduce CAPEX by avoiding the purchase of an external Mux
- > Reduce Foot print/ weight /shipping costs
- > Simple to operate ASI daisy chain
- > Flexibility : Software license can be purchased later
- > No additional board required

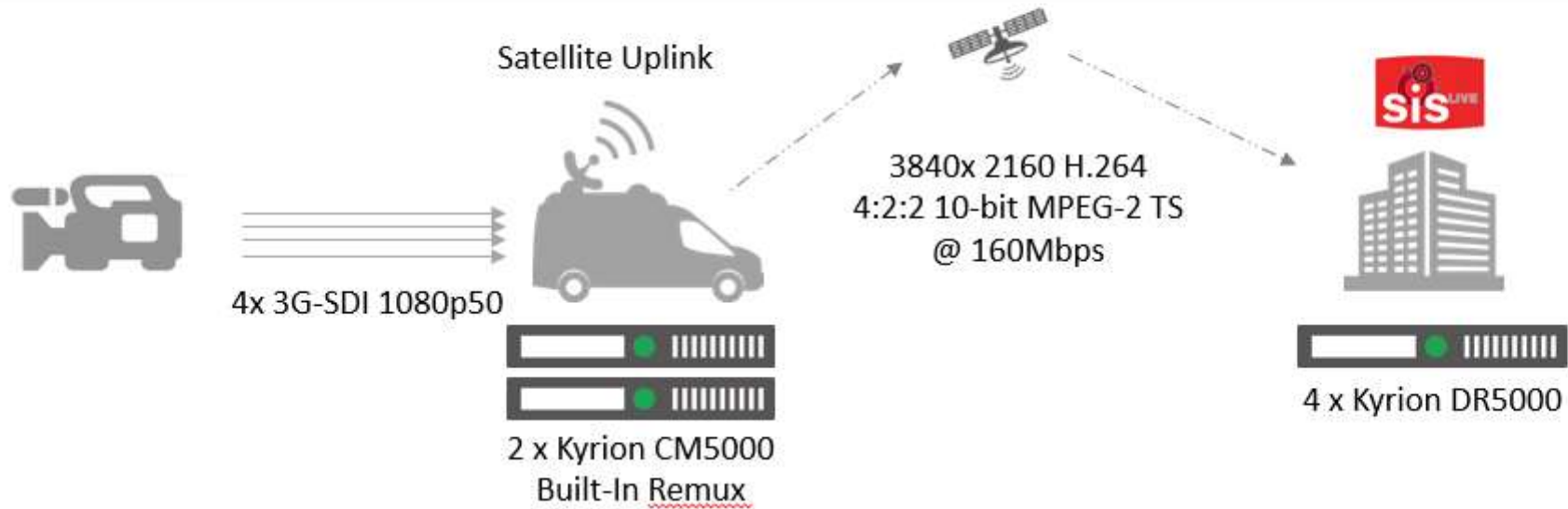


# Примеры инсталляций

# DNSG UHD Contribution



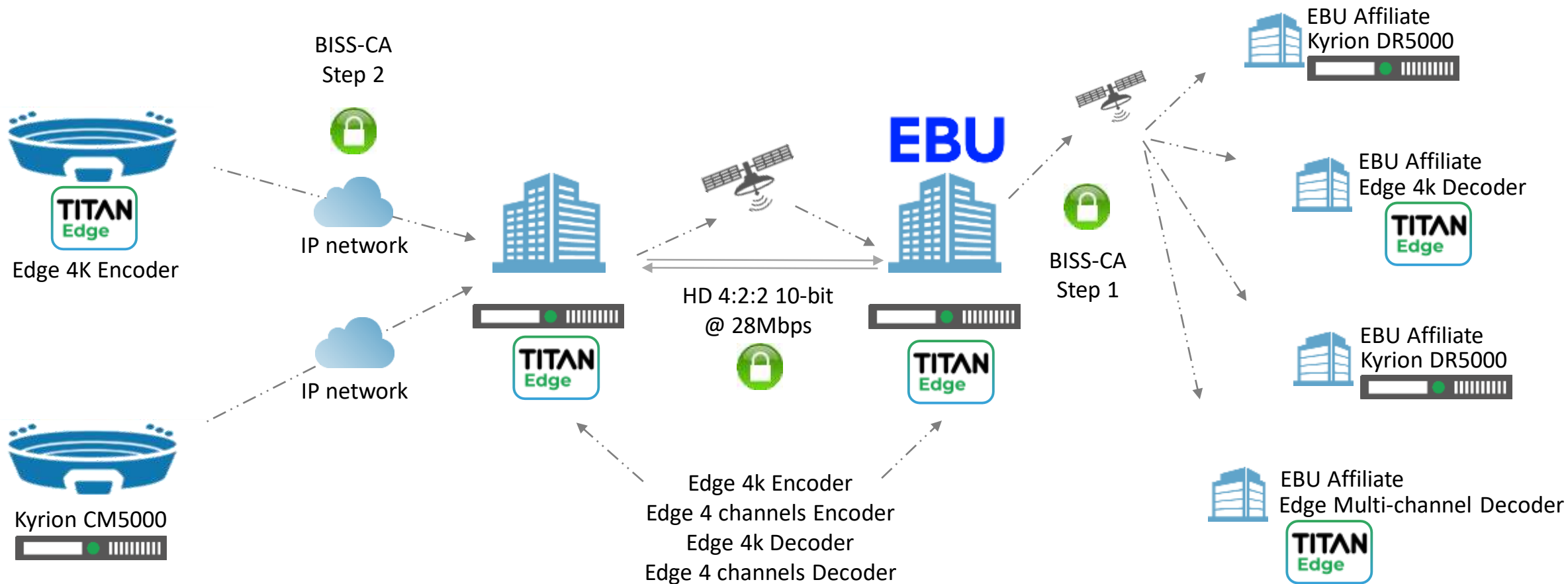
Success Story:  
4K UHD Contribution in H.264 Using ATEME Remux



# EBU Edge as Kyrion alternative for BISS-CA support



Success Story: International Primary Distribution over IP and Satellite



# Use-case: Tour de France and French League 1 !



Success Story: TITAN Edge 4k decoder used during 2019 Tour de France in Globecast Octopus truck



- > 3 weeks full event usage
- > 4k moto 1 feed (head of peloton) decoder
- > Appliance use-case
- > 4k feed controlled before being sent to France Televisions
- > Opened the door for next cycling event in full 4k

