NDI in the Master Control Room

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NDI In Master Control

- The NDI protocol was developed for production
- Most of the use of NDI in the world is on production
- Cameras, video mixers are the biggest users of NDI

BUT

- We understand that it's perfect also in the Master Control Room
- And I will try to share my experience

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NDI

- NDI stands for Network Device Interface and is developed by NewTek (Today part of VIZRT)
- NewTek announced NDI in 2015, and the protocol was made available for public use early 2016
- NDI allows multiple video systems to identify and communicate with one another over IP.
- NDI is generationally lossless meaning that loss only occurs in the first generation of video and all subsequent re-compression steps in the NDI system are lossless.

NDI: network

- Use Standard network devices
- No special adapter or switch is needed.
- Can be used to any resolution up to 4K

Companies Supporting NDI

- NDI is supported by a wide range of manufacturers and developers of both hardware and software
- Here are a few of the major ones:
  - Etere
  - Adobe / Adobe Creative Cloud
  - JVC Professional
  - Panasonic
  - Evertz
  - LiveU
  - BirdDog

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NDI Bandwith

Video Format	Max Bandwidth
480i	20Mbps
720p	90Mbps
1080i	100Mbps
1080p	150Mbps
2160i	250Mbps
2160p	400Mbps

Common challenges

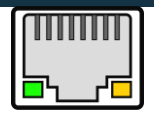
Challenge N.1 → Bandwidth

- Bandwidth use can explode if you send the same video to a lot of destinations (one HD is 100MB to 10 Destination is 1000GB)

NDI Bandwith Problems

Program

Preset



100

200

300

400

500

600

700

Encoder

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Solution - Planning

- Avoid unnecessary connections
- Plan connection carefully
- Use Lowres option for signal monitoring
- Privilege 10GB networks even for HD signals

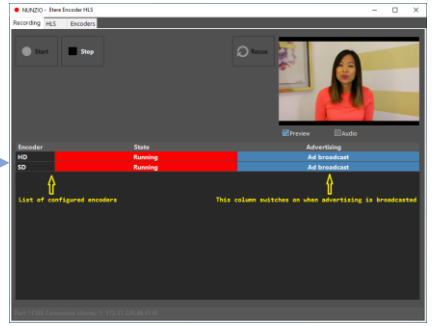
Challenge n2 Switch

Main Playout

Backup Playout

Video Change Over

Live Encoder



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Main/Backup NDI

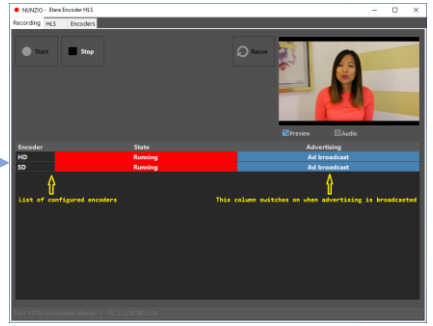
Main Playout

Main NDI Indicate the name of backup NDI

Backup Playout

Receiver switch Automatically

Live Encoder



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Challenge n 3 Routing in NDI

- In NDI every video signal has a Name
- To connect the receiver must connect with that stream
- The receiver can interrogate to have the list of streams available
- Receiver can choose the to connect in Full resolution or in monitor mode

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Stream Name

Stream Name

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Case Study: Mondo TV

Case Study: Mondo TV

- Fully NDI based
- All incoming signals converted to NDI
- One of the world's largest solely NDI powered broadcasting systems

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Case Study: Mondo TV

- A large scale broadcaster of Mondo TV
- Manages over 40 playout channels
- One All News channel
- 3 studios
- Multichannel ingest facility for incoming feeds
- Integrated editing via Adobe Premier
- Program archive and news archive
- Satellite and OTT output

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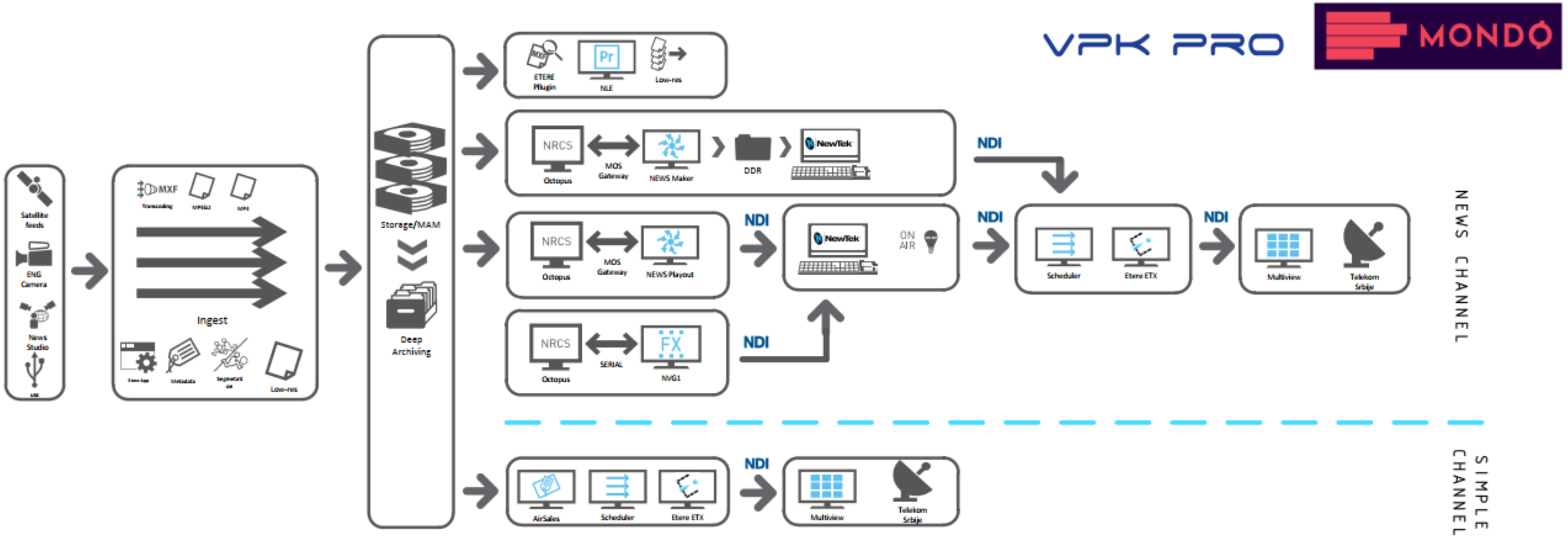

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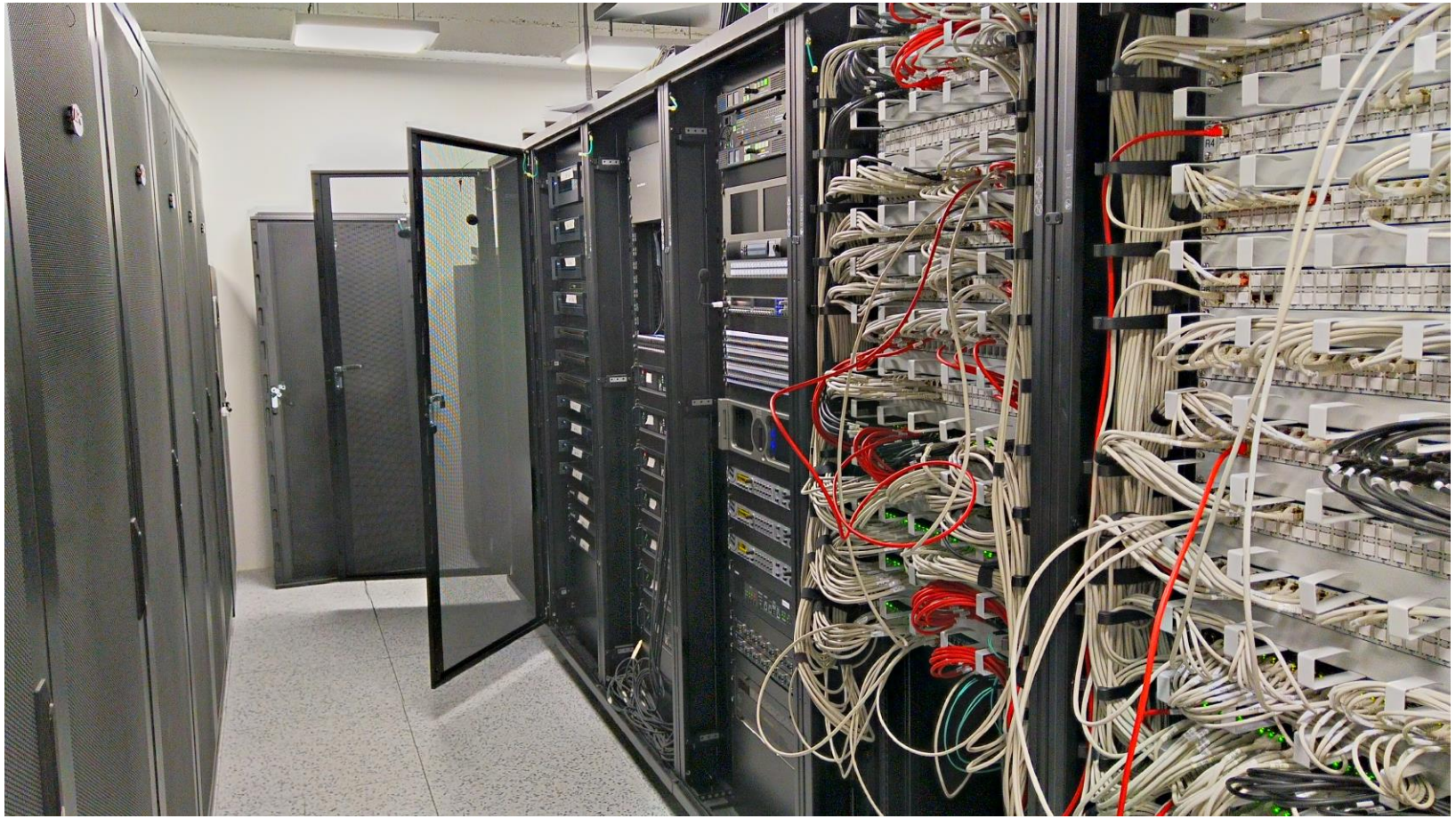
Case Study: Mondo TV



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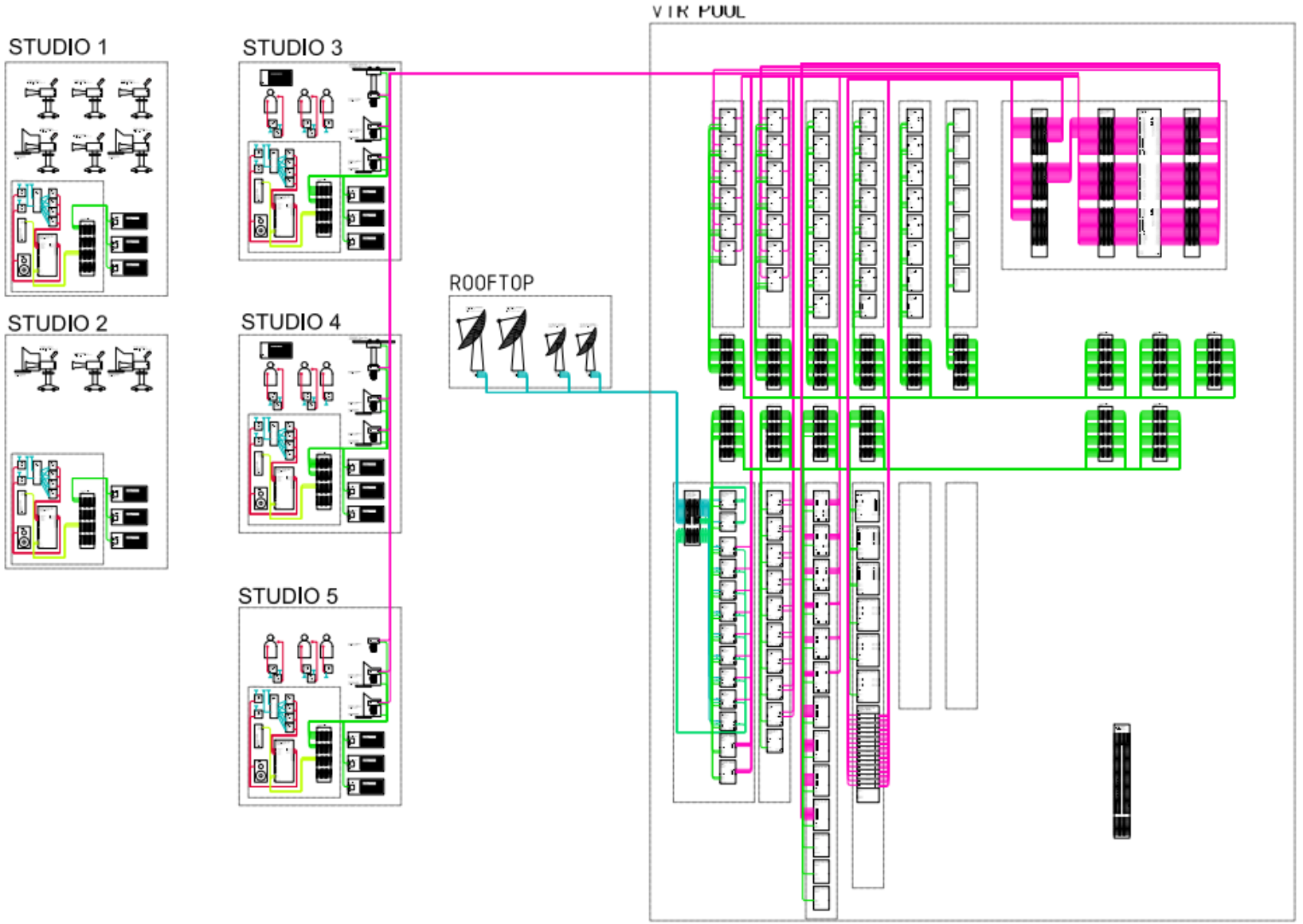

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Case Study: Mondo TV

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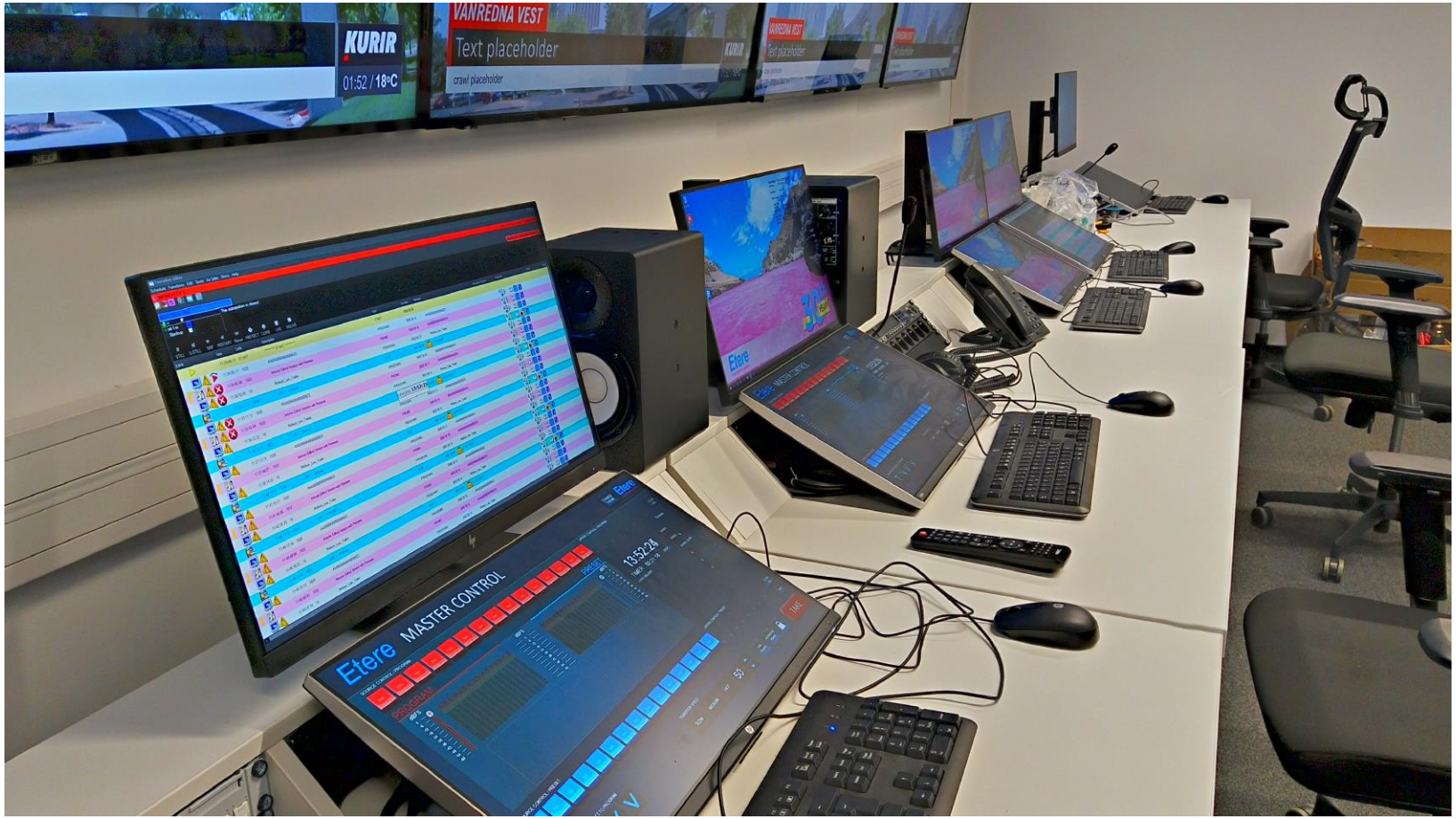
Case Study: Mondo TV



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NDI Video Monitoring

- Using native NDI monitor
- A Single station can control any video in the system without any additional cabling

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Monitoring/Deliver

- To decrease the running bandwith the delivery encoding is part of monitoring
- The software-based multiviewer provide both monitoring and encoding for the final delivery
- The advantage is a very compact and bandwidth efficient design
- For redundancy 2 multiviewer were used each one receive a redundant NDI signal

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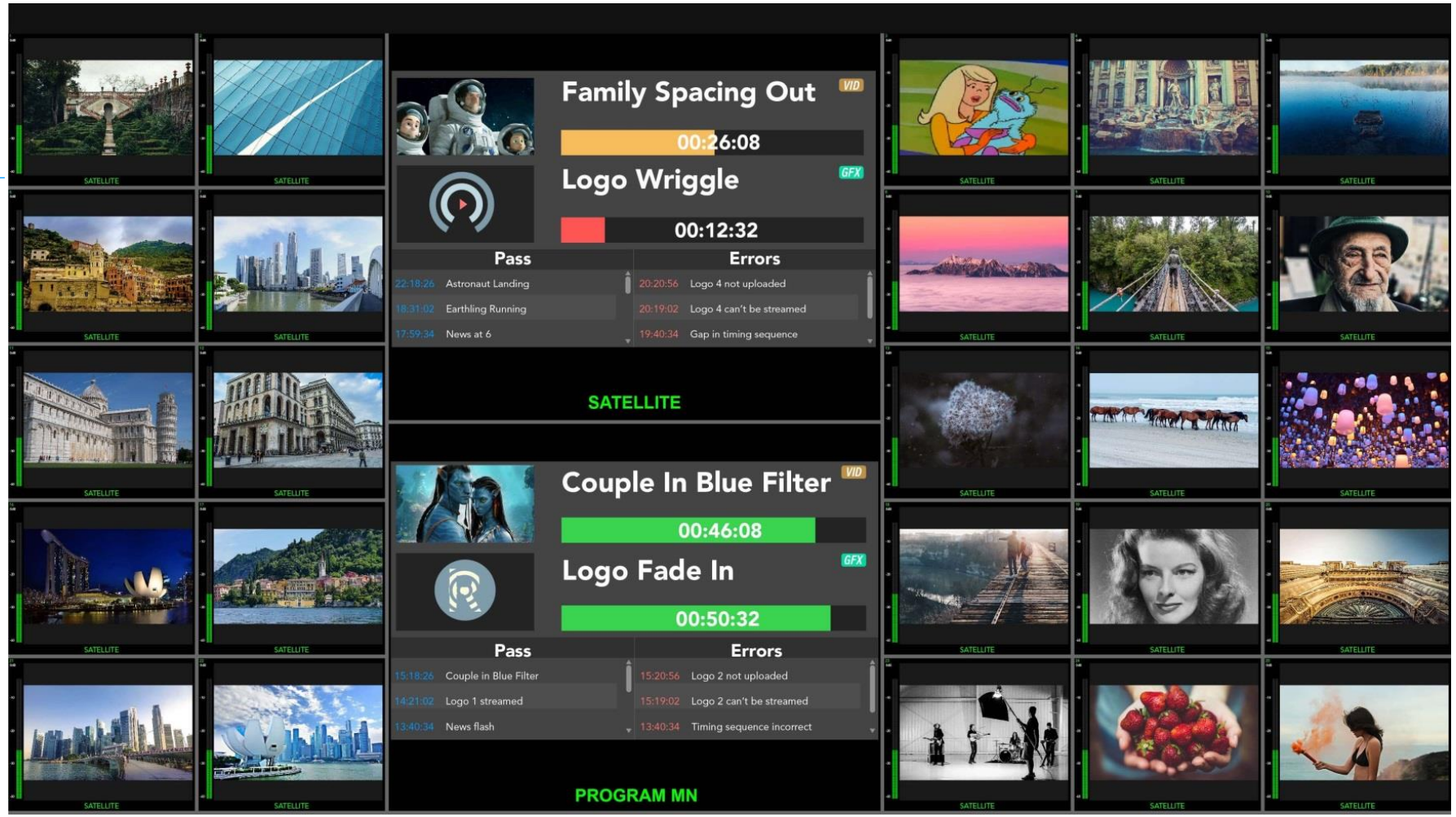
Multiviewer

Loudness Control



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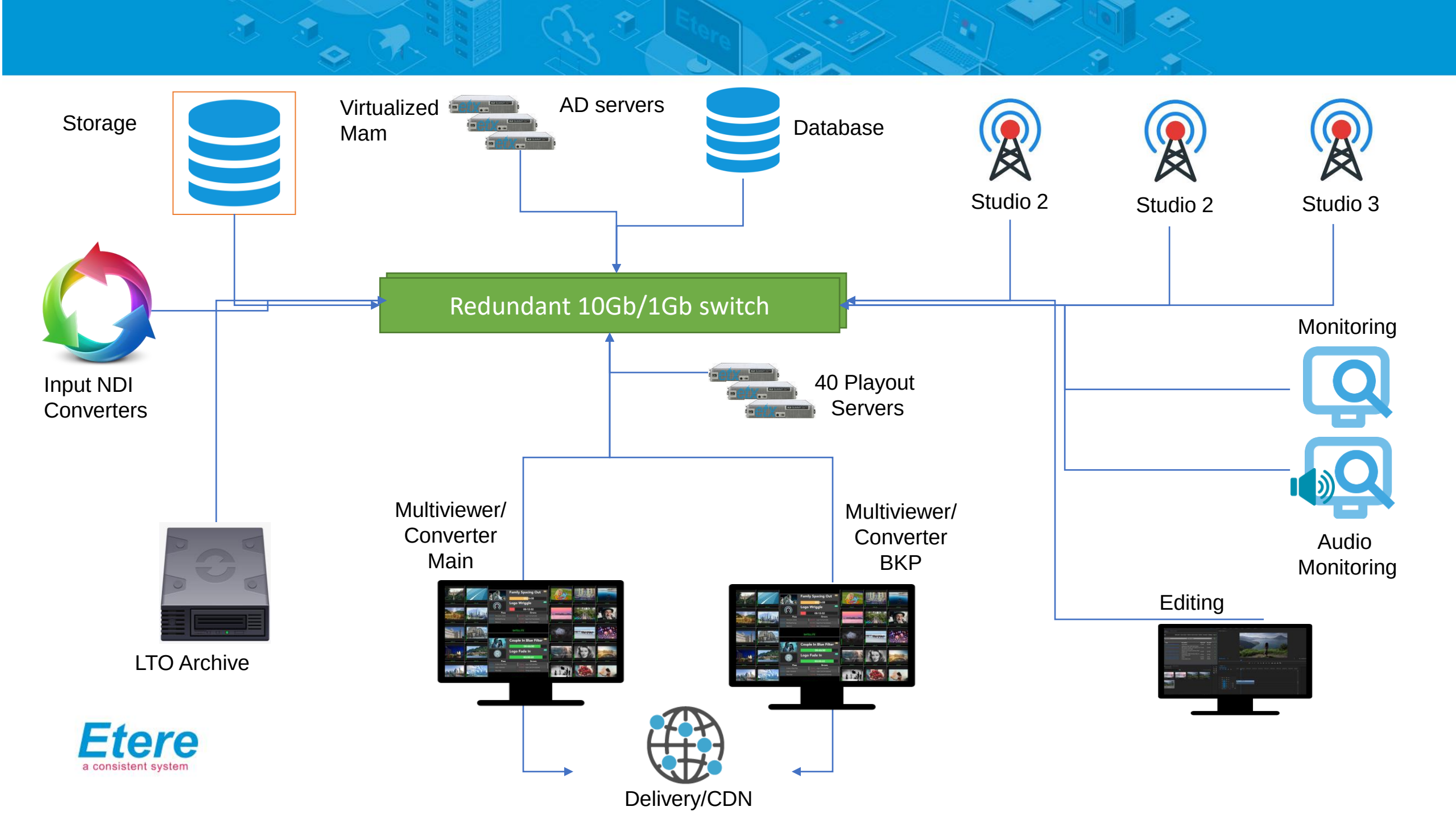
Storage
Virtualized Mam
AD servers
Database
Studio 2
Studio 2
Studio 3
Redundant 10Gb/1Gb switch
Input NDI Converters
40 Playout Servers
Monitoring
Audio Monitoring
Multiviewer/ Converter Main
Multiviewer/ Converter BKP
Editing
LTO Archive
Delivery/CDN
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NDI Audio Monitoring

- This software panel allows easy audio monitor
- Similar to existing hardware audio monitor
- Smaller footprint than traditional systems
- Preview window for an easy management
- Immediate switch between signals

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Small Problems Big problems

- When mondoTv was designed there were no NDI audio loudness processors
- To avoid an SDI or AES/EBU in/out the Loudness processor was integrated inside the playout system
- So every live and out were loudness normalized
- For a better audio design also the incoming files were normalized before playout if timing allows it

Mondo Tv summary

- Fully adapted NDI Master Control system
- Precise timing, seamless routing and monitoring
- Does not require any other IP protocols
- Greater cost savings
- Reliability
- Easy to expand/change

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Thank You

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