

Etere @ TV and Radio Fair

Kiev

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Agenda

- **About ETERE**
- **Moving from SDI to IP: A History**
- **Standards of SDI over IP**
- **World status of migration from SDI to IP**
- **Some case studies**
- **What is NDI**
- **Etere's vision of NDI**
- **Compare Etere with other solutions**
- **Sample system**

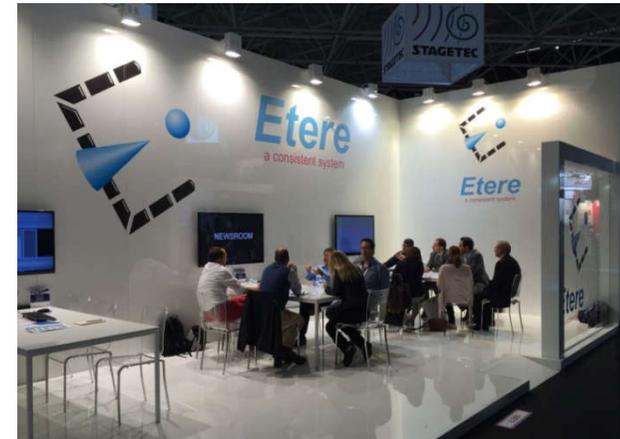
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Company profile

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Company Overview- History

- Established in 1987 (Italy)
- ERP software solutions for broadcast & media companies
- End-to-end modular solutions
- Headquarters in Singapore with multiple R&D centres worldwide
- Mark of Italian quality with its renowned expertise & experienced team



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Company Overview- Position

- Strong financial balance sheet
- Strong diverse portfolio with end-to-end solutions
- Strong network of distributors, resellers & partners from all around the world
- At the forefront of technology with forward-thinking solutions & upgrades

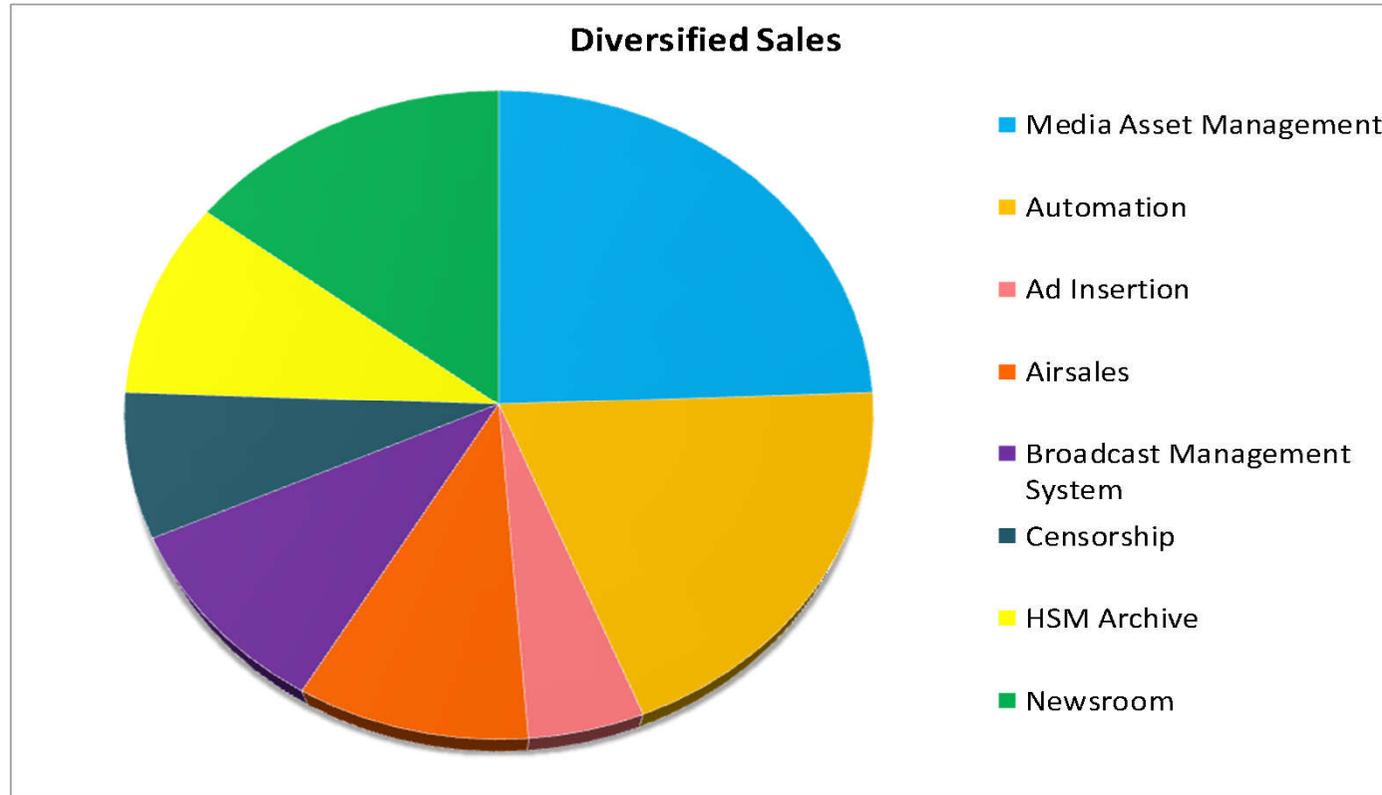


Company Overview- Strenghts

- Consistent leadership since 1987
- Strong core team of developers, engineers & support
- Market-proven solutions & worldwide customer base
- Trusted by many return customers worldwide
- Well positioned for growth and opportunities



Strong Diversified Portfolio



Etere MERP: Able to provide end-to-end solution to any company



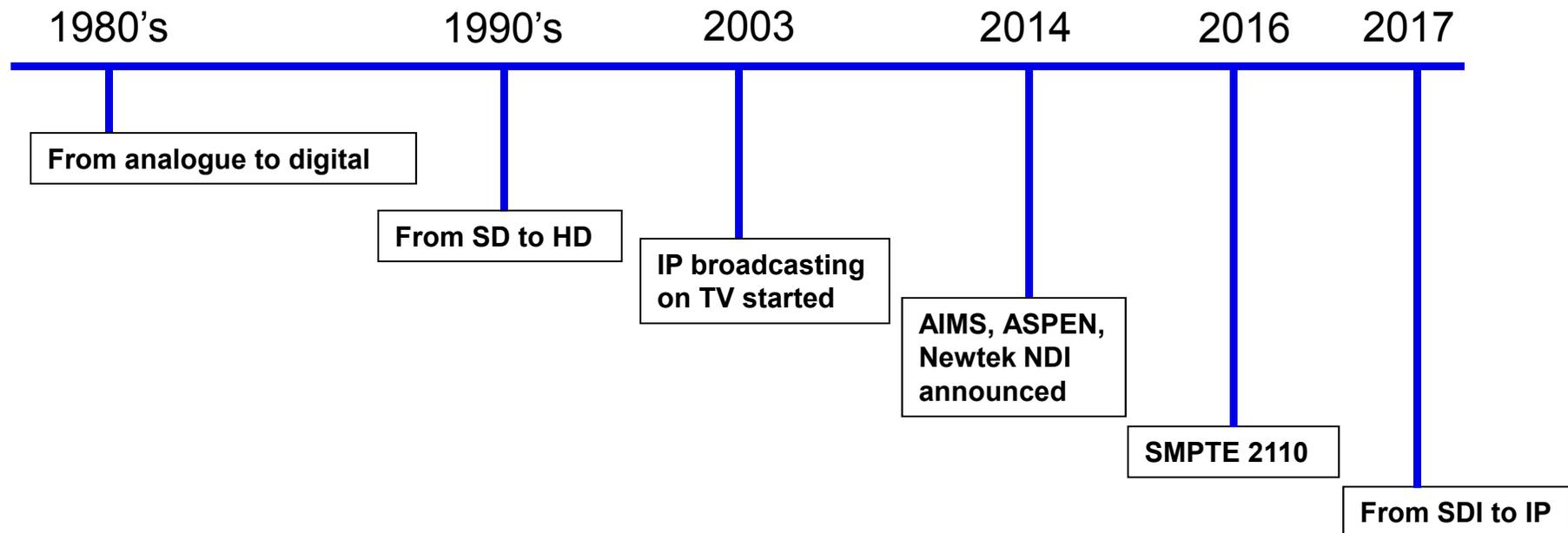
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SDI to IP History

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History of Transitions in Broadcasting

- 1980's: From analogue to digital
- 1990's: From SD to HD
- 2017: From SDI to IP



History of SDI to IP Broadcasting

- 1998: Video distribution for PC uses the Ethernet
- 2003: Ethernet is faster than SDI

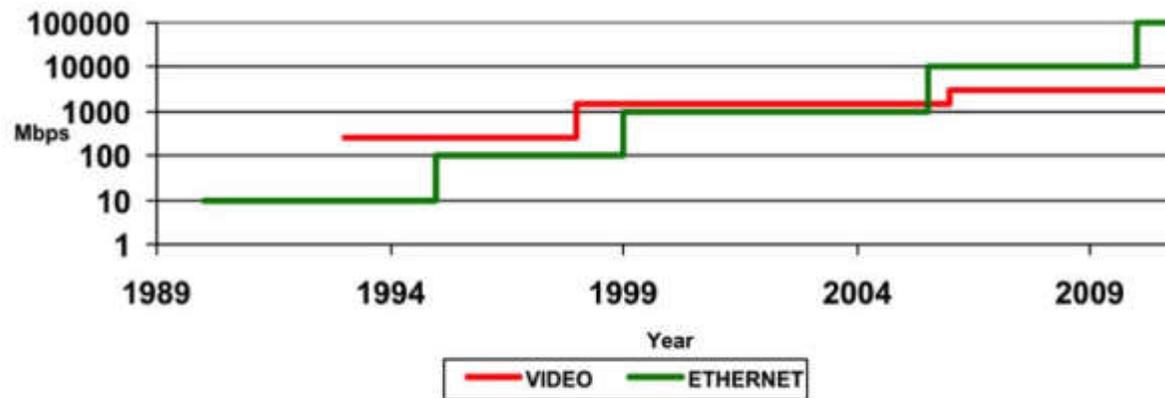


Figure 2: SDI vs. Ethernet link bandwidth over time

The Rise of IP

- **Lower costs and increasing capability and availability of commercial IT equipment**
- **10GbE IP switching, capable of transiting uncompressed HD baseband signals over IP at a reasonable cost**
- **IT-based workflow technologies and tools have matured and are now mainstream**



Challenges

- Industry standards
- Clear path to interoperability
- Router
- Inputs
- Outputs
- Costs
- Knowledge transfer
- Security
- Workflow
- Compression



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**Standards of
SDI over IP**

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IP Technologies of Today



- AIMS
- SMPTE 2022
- SMPTE 2110
- ASPEN
- SDN

BitRate on SDI

Name	Standard	Example Video Resolutions	Max Bitrate	Introduced
12G-SDI	SMPTE ST-2082	2160p60	12 Gbit/s	2015
6G-SDI	SMPTE ST-2081	2160p30	6 Gbit/s	2015
3G-SDI	SMPTE 424M	1080p60	2.970 Gbit/s	2006
Dual Link HD-SDI	SMPTE 372M	1080p60	2.970 Gbit/s	2002
HD-SDI	SMPTE 292M	720p, 1080i	1.485 Gbit/s	1998
ED-SDI	SMPTE 344M	480p, 576p	540 Mbit/s	–
SD-SDI	SMPTE 259M	480i, 576i	360 Mbit/s	1989

Alliance for IP Media Solutions (AIMS)

- Open-standards approach
- Based on the roadmap
- The goal of AIMS is to get support for SMPTE 2110
- **CONS**
 - Based on promotion for the VSF TR03 and TR04 protocols
 - Requires two 10 Gigabit videos, high bandwidth, over 10 Gigabit Ethernet
 - Used by selected customers



SMPTE 2022

- Standard from the Society of Motion Picture and Television Engineers (SMPTE)
- First introduced in 2007
- A group of standards that specifies the wrappings of professional video into IP
- Can be used both for multiplexed signals (e.g. multiple video and audio) and individual video signals
- **CONS**
 - It requires a special hardware, not a standard NIC
 - It requires a custom Ethernet switch with a custom SFN software
 - It requires a 10G connection
 - Its implementation is very complex
 - Requires the SMPTE 2059 PTP (Precise Time Protocol)



SMPTE 2110

- While SMPTE2022 describes the use of streams as a group (Audio Video Metadata)
- SMP2110 manages each part as single entity, so each one can be routed differently
- **CONS**
 - It requires a specialized hardware, not a standard NIC
 - It requires a custom Ethernet switch with a custom SFN software
 - It requires a 10G connection
 - Its implementation is very complex
 - It cannot deal with video, audio and metadata independently
 - Requires the SMPTE 2059 PTP (Precise Time Protocol)
 - Its complexity is normally unnecessary to save 16% of bandwidth



Adaptive Sample Picture Encapsulation (ASPEN)

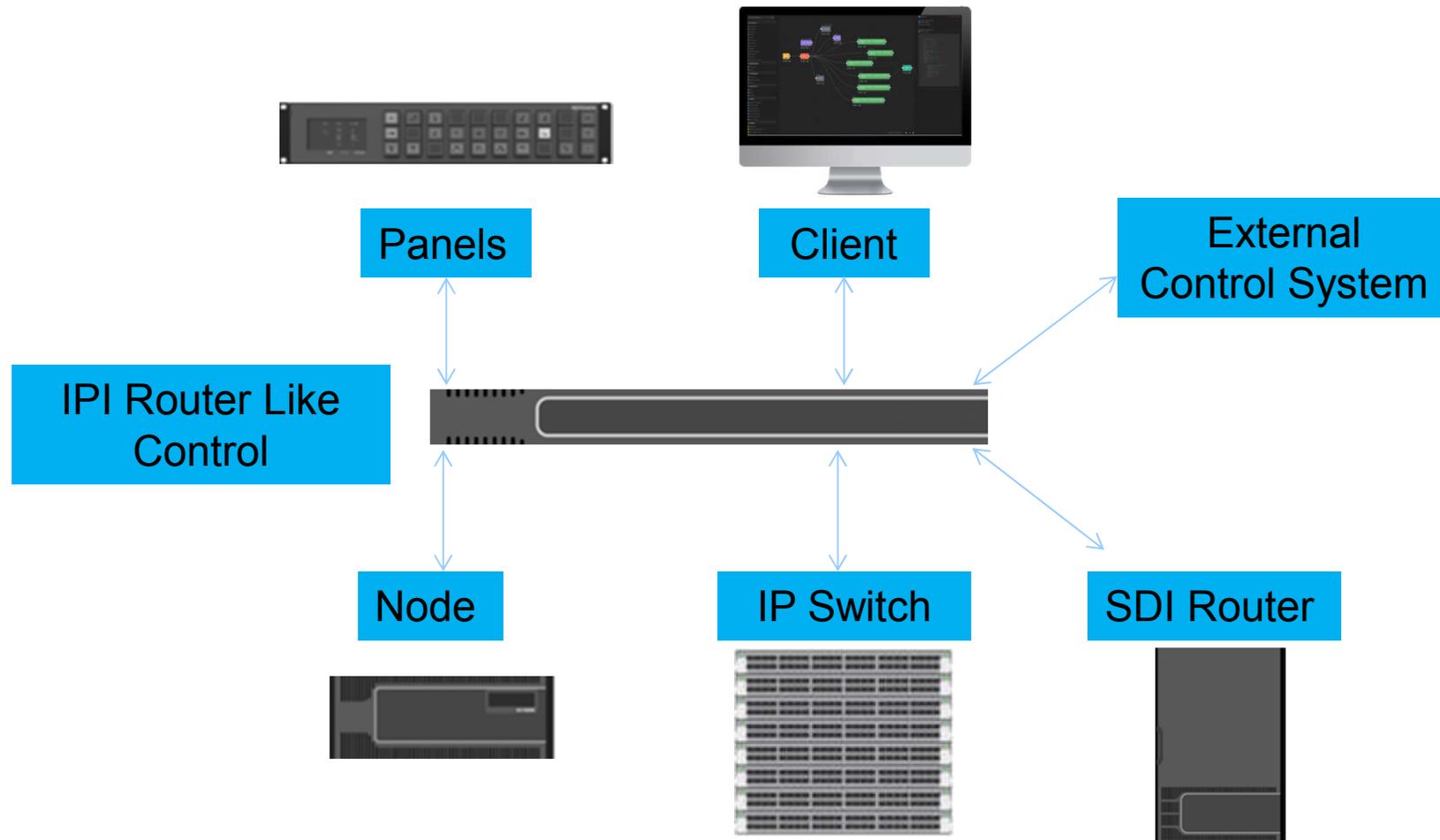
- Standards-based method for transport of video, audio and associated metadata over IP networks
- Uses the MPEG2-TS standards
- Delivery of video, audio, and metadata to the network using IETF-standardized RTP/UDP/IP
- **CONS**
 - ASPEN will no longer be marketed beyond the introduction of SMPTE ST 2110
 - Requires two 10 Gigabit videos, high bandwidth, over 10 Gigabit ethernet



Software-Defined Networking (SDN)

- All SDI over IP (except NDI) use SDN
- SDN emulate a video router on IP interface
- SDN comprised of multiple kinds of network technologies with a central control develop for TELCO use
- Even if SDN is a standard, every vendor has their own design, so as of today you cannot integrate different vendor devices as is common in SDI
- **CONS**
 - Not standardized for every vendors
 - Unnecessary complexity to deliver a TCP/IP packet

Software-Defined Networking (SDN)



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Transition Paths

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Migrate

- **Replace SDI infrastructures with high-bandwidth, standards-based hardware and networking for uncompressed video transport that mimics SDI**
- **Requires commitment to a set of SDI over IP standards, thus choosing sides and investing in it**
- **Costly to replace**
- **Requires high speed ethernet**

Hybrid

- **SDI-IP System**
- **Support AIMS or ASPEN**
- **Requires commitment to a set of SDI over IP standards, thus choosing sides and investing in it**
- **Handles compressed & uncompressed video**
- **Requires high speed ethernet**
- **Purchase of hybrid hardware needed**
- **Costly to replace**

Interconnect-Newtek NDI

- **Connecting any NDI-enabled device to a GigE switch turns a LAN into a live production network**
- **Does not disrupt baseband operations**
- **Flexibility to choose the equipment and format**
- **Can use existing equipment and devices**
- **Does not require high-speed ethernet**

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**World status of
migration from
SDI to IP**

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Global Status of Migration from SDI to IP

- **60% of media companies have already taken steps towards IP (sample system)**
- **15% move on IP on some critical Business**
 - **10% of them use NDI**
- **80% of media companies are waiting because the move requires a very high investment and there is no clear idea of standards**
- **Many vendors are pushing for migration, but with a very low result worldwide**

Global Status of Migration from SDI to IP

- Hundreds of companies adopting and integrating Newtek NDI
- NDI has quickly become the most prolific IP-based workflow in the industry
- NDI-enabled systems, devices and applications are currently in the hands of millions of customers worldwide

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Case Studies of Migration

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ESPN

- Uses IP at the core of facility since 2014
- Built Digital Centre 2 in Bristol using JPEG2000 compression and MPEG2 transport stream
- ESPN's solution is a mix of technologies: IP networking, JPEG 2000 (J2K) compression and MPEG transport streams



ESPN



- However, it uses SDI-based switching
- A/B video switching was not possible
- SDI-based/switching and routing handle individual uncompressed video streams that are frame-synchronized to each other
- Video-over-IP signals are packet-based, with many streams in a pipeline, not real-time
- Hybrid network: ESPN designed a parallel IP and SDI infrastructure to deal with the situation

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What is NDI

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Why Move to IP Now?

- Transition to IP does not mean higher costs; it can provide greater value as a smart investment
- IP migration is increasingly a reality
- Meet future demands and expand monetization opportunities
- SMPTE 2022, SMPTE 2010, Aspen & AIMS are too FAR away to be a standard
- So the idea is to create a more cost efficient and more effective IP solution for Production/Playout/Media Asset Management
- Leverage the advantages of IP, lower your operating & maintenance costs NOW

History of Newtek NDI

- **2015:** NewTek announced the Network Device Interface (NDI®) protocol which allows applications and devices to transport high quality, low latency video over gigabit Ethernet networks
- **2016:** NDI was available
- **2017:** version 3 of the protocol was released, with multicast support & a high efficiency mode, NDI-HX

Newtek NDI

- **PROS**

- Unlike other professional IP Video protocols which require 10 Gigabit networks, NDI is designed to run over existing 1 Gigabit networks allowing easy adoption of the protocol without new infrastructure
- Uses standard network switches
- It has a very low CPU impact
- Intra frame compression low latency
- Available for Production and Transmission
- More than 100 companies produce NDI devices/software
- Royalty-free

- **CONS**

- Uses compressed video



Bandwidth Difference

Format	SMPTE 2022-6	SMPTE 2110	NDI
2160P	12282	10279	250
1080p	3070	2570	125
1080i	1535	1285	100
720p	1535	1142	90

NDI: A technology that is available NOW, saving money on investments

What can NDI do

- **Minimizes network component costs**
- **Simplifies IT configuration, prevents common IP configuration issues**
- **Enables low-latency, multi-channel frame-accurate video streams, with alpha channel**
- **Eliminates concerns about the limited number of physical inputs on a switcher when an additional live video source is needed—just plug into a network connection on the LAN**

Challenges Using NDI

- It is a SDI over IP so most of the tools you know and implemented do not work
- Whatever you know about SDI video is not useful anymore
- Requires knowledge of IP protocols and configuration
- Network and cabling issues



SDN and SDI and NDI

	SDI	SDN	NDI
Hardware-independent	No	No	YES
No need for cables or accessories	No	No	YES
Manage more than one source for live production switching without having to connect to new devices, to build new infrastructure or to move	No	No	YES
Scale without dependency on vendor	No	No	YES
Server Virtualization	No	No	YES
Programmable networks	No	YES	YES
Centralized control via software	No	YES	YES

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Etere's Vision of NDI

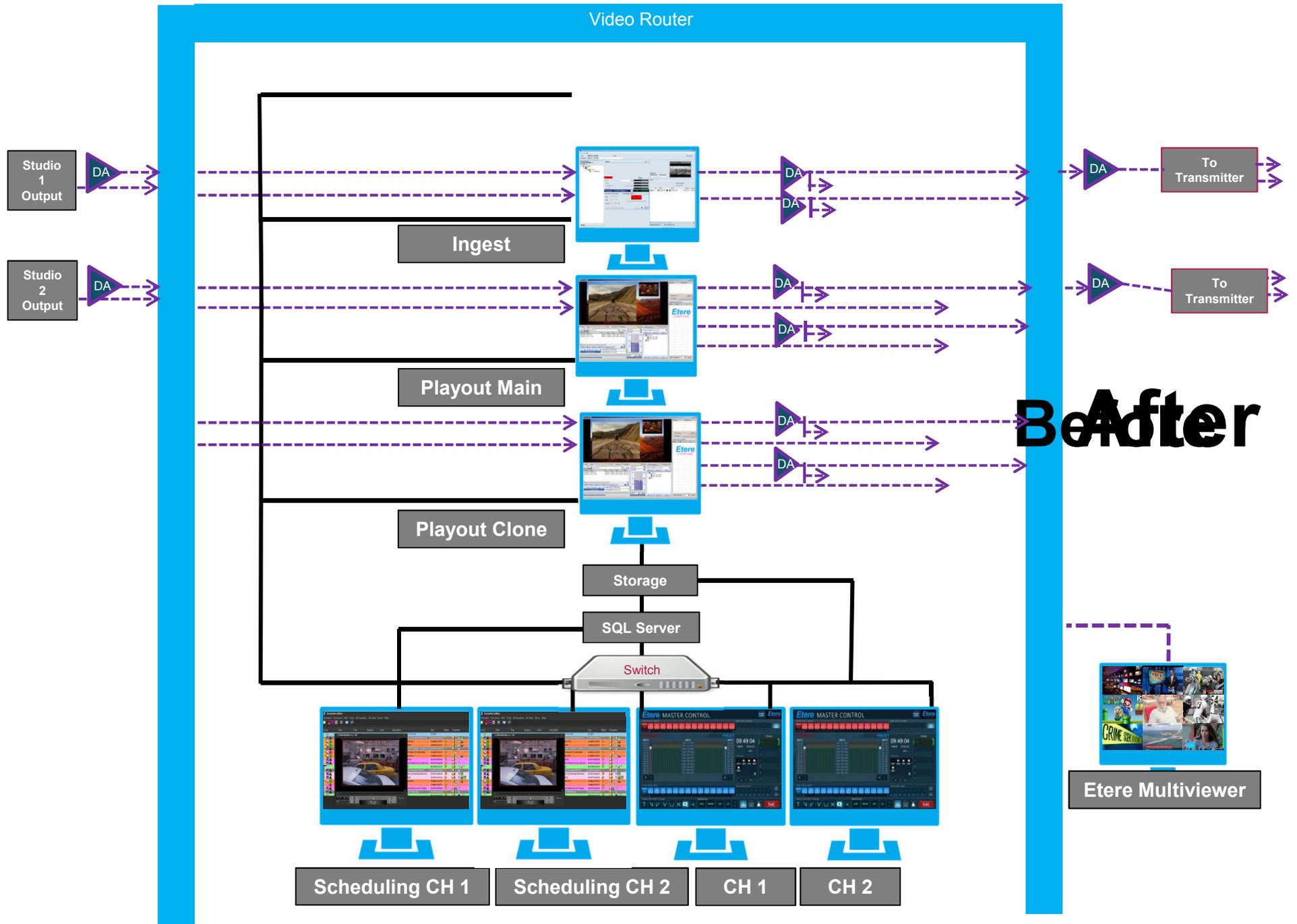
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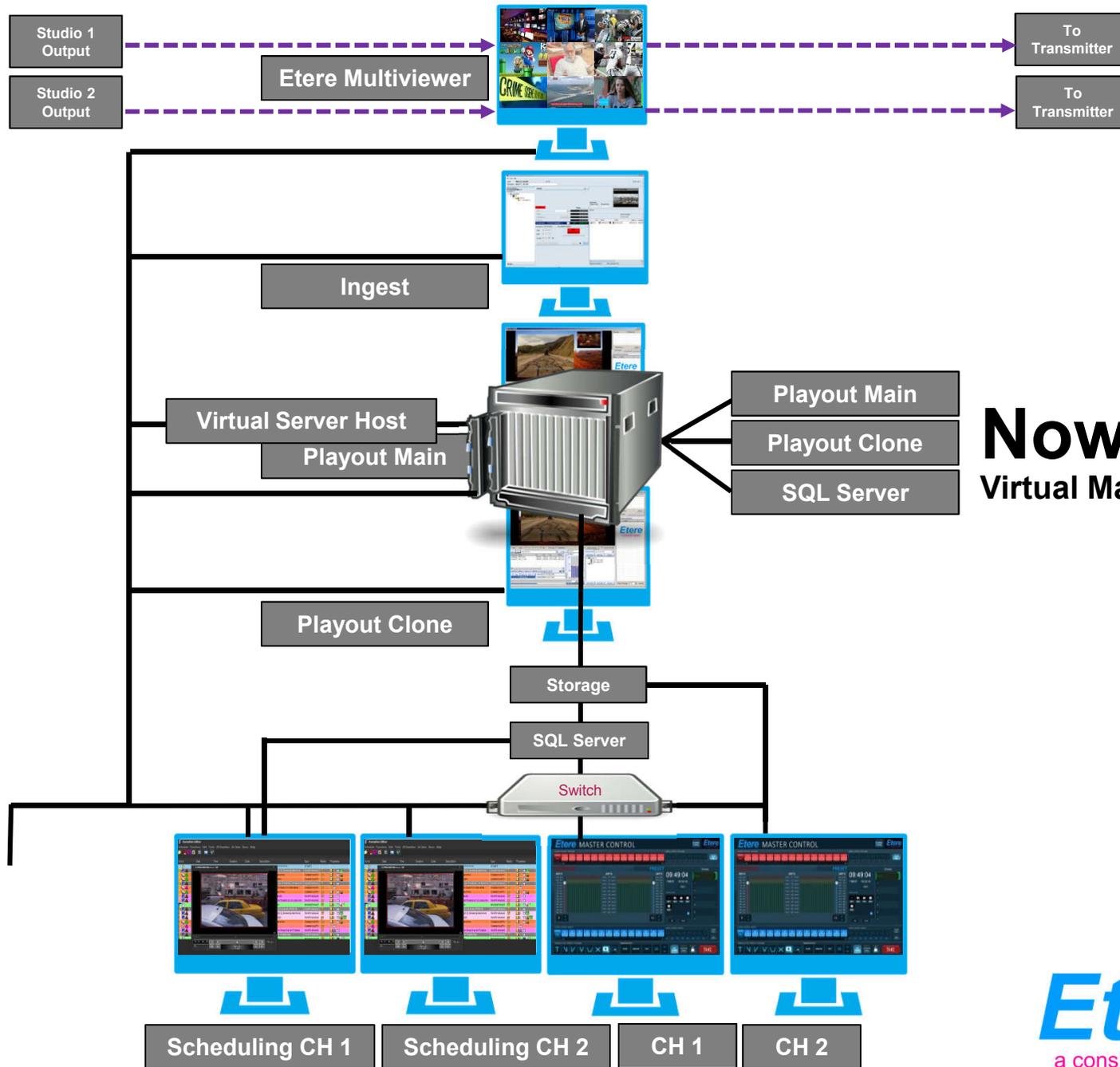
Complete Product range

Etere implements NDI in one software that manages MAM, ingest, playout, graphics & newsroom.

Virtual Machines support, IP Multiviewer inclusive!

- **Etere MAM:** Complete workflow orchestration of ingest, index, storage and retrieval of digital assets
- **Etere ETX:** Complete channel-in-a-box
- **Etere ETX-G:** Live graphics, graphics MAM
- **Etere Master Control:** Master Control in a software
- **Etere ETX-M Multiviewer:** Up to 9 monitors & 30 sources
- **Etere Nunzio:** Multi-channel MOS-complaint newsroom





Now
Virtual Machines

Etere is VM Compatible

- Uses Virtual Machines (VM) for any scope
- Only Multiviewer requires the SDI cards
- Virtual environment to manage your Media Asset Management, Ingest, Transcoding and Playout
- Cost savings of more than 50% in hardware & maintenance



Benefits of Etere IP solution

Automatic switching with DHCP	High quality and frame-accurate video streams
Low bandwidth consumption and CPU impact	Manages SD/HD/4K signals
Requires only standard Gigabit cables	Encodes, transmits, receives multiple streams
Requires only standard GigE networks	Virtual Machines: Multiple OS Environments
Supports live broadcast	Fully scalable and flexible
With failover & automatic re-connections	Open to future standards
ETX-M IP Multiviewer inclusive	No distribution amps, video matrix routers
Reduces operating costs and deployment time	Etere Legacy Converter inclusive
Does not need new infrastructure or investments	Manages 9 monitors & 30 sources simultaneously
Upgrades without change in system or location	SD, HD and 4K video, audio and metadata

Etere ETX-M IP Multiviewer

Manages	Benefits
Up to 9 monitors and 30 sources simultaneously	<ul style="list-style-type: none">• Centralized management,• Alert notification of all video and audio errors• Prompt problem management 
Mixed signal types of IP transmission	
Video and audio errors (Detects & notifies)	
Loudness control	
Time zones	
Conversion of SDI or IP streams to NDI IP data	
Easy management especially in live broadcast	

Etere ETX-M IP Multiviewer



A Complete IP System

Features	Benefits
Use of Virtual Machines	<ul style="list-style-type: none">• Multiple OS environments• Easy maintenance, application provisioning, availability and convenient recovery
Integrative and connected framework	<ul style="list-style-type: none">• Seamless and end-to-end management of Ingest, MAM, Transcoding, Quality Control, Newsroom, Playout, Graphics, Multiviewer and Closed Caption
Multiviewer	<ul style="list-style-type: none">• Real-time management of multiple network inputs, live video sources and simultaneous broadcast
Legacy Converter	<ul style="list-style-type: none">• Converts SDI in and SDI out in with very low CPU impact

Transition to Etere IP

- **A smart investment: Provides better value**
- **Customized workflows that are designed to perfectly fit the needs of the company**
- **Independent of updates/upgrades from hardware manufacturers**
- **Up to 50% in cost savings**
- **Low CPU impact regardless of video streams**
- **Fast and easy software-based upgrade**
- **Manages your end-to-end workflows from a single interface**

Other IP Systems

Comparison

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Comparison

	Etere IP Solution	Marsis Payout	Digital Video Play	Pixel Power StreamMaster	Tricube Playcube
Character Generator	YES	YES	YES	YES	YES
Supports Live Inputs	YES	YES	YES	YES	No
4K	YES	YES	YES	YES	YES
MAM Integration	YES	YES	YES	No	YES
Broadcast Master Switcher	YES	YES	No	YES	No
HTML5 Graphics	YES	No	No	No	No
Supports Virtual Machines	YES	No	No	YES	No
Backup and Cloning	YES	No	No	No	No
IP Multiviewer	YES	No	No	No	No
File based Quality Control	YES	No	No	No	No

One Sample System

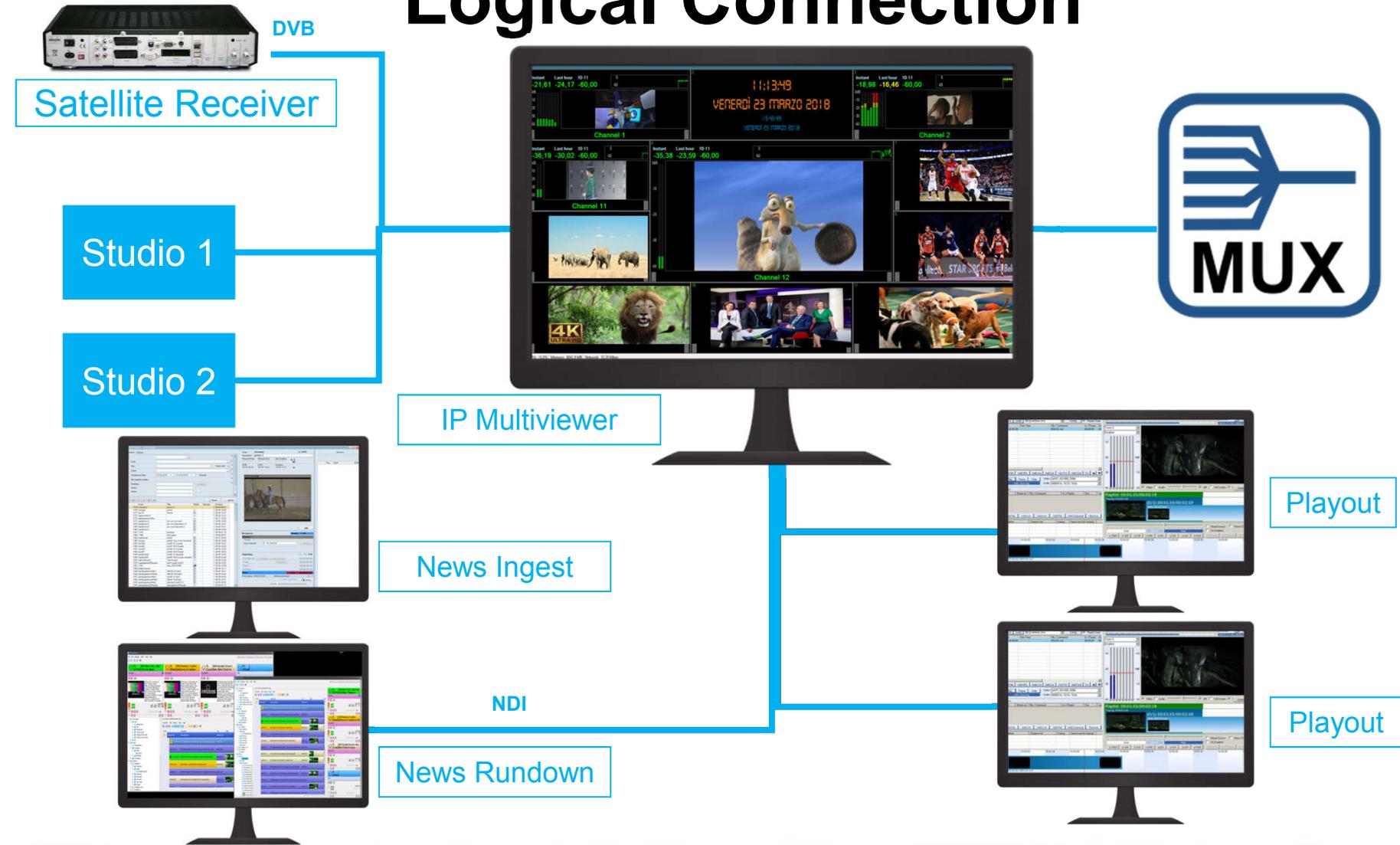
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Sample Project

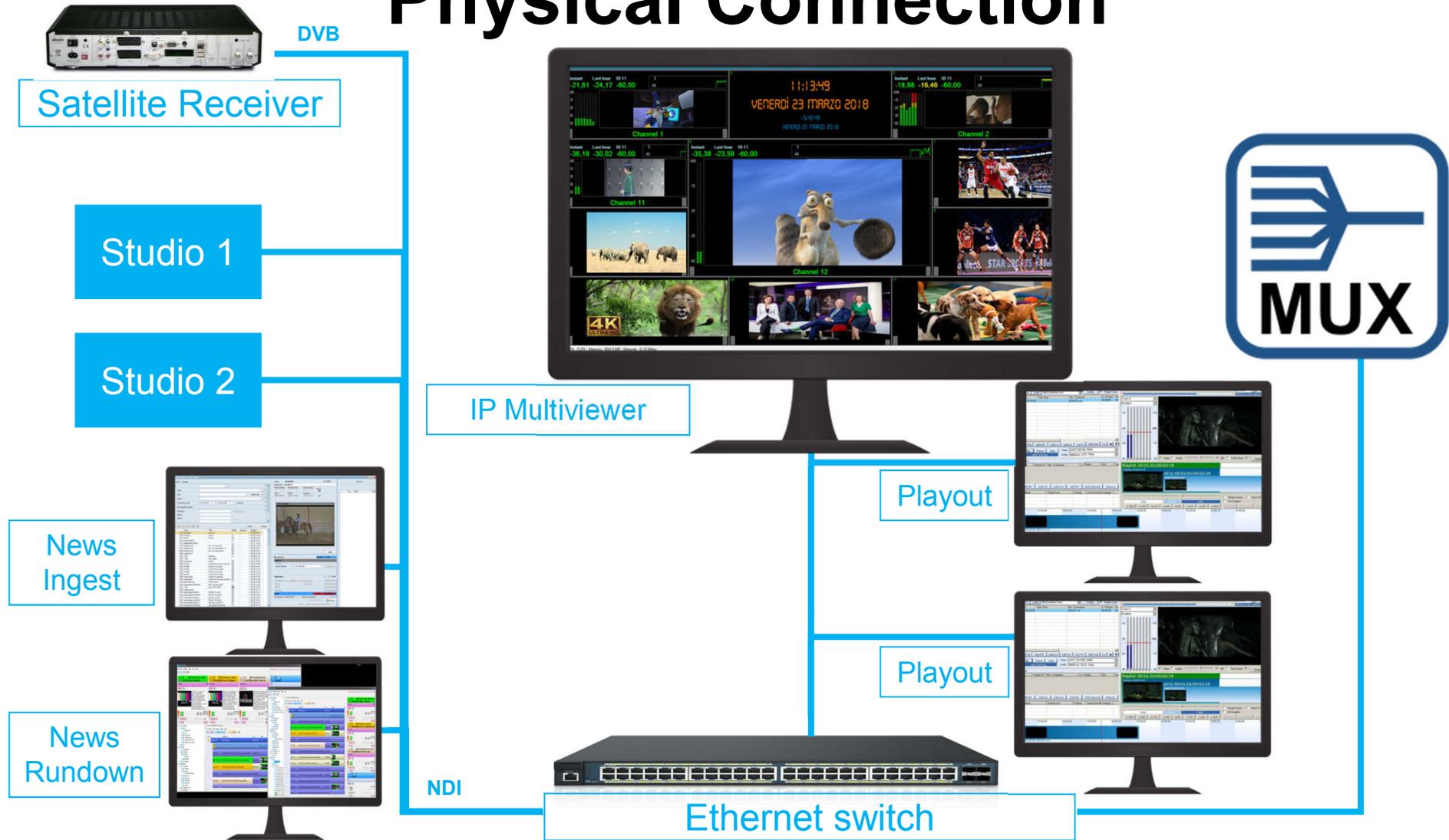
- **2 channels playout (redundant)**
- **Newsroom system**
- **Newsroom playout**
- **2 studios**
- **File based ingest**
- **Editing**
- **File based QC**
- **Satellite Feed**



Logical Connection



Physical Connection



Questions?

The image features a large, stylized graphic composed of two overlapping triangles. The left triangle is red and contains a white line graph with an upward-pointing arrow and several data points. The right triangle is blue and contains a blurred image of a modern office interior with desks and chairs. In the bottom left corner, the word "Etere" is written in a bold, blue, sans-serif font, with the tagline "a consistent system" in a smaller, pink, sans-serif font directly below it.

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www.etere.com

Thank You

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