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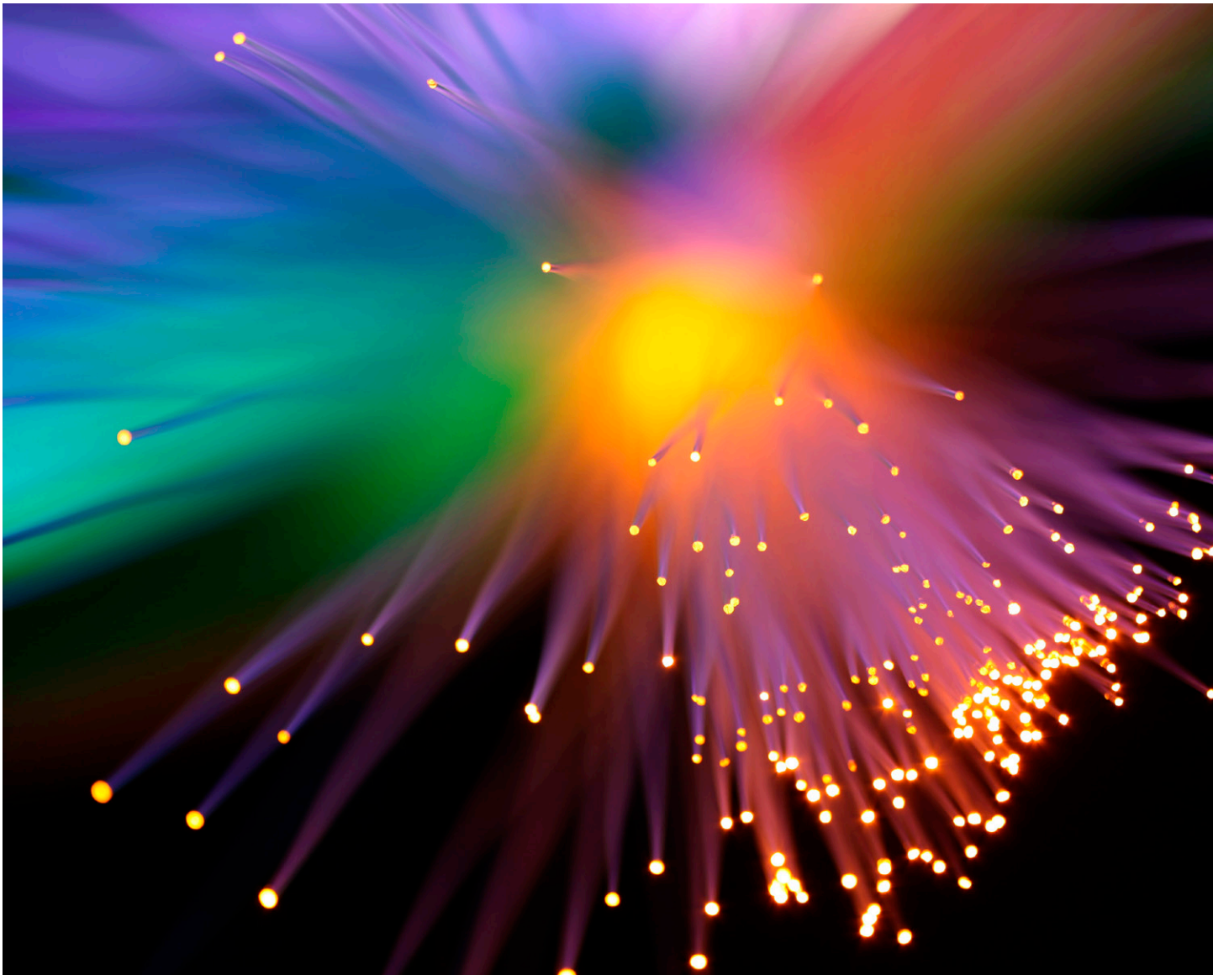
4K UHD/HDR IP Case Studies



OB Van — Tencent Video Full IP 4K UHD OB Van

Background

Tencent Video's all-IP 4K UHD OB van is Asia's first true all-IP architecture 4K UHD OB van. The system framework was designed in June 2016. At the end of December of the same year, the main equipment of the system was built into the EFP system in advance, and it was put into production on-site. The vehicle was officially delivered in March 2017 and officially put into use. It has been used to produce and broadcast live on several large-scale seasonal variety shows. At the end of 2017, the entire vehicle was expanded and rebuilt, and the project completed in early 2018.

At present, it has become Tencent's most important flagship OB van system, and is used for the production and broadcast of video major programs.

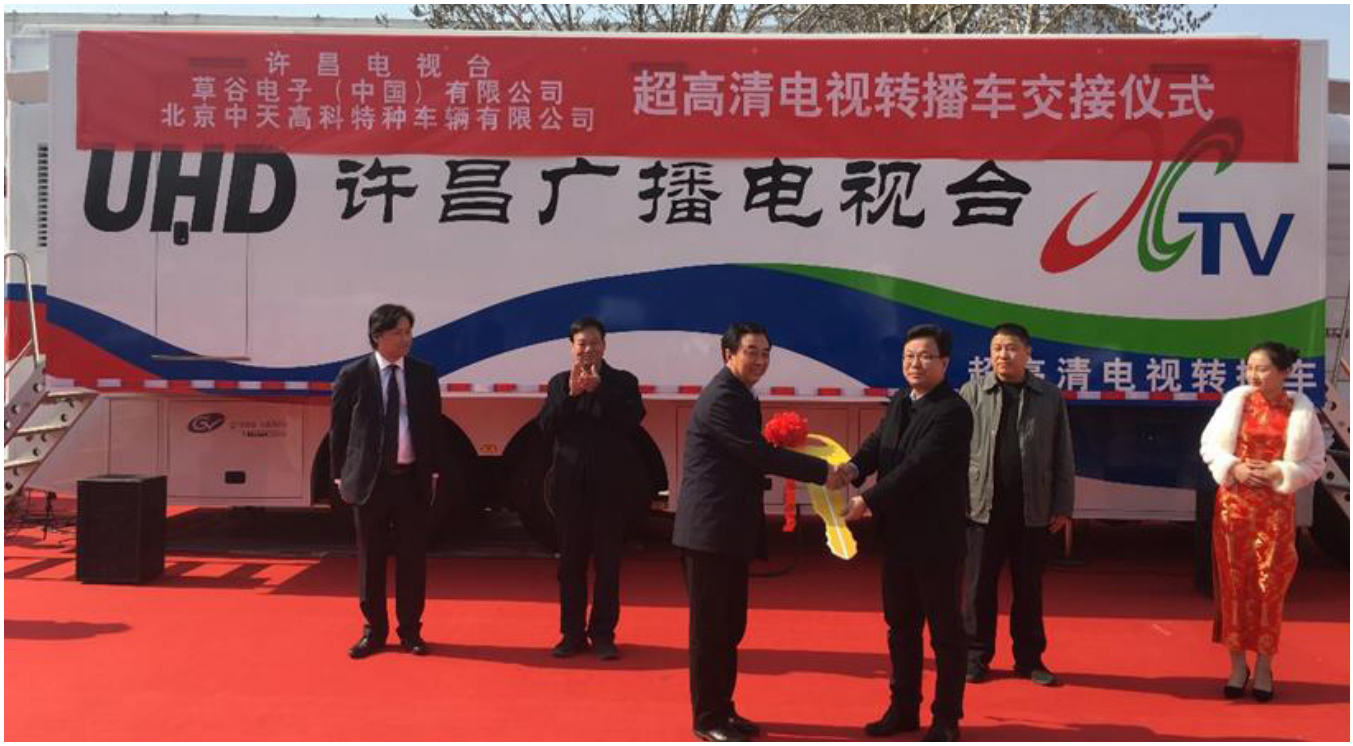
Technical Specifications

IP Core	Camera	Vision Mixer	Routing & MV	SDN Control	IP Standard
2x CISCO N9K-C9236C	20x LDX 86^{N}	1x GV K-Frame X 5 M/E All IP /O	2x GV Node	2x GV Convergent	SMPTE ST 2022-6
2x DCNM X-Y Model	20x UXF	1x Kayenne	14x XIO-4901		SMPTE ST 2022-7
		1x GV Korona	6x KMX-4911		TICO
			8x KMX-4921		

OB Van — Xuchang TVS 4K UHD IP OB Van

Background

The Xuchang TV 4K UHD IP OB van is the first HD TV OB van designed and built on an all-IP architecture for a China prefecture-level TV station. Due to the use of IP technology, the system is format-independent and is fully compatible with HD and 4K UHD. The overall 4K-ready system supports the temporary or permanent upgrade of the van using Grass Valley's unique short-term or long-term eLicense technology. The overall upgrade to 4K UHD comes without increasing the hardware cost and without changing the system structure. The system was officially delivered in March 2018.



Technical Specifications

IP Core	Camera	Vision Mixer	Routing & MV	SDN Control	IP Standard
N/A	8x LDX 86^{N} WorldCam	1x K-Frame S-series (Compact) 2 M/E	1x GV Node	NV920D	SMPTE ST 2022-6
	12x UXF	1x GV Korona	3x XIO-4901		TICO
			3x KMX-4921		

OB Van — Jinan TVS 4K UHD HDR IP OB Van

Background

The Jinan TV 4K UHD HDR IP OB van is the first 4K UHD TV OB truck designed and built on an all-IP architecture in the provincial capital city TV station in China. The entire system supports native 4K UHD HDR (HLG/PQ) production and broadcast.

The system was officially delivered in April 2018 and received for test by the State Administration of Radio and Television.

Technical Specifications

IP Core	Camera	Vision Mixer	Routing & MV	SDN Control	IP Standard
2x CISCO N9K-C93180	8x LDX 86^{N}	1x K-Frame S-series (Compact) 2 M/E	1x GV Node	2x GV Convergent	SMPTE ST 2022-6
2x DCNM X-Y Model	8x UXF	1x Kayenne	4x XIO-4901		SMPTE ST 2022-7
		1x GV Korona	5x KMX-4921		TICO

OB Van — SMG Full IP 4K UHD OB Platform

Background

The SMG All-IP 4K Ultra HD Broadcast Cluster Platform consists of a 32-channel OB van and a 28-channel EFP box system. The entire system is based on an IP data center architecture and fully supports 4K UHD, HDR and WCG technology standards. The two subsystems can work independently or cascaded through an IP data center, extending the scale to 60 4K Ultra HD channels. It meets the highest requirements of the international S-class broadcast production line and is now the SMG flagship broadcast platform. In the future, it will see platform operation and modular splicing. By interconnecting with the entire network and the internet, it will change the island-based production mode and realize the growth of the 4K UHD HDR format, becoming a service-oriented technical service provider.

The system was officially delivered in June 2018. Appraised by the expert group of the State Administration of Radio, Film and Television. The system is technically at the international advanced level.

32-Channel OB Truck

IP Core	Camera	Vision Mixer	Routing & MV	SDN Control	IP Standard
6x CISCO N9K-C9272Q	32x LDX 86^{N}	1x GV K-Frame X 9 M/E All IP I/O	7x GV Node	2x GV Convergent	SMPTE ST 2022-6 SMPTE ST 2022-7 SMPTE ST 2110
2x DCNM Spine-Leaf	32x UXF	1x Kayenne	24x XIO-4901		TICO/ AES67
		1x GV Korona	23x KMX-4921		TR-04/TR-03

28-Channel EFP

IP Core	Camera	Vision Mixer	Routing & MV	SDN Control	IP Standard
2x CISCO N9K-C9272Q	28x LDX 86^{N}	1x GV K-Frame X 3 M/E All IP I/O	3x GV Node	2x GV Convergent	SMPTE ST 2022-6 SMPTE ST 2022-7 SMPTE ST 2110
2x DCNM X-Y Model	28x UXF	1x Kayenne	18x XIO-4901		TICO/ AES67
		1x GV Korona	14x KMX-4921		TR-04/TR-03

Studio — GRT HD/4K UHD Studio Group

Background

The Guangdong Broadcasting and Television Station HD/4K UHD Variety Broadcasting Group is the first studio designed and built by China's provincial TV stations based on the all-IP architecture. The system framework was designed at the end of 2015. After a long-term technical investigation and demonstration, the first phase of the project completed the 600 studio section in early 2017. After a long-term trial run, the system was officially delivered in August 2017 and was put into production for HD/4K UHD programs.

In order to meet the requirements of Guangdong TV Station for 4K UHD broadcast, the system was expanded in two phases in October 2017. Due to the IP architecture, the system is format-independent and is fully compatible with HD and 4K UHD. At the same time, the IP system can rapidly expand the HD/4K UHD channel, picture points, switcher and other system resources without affecting daily production requirements, so as to adapt to future unknown needs. Based on this, the system successfully supported the launch of the 4K UHD channel of Guangdong TV Station at the end of 2017.

Recently, the studio group underwent an in-depth transformation and integration of the second phase of the system. Additional studios such as 300 and 400 are included in the cluster, and a remote field production system is built on the basis of the IP framework. The goal was for cross-distance, cross-space production collaboration between remote and field directors and studio directors and central room equipment.

Technical Specifications

IP Core	Camera	Vision Mixer	Routing & MV	SDN Control	IP Standard
2x CISCO N9K-C9236C	5x LDX 80	2x K-Frame S-series (Compact) 2 M/E	2x GV Node	2x GV Convergent	SMPTE ST 2022-6
2x DCNM X-Y Model	3x LDX 86	1x K-Frame X 2 M/E All IP I/O	6x XIO-4901		SMPTE ST 2022-7
2x CISCO N9K-C92160	10x LDX 86^{N}	3x Kayenne	6x KMX-4911		TICO
Remote Production	8x XCU-IP	1x GV Korona	9x KMX-4921		
	10x UXF				

Studio — Shandong TVS Media Center IP Studio

Background

The IP studio cluster of the Shandong Media and Television Media Center is a studio infrastructure system based on IP data center technology design. The IP studio system cluster breaks the concept of studio cluster construction based on traditional baseband technology. It is no longer a single repetitive studio system overlay, but a comprehensive system, to achieve hardware resource sharing, signal content resource sharing, and ensure users can maximize the production capacity of the entire media center.

The project was completed and officially put into use on August 22, 2017. Currently participating in the production of the media outlets are: Shandong Wei Video Road “News Network” and “Good Morning Shandong,” Shandong Public Channel “News Shuttle Bus,” “Government Face to Face,” “Night News,” “Lightning Field” and “People’s Live Through Train;” Shandong Qilu Channel “Lahu,” “Five Differences,” “Xiaoxi Service” and “Daily News;” Shandong Sports Channel “Lightning Sports” and relayed Premier League, La Liga, football, billiards and table tennis and other related events. The new architecture of the media system platform has been well received by all production groups.

The IP Media Studio of Media Center has been in good condition since the official production of the program in August 2017. The system is stable and reliable.

Technical Specifications

IP Core	Camera	Vision Mixer	Routing & MV	SDN Control	IP Standard
2x Huawei CE8860-4C-EI X-Y Model	19x HD	1x K-Frame S-series 6 M/E	2x GV Node	NV920D	SMPTE ST 2022-6
		1x K-Frame S-series (Compact) 3 M/E	22x XIO-4901		SMPTE ST 2022-7
		3x Kayenne	10x KMX-4911		TICO Option
		1x GV Korona			

Studio — CCTV E16 4K UHD IP Studio

Background

The E16 studio in the Guanghua Road office area of the Central Broadcasting and Television Station is located on the 49th floor of the main building and is an aerial landscape studio. As the first full 4K Ultra HD studio, the latest 4K Ultra HD video technology and surround sound audio technology are adopted in the design. Taking into account the combination of advanced technology and system security, the production control room and the sound control room are fully equipped. Surround sound monitoring environment greatly facilitates the production of surround sound programs.

The E16 studio video system uses an all-IP dual-link architecture and a redundant backup mechanism for dual data cores. The video signal uses 4K UHD TICO-compressed signals and follows the unified 4K UHD HDR signal standard (3840x2160/50p, HLG/1000nit, BT.2020), monitoring uses the 1080/50p signal format. All signal sources and scheduling signals in the system are dual-link, which is inline with SMPTE ST 2022-7 signal level backup. The system is equipped with four cameras, six external signals, two channel file playback server, 4 channels of wonderful editing (configuration 2 in 2 out), 2 sets of online packaging system (supporting dual windows) and two-channel recording server. The signal switching and scheduling system is equipped with an all-IP 4K switcher and an active/standby data exchange core. It has a complete IP security mechanism while meeting the 4K Ultra HD event broadcast requirements.

The first 4K Ultra HD studio of the Central Radio and Television General Station was officially put into use on October 1st, and the 2018 China Tennis Open was broadcast live on the first day of the National Day. Sports fans from all over the country enjoyed the CCTV 4K Ultra HD channel. More delicate images, brighter colors, richer levels of tennis.

Technical Specifications

IP Core	Camera	Vision Mixer	Routing & MV	SDN Control	IP Standard
2x CISCO N9K-C9236C	4x LDX 86^{N}	1x K-Frame S-series 5 M/E All IP I/O	2x GV Node	2x GV Convergent	SMPTE ST 2022-6
2x DCNM X-Y Model	4x UXF	1x Karrera	2x XIO-4901		SMPTE ST 2022-7
			20x KMX-4921		TICO

Master Control Room & Playout

Background

GRT News Studio Group

- 26x IPG-3901 – point-to-point transmission

Hunan TV Studio

- 6x IPG-3901 connected via 2x Huawei IP switches over distance of 10 km, with GV Convergent control

GZTV News Studio Group

- 5x IPG-3901 connected via 1x CISCO IP switch, with GV Convergent control

Heilongjiang TV Master Control Room

- IQUCP25

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