Delivery of STLTP seamlessly over multiple Links

Adi Rozenberg

CTO and Co-founder

VideoFlow

Adi.Rozenberg@video-flow.com

VideoFlow

VSF
VIDEO SERVICES FORUM

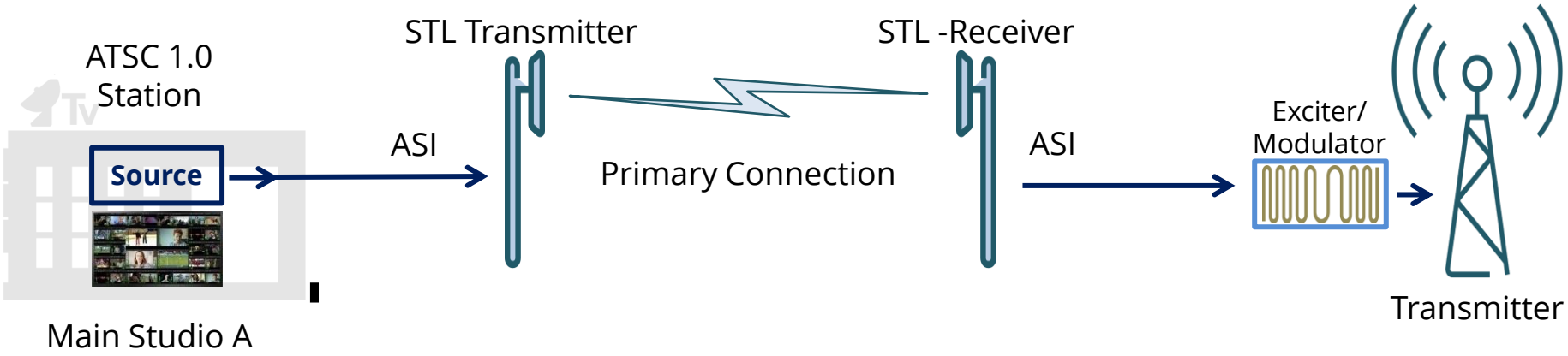
Outline

- Studio to Transmitter Link in ATSC1.0
- Moving to all IP with ATSC3.0
- The new kids in the block STLTP,ALPTP, DSTP
- What so special?
- Why Reliable delivery is so important?
- Deployment options (point to point and SFN)
- Full scale lighthouse for ATSC3.0 and ATSC1.0

VideoFlow

VSF
VIDEO SERVICES FORUM

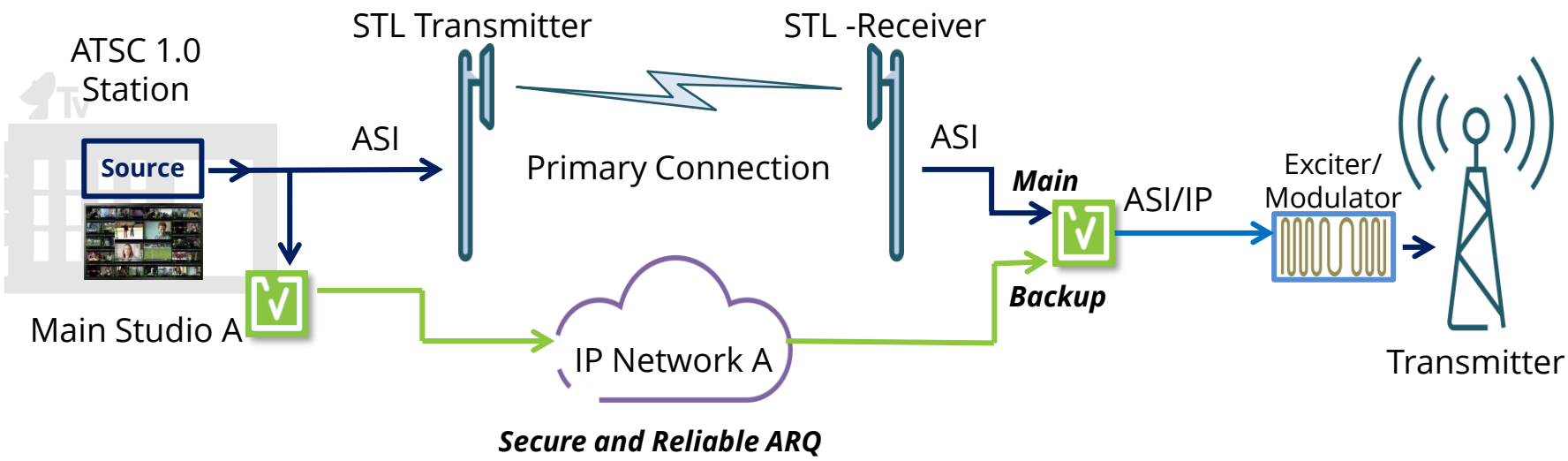
Standard STL



VideoFlow

VSF
VIDEO SERVICES FORUM

Standard ASI and IP



VideoFlow

VSF
VIDEO SERVICES FORUM

VideoFlow

VSF
VIDEO SERVICES FORUM

STLTP,ALPTP and DSTP

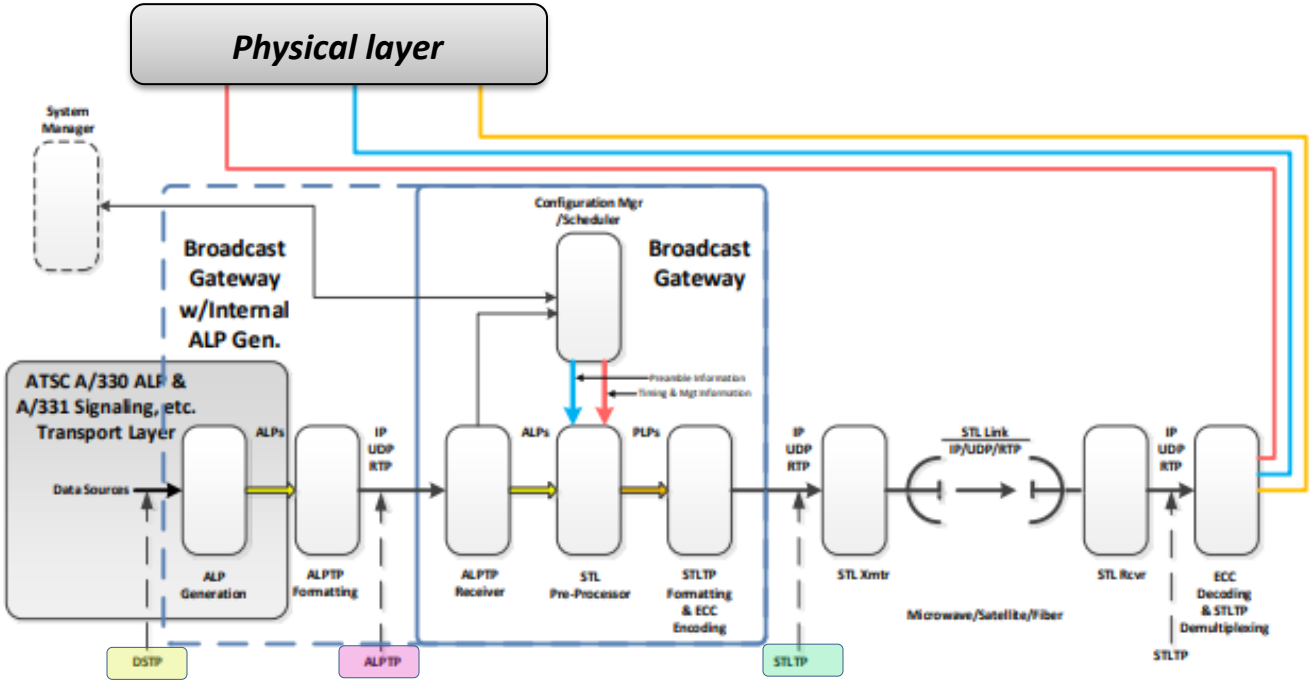
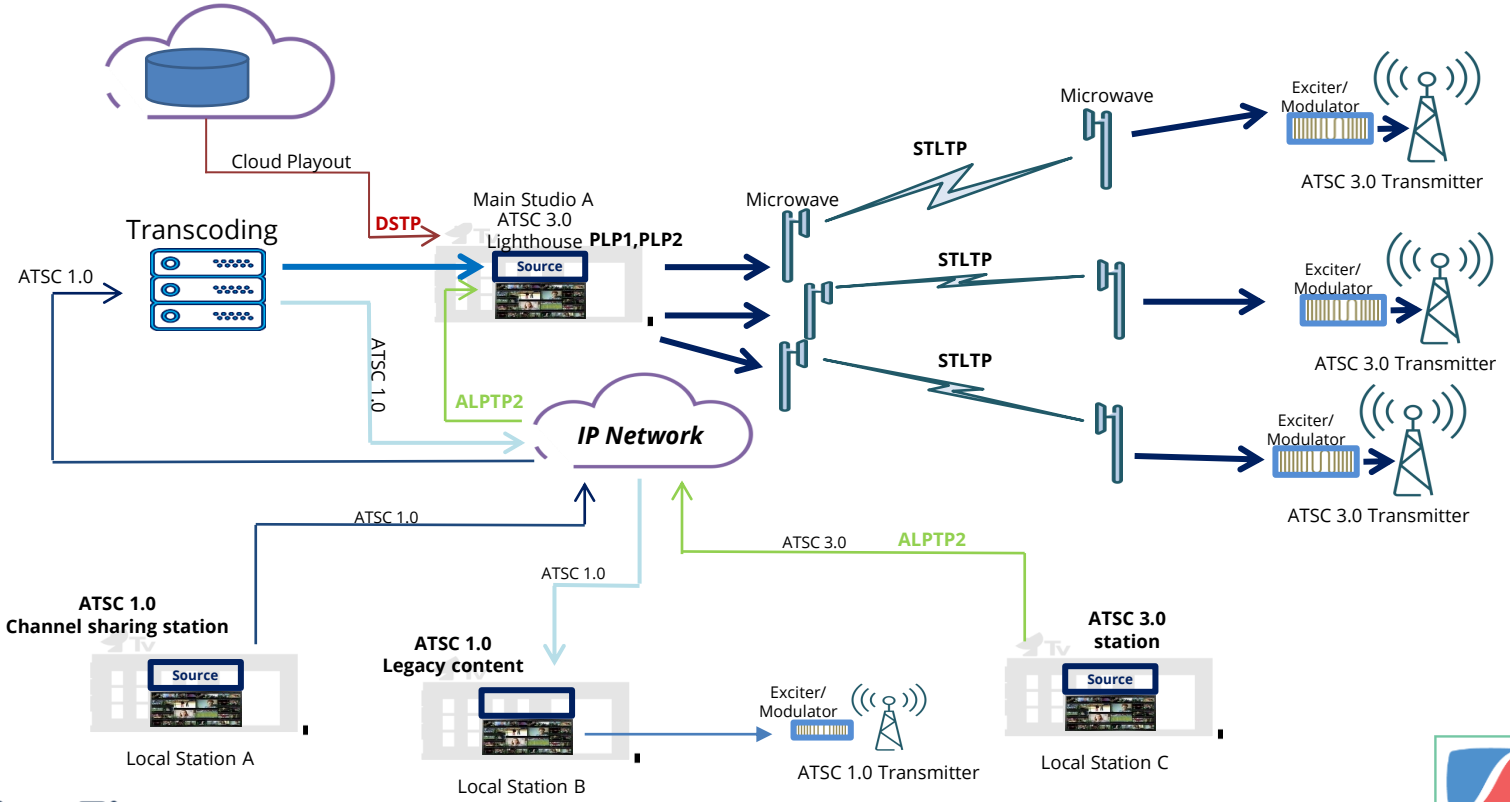


Figure 4.1 High-level overview of system configuration.

VideoFlow

VSF VIDEO SERVICES FORUM

ATSC3.0 system



VideoFlow

VSF
VIDEO SERVICES FORUM

STLTP,ALP and DSTP

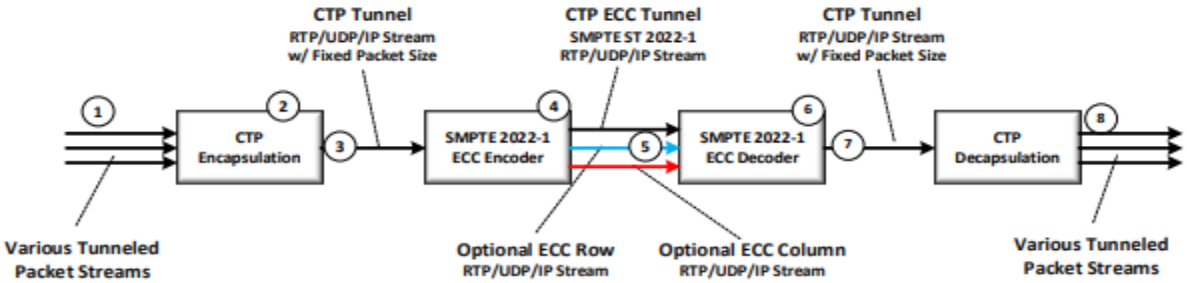
- Data Source Transport Protocol (**DSTP**) - transferring content data, associated metadata, and signaling through a typical IP Network from Data Sources to a Broadcast Gateway
- The ATSC Link-layer Protocol Transport Protocol (**ALPTP**) provides a solution for transferring ATSC Link-layer Protocol (ALP) packets through a typical IP Network between two separated devices
- The Studio to Transmitter Link Transport Protocol (**STLTP**) provides a solution for transferring a potentially large number of parallel Baseband Packet data Streams carrying content for a like number of PLPs plus Preamble data and Transmitter control signaling through a typical IP Network from a Broadcast Gateway output to one or more Transmitters using Tunneling

VideoFlow

VSF
VIDEO SERVICES FORUM

STLTP,ALPTP and DSTP

- The Data Source Transport Protocol (DSTP), ALP Transport Protocol (ALPTP) and STL Transport Protocol (STLTP) all rely on the capability to encapsulate them into an IP/UDP/RTP packet stream
- The RTP packets are similar such that a common tunneling protocol can be defined that is common to all three protocols (DSTP, ALPTP and STLTP).
- A common Tunneling Protocol (CTP) is used to hide the details of the various Tunneled Packets by treating them as payload data. The Common Tunnel consists of an RTP unicast or multicast IPv4 packet stream based on the SMPTE ST 2022-1 . The packets are of fixed size.
- SMPTE ST2022-1 FEC can be applied on the RTP Stream to provide basic packet recovery.
- It is now possible to add Reliable Stream delivery protocol (RIST, SRT and proprietary protocols) to supplement the delivery over challenging networks and create new applications and use cases.



Videof

VSF
VIDEO SERVICES FORUM

A324 modification to standard RTP

- **'M' Marker flag** - Indicates, if '1', that a Tunneled Packet starts within the payload of this RTP packet. When set to '1', the first byte of the first Tunneled Packet starting within the payload is indicated by the value of the packet_offset field
- **SSRC field** – renamed to used as packet_offset
- **Timstamp** – based on seconds, and shared between multiple packets
- PT payload type:

Table 6.3 Timestamp Field Definitions for DSTP and ALPTP

Syntax	No. of Bits	Format
timestamp_min () {		
seconds	16	uimsbf
fraction	16	uimsbf
}		

Table 9.2 RTP Header Timestamp Field Definitions

Syntax	No. of Bits	Format
timestamp () {		
seconds_pre	22	uimsbf
a-milliseconds_pre	10	uimsbf
{		

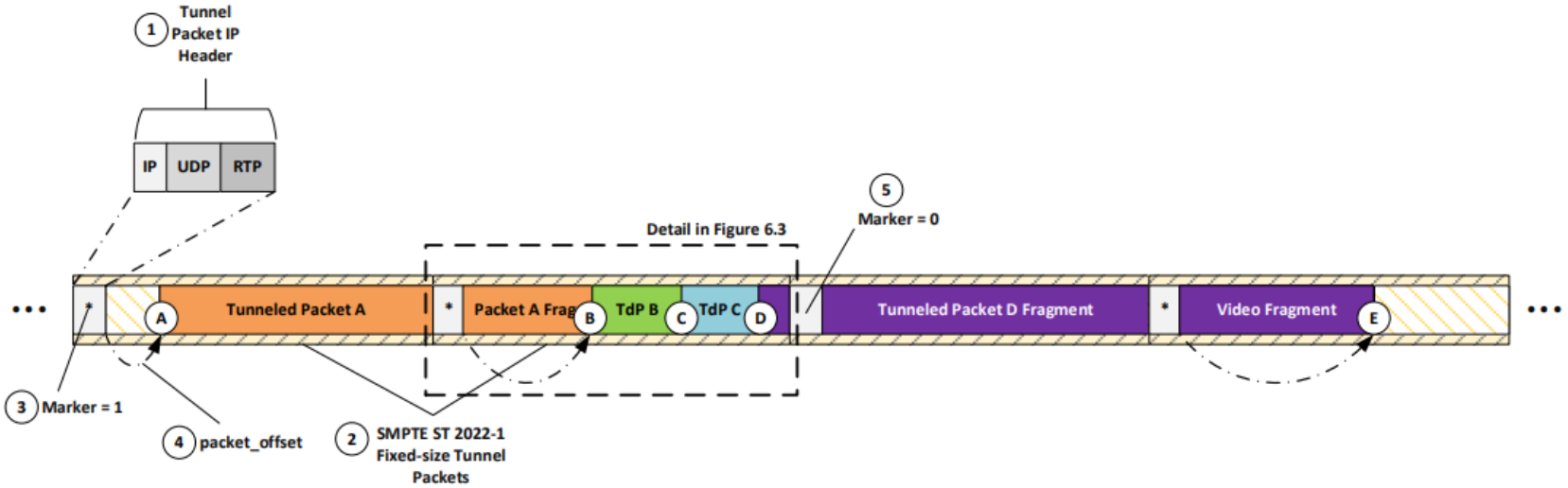
Table 6.2 Code Values for **payload_type**

payload_type	Abbreviation	Meaning
81 ('1010001')	DSTP	Data Source Transport Protocol Tunnel Packets and Information Headers
82 ('1010010')	ALPTP	ALP Transport Protocol Tunnel Packets and Information Headers
97 ('1100001')	STLTP	STL Transport Protocol Tunnel Packets

VideoFlow

VSF VIDEO SERVICES FORUM

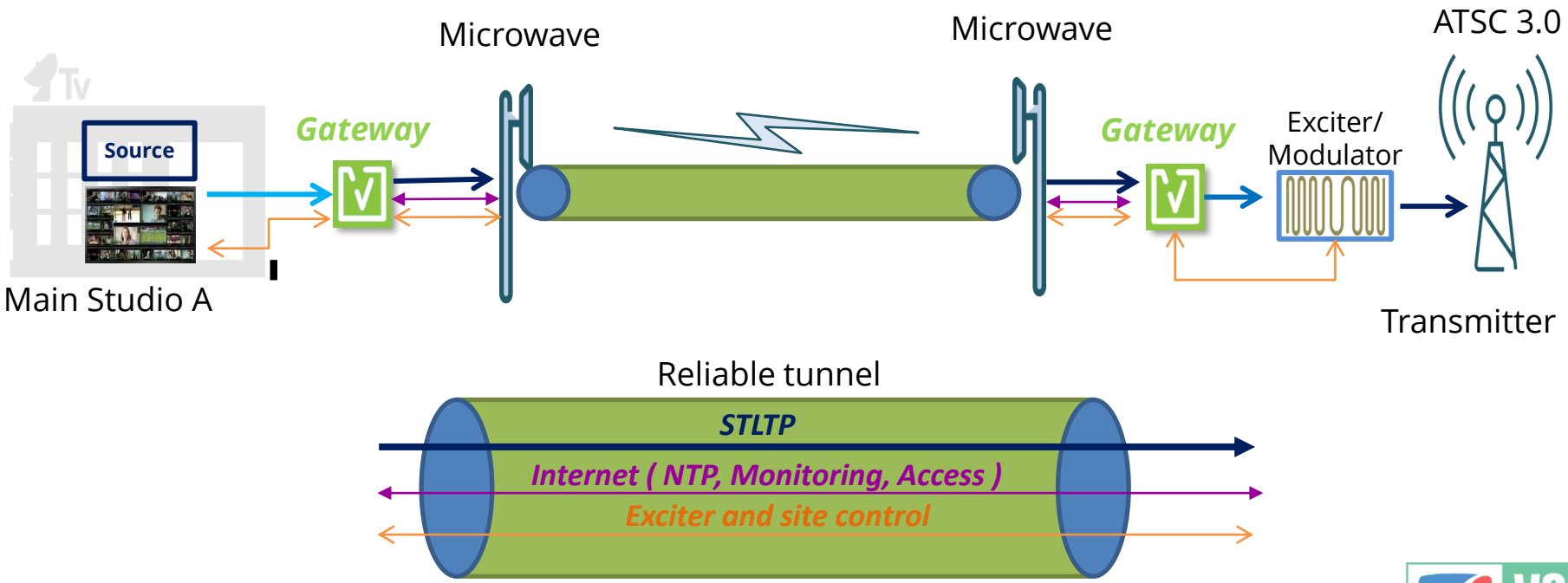
Marker and Payload offset



VideoFlow

VSF
VIDEO SERVICES FORUM

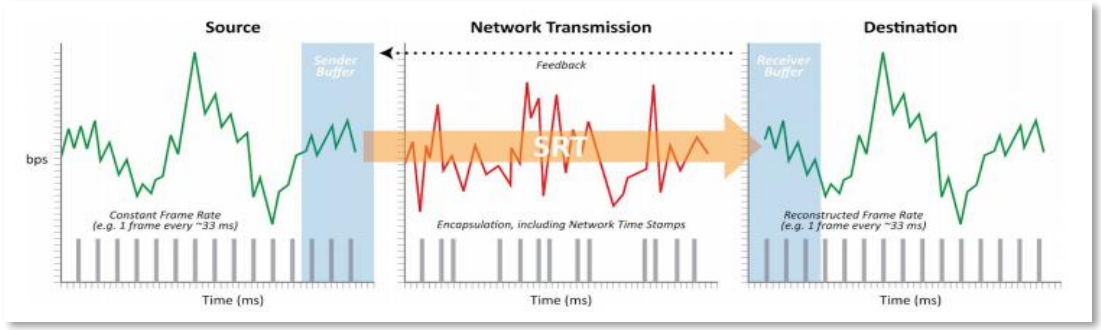
Reliable Delivery: Dejitter, ARQ, Tunnel



VideoFlow

VSF
VIDEO SERVICES FORUM

Why Reliable delivery is so important?



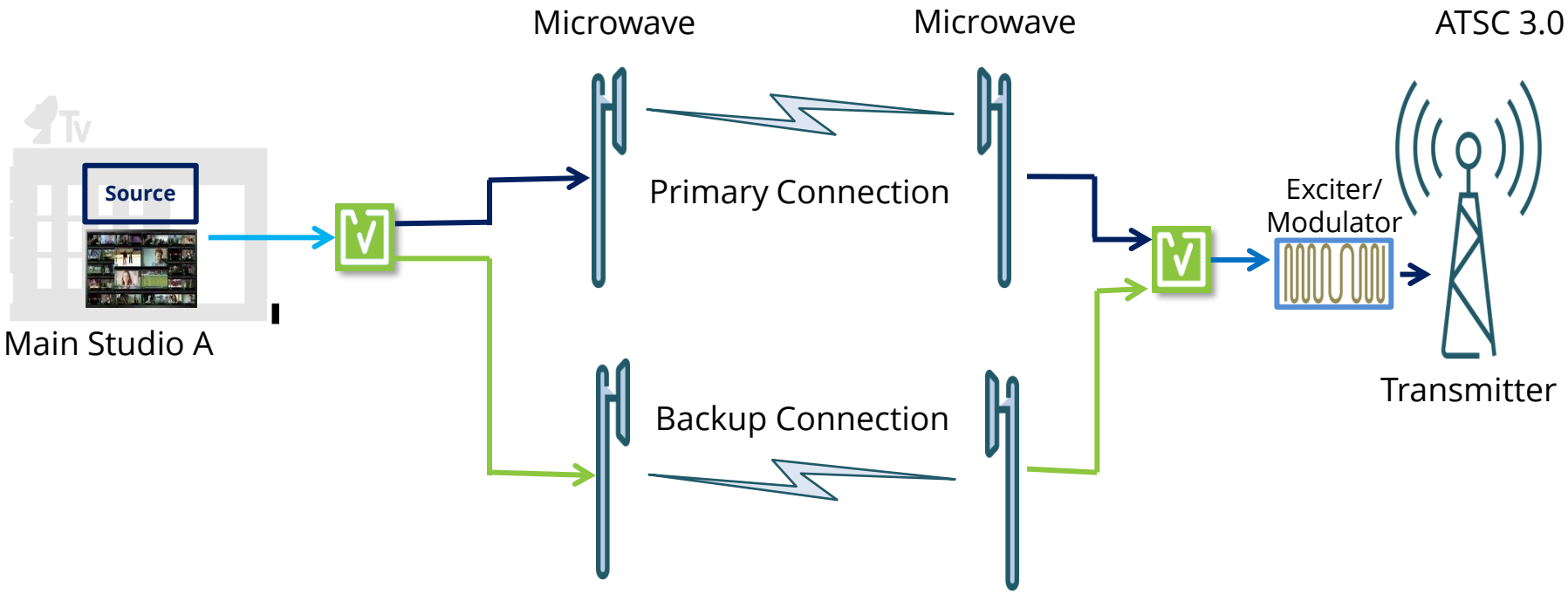
Source is replicated

CBR output

VideoFlow

VSF
VIDEO SERVICES FORUM

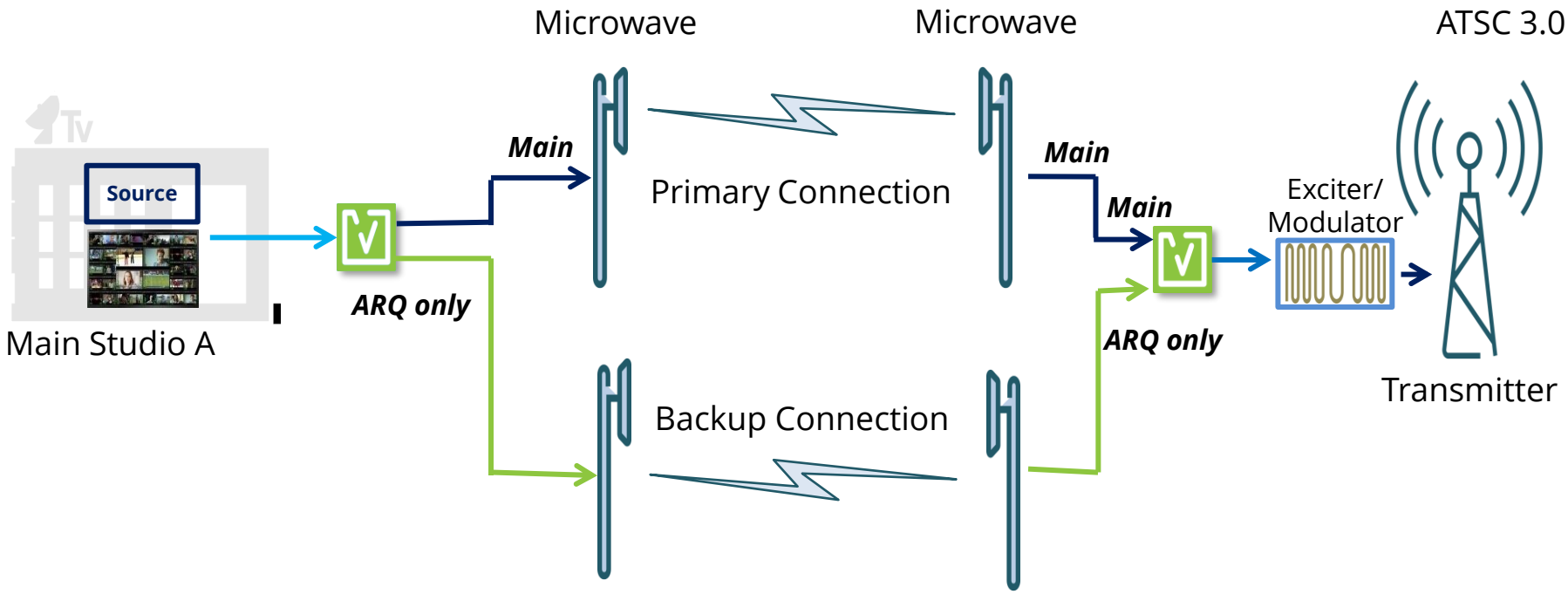
Deployment using two Microwave paths



VideoFlow

VSF
VIDEO SERVICES FORUM

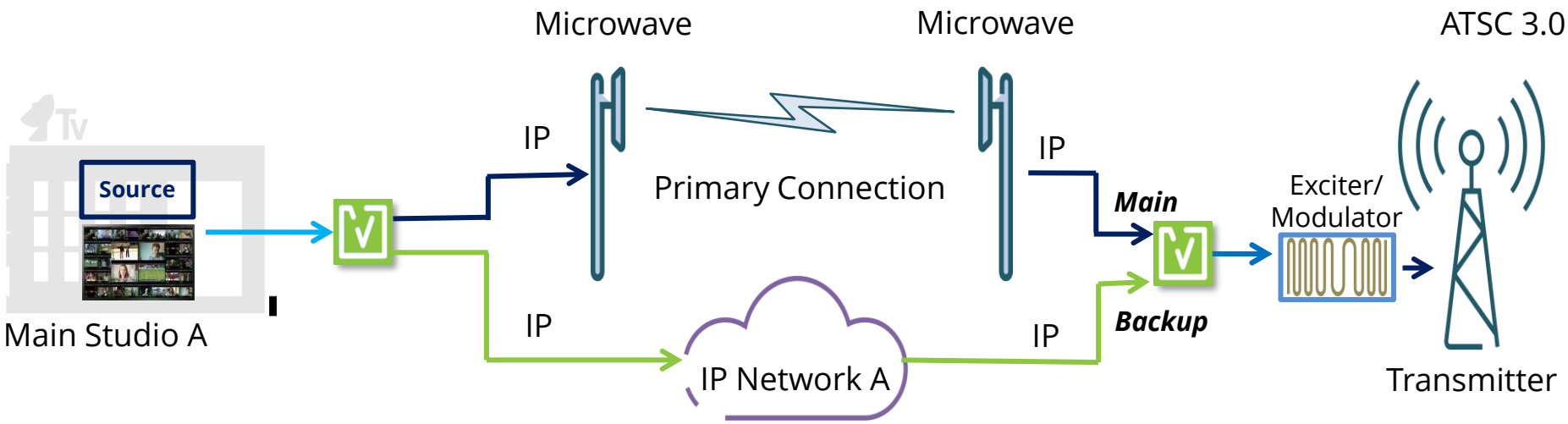
Primary and ARQ backup



VideoFlow

VSF
VIDEO SERVICES FORUM

Seamless switching of microwave and IP/Internet

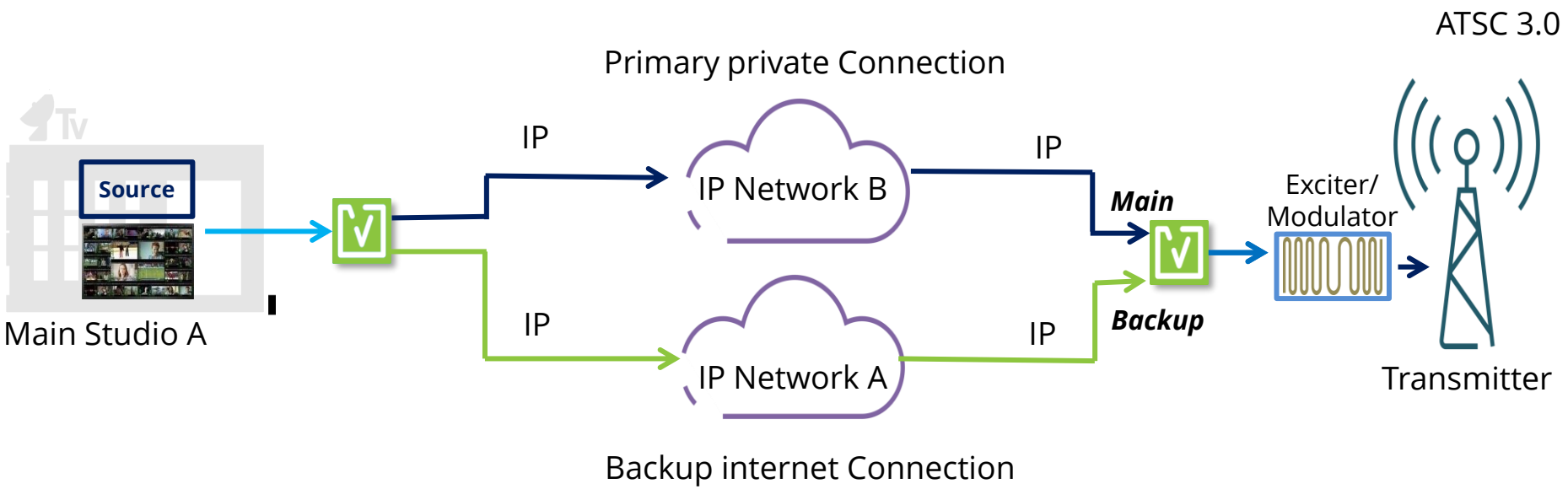


Ability to pick an chose from a buffet of IP Link options:
Wired, Cable, 5G, StarlinK

VideoFlow

VSF
VIDEO SERVICES FORUM

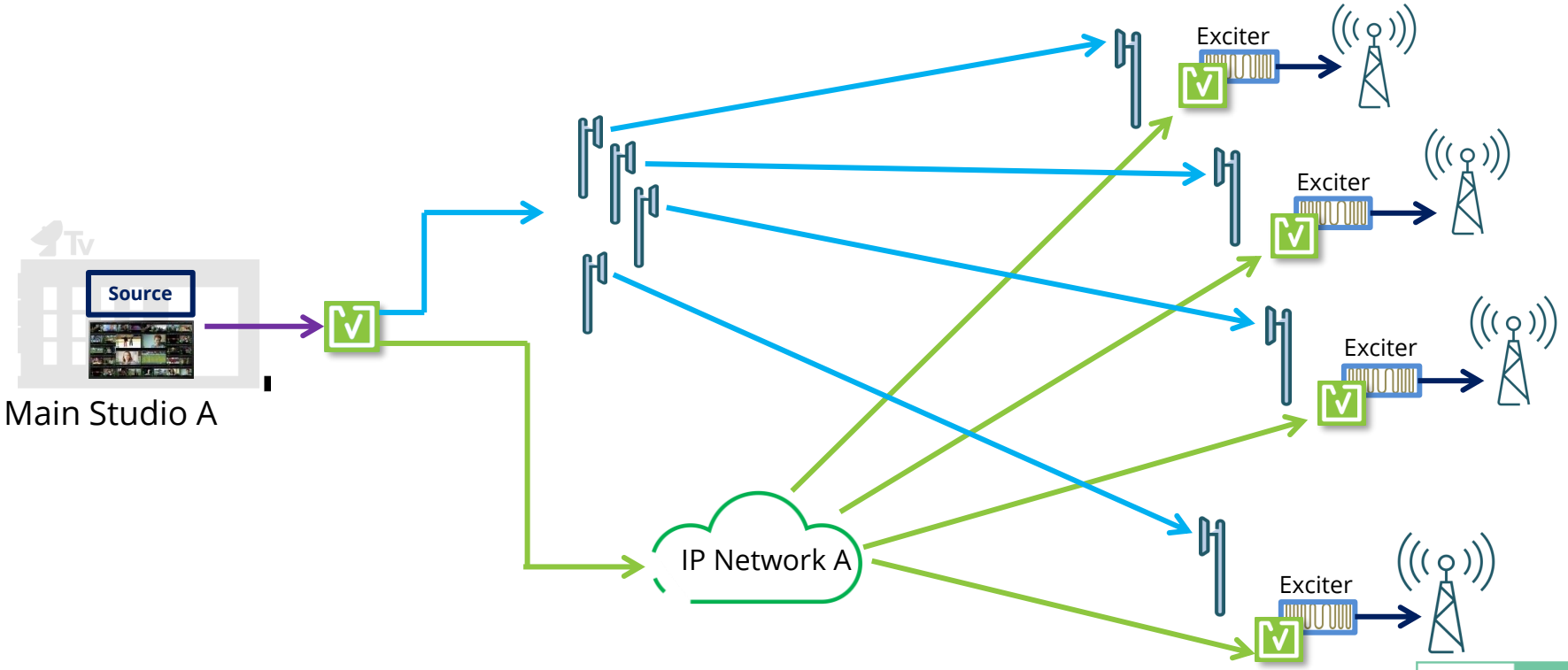
Seamless switching of two IP links



VideoFlow

VSF
VIDEO SERVICES FORUM

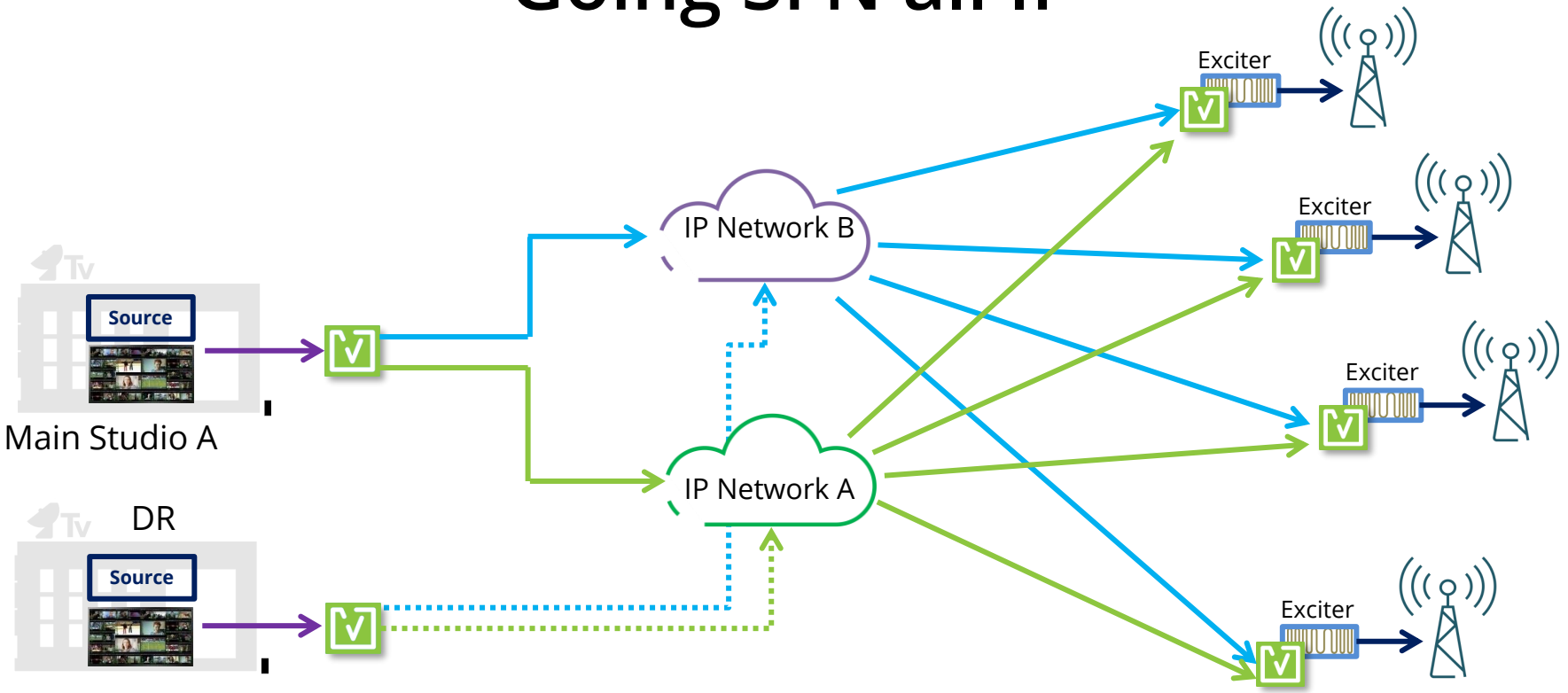
Going SFN, mixed microwave and IP



VideoFlow

VSF
VIDEO SERVICES FORUM

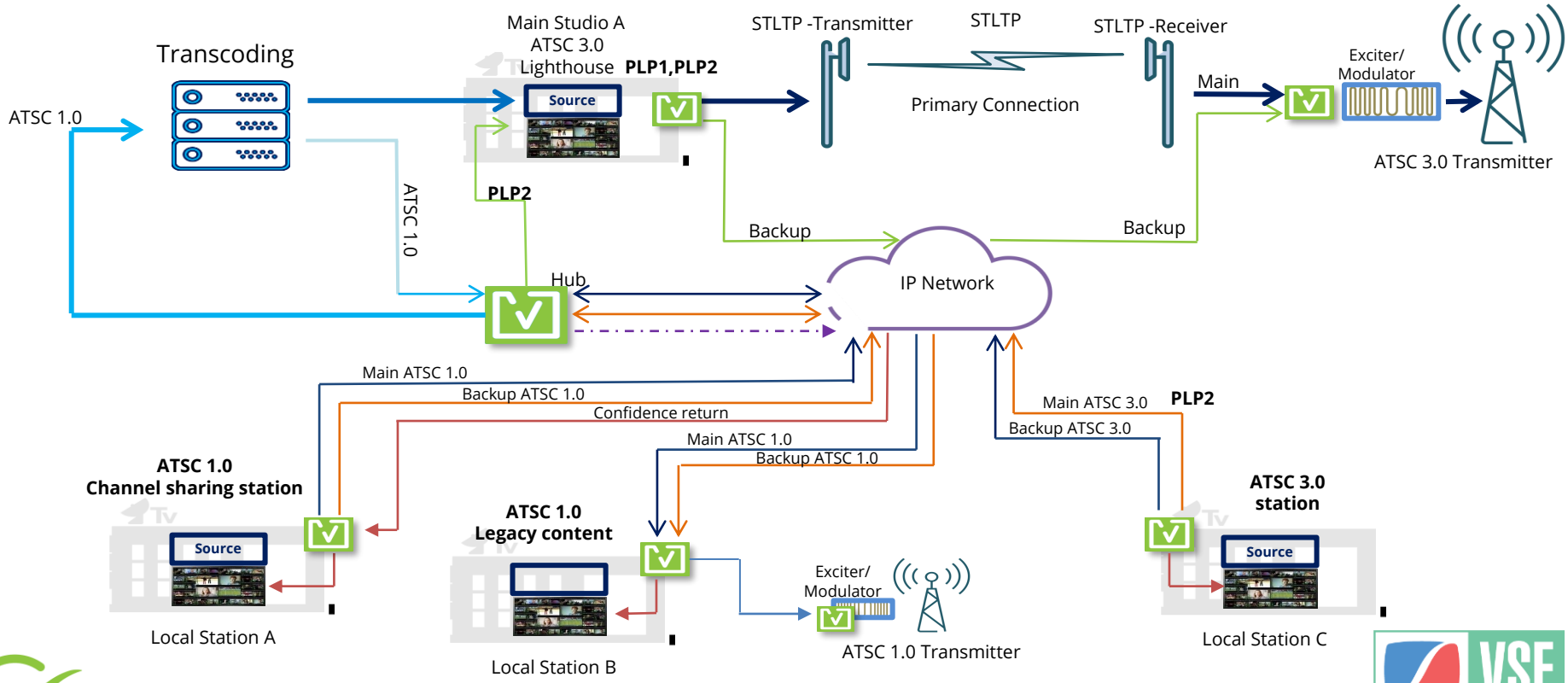
Going SFN all IP



VideoFlow

VSF
VIDEO SERVICES FORUM

Full ATSC3.0 Lighthouse



VideoFlow

VSF
VIDEO SERVICES FORUM

QA

Thank you

Adi.Rozenberg@video-flow.com

VideoFlow

VSF
VIDEO SERVICES FORUM