IP SHOWCASE THEATRE

CURATED BY VSF VIDEO SERVICES FORUM

Simplifying Super-Slo Workflow

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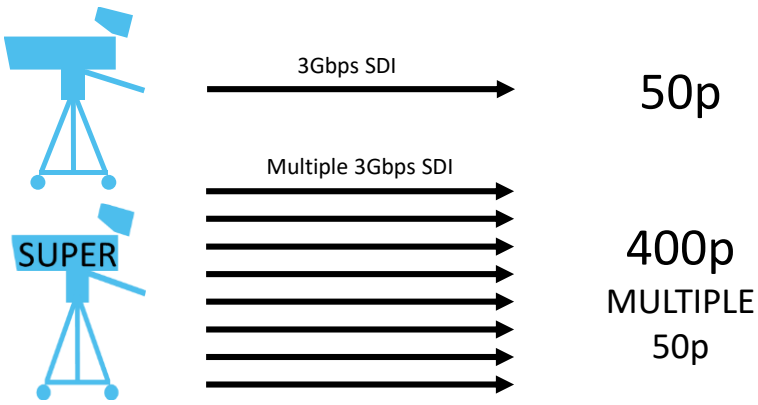
EVS grass valley A BELDEN BRAND

IP SHOWCASE THEATRE AT IBC – SEPT. 14-18, 2018

IP SHOWCASE THEATRE

High Bandwidth Flows? What are we talking about



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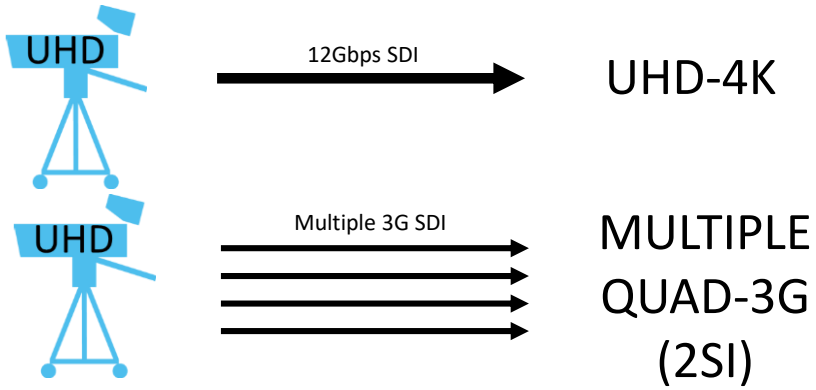
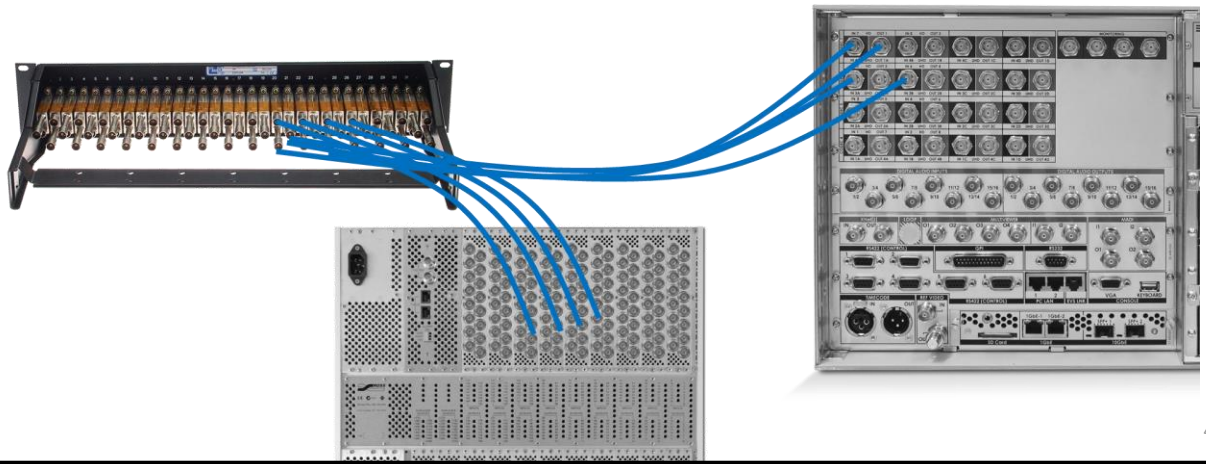


SDI IS EASY…right?

1 WIRE per signal, point-to-point



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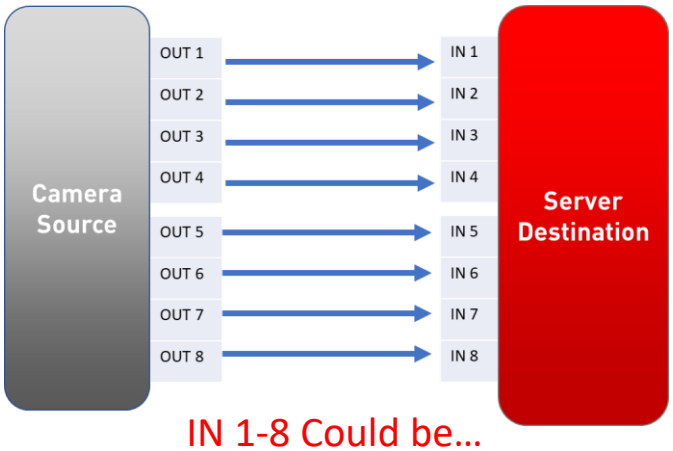
PLUG AND PLAY?



IN 1-8 Could be…

-> Lots of configuration time!
-> Lots of troublshooting

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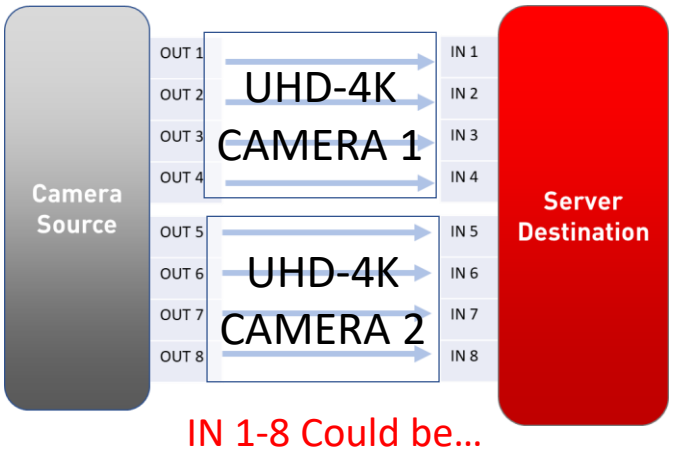
PLUG AND PLAY?



IN 1-8 Could be…

2 cameras of UHD-4K

-> Lots of configuration time!
-> Lots of troublshooting

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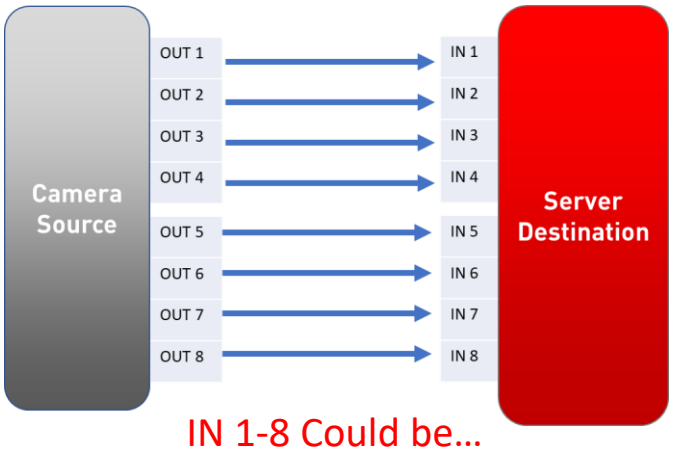
PLUG AND PLAY?



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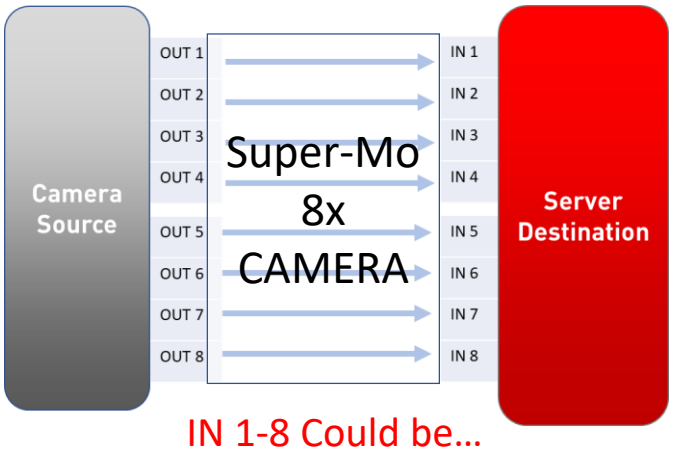
PLUG AND PLAY?



IN 1-8 Could be…

1 cameras of 8x SuperMo

-> Lots of configuration time!
-> Lots of troublshooting

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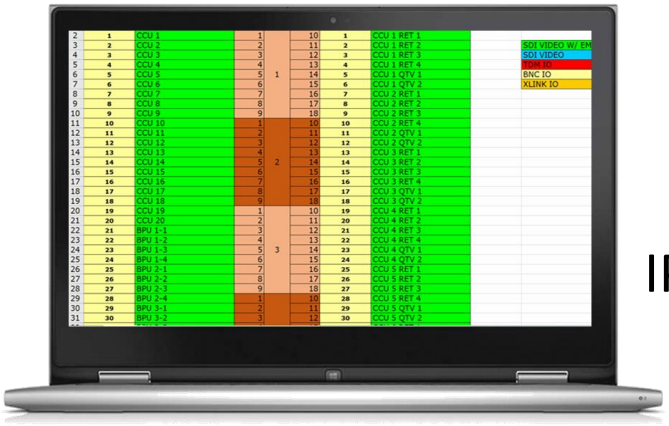
SDI IS MANUAL

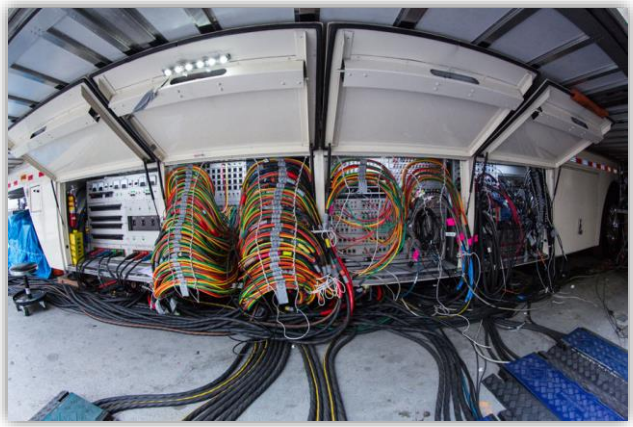


STATIC
CONNECTION LISTING

IP CAN BE MUCH BETTER!

Additional Problems with the SDI Legacy

- **Re-cabling** is required for every event
- Cameras switching from 4K to high frame rate mode
- Video servers changing from various input/output configurations
- TIME = MONEY



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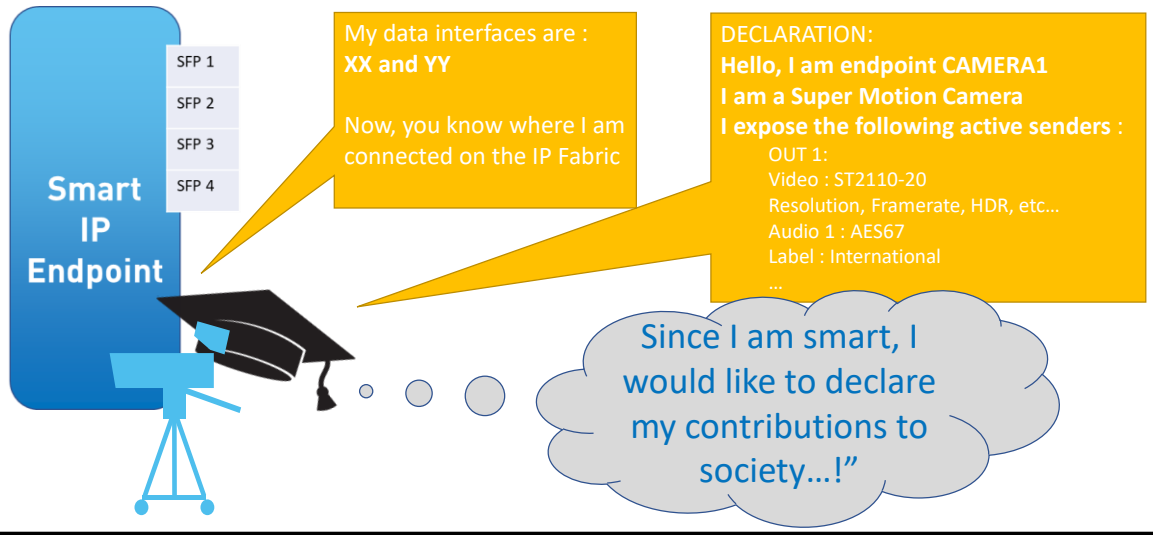
IP BRINGS SIMPLIFICATION



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These Problems Do Not Necessarily "Solve Themselves" in IP

10Gbps today

100Gbps tomorrow

- Most existing IP switches today are 10G/40G
  - UHD-1 does not fit on one 10G port
  - 8x Super-motion example does not fit on one 10G port
- Upgrading to 25G/100G
  - Might waste bandwidth/money in some cases
  - Need a solution that is flexible to upgrade when ready
  - High Speed UHD SuperMo may not fit in 25G

Open Protocols / Standards are the Tools!

- SMPTE ST2110
- NMOS
- PTP

SMPTE ST 2110 IS THE ENABLER

2110-10
SYSTEM

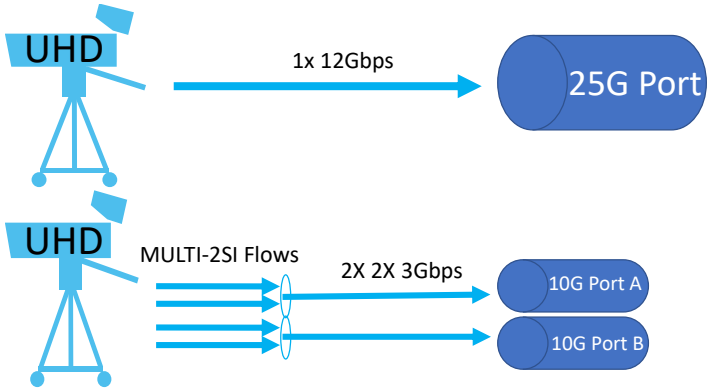
2110-20
Uncompressed active video

2110-30
Uncompressed PCM audio

2110-40
Ancillary data

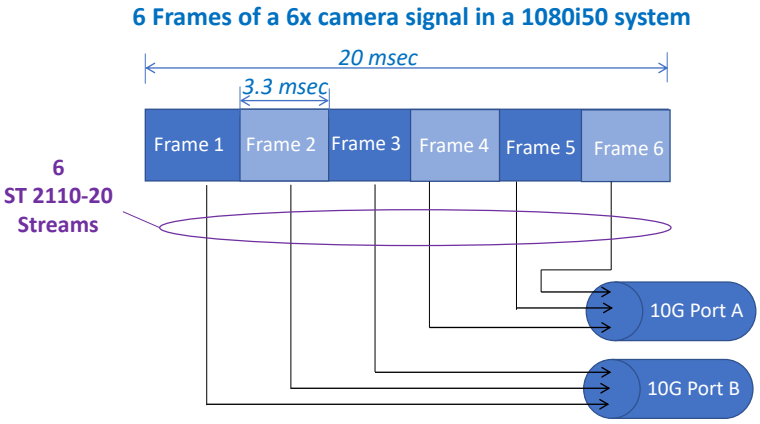
How does this work with ST2110?

- Divide higher bandwidth signals into separate **ST 2110-20** streams at the system data rate
  - For super-slo:
    - PHASES
  - For UHD:
    - MULTI-2SI



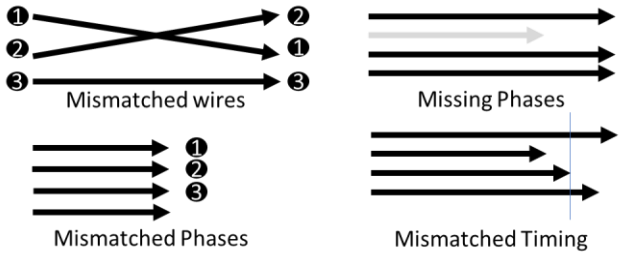
How does this work with ST2110?

- SuperMotion Example
  - For super-mo: PHASES
- We temporal timeslice exactly as we did for SDI signals



By how would this be better than SDI?

- SDI was a mess!
  - Wrong wires mismatch
  - Missing a phase
  - Timing problems of wires
  - Mismatch between camera and servers



- Signal relationship between streams with Session Description Protocol (**SDP**)

Defining Signal Relationships with SDP

- Starting from a typical ST 2110-20 SDP declaration…

- Use the grouping mechanism defined in IETF RFC 5888
- And add new semantics*: PHASED, MULTI-2SI

*proposed, to be registered with IANA

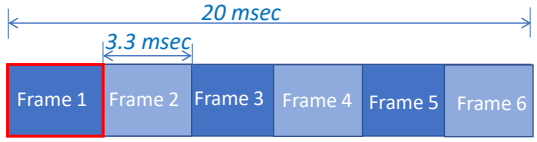
```
m=video 30000 RTP/AVP 112
c=IN IP4 239.252.0.0
a=rtpmap:112 raw/90000
a=fmtp:112 sampling=YCbCr-4:2:2; width=1920; height=1080;
exactframerate=50; depth=10; TCS=SDR; colorimetry=BT709;
PM=2110GPM; SSN=”ST2110-20:2017”;

a=group

a=group:PHASED    a=group:MULTI-2SI
```

Defining Signal Relationships with SDP

- Identify the relationship of each ST 2110-20 stream to the original higher BW signal



ST 2110-20 SDP for phase "1"

```
a=group:PHASED 1 2 3 4 5 6
m=video 30000 RTP/AVP 112
c=IN IP4 239.252.0.0
a=rtpmap:112 raw/90000
a=fmtp:112 sampling=YCbCr-4:2:2; width=1920; height=1080;
exactframerate=50; depth=10; TCS=SDR; colorimetry=BT709;
PM=2110GPM; SSN="ST2110-20:2017";
a=mid:1
```

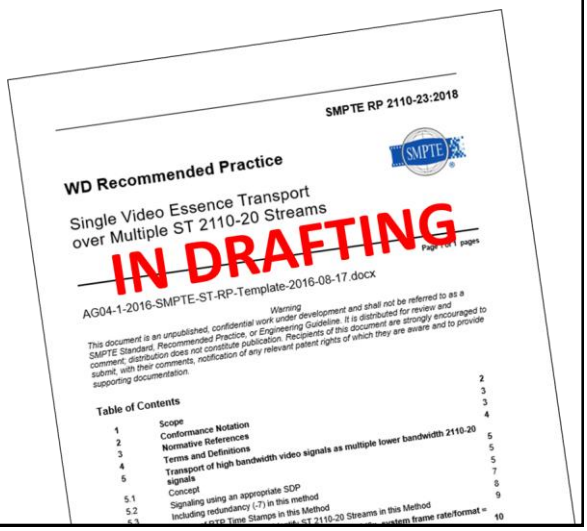
Key Characteristics of this Approach

- **Open Standard:**
  - Aligns with SMPTE 2110-20 and SMTPE 2110-10
  - Uses Standard SDP
  - Includes current, multi stream applications
- **Flexible and Extensible**
  - Future System Frame Rates
  - Future High Speed Frame Rates
- **Makes infrastructure Simpler** to troubleshoot
  - Simplifies Logical Broadcast Controller Operations
  - Enables self-description and accurate stream identification

RP2110-23 being drafted within SMPTE 32NF-60

- Status
  - Scope largely agreed upon
  - Draft text available for review for SMPTE members who are members of the DG (drafting group)

TARGET: SMPTE Recommended Practice


SMPTE RP 2110-23:2018

WD Recommended Practice

Single Video Essence Transport over Multiple ST 2110-20 Streams

IN DRAFTING

AG04-1-2016-SMPTE-ST-RP-Template-2016-08-17.docx

Warning

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Table of Contents

IP Production Infrastructures become easy…

- Flexibly work with existing infrastructure like 10Gbps switches
- Reconfigure without re-cabling!! from UHD to HD to Super-Mo
- Optimize the bandwidth of your switch infrastructure
- Have a flexible IP network, and protect future investments?

Acknowledgements

EVS and Grass Valley wish to thank the many members of the AIMS Technical Working Group and the members of the SMPTE 32NF-60 (SVIP) group for their feedback and support.