Benefits of IP Systems for Sporting Venues

John Mailhot

CTO, Networking & Infrastructure, Imagine Communications

Professional Sporting Venues

- OB Trucks are hired to do the television production for the rightsholders
- The "inside production" facility is part of the venue
  - Drives content for the scoreboards and inside displays
  - Includes replay, specialty cameras, switcher, graphics, multiviewers, etc.
  - Provides inside feeds to the Rightsholder's trucks
  - Consumes lateral feeds from the Rightsholder's trucks
- NFL Football: 8 home games + playoffs (per year)
- NBA Basketball / NHL Hockey: 41 home games + playoffs
- The arena is used for many many other events throughout the year
  - A typical large venue will have 250+ events per year
  - Every event has different internal production requirements

University Sporting Venues

- Sometimes OB Trucks are hired for big games (only)

- The "inside production" facility is used for every game across many sports
  - Produces the game feeds if there is no truck
  - Drives content for the scoreboards and inside displays
  - Includes replay, specialty cameras, switcher, graphics, multiviewers, etc.
  - Provides/Consumes signals to/from Rightsholder's trucks when present
  - Often produces an entire specialty channel of on-campus content

- One Sport (usually "Football") drives the inside production system
  - But the system is used by every sport on campus
  - Fiber Connections to other venues on campus for other sports
  - College Campuses can be very large

What Makes it Interesting?

- These Stadiums are VERY LARGE – fiber runs can be >500m
- Sometimes it's a re-fit into an existing structure
- Flexibility is paramount – every event has different production needs
- Audio Audio Audio
- Integration with the Truck Dock – formats/handoffs
- Integration across the campus
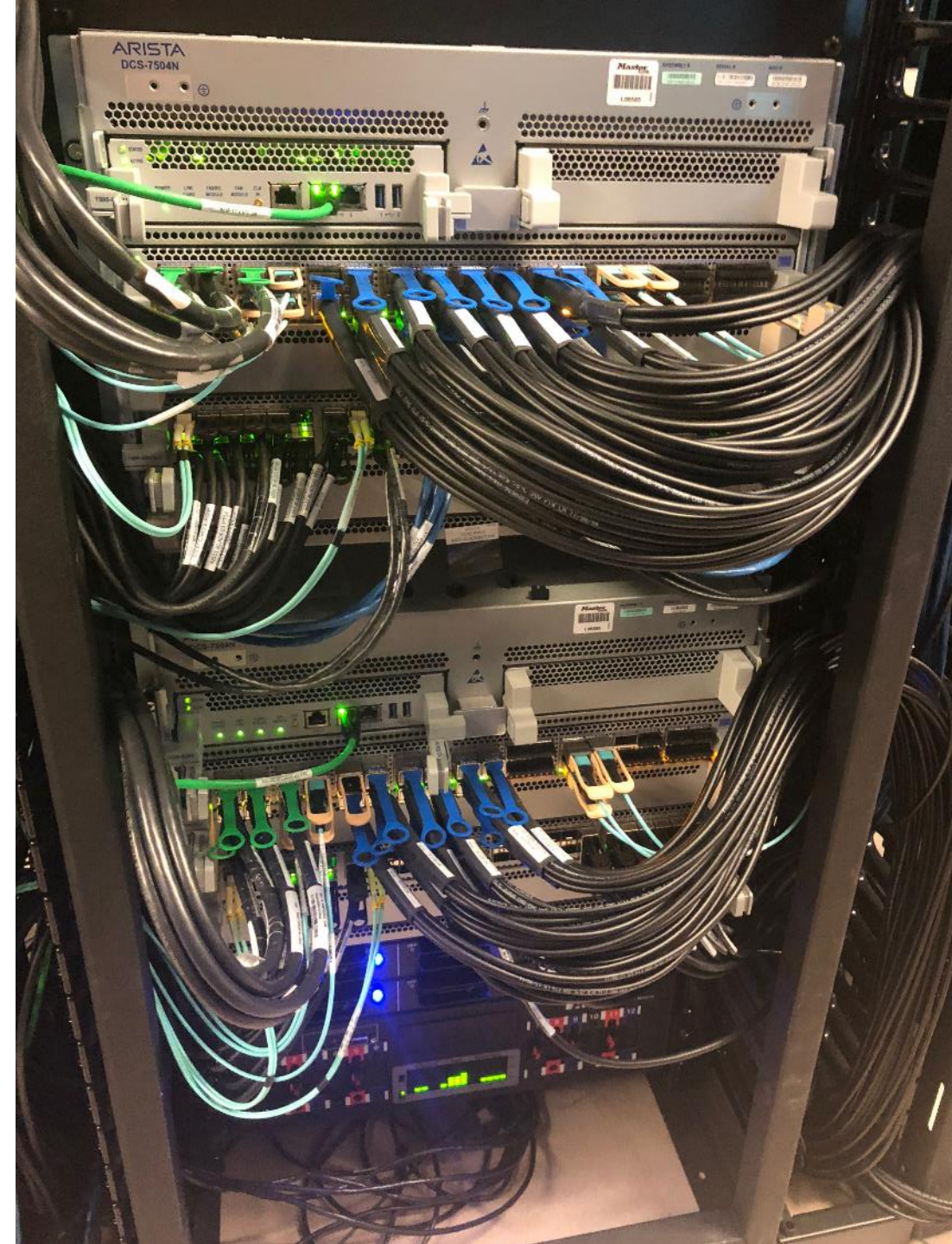- Freelance Operations Staff – or Student Operators

Images Used For Information and Reference Only, No Endorsement Implied – Standard Media Release Image Shown

Benefits of IP/2110: Physical-Scale

- 25G/100G fiber infrastructure
  - 8x 3G signals per fiber wavelength
  - Can mix AOC-direct-attach, OM4, and SingleMode for optimized economics

- Redundancy of the Infrastructure
  - 2022-7 protects against loss and errors in every fiber
  - 2022-7 protects against loss and errors in every SFP
  - 2022-7 protects against loss and errors in every network switch

- Takes Up Less Space and uses a lot fewer cables

- Going IP means never having to say that you can't make it bigger
  - UHD-capability can be built into the infrastructure
  - Network Switches can be as big as you want

Fiber to the Cores

- "Small" 4-slot network switches support up to 144 x 100G ports
  - Approx 4600x4600@3G
  - Approx 1152x1152@UHD

- Active (AOC) Direct-attach for in-room

- Multimode (OM4) for <400m
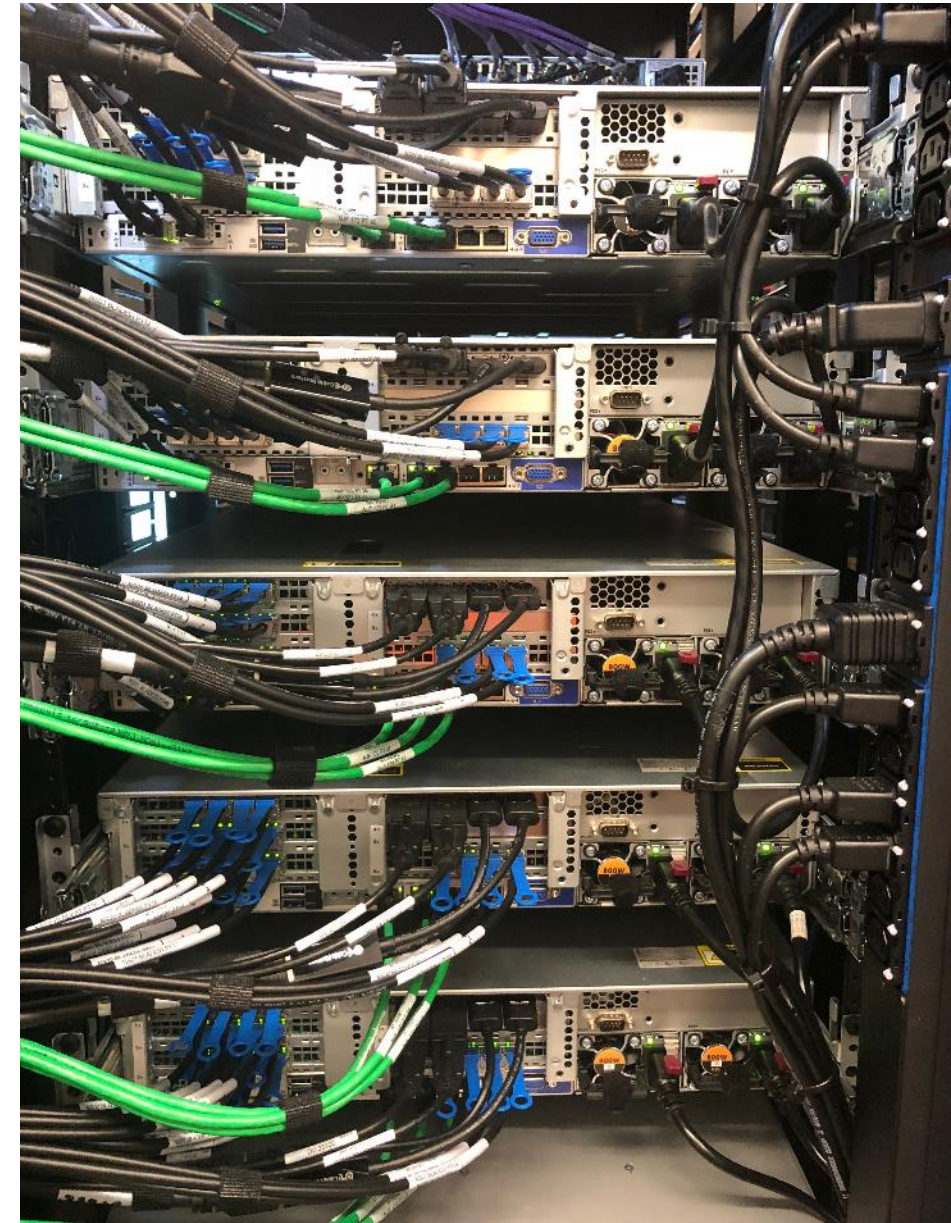
- Singlemode for longer runs

End-To-End IP

- IP Fiber
from the CCU

- IP Fiber to the Multiviewers

LESS CABLES OVERALL

Benefits of IP/2110: Audio

- SDI is limited to 16ch of audio per video
  - requires embedding and dis-embedding at every touch-point

- In ST2110, the audio is sent on separate IP streams
  - Audio console can subscribe to every stream it needs
  - Audio console generates new streams for its outputs

- Separate Audio == Total Flexibility == 250+ different events/year

- The Control System ties it all together
  - Every user gets the audio and video (and ANC data) they need for their job
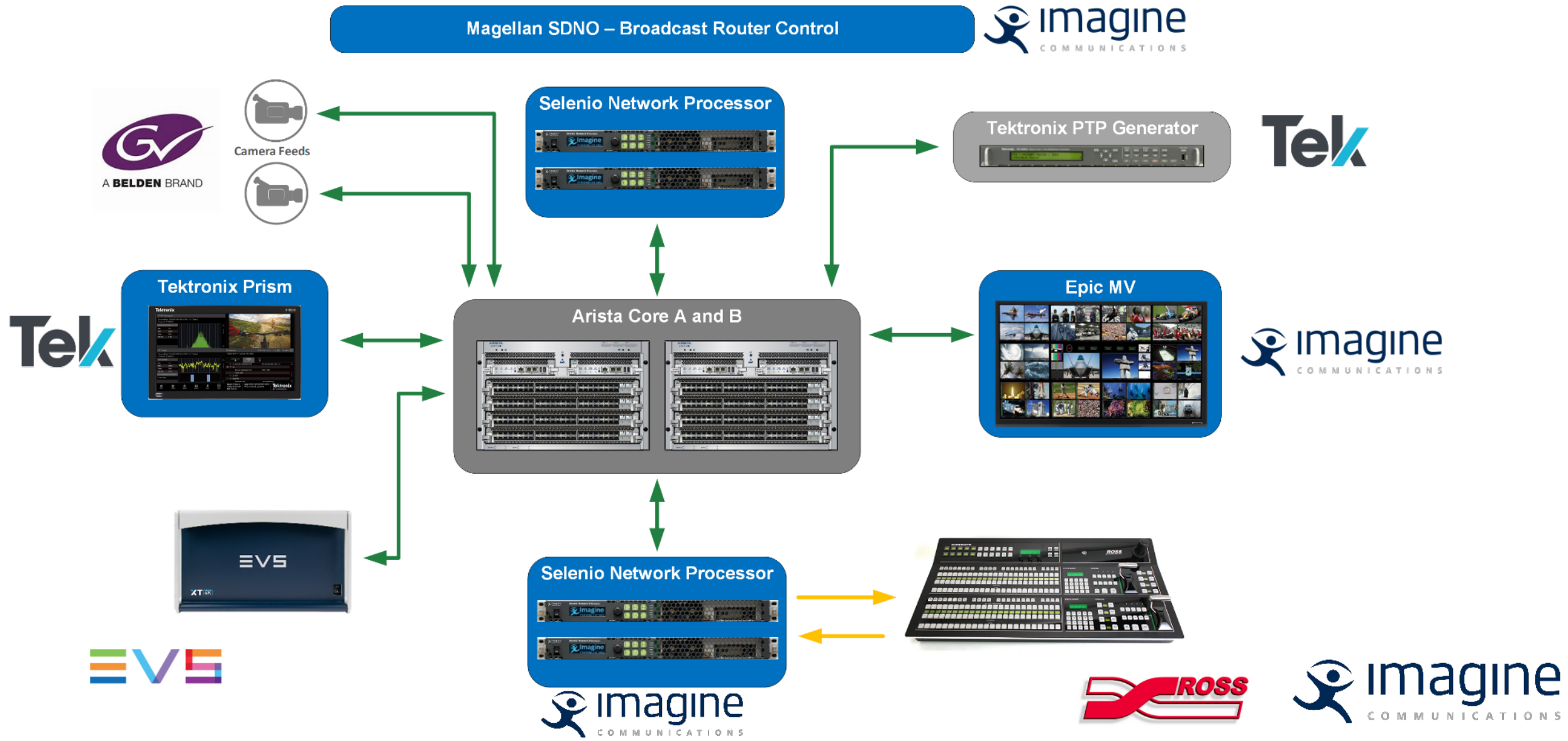 - Every production can be easily configured

Benefits of IP/2110: Timing

- PTP Timing on the Media Network
  - Uses the same cables and switches as the Media
  - No Black-Burst DA tree to Design, Build & Maintain
  - No Timecode DA tree to Design, Build, & Maintain
  - No Crazy Mix of Black-Burst, Tri-Level, Word Clock, DARS, …

- PTP is Format-flexible across SD, HD, 3G, UHD

- PTP == timestamps on every packet of video and audio
  - the tools are there in the standards to help with sync
  - allows equipment to synchronize audio and video anyplace in the system
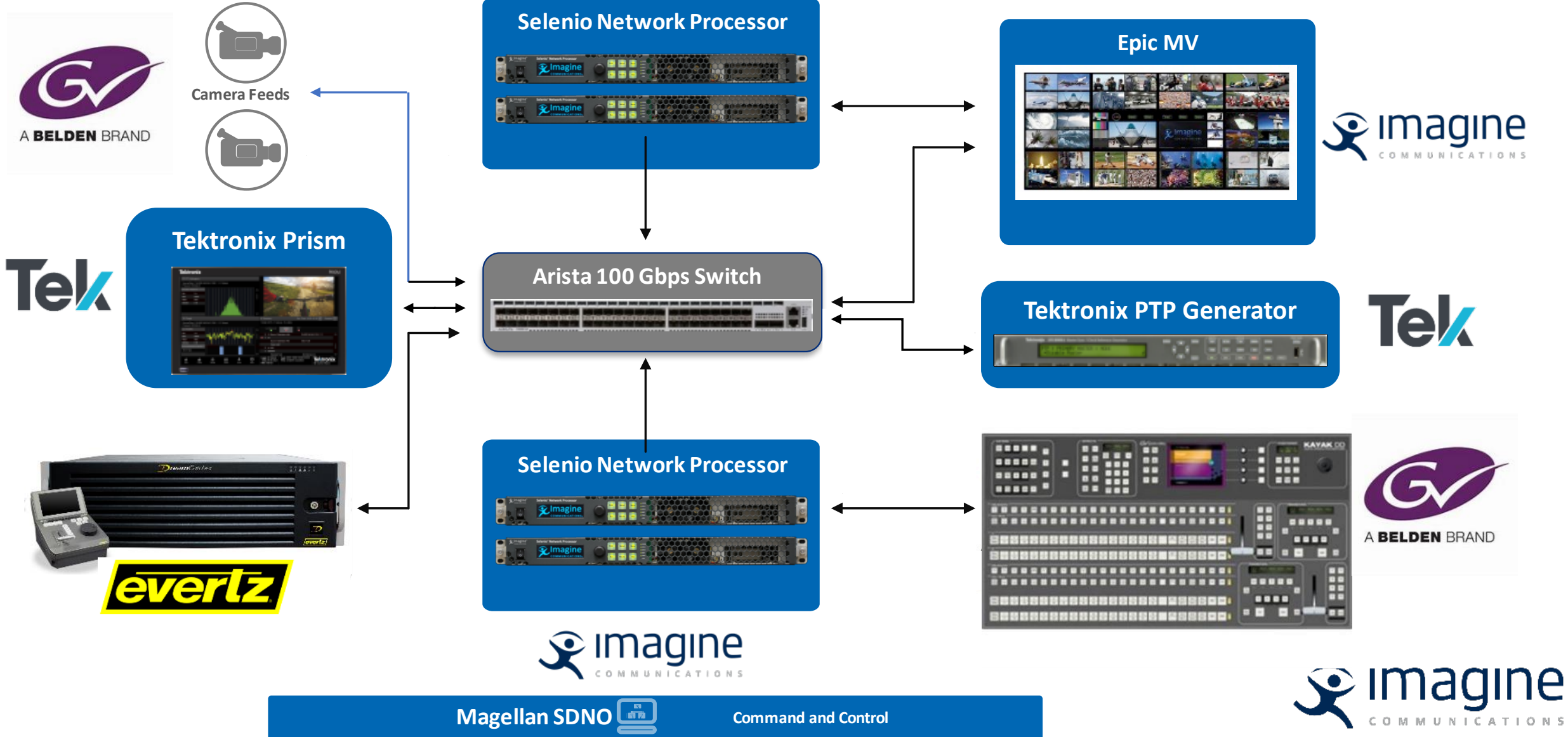
Benefits of IP/2110: Choices

- Every Meaningful Vendor is building ST2110 interfaces now

- Customers want to choose their Cameras, Switchers, Replay, Multiviewers, and other equipment based on operational criteria – not technical limitations

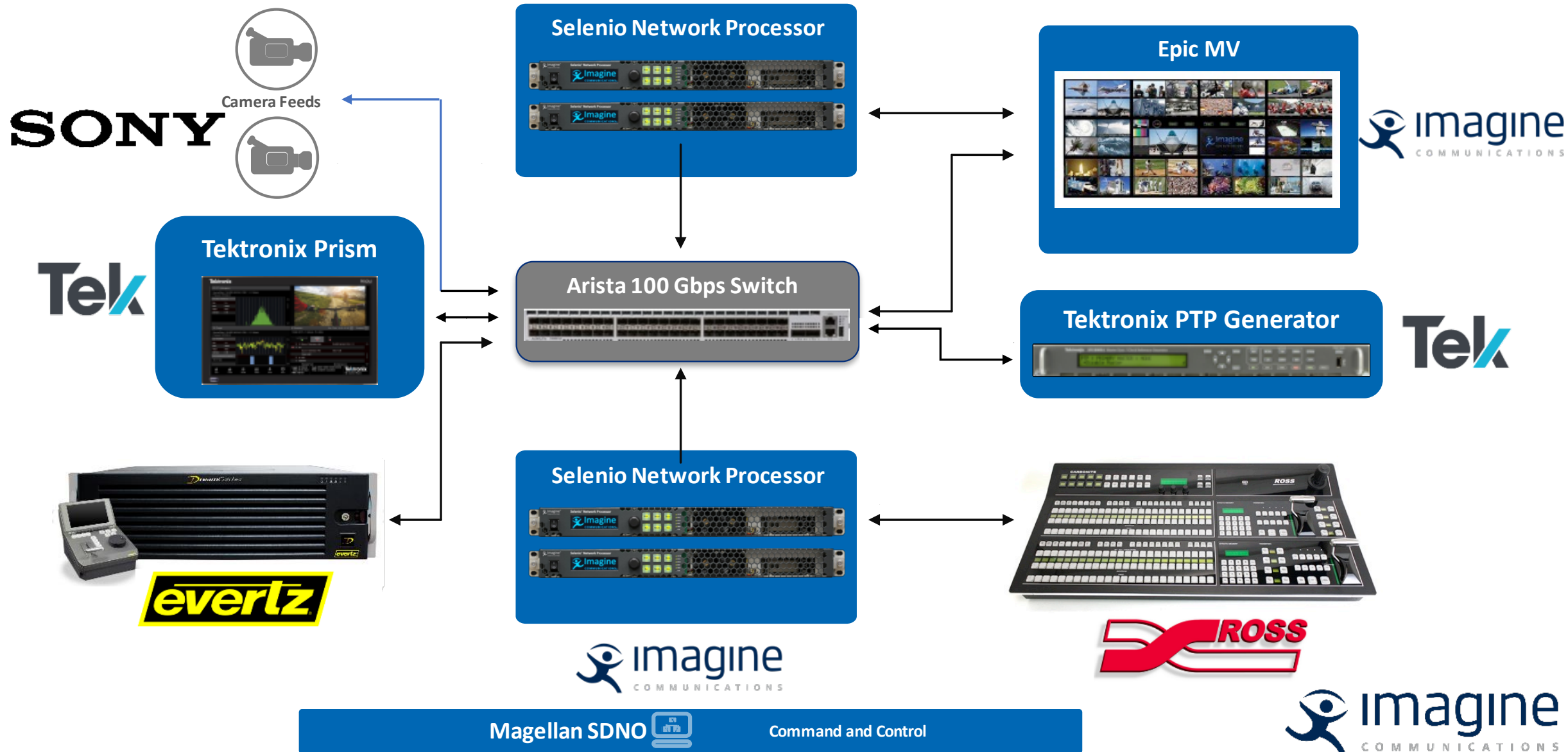- 2110 provides the level playing field for best-of-breed systems

Basketball Arena #1

Football Arena

Basketball Arena #2

IP/2110 for Sports: Perfect Together

- Scalability to build systems of whatever size is needed
  - for HD, 3G, or UHD

- Economy of Physical Space and Cabling

- Audio Flexibility for more channels, more streams, more ways

- Timing Flexibility managed through PTP Timestamps

- System Flexibility provides choices of vendors and partners

Thank You

John N. Mailhot

CTO, Networking & Infrastructure, Imagine Communications

Director, Advanced Media Workflow Association

Director, Video Services Forum

Fellow, SMPTE