Making SMPTE ST 2110 installations work

6:15pm  Food available, meet, greet and chat
7.00pm  Introduction from SMPTE (Peter Weitzel)
7.05pm  Welcome from Crystal Vision (Philip Scofield)
7.10pm  Making SMPTE ST 2110 installations work
         (Philip Scofield and Richard Lawrence)
7.45pm  Questions
8.15pm  Further demonstrations from Crystal Vision
         and Rascular Technology

Questions for the audience

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  a media over IP system (ST 2022 or ST 2110)?
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- Did a single manufacturer supply all the equipment and software?
- Is anyone not familiar with the ST 2022 / ST 2110 standards?
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- Who thinks they will plan a new SDI installation in the next two years?
- **Who thinks they will plan a new IP media system in the next two years?**
Why use IP instead of SDI?

- Flexibility
  - Use same connections for video, audio, data, control
  - Compressed, non-compressed. Resolution independent. Can have tiles for multiviewers, anything
- Can exploit high-end IT switches and mid-size low-cost switches
- Most other industries have moved to IT
- Can use some COTS devices? (Commercial off the shelf)
- Costs will be lower

Why NOT move to IP?

- Need different engineers
- New areas of complexity
- IT systems do not do what we want
- Specific technical objections (later in talk)
- IP cost is currently higher
- Any others?
Question

If you imagine that SDI didn’t exist, then would we invent it, or would we go to IP?

imagine...

Making SMPTE ST 2110 installations work

- **Part one…**
  Explanation and demonstration of a small IP system

- **Part two…**
  Theoretical talk about making ST 2110 and ST 2022 systems work
Part one: Our demonstration system

- Small and easy to install by television IT engineer
- Crystal Vision gateway and other products
- Rascular Technology control
- Dell, NETGEAR and Ubiquiti IP switches

Our demonstration system choices

- Multicast
- IGMP
- Not a software-defined network
- Could choose to use Unicast
IGMP issues

- System needs enough bandwidth for anything the IGMP system is allowed to do
- Switches will ‘choose’ how to make the connection
- Distributed rather than central control

Our system diagram
Our system diagram

Part two: Some issues with making ST 2110 and ST 2022 systems work

Network security

Firewalls

Compatibility between equipment suppliers

New methods of monitoring
Network security

- Multi-layered and largely an IT issue
- Not much difference from SDI

Firewalls

- Media firewall
- IT firewall
Compatibility between equipment suppliers

- Meet the specs, protocols and profiles
- Narrow or wide timing
- Choices with profiles don’t help compatibility
- IP to IP devices can solve compatibility problems

New methods of monitoring

- Media frame content
  - Black, frozen, audio present/missing
- Network packet statistics
  - Bandwidth, utilisation, counts, sFlow
- Media flow statistics
  - Primary/protect skew, % protect packets used, inter-packet gap
Synchronisation of IP based media

How it could have been...

Synchronisation of IP based media
Synchronisation of IP based media

SMPTE ST 2110

What about SMPTE ST 2110?
(We haven’t mentioned it much...)
MARBLE-V1 media processor

The most flexible solution to video over IP
Conclusions

When manufacturers have their latest equipment ready it will be common practice for all television IT engineers to plan and install IP systems.

Questions?

Do we agree that a small video over IP system will be easily built and is desirable?