

JT-NM Tech Stack – Part 1

JT-NM TR-1001-1

System Environment and Device Behaviors For SMPTE
ST 2110 Media Nodes in Engineered Networks -
Networks, Registration and Connection Management

AMWA

EBU



The PROBLEM to be SOLVED by TR-1001-1

- SMPTE 2110 describes the packet formats
- AMWA IS-04 provides a registry for organizing resources
- AMWA IS-05 describes the stream switching API
- Each of these also includes options and optional features, and sometimes incompatible choices are possible

- There are remaining details and behavior questions when building a system, and the industry benefits when these details are specified clearly and consistently

What is covered in TR-1001-1? (1 of 3)

- Use the Standards from SMPTE and AMWA
 - SMPTE ST 2110-10/20/21/30/31/40
 - AMWA NMOS IS-04, IS-05, BCP-002
- Use the Standards in a specific way
 - In some cases this TR constrains the standards
- How devices start-up and integrate into systems
 - This TR specifies some start-up behaviors and network services, so that device makers and system builders have a common expectation about the system

What is covered in TR-1001-1? (2 of 3)

- Network Services which must be present
 - DHCP on the Management and Media Networks
 - DNS including DNS Service Discovery (DNS-SD)
 - IS-04 (NMOS) Registration and Query Services
 - System Resource Service (system constants)
 - Precision Time Protocol (PTPv2) as in SMPTE 2059
 - Unicast Routing between Management and Media Networks

What is covered in TR-1001-1? (3 of 3)

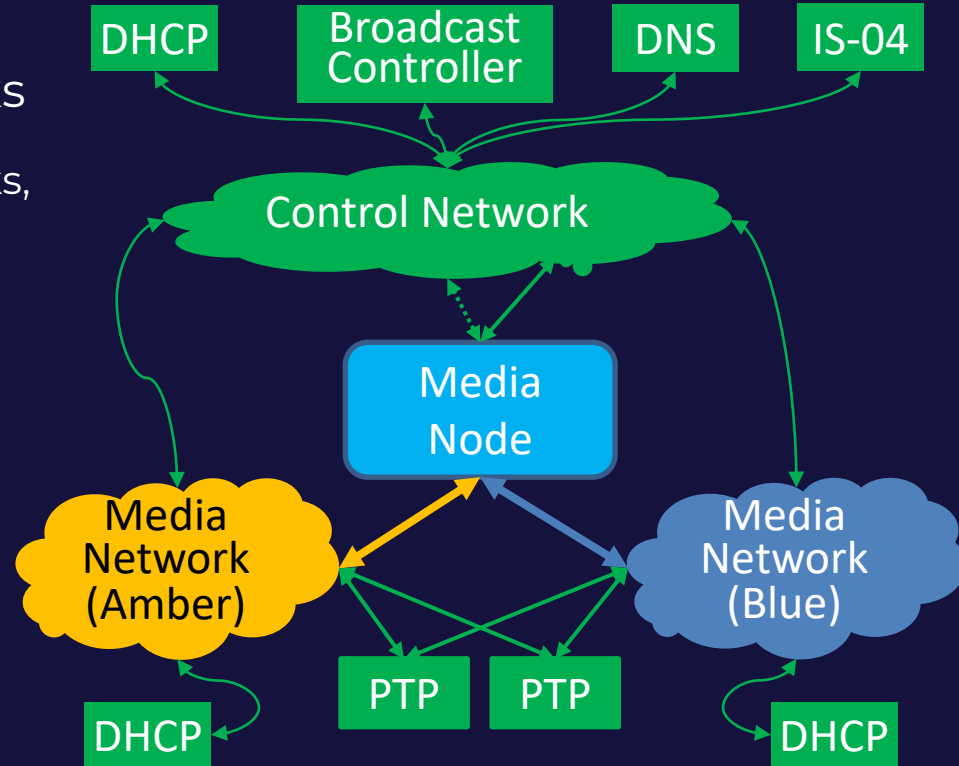
- System Startup Behaviors for Media Nodes
 - How nodes find the System Resource (via DNS-SD)
 - How nodes find the IS-04 Registry (via DNS-SD)
 - How nodes suggest grouping using BCP-002-01
 - How to identify if the current configuration is valid, out-of-date, or out-of-place (via System Resource)
 - How senders get their TX information (via IS-05)

Network Services – DHCP and DNS

- DHCP for Management and Media Networks
 - Eliminates the need to set host IP addresses by hand
 - Avoids errors and duplications
 - Tells the nodes how to find the DNS servers
 - Can securely register the node's hostnames into DNS
- DNS (Domain Names Service)
 - Nodes use DNS Service Discovery (DNS-SD) to find the IS-04 registration service and the system resource
 - Finding the System Resource and Registration Service are vital to system startup and system resiliency

Network Architecture Flexibility

- Unicast Routing between Management and Media Networks
 - Enables a mix of devices, some with management on the media networks, and others with separate management networks
- Separate Subnets for Main and Protect Media Nets
- Specific “Network Hygiene” rules
 - Every interface has unique MAC
 - Every interface has its own Host IP
 - Must support Echo-Request (ping)



Network Services

– System, NMOS, and PTP

- System Resource Service (provides global system constants)
 - Includes the PTP domain number and other PTP constants
 - Includes the registry timeout settings
 - Avoids needing to configure these by hand for every device in the system
- IS-04 (NMOS) Registration and Query Services
 - Nodes find the Registration Service using DNS-SD (not MDNS)
 - Nodes must register into the IS-04 Registry
 - Nodes should use the BCP-002 “grouphint” to signal natural groupings
 - Controllers look in the IS-04 Registry to find the nodes
 - Nodes update the Registry to signal switching events and other changes
- Precision Time Protocol (PTP)
 - as required by SMPTE ST 2110

System Startup Behaviors

- How nodes find the System Resource
 - Look up “_nmos-system._tcp” using DNS Service Discovery (DNS-SD)
- How nodes find the IS-04 Registration Service
 - Look up “_nmos-registration._tcp” using DNS Service Discovery (DNS-SD)
- How nodes identify if their current config is valid, or out-of-date, or out-of-place
 - Check the stored “system-ID” against the current system resource (to figure out if this is a new system and the configuration is invalid)
 - Check the time of the last saved configuration against the current system resource version timestamp (in case the node spent a long time in storage)

System Startup Behaviors

- How senders get their transmit configuration
 - If the config is current and from the same system ID, use the settings you have stored and start up
 - If the config is out of date or it's a new system:
 - Mute the transmitters
 - Disconnect the receivers
 - Wait for instructions
- Nodes shall support TX configuration via IS-05
 - A controller will configure new nodes

Industry Benefits of TR-1001-1

- Add New Media Nodes to a System Easily
 - DHCP (automatically) provides network addresses
 - DNS-SD (automatically) discloses the services
 - Devices follow specified configuration start-up behaviors
 - IS-04 registration and IS-05 controls integrate the system
- Gives Users a uniform set of requirements language
 - TR-1001-1 should be referred to in RFI, RFP, RFQ
 - Eliminates customers needing to create their own unique requirements documents covering these system basics
- Gives Vendors a consistent set of requirements to develop against when making IP Media System products

JT-NM TR-1001-1 Demo Participants



A Special Thanks to



For System Integration Services