

NMOS IS-07

GPI Replacement and Much, Much More...

Miroslav Jeras, CTO
Pebble Beach Systems

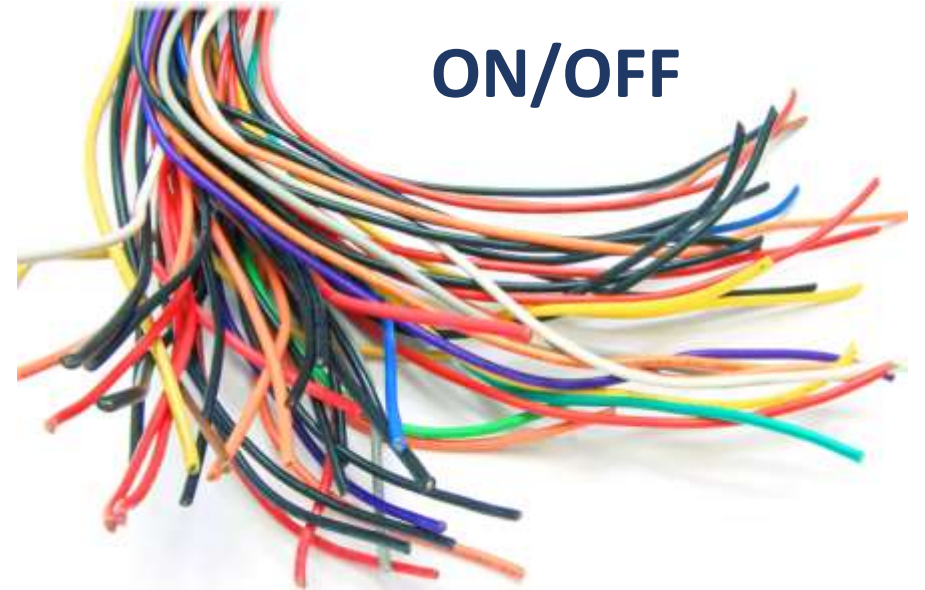
What is IS-07?

- AMWA Interface specification
- Full name: AMWA IS-07 NMOS Event & Tally
- A protocol that allows a source to publish its state and communicate its state changes to subscribed receivers
- Published on GitHub:
 - <https://github.com/AMWA-TV/nmos-event-tally>
 - <https://amwa-tv.github.io/nmos-event-tally/>



GPI Signals

- What is the traditional GPI?
 - Electrical ON/OFF signal used by the sending device to trigger an action on the receiving device
 - Carried by a physical cable
 - Not very practical for modern IP environments
 - Impossible on virtualized platforms

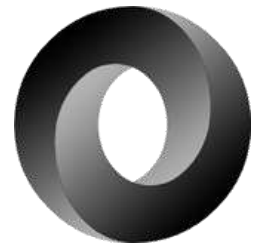


ON/OFF

GPI Replacement

- How does this translate into the modern IT world?
 - Logical (boolean) data type: true/false
 - Carried over the IP network
 - Formatted in a modern message format (JSON)
- But what about timing, networks introduce delays?
 - Messages contain a timing section with PTP (SMPTE ST-2059) based timestamps allowing for frame and sample accurate precision

true/false



JSON

ST-2059



Extending the GPIs

- Now that we have a nice JSON message, why not use additional types available?
 - string
 - number
- That's very nice, but how would a receiver know what to expect?
 - Type definition

"Las Vegas"

3.14159

"John", "Frank", "Mike"

-20°C – 100°C

Example IS-07 Message and Type Definition

```
{
  "identity": {
    "source_id": "1ea39324-a32b-4e1d-86e9-33f9956ebc60",
    "flow_id": "0d4a3430-ed34-42f2-9242-580409b5cafa"
  },
  "event_type": "string",
  "timing": {
    "creation_timestamp": "1532504241:104000200"
  },
  "payload": {
    "value": "ok"
  },
  "message_type": "state"
}
```

```
{
  "type" : "string",
  "values" : [
    {
      "value": "unknown",
      "label": "Device state is unknown",
      "description": "Device state is unknown. Check extension card is plugged in correctly."
    },
    {
      "value": "ok",
      "label": "Device state is ok",
      "description": "Device state is ok."
    },
    {
      "value": "warn",
      "label": "Device state is warning",
      "description": "Device state is warning. PSU 1 shows signs of failure."
    },
    {
      "value": "fail",
      "label": "Device state is fail",
      "description": "Device state is fail. No PTP reference found."
    }
  ]
}
```

Transport Mechanisms

- We have the JSONs, but how do we carry them across the network?

MQTT

- Common IoT protocol
- Broker based
- One-to-many
- Scalable

WebSocket

- Existing NMOS protocol
- Brokerless
- One-to-one
- Optimal speed

Routing and Grouping

- So, how does all this fit together with the rest of NMOS?
 - IS-07 uses the NMOS object model
 - Extending the existing senders and receivers with new transports **IS-04**
 - IS-04 registration in the registry
 - IS-05 connection management **IS-05**
- What about linking to the video and audio flows?
 - IS-07 resources are subject to BCP-002-01 – Natural Grouping
 - Signal metadata grouped with audio/video streams **BCP-002-01**
 - Multiple IS-07 signals grouped together

Use cases?

- GPI replacement
- Two-way communication between physical and virtual control panels
 - Buttons and button panels (triggers, labels, colour)
 - Sliders, knobs (position)
- Sensor readings
- Annotation of the media streams and metadata transfer



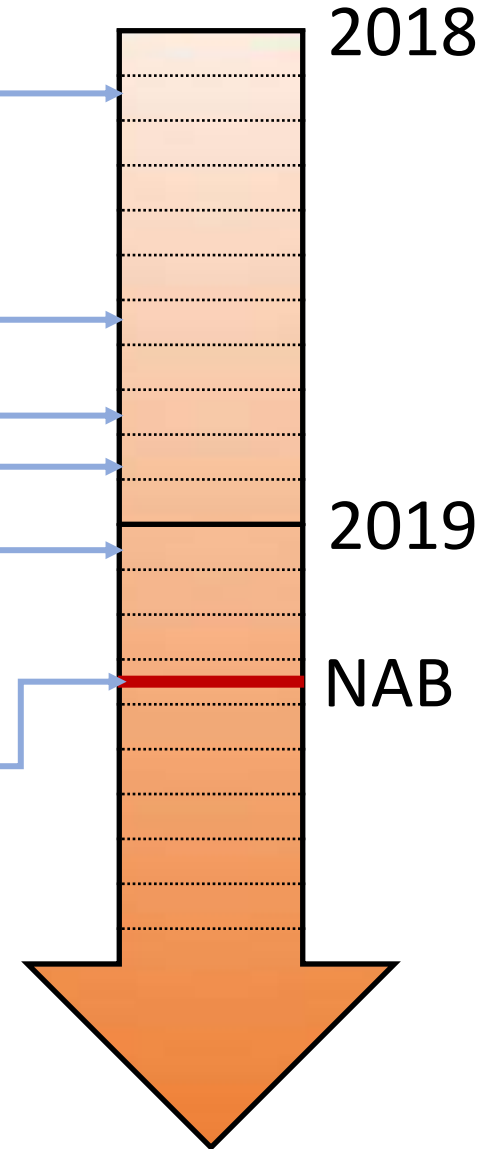
- Custom communication between devices in a system, controlled by the control system and on top of an open standard

Swiss Army Knife for System Integration



Timeline

- Early 2018: start of the project
- July 2018: the first workshop
- IBC 2018: the first demonstrations
- November 2018: approval by AMWA board
- January 2019: the second workshop with more implementations
- NAB 2019: IP Showcase demo marking the end of **Phase 1**



NAB 2019 IP Showcase Future Zone Demo

- Components:
 - Button panel
 - Playout automation
 - Multiviewer
 - Control system
- Data types:
 - Boolean
 - Button press
 - Number
 - Enumeration
 - Colour (RGB value)
 - String
 - Text
 - Timecode
 - Image (encoded)

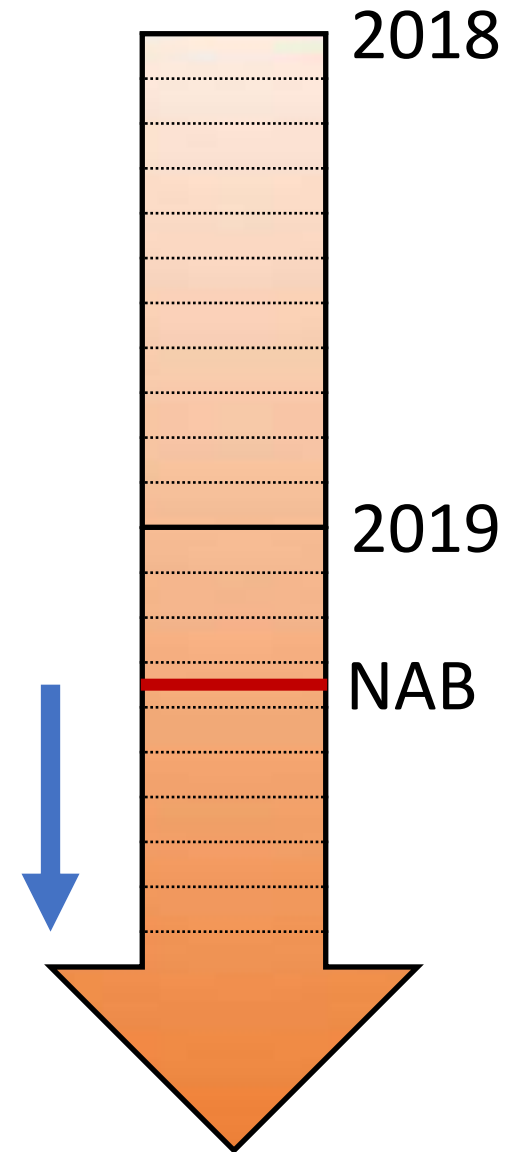


What is next?

- Standardizing device models:
 - What is expected from devices of a specific type?
- Complex objects
 - Type definition/validation
 - Incremental updates?
- More use cases
 - Telemetry?



- Tested at the next AMWA workshop
- First projects delivered in summer 2019
- Presented at IBC 2019





Thank You

Miroslav Jeras, Pebble Beach Systems (SL4528)

miroslav.jeras@pebble.tv



IP SHOWCASE THEATER AT NAB – APRIL 8-11, 2019