The Good, the Bad, and the Ugly

Open Specifications - why brilliant ideas don't always work out as expected.

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IP SHOWCASE

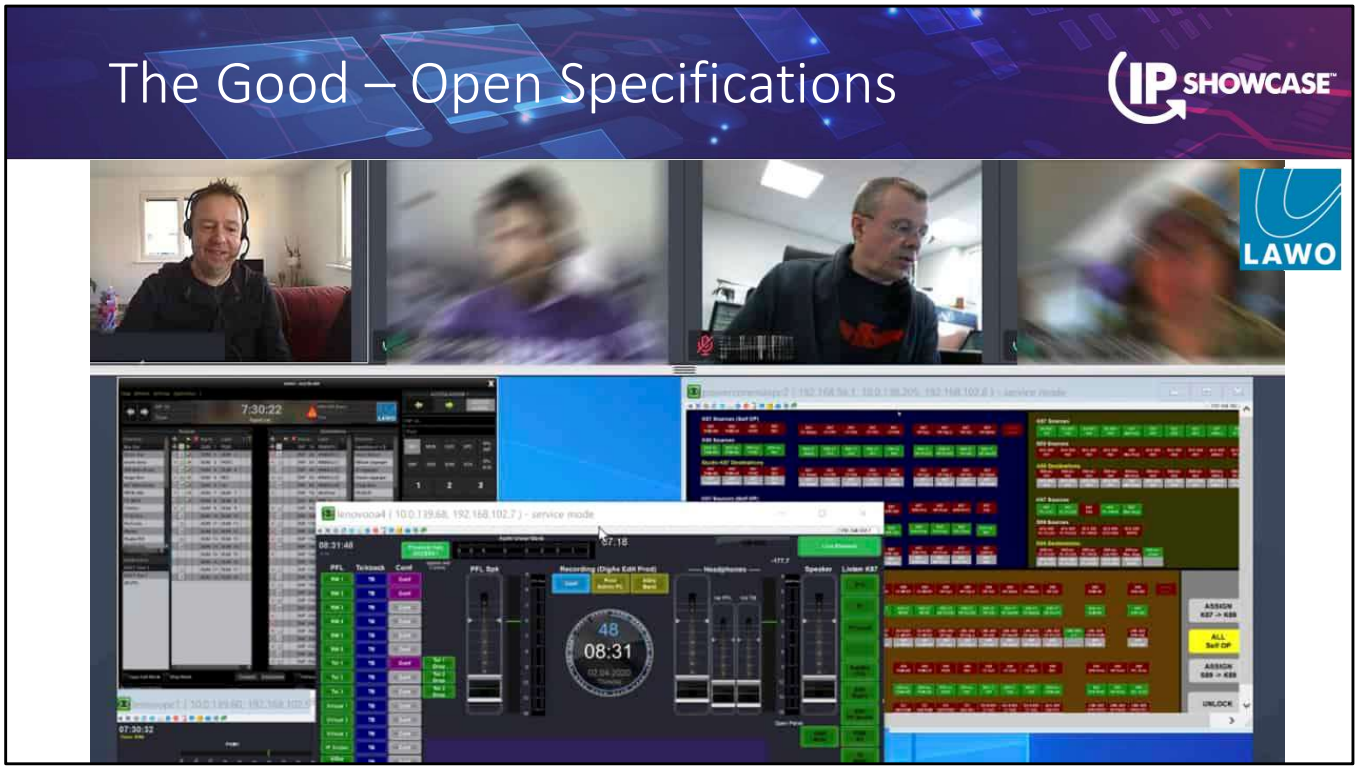
Audio Engineering Society · AIMS · AMWA Networked Media. Working. · EBU · SMPTE · VSF

The good, the bad, the ugly with open specifications… I admit, that famous film title might sound a bit provocative as a headline for a presentation at an industry event, where we all attend to catch up on progress and innovation.

Don't worry – it is not meant provocative at all.
But - it helps, to catch your attention. Your attention for a topic, which I believe could use some real-life insights for a better understanding….

You may have wondered, why the industry is making good progress with some standards and technical specifications, while others seem to take forever until they get adopted.

In the next minutes, I will try to shed some light into ***why good ideas are sometimes hit by the ugly reality…***



When technological evolutions transform an entire industry – like it happens with us at present – nothing remains as it is. We are moving our broadcast production infrastructures to IP, encode media data into packages and stream them from senders to receivers across local and wide area networks. We increasingly **benefit** from our new infrastructure architectures and begin to rethink our production workflows. Consequently, we break out of the boundaries of local installs and embrace the advanced possibilities of global networks. Our tools evolve into the cloud, as our workflows do.

Such transitions trigger engineering departments in many, many ways. Engineers want to make things possible, want to find solutions. Adapting to new technologies, enhancing existing product, developing something new from scratch – this is what keeps us busy, curious and excited.

The technological evolution **our** industry currently deals with is ‚huge'. It is *more fundamental* as the transition from analog to digital, complex in its nature and radically fast.

As an industry, we teamed up and pursued the higher goal of mitigating rising incompatibilities by

developing standards and open specifications to achieve a good level of unification across technologies.

The specifications for industry-wide technical unification have been perfectly summarized in the **Technology Pyramid for Media Nodes** by the EBU.

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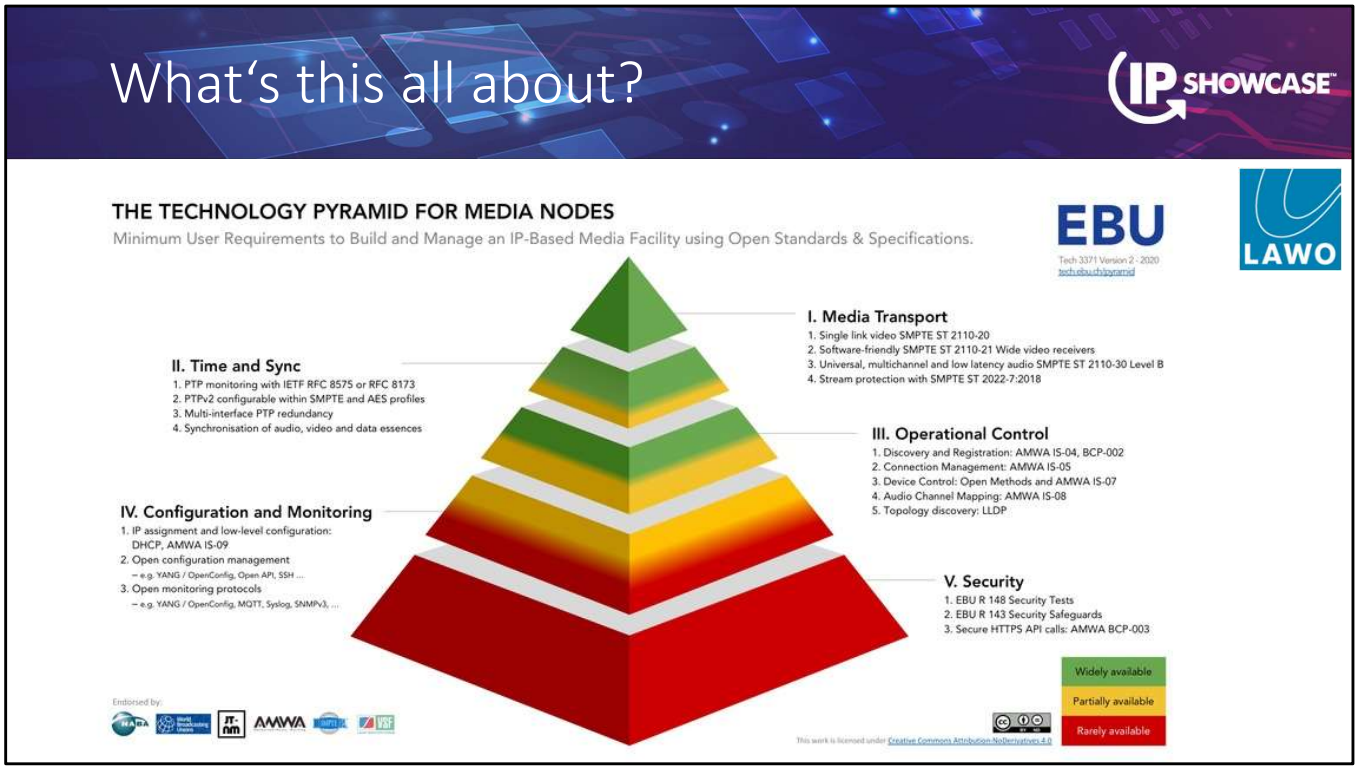
What‘s this all about?



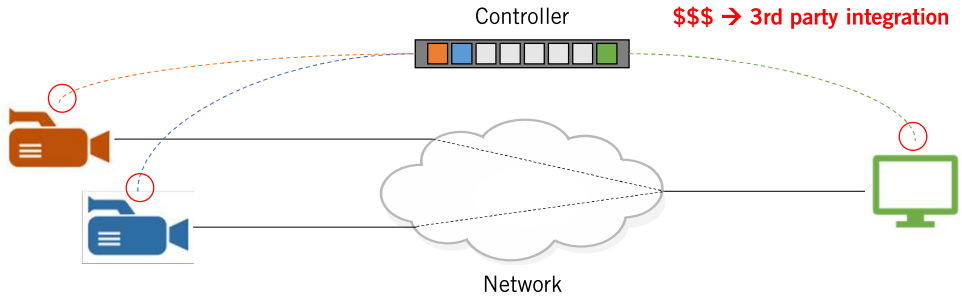
The pyramid perfectly visualizes various information:

- Firstly it shows the fields of applications our solutions will be utilized within.
    - Media Transport, Time and Sync, Operational Control, Configuration and Monitoring, Security
- Then, it explains which Standards and Open Specifications are recommended for a manufacturer to achieve compatibility with other products in a specific field of application.
    - In Media Transport, ST 2110-20 is clearly recommended for Single Link video
    - PTPv2 is recommended as synchronization within SMPTE and AES profiles.
    - The recommendation for a global Discovery and Registration mechanism is NMOS IS-04.
- And, it visualizes the current state of the adoption of these recommendations across the industry, by using a color code.
    - Green for a wide adoption across the market
    - Yellow indicating a partial adoption
    - And red is highlighting areas, where adoption is sparse.

The Good – Open Specifications

Example: NMOS Operational Control

- The traditional situation in broadcast control



Let me try to explain what standardization or following industry approved open specifications means in detail. I am using an example for this - NMOS operational control.

NMOS with its specifications aims to unify various mechanisms of operational control. From the discovery and registration of devices, to basic stream control, then parameter control, channel mapping, and authorizaton – to name a few. As system installs are always heterogenous, meaning, that no system install out there is realized as a single vendor solution, unification of operational control is highly appreciated, as interfacing between products of different vendors is not hazzlefree, likely costy and comprehensive in very few cases. Cost of integration traditionally has always been associated with the overall control system, which has the responsibility for the workflow integation.

Usually, devices offer proprietary control APIs for external controllers to get access to system parameters. Understanding these control APIs and using them was and is the job of a control system, which has a „driver“ for each of those APIs. If no driver exists, e.g. because an API is new or has changed, the control system has to learn it, a driver needs to be developed. That is a human task. And as engineers coding drivers generate cost, interfacing will be typically monitized.

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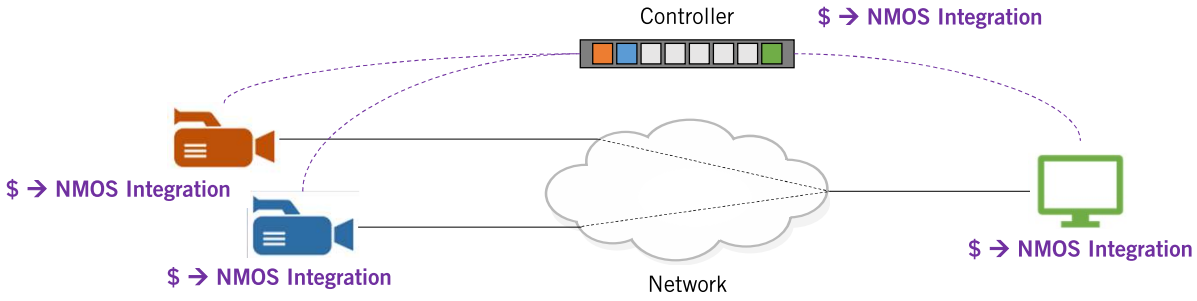
The Good – Open Specifications

Example: NMOS Operational Control

- Since 3-4 Years: No project tender without NMOS requirement
- Good reasons:



Since quite a while, we do not face any project tenders **without** NMOS as a key requirement. Some even request NMOS as a binding requirement. And the reasons for this are obvious. A technology shift introduces new products and mechanisms. New products come with new APIs and new mechanisms require different handling. Consequently, the need for adaptation especially in the control layer increases dramatically. Avoiding lock-ins through proprietary solutions or limited functionality through bad integration can be mitigated by unification, which is defined in open specifications.

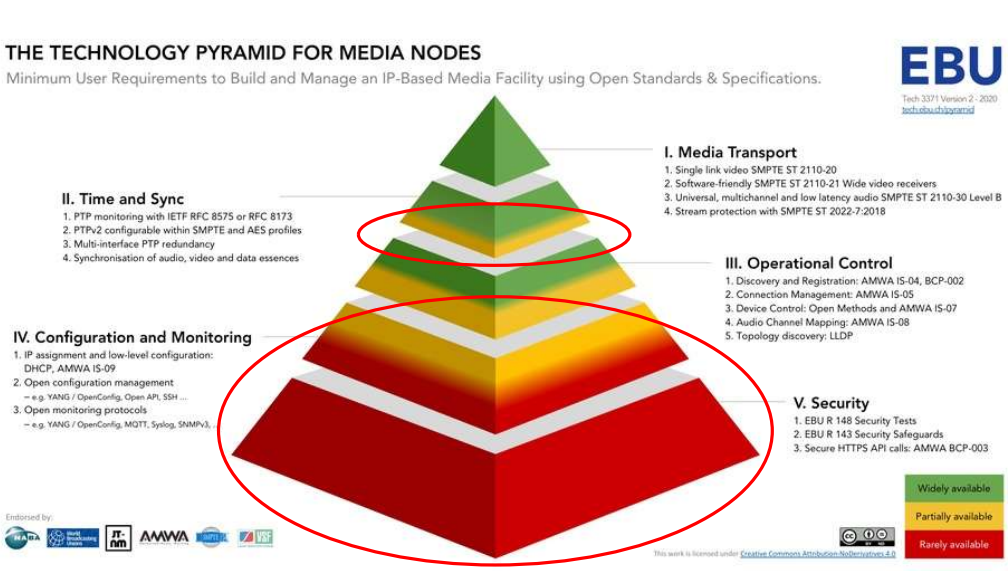
If sender devices, receiver devices, and the overarching controller integrate a common control specification, the responsibility gets spread. Which is one of the key intentions of a standard. And integration cost gets spread.

So unification through open specs is **GOOD**. Identifying existing or defining new open specifications and utilizing them for unification **is the way forward**.

To be very clear here: Also interfacing methods like NMOS need to be implemented into a device or a system, which again is an engineering task, which again costs money and therefore likely will be monitized once available.

However, the charming benefit of a commonly available and widely accepted interface is its inherent ability to be widely compatible by definition.
Initial driver developments can hardly be avoided, but recurring driver developments are likely to become unnecessary. API cost may have a smaller impact.

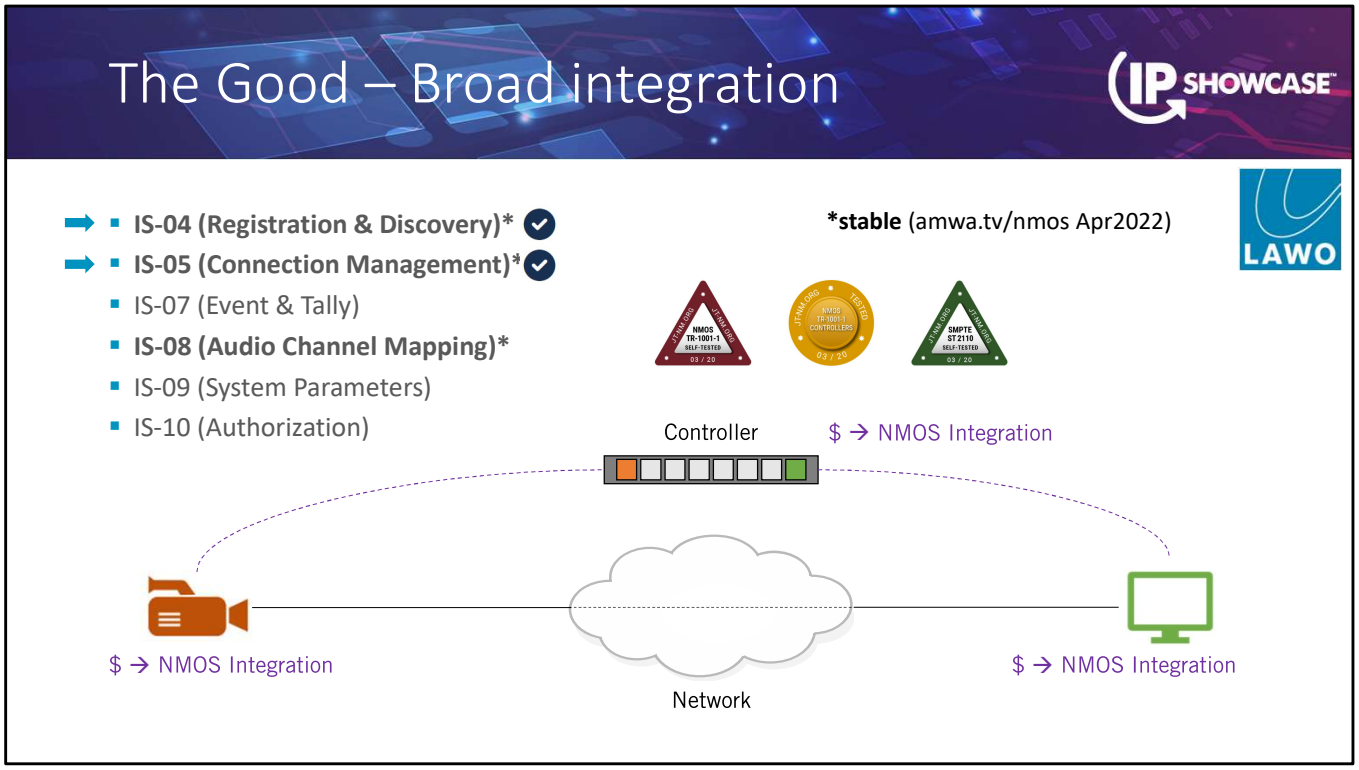
The Bad – Lack of integration



So, I mentioned the color codes of the pyramid.
Let‘s specifically look at the yellow and red sections. (CLICK)

Why are they colored yellow and red? Is the adoption of unifying standards, which were meant to simplify cross vendor integration, stalling?
Why don‘t vendors just go ahead an continue integration?

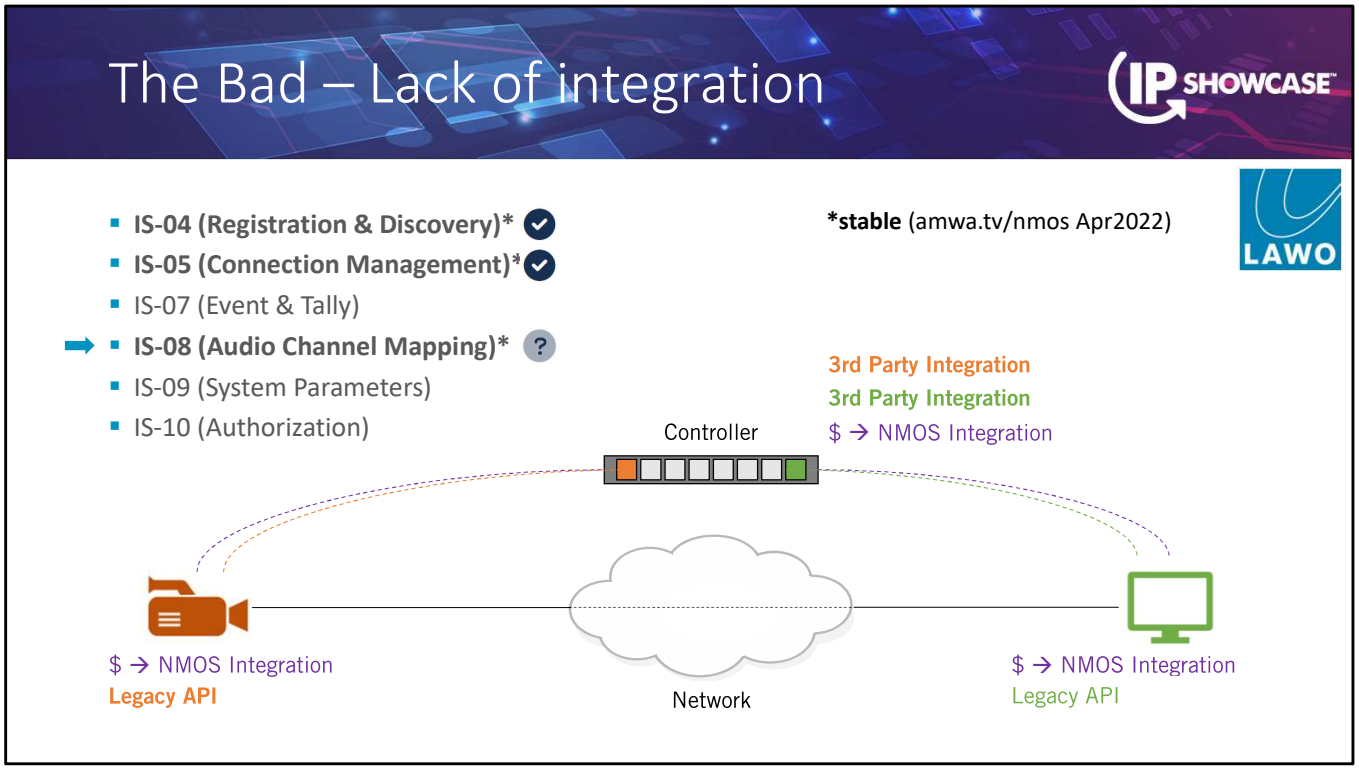
Well, let‘s get back to our example and talk about the „**BAD – the lack of integration**“.



A closer look at the current NMOS specifications helps to understand where we are at present.
Of these 6 NMOS specifications, IS-04 Registration and Discovery, IS-05 Connection Management, and IS-08 Audio Channel Mapping are stated „stable“.

IS-04 and IS-05 are facing a broader acceptance nowadays, compatible devices and systems can be found across the industry from many different manufacturers in all segments: edge devices and broadcast controllers. This wide acceptance may lead into further growth, as the specifications mature.

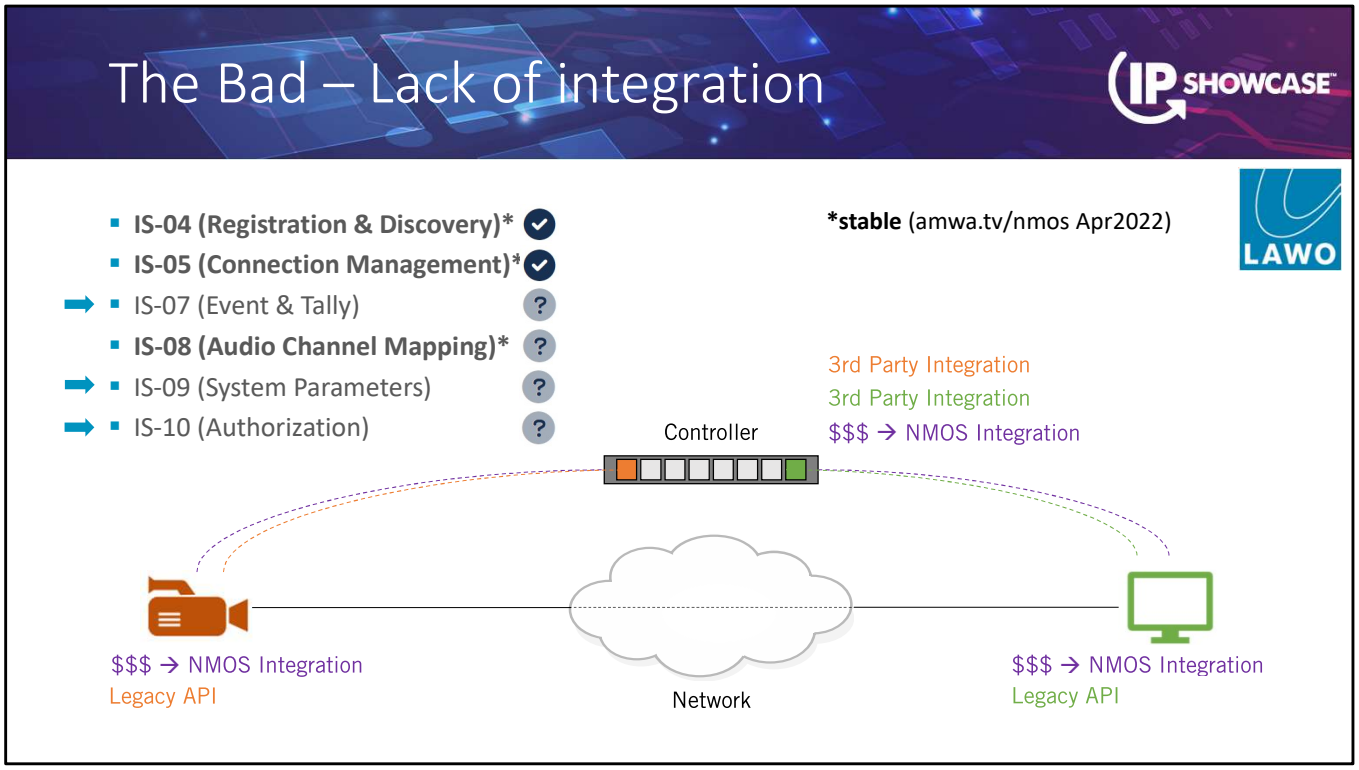
How could your project benefit now from the increasing compatibility? Many vendors state compliance, and industry organisations like the JTNM workgroup provide verification and certification of compatible vendor solutions in regular tests. The next one btw will take place in fall 2022. Watch out for „passed-test“ badges …



IS-08 is at the beginning of this acceptance increase, but not there yet.

One of the reasons for this is that many devices in the market, which use channel mapping functionality, are build on existing, well-proven platforms. Channel mapping addresses the IO matrix on the baseband side, before a stream gets packetized or after it is de-packetized. Many IO nodes in the field are based on existing platforms, where a baseband matrix as such and the control of that matrix have been available ever since. Given that fact, baseband matrices can already be controlled by well-known legacy control APIs, widely adopted across the market, so there is not a real urgency to add a new control API on top. Sometimes, there is even no possibility, for example when a product has no capacities for additional code.

This may mean for IS-08, that it will see increasing adoption with the advent of new IP-native IO solutions.



What about the other specifications – IS-07 Event & Tally, IS-09 System Parameter, IS-10 Authorization?

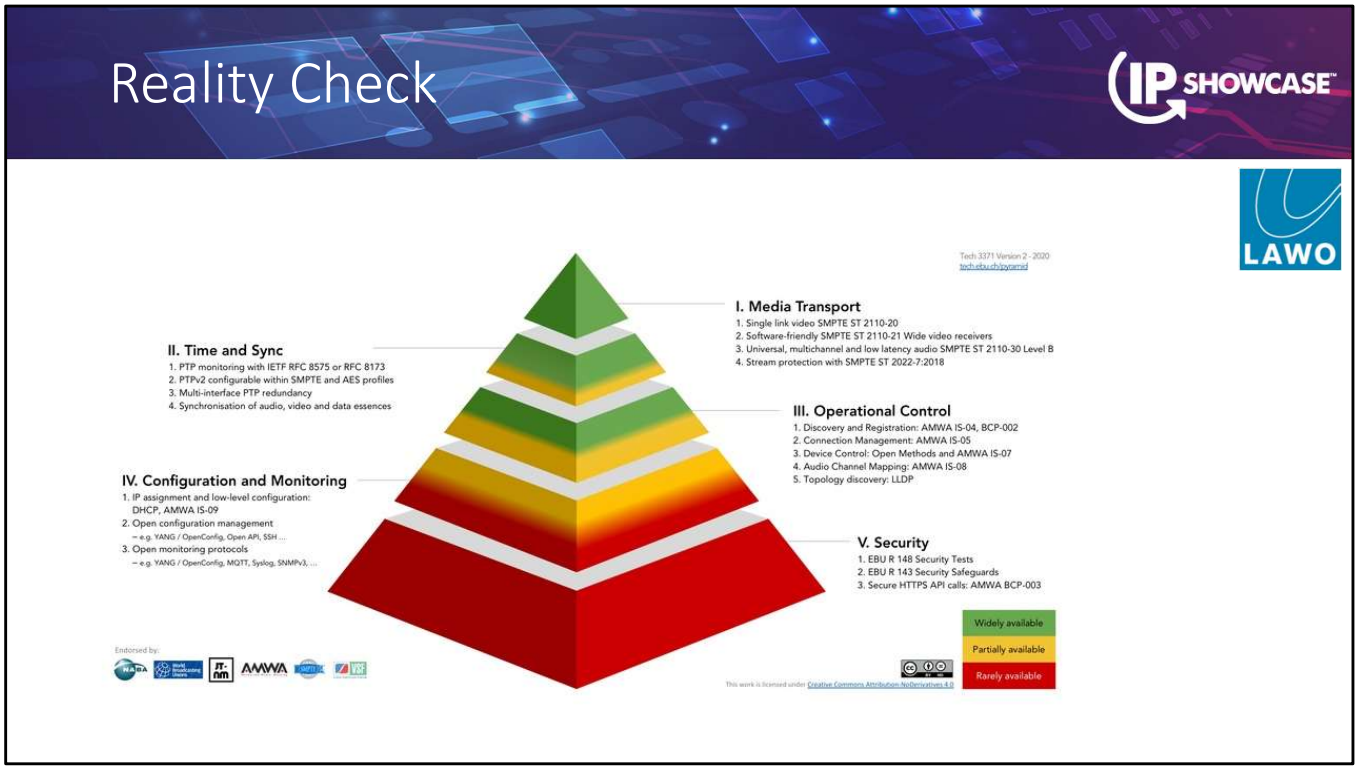
These specifications are currently in a stabilization phase. Stabilization means, that an implementation will be tested and verified against real-life measures – can it be implemented, will it scale, where does it misbehave - this usually leads to improvements and reworks, until stability is reached.

For those manufacturers, who integrate with a specification in an early stage, the risk is at hand. Iterations and reworks may cause an engineering team to throw away code and redo their job. This means extra cost and extra time. **Bad for the manufacturer,** as this time cannot be invested into product evolution. **And also bad from a customer perspective**. Utilizing non-ratified solutions may lead to reworks on a project site, causing delays and project cost increases.

Given all these risks, vendors usually prefer to wait for stabilization of a specification.

This begs the question of why vendors not just take that risk and mature a specification for an earlier acceptance? Well, lets have a final look at the pyramid!

Reality Check



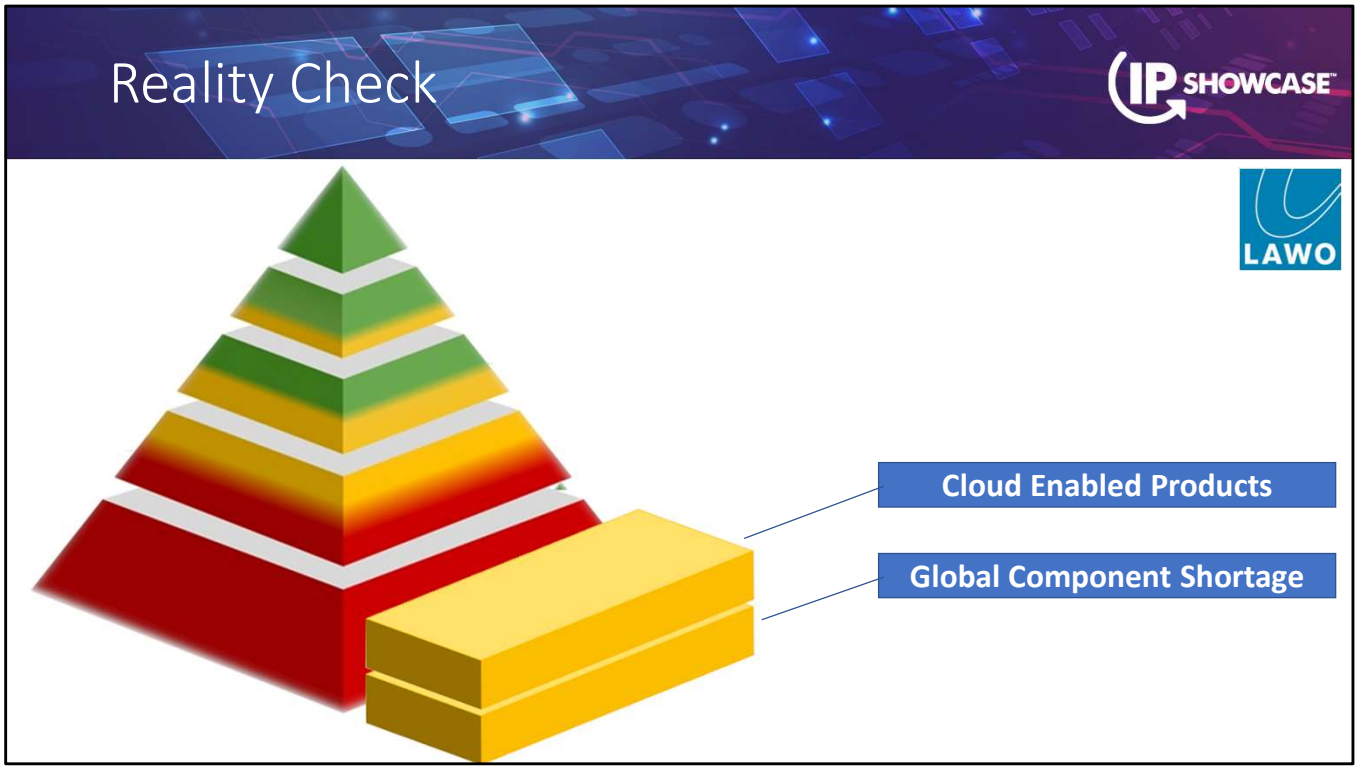
As mentioned already, the pyramid indicates the following information:

- The different fields of application for media nodes in an IP environment
- the recommended standards and specifications for general interoperability in these fields
- and the implementation progress in the industry in form of color codes

Beyond that, the pyramid also visualizes a 4th information – the actual size of a slice. It represents how extensive an integration in the field of application is expected to be.

So, if we take the slice at the bottom as an example – Security – the undergoing of applying mechanisms onto an entire product portfolio is a huge task for a manufacturer. Security can't be applied to just one product, maybe in form of a simple login/password dialog. Instead, it must be addressed as a universal solution to all systems and gear of relevance, and top-down, from the user interface to the data flows on the network. Consequently, applying security measures is a highly important, yet time consuming act of integration, which is addressed with many vendors, but still in the works -> Ergo: red.

And finally we should not forget the following: (CLICK)

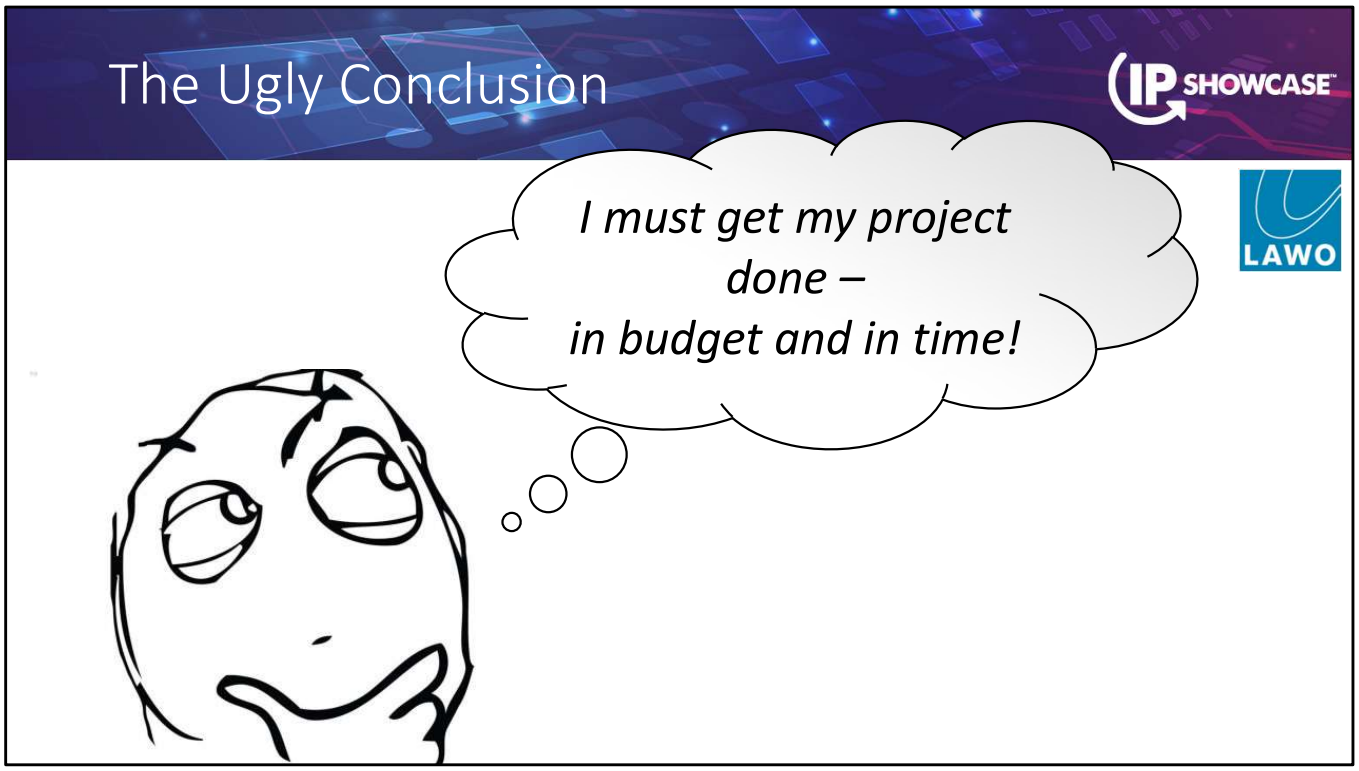


There are areas **outside** of the pyramid, which rushed into focus rather suddenly, and which require attention and commitment.

Over the past two years with the global pandemic, many of us and of our customers became creative and transformed their businesses, in order to remain productive and to be able to deliver their product. Remote production and cloud based workflows all of a sudden became the hot topic, and products, which were not intentially build for these environments, were forced to adapt – quickly. When you take a tour across the show floor, find it out yourself – Remote Production is not a niche application in an early stage anymore. There is broad experience with it all over the place, it has become a daily task, which now accelerates to the next levels. As a manufacturer, you cannot say no - you have to commit.

Like you can‘t say no to a forced redesign of your electronics. Like never before have manufacturers been hit by a global electronic component shortage, which overran our industry in the last year. Price rises for example from 8$ to 250$ for a selected circuit became a reality, some components could no even be delivered any more – without any of the usual prenotifications.
This forces a manufacturer from one day to another, to source comparable alternatives, adapt the supply chain and … start to redesign existing hardware as a unscheduled high priority task. This extremely time consuming undergoing is necessary to remain

operative, but it brings 0% functional evolution – the redesigned product does exactly what it did before the redesign.



So - what is our conclusion:

There are reasons for the perceived slow availability of some specific standards and specifications, and these are directly related to our everyday work.

Standardization of cross-manufacturer technologies always finds broad and rapid acceptance when there is no alternative and they've reached stability.

If one of these characteristics is missing, the adaptation loses momentum.

It is important that we understand that customer projects will not suffer from this as a result, because it is in all of our interests to bring a project across the finish line - either with standardized solutions or a stably working proprietary solution.

Many thanks for your attention.

Thank You ….. Or ….. Any Questions?

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