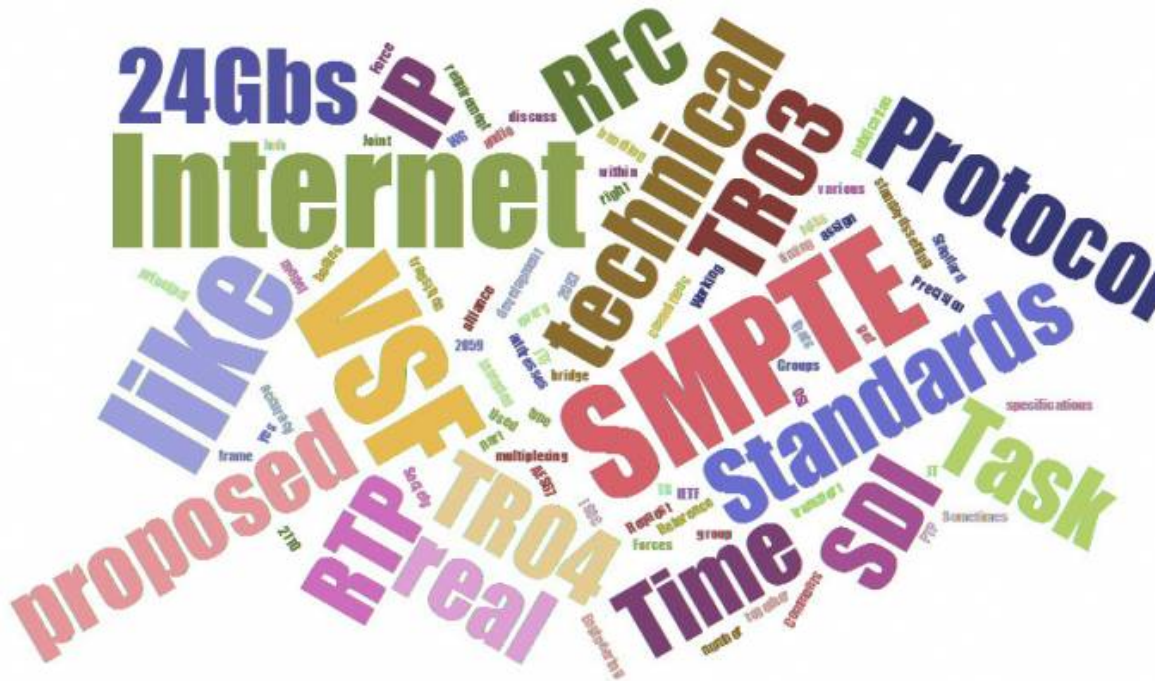


Understanding The Technology Behind IP Standards: Part 2



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Consultant Gary Olson explains key IP definitions and related technology terms.

The broadcast and production industries are filled with acronyms and terms. The author provides guidance into understanding key standards and technology.

It was suggested to me when I proposed this sequel that writing about acronyms could be ones' life's work. There is a never ending supply and new ideas for standards come out every day it seems. There were several comments on [my last definitions article](#) so I will address them as well.

There are also a number of joint working groups between organizations and I did not feel it necessary to list them all. Associations come and go, their names change as their direction or vision changes, and it's

tough to keep up. So I won't even try. My apologies to any I haven't mentioned. [yet]

First a few clarifications.

TR –Technical Reference – Used by VSF for the TR-04 and TR-03 are PROPOSED standards for IP transport

VSF TR-04 is intended to bridge the transition to VSF TR-03 by “bundling” (huh – is that like multiplexing) SDI with more AES67 audio and timing within RTP (Real Time Protocol- part of the OSI model). But then there is PTP (Precision Time Protocol- SMPTE 2059) that addresses the frame accuracy requirement RTP does not.

RFC is a **Request for Comments (RFC)** a type of publication from The **Internet Engineering Task Force (IETF)** and The **Internet Society (ISOC)**. These are the principal technical development and standards-setting bodies for the Internet.

Working Groups (WG) are like Joint Task Forces (JT or JTF). These are committees of the same folks that are in every other alliance and group that get together to discuss the various proposed specifications for Standards. Sometimes they assign a real Standard number like SMPTE 2110 for IP and SMPTE 2083 for 24Gb/s SDI. Yes that's right 24Gb/s.

And then there's **RDD** (registered disclosure document)

So TR and RFC are NOT standards, and other proposals like NMOS (Networked Media Open Specification) are NOT standards. A Technical Reference and Request for Comments are polite suggestions of proposed good ideas presented to the Standard Organizations like SMPTE, IEEE, IETF, ISOC and ITU for consideration.

- SMPTE 2022 in all its parts is a Standard
- SMPTE 2059 and its parts is a Standard
- SMPTE 2036 is a Standard
- As is SMPTE 2082 & 2083 (this is a test on what these standards are)

Back to the Terminology

So coming out of NAB the focus seems to be on UHD and HDR. That is enough and I promise to take a rest from the attack of the acronyms.

Let's start with HDR

HDR – High Dynamic Range this is essentially more contrast and deeper color. *Small piece of history – The SONY Trinitron changed the dynamic range on CRT TV's by using a black background and changed the shape and alignment of the “dots” on the screen, thus giving blacker blacks and richer colors.* So here we are again. HDR is the broadening of the contrast ratio and the deepening of color on a display. In the Edit Room, there's always a delicate balance between good black to white contrast ratio and color saturation that lost those qualities in transmission and ending up too dark at the consumer end point.

HDR is the 2016 way to produce and deliver the same thing so the consumer sees the content the way it was seen in the edit room. Audio HDR is the same philosophy – extending the dynamic range to the listener.

UHD – Ultra High Definition – This acronym started at CES because no one understood 4K or was interested in it. Enter UHD as better marketing. But wait. We now have an entire UHD Ecosystem and standards galore. It is so exciting that SMPTE even has a UHD wall chart, stay tuned for the mini series.

- UHDTV1 started as 2K, but got a promotion to also mean 4K. Probably because no one really knew 2K existed.
- UHDTV2 is 8K – Remember the Olympic Broadcast Service stated *4K was a bus stop for 8K*.

So what does that make 5K and 6K? Rest Stops?

Here are just a few of the SMPTE UHD standards and 1 ITU UHDTV standard

UHDTV By the Numbers

1. UHDTV1 - 2160p (3840x2160)
2. UHDTV2 - 4320p (7680x4320)
3. SMPTE ST 425-3:2014. Image Format and Ancillary Data Mapping for the Dual Link 3 Gb/s Serial Interface
4. SMPTE ST 425-4:2012. Dual 3 Gb/s Serial Digital Interface for Stereoscopic Image Transport
5. SMPTE ST 425-5:2014. Image Format and Ancillary Data Mapping for the Quad Link 3 Gb/s Serial Interface
6. SMPTE ST 425-6:2014. Quad 3 Gb/s Serial Digital Interface for Stereoscopic Image Transport
7. SMPTE ST 435:2012 (3 Parts). 10.6921 Gb/s Serial Signal/Data Optical Interface
8. SMPTE ST 2036-1:2013. Ultra High Definition Television — Image Parameter Values for Program Production
9. SMPTE ST 2036-2:2012. Ultra High Definition Television — Audio Characteristics and Audio Channel Mapping for Program Production
10. SMPTE ST 2036-3:2012. Ultra High Definition Television — Mapping into Single-link or Multi-link 10 Gb/s Serial Signal/Data Interface

ITU UHDTV Standards

1. Recommendation ITU-R BT.2020 (2012). Parameter values for ultra-high-definition television systems for production and international program exchange

That's a pretty good range of standards to remember. But what do they really mean?

So it appears SMPTE 425 in all its flavors is about 2 wire and 4 wire 4K SDI over a 3Gb/s link. 435 is the 3D version on 4 wire and 435: 2012 ups the ante to 10.6921 Gb/s (really?)

And what about SMPTE 2082 & 2083 (Bet you thought I forgot).

SMPTE 2082 is actually a suite of Standards. (Hmm a suite of Standards)

As stated the **SMPTE ST 2082** is all about mapping of various formats onto a single-link, dual-link and quad-link 12 Gb/s SDI transport

And **SMPTE 2083** is taking the adventure to 24Gb/s. Of course this is still in working group 32NF-70.

So while the IP battle continues, the coax challenge stands strong. And by all reports with no end in sight.

And to sum it all up, we not only don't have a single coax solution and we don't have a single IP Standard.

We are definitely in interesting times.

Other related articles posted on The Broadcast Bridge.

[Understanding the Terminology Behind IP Standards](#)

[Decoding IP terminology: Part 1](#)

[Decoding IP terminology: Part 2](#)