Key Issues

If the new buzzword is VR, broadband needs to get to 1 Gbps now

- **Investment in the US in VR has reached $1.1 billion in 2016 to date**
- **Technology never sleeps, and broadband can never be allowed to rest**
- **Faultline said that Arris had launched the wrong product in the wrong market**

Since the start of 2015 the buzzword in the video industry has been OTT – we may have discovered a new word, at present whispered rather than shouted, which will drive the industry for the next two years and that's VR.

Old hacks like us go back to multiple Virtual Reality hype curves of the 1980s and 90s, and we may be far more skeptical of the term VR, but there is some evidence, seen at NAB and TV Connect demonstrations and associated thinking, which suggests that the new Oculus Rift driven hype curve for VR is being taken seriously enough for it to form the basis of the next generation access networks designs.

One presentation we saw at TV Connect this week saw it as the killer-app to drive access network regeneration for the next decade. An Arris presentation went so far as to say that to support an existing Samsung Galaxy VR headset right now it requires 17 Mbps to the home, and translated that to 200 Mbps if it was delivered in HD and north of 500 Mbps when UHD VR was introduced.

Another demonstration we saw on the Viaccess-Orca stand, showed what a single UHD stream looked like in a VR app which immersed you in a soccer stadium, able to follow around any player that you wanted, rather than rely on the editing decisions of a camera crew. Viaccess execs told us that what was needed was a "zoom" function so that you could confine the screen to watching a smaller part of the pitch, and that this would come in its next edition. You can easily see where the estimate a 500 Mbps for a full UHD VR stream comes from.

The Viaccess-Orca interest in VR is unlike anything it has developed in the past – it is usually led by its parent Orange's technology needs – and instead has combined with France's TF1 and Sky Italia in these VR demonstrations, around a French international soccer game and further professional basketball league. The video stream runs with a 20 Mbps set of video feeds, being stitched together using cloud technology from Videostitch, as the headset turns 360 degrees, using encoding technology from Harmonic.

In a side discussion with Elemental CEO Sam Blackman, he said, "If I was not doing this (running Elemental), what I would do is a VR start up. It's really exciting and they're doing some great things," which perhaps gives us an idea of what may entice Blackman to stay at Elemental after he works through any earn-out he is on at AWS - put him in charge of enabling VR services from the cloud.

Investment in the US in VR has reached $1.1 billion in 2016 to date, according to Digi-Capital, with $793.5 million spent in a single investment in VR firm Magic Leap,

During 2015 VCs spent only $692 million in VR funding in services, hardware, advertising, marketing, distribution, video, peripherals, apps and games, triggered by the rise to prominence of Oculus, HTC and Sony VR gaming platforms.

All this goes to show that technology never sleeps, and from our point of view broadband can never be allowed to rest, or the technologies driving it – because the question of how you get from the 50 mbps broadband of today's telco networks, or even from the 300 Mbps broadband access networks of the cable operators, to 1 Gbps and 10 Gbps broadband access, turns out to be already in the planning stages and vital for the future of VR.

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A presentation from Arris pointed best at this and threw some light on the G.hn based broadband extenders that Arris launched last week through US retail. Charles Cheevers, CTO for the CPE division of Arris told us, "We can already do this with MoCA (backhaul WiFi extenders) and we can now do this with powerline as well, using existing fixed lines as a backhaul for WiFi. Already 30% of US homes have gone out to retail and bought WiFi extenders, so we can see the need for this emerging already."

Last week Faultline said that Arris had launched the wrong product in the wrong market, given that the US was really a MoCA market place with tons of coaxial cable in most homes. Cheevers shrugged as he agreed, but pointed out that it now has a decent SURFboard retail brand, and had already solved the problem of backhauling with MoCA, so the G.hn versions, both powerline and coax, were simply next in line.

"There's no religion here. Different operators want different flavors and we are happy to be in all the technology camps. What we are seeing in DOCSIS 3.1 is 1 Gbps coming to the home, but right

now the problem is that there is no way to distribute that kind of signal around the home at the same speeds. If you put an 8 x 8 WiFi chip in the middle of the home, that might work, but we are finding that home owners tend to have their home gateway in a basement or at one side of the house. So we are moving to a multi access point (AP) strategy with one 8 x 8 MIMO device, and perhaps two extenders that work in 4 x 4 MIMO." Higher volumes of APs will likely drive down pricing and make this affordable.

"We will also look at adding Bluetooth and Zigbee to the mix for home IoT apps and adding a 60 GHz WiFi signal as well for a 20 Gbps connection across a single room." WiGig is a 60 GHz protocol under the WiFi banner, running at around 7 Gbps although other systems have witnessed faster speeds, up to 20 Gbps.

WiFi has to be faster than its access connection, because a lot of home network traffic is generated inside the home

Cheevers also claimed that Arris has been one of the strong drivers behind the recent MoCA 2.5 standard, which uses 5 x 100 MHz MoCA channels to push 2.5 Gbps around the home. He sees this as one potential way of backhauling the multiple APs in a home and keeping the WiFi signal at around 2 Gbps to 2.5 Gbps usable.

The truth is that WiFi (or any home network) has to be faster than its access connection, because a lot of home network traffic is generated inside the home, say from a DVR, so the WiFi has to carry all the internet traffic plus in-home connected traffic. So 2.5 Gbps is good perhaps for a 1 Gbps internet connection. Going back to that VR signal at UHD, this makes for at least 2 players connected directly to the internet.

Cheevers told us all this at TV Connect, but has practiced the same presentation since March when he gave it to an investment audience at the Arris investors day, designed to show the kind of transitions that are happening at telcos and cablecos both inside and outside the US, and what implications it had on Arris's future.

Executives at that presentation directly addressed the issue that we have raised over Arris' future, that in the post open access set top world, envisaged by the FCC open set top initiative, the set top may become a retail proposition, and Arris has nothing like as good a retail brand as it has among its direct operator clients. Part of its answer was the way it had sponsored Nascar racing in North and South America to drive its brand with the public, and the company pointed to the tough opposition it faces, not from

consumer electronic brands like Samsung and Humax, but from Technicolor merged into the Scientific Atlanta part of Cisco, which has all the same retail brand problems.

Technicolor underscored this by announcing at the TV Connect show that it is supporting Comcast's consumer trials of DOCSIS 3.1 gigabit Internet service in Atlanta with a gigabit modem that Comcast will use in some of its early deployments.

Arris CEO Bob Stanzione told the investor audience in March that its combined business with Pace has supply arrangements with AT&T, Comcast, Charter, Verizon and Altice – all major US operator buyers. "Every one of these wants to improve how WiFi works and in particular the measures they have for customer satisfaction."

Another player in this market told us at the show that some US operators have as many as 1 million truck rolls a year, where most of the problems found are WiFi related, and a high percentage return with "no fault found."

Cheevers addressed this, "One of the most frequent calls operators get is to ask for the WiFi password in the home," and his demonstration, very similar to one we saw on the SoftAtHome stand, was to talk into a voice based TV remote control and simply ask, "What's my WiFi password," whereupon it came up in the middle of the screen. If that was responsible for 20% of calls, then that small demo is going to cut that operator's truck rolls by 200,000.

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But the demonstration went further. The idea seems to be that the "retail" product that we were so savage about last week, becomes an operator product, which we can see as working far better in the US for Arris, at least until it builds up its retail brand. So the WiFi extender is just part of the solution, and if you add a concept we first came across at Turkish WiFi player AirTies, where the system "steers" a WiFi client automatically to a particular AP. There are a variety of ways of doing this to get around the bad apple and sticky AP problems associated with some mobile products, but essentially the AP either tells the device to talk to a different AP, or it cuts it off and refuses to respond to a request to reconnect, so the device connects to another AP in the home in a few hundred milliseconds.

Cheevers showed a network diagram coming up on the TV screen, where those devices getting too slow a connection were in red. By clicking "fix me" on the red button, the device looked for a better

channel or better AP and turned itself green. This redistribution of WiFi connections can be offered to the home to fix, to the remote help desk to operate or to an automated policy manager, and all three are in the works says Cheevers. That should see most of the other truck rolls eliminated.

But more to the point, this will get a WiFi product far closer to its theoretical maximum MAC performance, on a real world basis, so we can see that two or three APs in a home can reach over 2 Gbps throughout in the 5 or 6 main rooms.

It looks like at least US operators are doing their bit to get the world ready for VR enabled access networks

While we know that Arris is not unique in thinking all of this, because this is also internal thinking at US operators, shared with equipment providers, it does show how the wall which appears to be in place, preventing broadband from going any faster until WiFi is "sorted out," is clearly not a barrier which the market is ignoring. Cheevers says the plan is to shift to 1 Gbps access networks within two years and then drive right through them to 10 Gbps, soon after. So it looks like at least US operators are doing their bit to get the world ready for VR enabled access networks, and have primed their suppliers accordingly. Telcos of course will have to move to fiber connections to make this all happen.

At that Arris investor day, the senior executives also addressed the issue of the FCC open set top initiative, pointing out that there would be a two-year compliance window, for standards that in some cases had not been selected yet, and in other cases had not been set yet. And that actually, presuming that Arris could establish a similar market share through retail, the margin was higher than its existing operator margins. They also pointed out that for some operators it would mean accelerating their switch to IP networks, which would mean lots of CCAP business for Arris in the meantime – painting the entire transformation as one that could be made to spin as positive for Arris. We continue to believe that it plays out better for Cisco and some others, but accept that even if the set top market dilutes or fragments, there would be a solid chunk of Arris that continues to make gains.

This week Arris said that it has sold its VAP 4300 G.hn backhauled wireless extender to Norwegian service provider GET to optimize home WiFi, citing internal research that said that 54% of people want to extend their WiFi beyond its current range, which will give G.hn an opportunity to flourish in Norway for the first time.