Constellations Podcast

Episode 26 – Latency, Link Optimization and the Need for Speed

Speaker: Jack Waters, CEO, XipLink – 22 minutes

John Gilroy: Today on the Constellation's podcast, we'll talk about the need for speed to stay ahead of the competition in the satellite industry, and the importance of optimization technologies for the government and commercial sectors. We'll also talk about the impact of the growth of high throughput satellites and how it has affected the satellite ecosystem, both from a business and technical perspective.

Our guest today is Jack Waters, CEO of XipLink, a company that specializes in wireless network optimization solutions. Jack has a wealth of experience in the satellite industry having previously been the SVP of sales at iDirect, where he helped lead the turnaround of a failed dot.com company with sales under one million to a market leader in the IP broadband VSAT business. While at iDirect, Jack created one of the strongest sales and distribution organizations in the satellite equipment market.

Wow, I'm just going to jump right in with that background. How are you, Jack?

Jack Waters: I'm doing great. Thanks, John.

John Gilroy: Let's jump right into latency. So, talk about latency and people have been worrying about this since the beginning of satellites, you know? It reduces the speed of communications and leads some IP capabilities to be throttled back. For example, first responders and warfighters, often times, just get a fraction of the throughput they need, and more importantly what the government is paying for. It's a big probably here. So, Jack, tell our listeners a little bit about how these latency problems can be addressed.

Jack Waters: Yeah, thanks, John. It is a big issue in the satellite business. I'll just start with the geospace. We'll treat that as our normalized situation, and in the geospace, there is what's called 600 milliseconds of latency that's absolutely guaranteed. When TCP/IP protocols came about in the internet era, they actually were not well adapted for high latency. So, several people in several companies built what are called TCP accelerators to mitigate the impact of the latency. That was very successful.

Over time, that went from being a stand-alone kind of function, in terms of mitigating latency into the actually VSAT's themselves. So, iDirect, Hughes, all the others now build in TCP acceleration into their modems, it's so important. So, that was the first step in mitigating latency. We've added several other

things since then that help the return channel especially because that's the most constrained part of the link. We do a few technical things. I won't go into too much. But, they're self-explanatory like, fast start, which is the ability to start transmitting as soon as you connect, as opposed to waiting for handshakes.

We have something called acknowledgment frequency reduction, which is another mechanism to reduce this small pack of traffic and help the actual snappiness, the quickness of the connection. To the user, it ends up seeming faster, and we're just making up for the inefficiencies of the TCP protocol in the middle.

John Gilroy: So, there must be special saucer or differentiator that XipLink has. What are you bringing to the party that's different from the other folks?

Jack Waters: A typical TCP accelerator today is embedded in the modem, and first of all, I'll start with the easy one. Military or anyone who wants to encrypt their traffic at the edge, which is becoming more and more prevalent, they will encrypt it, which will defeat the acceleration in the modem. They will have to put some sort of device on the clear side of their local area network before it hits the encryptor and that will allow full utilization of the traffic.

You mentioned in your introduction that the military only gets 10 or 20 percent of the actual link throughput, and that's true. It's bad enough without acceleration, but when you add security devices, it's even worse. There's more handshakes. Instead of three, there's seven, or eight, or nine, and therefore, it becomes even worse. You put what's called a stand-alone accelerator before the encryptor and the through-put ends up being full rated speed. So, that's kind of one scenario.

The second scenario is the more traffic, the higher the bandwidth, the more connections there tend to be. The modems that have embedded these accelerators were built for relatively low speed. Right? Two to 20 megabits per second. And now that we're going to higher speeds, and higher throughput, they literally can't keep up with the number of connections, and the speed. So, they need a front end processor like ours to put on the link. Our differentiator is the number of connections we can have per dollar. The highest capacity connection you can have, which for us is a one-gigabit link. For most players is, you know, less than 100 megabits. We differentiate ourselves with cost per bit and higher speed.

John Gilroy: So, you're referring to a TCP connection here, right?

Jack Waters: Correct. But, even non-TCP connections have to be managed. We do that through a quality of service mechanism that we built into our product. And

then, we also act on some of the UDP, or non-TCP packets as well, improving throughput there with a different technique. And that is aggregating small packets into larger packets and guaranteeing throughput through the links. So, it's a different technique, but the same result.

John Gilroy: I deal with software engineers and I remember years ago there was a server that was actually a hard drive sitting in a rack down the hall, and then it became virtualized. What I see is that a lot of the acceleration is taking the same kind of a road. Is that a parallel there? Is that what I see happening?

Jack Waters: Absolutely. About two years ago, we created a product line for that reason, where traditionally people had bought appliances. So, we have a product line called the XipLink appliances XA. It's still our largest seller, but over the next few years, we expect that to move to XipLink virtual, our XV product line. That's where, you know, the customer buys white labeled hardware, and they virtualize the XipLink function, both at the hub site and the remote site. It's extremely useful.

I'll use an example, in the maritime business where they have five or six different functions that used to be five or six different appliances in the rack, and now they can put in one piece of hardware, and virtualize those same seven or eight functions in one piece of hardware, and have one spare instead of seven or eight spares, since you're out at sea for a long time. And so, we see a movement there.

It also helps reduce the weight and size for the military. On a backpack, or a SOCOM operation, where they need to reduce the size, reduce the weight, so they can be carried furthered distances. We can take XipLink and a few other functions that they use and put them in one piece of hardware instead of several. It's going to be great for the business.

John Gilroy: You know, years ago, I remember when IBM came up with virtualization, I never thought it would be applied to so many different areas. It's applied to virtual servers. It's being applied to networks. it just amplifies things so quickly. It's easy to manage, easy to maintain. It's really a breakthrough in technology, isn't it?

Jack Waters: It really is. It puts a little more pressure on the network engineers, so that's for the customers listening, that's probably one of the key things to be successful if you start to virtualize, is make sure you get your network engineers trained, or hire trained companies that understand the underlying infrastructure required for the virtualization because it's a little different for networking then it is for application, virtualization. There's some evolving standards in that way that are changing a little bit over time, so we'll have to stay alert to those.

John Gilroy: If we look at your market, I assume you do some military work because you know it so well, but you also work with cruise lines. And so, it's a different type of value you bring with each market segment, isn't there?

Jack Waters: Yes, for sure. Military, the company was started to serve a military need, actually. It's always been a good 15 to 20 percent of our business, year in and year out. But, the fasted growing segment is maritime. And the fastest growing subsegment of maritime is the cruise industry. We have three of the four largest cruise companies using our system, typically, through an integrator that we work with. That's because we handle the high speeds. You may have talked to some of the Carnival Cruise Lines, or Royal Caribbean Cruise Lines, so forth, that are dramatically increasing their bandwidth from, you know, 10 megabits, 20 megabits, up to 500 megabits.

Recently, we did participate in some record-setting events. We were a quiet contributor to some of the technology, underlying technology that allowed all the high data rates, so we're pretty proud of our capacity there. Yeah, for entertainment, you have to have high-speed connections. Not only for the millennials, but also for the baby boomers.

John Gilroy: It also means more TCP connections too, doesn't it? I mean, that comes with it.

Jack Waters: That's for sure. It used to be when somebody got on a ship, and they opened up their laptop computer once a day and connected, that would be one connection. And then, they would use a regular phone, not over the internet to make their phone calls. Now, someone gets on a ship, they've got a family of four, each one of them has a computer, each one of them has a cell phone. When they open up the cell phone, they're going to open up four or five applications. Instead of one connection per cabin, you end up having 30 or 40 connections per cabin.

John Gilroy: Wow.

Jack Waters: And that is why our product is popular in that world because we handle the volume gracefully and at a lower cost.

John Gilroy: You kind of touched on the subject earlier, but I want to talk a little bit about high throughput satellites, and other new technologies. You know, this industry is evolving rapidly. It's all kinds of change from miniature satellites, to space tourism, to explosion, and innovation everywhere. So, as this demand for bandwidth soars, what about this whole concept of high throughput satellites? Is that impacting you or not?

Jack Waters: Yeah, obviously the high throughput satellites, fantastic for the industry. It gets us a little bit closer to everyone's goal, and that is to act like a living room connection, which we probably will never get to exactly, but the closer we come, the more people will use it. So, from an industry perspective, it's fantastic. It's also lowering the cost per bit dramatically, so to compete with more sectors in the overall communications market. I think it's all going to work out very well for the satellite industry.

As far as XipLink is concerned, how does high throughput satellites affect us? At first, thought it would negatively affect us because all the bandwidth availability would reduce one of our key values, and that is bandwidth expansion. The ability to compress payloads, and get more out of it. That's being reduced a little bit by encryption. But, the positive side is there are many more connections now and we're the leader, as I mentioned earlier, with scalability, and cost per bit. That has actually opened up the market for us and our sales grew, roughly 40 percent last year. So, it's actually having a very good effect on us.

There's a second feature we added that's important and that is an ability to link, bond, and balance connections. That's taking maybe a GEO connection, a MEO connection, and a LEO connection at varying bandwidths and aggregating them together. So, if one were to fail or degrade, we can gracefully move all that traffic from one link to another without operator intervention. That allows people to build high availability networks using some of the new technology, HTS technology being out there today.

John Gilroy: You know, what I see is that your software developers is really an example of innovation. I mean, the market's changing quickly, new concepts are being introduced, but your team seems to be floating with this, and coming up with creative concepts to handle this, and still, you know, accelerating TCP. That's really a star on your forehead, I think, for this whole concept. I mean, it's hard to get developers to begin with, but to get them to be creative in a changing environment, that's really hard.

Jack Waters: It is, but one of the good things about having a smaller company that's just focused on optimization and satellite is that we have really good customers that tell us where they're going. One thing that's been true the whole time in our ten-year existence, and before XipLink existed, this product existed inside of an Aerospace company called Zypho's in Montreal. So, it's a 15-year-old product, but we've been able to evolve it throughout time and add other features to it as our customers have brought us problems with us.

The one that got us into the link balancing and bonding, happened to be Go Go, where they actually had a cellular network, air to ground cellular network, and they had to keep their planes connected to two base stations at all times. And so, we developed this capability and then we applied it to maritime and some

other markets. So, it's a good combination of, you know, our marketing team, and our developers working in conjunction to make sure we deliver what the customers are looking for.

John Gilroy: I'm glad you used the word aerospace. I want to pull up about 40,000 feet here and talk about some of the business aspects of this technology here. So, we know this HTS has driven a lot of the satellite capacity. There are some satellite operators that are struggling to maintain profitability here. What do you think the keys are to maintaining profitability in this rapidly changing world? Obviously, you're flexing with it, but some aren't.

Jack Waters: Yeah, I think overall, on a macro basis, it is going to improve the number of connections and the overall revenue for services. I think some of the studies are also maintaining that it will increase. But, at the same time, I think the power goes a little bit more and more to the larger players because of, what are known as spot beams and the investment required to put up many beams, and the smaller operator is going to have a hard time keeping up.

They may have to end up reselling someone else's service that makes that investment. I think you see the large satellite operators either turning into service providers or creating wholesale models to allow those middle market players to resell their service. Those are big changes in our business, but I think it's going to result in a larger overall business. So, it's good for the whole industry.

John Gilroy: I think and that's going to be bigger if people may have to adopt and change, well, you guys have. You know, there are topics that always seem to come up with conversations I have with executives. One thing that keeps coming up is artificial intelligence. You know, perhaps that's a technology that some of these satellite operators can use to try to improve their services somehow. Do you think AI is going to fit in anywhere in this new world of satellites?

Jack Waters: Absolutely. The networks will be larger with many more connections, and many more end users, so I think operationally, artificial intelligence is going to play a huge role in creating efficiencies for the operations teams of these service providers. And then, there's another market that we don't play in, but they're going to be addressing the internet of things market, which is orders of magnitude larger in terms of numbers of connections, and numbers of customers they have to deal with. They're going to have to get into, you know, artificial intelligence to automate some of the provisioning function, and some of the customer capture function in order to do it economically.

John Gilroy: And maybe that's where some of these satellite operators can differentiate themselves in the ability to handle artificial intelligence, and automate some of

these concepts with the internet of things. I mean, if Gartner says there's going to be 20 billion IOT devices in 2020, I mean, that can't be handled manually with a spreadsheet and a checklist, now can it?

Jack Waters: No.

John Gilroy: No. It's impossible. When I think about new things on the horizon, I think about cloud computing. There are all kinds of as a service offering, you know? Mail as a service, software as a service, and WAN, WAN optimization is a service. I googled that. That's a concept now. I mean, there's so many new services out there, aren't there?

Jack Waters: There are and that's a big open question that I wish I could predict. The subscription model of selling software is highly mature in applications. I'm sure you bought some subscriptions yourself. What we've done for many years is we've sold software to operators, all the large operators I'm sure you talk to. They buy it for a fee, and then they leverage it. I'll just use Speedcast as an example. They'll take our hardware and then they'll turn that into a service, a turnkey service for the customer with all the pieces they need. Commonly known as managed service.

From an end customer point of view, it's a subscription. From our point of view, it is a paid-up license to Speedcast. But, we are going to open up some models over the next few years to our suppliers, and to our customers that would allow them to buy optimization as a service. There were two companies that entered the market in the satellite space that tried to sell it as a service, and they failed, unfortunately for them.

I'm not quite sure, you know, our market is ready for it, a supplier to the service providers, but we will watch that carefully and see if there's a good opportunity to partner with some of the service providers and offer the added value. Many of the service providers want to use optimization as one of the values to differentiate themselves so you might not see the WAN optimization as a separate subscription. You might just see it in a better service from one provider over another.

John Gilroy: Wow. These concepts are just so new and dynamic, and borrowing from other fields, and I guess that's the way you can adapt. I mean, there's going to be so much innovation that's going to be expected and demanded in the next few years. I mean, hundreds of large satellites. 2,000 micro and nanosatellites will be launched. I mean, everyone's going to have to adapt and change this new environment, aren't they?

Jack Waters: They are. I agree with you that there will be lots of opportunity to innovate from a service perspective. I think what it's going to call for is just a lot of technical expertise to be able to understand which pieces you're going to use, and which pieces you can't use, or you want to wait for to mature. I think the ones that make the right choices are going to have differentiated products, and a good opportunity to offer customers what they're looking for. Of course, in an early market, you can also make mistakes, so we'll have to watch that carefully.

John Gilroy: When I talk about IOT, you can go to the Gartner report, and most people know about IOT, but I think what very few people know is that now people are talking about terabits of data now. They're talking about some of the extended fleets, earth observation areas will have three terabits of data and 30 receiver stations. I mean, these problems are multiplying and multiplying for the operators. They're going to have to look at new ways. Maybe one of the new ways is innovation with optimization as a service, but it's going to be a lot more problems that we can't even see in the future, aren't there Jack?

Jack Waters: Well, there are. One thing that's always been true and I came from the optical business into the satellite business in 2001 when I went to iDirect. We brought some of our lessons there and even in that fiber world, you know, you put it in and eventually it's consumed. It really is. It seems like bandwidth is insatiable that way as long as it's priced right, it's taken. I'm sure Mark Dankberg has said this a million times, right? Just deliver more bandwidth at lower cost.

The business looks on the verge of doing just that after years of fairly relatively high prices. It's going to be very exciting. And then, of course, the take rate needs to be higher in terms of total bandwidth to make the economic model work for the satellite operators and the integrators. But, I do believe that will happen. It's happened in the other wireline businesses as well.

John Gilroy: You know, I've been around. I remember these articles from years ago, they used to call it dark fiber. Remember, all this fiber and no one's using it. All of a sudden, it's all used up. I mean, that can happen in your world too with HTS.

Jack Waters: Yeah. Yeah. They're still digging fiber trenches out there, aren't they?

John Gilroy: Yeah, they are.

Jack Waters: On the beltway, or what not.

John Gilroy: I remember when they came to my neighborhood, we'd never be able to ... you know, this concept of terabit was not even an imagined concept. We'd never be able to use anything like it. Now, it's used all the time, and used while people are driving their cars, and everywhere.

Jack Waters: Not only that, is for business, it's just become the critical connection now. And so, one of the great things about satellite is it bypasses the fiber and copper infrastructure completely. And so, some of the companies you're talking about are building networks that are going to completely switch in the sky and not on the ground. That offers say, a second connection for the very high data users, and they'll pay for that. They'll pay for high availability. That offers yet another new opportunity now that the data rates are high enough.

John Gilroy: Which brings us into our final question here, do you see a time in the future when satellite, the space segment itself, will be competitive with the terrestrial networks?

Jack Waters: I do. I think it's kind of starting to happen now depending on where you are. If you go to a highly regulated country, Toko country, today, prices are pretty high. I believe the satellite costs are getting down around those same costs. In a developed world, there's still a bit of a gap, but accessibility isn't always there. You were talking about your provider pulling fiber to your neighborhood, but unfortunately, that is not the norm around most of the country. That will not happen, I don't believe, because of the investment required to dig the fibers, so high-speed satellite will be a good alternate for them, as long as we can deliver the throughput and the good user experience they're looking for.

John Gilroy: Well, Jack, we're running out of time here, unfortunately. I'd like to thank my guest, Jack Waters. He's a CEO of a company called XipLink.