Pioneering telecommunication wholesaler Simwood has adopted Arista Networks technology to move to an entirely layer 3 switching infrastructure that is delivering major operational, security and costs benefits while underpinning innovative new services.

Highlights

Challenge

Upgrading a traditional hierarchical mixed switch and router based network to take advantage of software defined flexibility and control.

Solutions

- Arista 7050SX Switches
- Arista EOS®
- DirectFlow

Results

- Massive increase in capacity allowing business to scale in line with demand from clients
- Significant cost savings through the use of high density layer 3 switches with improved flexibility
- Switch to a more Dev Ops focused operational model that streamlines service management
- Deployment of containerisation complete with Routing on the Host and containers being first-class network citizens
- Ability to create self-defending containerised applications that strengthen its security posture

Challenging the perceived wisdom of how networks should be architected has helped Simwood upgrade its carrier grade, wholesale telecommunication service to meet both commercial goals while providing a better solution to long running attack survivability concerns. Using Arista Networks technology as a foundation for its software defined vision, Simwood is delivering the reliability, performance and flexibility demanded by ISP's, multinationals and telecommunications providers, while progressing the innovation needed to embrace the future.

SIMWOOD

STRAIGHT-TALKING, **FORWARD-THINKING**, TELECOMS

Project Background

The perceived wisdom in the networking industry has always been that layer 2 switches connect devices and layer 3 routers connect networks. A belief that states only a router offers the performance, scale and deterministic routing able to ensure the low latency and reliability needed for time sensitive and real-time use cases. However, over the last few years with advances in merchant silicon and the trend towards more intelligence in the networking layer through software defined architectures; a number of innovators are examining flat network topologies where switches are able to meet and in some cases exceed the capabilities of routers to deliver network traffic.

More than just an abstract technical experiment, the implications are that lower cost switches may be able to deliver new features that help solve long standing challenges, such as denial of service attack mitigation and intelligent filtering of content in a simpler and more cost effective way.

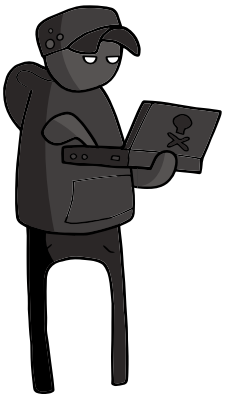
Challenge

One such pioneer that has taken the leap is Simon Woodhead, a technology innovator and CEO of Simwood, a wholesale telecommunications provider serving around 900 mostly ISP and telco customers plus a few very large 'Fortune 500' businesses. As the creator of eSMS in 1996 – the world's first gateway between SMS and the Internet, Woodhead has spent over 20 years working in and around advanced networking technologies, "We have kept a foot in each of TDM and bleeding edge technologies – we spent our money in the old world of building networks, but our heart and passion is always looking to and building the future," he quips.

Simwood runs a wholly owned and geographically resilient, SS7, IP and TDM network that offers UK-wide numbering with carrier-grade termination and inbound call routing. The network has on-net connections in eleven UK data centres for redundancy. With most of its customers being ISP's or telecommunications providers to end-customers, and 90% of its traffic being voice and video, latency and availability are critical.

With an existing network made up of Brocade Network switches and routers, in 2016 Woodhead and his team began looking at the longer term outlook as well as how it was achieving some of its key value added capabilities such as preventing denial of service attacks and VoIP fraud. "We have always really been a software company with a lot of telco infrastructure," he explains, "Our emerging competitors are increasingly cloud-based so in the future the network must become a living, breathing and ultimately strategic asset that adds value not cost to the business."

In his view, the value of dynamic real-time control with its ability to better manage the flexibility increasingly demanded by customers needed to be baked into the network as a software layer. "The new generation of layer 3 switches potentially negates the need for routers and we had been keeping an eye on merchant silicon and SDN philosophies which over the last five years have moved to a point where we believed it was a viable consideration."



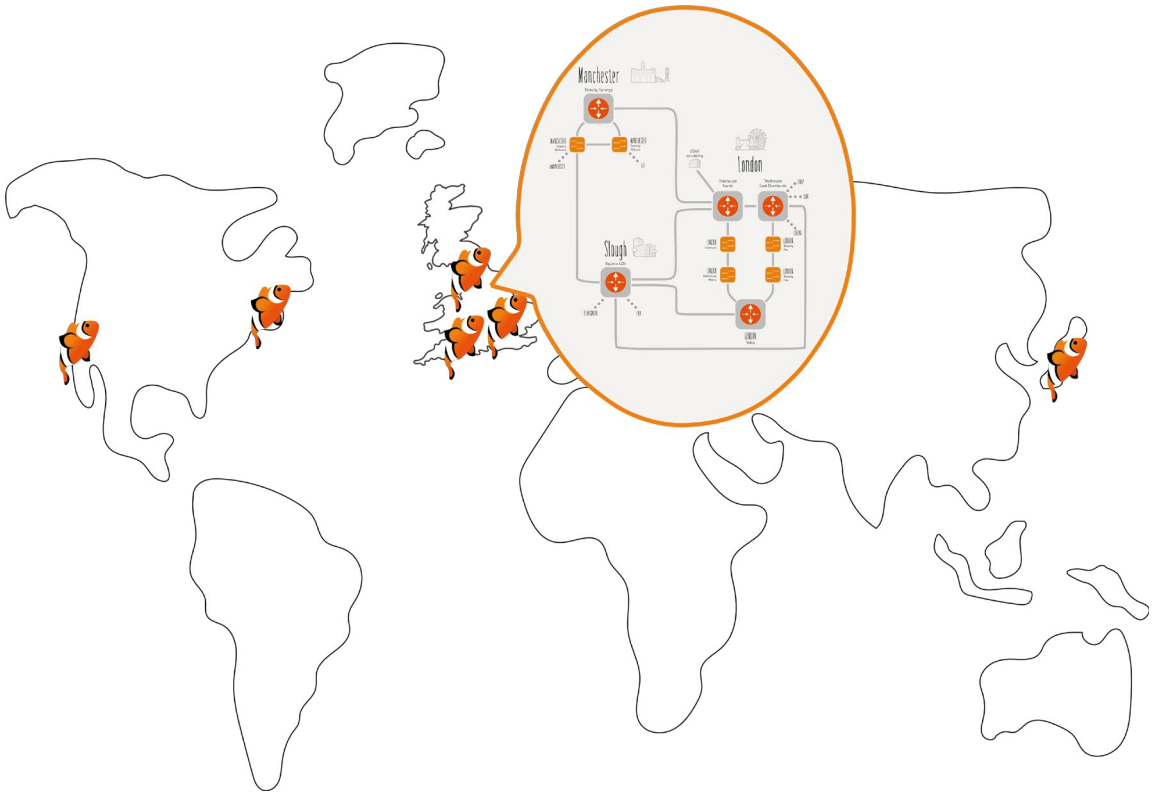
Woodhead acknowledged that "Although we probably could have got another 5 years of use out of the Brocade infrastructure - with the growth of the business and maturity of the market, it felt like the right time to upgrade."

Solution

Simwood has a deeply technical internal development and networking team that implements and supports its network and builds API's to allow its clients real-time control of its services. As such, there was a forensic examination at all the options available for its new network architecture that would potentially impact its customers and their respective clients in a major way over the next decade. As Woodhead explains, "If we wanted a simple layer-2 network, white-boxes would probably be the way to go. That isn't to say that the various flavours of Linux that specialise in this area such as Cumulus aren't excellent at layer-3 because they are. They are used at hyper-scale and do everything we need."

"Instead it comes down to the classic build or buy argument, an argument where we'd normally favour 'build'. We want the benefits of merchant silicon in ultra-density and software control, but we want the stability and support of a major vendor. Arista has an amazing software team and gives us that confidence," he explains.

Another driver was capacity. "We have been a pioneer in combating VoIP fraud and as such that has made us a bit of a target," explains Woodhead, "We have become obsessed with protecting the edge of the network from DDoS and other types of flood events, and as such we wanted 10G everywhere to deal with volume and with Arista we can deploy 96 ports of 10G per chassis and 40G between switches. This might be considered dramatic over subscription on the edge but it offers us headroom to contain problems."



However, it was the software side and a number of key features where Arista really offered a compelling proposition. One of the most useful was a method of overcoming the smaller routing table sizes that in the past had limited the usefulness of switches when compared to routers. Simwood uses Selective Route Download to determine in software which are the top relevant prefixes from the full Internet routing table of 700k. The full table could not be programmed into hardware in merchant silicon, but the relevant subset can. This has enabled Simwood to replace heavy routers holding the full table, with lightweight Arista switches. A killer feature was Arista's ability to pull a prefix-list from a URL – enabling the switches to update the list of relevant prefixes every minute from Simwood's software, without any changes to the running configuration.

Another major factor in the selection of Arista was DirectFlow. Simwood has several systems internally monitoring the network for bad actors. DirectFlow enables any of these systems to push dynamic rules to any or all of the edge switches to block or redirect this traffic. The company is developing this further to handle so-called Elephant Flows (large flows taking up more than 10% of a ports capacity) and prevent them disrupting Mice Flows (smaller flows such as VoIP calls) as an enhancement to its QoS measures.

This Arista capability is also used to improve the performance of security services with hardware assisted forwarding while maintaining operational control of the security platform. DirectFlow runs as an EOS extension on top of the Arista switches to dynamically insert flow table entries via Arista's DirectFlow API. This capability allows it to offload flows, thereby assisting attached in-line or out-of-band security appliances enabling the rapid interdiction of VoIP fraud but also as a defence against DDoS attacks.

Conclusion

Alongside performance, capacity and scalability gains, the deployment has resulted in a number of significant operational benefits. "We have effectively got rid of layer 2 on the network which has given us a massive simplification of the infrastructure while offering more resilience. Combined with other changes such as Routing on the Host, has given us several wins including the ability to use anycast for internal services," says Woodhead.

This simplification has also benefited operational and developer teams. "In the old days, a network project might require one person to create a VM, another to SSH into a switch and make a change, then a developer would need to do their thing, then a forth would manage change control. Our developers are now managing all of these themselves with improvements to security, agility and fluidity."

Woodhead notes that the shift towards a more Dev Ops culture, where the same teams are defining network and security requirements, building images and managing externally facing API's; is a much more seemless and ultimately efficient way of operating.

Looking to the future, the move to Arista is opening up a new set of opportunities to further strengthen its security position. Simwood developers are looking at new self-protecting containers that use the BGP Flowspec standard to maintain and propagate firewall and other traffic management rules. In essence, these smart applications can in effect defend themselves against different types of attack by communicating required security counter actions directly to the switching layer for implementation in real-time. The company is translating FlowSpec to DirectFlow to enable these rules to ascend all the way to the edge where relevant.

"Its not the end of the journey but we are on the right road," says Woodhead, "What Arista gives us is the software solution that allows us to build a living and breathing network and where it grows from this point onwards is in our own hands," he concludes.

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