



## Peplink + Citrix + VoIP Adds Up to Fast, Cost-Effective WAN for UK's Pluss

Peplink customer since 2006 and currently uses Peplink Balance devices in a multisite WAN infrastructure with 37 locations and more than 300 active users.



Adding to Life  
**pluss**

Steve Taylor is the IT manager at Pluss, a social enterprise that each year helps over 5,000 people with disabilities and other disadvantages to become employed.

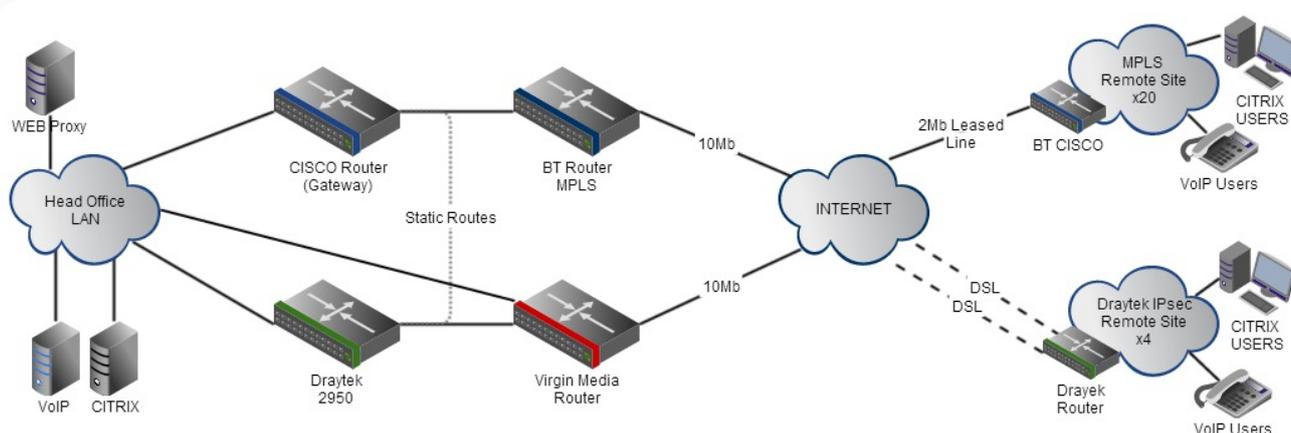
### Tell us about how and when you discovered Peplink and its products.

We discovered the Peplink Balance products back in 2006, when we were looking for a technical solution to our high availability requirement around two leased lines at the head office. At that time, we had a 10Mb leased line from BT and a 10Mb fiber connection from Virgin Media, with the intention of providing connection diversity and high availability to our remote sites.

The BT leased line was part of our existing MPLS infrastructure that connected most of our 24 locations at that point in time. The trouble was that when we looked at the existing bonding and load-balancing technologies available from the ISPs, they all required the two lines to be from the same ISP, as most of the bonding solutions required our lines to terminate to specialized equipment in the ISP data center.

Of course, there were other third-party products out there, like Xrio and Draytek, and we had already started to use Draytek routers on the new sites we were adding as part of a cost-saving exercise, where we would install a pair of DSLs at a new location connected to a Draytek, for outbound load-balancing and IPSec VPN connectivity, back to another Draytek router connected to the Virgin Media leased line.

The trouble was that this was getting really complicated fast, with complex routing configurations between the MPLS WAN and the Draytek WAN to enable inter-site traffic in a partial mesh for VoIP calls and outbound Internet access from the MPLS over the Virgin fiber line through a Web/proxy filter we had in place for compliance purposes. We also had servers configured using both the BT or Virgin router as the default gateway, as a form of cumbersome load balancing.



*“We knew there just had to be a better way. “*

Initially, we just started looking for a better load-balancing device, something we could put in the head office to balance outbound requests for Internet access from the remote sites. We tried a couple of four-port load-balancing devices from Draytek and added two additional DSL lines to the head office to cheaply increase bandwidth for Internet access.

Naturally, things got even more complicated, as we now had multiple routes, multiple load-balancing routers, and multiple ISP routers. If we had a network or routing fault, it took forever to isolate the root cause, and we had two engineers working almost full-time on network monitoring and management.

Then Google came to the rescue, and we found Peplink Balance routers.

Three things immediately grabbed our attention:

- Outbound load balancing across up to 13 WANs: we could easily add bandwidth as and when we needed it.
- Inbound DNS-based load balancing: we were hosting lots of centralized services.
- SpeedFusion VPN: true packet-level, bidirectional VPN bonding across multiple WAN links.

We immediately saw the potential of the Peplink Balance routers to help us simplify our network and reduce costs. After talking to Peplink support to learn more about deployment options and to confirm our understanding, we ordered a pair of Balance 1350s and a mix of Balance 310 and 580 routers.

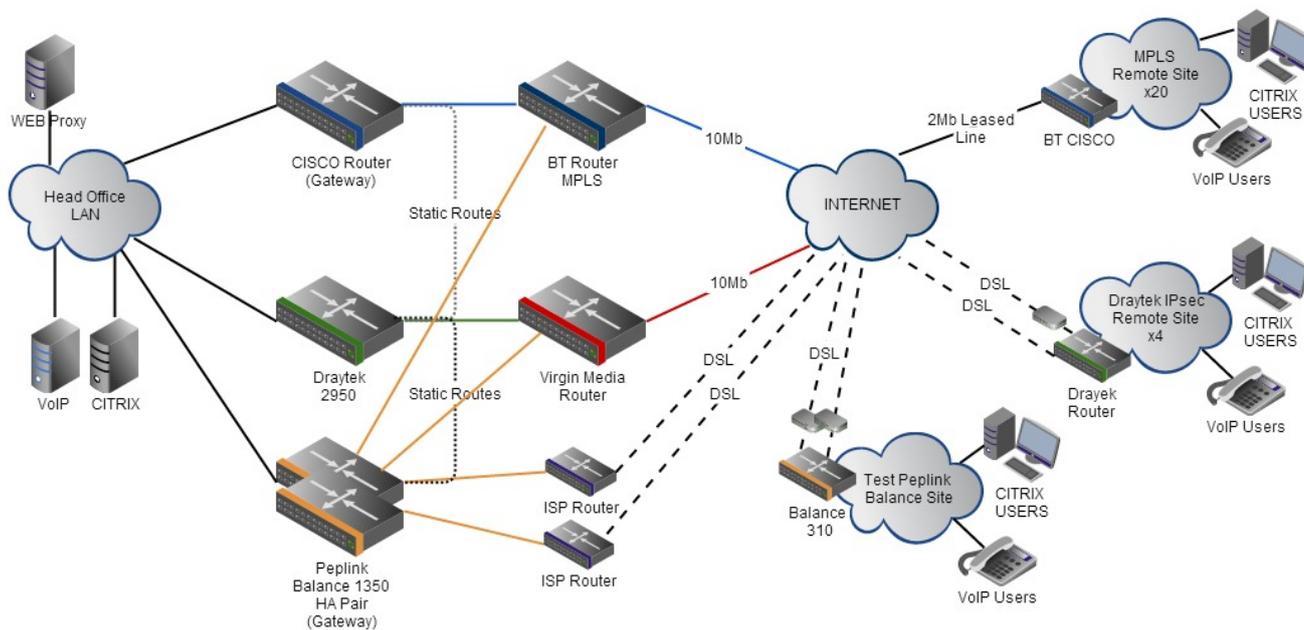
## Why did you choose the 310 and 580 models for the remote locations?

Well, we knew we wanted SpeedFusion VPN bonding support. The first enterprise model in the series was the Balance 210, and this would have been fine, since the maximum number of connections at a single site was generally two at that time, but we decided that for the extra £150-£200, it made sense to go for the three WAN 310s to give us the possibility for additional bandwidth, if needed.

We identified the 580 as the right fit for a couple of existing larger sites, where we already had four DSLs installed. We were using two Draytek routers at these locations, each with a pair of DSLs connected, and had then physically separated the site into two logical networks, with half the users and computers on one Draytek and half on the other. It worked fine, but it was a little messy from a management and configuration perspective, and as each user was tied to a share of bandwidth from a specific pair of DSLs, we could have a situation where one user would have great Internet bandwidth and another would have slow access because they were connected to different routers with different bandwidth saturation, yet they could be sat next to each other physically in the office. So a 580 with its five WAN ports made more sense, as we could load balance all user access across all of the available links, giving all users an equal share of the bandwidth. Since the 580 could support five WAN links, we also had the option to add another DSL later, if needed.

## How did you approach the initial Peplink deployment?

We obviously needed to prove the Peplink solution in a test scenario first, so we installed the pair of Balance 1350s in a VRRP pair in parallel to the existing MPLS and Draytek WAN routers, then had another pair of DSLs installed at the head office, into which we connected a Balance 310. For all intents and purposes, the Balance 310 at the head office was a convenient “remote site” and meant that we could test a deployment without actually having to leave the office.



As the Peplink installation wasn't providing us with live production services, we had a free hand to test failover, inbound and outbound load balancing, and SpeedFusion VPN without affecting logged-in users.

## What were your first impressions of the Balance devices? What were they like to configure?

The Balance devices arrived by courier in the morning and were rapidly unboxed by my network team. First impressions were great. The 1350s had solid enclosures and looked like the enterprise-level routers that they were. The 310s were small and near-silent when powered up, which would be great for our smaller locations, where it would be installed on a desk or in a small wall-mount network cabinet near the end users.

We talked over the test plan again, briefly, and I left James, one of our network engineers, to do the initial configuration. The first priority was to test outbound load balancing across the four WAN links -- two dedicated DSLs and then the BT and VM lines -- and then also run up a SpeedFusion VPN between the 1350s and a Balance 310 to see how well these features worked. We had earmarked a couple of days for this initial configuration from our experience of load

balancing and VPN configuration with other vendor equipment, adding a little more time in recognition that we had never used Peplink equipment before.

However, James stuck his head into my office 40 minutes later and told me it was all in and working! I honestly didn't believe that he could have done the full test plan at first, as he'd done it so quickly, but when he took me back to the workbench, he had not only managed to configure outbound load balancing across the WAN links and the remote site SpeedFusion link, but he had also run up a VoIP handset on the test site and proven VoIP and Citrix across SpeedFusion too.

## What made that initial configuration so easy, do you think?

A couple of things, I suppose. The first was that we had asked a lot of questions of Peplink support in the qualification stage, and they had helped us understand how and where the Balance products would fit into our network. So we had everything

ready for the test deployment.

James had also studied the online Balance demo on the Peplink site, as well as trawling through the manual, knowledge base, and forum, so he knew what to expect, even before the devices arrived.

But I suppose the two biggest contributing factors were the Web interface and the SpeedFusion VPN configuration, itself. The Web interface was just really well-designed and very easy to navigate and understand, with contextual help on nearly every screen and setting. Outbound load balancing was preconfigured out of the box, so all James had to do was set the static IPs on the WANs connected to the existing fiber connections and enter the PPPoE details for the DSL-connected WANs.

The SpeedFusion VPN configuration was ridiculously easy -- remember, we were creating a bonded VPN between four WAN links at the head office and two WANs at the remote site in this test - - so I had pictured screens and screens of configuration required. In fact, it was a single config page per device, and all that was needed was the unique serial of the device you wanted to connect to, along with one of the externally available static IPs of one of the devices.

In our case, we had configured one of the WAN links of the 1350 pair with an external static IP from the Virgin leased line, so that's the IP we used in the 310 SpeedFusion configuration page. Once the initial connection was made from the 310 to the 1350s, the routers then advertised all the other available connections, and these were then brought into the bonded VPN link.

### What specifically did you want to test as part of this initial deployment? Any gotchas or surprises?

We really wanted to see how well the SpeedFusion VPN coped with link failure, particularly since we were planning on using multiple DSL links at the remote sites. We were suffering from intermittent line faults at a couple of these sites, where we might lose Internet connectivity on a DSL for a moment or two throughout the day.

If we had just been using the connections for

Internet access, we likely wouldn't have noticed it, since the existing routers would successfully failover the traffic to the second DSL, but since we were using VoIP and Citrix, when this failover happened, any active VoIP calls would drop and the Citrix sessions would freeze or in some cases completely disconnect. This was naturally affecting productivity and frontline services, as customers would have to redial to speak with a staff member, and the member of staff would have to wait for their Citrix session to reconnect.

We hoped that by bonding the DSLs with SpeedFusion, this issue would go away, as the traffic should reroute at a packet level.

### How did you test for this, and what results did you see?

We used the test remote site connected via SpeedFusion to the 1350s and plugged in our standard VoIP handset and thin client device. Then we ran a Citrix session and made a call to the head office.

With both the live call in progress and by interacting with applications within Citrix, we then simulated a link failure by unplugging the WAN links on the 310 in turn, one at a time. We also then unplugged and replugged the links to the 1350 in the same fashion.

The end result was that both the VoIP call and the Citrix session were maintained when a WAN link failed. Neither the VoIP call nor the Citrix session dropped out. In fact, the only occasional indication that we could detect was a slight click sound on the call when a WAN link was unplugged.

### Apart from SpeedFusion, what other features did you test?

The initial goal of the deployment was outbound and inbound load balancing, so we spent some time to test this, as well as configuring and testing the high-availability VRRP configuration of the 1350s at the head office.

Everything went pretty smoothly. We needed a little help with the outbound policies, as we had a couple of Web-based services that needed to see

requests from us on specific external IPs, like the BT online accounting application. Peplink support was quick to answer our emails though, and generally this was just part and parcel of us learning the techniques and terminology so we could work out where to look for the settings in the Web interface.

In total, we spent probably five days working on the test configuration and proving everything before feeling confident enough to sit down and finalize the migration plan.

### How did you migrate your remote sites to Peplink? What were the challenges?

We started with the newer, existing Draytek sites, which already had dual DSLs, and preconfigured each 310 at the head office with the SpeedFusion settings and the ISP connection details for each WAN at these sites.

Then, we scheduled the migration with the manager at each location to best suit their function, with the initial migrations happening on a Friday evening, when their business tended to be quieter, giving us the weekend to resolve any issues that might have arisen.

Since everything was preconfigured, we could just turn up onsite and do a like-for-like swap with the existing router. James did the first couple of sites just to make sure everything went as planned, and then we used the first-line support team to do the rest. A couple of things became apparent during the migrations that I hadn't initially considered.

The first was that, since the Web UI was so easy to use, we could send a first-line engineer with little or no knowledge of the Peplink routers to do the migration, and if there were any issues -- normally, it was a mistyped password or username in the PPPoE settings on a WAN link -- they could do it themselves, with a network engineer talking them through the screens over the phone.

The second was that if there were any additional, perhaps more advanced, configuration required, like additional outbound rules, PPTP VPN settings, or perhaps we needed to use an existing router instead of the PPPoE modems in shared office spaces, the first-line engineer could just plug WAN

3 on the 310 into the local network. Since we left WAN 3 set to DHCP, the Balance would then pick up a private IP on the local LAN and use that to route out to the 1350s at the head office and successfully create a SpeedFusion VPN traversing NAT. The network team could then connect securely to the 310 over the VPN tunnel and change the settings, rather than having to talk the first-line engineer through the configuration. All of this could be done without making any network changes locally, which greatly minimized remote site downtime during the migration.

### What approach did you take with the MPLS sites?

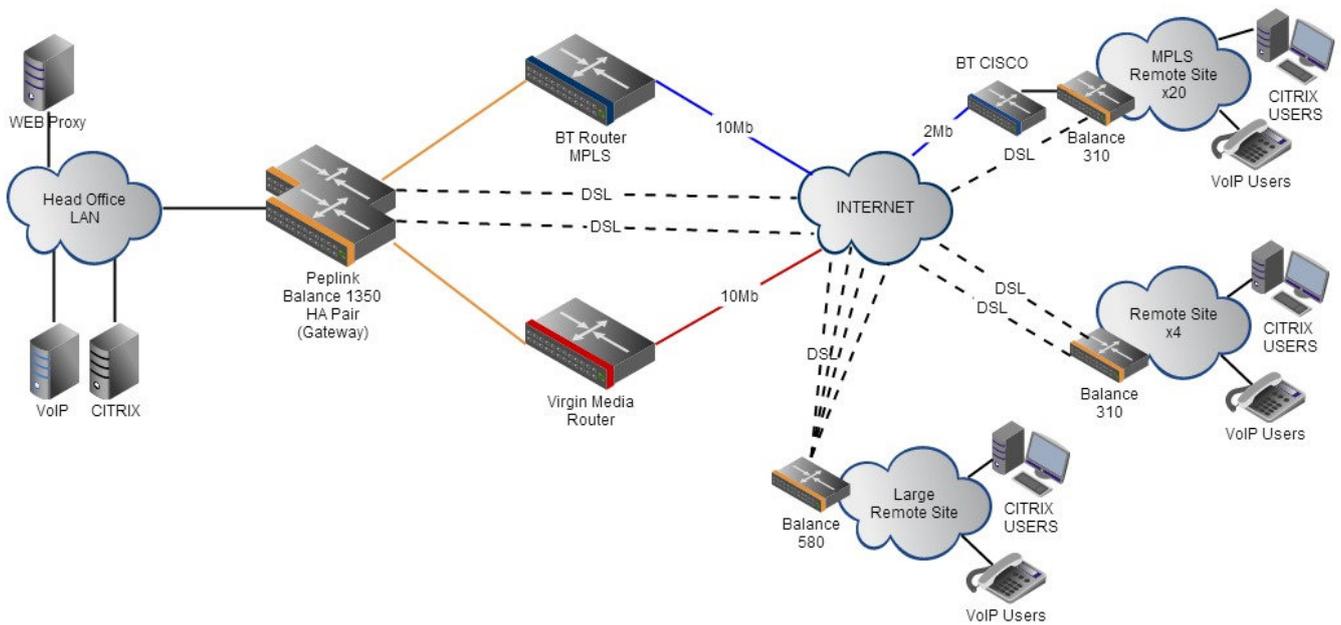
The migration of the existing MPLS sites was a little different, as we were generally tied into a contract for the 2Mb leased lines -- with anywhere from one to five years left to run -- so we couldn't just replace them immediately with DSL circuits. Instead, we simply installed a single additional DSL circuit and connected the 310 to both the existing MPLS leased line and the new DSL.

In this way, the SpeedFusion VPN tunnel was created using both the private MPLS circuit and over the public Internet, but it was presented as a single logical VPN at the 1350s, so in practice there was no difference between these sites and those with purely DSL.

Then as the contracts on the MPLS ran out, we would cancel them and replace them with either one or two additional DSL circuits, normally DSL enabled on existing PSTN FAX lines.

It proved to be a fairly painless process, really, with just the additional visits required when DSL was activated, to physically reconfigure the 310s onsite.

## You started the migration in 2006. How has your WAN evolved since then?



Well we cancelled the last of our remote MPLS circuits in 2011, and now all of our 37 remote sites use Peplink Balance devices to bond anywhere from two to five DSLs. We're in the process of migrating a number of DSLs to EFM circuits, where available, for the speed and physical line reliability improvements that EFM brings.

Our head office has moved locations, so we have built a new data center in a dedicated location and migrated all of our servers and virtual infrastructure. We're delivering more and more Web-based and SaaS services too, so we took the opportunity to upgrade our fiber connections to our new data center from a pair of 10Mb lines to a 100Mb and a 1Gb link, still from different ISPs. We have also incorporated a full offsite DR data center into the network design, as well -- connected via a Balance 580 with a 100Mb fiber -- for offsite backups and so that we can continue to function if a DR event occurs.

Really it's just more of the same: more users, more sites, and more bandwidth. We have deployed Pepwave access points to deliver managed Wi-Fi to some of our remote locations. Those have been very successful and are very easy to manage using the free cloud-based InControl service.

A direct result of the reliability of SpeedFusion is that we could take ownership of our VoIP service from our managed service provider and replace it with a centralized virtual PBX in HA in our data center that we manage ourselves, so that now all remote sites just have VoIP handsets, with the occasional ISDN gateway for local service breakout, rather than remote PBX shelves and appliances.

The team has grown, as well. We had five members of staff back in 2006, and now we have 12, with a dedicated application development team and more first- and second-line support engineers. Interestingly, we only have a single full-time network engineer now: James has moved from network engineering to server infrastructure management, although he provides cover as needed. Considering the network has grown tremendously, I consider that to be a direct reflection of how simple our Peplink Balance WAN is to manage support and grow.

If you had to summarize the benefits of running a Peplink Balance WAN, what would they be?

- **Reduced Opex** -- Compared to MPLS
- **Agility** -- With the ability to add and remove different types and classes of additional bandwidth as and when needed, at any location.
- **Lower support requirement** -- It's a very simple solution and can be monitored and managed by first-line engineers, which frees up network engineers to do more useful, proactive activities, like application monitoring and capacity planning.
- **Reliability** -- SpeedFusion has been a very reliable and secure method for our VPN WAN delivery. With a reliable network, we can spend more time on customer-facing projects that can really make a difference to our bottom line and the productivity of the company as a whole.
- **Enablement** -- A SpeedFusion-based LAN provides the stable, economical, and versatile WAN foundation you need to build enterprise apps on top of.

What advice would you give to anybody considering a migration to the Peplink Balance products for their WAN requirements?

Just do it! It's as simple as that. We would not be able to deliver the IT and communications services we do now, at the budgets and with the staffing levels we currently have, without it.

*"Our Peplink WAN has become a strategic enabler of all of our customer facing services."*