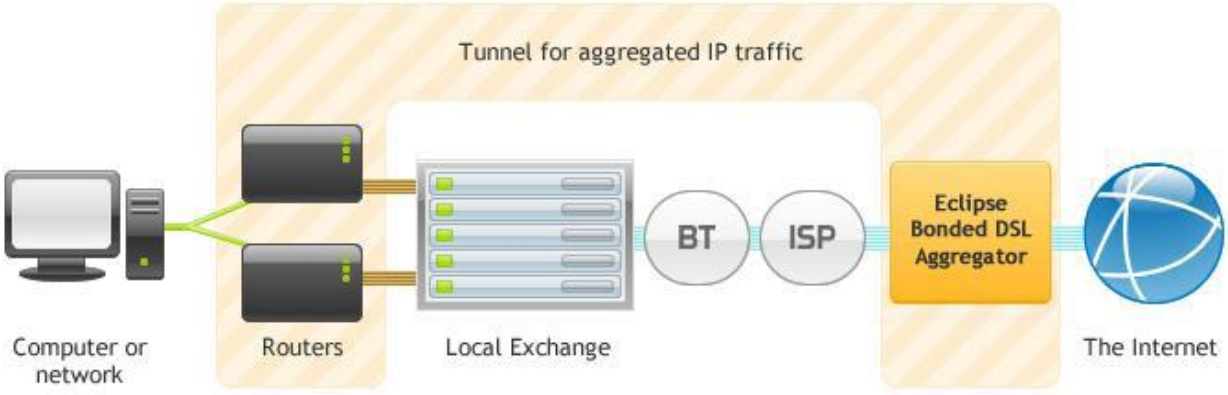
Q - How does the bonded solution differ from other suppliers solutions?

A - Aggregated connection – Our way
The Bonded DSL solution uses an aggregated connection for all IP traffic.

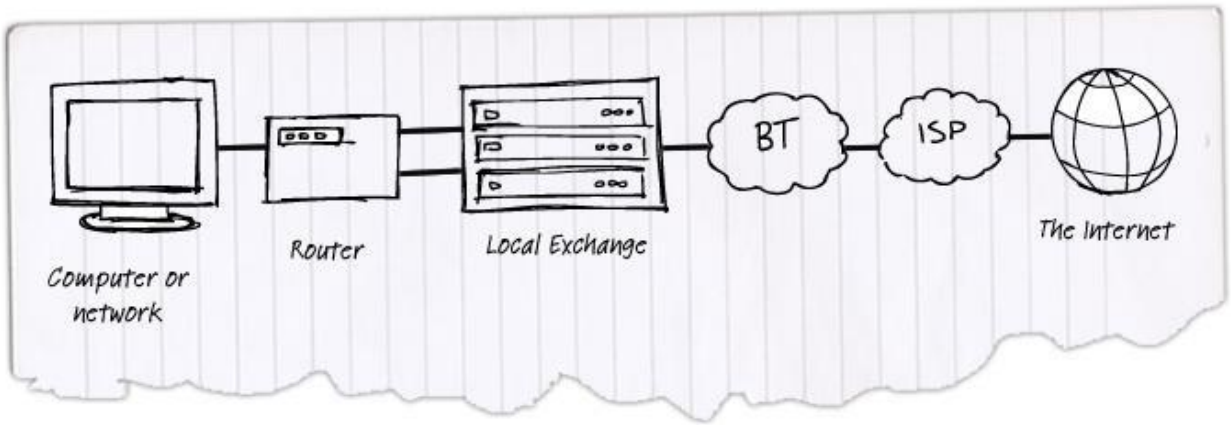


One standard off-the-shelf router is provided for each line. This adds resilience to the Bonded DSL solution.

Traffic is routed to take advantage of the full speed of each individual line.

Traffic is combined through our aggregator; this allows connection to continue even if one router fails.

Multi-Link Point to Point Protocol – Alternative providers
Other bonded DSL solutions use multi-link point to point protocol (MLPPP), creating a single PPP from multiple links.



One specialist router is used, meaning single point of failure within the solution.

Traffic is capped to the lowest performing line so if it is a 2 line solution, the combined speed will be 2 x that of the lowest performing as each line is equally weighted.

If a single link within the solution fails, connection has to be re-established to reinstate the failed line.

Other alternatives
Load Balancing – this way of delivering Bonded DSL means multiple IPs, no overall speed gain and less resilience.
Physically Bonding Lines – this way of delivering Bonded DSL sees bonding happening at a low level, two lines sync as one to give twice the speed. However, if one line drops, the connection may be lost and the solution may need to be reconfigured.

Q - What are the differences between an aggregated connection and other alternatives?

A **Aggregated Connection**	**Other**
Routers	
One off-the-shelf router is provided per line - all act as one virtual router	One expensive specialist router is provided for the solution
Latency	
Using an aggregator and routers, line latency is managed to provide consistency	With multiple lines, potential differences in performance lines have to be constantly managed to keep latency in sync – not a positive when lines are mis-matched
Speed	
Line speed is not capped at the lowest performing line so you get the full speed of all lines (only a small % of speed is lost during the virtualisation process)	Lines are capped at the speed of the lowest performing
Resilience	
If one router or line fails, the others will continue to perform - only performance of the dropped line will be seen	One router so if it fails, connection is lost and the router has to be re-started Depending on the set up, if one link fails, all connection could be lost
Performance	
The full speed of all lines combined is provided (only a small % of speed is lost during the virtualisation process) One single IP address is applied If one line drops during a VoIP call, the call won't be lost - the aggregated link continues working The platform continually monitors and adjusts for changes in line performance	Lines are controlled so all have to perform the same If line performance is mixed e.g. one stable, one unstable performance will suffer

Q - What hardware is provided with the Bonded DSL solution?

A - Bonded DSL solutions are provided with Netgear DG834. All routers for this solution are pre-configured and pre-loaded with the required software.

Q - With multiple routers how does it all work?

A - Computers on a network use a 'default gateway' address to route traffic to the internet. The default gateway is the LAN address of your router and is normally 192.168.0.1 (or similar).
With Bonded DSL, there can be up to 4 routers each with their own LAN address. In order for your LAN devices to route traffic properly, the group of routers become one 'Virtual Router'. The default gateway then becomes the LAN address of the Virtual Router, normally 192.168.0.250 (or similar).
If LAN devices are configured for DHCP (automatic IP setup), they will automatically pick up and apply these settings. However, if devices have to be configured manually, you will need to make sure they are using the Virtual Router as the default gateway and not an individual router in the group.
Your external internet IP is set and managed by the aggregation server.

Q - How are the routers linked together?

A - Recommended - Ethernet Switch

The recommended configuration for routers is using a switch. Each Bonded DSL router should be connected to the Ethernet switch. All other devices on your LAN should also be connected to this switch.
This configuration means that the 4 routers can communicate with each other via the switch, allowing the Bonded DSL software to make use of all routers and route traffic, according to individual line performance.

Alternative (not recommended except in emergency) - Daisy-chain

If you do not have access to a switch, devices on your LAN can be directly connected to the Bonded DSL routers, as long as the routers can also communicate with each other.
Routers can be connected together in a daisy-chain and LAN devices can then be connected using remaining ports.
This configuration is not recommended, as manual intervention may be required in the event of hardware failure. In addition, if one of the links between the routers or from a router to a device fails, the Bonded DSL solution will be affected.