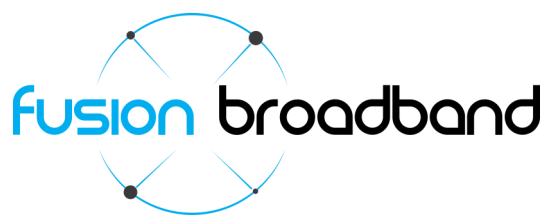
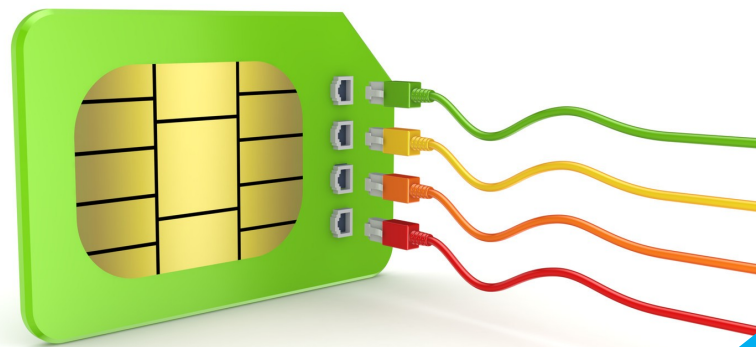


Broadband Bonding

Fusion Hybrid



Fusion Broadband Hybrid Bonder

The Best of Both Worlds!

Fusion Broadband has been supplying businesses with bonded broadband services for over four years now. We'd like to think that after all that time, we know quite a bit about bonding and how businesses use our Bonded connections.

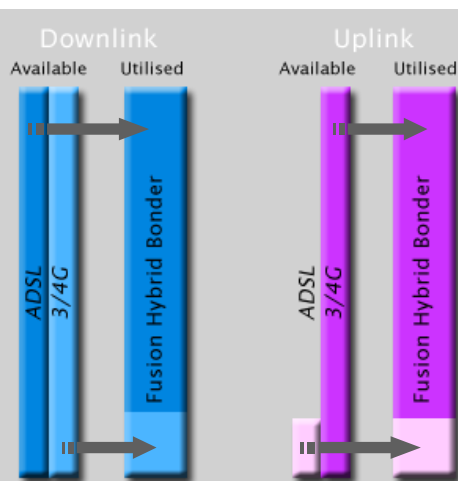
What we do know is that businesses are very downlink centric, meaning they generally download much more data than they upload. This ratio is perfect for ADSL which nearly all business have as their main Internet connection type. ADSL is low cost and provides excellent download speeds (producing very low data expenses). The main penalty with ADSL however, is the very slow uplink speed. Business generally don't need large volumes of data in the uplink direction, they just need the upload speed.

The simple answer would be to use a 3/4G wireless connection which now provide amazing speeds in both directions. There are a few issues here though:

- **Reliability in the connection.** Businesses now are held to ransom over their Internet connection. Throughput rates and connectivity resiliency have never been so important, so your business communication lifeline must be stable and redundant. Wireless connection while great, don't really provide this completely.
- **Speed inconsistency.** Cellular connections have very elastic speed profiles; one minute they are great, the next, less so.
- **Data costs.** Wireless data is expensive. You only need a rogue employee or rouge application to consume all your available data giving you a slow connection, suspended connection or a very costly invoice!
- **Static IP addresses.** Most 3/4G connection do not have a static IP address. A static public IP address is critical for business as remote workers, VPNs, etc, need to know where you are. With a changing dynamic IP address, remote workers, VPNs and the like can never find you.

The Ultimate Connection

Could the ultimate connection be a combination of both ADSL and 3/4G wireless? Could you use the low cost fast ADSL connection carrying majority of the download data the 3/4G connection for the majority of the upload data? - Yes you can!



The Fusion Hybrid Bonder uses 80-90% of the ADSL downlink speed and 80-90% of the 3/4G uplink speed to create a hybrid bonded service with the best of both worlds!

Whilst the bonded service continues to use all the ADSL uplink speed, only a small portion of the 3/4G downlink bandwidth is used in order to prevent expensive cellular LTE data charges.

* not to scale

Fusion Broadband Hybrid

Fusion Hybrid is the ultimate business broadband connection where we blend an ADSL connection with a wireless connection. Understanding that businesses download more data than they upload, we deliberately bias 80-90% of the download volume on the low cost ADSL connection and we bias 80-90% of the upload traffic on the 3/4G connection.

Bundle this with a static IP address, data compression, advanced end to end Quality of Service (QoS) and our TCP acceleration algorithms and you have a perfect connection. Fusion Hybrid combines bandwidth of both technologies on a single TCP flow supporting ALL applications and ALL protocols. VPN's RDP, Web traffic, email - everything.

The upside to this is you also get multi-path, multi-technology redundancy supporting your businesses Internet connectivity. If one of your connections through Fusion Hybrid fails, the connection will remain 100% active using just the remaining connection (obviously just a little slower!) so your business will remain 100% functional through a single failed connection.

Your data costs are controlled and more manageable as most of the downloads are carried by the ADSL connection. In the event you need to pause the data loads on the 3/4G connection, you can easily change the status of the service via the Fusion Administration Portal to where it will not carry any active data.

Is it hard to install Fusion Hybrid?

It couldn't be much easier! You connect your ADSL service into the Fusion Hybrid Bonder, insert your 3/4G sim card (all carriers - Telstra, Optus,

Vodafone) into the Bonder. Connect your Business router, tell your router your new Bonded Public IP address and you're off. Fast highly redundant business broadband made active in a minute! No additional lines to be installed. No onsite techs to visit.

Provisioning Process

Once ordered the device is shipped and available generally on site only days after the order is accepted.

Fusion Broadband charges an ongoing monthly fee for the broadband bonding service for the term of the contract (24 and 12 month options are available). You will be responsible for the cost of your ADSL service and the 3G/4G service.

The only requirement from Fusion Broadband is that your ADSL modem is placed into Full Bridge mode and that the router we hand off to has an Ethernet WAN port. A small configuration change is required to your router.

What do you get?

Fusion Broadband will provide you with:

- The Fusion Hybrid Bonder.
- A new public static IP address.
If your ADSL service charges for a static IP...feel free to cancel it. We can accept a dynamic IP address for your ISP.
- Redundancy.
Seamless failover/failback between your ADSL and 3G/4G services.
- Speed!
You will get the benefit of your ADSL downlink speed as well as the benefit of your 3G/4G Uplink speed.
- Bonded throughput in both directions, data compression, end-to-end Quality of Service, TCP Acceleration, carrier independence all available across the entire ADSL and cellular footprint in Australia.

Technical Specifications

Cellular Connection:

Air Interface: LTE,HSPA+,GSM/GPRS/ EDGE,EV-DO Rev A
Peak Download rate: 100Mbps
Peak Upload rate: 50Mbps
Carriers: Telstra, Optus, Vodafone
LTE module for Australian frequencies (1800Mhz) & 3G (850/900/2100 Mhz) including Telstra NextG.
Fall back to Quad band 3G/HSPA+ including NextG
Antenna diversity for improved fringe performance

Bonding Performance:

Throughput up to 60Mbps downlink and Uplink speeds

Protocol Support/Port influence:

Bonding is 100% transparent to ALL protocols VPNs are fully supported IPsec, PPTP, etc.
Port forwarding is performed by the customer router; Bonding forwards ALL ports and does not block any ports.

Bonding Efficiency:

Bonding efficiency is nearly always greater than 85%. The level of bonding efficiency is related to the speed stability of the lines supporting the bond. In most cases Uplink bonding is 95% and Downlink is 90%

Compression:

Typical compression ratios of Compression running on Bonders are about 1.5-1.7x for plain text, about 2-4x for HTML, and of course 1.0x for JPEGs, PNGs and other pre-compressed data. Definitive benchmarking of compression effect is difficult as internet / broadband data is made up of an ever changing mix of types of data and levels it can be compressed.

QoS:

QoS is bi-directional on both data and control packets and 100% fully customisable. Default parameters (all customisable) are: 4 Classes of traffic (Real Time, Interactive, Routine, Bulk).

Reserved percentages for each are: 40%, 20%, 20%, 20% respectively.

Packet Filters and classes:

Real-time - 40% of bandwidth is reserved for real-time traffic.

ICMP packets up to 500 bytes
Inter-Asterisk eXchange version 2 (IAX2) traffic
SIP and H.323 control traffic
Packets with DSCP expedited forwarding requested

Interactive - 20% of bandwidth is reserved for interactive traffic, classified as follows:

DNS traffic, Microsoft RDP traffic, TCP acknowledgements, SSH traffic.

Routine

This is the default class. Packets not matching any filter are classified as routine. 20% of bandwidth is reserved for this traffic.

Bulk - 20% of bandwidth is reserved for bulk traffic, classified as follows.

FTP traffic On ports 20, 21 only; data traffic on other ports will not be matched.
HTTP/S traffic part of flows greater than 2 MB

Bond Security (two variants):

HMAC: Hash-based message authentication codes. Data is signed and verified using an HMAC code. The algorithm uses MD5 hashing and a 30-byte secret key. HMAC-MD5 is defined in RFC 2104; or

Encryption: Data is encrypted between bonders and our aggregation network using the DTLS 1.2 protocol. DTLS is based on SSL/TLS, and is defined in RFC 4347 and RFC 6347.

Three ciphers are available: AES 128, AES 256 or Salsa20 256

TCP Acceleration:

TCP Accelerating process for dealing with unstable Bonded connections or connections with high jitter. By default TCP Acceleration is enabled on Ports 80, 443 and 8080 (http and https traffic). Additional ports available by request.

Contact

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