

**PORTABELLA Broadband Bonding Network Appliance
BBNA141 / 141i / 8000**

A Frequently Asked Question on

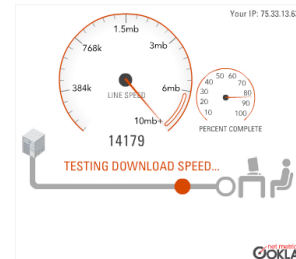
Link Bonding

vs.

Load Balancing

Question: What's the difference between a PortaBella Broadband Bonding Network Appliance and a load balancer or load balancing router?

Short answer: Try downloading or uploading a file from behind the PortaBella - you will see a big difference. With the PortaBella, all of your access lines will be used to transfer the file and therefore the file download/upload speed will be equal to the sum of all the lines and individual link fluctuations will be shielded from the applications. With a load balancer or load balancing router, only one of your access lines will be used to transfer the file and individual link fluctuations will adversely effect the application.



Long answer:

Speed - Several load balancing devices are available on the market. Some of these were specifically designed to manage multiple Internet access links – we call these load balancers. Other devices were originally designed as Internet routers but include a load balancing feature - we call these load balancing routers. The main distinction between any of these load balancing devices and the PortaBella BBNA is that the PortaBella BBNA provides *link bonding* for all data transfers in the downlink and uplink direction. With link bonding, the access links are effectively combined together into a single virtual pipe so that the data transfer rate of the virtual pipe is the sum of the data transfer rates of the access links that are being combined. Load balancing devices simply distribute load at the granularity of session. For example, if a user within the local network downloads a file, it generates a server request that is sent out over a single Internet access line. As a result, the file download will only use a single Internet access line, even though the other available Internet access lines may be idle. This is primarily how the load-balancers and load balancing routers operate.

Reliability and session continuity – Because of the true-bonding technology that PortaBella leverages, any link failure and/or performance fluctuations are cleverly shielded from the applications. As an example, a VPN application over the true bonded PortaBella link will continue without any interruption even in cases where some of the WAN links fail, as the session continuity feature transmits any lost packet over the available links and therefore shielding the outage from the application. In case of load-balancers, the VPN session will fail.

Smooth user experience – Since PortaBella is blending all the available bandwidth into a single IP pipe, the user experience is much smoother compared to load-balancers. As a matter of fact, with load-balancers, the user can have worse experience compared to a single card, since that session may get stuck in a card that is going through a deep fade and therefore not get any acceptable performance, even when there are better wireless links available.

Consider the following comparison table. We consider the PortaBella BBNA versus a load balancing device for a number of scenarios.

Scenario\Solution	PortaBella	Load Balancing Device
File download speed with four 1Mbps/400Kbps cellular lines from various carriers	4 Mbps	1 Mbps
File upload speed with four 1Mbps/400Kbps cellular lines from various carriers	1.6 Mbps	0.4 Mbps
Adapts load on each link during file download / upload for smooth end-user experience	Yes	No
Recovers from link failures during file downloads/uploads	Yes	No

In the first comparison, in the top row of the table, we consider the scenario where the cellular lines are used. It is assumed in this scenario that each of four cellular lines is from the different carriers and has a potential downlink data rate of 1Mbps and upload speed of 400Kbps. In this case, with a PortaBella BBNA, the potential data rate of a file download is 4 Mbps, which is the sum of the available data rates. Similarly, the upload rate is 1.6Mbps. Please note that the bonded uplink with Portabella requires the optional Broadband Bonding Service.

The data rates available on the cellular links may fluctuate with time according to network congestion variations. With the PortaBella BBNA, the traffic load is automatically adapted in real-time in an intelligent manner to maximize data throughput. This is indicated by the “Yes” in the third row of the table.

In fact, even during a file transfer if one or more links fail, the PortaBella BBNA automatically adapts and continues to intelligently manage traffic to maximize data throughput without any interruption to the applications. If a failed link should recover in the midst of a file download, the PortaBella BBNA can leverage the available bandwidth on the recovered link. This is indicated by the “Yes” in the fourth row of the table.