



BROADBAND AGGREGATOR BA-4000

Broadband Aggregator BA-4000
BA-4000 Quick Start

Legal information

Copyright

Copyright © 2010-2012, ValuePoint Networks, Inc. All rights reserved. No part of this documentation may be reproduced in any form or by any means without prior written authorization from ValuePoint Networks, Inc..

Disclaimer

Precautions have been taken to ensure accuracy of the information provided in this manual. Typographic or pictorial errors that are brought to our attention will be corrected in subsequent issues. ValuePoint Networks, Inc. reserves the right to revise this documentation and to make changes in content from time to time without obligation to provide notification of such changes. ValuePoint Networks, Inc. provides this documentation without warranty expressed, implied, statutory, or otherwise and specifically disclaims any warranty of merchantability or fitness for a particular purpose. ValuePoint Networks, Inc. may make improvements or changes in the product(s) described in this documentation at any time. Product specifications in this manual are provided for the convenience of our customers. They are all correct at the time of publication. ValuePoint Networks, Inc. reserves the right to make product changes from time to time, without prior notification, which may change certain specifications or functions described here. ValuePoint Networks, Inc. recommends you to check for changes or updates before using the equipment. The handling, installation and usage of the ValuePoint products are applicable to specified environments and should be used in recommended conditions. The equipment does not or will not provide protection against abuse, misuse, improper installation or maintenance. It is important that installation, operation and maintenance are performed in accordance with instructions supplied in the manual. Electricity and electrical devices must always be treated with caution and respect.

Trademarks

All trademarks and service marks specified herein are owned by their respective companies.

Technical support

ValuePoint Networks, Inc.
350 Townsend Street, Suite 320
San Francisco, CA 94107
Email: support@valuepointnet.com

Feedback

ValuePoint Networks, Inc. strives to provide quality documentation that enhances the user's experience with our products. We are constantly improving our guides and have a genuine interest in ensuring that our guides are easy to use and enable users to quickly find information they need. We invite you to be part of this process; please email your comments regarding ValuePoint Networks, Inc. product documentation and web content to: info@valuepointnet.com

Table of Contents

Introduction.....	1
BA-4000 Simple Link Aggregation Setup.....	3
Connect to the BA-4000 User Interface	3
Configure multiple WAN ports	3
Configure LAN port.....	4
Enable Load Balancing.....	4
ValuePoint Gateway Controller Setup.....	5
Basic Gateway Controller Setup for BA-4000	5
Accessing the Gateway Controller from the BA-4000 WAN	5
Configuring AP Manager or Other Port Forwarding Rules.....	6
Port Forwarding to Overlapping Ports.....	6
VPN Pass-through.....	7
VPN Static IPs	7
General Comments on Static IPs	7
Verifying Setup and Speed Tests.....	8
How to Do a Speed Test	8
Online Speed Tests	8
BitTorrent Speed Test.....	8

Introduction

This document is intended to help you with basic setup of a simple aggregated WAN link for your network. There are some common configurations and ValuePoint Gateway Controller features that must be configured correctly on the Broadband Aggregator BA-4000 to get the network behavior that you want. This Quick Start gives some examples of these settings. If you have another access controller on your network these settings may be applicable to that device as well. Please consult the BA-4000 User Guide for more complex topics and complete details on every setting on every menu.

BA-4000 Simple Link Aggregation Setup

It is very easy to set up a simple link aggregation with load balancing that will allow users to share two or more ISP connections.

Connect to the BA-4000 User Interface

Complete the following procedures to connect to the BA-4000 web GUI:

1. Switch on the BA-4000. Connect one end of the Ethernet cable on the LAN port of BA-4000 and the other end to the LAN port of a laptop or desktop. Ensure the laptop / desktop IP is configured for DHCP or in the same LAN segment of BA-4000 segment which is 192.168.100.x by default.

2. Launch a web-browser, either Mozilla Firefox or Internet Explorer and navigate to the following URL:

<http://192.168.100.1/>

192.168.100.1 is the default LAN IP address of BA-4000.

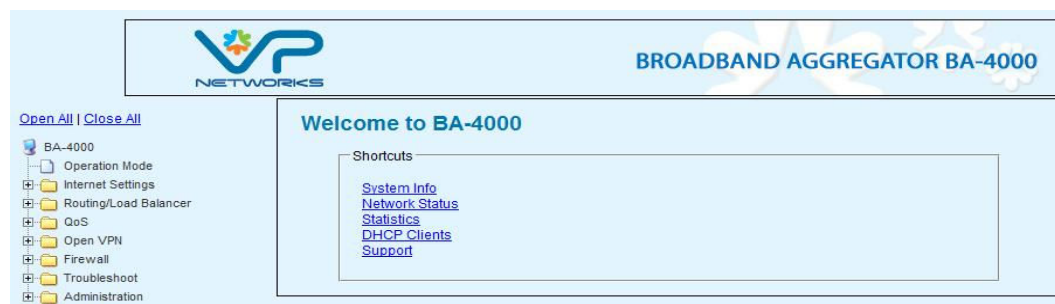
The **Login** screen is displayed.

3. Enter the appropriate BA-4000 UI username and password.

Default Username: “root” and Password: “root”

The home page of BA-4000 will be displayed.

4. If you want to access the BA-4000 remotely from one of the WAN IP addresses, enable Firewall – System Security – Remote Management. Please note that it is often not possible to access the WAN IP of the BA-4000 when connected to the LAN port, or through a device connected to the LAN port. Use the LAN IP when connected to the LAN port.



Configure multiple WAN ports

Link aggregation requires separate independent connections to each WAN interface. These connections could be DSL, T1, Cable or any other Ethernet. Complete the following procedures for each WAN (WAN-1, WAN-2, WAN-3) to enable your Internet Service Provider (ISP) WAN connections:

1. Connect the WAN (1, 2, or 3) port to your ISP modem or gateway.
2. Go to Internet – WAN (1, 2, or 3) and select the WAN connection type. Configurable options for that type will be displayed. Most DSL modems need to be in bridge mode to use PPPoE, or DHCP for Router Mode.
3. Each WAN link has a ratio that determines the amount of traffic directed to that link. The percentage is equal to WAN Ratio Value divided by the total ratio of all WAN ports. The simplest setting is to just set each ratio equal to the speed in Mbps.

Example 1: WAN-1 is ratio 1 and WAN-2 ratio 9, the total ratio for both links is 10(9+1). WAN-1 will receive 1/10 (10%) and WAN 2 9/10 (90%) of network traffic.

Example 2: WAN-1 is ratio 9 and WAN-2 is ratio 9. Setting ratio to 9 for both links is the same as 1 for both links. 9/18 is the same as 1/2. Ratio is only significant when the values are different.

Example 3: WAN-1 is ratio 5, WAN-2 is ratio 6, and WAN-3 is ratio 9. Total ratio is 20 (5+6+9). WAN-1 will receive 5/20 (25%), WAN-2 6/20 (30%), and WAN-3 9/20 (45%) of network traffic.
4. Set Ratio for all WAN links commensurate with their actual speed as reported by your ISP.
5. Enable Network Properties – WAN (1, 2, or 3) – NAT for each WAN port.

Configure LAN port

The BA-4000 has a single LAN port to connect LAN side devices. The simplest setup is to assign users, equipment or a Gateway Controller a private IP from the BA-4000 LAN port. This allows access and aggregation in the easiest configuration. See the Gateway Controller Setup for more information on complex addressing like port forwarding, routing, or use of public IPs on the BA-4000 LAN.

1. Go to Internet – LAN and configure the LAN options
2. DHCP is enabled by default for the pool 192.168.100.100-200
3. Connect the LAN port to your PC or a network switch.
4. Enable Network Properties – LAN – NAT.

Enable Load Balancing

By default the BA-4000 will route all traffic to the highest ratio WAN link in Failover mode. You must enable Load Balancing to distribute traffic amongst all the WAN links:

1. Go to Routing/Load Balancer – Load Balance
2. Select Load Balance and Fail Over and click Apply

Conclusion

By following these steps you have enabled basic load balancing for your WAN links. Any LAN traffic will be NATed and automatically distributed among the WAN ports based on the ratios you selected.

ValuePoint Gateway Controller Setup

The ValuePoint Gateway Controller has very sophisticated behavior in terms routing and control of subscriber traffic. To support these features across multiple WAN connections with aggregation and failover the BA-4000 must be correctly configured. If you are using other equipment review the feature setup below to see if it applies to your equipment, and review the full User Guide.

Basic Gateway Controller Setup for BA-4000

This is a simple configuration to allow all subscriber traffic to be processed by the ValuePoint Gateway Controller and Aggregated to the BA-4000 WAN ports:

1. Connect Controller WAN port to BA-4000 LAN port.
2. Set Gateway WAN port to Static IP matching the BA-4000 LAN subnet (192.168.100.2, etc.)
3. Set Gateway LAN port to different, non-overlapping IP subnet (10.1.1.1, etc)
4. Choose a public DNS server that can be accessed from any WAN port.

Example:

GoogleDNS: 8.8.8.8, 8.8.4.4

OpenDNS: 208.67.222.222, 208.67.220.220

5. Configure other Gateway features as desired.
6. See below for advanced configuration for port forwarding, static IPs, and VPN IPs.

Accessing the Gateway Controller from the BA-4000 WAN

To access the HTTP GUI of the Gateway Controller, you must configure the BA-4000 to forward port requests to its WAN ports to the HTTP port of the Gateway Controller.

1. Go to Controller Networks – Server – HTTP Server
2. Configure a HTTP port other than 80. 60000 is a good choice.
3. Click OK. All HTTP requests to the Controller must be made to this port now for the LAN and WAN. For example, <http://192.168.1.1:60000>.
4. Go to BA-4000 Firewall – Port Forwarding
5. Enter the WAN Port IP of the Controller under IP Address
6. Enter the Controller HTTP Port you just configured (60000 or other) in the BA-4000 Port Range
7. Select Protocol TCP and UDP
8. Describe this rule (Controller GUI, etc) under Comments

9. Click Apply

Configuring AP Manager or Other Port Forwarding Rules

You must configure the BA-4000 to forward port requests to its WAN ports to the WAN port of the Gateway Controller. For each AP manager, port forwarding, or port range rule:

1. Go to 4000 – Firewall – Port Forwarding
2. Enter the WAN Port IP of the Gateway under IP Address
3. Enter the Gateway Port or Ports (not Management Port) from Controller – Management – AP Manager in the BA-4000 Port Range
 Example: Gateway (10.1.1.1) Port 60001 is mapped to management port 80 on AP 1 (10.1.1.10). Create a Port Forward rule in BA-4000 for Port 60001 to 10.1.1.1.
4. Select Protocol TCP and UDP
5. Describe this rule (AP 1, etc) under Comments. Enter additional rules for more APs, or provide a port range that covers all the AP ports.
6. Click Apply
7. Go to 3560 – Management – AP Manager
8. Enter the WAN IP address of the BA 4000 under IP Address for AP URL Links. This will enable the AP links in Status – AP Manager.
9. Click OK

Port Forwarding to Overlapping Ports

In some circumstances you may want to forward the same BA-4000 port to multiple devices, or you may want to forward a port that is in use by the BA-4000 itself. An example of this would be port 80 for HTTP. Normally forwarding port 80 means you can never access the HTTP server of the forwarding device, only the target device. However, on the BA-4000 you can use IP Alias to create a conditional rule for another Public IP that will allow you for forward overlapping ports (port 80 in this case):

1. Get a block of Static IPs from one of your ISPs and note which ISP/BA-4000 WAN port they are associated with.
2. You will need two Static IPs from your ISP. Select one as the BA-4000 Public IP and one as the alias Public IP.
 Example: BA-4000 Public 216.163.137.68, Alias Public IP 216.163.137.69.
3. Go to BA-4000 Internet Settings –WAN-1 and configure WAN Connection Type: Static IP.
4. Enable IP Alias and enter the Public IP you selected above for the overlapping port.
5. Go to Firewall – Port Forwarding.
6. Enter the WAN IP of the Gateway under IP Address. This will be in the BA-4000 LAN subnet.
7. Enter Port Range 80 / 80.

8. Select Protocol TCP and UDP.
9. Enter the IP Alias you selected above under Original Destination IP Address. This rule will now only affect traffic to the Alias IP.
10. When you click Apply you create a rule that only applies to port 80 on the Alias IP. To access your Gateway port 80 you can now go to 216.163.137.69:80. Going to 216.163.137.68:80 accesses the BA-4000 HTTP port as usual.

VPN Pass-through

The ValuePoint Gateway Controller supports VPN Pass-through for IPSec, PPTP, and L2TP by default. These features must also be enabled in the BA-4000 under Internet Settings – VPN Pass-through. Otherwise some VPN traffic will be passed through by the Gateway Controller but not by the BA-4000.

VPN Static IPs

The ValuePoint Gateway Controller can dynamically provide routable public IPs to VPN users to enable them to connect in any situation. These public IPs are assigned on the LAN port of the Gateway Controller, so they must be correctly passed from Gateway WAN to BA-4000 LAN to BA-4000 WAN. It is extremely important to remember that these public IPs can be routed by only the ISP that issued them. They cannot be aggregated to another ISP.

1. Get a block of Static IPs from one of your ISPs and note which ISP/BA-4000 WAN port they are associated with.
2. Enable VPN Static IPs on the Gateway Controller as described in the documentation.
3. Go to BA-4000 Routing/Load Balancer – IP Pass-through.
4. Configure Outside Interface for the WAN port of the ISP that issued these Static IPs
5. Enter the Outside IP Address/Range for the VPN Static IP range you entered into the Gateway Controller
6. If you have configured routing or firewall rules in the BA-4000 that you do not want applied to this traffic, select Bypass Firewall.
7. Select Apply

General Comments on Static IPs

It is important to remember that a Public IP is routable only by the ISP that issued it. If you send traffic from your Cable ISP IPs to your DSL line, it will be dropped. Your DSL line only accepts packets from its DSL IPs. Using NAT on the LAN port, the BA-4000 can aggregate traffic to the ISPs correctly and reassemble it to allow combined throughput. Traffic from a Public Static IP prevents the link aggregation from functioning. If you configure your Gateway Controller to use a Public Static IP from one ISP, you must make sure to use BA-4000 IP Pass-through so this traffic is directed correctly. In this case all traffic from the Gateway Controller will go to the ISP that issued that Public IP.

Verifying Setup and Speed Tests

After you finish configuring your BA-4000 and ValuePoint Gateway Controller be sure to test the features that you are using like AP Manager port forwarding and VPN Static IPs. If the Gateway Controller and BA-4000 are not correctly configured these features will not work.

How to Do a Speed Test

When load balancing is enabled, the BA-4000 randomly assigns each new connection to the outgoing WAN ports based on the ratio. A connection is defined by the source and destination IP. This prevents secure traffic like IPSec between two machines from being split up and invalidating the connection.

When your BA-4000 and Gateway Controller are configured correctly you will want to verify your WAN link speeds. However, you will not get a good test result without keeping the BA-4000 WAN aggregation design in mind.

When you do a typical speed test (www.speedtest.net, etc) to a single server IP from a single PC, you are only creating a single connection. Based on the ratio you will be randomly assigned to a single outgoing WAN port. If you have 10Mb and 1Mb WAN ports, and ratio of 9 and 1, a single speed test will show 10Mb 90% of the time and 1Mb 10% of the time. The port assignments tend to be sticky as well, at least for the life of a TCP session, so once a single connection (Source IP to Destination IP) is assigned to a WAN port it will tend to stay on that port. You can see this easily by watching the lights during the speed test to see what port that single connection is on.

Online Speed Tests

The simplest speed test is to just run a few tests against different online speed test servers each time, and verify that the speeds are about what you would expect. In the example above: 10Mb about 90% of the time and 1Mb about 10% of the time. This would indicate everything is working correctly. In deployment 90% of connections would go over the 10Mb link and 10% over the 1Mb link. This is per unique connection, IP to IP. Not per user, per source IP, or per destination IP.

For a more accurate test of what multiple subscribers on your network would experience, run 2-3 tests simultaneously from different browser tabs to different servers.

Example: In your browser open three tabs. On each tab go to www.speedtest.net. On tab one select San Francisco. On tab two select Los Angeles. On tab three select Portland. Try to start the tests at the same time.

You may need to do it a few times, since by luck of the draw you could still end up with three tests on the 1Mb link.

BitTorrent Speed Test

A more accurate speed test that utilizes real network traffic is to download a large file using a BitTorrent client like uTorrent (www.utorrent.com). If you have a client already and a large file you would like to download, go ahead. If you are looking for an appropriate file, there are open

source images at <http://linuxtracker.org>. Choose an image with as many seeds as possible. BitTorrent may take a few minutes to get up to full speed, and make sure there are sufficient peers available. Here is a step by step summary if you are not familiar with BitTorrent

1. In Internet Explorer go to <http://utorrent.com> and install the client.
2. In Internet Explorer go to <http://linuxtracker.org> and select the image with the most Seeds (S) under top torrents.
3. Under torrent details click on the link for Torrent.
4. When Windows prompts you select uTorrent to open the file.
5. On uTorrent Add Torrent dialogue, select OK.
6. Open the uTorrent client and check the aggregate speed of you download after a few minutes.

If your speeds are a less than you expect, please make sure that you review the minimum connection speed your ISP has guaranteed on the link. Generally only a T1 gives you the full speed guaranteed. A 10 Mbps link may only provide 9 Mbps typically, and only guarantee 4Mbps or less.