BreezeNET B™

Load Sharing Using Cisco Switches – Application Note

December 2004
DN0833

Date	Document Name	Document Number
December 6, 2004	BNET B Load Sharing Using Cisco Switches – Application Note	DN0833

Written By: Ran Meyerstein **Title:** Product Expert	**No. of pages:** 7 **Rev:** A
Approved By:	**Name:**
Product Expert	Ran Meyerstein
Product Experts Director	Ulik Broida
Product Line Manager	Lior Mishan

Contents

Scope

The purpose of this document is to describe an application in which two BreezeNET B links are used in parallel. Using two parallel BreezeNET B links will achieve the following:

- A doubling of the end-to-end throughput.
- Redundancy.

The suggested configuration includes Cisco switches that support "**Load sharing using STP**" (Spanning Tree Protocol).

Load sharing using port priorities is supported in switches supporting STP. In this application note the commands apply to **Cisco Catalyst 2900 series.**

Introduction

The BreezeNET B is an 802.11a based system (layer two switch). The heart of the system is a MAC address database kept in the BU. In this MAC address database lays a list of all the active MAC addresses that the system has "learned". This table contains the location of the MAC address (Ethernet side or wireless side - behind the RB). When an Ethernet packet is intercepted by the system, its destination MAC address is analyzed. Next, the system decides if the packet should be transferred to the other side of the wireless bridge or disregarded (left on the Ethernet side), as its destination is a MAC address on the Ethernet side.

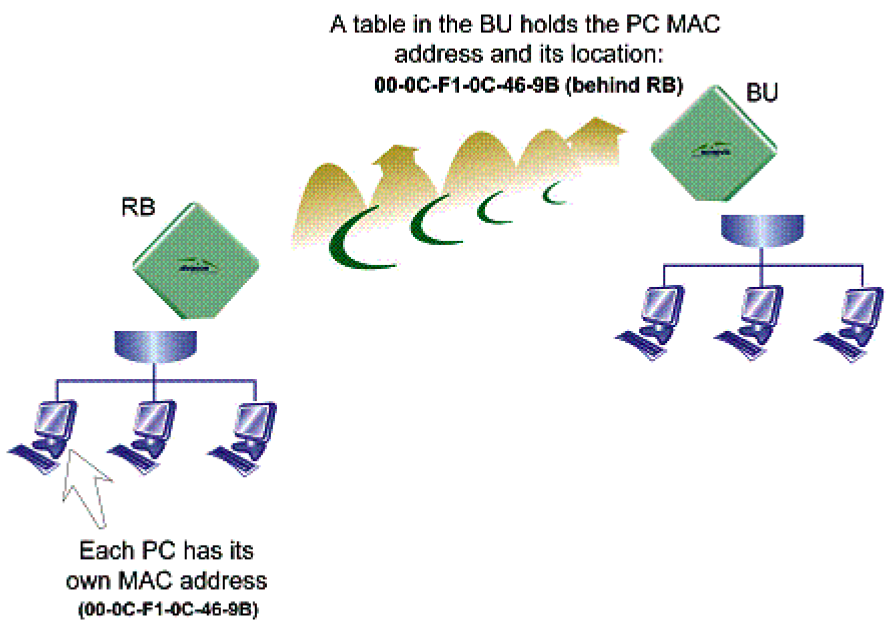

Figure 1: MAC Address Database

Connecting two BreezeNET B wireless bridges in parallel between two Ethernet networks results in packet duplication, as the two wireless bridges forward the same packet. In addition, "loops" may occur, as packets with unknown destination MAC addresses are always forwarded to the wireless side.

Taking all this into consideration leads to the conclusion that if two BreezeNET B are to be connected in parallel, a third party device must be connected between the Ethernet networks and the BreezeNET B links.

There are numerous devices that may act as third party. This document describes one suggested solution for connecting two BreezeNET B links in parallel, by using two Cisco switches (one on each Ethernet network) as the third party device.

The suggested solution can only be implemented if the Ethernet networks on each side of the BreezeNET B links are comprised of several virtual networks differentiated by different VLAN IDs (more than one). This is as Cisco's load sharing is based on the following principal: *packets that have a specific VLAN will be sent through a specific port in the switch.*

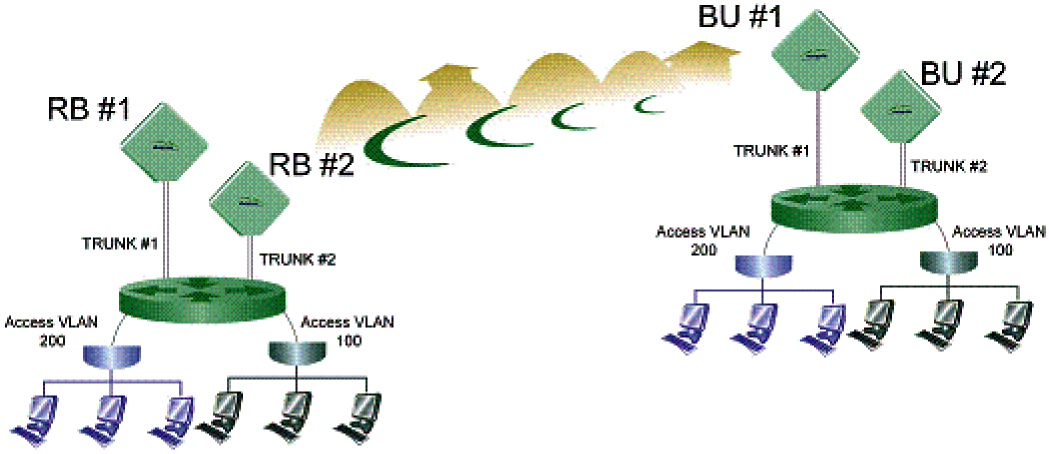

Figure 2: Using Cisco Switches for Networks Differentiation

Sending packets with a specific VLAN ID through specific ports in the Cisco switch is done by assigning different "port priorities" to specific VLAN IDs on specific trunk ports. A higher priority setting of a VLAN ID on the specific Trunk will result in the sending of packets with this VLAN ID through the specified Trunk. As a result, two objectives are accomplished:

1. Speed of connection between two sites is doubled as the VLAN traffic is conveyed by one of the Trunks-links. Furthermore, new networks with different VLAN IDs may be added on the less utilized link.

2. Redundancy is achieved. The Cisco switch handles this by sensing a fail in the link using STP and transferring all the traffic (all packets regardless of their VLAN IDs) via the active link.

Configuration

BreezeNET B

As the BreezeNET B links should act as a "transparent pipeline", the **VLAN link type** under **Bridge parameters – VLAN support** should be set to either **Hybrid** (transferring both VLAN tagged traffic and untagged traffic) or **Trunk** (transferring only VLAN tagged traffic).

Cisco Switches

Table 1shows the parameters configuration of the Cisco switches, and Figure 3 provides a graphic description of this configuration.

There are four physical ports (*interface FastEthernet0/#*) used in each of the two switches, two of which are used for linking the two "sites" (ports one and two) while the other two are used for generating two different networks with different VLAN IDs (ports three and four).

The two different VLAN networks are VLAN 330 and VLAN 430. When both links (connected to physical ports one and two) are up, traffic marked with VLAN ID 330 is transferred via port 1 (as its cost is higher there - 65535), and traffic with VLAN ID 430 is transferred via port 2 (as its cost is higher in this port - 65535). When one of the link fails, the traffic with the lower cost (for example in *FastEthernet0/1 VLAN 330* is given a cost of *1*) will be conveyed via the active. Thus, redundancy is achieved.

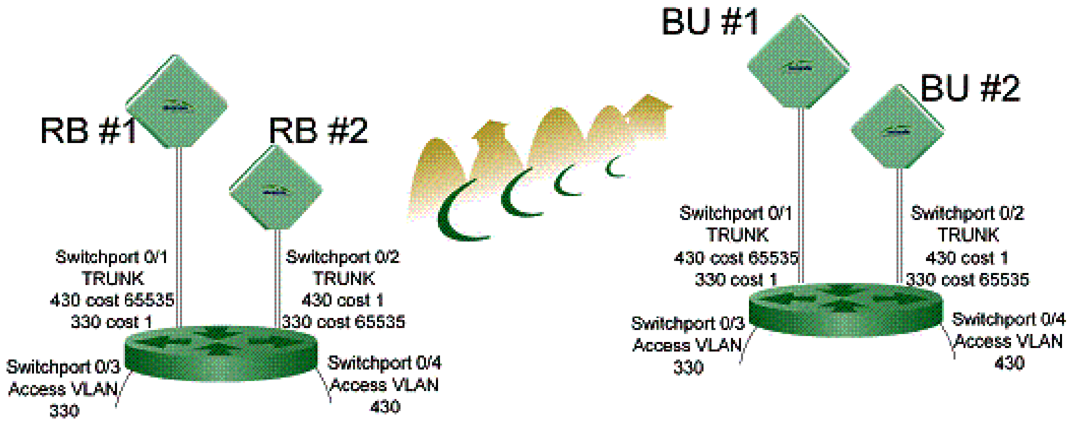

Figure 3: Detailed Configuration Using Cisco Switches

Table 1: Cisco Switches Configuration Suggestion

Switch 1	Switch 2
interface FastEthernet0/1	interface FastEthernet0/1
switchport mode trunk	switchport mode trunk
switchport trunk encapsulation dot1q	switchport trunk encapsulation dot1q
spanning-tree vlan 330 cost 1	spanning-tree vlan 330 cost 1
spanning-tree vlan 430 cost 65535	spanning-tree vlan 430 cost 65535
!	!
interface FastEthernet0/2	interface FastEthernet0/2
switchport mode trunk	switchport mode trunk
switchport trunk encapsulation dot1q	switchport trunk encapsulation dot1q
spanning-tree vlan 430 cost 1	spanning-tree vlan 330 cost 65535
spanning-tree vlan 330 cost 65535	spanning-tree vlan 430 cost 1
!	!
interface FastEthernet0/3	interface FastEthernet0/3
switchport access vlan 330	switchport access vlan 330
!	!
interface FastEthernet0/4	interface FastEthernet0/4
switchport access vlan 430	switchport access vlan 430