

vNIC Tutorial

System x

IBM BladeCenter vNIC tutorial

How to configure Virtual NICs using
the Emulex Virtual Fabric Adapter and
BNT Virtual Fabric Switch Module

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Introduction

This tutorial is intended as a ‘how-to’ guide for configuring BladeCenter Virtual NIC (vNIC) operation using the Emulex Virtual Fabric Adapter (VFA) and the Blade Network Technologies (BNT) Virtual Fabric Switch Module (VFS).

For the initial release of vNIC functionality for BladeCenter, configuration is accomplished using the standard management interfaces of the VFS. This guide describes implementation examples for both the Command Line Interface (CLI) and the Browser-Based Interface (BBI).

Hardware/Firmware Required:

- Emulex Virtual Fabric Adapter (49Y4235)
- BNT Virtual Fabric Switch Module for IBM BladeCenter (46C7191) with firmware build 6.1.1 or later.

It is strongly recommended that the reader of this tutorial become familiar with BladeCenter VNIC functionality by referring to the section entitled, “Virtual NICs”, in the [*BNT Virtual Fabric 10Gb Switch Module for IBM BladeCenter, Application Guide*](#) (see [Related Documentation](#) on p.41).



Getting Started

This tutorial assumes basic familiarity with BladeCenter virtual NIC (vNIC) functionality as implemented by the Emulex Virtual Fabric Adapter (VFA) and the BNT Virtual Fabric Switch Module (VFS).

General characteristics of this functionality are:

- Each Server physical NIC (pNIC) port is divided into 4 virtual NICs (vNICs)
- OS configurations see eight unique NICs (2 ports X 4 vNICs)
- All vNIC parameters are configured from the VFS user interface
 - DCBX protocol is used between switch and NIC to convey configuration information
- User enables vNICs and allocates bandwidth
 - Allowable vNIC bandwidth range is 100Mbps-10Gbps
 - increments of 100Mbps
 - default bandwidth setting is 2.5Gbps
 - the sum of all 4 vNICs cannot exceed 10Gbps
 - VFS to Server bandwidth metering on per vNIC per port basis
 - Server to VFS bandwidth metering on per vNIC basis
- User assigns vNIC(s) and, optionally, uplink(s) to vNIC groups
 - groups serve to isolate virtual NIC traffic flowing on the same physical port
 - existing VLANs within the customer network are not impacted
 - no forwarding occurs between uplinks assigned to vNIC groups
 - up to 32 vNIC groups supported per VFS
 - an uplink (port or trunk) can belong to only one vNIC group
 - a server port (pNIC or vNIC) can belong to only one vNIC group
 - failover mechanism is virtual port aware



Basic Setup

Virtual Fabric Adapter (VFA) Configuration

The Emulex Virtual Fabric Adapter for IBM BladeCenter (VFA) can operate in 10Gb dual 4-port Virtual Ethernet mode (vNIC) or 10Gb dual Port Ethernet mode (pNIC). The VFA default mode is set to vNIC.

vNIC mode is enumerated by the Operating System or Hypervisor as 8 separate Ethernet devices (4 per physical port). The pNIC mode can be enabled per the instructions in the *Installation and User's Guide for Emulex Virtual Fabric Adapter (CFFh)*.

There are two 10Gb Ethernet switch environments supported, depending on the VFA mode:

- **vNIC mode (default):** The VFA must be paired with one or two BNT Virtual Fabric 10Gb Switch Modules (VFS) to operate. To enable VFA (virtual) Ethernet connections, the VFS must be configured for vNIC mode. The VFS configuration parameters control the speed of the individual vNIC links (in increments of 100 Mbps) and assign a collection of vNIC links to common communication groups. Unused vNIC links can be disabled. Refer to *vNIC/pNIC Configuration Possibilities* (p.10).
- **pNIC mode:** The VFA functions as a 10 Gb dual port Ethernet device and can be paired with any high speed IBM BladeCenter 10Gb Ethernet/CEE (HSSM). This includes VFS and non virtual fabric 10Gb Ethernet switches or pass-thru modules. No additional HSSM configuration is required when the VFA is set to operate in this mode.

Other than mode selection, the VFA has no configuration requirement for virtual NIC operation.

Virtual Fabric Switch (VFS) Configuration

Three basic steps are required in order to permit vNIC operation between the VFA and the VFS.

1. Enable vNIC operation on the applicable blade ports
2. Customize the maximum bandwidth for each vNIC (optional)
3. Group the vNIC links into common communication groups

NOTE: if an attempt is made to enable vNIC operation on a blade port that is not capable, a warning message similar to the following is displayed on the switch Command Line Interface (CLI) and added to the switch log.

Warning: Peer does not support vNIC on port INT11

Note: if you are using the switch Browser-Based user interface (BBI), the following popup is given to alert you to this warning message.





VFA/VFS vNIC Correlation

Setting up virtual connections requires an understanding of how the adapter and switch identifies the eight (8) possible vNIC devices. Table 1 illustrates the designations used.

| VFA | | VFS | | |
|------------------|------|---------|---------------------------|------|
| PCIe Function ID | Port | I/O Bay | Port Alias (Blade slot x) | vNIC |
| 0 | 0 | 7 | INTx.1 | 1 |
| 2 | 0 | 7 | INTx.2 | 2 |
| 4 | 0 | 7 | INTx.3 | 3 |
| 6 | 0 | 7 | INTx.4 | 4 |
| 1 | 1 | 9 | INTx.1 | 1 |
| 3 | 1 | 9 | INTx.2 | 2 |
| 5 | 1 | 9 | INTx.3 | 3 |
| 7 | 1 | 9 | INTx.4 | 4 |

Table 1 - VFA/VFS vNIC Correlation table

Note: For the VFA, the PCIe Function ID can be determined by running the 'ethtool -i' command in Linux, or by viewing the Network Adapter Properties in Windows Device Manager.

What is Failover ?

When external VFS uplinks are part of a vNIC group, this feature allows the state of the external connection to directly influence the link state of all internal ports (vNICs and pNICs) which are members of the group.

When triggered, the failover mechanism operates on a 'per vNIC group' basis, thus not affecting vNICs/NICs which have no association with the failed uplink. Virtual connections within the group are disabled without bringing down the internal physical port (Refer to [Case 4](#) for configuration example).

Note: Refer to the [BNT Virtual Fabric 10Gb Switch Module for IBM BladeCenter, Application Guide](#) for a detailed explanation of how/why Failover is used during vNIC operation.



vNIC/pNIC Configuration Possibilities

The basic matrix of vNIC group possibilities is identified by considering the possible NIC types (physical, virtual) and uplink types (port, trunk). Table 2 enumerates the choices.

| Case | Uplink Trunk | Single Uplink | Phys NIC | Virt NIC | Comments |
|------|--------------|---------------|----------|----------|---|
| 1 | | | | ■ | vNICs only, No Uplinks (see p.12) |
| 2 | | | ■ | ■ | vNICs and pNICs, No uplinks (see p.16) |
| 3 | | ■ | | ■ | vNICs only, One uplink (see p.21) |
| 4 | | ■ | ■ | ■ | vNICs and pNICs, One uplink (w/failover) (see p.25) |
| 5 | ■ | | | ■ | vNICs only, One uplink trunk (see p.30) |
| 6 | ■ | | ■ | ■ | vNICs and pNICs , One uplink trunk (see p.35) |
| 7 | | | ■ | | pNICs only, no uplinks |
| 8 | | ■ | ■ | | pNICs only, one uplink |
| 9 | ■ | | ■ | | pNICs only, one uplink trunk |

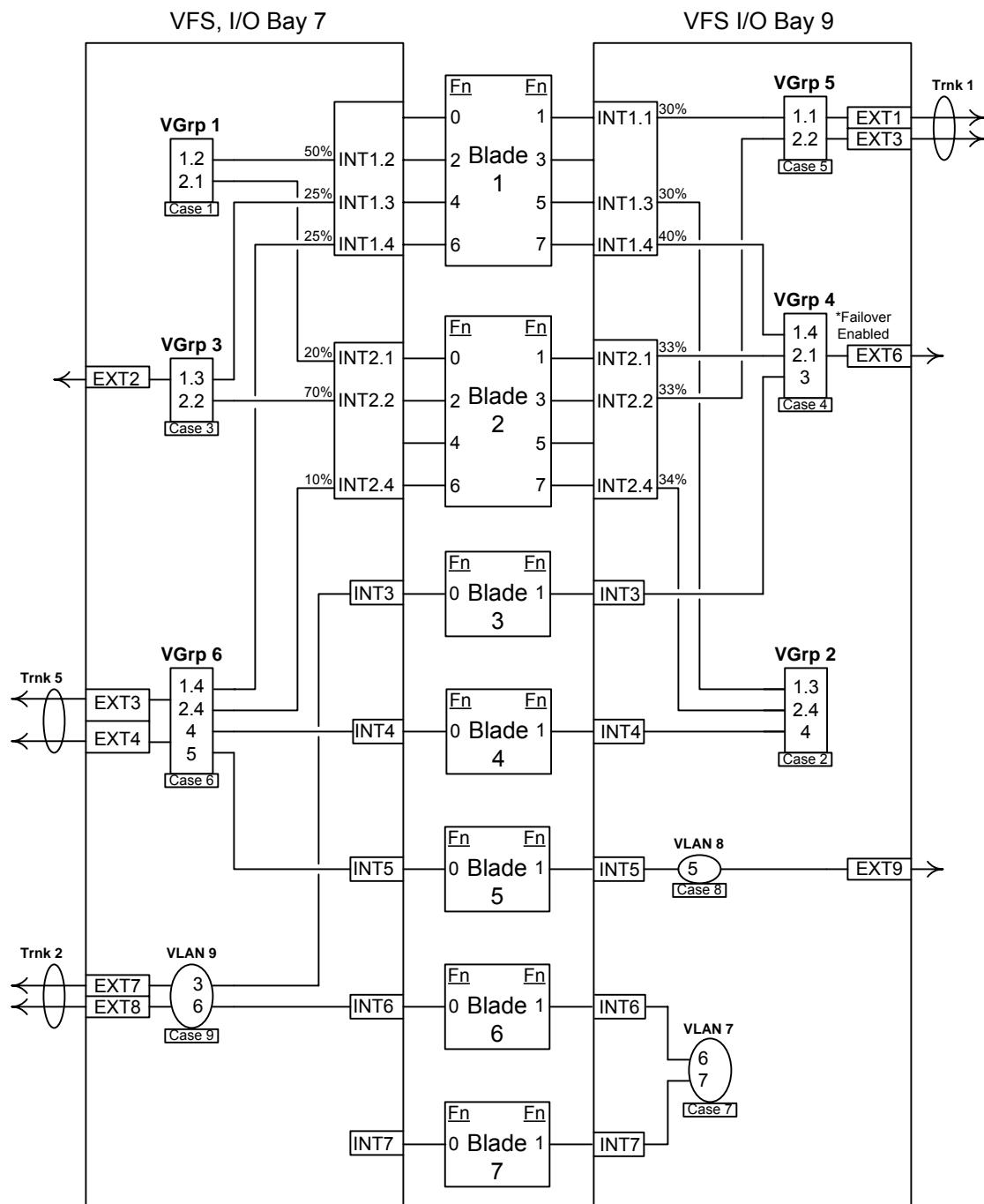
Table 2 : Combinations Matrix

Note: Cases 7-9, though permitted as vNIC groups, are typically handled by traditional VLAN configuration and are therefore not covered by this tutorial. They are included in the table for completeness.

Each of the configuration possibilities are depicted in [Figure 1](#) on p.11. The actions required to implement Cases 1-6 are detailed in subsequent sections.

Note: For switch CLI users, script files ("VFS-vnic-scripts.zip") are available which can be used to configure the vNIC groups depicted in Figure 1. See the /cfg/gtcfg command in the [BNT Virtual Fabric 10Gb Switch Module for IBM BladeCenter, Command Reference](#) for instructions on loading these scripts via FTP or TFTP. Alternately, the configuration text can be copied and pasted directly into the CLI session.

Figure 1 – Typical vNIC Configuration Scenarios





Case 1 - vNICs only, No Uplinks

Represented as VGRP 1 in [Figure 1](#) on p.[11](#), this group consists solely of vNIC ports.

Switch CLI

The following command script can be used to implement this configuration.

```
/c/virt/vnic
    on
/c/virt/vnic/port INT1/vnic 2
    ena
    bw 50
/c/virt/vnic/port INT2/vnic 1
    ena
    bw 20
/c/virt/vnic/vnicgrp 1
    ena
    vnicvlan 127
    addvnic INT1.2
    addvnic INT2.1
apply
```

Switch BBI

Click on the 'Configure' tab, then perform the following sequence of web interface entries to implement this configuration.

1. Enable vNIC operation. (Submit, Apply ... and Save, if you want it to persist after switch reboot.)



Figure 2 - BBI : Case 1, Enable vNIC operation

2. Enable and configure vNICs (remember to Submit and Apply).

The screenshot shows the BLADE OS interface with the title "vNICs Configuration". On the left, there is a navigation tree under "BNT Virtual Fabric 10Gb Switch" with various network-related options like System, Switch Ports, Port-Based Port Mirroring, Layer 2, RMON Menu, Layer 3, QoS, Access Control, CEE, FCOE, Virtualization, VNIC, and VM NICs. The "VM NICs" option is circled in red. The main pane displays a search interface with fields for "From" (INT1.1) and "To" (INT14.4), and search options for State (any), Max Bandwidth (0), and vNIC Group (0). Below the search is a table of vNICs:

| vNIC | State | vNIC Group | Max Bandwidth |
|--------|----------|------------|---------------|
| INT1.1 | disabled | 0 | 25 |
| INT1.2 | disabled | 0 | 25 |
| INT1.3 | disabled | 0 | 25 |
| INT1.4 | disabled | 0 | 25 |
| INT2.1 | disabled | 0 | 25 |
| INT2.2 | disabled | 0 | 25 |
| INT2.3 | disabled | 0 | 25 |
| INT2.4 | disabled | 0 | 25 |

Figure 3 - BBI : Case 1, vNICs pane

This is a configuration dialog for vNIC INT1.2. It has two main fields: "State" set to "enabled" and "Max Bandwidth in increments of 100Mbps (1-100)" set to "50". A red box highlights the "Max Bandwidth" input field.

Figure 4 - BBI : Case 1, vNIC INT1.2 Configuration

This is a configuration dialog for vNIC INT2.1. It has two main fields: "State" set to "enabled" and "Max Bandwidth in increments of 100Mbps (1-100)" set to "20". A red box highlights the "Max Bandwidth" input field.

Figure 5 - BBI : Case 1, vNIC INT2.1 Configuration

3. Enable and configure the vNIC group.

| vNIC Group | State | Vlan | Failover State |
|------------|----------|------|----------------|
| 1 | disabled | 0 | disabled |
| 2 | disabled | 0 | disabled |
| 3 | disabled | 0 | disabled |
| 4 | disabled | 0 | disabled |
| 5 | disabled | 0 | disabled |
| 6 | disabled | 0 | disabled |
| 7 | disabled | 0 | disabled |
| 8 | disabled | 0 | disabled |
| 9 | disabled | 0 | disabled |
| 10 | disabled | 0 | disabled |
| 11 | disabled | 0 | disabled |
| 12 | disabled | 0 | disabled |
| 13 | disabled | 0 | disabled |
| 14 | disabled | 0 | disabled |

Figure 6 - BBI : Case 1, vNIC Groups pane

Figure 7 - BBI : Case 1, vNIC Group Configuration



Case 2 - vNICs and pNICs, No uplinks

Represented as VGRP 2 in [Figure 1](#) on p.[11](#), this group consists of vNIC and pNIC ports, but no uplink ports.

Switch CLI

The following command script can be used to implement this configuration.

```
/c/virt/vnic
    on
/c/virt/vnic/port INT1/vnic 3
    ena
    bw 30
/c/virt/vnic/port INT2/vnic 4
    ena
    bw 34
/c/virt/vnic/vnicgrp 2
    ena
    vnicvlan 310
    addvnic INT1.3
    addvnic INT2.4
    addport INT4
apply
```

Switch BBI

Click on the 'Configure' tab, then perform the following sequence of web interface entries to implement this configuration.

1. Enable vNIC operation. (Submit, Apply ... and Save, if you want it to persist after switch reboot.)



Figure 8 - BBI : Case 2, Enable vNIC operation

2. Enable and configure vNICs (remember to Submit and Apply).

The screenshot shows the BLADE OS interface with the 'CONFIGURE' tab selected. On the left, a navigation tree includes 'BNT Virtual Fabric 10Gb Switch' and 'Virtualization' (with 'VNIC' and 'VNICS' selected). The main pane is titled 'vNICs Configuration'. It features a search section with fields for 'From' (INT1.1) and 'To' (INT14.4), and a 'Search' button. Below is a table of vNICs:

| vNIC | State | vNIC Group | Max Bandwidth |
|--------|----------|------------|---------------|
| INT1.1 | disabled | 0 | 25 |
| INT1.2 | disabled | 0 | 25 |
| INT1.3 | disabled | 0 | 25 |
| INT1.4 | disabled | 0 | 25 |
| INT2.1 | disabled | 0 | 25 |
| INT2.2 | disabled | 0 | 25 |
| INT2.3 | disabled | 0 | 25 |
| INT2.4 | disabled | 0 | 25 |

Figure 9 - BBI : Case 2, vNICs pane

This dialog is titled 'vNIC INT1.3 Configuration'. It contains two fields: 'State' (set to 'enabled') and 'Max Bandwidth in increments of 100Mbps (1-100)' (set to '30'). A red box highlights the 'Max Bandwidth' field.

Figure 10 - BBI : Case 2, vNIC INT1.3 Configuration

This dialog is titled 'vNIC INT2.4 Configuration'. It contains two fields: 'State' (set to 'enabled') and 'Max Bandwidth in increments of 100Mbps (1-100)' (set to '34'). A red box highlights the 'Max Bandwidth' field.

Figure 11 - BBI : Case 2, vNIC INT2.4 Configuration

3. Enable and configure the vNIC group.

The screenshot shows the BLADE OS interface. The top navigation bar includes links for CONFIGURE, STATISTICS, and DASHBOARD, along with buttons for Apply, Save, Revert, Diff, Dump, Show Log, Help, and Logout. A timestamp at the top left indicates the date and time as 22. Jan 14 23:14:44 9.42.212.108 NOTICE server: link up on port INT6. The left sidebar contains a hierarchical menu under 'BNT Virtual Fabric 10Gb Switch Mo': System, Switch Ports, Port-Based Port Mirroring, Layer 2, RMON Menu, Layer 3, QoS, Access Control, CEE, FCOE, Virtualization, VNIC, VNICs, and VNIC Groups. The 'VNIC Groups' item is highlighted with a red circle. The main content area is titled 'vNIC Groups Configuration' and displays a table with 14 rows, each representing a vNIC group. The columns are labeled 'vNIC Group', 'State', 'Vlan', and 'Failover State'. All entries show 'disabled' in the 'State' column and '0' in the 'Vlan' column. The 'Failover State' column also shows 'disabled' for all groups.

| vNIC Group | State | Vlan | Failover State |
|------------|----------|------|----------------|
| 1 | disabled | 0 | disabled |
| 2 | disabled | 0 | disabled |
| 3 | disabled | 0 | disabled |
| 4 | disabled | 0 | disabled |
| 5 | disabled | 0 | disabled |
| 6 | disabled | 0 | disabled |
| 7 | disabled | 0 | disabled |
| 8 | disabled | 0 | disabled |
| 9 | disabled | 0 | disabled |
| 10 | disabled | 0 | disabled |
| 11 | disabled | 0 | disabled |
| 12 | disabled | 0 | disabled |
| 13 | disabled | 0 | disabled |
| 14 | disabled | 0 | disabled |

Figure 12 - BBI : Case 2, vNIC Groups pane

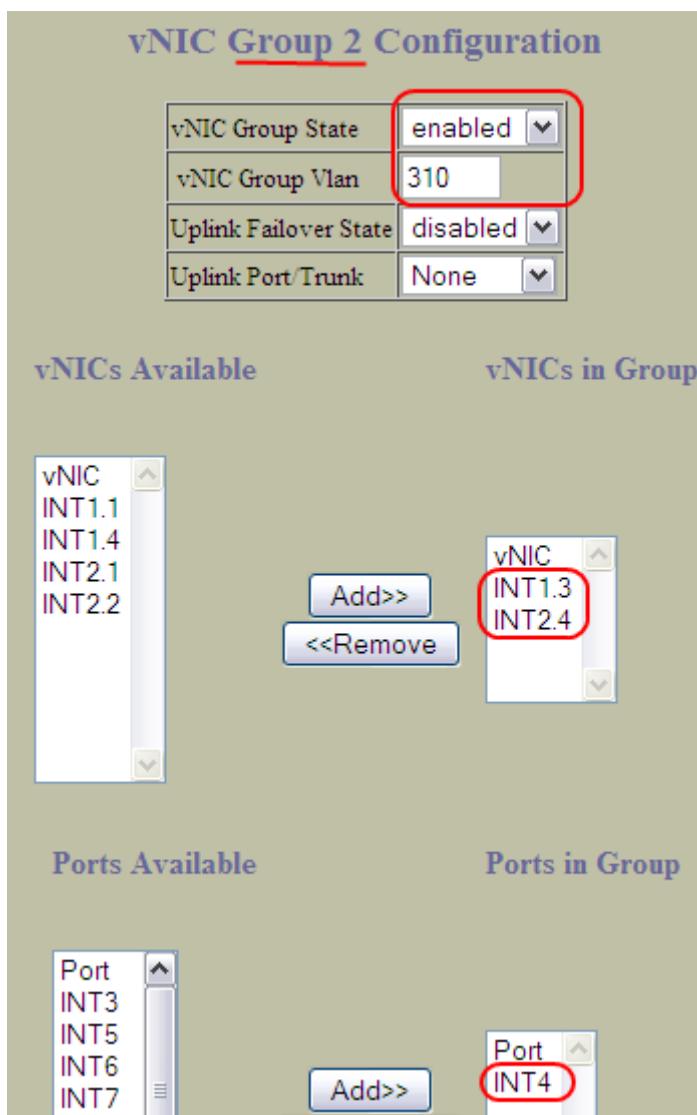


Figure 13 - BBI : Case 2, vNIC Group Configuration



Case 3 - vNICs only, One uplink port

Represented as VGRP 3 in [Figure 1](#) on p.[11](#), this group consists of vNIC ports and one uplink port.

Switch CLI

The following command script can be used to implement this configuration.

```
/c/virt/vnic
    on
/c/virt/vnic/port INT1/vnic 3
    ena
    bw 25
/c/virt/vnic/port INT2/vnic 2
    ena
    bw 70
/c/virt/vnic/vnicgrp 3
    ena
    vnicvlan 500
    addvnic INT1.3
    addvnic INT2.2
    addport EXT2
apply
```

Switch BBI

Click on the 'Configure' tab, then perform the following sequence of web interface entries to implement this configuration.

1. Enable vNIC operation. (Submit, Apply ... and Save, if you want it to persist after switch reboot.)

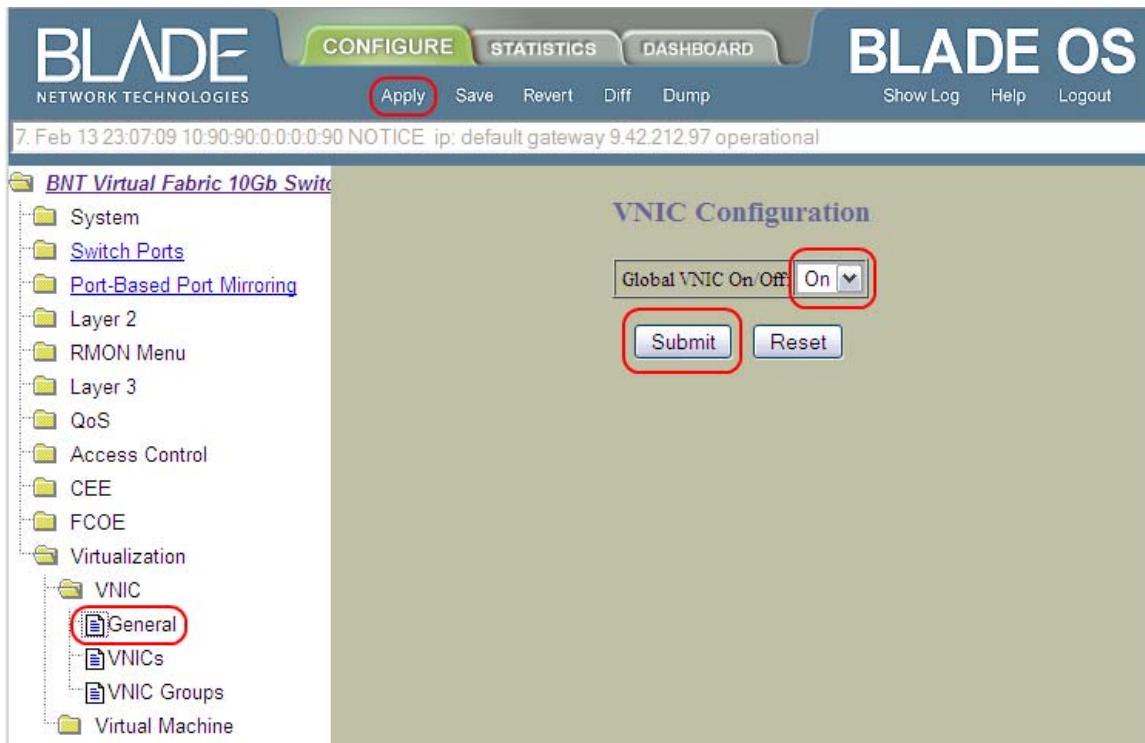


Figure 14 - BBI : Case 3, Enable vNIC operation

2. Enable and configure vNICs (remember to Submit and Apply).

| vNIC | State | vNIC Group | Max Bandwidth |
|--------|----------|------------|---------------|
| INT1.1 | disabled | 0 | 25 |
| INT1.2 | disabled | 0 | 25 |
| INT1.3 | disabled | 0 | 25 |
| INT1.4 | disabled | 0 | 25 |
| INT2.1 | disabled | 0 | 25 |
| INT2.2 | disabled | 0 | 25 |
| INT2.3 | disabled | 0 | 25 |
| INT2.4 | disabled | 0 | 25 |

| vNIC | State | vNIC Group | Max Bandwidth |
|--------|----------|------------|---------------|
| INT1.1 | disabled | 0 | 25 |
| INT1.2 | disabled | 0 | 25 |
| INT1.3 | disabled | 0 | 25 |
| INT1.4 | disabled | 0 | 25 |
| INT2.1 | disabled | 0 | 25 |
| INT2.2 | disabled | 0 | 25 |
| INT2.3 | disabled | 0 | 25 |
| INT2.4 | disabled | 0 | 25 |

Figure 15 - BBI : Case 3, vNICs pane

vNIC INT1.3 Configuration

| | |
|--|---------|
| State | enabled |
| Max Bandwidth in increments of 100Mbps (1-100) | 25 |

Submit

Figure 16 - BBI : Case 3, vNIC INT1.3 Configuration

vNIC INT2.2 Configuration

| | |
|--|---------|
| State | enabled |
| Max Bandwidth in increments of 100Mbps (1-100) | 70 |

Submit

Figure 17 - BBI : Case 3, vNIC INT2.2 Configuration

3. Enable and configure the vNIC group.

| vNIC Group | State | Vlan | Failover State |
|------------|----------|------|----------------|
| 1 | disabled | 0 | disabled |
| 2 | disabled | 0 | disabled |
| 3 | disabled | 0 | disabled |
| 4 | disabled | 0 | disabled |
| 5 | disabled | 0 | disabled |
| 6 | disabled | 0 | disabled |
| 7 | disabled | 0 | disabled |
| 8 | disabled | 0 | disabled |
| 9 | disabled | 0 | disabled |
| 10 | disabled | 0 | disabled |
| 11 | disabled | 0 | disabled |
| 12 | disabled | 0 | disabled |
| 13 | disabled | 0 | disabled |
| 14 | disabled | 0 | disabled |

Figure 18 - BBI : Case 3, vNIC Groups pane

Figure 19 - BBI : Case 3, vNIC Group Configuration



Case 4 - vNICs and pNICs, One uplink port (w/failover)

Represented as VGRP 4 in [Figure 1](#) on p.[11](#), this group consists of vNIC and pNIC ports, and one uplink port.

Failover is enabled for this group, so if the link on EXT6 is disrupted, the VFS disables virtual ports INT1.4, INT2.1 and physical port INT3. This action facilitates NIC team failover on the server blade.

Switch CLI

The following command script can be used to implement this configuration.

```
/c/virt/vnic
    on
/c/virt/vnic/port INT1/vnic 4
    ena
    bw 40
/c/virt/vnic/port INT2/vnic 1
    ena
    bw 33
/c/virt/vnic/vnicgrp 4
    ena
    vnicvlan 727
    failover ena
    addvnic INT1.4
    addvnic INT2.1
    addport INT3
    addport EXT6
apply
```

Switch BBI

Click on the 'Configure' tab, and then perform the following sequence of web interface entries to implement this configuration.

1. Enable vNIC operation. (Submit, Apply ... and Save, if you want it to persist after switch reboot.)

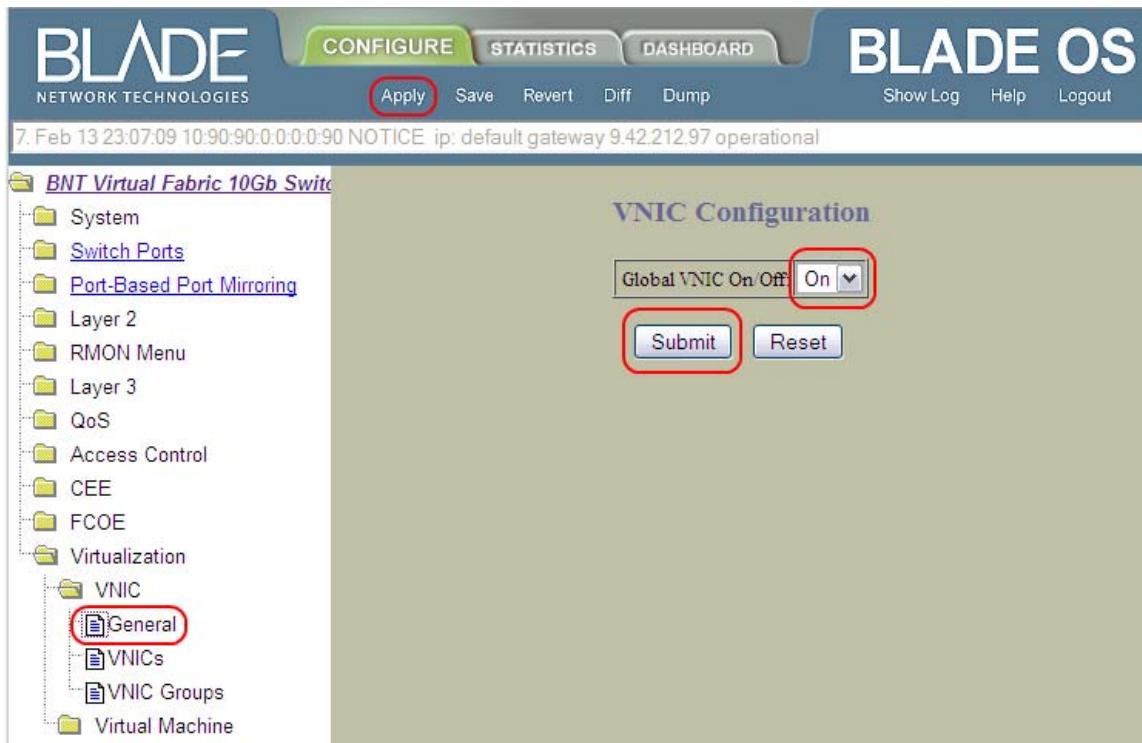


Figure 20 - BBI : Case 4, Enable vNIC operation

2. Enable and configure vNICs (remember to Submit and Apply).

The screenshot shows the BLADE OS interface with the 'CONFIGURE' tab selected. On the left, a navigation tree under 'BNT Virtual Fabric 10Gb Switch' includes 'System', 'Switch Ports', 'Port-Based Port Mirroring', 'Layer 2', 'RMON Menu', 'Layer 3', 'QoS', 'Access Control', 'CEE', 'FCOE', 'Virtualization' (with 'VNIC' expanded), 'VNICS' (circled in red), 'VNIC Groups', and 'Virtual Machine'. The main pane is titled 'vNICs Configuration' and contains two sections: '1. Search Range' and '2. Search Options'. In '1. Search Range', fields are set to 'From INT1.1' and 'To INT14.4'. In '2. Search Options', 'State' is set to 'any', 'Max Bandwidth(0 = any)' is 0, and 'vNIC Group(0 = any)' is 0. A 'Search Operation' dropdown is set to 'or' and a 'Search' button is present. Below these is a table of vNICs:

| vNIC | State | vNIC Group | Max Bandwidth |
|--------|----------|------------|---------------|
| INT1.1 | disabled | 0 | 25 |
| INT1.2 | disabled | 0 | 25 |
| INT1.3 | disabled | 0 | 25 |
| INT1.4 | disabled | 0 | 25 |
| INT2.1 | disabled | 0 | 25 |
| INT2.2 | disabled | 0 | 25 |
| INT2.3 | disabled | 0 | 25 |
| INT2.4 | disabled | 0 | 25 |

Figure 21 - BBI : Case 4, vNICs pane

This dialog is titled 'vNIC INT1.4 Configuration'. It has two fields: 'State' (set to 'enabled') and 'Max Bandwidth in increments of 100Mbps (1-100)' (set to '40'). A red box highlights the 'Max Bandwidth' input field.

Figure 22 - BBI : Case 4, vNIC INT1.4 Configuration

This dialog is titled 'vNIC INT2.1 Configuration'. It has two fields: 'State' (set to 'enabled') and 'Max Bandwidth in increments of 100Mbps (1-100)' (set to '33'). A red box highlights the 'Max Bandwidth' input field.

Figure 23 - BBI : Case 4, vNIC INT2.1 Configuration

3. Enable and configure the vNIC group.

The screenshot shows the BLADE OS interface with the title 'vNIC Groups Configuration'. On the left, there is a navigation tree under 'BNT Virtual Fabric 10Gb Switch Mo' containing various network-related settings like System, Switch Ports, Port-Based Port Mirroring, Layer 2, RMON Menu, Layer 3, QoS, Access Control, CEE, FCOE, and Virtualization. Under Virtualization, there are three sub-folders: VNIC, VNICs, and VNIC Groups. The 'VNIC Groups' folder is highlighted with a red circle. The main pane displays a table with 14 rows, each representing a vNIC group. The columns are 'vNIC Group' (numbered 1 to 14), 'State' (all disabled), 'Vlan' (all 0), and 'Failover State' (all disabled). The row for 'VNIC Groups' is also circled in red.

| vNIC Group | State | Vlan | Failover State |
|------------|----------|------|----------------|
| 1 | disabled | 0 | disabled |
| 2 | disabled | 0 | disabled |
| 3 | disabled | 0 | disabled |
| 4 | disabled | 0 | disabled |
| 5 | disabled | 0 | disabled |
| 6 | disabled | 0 | disabled |
| 7 | disabled | 0 | disabled |
| 8 | disabled | 0 | disabled |
| 9 | disabled | 0 | disabled |
| 10 | disabled | 0 | disabled |
| 11 | disabled | 0 | disabled |
| 12 | disabled | 0 | disabled |
| 13 | disabled | 0 | disabled |
| 14 | disabled | 0 | disabled |

Figure 24 - BBI : Case 4, vNIC Groups pane

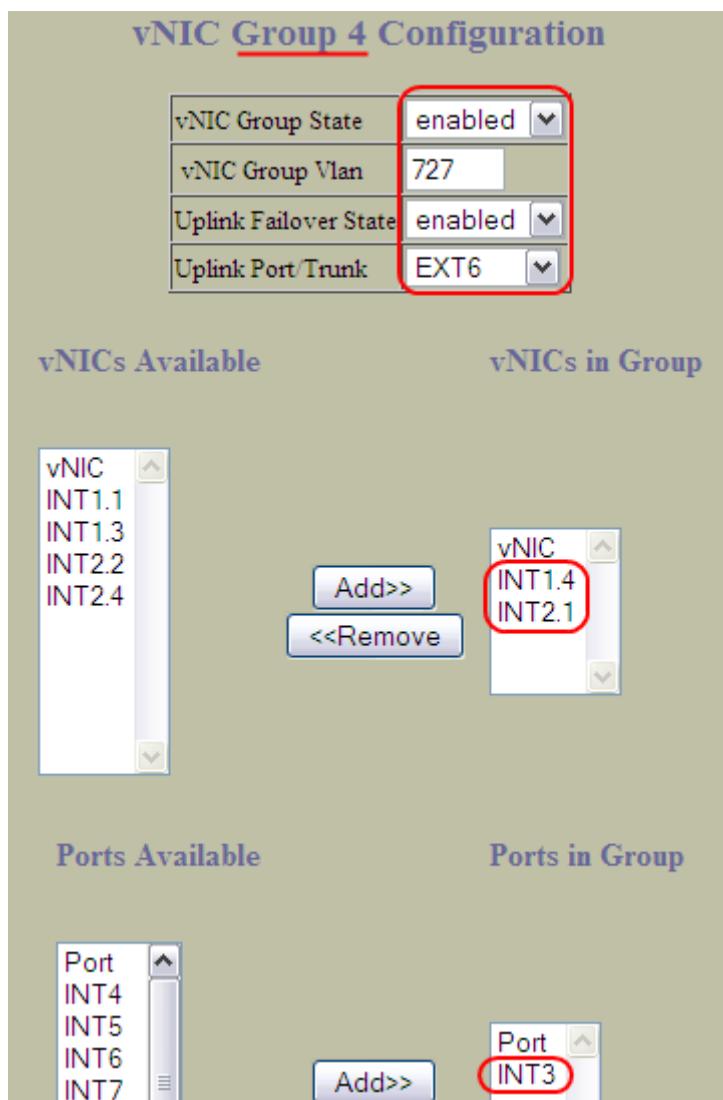


Figure 25 - BBI : Case 4, vNIC Group Configuration



Case 5 - vNICs only, One uplink trunk

Represented as VGRP 5 in [Figure 1](#) on p.[11](#), this group consists of vNIC ports and one uplink trunk.

Switch CLI

The following command script can be used to implement this configuration.

```
/c/l2/trunk 1
    ena
    add EXT1
    add EXT3
/c/virt/vnic
    on
/c/virt/vnic/port INT1/vnic 1
    ena
    bw 30
/c/virt/vnic/port INT2/vnic 2
    ena
    bw 33
/c/virt/vnic/vnicgrp 5
    ena
    vnicvlan 925
    addvnic INT1.1
    addvnic INT2.2
    addtrnk 1
apply
```

Switch BBI

Click on the 'Configure' tab, then perform the following sequence of web interface entries to implement this configuration.

1. Enable vNIC operation. (Submit, Apply ... and Save, if you want it to persist after switch reboot.)

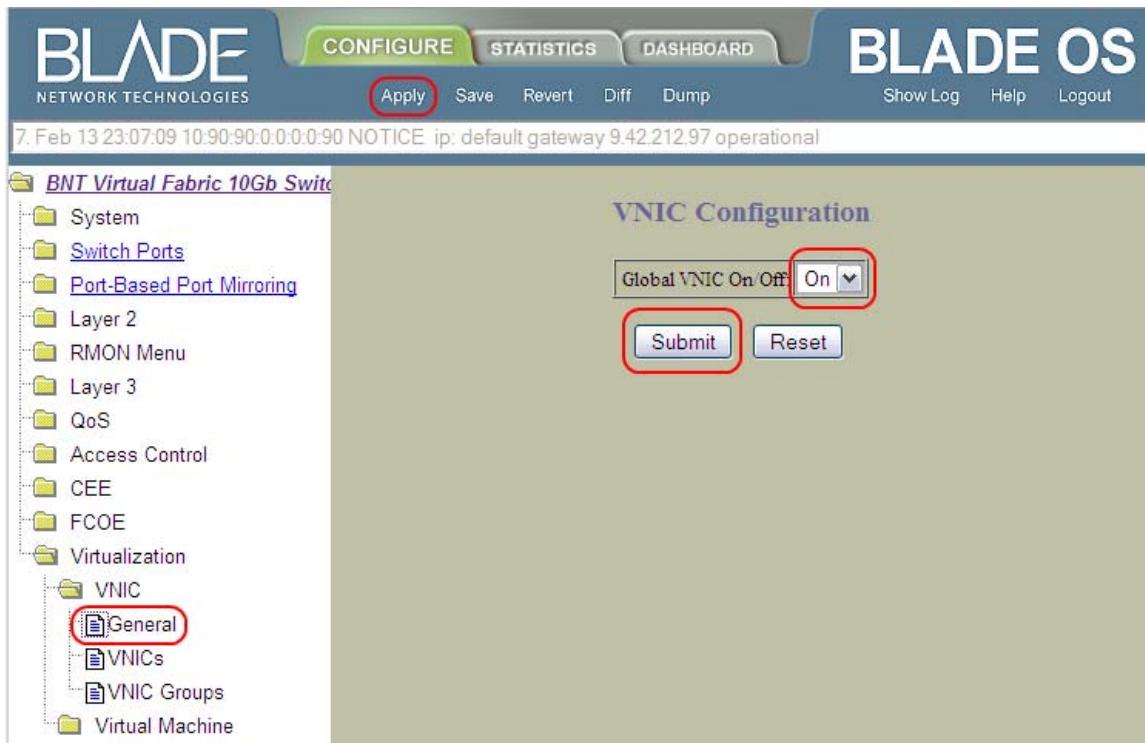


Figure 26 - BBI : Case 5, Enable vNIC operation

2. Enable and configure vNICs (remember to Submit and Apply).

The screenshot shows the BLADE OS interface with the title "vNICs Configuration". On the left, there is a navigation tree under "BNT Virtual Fabric 10Gb Switch" with categories like System, Switch Ports, Port-Based Port Mirroring, Layer 2, RMON Menu, Layer 3, QoS, Access Control, CEE, FCOE, Virtualization, VNIC, General, VNICS (which is selected and highlighted), VNIC Groups, and Virtual Machine. The main pane displays a search interface with fields for "From" (INT1.1) and "To" (INT14.4), and search options for State (any), Max Bandwidth (0), vNIC Group (0), and Search Operation (or). Below the search interface is a table with columns: vNIC, State, vNIC Group, and Max Bandwidth. The table lists nine vNICs: INT1.1, INT1.2, INT1.3, INT1.4, INT2.1, INT2.2, INT2.3, INT2.4. All vNICs are currently disabled (State: disabled) and have a Max Bandwidth of 25. The vNICs INT1.1 and INT2.2 are circled in red.

| vNIC | State | vNIC Group | Max Bandwidth |
|--------|----------|------------|---------------|
| INT1.1 | disabled | 0 | 25 |
| INT1.2 | disabled | 0 | 25 |
| INT1.3 | disabled | 0 | 25 |
| INT1.4 | disabled | 0 | 25 |
| INT2.1 | disabled | 0 | 25 |
| INT2.2 | disabled | 0 | 25 |
| INT2.3 | disabled | 0 | 25 |
| INT2.4 | disabled | 0 | 25 |

Figure 27 - BBI : Case 5, vNICs pane

This dialog is titled "vNIC INT1.1 Configuration". It contains two fields: "State" (set to "enabled") and "Max Bandwidth in increments of 100Mbps (1-100)" (set to 30). A red box highlights the "Max Bandwidth" field.

Figure 28 - BBI : Case 5, vNIC INT1.1 Configuration

This dialog is titled "vNIC INT2.2 Configuration". It contains two fields: "State" (set to "enabled") and "Max Bandwidth in increments of 100Mbps (1-100)" (set to 33). A red box highlights the "Max Bandwidth" field.

Figure 29 - BBI : Case 5, vNIC INT2.2 Configuration

3. Enable the trunk group.

The screenshot shows the BLADE OS interface with the title "Trunk Groups Configuration". On the left, there is a navigation tree under "BNT Virtual Fabric 10Gb Switch" with the following items: System, Switch Ports, Port-Based Port Mirroring, Layer 2 (containing 802.1x, FDB, Virtual LANs, Spanning Tree Groups, MSTP/RSTP, LLDP), Failover, Hot Links, Trunk Groups (which is selected and highlighted with a red box), and Trunk Hash. At the top, there are tabs for CONFIGURE, STATISTICS, and DASHBOARD, along with buttons for Apply, Save, Revert, Diff, Dump, Show Log, Help, and Logout. The main area displays a table titled "Trunk Groups Configuration" with 10 entries:

| Trunk Group | State |
|-------------|----------|
| 1 | disabled |
| 2 | disabled |
| 3 | disabled |
| 4 | disabled |
| 5 | disabled |
| 6 | disabled |
| 7 | disabled |
| 8 | disabled |
| 9 | disabled |
| 10 | disabled |

Figure 30 - BBI : Case 5, Trunk Groups pane

The screenshot shows the "Switch Trunk Group 1 Configuration" dialog box. At the top, there is a dropdown menu labeled "Trunk State" with the value "Enabled" circled in red. Below this, there are two sections: "Ports Available" on the left containing ports INT14, EXT2, EXT4, EXT5, and EXT6, and "Ports added to Trunk" on the right containing ports EXT1 and EXT3. Between these sections are buttons "Add>>" and "<<Remove". At the bottom is a "Submit" button.

Figure 31 - BBI : Case 5, Trunk Group 1 Configuration

4. Enable and configure the vNIC group.

| vNIC Group | State | Vlan | Failover State |
|------------|----------|------|----------------|
| 1 | disabled | 0 | disabled |
| 2 | disabled | 0 | disabled |
| 3 | disabled | 0 | disabled |
| 4 | disabled | 0 | disabled |
| 5 | disabled | 0 | disabled |
| 6 | disabled | 0 | disabled |
| 7 | disabled | 0 | disabled |
| 8 | disabled | 0 | disabled |
| 9 | disabled | 0 | disabled |
| 10 | disabled | 0 | disabled |
| 11 | disabled | 0 | disabled |
| 12 | disabled | 0 | disabled |
| 13 | disabled | 0 | disabled |
| 14 | disabled | 0 | disabled |

Figure 32 - BBI : Case 5, vNIC Groups pane

Figure 33 - BBI : Case 5, vNIC Group Configuration



Case 6 - vNICs and pNICs , One uplink trunk

Represented as VGRP 6 in [Figure 1](#) on p.[11](#), this group consists of vNIC and pNIC ports, and one uplink trunk.

Switch CLI

The following command script can be used to implement this configuration.

```
/c/12/trunk 5
    ena
    add EXT3
    add EXT4
/c/virt/vnic
    on
/c/virt/vnic/port INT1/vnic 4
    ena
    bw 25
/c/virt/vnic/port INT2/vnic 4
    ena
    bw 10
/c/virt/vnic/vnicgrp 6
    ena
    vnicvlan 1010
    addvnic INT1.4
    addvnic INT2.4
    addport INT4
    addport INT5
    addtrnk 5
apply
```

Switch BBI

Click on the 'Configure' tab, then perform the following sequence of web interface entries to implement this configuration.

1. Enable vNIC operation. (Submit, Apply ... and Save, if you want it to persist after switch reboot.)

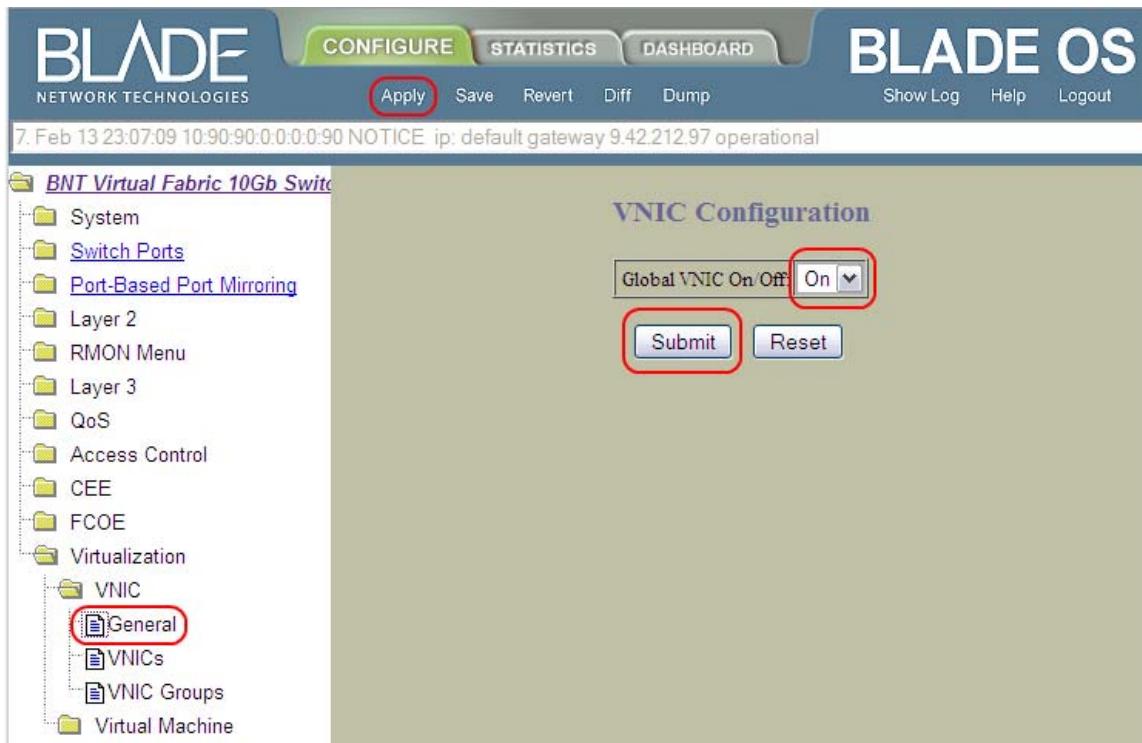


Figure 34 - BBI : Case 6, Enable vNIC operation

2. Enable and configure vNICs (remember to Submit and Apply).

The screenshot shows the BLADE OS interface with the title "vNICs Configuration". On the left, there is a navigation tree under "BNT Virtual Fabric 10Gb Switch" with various options like System, Switch Ports, Port-Based Port Mirroring, Layer 2, RMON Menu, Layer 3, QoS, Access Control, CEE, FCOE, Virtualization, VNIC, General, VNICS (which is selected and highlighted with a red circle), VNIC Groups, and Virtual Machine. The main area has two search sections: "1. Search Range" (vNICs(INT1.1-INT14.4) From INT1.1 To INT14.4) and "2. Search Options" (State: any, Max Bandwidth(0 = any): 0, vNIC Group(0 = any): 0, Search Operation: or). Below these is a table of vNICs:

| vNIC | State | vNIC Group | Max Bandwidth |
|--------|----------|------------|---------------|
| INT1.1 | disabled | 0 | 25 |
| INT1.2 | disabled | 0 | 25 |
| INT1.3 | disabled | 0 | 25 |
| INT1.4 | disabled | 0 | 25 |
| INT2.1 | disabled | 0 | 25 |
| INT2.2 | disabled | 0 | 25 |
| INT2.3 | disabled | 0 | 25 |
| INT2.4 | disabled | 0 | 25 |

Figure 35 - BBI : Case 6, vNICs pane

This is a configuration dialog for vNIC INT1.4. It has two fields: "State" set to "enabled" and "Max Bandwidth in increments of 100Mbps (1-100)" set to "25". A red box highlights the "Max Bandwidth" field.

Figure 36 - BBI : Case 6, vNIC INT1.4 Configuration

This is a configuration dialog for vNIC INT2.4. It has two fields: "State" set to "enabled" and "Max Bandwidth in increments of 100Mbps (1-100)" set to "10". A red box highlights the "Max Bandwidth" field.

Figure 37 - BBI : Case 6, vNIC INT2.4 Configuration

3. Enable the trunk group.

The screenshot shows the BLADE OS web interface. The top navigation bar includes links for CONFIGURE, STATISTICS, DASHBOARD, Show Log, Help, and Logout. The left sidebar menu under 'BNT Virtual Fabric 10Gb Switch' includes System, Switch Ports, Port-Based Port Mirroring, Layer 2 (802.1x, FDB, Virtual LANs, Spanning Tree Groups, MSTP/RSTP, LLDP), Failover, Hot Links, Trunk Groups (which is highlighted with a red circle), and Trunk Hash. The main content area is titled 'Trunk Groups Configuration'. It displays a table with 10 entries, each representing a Trunk Group numbered 1 to 10. All groups are listed as 'disabled'. The entry for Trunk Group 5 is circled with a red circle.

| Trunk Group | State |
|-------------|----------|
| 1 | disabled |
| 2 | disabled |
| 3 | disabled |
| 4 | disabled |
| 5 | disabled |
| 6 | disabled |
| 7 | disabled |
| 8 | disabled |
| 9 | disabled |
| 10 | disabled |

Figure 38 - BBI : Case 6, Trunk Groups pane

The screenshot shows the 'Switch Trunk Group 5 Configuration' dialog. At the top, there is a dropdown menu labeled 'Trunk State' with the value 'Enabled' selected. Below this, there are two sections: 'Ports Available' on the left and 'Ports added to Trunk' on the right. The 'Ports Available' section contains a list of ports: INT1, INT2, INT3, INT4. The 'Ports added to Trunk' section contains a list of ports: EXT3, EXT4. Between these two sections is a button labeled 'Add>>' and another labeled '<<Remove'. At the bottom of the dialog is a 'Submit' button.

Figure 39 - BBI : Case 6, Trunk Group 5 Configuration

4. Enable and configure the vNIC group.

| vNIC Group | State | Vlan | Failover State |
|------------|----------|------|----------------|
| 1 | disabled | 0 | disabled |
| 2 | disabled | 0 | disabled |
| 3 | disabled | 0 | disabled |
| 4 | disabled | 0 | disabled |
| 5 | disabled | 0 | disabled |
| 6 | disabled | 0 | disabled |
| 7 | disabled | 0 | disabled |
| 8 | disabled | 0 | disabled |
| 9 | disabled | 0 | disabled |
| 10 | disabled | 0 | disabled |
| 11 | disabled | 0 | disabled |
| 12 | disabled | 0 | disabled |
| 13 | disabled | 0 | disabled |
| 14 | disabled | 0 | disabled |

Figure 40 - BBI : Case 6, vNIC Groups pane

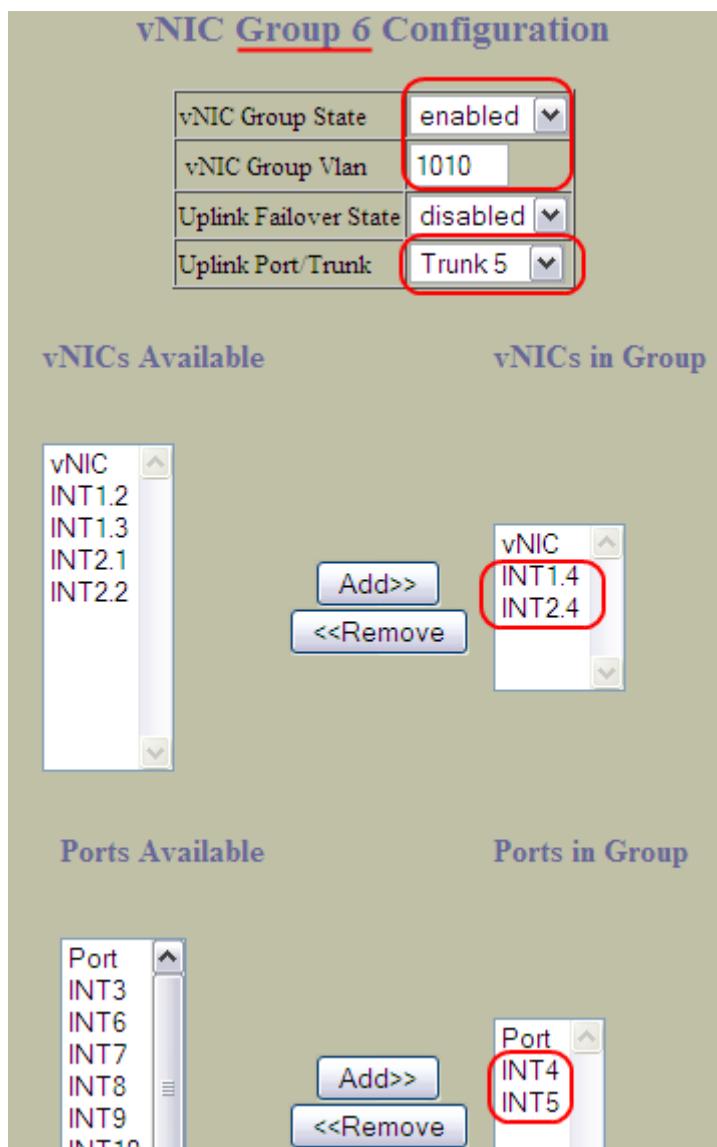


Figure 41 - BBI : Case 6, vNIC Group Configuration



Related Documentation

Virtual Fabric Switch (VFS) documentation is available at:

<http://www.ibm.com/systems/support/supportsite.wss/brandmain?brandind=5000020>

Enter "BNT Virtual Fabric" (including the quotes) in the search box in the upper right and click the Search button. Click on the 'Publications' item in the results list and select the document of interest.

- 1) *BNT Virtual Fabric 10Gb Switch Module for IBM BladeCenter, Application Guide*
- 2) *BNT Virtual Fabric 10Gb Switch Module for IBM BladeCenter, Command Reference*
- 3) *BNT Virtual Fabric 10Gb Switch Module for IBM BladeCenter, ISCLI Reference*
- 4) *BNT Virtual Fabric 10Gb Switch Module for IBM BladeCenter, Browser Based Interface Quick Guide*

Virtual Fabric Adapter (VFA) documentation is available at:

<http://www.ibm.com/systems/support/supportsite.wss/brandmain?brandind=5000020>

Enter "Emulex Virtual Fabric" (including the quotes) in the search box in the upper right and click the Search button. Click on the 'Publications' item in the results list and select the document of interest.

- 5) *Installation and User's Guide for Emulex Virtual Fabric Adapter (CFFh)*
- 6) *Emulex Virtual Fabric Adapter Release Notes*