Brocade 7800 Extension to Brocade 7810 Extension Migration

Overview

Through the natural evolution of technology, the Brocade 7800 Extension Switch has been replaced with the Brocade 7810 Extension Switch. Many Brocade customers will update their current 7800 technology to the 7810. Extension innovation and refinement of features and functionality have changed various aspects of implementation and configuration. This document details the most common configuration tasks needed to replace a Brocade 7800 with a Brocade 7810.

Most FCIP Extension environments deploy two parallel replication fabrics (A and B). For simplicity, this document covers one of those fabrics, for example arbitrarily the "A" fabric.

To prevent duplicate IP addresses on the network, this document assumes that either the Brocade 7800 with FOS 7.4.2 or the Brocade 7810 with FOS 8.2.2 will be physically disconnected from the network or the Ethernet interfaces will be offline when using the same IP addresses. Note: Duplicate IP addresses on an IP network can create network conflicts and stop traffic.

The Brocade 7810, when not connected to the IP network, can be configured in parallel while the Brocade7800 remains operational. After the Brocade 7810 is configured, the Fibre Channel (FC) and Ethernet connections can be moved from the Brocade 7800 to the Brocade 7810, assuming that the existing 1Gb/s Ethernet connections will continue to be used.

If upgrading to 10GE connections, shut down the Brocade 7810 GE interfaces and make those network connections. Ensure that the 10GE interfaces on the data center LAN switch have been configured as `switchport mode access` and `switchport access vlan <#>` and are members of the correct VLAN. Alternatively and only if applicable, configure VLAN tagging using `switchport mode trunk` and `switchport allowed vlan <#>`. Assuming that the WAN infrastructure remains consistent, the VLAN number should continue to be the same as when connected to the Brocade 7800 GE interfaces. Upon completing the Brocade 7810 configuration, either shut down or disconnect the Brocade 7800 and enable the 10GE interfaces on the Brocade 7810.

The following features and changes are not within the scope of this document:
- IP Extension (The Brocade 7800 does not support IP Extension.)
- FICON (The Brocade 7810 does not support FICON.)
- Certificate-based encryption (IPsec)
- QoS
- SLA
- Failover metrics/groups
- KATOV (Keepalive Timeout Value)
- TCP changes (SACK)
- NAT
- Brocade 7810 unboxing, racking, installation, power, and management connectivity
- General FOS switch/SAN configuration (zoning, DNS, domain ID, switch name, fabric name, NTP, users, roles, passwords, banners, and so on)

This document offers guidance in Extension tunnel configuration when moving from the Brocade 7800 to the new Brocade 7810. Figure 1 shows a reference diagram used in the example CLI input/output. Multiple circuits per VE_Port are called Brocade Extension Trunking (BET). The reference architecture assumes that the Brocade 7810 is the "upgraded" or "full" model, which enables BET. On the Brocade 7800, BET and Adaptive Rate Limiting (ARL) are enabled via the Advanced Extension license. There is no Advanced Extension license for the Brocade 7810; instead, it is purchased as "base" or "full." The base can be upgraded at any time to a full version via an upgrade license. The document's concepts can apply to the base Brocade 7810; however, the base unit's limitations will apply.

The IP addressing presented here will be different than yours. The number of tunnels and circuits in your environment may differ as well, as may the bandwidth, network, storage, and replication applications. Nevertheless, most configuration tasks can be gleaned from and surmised in this document.

Figure 1: Reference Extension Architecture
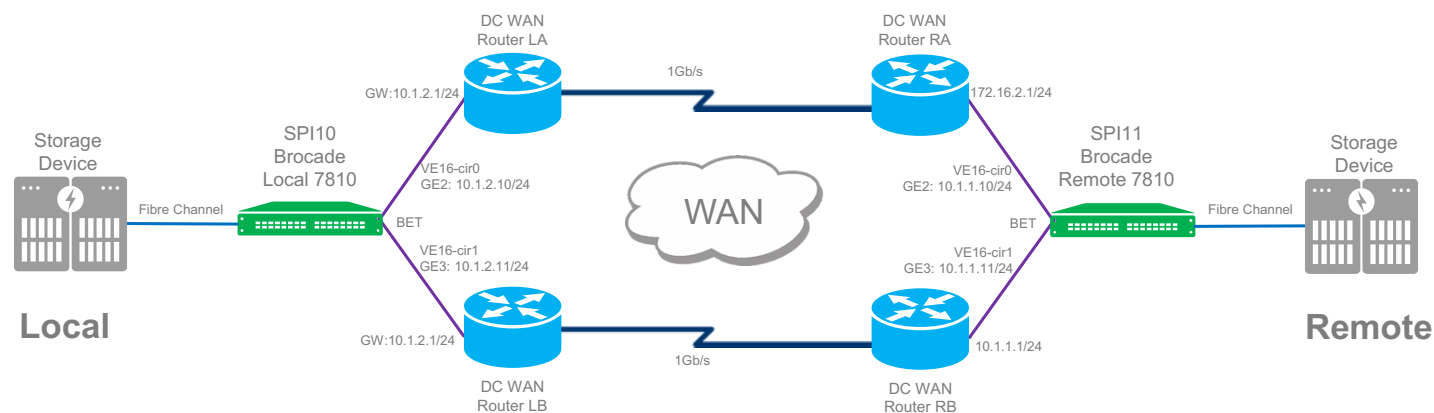
Before Starting

Gather information required for building IP interfaces, IP routes, tunnels, and circuits on the Brocade 7810. The following is a `portshow` CLI command that displays comprehensive information about the tunnel and circuit configuration.

```
portshow fciptunnel -c --detail
-------------------------------------------
Tunnel ID: 16
   Tunnel Description:
   Admin Status: Enabled
   Oper Status: Up
   Compression: On (Auto-Mode)
   Fastwrite: On
   Tape Acceleration: Write/Read
   TPerf Option: Off
   IPSec: Enabled
   QoS Percentages: High 50%, Med 30%, Low 20%
   Remote WWN: Not Configured
   Local WWN: 10:00:00:05:1e:c3:e6:6e
   Peer WWN: 10:00:00:05:1e:c3:ef:95
   Circuit Count: 2
   Flags: 0x00000000
   FICON: Off
   Oper Status: Up
   Flow Ctrl State: Off
   Connected Count: 3
```

```
  Tunnel Duration: 1m53s
     Compression Statistics:
         8728 Uncompressed Bytes
         7000 Compressed Bytes
           1.25 : 1 Compression Ratio
     Performance Statistics: Overall Throughput
         39088 Output Bytes
             7 Bps 30s Avg, 345 Bps Delta Lifetime Avg
         261 Output Packets
             0 pkt/s 30s Avg, 2 pkt/s Delta Lifetime Avg
         36940 Input Bytes
             7 Bps 30s Avg, 326 Bps Delta Lifetime Avg
         261 Input Packets
             0 pkt/s 30s Avg, 2 pkt/s Delta Lifetime Avg
         TCP Stats:
             540680 Output Bytes
             5106 Output Packets
             251388 Input Bytes
             5078 Input Packets
             Retransmits: 0
             Round Trip Time: 0 ms
             Out Of Order: 0
             Slow Starts: 10
  --------------------------------------------
  Circuit ID: 16.0
     Circuit Num: 0
     Admin Status: Enabled
     Oper Status: Up
     Connection Type: Default
     Remote IP: 10.1.1.10
     Local IP: 10.1.2.10
     Metric: 0
     Failover Group ID: (Not Config/Active)
     Min Comm Rt: 1000000
     Max Comm Rt: 1000000
     SACK: On
     Min Retrans Time: 100
     Max Retransmits: 8
     Keepalive Timeout: 10000
     Path MTU Disc: 0
     VLAN ID: (Not Configured)
     L2CoS: (VLAN Not Configured)
     DSCP:  F:  0 H:  0 M:  0 L:  0
     Flags: 0x00000000
     Flow Ctrl State: Off
     Connected Count: 3
     Circuit Duration: 1m53s
     Performance Statistics: Overall Throughput
         17276 Output Bytes
             3 Bps 30s Avg, 152 Bps Delta Lifetime Avg
         132 Output Packets
             0 pkt/s 30s Avg, 1 pkt/s Delta Lifetime Avg
         18304 Input Bytes
             3 Bps 30s Avg, 161 Bps Delta Lifetime Avg
         130 Input Packets
             0 pkt/s 30s Avg, 1 pkt/s Delta Lifetime Avg
         TCP Stats:
             2395202872 Output Bytes
```

```
          26666332 Output Packets
          1327809092 Input Bytes
          26660557 Input Packets
          Retransmits: 0
          Round Trip Time: 0 ms
          Out Of Order: 0
          Slow Starts: 5
   -------------------------------------------
   Circuit ID: 16.1
      Circuit Num: 1
      Admin Status: Enabled
      Oper Status: Up
      Connection Type: Default
      Remote IP: 10.1.1.11
      Local IP: 10.1.2.11
      Metric: 0
      Failover Group ID: (Not Config/Active)
      Min Comm Rt: 1000000
      Max Comm Rt: 1000000
      SACK: On
      Min Retrans Time: 100
      Max Retransmits: 8
      Keepalive Timeout: 10000
      Path MTU Disc: 0
      VLAN ID: (Not Configured)
      L2CoS: (VLAN Not Configured)
      DSCP:  F:  0 H:  0 M:  0 L:  0
      Flags: 0x00000000
      Flow Ctrl State: Off
      Connected Count: 3
      Circuit Duration: 1m54s
      Performance Statistics: Overall Throughput
         21812 Output Bytes
            4 Bps 30s Avg, 191 Bps Delta Lifetime Avg
         129 Output Packets
            0 pkt/s 30s Avg, 1 pkt/s Delta Lifetime Avg
         18636 Input Bytes
            4 Bps 30s Avg, 163 Bps Delta Lifetime Avg
         131 Input Packets
            0 pkt/s 30s Avg, 1 pkt/s Delta Lifetime Avg
         TCP Stats:
            2395119424 Output Bytes
            26665668 Output Packets
            1327816304 Input Bytes
            26658149 Input Packets
            Retransmits: 0
            Round Trip Time: 0 ms
            Out Of Order: 0
            Slow Starts: 5
```

Record the IP address information currently being used on the Brocade 7800. This is easily done using the `portshow fciptunnel -c --config` command. The `--config` argument instructs the output to show the local and remote IP addresses being used to form the circuits.

Take note of which IP address is used at each end and for which circuit. In this case, there are two circuits (0 and 1). Check the remote side as well; the output will be nearly the same, except the local and remote IP addresses will be switched.

Take note of the flags in the top line. Have IPsec (i), FastWrite (f), and Tape Pipelining (t) (also known as OSTP) been enabled?

```
portshow fciptunnel -c --config
 Tunnel Circuit   AdminSt Flags   Local IP              Remote Ip
-------------------------------------------------------------------------------
 16     -         Enabled Aft--i- ipsec:123456789012345678901234556789012
 16     0 ge2     Enabled ---4--s 10.1.2.10            10.1.1.10
 16     1 ge3     Enabled ---4--s 10.1.2.11            10.1.1.11
-------------------------------------------------------------------------------
 Flags (tunnel): c=compression m=moderate compression a=aggressive compression
                 A=Auto compression f=fastwrite t=Tapepipelining F=FICON
                 T=TPerf i=IPSec l=IPSec Legacy
       (circuit): s=sack v=VLAN Tagged x=crossport 4=IPv4 6=IPv6
                 L=Listener I=Initiator
```

The subnet mask for the IP addresses must be noted. In this case, each IP interface is using /24 (255.255.255.0). The MTU will not be more than 1500 on the Brocade 7800, but it could be less. Note the MTU. Since IP networks constantly evolve, it is prudent to ask the network administrator what the current supported MTU is.

If VLAN tagging is being used, note the VLAN number. In this case, no VLAN tagging is being used.

```
portshow ipif
 Port       IP Address                  / Pfx  MTU   VLAN  Flags
-------------------------------------------------------------------------------
 ge2        10.1.2.10                   / 24   1500  n/a   U R M
 ge3        10.1.2.11                   / 24   1500  n/a   U R M
-------------------------------------------------------------------------------
Flags: U=Up B=Broadcast D=Debug L=Loopback P=Point2Point R=Running
       N=NoArp PR=Promisc M=Multicast S=StaticArp LU=LinkUp X=Crossport
```

The gateway (GW) for the subnet must be noted. In this case, the subnet used on each GE interface is the same (10.1.2.0/24); therefore, it uses the same GW. On Brocade Extension, every GE interface is autonomous and requires its own IP routes; therefore, the same route may occur on more than one GE interface. The lines with the "S" flag contain the user-configured IP routes. The other lines are routes that are automatically generated by the OS.

Reading an IP route: On GE2, to get to subnet 10.1.1.0/24, send traffic to gateway 10.1.2.1.

Local Brocade 7800

```
7800-Local:admin> portshow iproute
 Port       IP Address                  / Pfx  Gateway                Flags
-------------------------------------------------------------------------------
 ge2        10.1.1.0                    / 24   10.1.2.1               U G S
 ge2        10.1.2.0                    / 24   *                      U C
 ge2        10.1.2.1                    / 32   *                      U H L
 ge3        10.1.1.0                    / 24   10.1.2.1               U G S
 ge3        10.1.2.0                    / 24   *                      U C
 ge3        10.1.2.1                    / 32   *                      U H L
-------------------------------------------------------------------------------
 Flags: U=Usable G=Gateway H=Host C=Created(Interface)
        S=Static L=LinkLayer X=Crossport
```

Remote Brocade 7800

```
7800-Remote:admin> portshow iproute
Port          IP Address               / Pfx  Gateway                 Flags
-------------------------------------------------------------------------------
ge2           10.1.1.0                 / 24   *                       U C
ge2           10.1.1.1                 / 32   *                       U H L
ge2           10.1.2.0                 / 24   10.1.1.1                U G S
ge3           10.1.1.0                 / 24   *                       U C
ge3           10.1.1.1                 / 32   *                       U H L
ge3           10.1.2.0                 / 24   10.1.1.1                U G S
-------------------------------------------------------------------------------
Flags: U=Usable G=Gateway H=Host C=Created(Interface)
       S=Static L=LinkLayer X=Crossport
```

Lastly, note your CommRt values. In the output that follows, the two values 1000/1000 are respectively:

■ -b (--min-comm-rate)
■ -B (--max-comm-rate)

```
portshow fciptunnel -c --summary
 Tunnel Circuit  OpStatus  Flags      Uptime  TxMBps  RxMBps ConnCnt CommRt Met/G
-------------------------------------------------------------------------------
16     -         Up        Aft--i-    7m11s   0.00    0.00    3      -       -/-
16     0 ge2     Up        ---4--s    7m10s   0.00    0.00    3   1000/1000  0/-
16     1 ge3     Up        ---4--s    7m11s   0.00    0.00    3   1000/1000  0/-
-------------------------------------------------------------------------------
Flags (tunnel): c=compression m=moderate compression a=aggressive compression
                A=Auto compression f=fastwrite t=Tapepipelining F=FICON
                T=TPerf i=IPSec l=IPSec Legacy
       (circuit): s=sack v=VLAN Tagged x=crossport 4=IPv4 6=IPv6
                L=Listener I=Initiator
```

In this example, min=max=1000Mb/s (1Gb/s). Note: the `portshow` output is in Mb/s; however, the CLI `portcfg fcipcircuit` input is in kb/s.

Notice that the current Brocade 7800 is online, and the VE16 tunnel and circuits are up. When the tunnel and circuits are up, the output from this command will be the same (except for Tx/Rx) on both ends.

FC Connections

The Brocade 7800 is a Gen 4 platform with two different SFP types that support either 1, 2, 4 or 2, 4, 8 Gig FC. The Brocade 7810 is a Gen 6 platform with two different SWL MMF SFP types that support either 4, 8, 16 or 8, 16, 32 Gig FC. Before migrating platforms, ensure that the new Brocade branded SFPs purchased with the Brocade 7810s match the fiber type (for example: SWL MMF) and can match the fastest speed capable of the storage replication ports. For example, a 2G FC connection cannot be made to the Brocade 7810 no matter which SFP is used.

Extension Configuration

The original extension configuration may be found using the `clihistory` command. Depending on the age of your Brocade 7800, the original CLI commands may be recorded.

Configuration staging is not available on the 7800, which means that the entire tunnel or entire circuit was configured in a single CLI entry. Configuration staging will be used to configure the Brocade 7810.

Configuring Brocade Extension has a logical flow.

First, IP interfaces are constructed. These interfaces will be the IP address endpoints for each circuit. Each circuit endpoint must have a unique IP address; therefore, two circuits will require two IPIF to be configured at each end. Circuit IP addresses can be from the same or different subnets. Circuits are assigned to specific GE interfaces by putting the IP endpoint on that GE interface.

Second, if the local and remote IP addresses are on different subnets, there must be a router along the path and a gateway must be specified. IP routes must be configured to designate the WAN gateway to the remote subnet.

Third, the tunnel must be constructed, which is where the VE_Port, compression, IPsec, FastWrite, and OSTP (Open Systems Tape Pipelining) are specified. Only the VE_Port is required; all other parameters are optional.

Lastly, the tunnel's circuits are built in which the local/remote IP addresses are specified along with the min/max circuit bandwidth. These parameters are required before a circuit will come online.

GE Interfaces

Unique to the Brocade 7810 are speed and LAN/WAN settings for the GE interfaces. Make sure that the GE interface speed and type are configured appropriately for your environment. In this example, the Brocade 7810 GE interfaces will be connected at 10GE instead of GE; therefore, GE2 and GE3 must be modified to be 10G. Observe the flags. Are any of the interfaces set to LAN or copper? The default speed is 1G. The default type is WAN port. The GE interfaces are already not LAN ports. Auto-negotiation does not apply to 10GE interfaces. Link aggregation (LAG) does not apply to FCIP. LAG is used only in IP Extension environments on the LAN side. This example does not use the built-in RJ-45 copper ports on the Brocade 7810.

Show the Brocade 7810 GE Settings Before Configuration

```
7810-Local:admin> portcfgge --show
 Port          Speed      Flags      Channel  Lag Name
-------------------------------------------------------------------------
 ge0           1G         AC--       N/A      -
 ge1           1G         AC--       N/A      -
 ge2           1G         A---       N/A      -
 ge3           1G         A---       N/A      -
 ge4           1G         A---       N/A      -
 ge5           1G         A---       N/A      -
 ge6           1G         A---       N/A      -
 ge7           1G         A---       N/A      -
-------------------------------------------------------------------------
Flags: A:Auto-Negotiation Enabled  C:Copper Media Type
L:LAN Port G: LAG Member
```

Local Set Brocade 7810 GE Speed

```
portcfgge ge2 --set -speed 10G
portcfgge ge3 --set -speed 10G
```

Remote Set Brocade 7810 GE Speed

```
portcfgge ge2 --set -speed 10G
portcfgge ge3 --set -speed 10G
```

Show the Brocade 7810 GE Settings After Configuration

```
7810-Local:admin> portcfgge --show
 Port          Speed     Flags     Channel  Lag Name
-------------------------------------------------------------------------
 ge0           1G        AC--      N/A      -
 ge1           1G        AC--      N/A      -
 ge2           10G       ----      N/A      -
 ge3           10G       ----      N/A      -
 ge4           1G        A---      N/A      -
 ge5           1G        A---      N/A      -
 ge6           1G        A---      N/A      -
 ge7           1G        A---      N/A      -

-------------------------------------------------------------------------
Flags: A:Auto-Negotiation Enabled  C:Copper Media Type
L:LAN Port G: LAG Member
```

Brocade 7810 LLDP

Link Layer Discovery Protocol (LLDP) shows what the GE interfaces are connected to on the data center LAN switch. The Brocade 7800 does not support LLDP. LLDP on the Brocade 7810 is enabled by default. Brocade 7810 LLDP will show the connections to the data center LAN ports. This information will be especially useful if new 10GE connections are used. Ensure that the connections are to the correct data center LAN switch and the correct ports on that switch.

If LLDP has no entries or is missing expected entries, the following may be possible problems:

- The data center LAN switch port is in shutdown state.
- The cable is broken (Is there light? `portshow ge#`).
- The cable is not connected (Is there light? `portshow ge#`).
- There is a speed mismatch (1G vs 10G).
- There is a VLAN tagging mismatch (tagged vs untagged).
- There is a VLAN ID mismatch (VLAN X vs. VLAN Y).
- LLDP is not enabled on the data center LAN switch.

PortShow GE2

```
7810-Local:admin> portshow ge2
Eth Mac Address: 88.94.71.7a.0d.cb
Port State: 1   Online
Port Phys:  6   In_Sync
Port Flags: 0x4003      PRESENT ACTIVE LED
Port Speed: 10G
```

Check the Ethernet Connectivity

```
7810-Local:admin> lldp --show -nbr
Local Intf  Dead Interval   Remaining Life  Remote Intf  Chassis ID      Tx    Rx     System Name
ge2         120             109             TenGig 1/19  3417.ebf5.e5c4  6704  6542   tor-switch-A
ge3         120             110             TenGig 1/20  3417.ebf5.e5c4  6718  6542   tor-switch-B
```

IPIF

After GE interfaces are established, the IP Interfaces (IPIFs) are configured. The CLI commands used to originally create the local and remote IPIFs are shown below. The associated `portshow ipif` output is shown as well.

Local 7800 IP Interfaces

```
portcfg ipif ge2 create 10.1.1.10/24
portcfg ipif ge3 create 10.1.1.11/24


7800-Local:admin> portshow ipif
Port           IP Address                    / Pfx  MTU    VLAN  Flags
-------------------------------------------------------------------------
 ge2           10.1.2.10                     / 24   1500   n/a   U R M
 ge3           10.1.2.11                     / 24   1500   n/a   U R M
-------------------------------------------------------------------------
Flags: U=Up B=Broadcast D=Debug L=Loopback P=Point2Point R=Running
       N=NoArp PR=Promisc M=Multicast S=StaticArp LU=LinkUp X=Crossport
```

Remote 7800 IP Interfaces

```
portcfg ipif ge2 create 10.1.2.10/24
portcfg ipif ge3 create 10.1.2.11/24


7800-Remote:admin> portshow ipif

 Port          IP Address                    / Pfx  MTU    VLAN  Flags
-------------------------------------------------------------------------
 ge2           10.1.1.10                     / 24   1500   n/a   U R M
 ge3           10.1.1.11                     / 24   1500   n/a   U R M
-------------------------------------------------------------------------
Flags: U=Up B=Broadcast D=Debug L=Loopback P=Point2Point R=Running
       N=NoArp PR=Promisc M=Multicast S=StaticArp LU=LinkUp X=Crossport
```

An IP address is associated with one GE interface, for example, 10.1.1.10/24 is bound to ge2. GE interfaces used on the Brocade 7800 may be different than those used on the Brocade 7810. The GE interface numbering is different on the two platforms.

The GE interfaces on the Brocade 7800 are GE (1 Gb/s) only. The optical GE interfaces on the Brocade 7810 can be GE or 10GE, and they require the correct corresponding SFP (GE) or SFP+ (10GE). An SFP+ will not operate down to GE speeds.

The Brocade 7810 CLI entry is always `ge#.dp0` no matter what speed the interface is set to.

In CLI commands, specifying the data processor (DP) is a significant difference between the Brocade 7800 and the Brocade 7810. The Brocade 7810 has only a single DP, which is dp0. While the Brocade 7810 CLI commands will designate only dp0, it still must be added to all commands that require a DP designation. Brocade 7800 CLI commands specify only the GE interface without any DP designation.

The Brocade 7800 has an MTU of 1500 bytes. The Brocade 7810 has an MTU of 9216 bytes. MTU is an optional argument, and the default is 1500 bytes on both platforms. Check with your networking administrator for the MTU that is supported on the WAN network. The following are the Brocade 7810 CLI commands with and without an MTU designation.

VLAN tagging is not configured in this example reference architecture; nevertheless, if a VLAN ID is used in your environment, please note it. A VLAN ID can be added when creating an IPIF on the Brocade 7810. The VLAN default is none (no VLAN tagging). GE interfaces typically connect to a data center LAN switch in which the ports themselves are in the VLAN and tagging is not required to the end device. The following are the Brocade 7810 CLI commands with and without a VLAN designation. The VLAN designation is optional.

The following are the equivalent IPIFs configured on the local and remote Brocade 7810s. Plus, an example of adding the MTU and/or VLAN ID is shown. The VLAN number must match that of the data center LAN switch tagging. 100 is used as an example.

Local 7810 IP Interfaces

```
portcfg ipif ge2.dp0 create 10.1.2.10/24
portcfg ipif ge3.dp0 create 10.1.2.11/24
```

Same IPIF Adding MTU and VLAN Tagging

```
portcfg ipif ge2.dp0 create 10.1.2.10/24 mtu 9216 vlan 100
portcfg ipif ge3.dp0 create 10.1.2.11/24 mtu 9216 vlan 100
```

Remote 7810 IP Interfaces

```
portcfg ipif ge2.dp0 create 10.1.1.10/24
portcfg ipif ge3.dp0 create 10.1.1.11/24
```

Same IPIF Adding MTU and VLAN Tagging

```
portcfg ipif ge2.dp0 create 10.1.1.10/24 mtu 9216 vlan 100
portcfg ipif ge3.dp0 create 10.1.1.11/24 mtu 9216 vlan 100
```

IP Route

More often than not, WAN-side extension travels across a routed IP network, also referred to as a Layer 3 network. This means that the subnet on each end of a circuit is different. To get from one subnet to another, a router gateway must be passed. If the subnet is the same on both ends of the circuit, which is referred to as a Layer 2 network, this configuration step can be skipped.

To configure the remote subnets and the associated gateway, use the `portcfg iproute` command.

The following are the original commands used to configure the IP routes and the `portshow iproute` output for the local and remote Brocade 7800s.

Local 7800 IP Routes

```
portcfg iproute ge2 create 10.1.1.0/24 10.1.2.1
portcfg iproute ge3 create 10.1.1.0/24 10.1.2.1

SPI10:FID128:admin> portshow iproute
 Port        IP Address              / Pfx  Gateway             Flags
-------------------------------------------------------------------------
 ge2         10.1.1.0                / 24   10.1.2.1            U G S
 ge2         10.1.2.0                / 24   *                   U C
 ge2         10.1.2.1                / 32   *                   U H L
 ge3         10.1.1.0                / 24   10.1.2.1            U G S
 ge3         10.1.2.0                / 24   *                   U C
 ge3         10.1.2.1                / 32   *                   U H L
-------------------------------------------------------------------------
 Flags: U=Usable G=Gateway H=Host C=Created(Interface)
        S=Static L=LinkLayer X=Crossport
```

Remote 7800 IP Routes

```
portcfg iproute ge2 create 10.1.2.0/24 10.1.1.1
portcfg iproute ge3 create 10.1.2.0/24 10.1.1.1


SPI11:FID128:admin> portshow iproute
 Port          IP Address              / Pfx  Gateway           Flags
 ---------------------------------------------------------------------------
 ge2           10.1.1.0                / 24   *                 U C
 ge2           10.1.1.1                / 32   *                 U H L
 ge2           10.1.2.0                / 24   10.1.1.1          U G S
 ge3           10.1.1.0                / 24   *                 U C
 ge3           10.1.1.1                / 32   *                 U H L
 ge3           10.1.2.0                / 24   10.1.1.1          U G S
 ---------------------------------------------------------------------------
 Flags: U=Usable G=Gateway H=Host C=Created(Interface)
        S=Static L=LinkLayer X=Crossport
```

The Brocade 7810 offers a new CLI command `portcfgshow iproute`, which shows only the pertinent static routes configured by the user, without any confusing system-generated routes. Additionally, it is possible to add the suffix `ge<#>` to see the routes that are configured for a specific GE interface. For example, `portcfgshow iproute ge2` shows only the routes applicable to GE2.

The following are the equivalent IP routes that are configured on the local and remote Brocade 7810s.

Local 7810 IP Routes

```
portcfg iproute ge2.dp0 create 10.1.1.0/24 10.1.2.1
portcfg iproute ge3.dp0 create 10.1.1.0/24 10.1.2.1


7810-Local:admin> portcfgshow iproute
 Port          IP Address              / Pfx  Gateway           Flags
 ---------------------------------------------------------------------------
 ge2.dp0       10.1.1.0                / 24   10.1.2.1          S
 ge3.dp0       10.1.1.0                / 24   10.1.2.1          S
 ---------------------------------------------------------------------------
 Flags: S=Static X=Crossport
```

Remote 7810 IP Routes

```
portcfg iproute ge2.dp0 create 10.1.2.0/24 10.1.1.1
portcfg iproute ge3.dp0 create 10.1.2.0/24 10.1.1.1


7810-Remote:admin> portcfgshow iproute
 Port          IP Address              / Pfx  Gateway           Flags
 ---------------------------------------------------------------------------
 ge2.dp0       10.1.2.0                / 24   10.1.1.1          S
 ge3.dp0       10.1.2.0                / 24   10.1.1.1          S
 ---------------------------------------------------------------------------
 Flags: S=Static X=Crossport
```

IPsec

The best practice is to use encryption since there is no performance degradation or extra cost involved. IPsec applies to an entire tunnel, not per circuit.

The Brocade 7800 supports IPsec, and it is configured using `portcfg fciptunnel`. The CLI command used to configure IPsec on the 7800 is shown in the portcfg fciptunnel section.

The Brocade 7810 does not configure IPsec using the `portcfg fciptunnel` command; it only applies IPsec to a tunnel using the `portcfg fciptunnel` command. The Brocade 7810 requires an IPsec policy be created before applying IPsec to a tunnel. The same Brocade 7810 CLI command is used on both the local and remote sides (cut/paste). The Brocade 7800 pre-shared key (PSK) requires a 32-character key.

The PSK used on the Brocade 7800 can be used on the Brocade 7810; however, this is not necessary. A new random string is recommended. Plus, there is no reason to record or memorize PSKs. Merely cut/paste a PSK into the IPsec policy configuration on both ends, and that's it.

The Brocade 7810 PSK can accept up to 64 characters; however, it does not require all 64 characters. There is no default PSK.

The CLI command for creating an IPsec policy, `portcfg ipsec-policy`, is shown below. This command applies only to the Brocade 7810 and was not done on the Brocade 7800. The output from `portshow ipsec-policy` is shown as well. To verify the PSK on both ends, use the `-p` argument: `portshow ipsec-policy -p`.

Local 7810 IPsec Policy
```
portcfg ipsec-policy MyPolicy create -k MyTopSecret7810PSK
```

portshow ipsec-policy

```
 IPSec Policy     Flg Authentication data
--------------------------------------------------------------------------------
 MyPolicy         S-- ********************************************************
--------------------------------------------------------------------------------
Flags: *=Name Truncated. Use "portshow ipsec-policy -d for details".
       P=PKI Profile  S=Shared-Key Profile
       X=Expired Cert  M=Hash Mismatch
```

Remote 7810 IPsec Policy
```
portcfg ipsec-policy MyPolicy create -k MyTopSecret7810PSK
```

portshow ipsec-policy -p

```
 IPSec Policy     Flg Authentication data
--------------------------------------------------------------------------------
 MyPolicy         S-- MyTopSecret7810PSK
--------------------------------------------------------------------------------
Flags: *=Name Truncated. Use "portshow ipsec-policy -d for details".
       P=PKI Profile  S=Shared-Key Profile
       X=Expired Cert  M=Hash Mismatch
```

portcfg fciptunnel

The Brocade 7810 CLI command for creating the local and remote tunnel is the same, so cut/paste. The original command was designated VE16 on the Brocade 7800. There is no VE16 on the Brocade 7810. VE_Ports range from VE12 to VE15. VE12 is the first available VE_Port on the Brocade 7810 and is used in this example.

In this example, IP Extension has been enabled on the Brocade 7810 tunnel. There is no penalty for enabling IP Extension on the Brocade 7810. IP Extension allows IP storage to benefit from Brocade transport technology such as TCP acceleration, compression, and encryption. It is recommended that only qualified IP storage applications be used with IP Extension. The Brocade 7800 does not offer IP Extension.

On the Brocade 7800, compression (`-c`) is often set to auto. The auto-compression setting has been deprecated, and the Brocade 7810 does not support it. Compression (`--compression`) on the Brocade 7810 can be set to either `deflate` or `aggr-deflate` depending on the cumulative circuit bandwidth across all tunnels. Aggressive-Deflate supports 1.5Gb/s or less, and Deflate supports 1.5Gb/s or more. For example, a Brocade 7810 with a single tunnel that has two 500Mb/s circuits across a 1Gb/s WAN would use Aggressive-Deflate. Alternatively, two 1Gb/s circuits across a 2Gb/s WAN would use Deflate.

Lastly, on the Brocade 7800, IPsec PSK (`-K`) is specified. The Brocade 7810 does not accept the `-K` argument; instead, the PSK is specified in the `portcfg ipsec-policy` command, and that IPsec policy is merely enabled or disabled in the `portcfg fciptunnel` command.

If FastWrite or Tape Pipelining (OSTP) was enabled on the Brocade 7800, it should be enabled on the Brocade 7810 as well. These SCSI optimizations apply to the entire tunnel and not per circuit. If your environment benefits from FastWrite for array-array Remote Data Replication (RDR), add FastWrite. If your environment has Open Systems FC Tape across Extension, you must first enable FastWrite and then enable OSTP (Tape Pipelining). An example configuration is shown below.

The Brocade 7810 is configured using staging, which means that separate CLI commands are issued for the different parameters being configured, such as compression and IPsec. The operation changes from create to modify. There is nothing preventing users from issuing a command that contains all the parameters at once. This is a matter of personal preference.

Local 7800 Tunnel
```
portcfg fciptunnel 16 create -c auto -K 12345678901234567890123456789012
```

Remote 7800 Tunnel
```
portcfg fciptunnel 16 create -c auto -K 12345678901234567890123456789012
```

Local 7810 Tunnel
```
portcfg fciptunnel 12 create --ipext enable
portcfg fciptunnel 12 modify --compression deflate
portcfg fciptunnel 12 modify --ipsec MyPolicy
portcfg fciptunnel 12 modify --fastwrite enable
portcfg fciptunnel 12 modify --tape-pipelining enable
```

Remote 7810 Tunnel
```
portcfg fciptunnel 12 create --ipext enable
portcfg fciptunnel 12 modify --compression deflate
portcfg fciptunnel 12 modify --ipsec MyPolicy
portcfg fciptunnel 12 modify --fastwrite enable
portcfg fciptunnel 12 modify --tape-pipelining enable
```

portcfg fcipcircuit

Extension circuits make up a tunnel and belong to the VE_Port. The VE_Port acts as the tunnel endpoint. At least one circuit is required; however, typically more than one circuit is used to construct a tunnel to gain resiliency and redundancy. Configuring more than one circuit per VE_Port is called Brocade Extension Trunking (BET). The Brocade 7800 requires the Advanced Extension license before allowing more than one circuit per VE_Port. The Brocade 7810 requires the "full" or "upgraded" platform before permitting multiple circuits per VE_Port.

Circuits take disparate paths through the IP network to gain resiliency and redundancy. Typically, circuits are assigned to different and dedicated GE interfaces on the platform for port, optic, and cable redundancy. Circuits connect to different data center LAN switches and routers for redundancy. Circuits may traverse different WAN connections for redundancy reasons. Circuits do not have to be the same min/max bandwidth or the same RTT. When a circuit goes offline, any data lost inflight

is retransmitted and put back in-order before being sent to upper-layer protocols. A tunnel with multiple circuits will deliver all data and deliver it in-order.

Before a tunnel will come online, circuits require a local and remote IP address and min/max communication rates in kb/s. The communication rates set on one side must match on the other side. It is not possible to asymmetrically set the comm-rates.

Local 7800 Circuits
```
portcfg fcipcircuit 16 create 0 -S 10.1.1.10 -D 10.1.2.10 -b 1000000 -B 1000000
portcfg fcipcircuit 16 create 1 -S 10.1.1.11 -D 10.1.2.11 -b 1000000 -B 1000000
```

Remote 7800 Circuits
```
portcfg fcipcircuit 16 create 0 -S 10.1.2.10 -D 10.1.1.10 -b 1000000 -B 1000000
portcfg fcipcircuit 16 create 1 -S 10.1.2.11 -D 10.1.1.11 -b 1000000 -B 1000000
```

Local 7810 Circuits
```
portcfg fcipcircuit 12 create 0
portcfg fcipcircuit 12 create 1
portcfg fcipcircuit 12 modify 0 --local-ip 10.1.1.10 --remote-ip 10.1.2.10
portcfg fcipcircuit 12 modify 1 --local-ip 10.1.1.11 --remote-ip 10.1.2.11
portcfg fcipcircuit 12 modify 0 --min-comm-rate 1000000 --max-comm-rate 1000000
portcfg fcipcircuit 12 modify 1 --min-comm-rate 1000000 --max-comm-rate 1000000
```

Remote 7810 Circuits
```
portcfg fcipcircuit 12 create 0
portcfg fcipcircuit 12 create 1
portcfg fcipcircuit 12 modify 0 --local-ip 10.1.2.10 --remote-ip 10.1.1.10
portcfg fcipcircuit 12 modify 1 --local-ip 10.1.2.11 --remote-ip 10.1.1.11
portcfg fcipcircuit 12 modify 0 --min-comm-rate 1000000 --max-comm-rate 1000000
portcfg fcipcircuit 12 modify 1 --min-comm-rate 1000000 --max-comm-rate 1000000
```

Brocade 7810 FCIP Tunnel Validation

The `portshow fciptunnel` command displays configuration settings and tunnel and circuit status. If a tunnel status is up, essentially there is an active ISL between the two connected domains. There are several arguments that can be added to display specific characteristics of the circuits and tunnel.

portshow fciptunnel --help

```
Usage:
  portshow fciptunnel [<slot>/][port] [<options>]
      or
  portshow fcipcircuit [<options>]

Optional Arguments:
  -c,--circuits        - Display circuits with the tunnel.
  -t,--tcp             - Display the TCP statistics.
  -q,--qos             - Display the QoS parameters.
  -h,--ha              - Display the HA parameters.
  -p,--perf            - Display performance statistics.
                         Mutually exclusive with -C,--config.
  -s,--summary         - Display the objects in a summary table.
  -d,--detail          - Display the objects in detailed view.
  -C,--config          - Display the configuration information.
                         Mutually exclusive with -p,--perf.
  -L,--lifetime        - Display the lifetime statistics.
```

```
 -R,--reset           - Reset the runtime statistics.
 -v,--validate <ver>  - Validate config for specified version.
    --hcl-status      - Display the current HCL readiness status
                         or HCL status if HCL is in progress.

    --filter <args>   - Limit the output to specific filter criteria.
                         Use portShow fciptunnel --filter -help for details.
```

The `--config` argument is used to display the local and remote configured IP addresses. This command is useful to determine the ping source and destination IP addresses when the `portcmd --ping` command is used.

Configuration on Local Brocade 7810
```
7810-Local:admin> portshow fciptunnel -c --config

 Tunnel Circuit AdminSt Flags      Local IP            Remote Ip
---------------------------------------------------------------------------
 12    -         Enabled --ifT--PI
 12    0 ge2     Enabled ----a--i4 10.1.2.10           10.1.1.10
 12    1 ge3     Enabled ----a--i4 10.1.2.11           10.1.1.11
---------------------------------------------------------------------------
 Flags (tunnel): l=Legacy QOS Mode
                 i=IPSec f=Fastwrite T=TapePipelining F=FICON r=ReservedBW
                 a=FastDeflate d=Deflate D=AggrDeflate P=Protocol
                 I=IP-Ext
       (circuit): h=HA-Configured v=VLAN-Tagged p=PMTU i=IPSec 4=IPv4 6=IPv6
                 ARL a=Auto r=Reset s=StepDown t=TimedStepDown  S=SLA
```

Configuration on Remote Brocade 7810
```
7810-Remote:admin> portshow fciptunnel -c --config

 Tunnel Circuit AdminSt Flags      Local IP            Remote Ip
---------------------------------------------------------------------------
 12    -         Enabled --ifT--PI
 12    0 ge2     Enabled ----a--i4 10.1.1.10           10.1.2.10
 12    1 ge3     Enabled ----a--i4 10.1.1.11           10.1.2.11
---------------------------------------------------------------------------
 Flags (tunnel): l=Legacy QOS Mode
                 i=IPSec f=Fastwrite T=TapePipelining F=FICON r=ReservedBW
                 a=FastDeflate d=Deflate D=AggrDeflate P=Protocol
                 I=IP-Ext
       (circuit): h=HA-Configured v=VLAN-Tagged p=PMTU i=IPSec 4=IPv4 6=IPv6
                 ARL a=Auto r=Reset s=StepDown t=TimedStepDown  S=SLA
```

Ping from Local Brocade 7810 via GE2 to WAN Gateway
```
portcmd --ping ge2.dp0 -s 10.1.2.10 -d 10.1.2.1

PING 10.1.2.1 (10.1.2.10) with 64 bytes of data.
64 bytes from 10.1.2.1: icmp_seq=1 ttl=64 time=1 ms
64 bytes from 10.1.2.1: icmp_seq=2 ttl=64 time=1 ms
64 bytes from 10.1.2.1: icmp_seq=3 ttl=64 time=1 ms
64 bytes from 10.1.2.1: icmp_seq=4 ttl=64 time=1 ms


--- 10.1.2.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 723 ms
rtt min/avg/max = 1/1/1 ms
```

The `portshow fciptunnel` command with the `-c` argument displays the tunnel and its associated circuits. A tunnel with multiple circuits is referred to as Brocade Extension Trunking (BET). The `--summary` argument displays a condensed view with tunnel and circuit status, Tx/Rx in MB/s, uptime, connection count, and the configuration values for min/max commit rates and circuit failover metric/group.

Summary of Local Brocade 7810 Tunnel and Circuits

```
7810-Local:admin> portshow fciptunnel -c --summary

 Tunnel Circuit  OpStatus  Flags      Uptime   TxMBps  RxMBps ConnCnt CommRt Met/G
--------------------------------------------------------------------------------
 12     -        Up        --i----PI 2d19h55m   0.00    0.00   1        -      -
 12     0 ge2    Up        ----a--i4 2d19h55m   0.00    0.00   1     1000/1000 0/-
 12     1 ge3    Up        ----a--i4 2d19h55m   0.00    0.00   1     1000/1000 0/-
--------------------------------------------------------------------------------
 Flags (tunnel): l=Legacy QOS Mode
                 i=IPSec f=Fastwrite T=TapePipelining F=FICON r=ReservedBW
                 a=FastDeflate d=Deflate D=AggrDeflate P=Protocol
                 I=IP-Ext
       (circuit): h=HA-Configured v=VLAN-Tagged p=PMTU i=IPSec 4=IPv4 6=IPv6
                 ARL a=Auto r=Reset s=StepDown t=TimedStepDown  S=SLA
```

Summary of Remote Brocade 7810 Tunnel and Circuits

```
7810-Remote:admin> portshow fciptunnel -c --summary

 Tunnel Circuit  OpStatus  Flags      Uptime   TxMBps  RxMBps ConnCnt CommRt Met/G
--------------------------------------------------------------------------------
 12     -        Up        --ifT--PI 2d19h55m   0.00    0.00   1        -      -
 12     0 ge2    Up        ----a--i4 2d19h55m   0.00    0.00   1     1000/1000 0/-
 12     1 ge3    Up        ----a--i4 2d19h55m   0.00    0.00   1     1000/1000 0/-
--------------------------------------------------------------------------------
 Flags (tunnel): l=Legacy QOS Mode
                 i=IPSec f=Fastwrite T=TapePipelining F=FICON r=ReservedBW
                 a=FastDeflate d=Deflate D=AggrDeflate P=Protocol
                 I=IP-Ext
       (circuit): h=HA-Configured v=VLAN-Tagged p=PMTU i=IPSec 4=IPv4 6=IPv6
                 ARL a=Auto r=Reset s=StepDown t=TimedStepDown  S=SLA
```

The `portshow fciptunnel` command with the `--perf` argument displays Tx and Rx MB/s, compression ratio (Note: Only Tx is included in compression), Round Trip Time (RTT), retransmits, circuit utilization percentage, and transmit queue percentage (tunnel only).

Performance Summary of Local Brocade 7810 Tunnel and Circuits

```
7810-Local:admin> portshow fciptunnel -c --perf --summary

 Tunnel Circuit St Flg TxMBps RxMBps CmpRtio RTTms  ReTx   TxWAN%  TxQ%/BW  Met/G
--------------------------------------------------------------------------------
 12     -        Up -I-   0.0    0.0   3.1:1    -    156     0        0       -
 12     0 ge2    Up ---   0.0    0.0     -     41     69     0     1000/1000 0/-
 12     1 ge3    Up ---   0.0    0.0     -     41     87     0     1000/1000 0/-
--------------------------------------------------------------------------------
   Flg (tunnel): I=IP-Ext, s=Spillover
            St: High level state, Up or Dn
 TxWAN (tunnel): Tx WAN utilization high of primary circuits (--qos for range)
       (circuit): Tx WAN utilization high (--qos for range)
   TxQ (tunnel): Tx data buffering utilization high (--qos for range)
```

Performance Summary of Remote Brocade 7810 Tunnel and Circuits

```
7810-Remote:admin> portshow fciptunnel -c --perf --summary

 Tunnel Circuit St Flg TxMBps RxMBps CmpRtio RTTms  ReTx   TxWAN%  TxQ%/BW  Met/G
 -------------------------------------------------------------------------------
 12    -        Up -I-   0.0    0.0   1.1:1   -      36     0         0        -
 12    0 ge2    Up ---   0.0    0.0     -     41     15     0       1000/1000 0/-
 12    1 ge3    Up ---   0.0    0.0     -     41     21     0       1000/1000 0/-
 -------------------------------------------------------------------------------
    Flg (tunnel): I=IP-Ext, s=Spillover
             St: High level state, Up or Dn
 TxWAN (tunnel): Tx WAN utilization high of primary circuits (--qos for range)
      (circuit): Tx WAN utilization high (--qos for range)
   TxQ (tunnel): Tx data buffering utilization high (--qos for range)
```

Brocade 7800 Support

The End of Life (EOL) notification for the Brocade 7800 went out on April 30, 2019. The End of Support (EOS) date is October 31, 2024. The recommended alternative solution is the Brocade 7810 or Brocade 7840 depending on bandwidth requirements. The Brocade 7810 is not an exact swap for the Brocade 7800; contact your OEM or Broadcom representative for technology refresh details.

Revision History

7800-7810-Migrate-UG100; October 23, 2020

Initial document version.

BROCADE
A **Broadcom** Company