Deploy ERSPAN with an ExtraHop sensor and Brocade 5600 vRouter in AWS

Published: 2023-04-22

This guide explains how to install and configure an example environment within Amazon Web Services (AWS) through built-in ERSPAN capabilities on the ExtraHop sensor and the Brocade 5600 vRouter.

Encapsulated Remote Switched Port Analyzer (ERSPAN) enables you to monitor traffic on multiple network interfaces or VLANs and send the monitored traffic to one or more destinations, including ExtraHop sensors. Configuring ERSPAN on the Brocade 5600 vRouter with the ExtraHop sensor enables additional mission-critical traffic analytics, monitoring, and visibility across AWS and other cloud platforms.

Additional references

The document assumes a certain level of familiarity with networking. Completing the steps in this guide requires an AWS account. If you are new to ExtraHop, Brocade, or Amazon Web Services, see the following links for additional information:

- Deploy the ExtraHop sensor in AWS

  https://docs.extrahop.com/current/install-ehv-de-aws/
- Using the Brocade 5600 vRouter 5600 in AWS

  https://www.brocade.com/content/dam/common/documents/content-types/deployment-guide/brocade-vrouter-5600-amazon-aws-dp.pdf

Configure an AWS Virtual Private Cloud network

In this section, you will configure a new virtual private cloud (VPC), an Internet gateway, subnets, and routing services.

Create a VPC

1. Sign into the AWS console.
2. In the Networking section, click **VPC**.
3. In the Virtual Private Cloud section, click **Your VPCs** and then click **Create VPC**.
4. In the Name tag field, type a name for the VPC.
5. In the CIDR block field, type a block of IP addresses for the network, such as `10.4.0.0/16`.
6. In the Tenancy field, leave the option set to **Default**.
7. Click **Yes, Create**.

   Note: Make note of the VPC ID (vpc-nnnnnnnn), which is needed for the next procedure.

Create an Internet Gateway

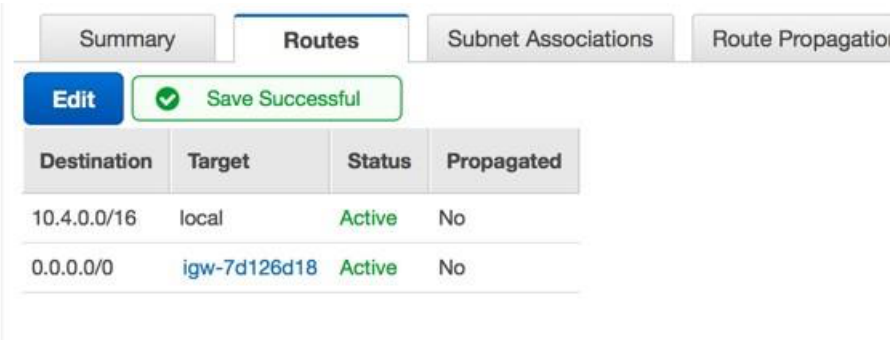
1. In the navigation pane, click **Internet Gateways**, and then click **Create Internet Gateway**.
2. In the Name tag field, type a name to identify the Internet gateway.
   This setting allows public traffic in and out of your virtual private cloud.
3. Click **Yes, Create**.
   Make note of the gateway ID (igw-nnnnnnnn).
4. Click **Attach to VPC**.

5. From the drop-down list, select the VPC you created and then click **Yes, Attach**.

Set routes

Before traffic is allowed in or out of the new VPC, routing and traffic security rules must be configured. By default, all outbound traffic is allowed, but inbound traffic is more restrictive.

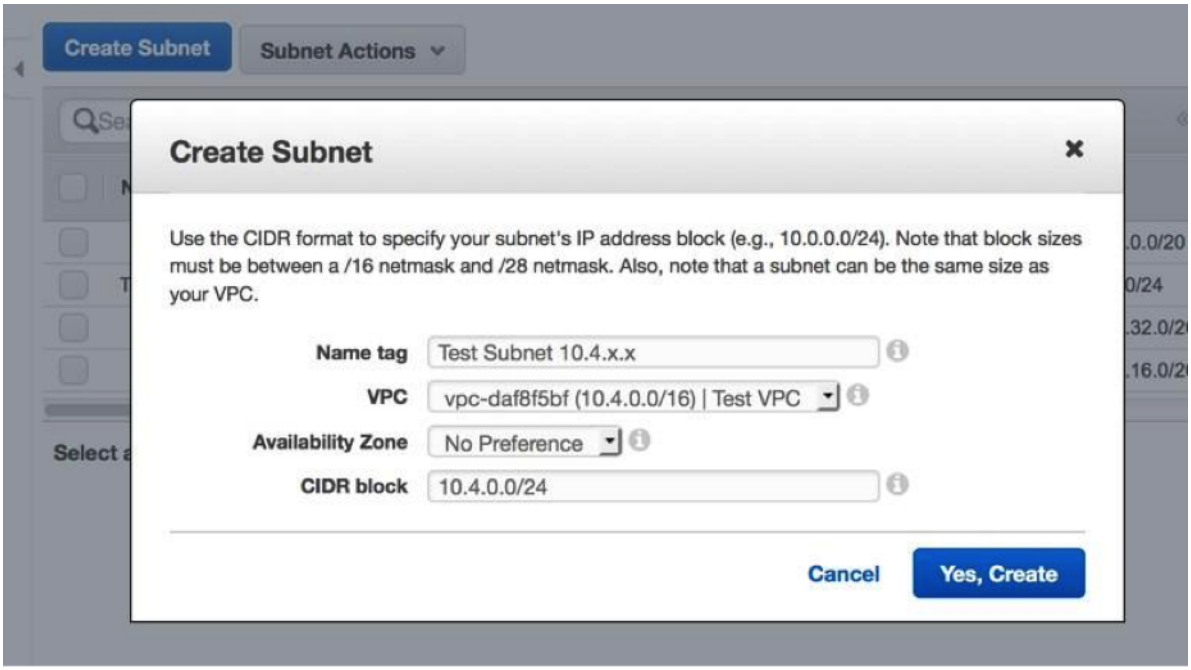
1. In the navigation pane, click **Route Tables**.
2. From the table, select the checkbox next to the route that is associated with the VPC you created.
3. Click the **Routes** tab, and then click **Edit**.
4. Click **Add another route**.
5. In the Destination field, type `0.0.0.0/0`.
6. In the Target field, type the name tag you entered for the Internet gateway.
7. Click **Save**.



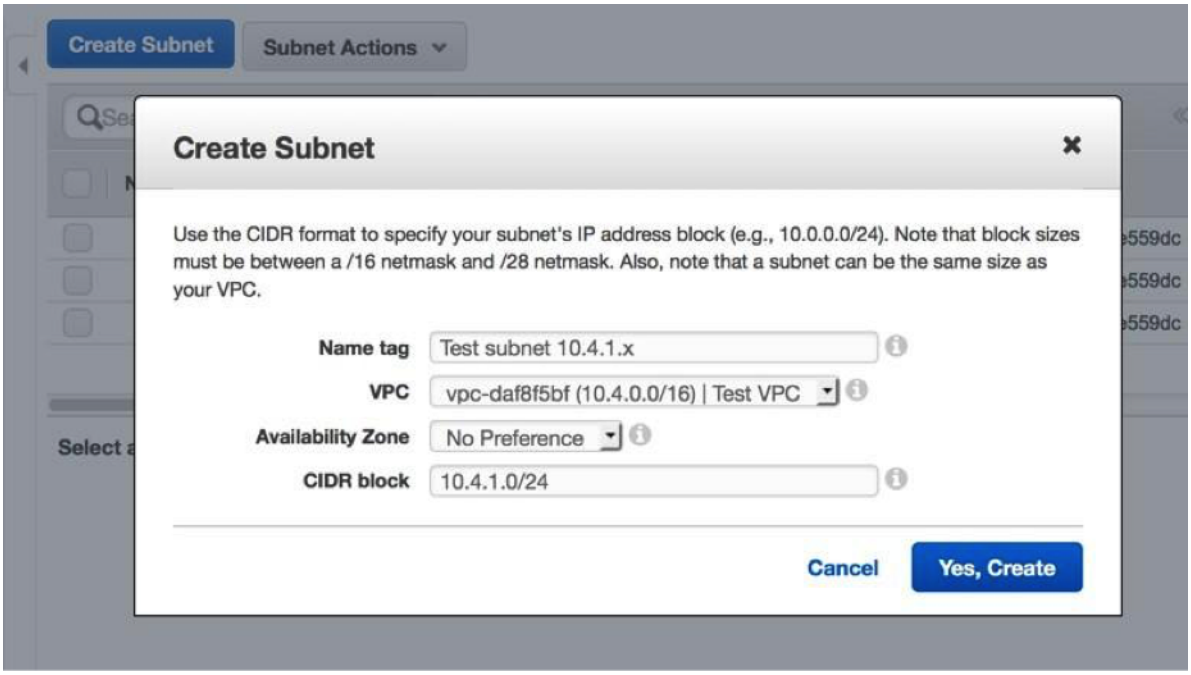
Create a subnet

This example network has a public and private subnet within the CIDR block you configured earlier. You will configure 10.4.0.0/24 as the public subnet and 10.4.1.0/24 as the private subnet.

1. In the navigation pane, click **Subnets**, and then click **Create Subnet**.
2. In the Name tag field, type a name for the subnet.
3. From the **VPC** drop-down list, select the VPC created earlier.
4. Optional: From the **Availability Zone** drop-down list, select the Amazon availability zone where the subnet will reside.
5. In the CIDR block field, type the public CIDR block of `10.4.0.0/24`.
6. Click **Yes, Create**.



7. Repeat steps 1-6 to create a private subnet with the `10.4.1.0/24` CIDR block.

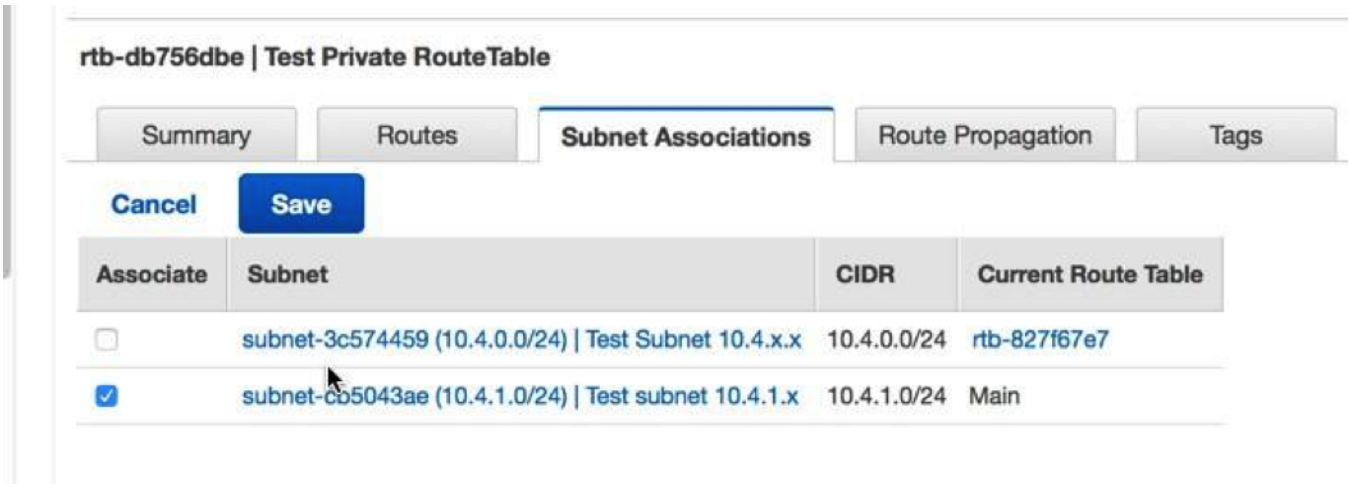


Associate the route table with the subnet

1. In the navigation pane, click **Route Tables**.
2. Verify that the route table selected is the table with the Internet gateway you created earlier.
3. Click the **Subnet Associations** tab.
4. Click **Edit** and select the public subnet of `10.4.0.0/24`, and then click **Save**.

5. Click **Create Route Table** to create a new route table for the private subnet `10.4.1.0/24`.
6. In the Name tag field, type a name for the route table and select the VPC you created earlier, and then click **Yes, Create**.
7. Select the route table created for the private subnet `10.4.1.0/24`.
8. Select the **Subnet Associations** tab.
9. Click **Edit** and select the private subnet `10.4.1.0/24` and then click **Save**.

   Make note of this route table, in a subsequent step an association is made to the private interface of the Brocade vRouter with a route.

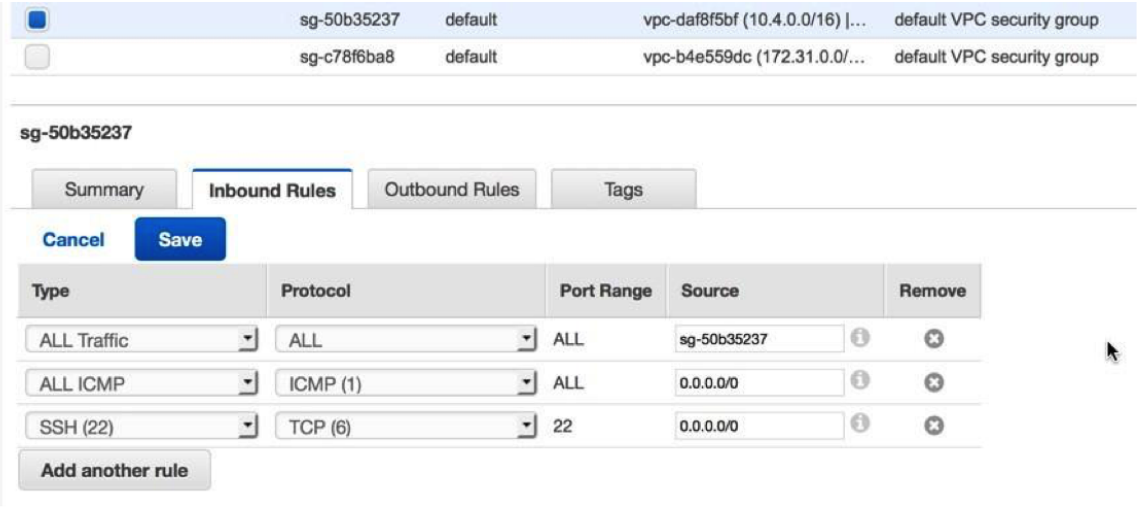


Add inbound rules to the security group

1. In the navigation pane, select your new VPC from the **Filter by VPC** pulldown.
2. In the navigation pane, click **Security Groups**.

   The security group has rules allowing traffic into the VPC. The initial setup allows all traffic from itself, all ICMP (so you can test ping of interface) and SSH on port 22.
3. Select the default security group for your new VPC.
4. Click the **Inbound Rules** tab and then click **Edit**.
5. Click **Add another rule**.
6. Select **All ICMP** from the dropdown list and type `0.0.0.0/0` in the Source field.
7. Click **Add another rule**.
8. Select **SSH (22)** from the dropdown list and type `0.0.0.0/0` in the Source field.
9. Click **Save**.

Note: This is a non-production configuration; you would not typically allow all IP addresses to access your instance.



Summary

In this section you created a virtual public cloud, a private subnet for the 10.4.1.0/24 network and a public subnet for the 10.4.0.0/24 network. In addition, you created routing tables for routing traffic within the VPC subnets and externally through an Internet Gateway. Security groups allow traffic in or out of the VPC and you configured inbound rules to allow ICMP and SSH traffic.

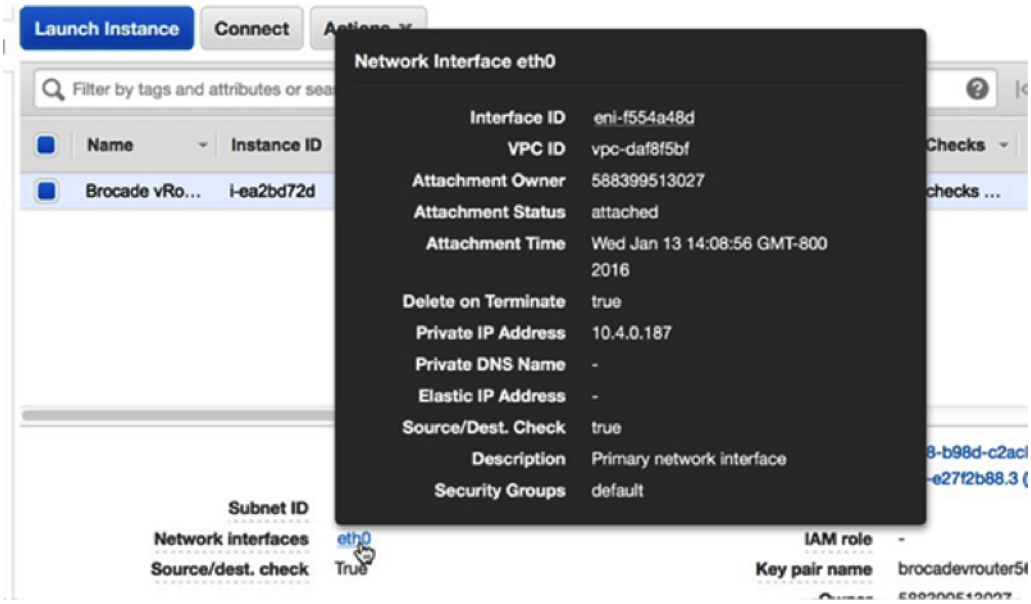
Configure the Brocade 5600v router

In this section you will configure a new Brocade 5600v router within the public subnet created previously, and assign an Elastic IP to configure and test the setup through SSH.

1. Click the Console Home icon in the upper left corner to return to the AWS Management Console page.
2. In the Compute section, click **EC2**.
3. In the navigation pane, click **Instances**.
4. Click **Launch Instance** to start the Amazon Machine Image (AMI) wizard.
5. Click **AWS Marketplace** and type `5600` or `Brocade vRouter` in the Search AWS Marketplace Products field and then press ENTER.
6. Click the **Select** button next to **Brocade 5600 Virtual Router/Firewall/VPN**.
7. For this example, select the **m4.large** instance type and then click **Next: Configure Instance Details**.
8. On the Configure Instance Details page, complete the following steps:
   a) Type `1` in the Number of instances field.
   b) From the **Network** dropdown list, select the VPC you created in the first section of this guide.
   c) From the Subnet dropdown list, select the public subnet, `10.4.0.0/24`.
   d) In the Network interfaces section at the bottom of the page, type `10.4.0.187` in the Primary IP field.
9. Click **Next: Add Storage**. Keep the default storage settings and then click **Next: Tag Instance**.
10. Type any name in the Value field for the **Name** key to identify the instance. Add any additional tags to identify this instance in the environment and then click **Next: Configure Security Group**.
11. Choose **Select an existing security group** and the select the default Security Group ID for your VPC.

Ensure the rules created earlier have been applied. For example, SSH and ICMP are still listed and their source addresses are 0.0.0.0/0. Optionally, a new security group could be created specifically for this instance.

12. Click **Review and Launch** to launch and install the Brocade vRouter.
13. Review the selections and entries, especially the subnet and IP addresses. If costs are a concern, ensure the instance has stayed within the confines of the free trial. Click **Launch** to launch the instance and register the Brocade vRouter.
14. In the key pair dialog box, select **Create a new key pair** from the dropdown menu, type a friendly name and click the **Download Key Pair** button to download the key pair. Ensure you make note of the download location.
15. Click **Launch Instances** to finish the install process.
16. Click **View Instances** at the bottom of the Launch Status screen or select **Instances** from navigation pane. The instance, depending on the selections, might take a several minutes to be fully online.
17. After the instance has fully launched and the Status Checks are complete, click the **Description** tab at the bottom of the page. In the Network interfaces section, click **eth0**. Verify that the IP address is `10.4.0.187` (or the IP address configured earlier).
18. Click the link associated with the Interface ID. In this example, the ID is `eni-f554a48d`.



19. With the private interface of the Brocade vRouter selected, click on the **Actions** dropdown menu and select **Change Source/Dest. Check**.
20. Select the **Disabled** radio button and then click **Save**.
21. Create the private subnet interface for the Brocade vRouter by clicking **Create Network Interface**.
22. In the Create Network Interface dialog box, complete the following fields:

    Description

    Type a name to identify the private interface.

    Subnet

    From the dropdown list, select the subnet for `10.4.1.0/24`.

    Private IP

    Type `10.4.1.10`.

    Security groups

    Select the default VPS security group.
23. Click **Yes, Create** to create the new interface.

24. Select the private interface and then click on the **Actions** dropdown menu and select **Change Source/Dest. Check**.
25. Select the **Disabled** radio button and then click **Save**.
    Record or make note of the `10.4.1.10` network interface ID.
26. With the private interface still selected, click **Attach**.
27. Select your instance from the Instance ID dropdown list and then click **Attach**.
28. Return to the VPC Dashboard.
29. In the navigation pane, select **Route Tables**.
30. Select the route table associated with the private subnet `10.4.1.0/24`.
31. Click the **Routes** tab and then click **Edit**.
32. Click **Add another route**. In the Destination field, type `0.0.0.0/0` and in the target field, type the interface ID noted in step 23 and then click **Save**. This route table should be associated with the private Interface ID of the Brocade vRouter and associated with the private subnet `10.4.1.0/24`.
33. Allocate an Amazon Elastic IP, a dynamically allocated publicly routed IP, by selecting **Elastic IPs** from the navigation pane. Click **Allocate New Address**, and then click **Yes, Allocate**.
34. From the Actions drop-down menu, select Associate Address and set the following fields:

    Associate with

    Network Interface

    Network Interface

    Select the public interface ID of the Brocade vRouter. In this example, the ID is `eni-f554a48d`.

    Private IP address

    Select the public subnet assigned IP address. In this example, it is `10.4.0.187`.
35. Click **Yes, Associate**.

Connect to your Brocade vRouter instance through SSH

Note: The following procedures were performed in a macOS terminal application. Your commands might vary based on your choice of client.

1. Open a terminal client and run the following commands:
   a) Change to the directory where you downloaded your private key file. For example:

   ```
   remote$ cd ~/Downloads
   ```

   b) Change the permissions of the key file so that it is not publically viewable:

   ```
   remote$ chmod 400 *.pem
   ```

   c) Establish the connection:

   ```
   remote$ ssh -i <vrouter_private_key.pm> vyatta@<elastic_IP>
   ```

   For example:

   ```
   ssh -i brocadevrouter5600.pem vyatta@52.35.186.255
   ```

   If the SSH connection is successful, output similar to the following appears:

   ```
   Welcome to Brocade vRouter
   Welcome to Brocade Vyatta Network OS
   Version: 4.1R2B
   Description: Brocade Vyatta Network OS 4.1 R2
   Built on: Fri Dec 18 07:10:38 UTC 2015
   ```

Note: If the connection fails, add `-vvv` to the `ssh` command to collect debug output, check the security group rules to ensure SSH is allowed, verify the elastic IP is associated with the public interface, and verify ping to the public elastic IP returns a response.

2. Display a list of configured interfaces by running the following command:

```
show interfaces
```

Output similar to the following appears:

```
Codes: S - State, L - Link, u - Up, D - Down, A – Admin Down
  Interface        IP Address                     S/L  Description
  ---------        ----------                     ---  -----------
  dp0s0            10.4.0.187/24                  u/u
  dp0s1            10.4.1.10/24                  -A/D
```

Note: If only one interface appears, reboot the Brocade vRouter by running the `reboot` command.

3. Two interfaces should be visible. One interface is not configured and an IP address does not appear. To configure the interface run the following commands:
   a) Enter configure mode:

```
configure
```

   b) Configure the private interface with the previously assigned private IP. In this example, `10.4.1.0.24` was assigned in the instance in AWS on the private interface.

```
set interfaces dataplane dp0s1 address 10.4.1.10/24
```

   c) Set the number of gratuitous Address Resolution Protocol (ARP) requests to send:

```
set interfaces dataplane dp0s1 ip gratuitous-arp-count 1
```

   d) Enable reverse-path filter with no source validation:

```
set interfaces dataplane dp0s1 ip rpf-check disable
```

   e) Set the number of NS packets to transmit:

```
set interfaces dataplane dp0s1 ipv6 dup-addr-detect-transmits 1
```

   f) Sets the size of the MTU for the data plane interface:

```
set interfaces dataplane dp0s1 mtu 1500
```

   g) Set the EtherType for VLAN frames:

```
set interfaces dataplane dp0s1 vlan-protocol 0x8100
```

4. Run the show interfaces command to view the configured interfaces. Output similar to the following appears:

```
interfaces {
        dataplane dp0s0 {
                address dhcp
                ip {
                        gratuitous-arp-count 1
                        rpf-check disable
                }
                ipv6 {
```

```
                        dup-addr-detect-transmits 1
                }
                mtu 1500
                vlan-protocol 0x8100
        }
+       dataplane dp0s1 {
+                address 10.4.1.10/24
+                ip {
+                        gratuitous-arp-count 1
+                        rpf-check disable
+                }
+                ipv6 {
+                        dup-addr-detect-transmits 1
+                }
+                mtu 1500
+                vlan-protocol 0x8100
+        }
+        loopback lo
+ }
```

Note: The plus (+) sign indicates unsaved changes.

5. Type `commit` and then press ENTER.
6. Type `save` and then press ENTER to save the changes.
7. Optional: Set the SSH service port to 22 to ensure ports are assigned properly on the Brocade vRouter in the configuration file:

```
set service ssh port 22
```

8. Type `commit` and then press ENTER.
9. Type `save` and then press ENTER to save the changes.
10. Type `exit` to leave configure mode.
11. Run the `show interfaces` command. Both interfaces should be up and administratively up, similar to the following output:

```
Codes: S - State, L - Link, u - Up, D - Down, A – Admin Down
  Interface        IP Address                     S/L  Description
  ---------        ----------                     ---  -----------
  dp0s0            10.4.0.187/24                  u/u
  dp0s1            10.4.1.10/24                   u/u
```

Note: Leave the vRouter shell open to run additional commands later in this procedure.

Summary

In this section, you configured the Brocade vRouter to be accessible and configurable from a remote machine. You also added the appropriate interfaces for creation of additional subnets.

(Optional) Configure Linux client for traffic generation

In this section and the next, you will configure a new Linux AMI in order to verify the Brocade vRouter and ExtraHop Discover configuration. If other sources of traffic are available, then these sections can be skipped.

Note: A Linux client is selected in the following example.

1. Click the Console Home icon in the upper left corner to return to the AWS Management Console page.

2. In the Compute section, click **EC2**.
3. In the navigation pane, click **Instances**.
4. Click **Launch Instance** to start the Amazon Machine Image (AMI) wizard.
5. Locate an Ubuntu Server image in the list and then click **Select**.
6. Select the **t2.micro** instance type and then click **Next: Configure Instance Details**.
7. On the Configure Instance Details page, complete the following steps:
   a) Type `1` in the Number of instances field.
   b) From the **Network** dropdown list, select the VPC you created in the first section of this guide.
   c) From the Subnet dropdown list, select the `10.4.1.0/24` subnet.

      A static IP is not necessary for this step, but make note of the IP address assigned to the instance. In this example, the IP is `10.4.1.50`.
   d) The remaining settings can be left at their default values.
8. Click **Next: Add Storage**. No changes are necessary.
9. Click **Next: Tag Instance**. No changes are necessary.
10. Click **Next: Configure Security Group**.
11. On the Configure Security Group page, complete the following steps:
    a) Select **Create a new security group**.
    b) In the **Security group name field**, type a descriptive name. For example, Ubuntu Linux.
    c) In the Description field, type a description for this security group.
    d) Click **Add Rule**.
    e) Select **All ICMP** from the dropdown list.
    f) In the Source column, select **Anywhere** from the dropdown list and type `0.0.0.0/0` in the field.
    g) If SSH is not listed, click **Add Rule**.
    h) In the Source column, select **Anywhere** from the dropdown list and type `0.0.0.0/0` in the field.
    i) Click **Review and Launch**.
    j) Acknowledge that your security group is open to the world, and then click **Launch**.

       Note: This is a non-production configuration. Typically, traffic should not be configured open to the world.
    k) In the key pair dialog box, select **Create a new key pair** from the dropdown list. Type a name in the Key pair name field and click **Download Key Pair**. Make note of the download location and then click **Launch Instances** to finish the install process.

(Optional) Configure NAT on the vRouter for the Linux client

To reach the Linux client on the internal private subnet, both inbound and outbound for traffic generation, NAT must be configured on the vRouter.

1. Return to the previously opened vRouter shell prompt.
2. Open a port and masquerade outbound traffic by running the following commands.
   a) Enter configure mode:

   ```
   configure
   ```

   b) Set the destination port. This is an arbitrary port and 445 is specified in this example.

   ```
   set service nat destination rule 10 destination port 445
   ```

   c) Set the inbound interface:

   ```
   set service nat destination rule 10 inbound-interface dp0s0
   ```

d) Set the protocol:

```
set service nat destination rule 10 protocol tcp
```

e) Set the translation address, where *<client_instance_ip>* is the IP address of the Linux client:

```
set service nat destination rule 10 translation address
 <client_ip_address>
```

For example:

```
set service nat destination rule 10 translation address 10.4.1.50
```

f) Set the translation port:

```
set service nat destination rule 10 translation port 22
```

g) Type `commit` and then press ENTER.

h) Type `save` and then press ENTER to save the changes.

i) Configure outbound traffic on the vRouter to mask the internal addresses:

```
set service nat source rule 100 outbound-interface dp0s0

set service nat source rule 100 translation address masquerade
```

j) Type `commit` and then press ENTER

k) Type `save` and then press ENTER to save the changes.

Note: The rule numbers are arbitrary; however, allow enough space between ranges in case you need to add related rules in the future.

3. Verify that the configuration is updated with the rules just created by running the following command:

```
show service
```

Output similar to the following appears. Make note of the destination port, the translation port and address to the Linux instance created. Additionally, make sure the interface on both rules are the external interface of the vRouter.

```
nat {
 destination {
  rule 10 {
   destination {
    port 445
   }
   inbound-interface dp0s0
   protocol tcp
   translation {
    address 10.4.1.50
    port 22
   }
  }
 }
 source {
  rule 100 {
   outbound-interface dp0s0
   translation {
    address masquerade
   }
  }
 }
}
```

```
ssh {
 authentication-retries 3
 disable-password-authentication
 port 22
 timeout 120
}
```

4. Return to the AWS console to create an inbound rule on the default security group to test NAT rules.
   a) In the navigation pane, click **Instances**.
   b) Select the vRouter in the list of instances.
   c) In the **Description** tab area, next to Security groups, click **default**.
   d) On the security group page, click the **Inbound** tab.
   e) Click **Edit**.
   f) Click **Add Rule**.
   g) In the **Type** drop-down list, select **Custom TCP Rule**.
   h) In the Port Range field, type `445`.
   i) In the Source field, type `0.0.0.0/0`.

(Optional) Test the Linux client configuration

1. On your client computer, open a new terminal window.
2. Connect to the AWS Linux or Windows client with the appropriate keypair and username.

   ```
   ssh –i <client.pem> <username>@<elastic_ip> -p 445
   ```

   For example:

   ```
   ssh -i ubuntulinux.pem ubuntu@52.35.186.255 -p 445
   ```

   Note: In the AWS console, with the instance selected, click **Connect** to learn how to connect to your particular instance. Usernames and connectivity are unique to the AMI selected.
3. After you have successfully connected to the client, ping the public and private IP addresses that you configured earlier and make sure you can reach the specified IPs. For example:

   ```
   ubuntu@ip-10-4-1-50:~$ ping 10.4.0.187
   ubuntu@ip-10-4-1-50:~$ ping 10.4.1.10
   ```
4. Open a new terminal window and connect to the Brocade vRouter with the appropriate username and keypair.
5. Ping the Linux client IP address. For example:

   ```
   ping 10.4.1.50
   ```
6. Display the route map by running the following command:

   ```
   show ip route
   ```

   Output similar to the following appears:

   ```
   Codes: K - kernel, C - connected, S - static, R - RIP, B - BGP
          O - OSPF, IA - OSPF inter area
          N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
          E1 - OSPF external type 1, E2 - OSPF external type 2
          i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
   inter area
   > - selected route, * - FIB route, p - stale info

   IP Route Table for VRF "default"
   ```

```
Gateway of last resort is 10.4.0.1 to network 0.0.0.0

K    *> 0.0.0.0/0 via 10.4.0.1, dp0s0
C    *> 10.4.0.0/24 is directly connected, dp0s0
C    *> 10.4.1.0/24 is directly connected, dp0s1
C    *> 127.0.0.0/8 is directly connected, lo
```

7. Display the ARP table by running the following command:

```
show arp
```

Output similar to the following appears:

```
IP Address     HW address              Dataplane   Controller  Device
10.4.0.2       02:22:ef:75:6b:79       VALID       VALID       dp0s0
10.4.0.1       02:22:ef:75:6b:79       VALID       VALID       dp0s0
10.4.1.1       02:1f:68:6c:5c:81       VALID                   dp0s1
10.4.1.50      02:f2:d9:aa:fe:c5       VALID       VALID       dp0s1
```

8. Display the interfaces by running the following command:

```
show interface
```

Output similar to the following appears:

```
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address       S/L       Description
---------        ----------       --- -----------
dp0s0     10.4.0.187/24    u/u
dp0s1     10.4.1.10/24     u/u
```

Summary

In this section, you installed and configured a Linux instance for generating test packet traffic.

Configure an ExtraHop EDA 1000v

In this section, you will configure a new ExtraHop EDA 1000v sensor.

1. Click the Console Home icon in the upper left corner to return to the AWS Management Console page.
2. In the Compute section, click **EC2**.
3. In the navigation pane, click **Instances**.
4. Click **Launch Instance** to start the Amazon Machine Image (AMI) wizard.
5. Click **Community AMIs**.
6. Type `ExtraHop` in the Search community AMIs field and locate the `ExtraHop Discover appliance 1000v 5.x.x.x AMI` and click **Select**.
7. Select the **t2.medium** instance type and then click **Next: Configure Instance Details**.
8. In the Configure Instance Details page, complete the following steps:
   a) Type `1` in the Number of instances field.
   b) In the **Network** drop-down list, select the VPC created in the first portion of this guide.
   c) In the **Subnet** drop-down list, select the private subnet `10.4.1.0/24`.
   d) In the Network interfaces section type `10.4.1.15` in the Primary IP field and then click **Next: Add Storage**.
9. Leave the default storage size at the default setting. Click **Next: Tag Instance**.
10. Tag the instance with a name to identify the instance. Add any additional tags for identifying this instance in the environment and then click **Next: Configure Security Group**.

11. On the Configure Security Group page, complete the following steps:
    a) Select **Create a new security group**.
    b) In the Security group name field, type a descriptive name. For example, `EDA 1000v`.
    c) In the Description field, type a description for this security group.
    d) Click **Add Rule** 6 times and configure each protocol type as follows:

Type	Protocol	Port Range	Source
SSH	TCP	22	Anywhere 0.0.0.0/0
HTTP	TCP	80	Anywhere 0.0.0.0/0
HTTPS	TCP	443	Anywhere 0.0.0.0/0
Custom TCP Rule	TCP	2003	Anywhere 0.0.0.0/0
Custom UDP Rule	UDP	2003	Anywhere 0.0.0.0/0
All Traffic	ALL	0-65535	Custom IP 10.4.0.0/16
All ICMP	ICMP	0-65535	Anywhere 0.0.0.0/0

12. Click **Review and Launch**.

    Note: If a **Boot from General Purpose (SSD)** dialog appears, select the first option and then click **Next**.

13. Review the instance selection and then click **Launch**.
14. In the Select an existing key pair page dialog box, select **Proceed without a key pair** from the drop-down list. Most of the configuration is completed through the Administration settings on the sensor, so a key pair is not necessary. Select the **I acknowledge** checkbox and then click **Launch Instances**.
15. Go to your Instances list in AWS. Confirm that the status checks have passed and note the instance IP.

Configure NAT on the vRouter to access the ExtraHop system

To access the ExtraHop system, NAT must be configured on the vRouter.

1. Return to the previously opened vRouter shell prompt.
2. Open a port and masquerade outbound traffic by running the following commands.
    a) Enter configure mode:

```
configure
```

    b) Set the destination port. This is an arbitrary port and `8443` is specified in this example.

```
set service nat destination rule 20 destination port 8443
```

    c) Set the inbound interface:

```
set service nat destination rule 20 inbound-interface dp0s0
```

    d) Set the protocol:

```
set service nat destination rule 20 protocol tcp
```

    e) Set the translation address, where `<extrahop_instance_ip>` is the IP address of the Linux client:

```
set service nat destination rule 20 translation address
    <extrahop_ip_address>
```

For example:

```
set service nat destination rule 20 translation address 10.4.1.15
```

f) Set the translation port:

```
set service nat destination rule 20 translation port 443
```

g) Configure outbound traffic on the vRouter to mask the internal addresses (if not done already):

```
set service nat source rule 100 outbound-interface dp0s0

set service nat source rule 100 translation address masquerade
```

h) Type commit and then press ENTER.

i) Type `save` and then press ENTER to save the changes.

Note: The rule numbers are arbitrary; however, allow enough space between ranges in case you need to add related rules in the future.

3. Verify that the configuration is updated with the rules just created by running the following command:

```
show service
```

4. Return to the AWS console to create an inbound rule on the default security group to test NAT rules.
   a) In the navigation pane, click **Instances**.
   b) Select the vRouter in the list of instances.
   c) In the **Description** tab area, next to Security groups, click **default**.
   d) On the security group page, click the **Inbound** tab.
   e) Click **Edit**.
   f) Click **Add Rule**.
   g) In the **Type** drop-down list, select **Custom TCP Rule**.
   h) In the Port Range field, type `8443`.
   i) In the Source field, type `0.0.0.0/0`.
5. In your browser, type the IP address of the ExtraHop system:

```
https://<elastic_public_ip:8443>/admin
```

6. On the Licensing page, read the ExtraHop general terms and conditions, select **I Agree**, and then click **Submit**.
7. On the login screen, type `setup` for the user name and the instance ID for the password. You can find the Instance ID on the Instances page. Type the characters that follow `i-` (but not `i-` itself), and then click **Log In**.
8. On the Sensor Administration page, in the Appliance Settings section, click **License**.
9. Click **Manage License** and then click **Register**.
10. Type the product key obtained from ExtraHop in the Product Key field and then click **Register**.

    Note: If license registration fails, ensure the AWS security rules allow outbound HTTP and HTTPS traffic.

11. Click **Done**.
12. Return to the **Admin** page.
13. In the Network Settings section, click **Connectivity**.
14. In the Interfaces section verify that Interface 1 is set to **Management + RPCAP/ERSPAN/VXLAN/GENEVE Target**.

(Optional) Create a new volume for packet capture storage

Create a new volume for the EDA 1000v to store trigger-enabled packet capture data.

1. In the navigation pane in AWS, click **Volumes**.
2. Click **Create Volume**. In the Create Volume dialog box, make sure that the Availability Zone selected is the same zone as the Discover instance and then click **Create**.
3. Select the new volume in the Volumes list and then select **Attach Volume** from the **Actions** drop-down menu. In the Instance field, select your Discover instance and then click **Attach**.
4. In the navigation pane, click **Instances**.
5. Select the Discover instance in the list and then click **Actions** > **Instance State** > **Reboot**.
6. When the Discover instance returns to a running state, log in to the Administration settings on the ExtraHop system through `https://<extrahop-hostname-or-IP-address>/admin`.
7. In the Appliance Settings section, click **Disks** and verify that the new packet capture disk appears in the list of direct connected disks.
8. Click **Enable** on the Packet Capture disk to enable.

Summary

In this section, you configured the ExtraHop system to receive network packets and traffic from the ERSPAN interface. Optionally, an additional disk was configured to allow trigger-enabled packet captures.

Configure ERSPAN and portmonitoring on the Brocade vRouter

In this section you will configure the ERSPAN and portmonitoring features on the Brocade vRouter to send ERSPAN traffic to the ExtraHop sensor.

1. From a remote machine, SSH to the vRouter.

```
ssh -i <vrouter_private_key.pm> vyatta@<elastic_IP>
```

2. Configure the ERSPAN interface by running the following commands:
   a) Enter configuration mode:

```
configure
```

   b) Set the local IP address for the ERSPAN interface:

```
set interfaces erspan erspan1 local-ip 10.4.1.10
```

   c) Set the remote IP address for the ERSPAN interface:

```
set interfaces erspan erspan1 remote-ip 10.4.1.15
```

   d) Set the following additional configuration:

```
set interfaces erspan erspan1 ip tos inherit
set interfaces erspan erspan1 ip ttl 255
set interfaces erspan erspan1 mtu 1500
```

   e) Display the configuration changes:

```
show interfaces
```

   f) Type commit and then press ENTER.
   g) Type save and then press ENTER to save the changes.

3. Configure the Port Monitor and ERSPAN source by running the following commands:

   Note: In this example, the source of the monitor is the internal interface of the Brocade vRouter. Additionally, the session and identifier numbers are arbitrary, but should not overlap other session IDs.

   a) Set the portmonitor session type:

   ```
   set service portmonitor session 25 type erspan-source
   ```

   b) Set the source interface for portmonitoring:

   ```
   set service portmonitor session 25 source dp0s1
   ```

   c) Set the destination interface for portmonitoring:

   ```
   set service portmonitor session 25 destination erspan1
   ```

   d) Set the session identifier:

   ```
   set service portmonitor session 25 erspan identifier 200
   ```

   e) Set the ERSPAN header type:

   ```
   set service portmonitor session 25 erspan header type-II
   ```

   f) Set the ERSPAN direction:

   ```
   set service portmonitor session 25 source dp0s1 direction both
   ```

   g) Type `commit` and then press ENTER.

   h) Type `save` and then press ENTER to save the changes.

   Port monitoring for the session is immediately enabled if the type, source, destination, ERSPAN identifier, and ERSPAN header type parameters are configured correctly.

   i) Type `exit` to leave configuration mode.

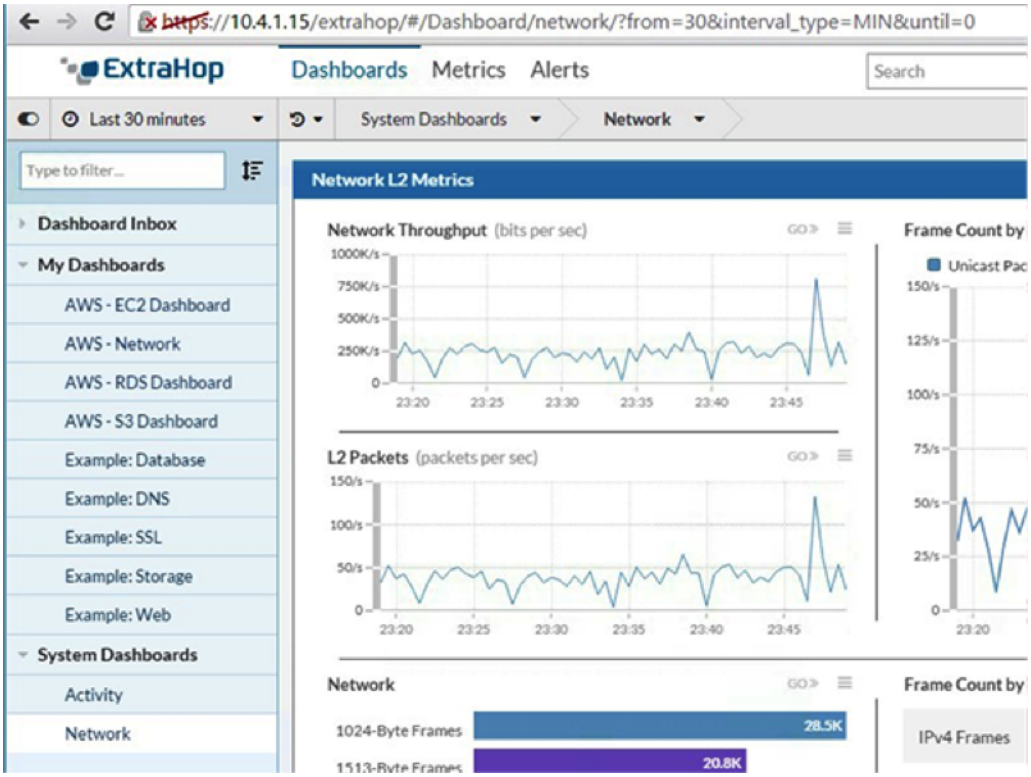
   j) Type `show configuration` to display the new configuration.

   Output similar to the following appears (truncated for clarity):

   ```
   erspan erspan1 {
                   ip {
                           tos inherit
                           ttl 255
                   }
                   local-ip 10.4.1.10
                   mtu 1500
                   remote-ip 10.4.1.15
           }
   .
   .
   portmonitor {
                   session 25 {
                           destination erspan1
                           erspan {
                                   header type-II
                                   identifier 200
                           }
                           source dp0s1 {
                                   direction both
                           }
                           type erspan-source
                   }
   ```

```
        }
```

4. Log in to the ExtraHop system through `https://<elastic_public_ip:8443>/extrahop` and verify that the ExtraHop is receiving ERSPAN traffic from the vRouter from the Dashboards interface.



Summary

In this section you have configured the Brocade vRouter to send ERSPAN traffic to the ExtraHop system allowing analysis of traffic within the Amazon Web Services virtual private cloud without installing any RPCAPD clients.

Sample Brocade vRouter configuration

```
vyatta@vyatta:~$ show configuration
interfaces {
        dataplane dp0s0 {
                address dhcp
                ip {
                        gratuitous-arp-count 1
                        rpf-check disable
                }
                ipv6 {
                        dup-addr-detect-transmits 1
                }
                mtu 1500
                vlan-protocol 0x8100
        }
        dataplane dp0s1 {
                address 10.4.1.10/24
                ip {
                        gratuitous-arp-count 1
                        rpf-check disable
                }
                ipv6 {
```

```
                        dup-addr-detect-transmits 1
                }
                mtu 1500
                vlan-protocol 0x8100
        }
        erspan erspan1 {
                ip {
                        tos inherit
                        ttl 255
                }
                local-ip 10.4.1.10
                mtu 1500
                remote-ip 10.4.1.15
        }
        loopback lo
}
protocols {
        ecmp {
                mode hrw
        }
        pim {
                register-suppression-timer 60
        }
        pim6 {
                register-suppression-timer 60
        }
}
security {
        firewall {
                all-ping enable
                broadcast-ping disable
                config-trap disable
                syn-cookies enable
        }
}
service {
        nat {
                destination {
                        rule 10 {
                                destination {
                                        port 445
                                }
                                inbound-interface dp0s0
                                protocol tcp
                                translation {
                                        address 10.4.1.50
                                        port 22
                                }
                        }
                        rule 20 {
                                destination {
                                        port 8443
                                }
                                inbound-interface dp0s0
                                protocol tcp
                                translation {
                                        address 10.4.1.15
                                        port 443
                                }
                        }
                }
                source {
                        rule 100 {
                                outbound-interface dp0s0
```

```
                                translation {
                                        address masquerade
                                }
                        }
                }
        }
        portmonitor {
                session 25 {
                        destination erspan1
                        erspan {
                                header type-II
                                identifier 200
                        }
                        source dp0s1 {
                                direction both
                        }
                        type erspan-source
                }
        }
        ssh {
                authentication-retries 3
                disable-password-authentication
                port 22
                timeout 120
        }
}
system {
        acm {
                create-default deny
                delete-default deny
                enable
                exec-default allow
                operational-ruleset {
                        rule 9977 {
                                action allow
                                command /show/tech-support/save
                                group vyattaop
                        }
                        rule 9978 {
                                action deny
                                command "/show/tech-support/save/*"
                                group vyattaop
                        }
                        rule 9979 {
                                action allow
                                command /show/tech-support/save-uncompressed
                                group vyattaop
                        }
                        rule 9980 {
                                action deny
                                command "/show/tech-support/save-
uncompressed/*"
                                group vyattaop
                        }
                        rule 9981 {
                                action allow
                                command /show/tech-support/brief/save
                                group vyattaop
                        }
                        rule 9982 {
                                action deny
                                command "/show/tech-support/brief/save/*"
                                group vyattaop
                        }
```

```
                        rule 9983 {
                                action allow
                                command /show/tech-support/brief/save-
uncompressed
                                group vyattaop
                        }
                        rule 9984 {
                                action deny
                                command "/show/tech-support/brief/save-
uncompressed/*"
                                group vyattaop
                        }
                        rule 9985 {
                                action allow
                                command /show/tech-support/brief/
                                group vyattaop
                        }
                        rule 9986 {
                                action deny
                                command /show/tech-support/brief
                                group vyattaop
                        }
                        rule 9987 {
                                action deny
                                command /show/tech-support
                                group vyattaop
                        }
                        rule 9988 {
                                action deny
                                command /show/configuration
                                group vyattaop
                        }
                        rule 9989 {
                                action allow
                                command "/clear/*"
                                group vyattaop
                        }
                        rule 9990 {
                                action allow
                                command "/show/*"
                                group vyattaop
                        }
                        rule 9991 {
                                action allow
                                command "/monitor/*"
                                group vyattaop
                        }
                        rule 9992 {
                                action allow
                                command "/ping/*"
                                group vyattaop
                        }
                        rule 9993 {
                                action allow
                                command "/reset/*"
                                group vyattaop
                        }
                        rule 9994 {
                                action allow
                                command "/release/*"
                                group vyattaop
                        }
                        rule 9995 {
                                action allow
```

```
                        command "/renew/*"
                        group vyattaop
                }
                rule 9996 {
                        action allow
                        command "/telnet/*"
                        group vyattaop
                }
                rule 9997 {
                        action allow
                        command "/traceroute/*"
                        group vyattaop
                }
                rule 9998 {
                        action allow
                        command "/update/*"
                        group vyattaop
                }
                rule 9999 {
                        action deny
                        command "*"
                        group vyattaop
                }
        }
        read-default allow
        ruleset {
                rule 9999 {
                        action allow
                        group vyattacfg
                        operation "*"
                        path "*"
                }
        }
        update-default deny
}
config-management {
        commit-revisions 20
}
console {
        device ttyS0 {
                speed 9600
        }
}
host-name vyatta
login {
        session-timeout 0
        user vyatta {
                authentication {
                        encrypted-password "********"
                        public-keys TestBrocade {
                                key xxx
                                type ssh-rsa
                        }
                }
                level admin
        }
}
syslog {
        global {
                archive {
                        files 5
                        size 250
                }
                facility all {
```

```
                                level warning
                        }
                }
        }
        time-zone GMT
}
```