Configuring VRRP with CLI

This section provides information to configure VRRP using the command line interface.

Topics in this section include:

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- Basic VRRP Configurations on page 331
- Common Configuration Tasks on page 335
- Configuring VRRP Policy Components on page 337
- VRRP Configuration Management Tasks on page 342
- Modifying a VRRP Policy on page 342
- Deleting a VRRP Policy on page 343
  - Modifying Service and Interface VRRP Parameters on page 344
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VRRP Configuration Overview

VRRP Configuration Overview

Configuring VRRP policies and configuring VRRP instances on interfaces and router interfaces is optional. The basic owner and non-owner VRRP configurations on an IES or router interface must specify the `backup ip-address` parameter.

VRRP helps eliminate the single point of failure in a routed environment by using virtual router IP address shared between two or more routers connecting the common domain. VRRP provides dynamic fail over of the forwarding responsibility if the master becomes unavailable.

The VRRP implementation allows one master per IP subnet. All other VRRP instances in the same domain must be in backup mode.

Preconfiguration Requirements

VRRP policies:

- VRRP policies must be configured before they can be applied to an interface or IES or VPRN VRRP instance. VRRP policies are configured in the `config>vrrp` context.

Configuring VRRP on an IES or VPRN service interface:

- The service customer account must be created prior to configuring an IES or VPRN VRRP instance.
- The interface address must be specified in the both the owner and non-owner IES, VPRN or router interface instances.
Basic VRRP Configurations

Configure VRRP parameters in the following contexts:

- VRRP Policy on page 331
- VRRP IES Service Parameters on page 332
- VRRP Router Interface Parameters on page 334

VRRP Policy

Configuring and applying VRRP policies are optional. There are no default VRRP policies. Each policy must be explicitly defined. A VRRP configuration must include the following:

- Policy ID
- Define at least one of the following priority events:
  - Port down
  - LAG port down
  - Host unreachable
  - Route unknown

The following example displays a sample configuration of a VRRP policy.

```
A:SR2>config>vrrp>policy# info
----------------------------------------------
delta-in-use-limit 50
priority-event
  port-down 4/1/2
    hold-set 43200
    priority 100 delta
  exit
  port-down 4/1/3
    priority 200 explicit
  exit
  lag-port-down 1
    number-down 3
      priority 50 explicit
  exit
  exit
  host-unreachable 10.10.24.4
    drop-count 25
  exit
  route-unknown 10.10.0.0/32
    priority 50 delta
    protocol bgp
  exit
  exit
----------------------------------------------
```
VRRP parameters are configured within an IES service with two contexts, owner or non-owner. The status is specified when the VRRP configuration is created. When configured as owner, the virtual router instance owns the backup IP addresses. All other virtual router instances participating in this message domain must have the same vrid configured and cannot be configured as owner.

For IPv4, up to 4 virtual routers IDs (vrid) can be configured on an IES service interface. Each virtual router instance can manage up to 16 backup IP addresses. For IPv6, only one virtual router instance can be configured on an IES service interface.

VRRP parameters configured within an IES service must include the following:

- VRID
- Backup IP address(es)

The following example displays a sample configuration of a IES service owner and non-owner VRRP configurations.

```
A:SR2>config>service>ies# info
----------------------------------------------
interface "tuesday" create
  address 10.10.36.2/24
  sap 7/1/1.2.2 create
  vrrp 19 owner
    backup 10.10.36.2
    authentication-key "testabc"
exit
exit
interface "testing" create
  address 10.10.10.16/24
  sap 1/1/55:0 create
  vrrp 12
    backup 10.10.10.15
    policy 1
    authentication-key "testabc"
exit
exit
no shutdown
----------------------------------------------
A:SR2>config>service>ies#
```
Configure VRRP for IPv6

The following output shows a VRRP for IPV6 configuration example. The interface must be configured first.

*A:nlt7750-3>config>router>router-advert# info
--------------------------------------------------------
interface "DSC-101-Application"
   use-virtual-mac
   no shutdown
   exit
...
--------------------------------------------------------
*A:nlt7750-3>config>router>router-advert#

*A:nlt7750-3>config>service>ies# info
-----------------------------------------------
description "VLAN 921 for DSC-101 Application"
interface "DSC-101-Application" create
   address 10.152.2.220/28
   vrrp 217
      backup 10.152.2.222
      priority 254
      ping-reply
   exit
   ipv6
      address FD10:D68F:1:221::FFFD/64
      link-local-address FE80::D68F:1:221:FFFD preferred
      vrrp 219
         backup FE80::D68F:1:221::FFFF
         priority 254
         ping-reply
      exit
   exit
   sap ccag-1.a:921 create
      description "cross connect to VPLS 921"
   exit
   exit
   no shutdown
-----------------------------------------------
*A:nlt7750-3>config>service>ies#
VRRP parameters are configured on a router interface with two contexts, owner or non-owner. The status is specified when the VRRP configuration is created. When configured as owner, the virtual router instance owns the backed up IP addresses. All other virtual router instances participating in this message domain must have the same vrid configured and cannot be configured as owner.

For IPv4, up to 4 virtual routers IDs (vrid) can be configured on a router interface. Each virtual router instance can manage up to 16 backup IP addresses. For IPv6, only one virtual router instance can be configured on a router interface.

VRRP parameters configured on a router interface must include the following:

- VRID
- Backup IP address(es)

The following example displays a sample configuration of a router interface owner and non-owner VRRP configurations.

A:SR4>config>router# info
#------------------------------------------
channel VRRP:0 IP Configuration
#------------------------------------------
interface "system"
    address 10.10.0.4/32
exit
interface "test1"
    address 10.10.14.1/24
    secondary 10.10.16.1/24
    secondary 10.10.17.1/24
    secondary 10.10.18.1/24
exit
interface "test2"
    address 10.10.10.23/24
    vrrp 1 owner
    backup 10.10.10.23
    authentication-key "testabc"
exit
exit
#------------------------------------------
A:SR4>config>router#
Common Configuration Tasks

This section provides a brief overview of the tasks that must be performed to configure VRRP and provides the CLI commands.

VRRP parameters are defined under a service interface or a router interface context. An IP address must be assigned to each IP interface. Only one IP address can be associated with an IP interface but several secondary IP addresses also be associated.

Owner and non-owner configurations must include the following parameters:

- All participating routers in a VRRP instance must be configured with the same vrid.
- All participating non-owner routers can specify up to 16 backup IP addresses (IP addresses the master is representing). The owner configuration must include at least one backup IP address.
- For IPv6, all participating routers must be configured with the same link-local backup address (the one configured for the owner instance.)

Other owner and non-owner configurations include the following optional commands:

- authentication-key
- MAC
- message-interval

In addition to the common parameters, the following non-owner commands can be configured:

- master-int-inherit
- priority
- policy
- ping-reply
- preempt
- telnet-reply
- ssh-reply (IPv4 only)
- [no] shutdown
Creating Interface Parameters

If you have multiple subnets configured on an Ethernet interface, you can configure VRRP on each subnet.

The following displays an IP interface configuration example:

```
A:SR1>config>router# info
#------------------------------------------
echo "IP Configuration "
#------------------------------------------
    interface "system"
         address 10.10.0.1/32
    exit
    interface "testA"
         address 123.123.123.123/24
    exit
    interface "testB"
         address 10.10.14.1/24
         secondary 10.10.16.1/24
         secondary 10.10.17.1/24
         secondary 10.10.18.1/24
    exit
    router-id 10.10.0.1
#------------------------------------------
A:SR1>config>router#
```
Configuring VRRP Policy Components

The following displays a VRRP policy configuration example:

```
A:SR1>config>vrrp# info
----------------------------------------------
policy 1
delta-in-use-limit 50
priority-event
port-down 1/1/2
hold-set 43200
priority 100 delta
exit
route-unknown 0.0.0.0/0
protocol isis
exit
exit
exit
----------------------------------------------
A:SR1>config>vrrp#
```
Configuring Service VRRP Parameters

VRRP parameters can be configured on an interface in a service to provide virtual default router support which allows traffic to be routed without relying on a single router in case of failure. VRRP can be configured the following ways:

- Non-Owner VRRP Example on page 338
- Owner Service VRRP on page 339

Non-Owner VRRP Example

The following displays a basic non-owner VRRP configuration example:

```
A:SR2>config>service>ies# info
---------------------------------------------------------------
...   
   interface "testing" create
   address 10.10.10.16/24
   sap 1/1/55:0 create
   vrrp 12
       backup 10.10.10.15
       policy 1
       authentication-key "testabc"
   exit
   exit
   no shutdown
---------------------------------------------------------------
A:SR2>config>service>ies#
```
Owner Service VRRP

The following displays the owner VRRP configuration example:

```
A:SR4>config>router# info
#------------------------------------------
echo "IP Configuration "
#------------------------------------------

interface "test2"
  address 10.10.10.23/24
  vrrp 1 owner
    backup 10.10.10.23
    authentication-key "testabc"
  exit
exit
#------------------------------------------
A:SR4>config>router#
```
VRRP parameters can be configured on an interface in an interface to provide virtual default router support which allows traffic to be routed without relying on a single router in case of failure.

VRRP can be configured the following ways:

- Router Interface VRRP Non-Owner on page 340

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Router Interface VRRP Non-Owner

The following displays a non-owner interface VRRP configuration example:

```bash
A:SR2>config># info
#------------------------------------------
interface "if-test"
  address 10.20.30.40/24
  secondary 10.10.50.1/24
  secondary 10.10.60.1/24
  secondary 10.10.70.1/24
  vrrp 1
    backup 10.10.50.2
    backup 10.10.60.2
    backup 10.10.70.2
    backup 10.20.30.41
    ping-reply
telnet-reply
  authentication-key "testabc"
exit
#------------------------------------------
A:SR2>config>#
```
Router Interface VRRP Owner

The following displays router interface owner VRRP configuration example:

```
A:SR2>config>router# info
#------------------------------------------
  interface "vrrpowner"
   address 10.10.10.23/24
   vrrp 1 owner
   backup 10.10.10.23
   authentication-key "testabc"
   exit
exit
#------------------------------------------
A:SR2>config>router#
```
VRRP Configuration Management Tasks

This section discusses the following VRRP configuration management tasks:

- Modifying a VRRP Policy on page 342
- Deleting a VRRP Policy on page 343
- Modifying Service and Interface VRRP Parameters on page 344
  → Modifying Non-Owner Parameters on page 344
  → Modifying Owner Parameters on page 344
  → Deleting VRRP on an Interface or Service on page 344

Modifying a VRRP Policy

To access a specific VRRP policy, you must specify the policy ID. To display a list of VRRP policies, use the `show vrrp policy` command.

The following example displays the modified VRRP policy configuration:

```
A:SR2>config>vrrp>policy# info
----------------------------------------------
delta-in-use-limit 50
priority-event
  port-down 1/1/2
    hold-set 43200
    priority 100 delta
  exit
  port-down 1/1/3
    priority 200 explicit
  exit
  host-unreachable 10.10.24.4
    drop-count 25
  exit
  exit
----------------------------------------------
A:SR2>config>vrrp>policy#
```
Deleting a VRRP Policy

Policies are only applied to non-owner VRRP instances. A VRRP policy cannot be deleted if it is applied to an interface or to an IES service. Each instance in which the policy is applied must be deleted.

The *Applied* column in the following example displays whether or not the VRRP policies are applied to an entity.

```
A:SR2#
===============================================================================
VRRP Policies
===============================================================================
<table>
<thead>
<tr>
<th>Policy Id</th>
<th>Current Priority &amp; Effect</th>
<th>Current Explicit</th>
<th>Current Delta</th>
<th>Delta Sum</th>
<th>Limit</th>
<th>Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200 Explicit</td>
<td>200</td>
<td>100</td>
<td>50</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td>254 None</td>
<td>None</td>
<td>None</td>
<td>1</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>32</td>
<td>100 None</td>
<td>None</td>
<td>None</td>
<td>1</td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>
A:SR2#
```
Modifying Service and Interface VRRP Parameters

Modifying Non-Owner Parameters

Once a VRRP instance is created as non-owner, it cannot be modified to the owner state. The vrid must be deleted and then recreated with the owner keyword to invoke IP address ownership.

Modifying Owner Parameters

Once a VRRP instance is created as owner, it cannot be modified to the non-owner state. The vrid must be deleted and then recreated without the owner keyword to remove IP address ownership.

Entering the owner keyword is optional when entering the vrid for modification purposes.

Deleting VRRP on an Interface or Service

The vrid does not need to be shutdown to remove the virtual router instance from an interface or service.

Example:
```
cfg(config)#interface
  cfg(config)# interface if-test
  cfg(config)# shutdown
  cfg(config)# exit
  cfg(config)# no interface if-test
  cfg(config)# exit
```

The following example displays the command usage to delete a VRRP instance from an interface or IES service:

Example:
```
cfg(config)#service ies 10
  cfg(config)#service ies# interface “test”
  cfg(config)#service ies# if# vrrp 1
  cfg(config)#service ies# if# vrrp# shutdown
  cfg(config)#service ies# if# vrrp# exit
  cfg(config)#service ies# if# no vrrp 1
  cfg(config)#service ies# if# exit all
```