SQA Test Plan

VRRP V2

SONiC 2.0 Release

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# Test Strategy Plan Revision History

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| --- | --- | --- | --- |
| Rev | Date | Author | Change Description |
| 1.00 | 7/17/2019 | Naveen Nagaraju | Initial Draft |
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# List of Approvers

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| Function | Name | Date Approved |
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# List of Reviewers

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| Function | Name |
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# Glossary

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| --- | --- |
| Term | Meaning |
| VRRP | VRRP Virtual Router Redundancy Protocol |
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# Functional Project Overview

# Requirements Source and Test Traceability

This document covers test cases designed to verify VRRP functionality on SONiC 2.0 release.

Below is the link to VRRP development and config guide of the feature which provides the high level design of this feature:

<http://gerrit-lvn-07.lvn.broadcom.net:8083/c/sonic/sonic-swss/+/8577>

<https://docs.google.com/document/d/1ATWDI3kmqA_8SEJ9eON3UJO0uMhGgveKdyyA2DR3_iI/edit>

# Feature Description

VRRP specifies an election protocol to provide the virtual router function described earlier.  All protocol messaging is performed using IP multicast datagrams, thus the protocol can operate over a variety of multi-access LAN technologies supporting IP multicast. Each VRRP virtual router has a single well-known MAC address allocated to it.  This document currently only details the mapping to networks using the IEEE 802 48-bit MAC address. The virtual router MAC address is used as the source in all periodic VRRP messages sent by the Master router to enable bridge learning in an extended LAN.

A virtual router is defined by its virtual router identifier (VRID) and a set of IP addresses.  A VRRP router may associate a virtual router with its real addresses on an interface, and may also be configured with additional virtual router mappings and priority for virtual routers it is willing to backup.  The mapping between VRID and addresses must be coordinated among all VRRP routers on a LAN. However, there is no restriction against reusing a VRID with a different address mapping on different LANs. The scope of each virtual router is restricted to a single LAN.

To minimize network traffic, only the Master for each virtual router sends periodic VRRP Advertisement messages.  A Backup router will not attempt to preempt the Master unless it has higher priority. This eliminates service disruption unless a more preferred path becomes available.  It's also possible to administratively prohibit all preemption attempts. The only exception is that a VRRP router will always become Master of any virtual router associated with addresses it owns.  If the Master becomes unavailable then the highest priority Backup will transition to Master after a short delay, providing a controlled transition of the virtual router responsibility with minimal service interruption.

The VRRP protocol design provides rapid transition from Backup to Master to minimize service interruption, and incorporates optimizations that reduce protocol complexity while guaranteeing    controlled Master transition for typical operational scenarios. The optimizations result in an election protocol with minimal runtime state requirements, minimal active protocol states, and a single message type and sender.  The typical operational scenarios are defined to be two redundant routers and/or distinct path preferences among each router. A side effect when these assumptions are violated (i.e., more than two redundant paths all with equal preference) is that duplicate packets may be forwarded for a brief period during Master election.  However, the typical scenario assumptions are likely to cover the vast majority of deployments, loss of the Master router is infrequent, and the expected duration in Master election convergence is quite small (<< 1 second). Thus the VRRP optimizations represent significant simplifications in the protocol design while incurring an insignificant probability of brief network   degradation.

### Network Test Topology

Below Lag interface is part of vlan and there are 2 different Lag interface from Sw-1 to dut1 & dut2, it's not a MLAG here.





























# Test Case and Objectives

## CLI Validation

### Verify cli for Advertisement-interval, priority, Virtual IP, pre-empt

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To Test the consistency of CLI features of the  command “Advertisement-interval” , priority, Virtual IP & pre-empt |
| Test Case Id | FtSwVrrpCli001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | CLI |
| New in Release | 2.0 |
| Platform Dependent | No |
| 1. Configure VRRP on the DUT A  2. Give the inputs valid and invalid configuration input like complete and incomplete  command, valid and invalid input, within and out of range value.  3.. Above step is repeated for “no” form of the command. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify show vrrp output

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify show vrrp output |
| Test Case Id | FtSwVrrpCli002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | CLI |
| New in Release | 2.0 |
| Platform Dependent | No |
| 1. Configure VRRP on the DUT A  2. Configure all the required parameters of VRRP and execute show vrrp output  3. Make sure all the values are shown  4.Above step is repeated for “no” form of the command and verify the show output again. | |
| Pass/Fail Criteria | Above verifications should pass. |

## Functional Test Cases

### Test the configured VRRP Advertisement interval

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Test the configured VRRP Advertisement  interval |
| Test Case Id | FtSwVrrpFn001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:  1. Configure VRRP on the DUTA1 and DUTA2 with same VRID.  2. Set the priority of DUTA1 higher so that it becomes the master.  3. Check the default advertisement interval on the Master(DUTA)  4. Set Advertisement interval to 5 seconds on both DUT.  5. check the Advertisement interval on both DUT  6. Debug the VRRP packets on both DUTA1 and DUTA2  7. Verify that the backup shouldn’t send any advertisement to Master.  8. Set different Advertisement interval on DUT say 100 sec on DUTA1 and 5 sec on  DUTA2  9. Check the State and Advertisement interval on both DUT  10. Execute no advertisement interval on both the dut and verify that the advertisement  interval is set to default value(1 secs)  11. Shutdown the VRRP session on the Master and observe the Advertisement sent to  Backup  12. The Master DUTA1 should send an Advertisement with Priority 0 and stops sending any  more Advertisements to Backup and move its state to Initialize | |
| Pass/Fail Criteria | Above verifications should pass. |

### To check the Default VRRP Priority & user configured priority on a VRRP router

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To check the Default VRRP Priority & user configured priority on a VRRP router |
| Test Case Id | FtSwVrrpFn002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP on the DUT A 2. Assign a Virtual IP-address such that it should not be the owner of the Virtual IP address. 3. Enable the VRRP session 4. Execute Show VRRP and verify that the priority is 100 5. Set the Priority value to non-default number say 200 and verify the same 6. Execute no Priority and verify that the priority is set back to default value 100. 7. Change the virtual IP address to interface IP address on DUTA so that it becomes the owner   Verify that the priority is set to 255 and user should not be able to change the priority of the owner | |
| Pass/Fail Criteria | Above verifications should pass. |

### To test whether the Master send the Gratuitous ARP.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To test whether the Master send the Gratuitous ARP. |
| Test Case Id | FtSwVrrpFn003 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP on the DUTA1 2. Enable the VRRP session 3. Debug the VRRP packets on DUTA1 and capture the packet on the Spirent 4. Disable the VRRP session on Master. 5. Enable the VRRP session on Master. 6. Check the Master router should send a Gratuitous ARP once it comes up. 7. Repeat the same steps by enabling VRRP. 8. Verify that the backup shouldn’t respond request to Gratuitous ARP | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To test whether the Master respond to ARP request*

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To test whether the Master respond to ARP request |
| Test Case Id | FtSwVrrpFn004 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP 10 on the DUTA1 2. Enable the VRRP session 3. Send the packets from the Spirent destined to Virtual IP address (16 IP address to be configured). 4. Check the packets forwarded by the DUT A1 5. Send a ARP request to Master for the IP addresses associated with VR. 6. Capture the ARP response and verify it has Virtual mac as destination mac 7. Make sure only one ARP response is generated for each request. 8. Configure DUTA1 as back up for a different VRRP group say 100. 9. Now send a ARP request to DUTA1 for the IP address associated with VR 100 and VR 10 10. Verify that DUTA1 responds only to VRRP group 10 since it is the master for this group and doesn’t respond to VRRP group 100 since it is back up. | |
| Pass/Fail Criteria | Above verifications should pass. |

### *The Master should accepts packets destined to IP addresses associated even if it is not the IP address owner*.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | The Master should accepts packets destined to IP addresses associated even if it is not the IP address owner |
| Test Case Id | FtSwVrrpFn005 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP on the DUTA1 and DUTA2 with same VRRP group 2. Assign the DUTA1 interface address as the virtual IP-address. 3. Enable the VRRP session 4. Check the packets forwarded by the Master DUT A. 5. Send ICMP echo request to the Master. 6. Check whether master reply to that echo request. 7. The Master should accept packets destined to IP addresses associated even if it is not the IP address owner. It should reply to ICMP echo request. 8. Verify the VIP should be programmed in the routing table with /32 subnet | |
| Pass/Fail Criteria | Above verifications should pass. |

### *On receipt of Advertisement with a higher priority move to Backup state if priority more than local priority*

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | On receipt of Advertisement with a higher priority move to Backup state if priority more than local priority |
| Test Case Id | FtSwVrrpFn006 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP on the DUTA1 2. Assign the virtual IP-address on the DUT A 3. Enable the VRRP session 4. Send the packets from the Spirent with priority more than local priority 5. he Master DUTA1 should set the Master\_down\_timer to Master\_down\_interval , cancel the Adver\_timer and transitioned to Backup state if priority more than local priority 6. *On receipt of Advertisement with a Lower priority, Master should remain in Master State if priority in the Advertisement is less than local priority* 7. *On receipt of Advertisement with an equal priority and a higher Primary IP address the Master should move to Backup state* 8. *On receipt of Advertisement with an equal priority and a higher Primary IP address the Master should move to Backup state On receipt of Advertisement with an equal priority and a lesser Primary IP address the Master should remain in Master State* | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To test whether the Backup respond to ARP request for the IP address associated with the Virtual router*.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To test whether the Backup respond to ARP request for the IP address associated with the Virtual router |
| Test Case Id | FtSwVrrpFn007 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP on the DUTA1 and DUTA2 with same VRRP group 2. Set the priority of DUTA1 higher so that it becomes the Master and DUTA2 becomes the Backup. 3. Enable the VRRP session 4. Send the ARP request packet destined to Virtual router MAC address from the Spirent to DUTA2 . 5. The Backup router should neither respond nor forward the ARP request for IP address associated with the virtual router | |
| Pass/Fail Criteria | Above verifications should pass. |

### *The Back should not accept packet destined to IP address associated to Virtual IP address*.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | The Back should not accept packet destined to IP address associated to Virtual IP address |
| Test Case Id | FtSwVrrpFn008 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP on the DUTA1 and DUTA2 with same VRRP group 2. Set the priority of DUTA1 higher so that it becomes the Master and DUTA2 becomes the Backup. 3. Enable the VRRP session 4. Send the IP packet destined to Virtual IP address from the Spirent to DUTA2 5. Debug VRRP packets on DUTA2 6. The Backup router should not accept packets destined to IP addresses associated virtual router 7. Verify the mac table, virtual mac should be present pointing to the VRRP interface 8. Make sure VIP shouldn’t be present in the ip route since only master should forward the traffic. | |
| Pass/Fail Criteria | Above verifications should pass. |

### *The Backup should transition to Master state on reception of the Advertisement with Priority less than local priority and Preemption mode true.*.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | The Backup should transition to Master state on reception of the Advertisement with Priority less than local priority and Preemption mode true. |
| Test Case Id | FtSwVrrpFn009 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP on the DUTA1 and DUTA2 with few VRRP groups say 1 - 50 2. Set the priority of DUTA1 higher so that it becomes the Master and DUTA2 becomes the Backup for all the 50 VRRP groups 3. Verify that the preempt mode is in default value (True) for 1 – 25 VRRP groups and false for the rest 4. Enable the VRRP session 5. Verify that DUTA1 is master for all the VRRP group 1- 50 6. Increase the priority of DUTA2 to 200 7. Verify that the DUTA2 has become master only for VRRP group 1 – 25 whereas for the rest DUTA1 should continue to be the master. 8. Verify that DUTA1 doesn’t preempt DUTA2 for the VRRP group 1 – 25. 9. The Backup should discard the Advertisement upon reception, after the Master\_downtime\_interval and Master\_down\_timer expires the Backup should transmit an Advertisement broadcast a Gratuitous ARP containing the virtual MAC address for each IP address associated with the virtual router and transitioned to Master state 10. Send the Advertisement with priority not equal to zero from the Spirent to DUTA2 . 11. The Backup router should not accept packets destined to IP addresses associated virtual router | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To check whether the Master comes up while assigning the secondary IP address of the DUT as the Virtual IP address*.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To check whether the Master comes up while assigning the secondary IP address of the DUT as the Virtual IP address |
| Test Case Id | FtSwVrrpFn010 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure the DUTA1 interfaces with a primary and Secondary IP address. 2. Configure VRRP on the DUTA1 with a particular VRRP group 3. Assign the DUTA1 secondary IP address as the Virtual IP address. 4. Enable the VRRP session 5. Verify the Source IP address of the packet captured from the Spirent. 6. Even though the Virtual IP address is assigned as Secondary IP address, but still the Source IP address of the Master should be the Primary IP address 7. Execute clear VRRP statistics and verify that the VRRP counters are cleared. 8. Delete the Secondary IP address assigned on the DUTA1 Interface 9. After deleting the Secondary IP address of the DUTA1 interface, the State should remain as a Master and the Source IP address of the Master should be the Primary IP address. 10. Check the VRRP packet, and verify the state and source IP address of the packet sent from the DUT A 11. Execute clear VRRP statistics interface < > and verify that the VRRP counters are cleared. 12. Now delete the primary IP address and verify that the node stops participating in the VRRP for the virtual IP configured on that interface. 13. Assign the primary IP address which is totally a different subnet on an interface 14. Verify that still the node forwards the packets for the virtual ip configured even though the primary IP is in different subnet. 15. Repeat the above steps by configuring secondary IP address on port-channel and VE interfaces. 16. Similarly repeat all the above steps by enabling VRRP. | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To check whether the DUT allows configuring same Virtual IP address for different VRRP group*

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To check whether the DUT allows configuring same Virtual IP address for different VRRP group |
| Test Case Id | FtSwVrrpFn011 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure the DUTA1 interfaces with VRRP Group say VRRP 50 2. Assign the Virtual IP address 2.2.2.2 3. Enable the VRRP session 4. Configure another VRRP group on DUTA1 say VRRP 100 5. Assign the same Virtual IP address 2.2.2.2. 6. Enable the VRRP session 7. The DUT Should not allow configuring the same Virtual IP address on different VRRP group. | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To verify the behaviour of the virtual routers when the Virtual IP address owner keeps going down while the traffic is continuously On*.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To verify the behaviour of the virtual routers when the Virtual IP address owner keeps going down while the traffic is continuously On |
| Test Case Id | FtSwVrrpFn012 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP on the DUTA1 and DUTA2 with same VRRP group 2. Assign the DUTA1 interface address as the Virtual IP Address for both DUT. 3. Enable the VRRP session 4. Once the VRRP session is enabled with DUTA1 has the master and DUTA2 has the Backup, the IP packets transmitted from Host A should be forwarded by DUTA1 to Host B . 5. Ping continuously from Host A and Debug the packets on both interfaces. 6. Make sure there is only one ARP response 7. Now shutdown the master and observe the path the packet takes. 8. Bring back the Master after say 5 seconds and observe the packet path 9. When the master is shutdown the IP packets transmitted from Host A to Host B should be forwarded by DUTA2, once the Master comes back the DUTA1 should start forwarding the packets. 10. now again shutdown the Master and debug the packets 11. Bring back the master again, like this keep on shutting down and bring back the Master for every 5 seconds | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To check the load Balancing and redundancy behaviour of the virtual routers*

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To check the load Balancing and redundancy behaviour of the virtual routers |
| Test Case Id | FtSwVrrpFn013 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure the DUTA1 and DUTA2 with a VRRP group say 100 2. Assign the DUTA1 interface address as the virtual IP address for the VRRP group 100 as a result DUTA1 will become Master and DUTA2 becomes backup for VRRP 100. 3. Configure the Default route for the Host A has the DUTA1 interface. 4. Configure the DUTA1 and DUTA2 with another VRRP group say 200. 5. Assign the DUTA2 interface address as the virtual IP address for the VRRP group 200 as a result DUTA2 will become Master and DUTA1 becomes backup for VRRP 200. 6. Configure the Default route for the Host B has the DUTA2 interface. 7. Enable the VRRP session 8. Send continuous packets from both Host A and Host B to Host C. 9. Debug the packets and check the path it takes to reach Host C. 10. Shutdown the DUTA1 interface, now debug the packets from Host A and check the path it takes to reach Host C 11. Bring back the DUTA1 interface and now shutdown the DUTA2 interface. 12. Debug the packets from Host A and check the path it takes to reach Host C 13. Bring back the DUTA2 interface and check the packets transmitted from both Host A and Host B 14. Increase the priority on DUTA1 such that it becomes master for both VRRP group 15. Disable VRRP on the session VRRP 200 , verify that only VRRP group 200 is disabled and DUTA1 continues to be master for VRRP 100 16. Enable the session and verify that DUTA1 becomes master for VRRP 200 and continues to be the master for VRRP 100. 17. Restart the VRRP docker on the Master, during the docker restart make sure the Back up takes over 18. Once the docker is restarted verify the original Master is back and should start forwarding the traffic 19. Similarly try config reload on both Master and backup, make sure during the config reload process backup should become master and traffic should be forwarded | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To verify VRRP protocol on Ve & physical interfaces*

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To verify VRRP protocol on Ve & physical interfaces |
| Test Case Id | FtSwVrrpFn014 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure the DUTA1 and DUTA2 with a VRRP group say 100 2. Assign the DUTA1 interface to vlan 100, create a Ve 100 interface assign the IP address say 10.10.10.10/24 and the same address as the virtual IP address so that DUTA1 will become Master and DUTA2 becomes backup for VRRP 100. 3. Configure the DUTA1 and DUTA2 with another VRRP group say 200. 4. Assign the DUTA2 interface address as the virtual IP address for the VRRP group 200 as a result DUTA2 will become Master and DUTA1 becomes backup for VRRP 200. 5. Enable the VRRP session 6. Send continuous packets from both Host A and Host B to Host C. 7. Debug the packets and check the path it takes to reach Host C. 8. Shutdown the DUTA1 interfaces (port assigned to ve) and verifies that DUTA2 becomes the master for both the VRRP groups 100 & 200. 9. Bring back the DUTA1 interface and verify that DUTA1 regains its mastership and DUTA2 continues to be master for VRRP group 200 10. Similarly, do shut/noshut on Ve interface and verify the same. 11. During these process, let the continuous traffic be running and verify that master should transmit the packets to the host 12. Repeat the above steps from 5 – 10 by enabling tracking on the physical interface assigned to ve interface.. | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To verify VRRP protocol by assigning the interfaces to vlan and by sending different kinds of traffic on it*

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | To verify VRRP protocol by assigning the interfaces to vlan and by sending different kinds of traffic on it |
| Test Case Id | FtSwVrrpFn015 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure the DUTA1 and DUTA2 with a VRRP group say 100 2. Assign the IP address 10.10.10.11/24 on the DUTA1 interface connected to DUTA2, and on DUTA2 assign 10.10.10.10/24 with default priority so that DUTA1 will become Master and DUTA2 becomes backup for VRRP 100. 3. Assign the ports connected to Host A, B & C to vlan 10(untagged). 4. Start continuous traffic from Host C to Host A and verify that DUTA1 forwards the traffic. 5. Make the port Host C tagged to vlan 10 port which is connected to DUTA1. 6. Start sending continuous packets from both Host C and Host A with untagged traffic. 7. Packets shouldn’t reach Host A since DUTA1 will drop the tagged traffic since the port is untagged, and even though DUTA2 is untagged still it shouldn’t forward the packet 8. Similarly make different combination of untagged and tagged and send traffic. 9. Verify that no matter what state the backup port is , if the DUTA1 port is untagged or tagged and receive the packets with tagged and untagged respectively, Host C shouldn’t be able to reach HostA. 10. Similarly repeat the test case for Native vlan as well. | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To verify track port with different weight while flapping the track port*

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| --- | --- |
| Test Case Details | |
| Title / Test Name | To verify track port with different weight while flapping the track port |
| Test Case Id | FtSwVrrpFn016 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure few VRRP session on both dutA & dutB in such a way that dutA is master for few sessions whereas dutB is master for rest. 2. Track the uplink ports which includes a Port-channel, physical & Ve interface. 3. Verify the priority are shown as configured since all the track ports are up 4. Start the traffic and make sure Master is forwarding the traffic for all the sessions 5. Start shutting down the track port one by one in such a way that the priority is reduced below backup and back up takes over 6. Verify the new master is forwarding the traffic and the priority on the back up is reduced to the weight on the track interface. 7. Bring back the track interface up one by one and verify the backup becomes master 8. Flap the track interface multiple times and verify the priority is reverted back as expected | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To verify track port with higher weight and invalid interface*

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| --- | --- |
| Test Case Details | |
| Title / Test Name | To verify track port with higher weights and invalid interface |
| Test Case Id | FtSwVrrpFn017 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure few VRRP session on both dutA & dutB in such a way that dutA is master for few sessions whereas dutB is master for rest. 2. Track the uplink ports which includes a Port-channel, physical & Vlan interface which are not present in the system 3. Verify the priority is reduced by the weight since the ports are considered down due to non-existent 4. Bring the ports online by assigning the ports part of port-channel and vlan interface and verify the current priority is same as configured priority since the ports are up. 5. Start the traffic and make sure Master is forwarding the traffic for all the sessions 6. Try configuring the weight greater than configured priority, the cli should throw an error since bring the port down will set the priority to negative 7. Track port greater than 8 numbers and verify suitable errors are shown. 8. Track both port which is part of port-channel and port-channel it self, removing the port from port-channel will bring the port-channel down but the physical port will be up 9. Make sure only the weight w.r.t port-channel is reduced 10. Similarly try the same experiment on the interface part of vlan interface too | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To verify the docker restart and config reload case*

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| --- | --- |
| Test Case Details | |
| Title / Test Name | To verify the docker restart and config reload case |
| Test Case Id | FtSwVrrpFn018 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:  Configure the DUTA1 and DUTA2 with a VRRP group say 100  Assign the DUTA1 interface address as the virtual IP address for the VRRP group 100 as a result DUTA1 will become Master and DUTA2 becomes backup for VRRP 100.  Configure the Default route for the Host A has the DUTA1 interface.  Configure the DUTA1 and DUTA2 with another VRRP group say 200.  Assign the DUTA2 interface address as the virtual IP address for the VRRP group 200 as a result DUTA2 will become Master and DUTA1 becomes backup for VRRP 200.  Configure the Default route for the Host B has the DUTA2 interface.  Enable the VRRP session  Send continuous packets from both Host A and Host B to Host C.  Debug the packets and check the path it takes to reach Host C.  Shutdown the DUTA1 interface, now debug the packets from Host A and check the path it takes to reach Host C  Bring back the DUTA1 interface and now shutdown the DUTA2 interface.  Debug the packets from Host A and check the path it takes to reach Host C  Bring back the DUTA2 interface and check the packets transmitted from both Host A and Host B  Increase the priority on DUTA1 such that it becomes master for both VRRP group  Disable VRRP on the session VRRP 200 , verify that only VRRP group 200 is disabled and DUTA1 continues to be master for VRRP 100  Enable the session and verify that DUTA1 becomes master for VRRP 200 and continues to be the master for VRRP 100.  Disable VRRP globally by executing no protocol VRRP and verify that all the VRRP related configurations ( both global & interface level) are removed completely.  when both DUT interfaces are up, the packets transmitted by host A has to be forwarded by DUTA1 and the packets from Host B had to be forwarded by DUTA2 to host C  When DUTA1 interface is down, DUTA2 has to forward both Host A and Host B packets to Host C.  Similarly When the DUTA2 interface is down , DUTA1 has to forward the packets from both Host A and Host B to Host C  When again both DUT’s interface is Up, DUTA1 has to forward the Host A packet and DUTA2 has to forward the Host B packet to Host C. | |
| Pass/Fail Criteria | Above verifications should pass. |

## Scale Test Cases

1. Max number of VRRP Instances: 128

2. Max number of Interfaces: 128

3. Max number of VRRP Instances per Interface: 16

4. Max number of tracked interfaces per VRRP Instance: 8

5. Max IP address per VRRP Instance: 4

### To configure and verify the scale numbers are working fine one vrrp instance per interface

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| --- | --- |
| Test Case Details | |
| Title / Test Name | Configure IPv4 and IPv6 address under vlan and verify ping |
| Test Case Id | FtSwVrrpIt001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure the DUTA1 with a VRRP group say VRRP 1, assign the virtual IP address and enable the VRRP session. 2. Verify the VRRP session by using the command Show VRRP 3. Now Configure the DUTA1 with a VRRP group say VRRP 2, assign different virtual IP address which is not same as the one assigned to VRRP 1 and enable the VRRP session 4. Verify the VRRP session by using the command Show VRRP 5. Similarly continue to configure the DUTA1 with VRRP group 3 to 128. Assign different virtual IP address for the entire VRRP group. 6. Verify that all the VRRP session should be enabled and shown after executing the command Show VRRP and also dutA1 should be master for all the 128 sessions 7. Start sending traffic for all the virtual IP address, and verify that only DUTA1 should forward the packet for all the 128 sessions and dutA2 being back should drop the packets. 8. Increase the priority on dutA2 to 101 from VRRP 65-128 sessions and verify that dutA2 changes its state to Master and dutA1 continues to be Master from 65-128 and for the rest of the sessions it should be backup. 9. Save the configuration to start up Config. 10. Reboot the DUT 11. Copy the start up Config to Running Config 12. Verify that all the VRRP session are retained and shown after executing the command Show VRRP 13. Set the advertisement of all the VRRP sessions to 90 seconds and verify that sessions are fine | |
| Pass/Fail Criteria | Above verifications should pass. |

### To configure and verify the scale numbers are working fine 16 session per interface

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| --- | --- |
| Test Case Details | |
| Title / Test Name | To configure and verify the scale numbers are working fine 16 session per interface |
| Test Case Id | FtSwVrrpIt002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Similar to last test case, here we will be configuring 16 session per interface 2. In total 8 interface will be used to achieve 128 sessions 3. Do all the triggers to switch over from Master/back up, rebooting, shutting the track interface, interface up/down etc 4. Make sure the traffic is on throughout the test case and once the session is Up and running, traffic should be resumed. | |
| Pass/Fail Criteria | Above verifications should pass. |

## Stress Test Cases

### *To Add and Delete the VRRP configuration in a loop*.

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| --- | --- |
| Test Case Details | |
| Title / Test Name | To Add and Delete the VRRP configuration in a loop |
| Test Case Id | FtSwVrrpNe001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure the DUTA1 with a VRRP group say VRRP 1, assign the virtual IP address and enable the VRRP session. 2. Verify the VRRP session by using the command Show VRRP 3. Now Configure the DUTA1 with a VRRP group say VRRP 2, assign different virtual IP address which is not same as the one assigned to VRRP 1 and enable the VRRP session 4. Verify the VRRP session by using the command Show VRRP 5. Similarly continue to configure the DUTA1 with VRRP group 3 to 255. Assign different virtual IP address for the entire VRRP group. 6. Enable the VRRP sessions. 7. Verify that all the VRRP session should be enabled and shown after executing the command Show VRRP. 8. Now delete the VRRP instance say VRRP 1, and check whether the VRRP instance is not shown in the Command Show VRRP. 9. Similarly Delete the VRRP instances till say VRRP 100 and verify that the deleted instances are not shown in the Command Shoe VRRP 10. Save the configuration to start up Config. 11. Reboot the DUT 12. Copy the start up Config to Running Config 13. Verify that the VRRP session from VRRP 101 till VRRP 255 are retained and shown after executing the command Show VRRP 14. Now start deleting the VRRP instance from VRRP, and accordingly check whether the VRRP instance is not shown in the Command Show VRRP. | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To Shut down the Master in different ways and observe the behaviour.*

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| --- | --- |
| Test Case Details | |
| Title / Test Name | To Shut down the Master in different ways and observe the behaviour. |
| Test Case Id | FtSwVrrpNe002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Configure VRRP on the DUTA1 and DUTA2 such that DUTA1 becomes the master. 2. Enable the VRRP session 3. Debug the VRRP packets on DUTA1 and capture the packet on the Spirent after shutting down in following ways 4. Disable the VRRP session on interface 5. Shutdown the Interface 6. Remove the IP address from the interface 7. Remove the VRRP session from the interface 8. Remove the Virtual IP from the VRRP session configured on that interface 9. Remove the cable connected to VRRP Master. 10. After disabling/removing in all the above cases enable the VRRP session and capture the packet on the Spirent | |
| Pass/Fail Criteria | Above verifications should pass. |

### *To check the behaviour of the protocol when multiple VR groups with multiple Virtual IP’s are created on the interface.*

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| --- | --- |
| Test Case Details | |
| Title / Test Name | To check the behaviour of the protocol when multiple VR groups with multiple Virtual IP’s are created on the interface. |
| Test Case Id | FtSwVrrpNe003 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. On the DUTA1’s interface create few VRRP group say 1 - 50 and assign around 16 virtual ip addresses to each virtual group, set priority as 101 and enable the VRRP session. 2. On DUTA2 do the same configuration as mentioned above but with different priority such that for few virtual group say 51 – 100 DUTA2 is master whereas for the rest DUTA1 is the master. 3. Verify the VRRP session by using the command Show VRRP and verify that running config is showing all the VRRP groups and virtual ip configured on the box. 4. Now starting pinging the Spirent to all the virtual IP assigned to all the VRRP groups. 5. Verify that DUTA1 should forward the packet for the group 1 – 50 and for all the virtual IP address assigned to these groups, whereas DUTA2 should forward the packet for the rest. 6. Disable VRRP globally on DUTA1 and verify that DUTA2 is master for all the group and should forward the packets for all the Virtual IP and VRRP group. 7. Enable VRRP on DUTA1 (with preemption disable), Verify that still DUTA2 continues to be the master and forward all the packets. 8. Enable preemption and verify that DUTA1 is master for VRRP group 1 – 50 and DUTB continues to be the master for VRRP group 51 - 100. | |
| Pass/Fail Criteria | Above verifications should pass. |

## References

FS: