IPv4 CONSORTIUM

VRRP Test Report

Revision 2.4

InterOperability Lab – 121 Technology Drive, Suite 2 – Durham NH, 03824 – +1-603-862-3941

Consortium Managers:	Erica Williamsen Timothy Winters	ericaw@iol.unh.edu twinters@iol.unh.edu
Technician:	Technician A	techniciana@iol.unh.edu

Month Day, Year

Member Contact Name
COMPANY NAME
ADDRESS

Mr(s). Vendor,

Enclosed are the results from the Virtual Router Redundancy Protocol (VRRP) testing performed on:

RUT HERE. Identified as “SHORT RUT HERE” MAC Address 01-02-03-04-05-06 s/n 1234567. Console “system” command reports software version 1.2.3.

This testing pertains to a set of VRRP requirements, put fourth in RFC 3768. The tests performed are part of the VRRP Test Suite, which is available on the UNH InterOperability Lab’s website:

ftp://public.iol.unh.edu/pub/ipv4/testsuites/VRRP_Description.pdf

During the testing process, the following issues were uncovered:

Test #	Result
Test VRRP.3.1:	The time interval between the ADVERTISEMENTS that the RUT transmits is incorrect.

As always, we welcome any comments regarding this Test Suite. If you have any questions about the test procedures or results, please feel free to contact me via e-mail at techniciana@iol.unh.edu or by phone at +1-603-862-3941.

Regards,

Technicnan A

Digital Signature Information

This document was created using an Adobe digital signature. A digital signature helps to ensure the authenticity of the document, but only in this digital format. For information on how to verify this document’s integrity proceed to the following site:

http://www.iol.unh.edu/certifyDoc/

If the document status still indicates “Validity of author NOT confirmed”, then please contact the UNH-IOL to confirm the document’s authenticity. To further validate the certificate integrity, Adobe 6.0 should report the following fingerprint information:

MD5 Fingerprint: A569 F807 031D B1EC E509 4110 95E3 5362
SHA-1 Fingerprint: F007 7D91 2FAA A22C A3D9 F93F 05AC 09DB E219 84B2

The following table contains the test results and their meanings.

Result	Interpretation
PASS	The RUT was observed to exhibit conformant behavior.
FAIL	The RUT was observed to exhibit non-compliant behavior.
PASS with Comments	The RUT was observed to exhibit conformant behavior, however this behavior deviated from previous compliant results. An additional explanation of the situation is included.
Warning	The RUT was observed to exhibit behavior that is not recommended.
NOTE	From the observations, a valid pass or fail could not be determined. An additional explanation of the situation is included.
N/S	Not Supported: The specified behavior is optional and is applicable but not implemented.
N/T	Not Tested: The specified behavior cannot be tested due to a(n) (un)related failure.

The RUT was tested with the following pair(s) of devices for tests 1.1a-e and 1.2a-d :

- TR1
- TR2
- TR3

The result listed for each of the tests is for all of these devices, unless noted otherwise on the test in question.

Group 1: Interoperability

The Following tests verify Interoperability of the Virtual Router Redundancy Protocol of the RUT.

Test #	
Test VRRP.1.1	**Basic VRRP Interoperability**
Purpose To verify that a router can interoperate with other VRRP implementations in a setup with a single virtual router.	
Comments on Test Procedure	
a. TR1 is configured to associate a virtual router {VRID = 1} with the IP address of its first interface. TR1 is configured with a Priority of 255; it owns the IP address of the virtual router. The RUT is configured as backup, with a Priority of 100 for the virtual router. TR2 is configured to have a Priority of 99. VRRP is enabled on the RUT, TR1 and TR2. A ping is sent from station A to station B. Packets are observed on network 0 and network 1. b. TR1's interface on network 1 is disconnected. A ping is sent from station A to station B. Packets are observed on network 0 and network 1. c. TR2 is configured as backup with Priority of 101. A ping is sent from station A to station B. Packets are observed on network 0 and network 1. d. VRRP is disabled on TR1, TR2 and the RUT. The original test setup is configured. TR1 is configured to backup a virtual router {VRID = 1} with one virtual router IP address equal to the IP address of the RUT's first interface. The Priority on TR1 is 100 and the Priority on TR2 is 99. The RUT is configured to associate the virtual router {VRID = 1} with the IP address of its first interface with a Priority of 255. VRRP is enabled on the RUT, TR1 and TR2. A ping is sent from station A to station B. Packets are observed on network 0 and network 1. e. The RUT is power off. A ping is sent from station A to station B. Packets are observed on network 0 and network 1.	
Comments on Test Results	RFC 3768 - Sections 3, 4 and 5
a. PASS: The RUT remained in the Backup state. IP packets transmitted by station A destined for station B were forwarded onto network 1 by TR1. b. PASS: After a delay of no more than 4 seconds, the RUT transitioned into the Master state. IP packets transmitted by station A destined for station B were forwarded onto network 1 by the RUT. TR2 remained in the Backup state. c. PASS: After a delay of no more than 4 seconds, TR2 transitioned into the Master state, preempting the RUT. IP packets transmitted by station A destined for station B were forwarded onto network 1 by TR2. d. PASS: The RUT entered into the Master state. IP packets transmitted by station A destined for station B were forwarded onto network 1 by the RUT. e. PASS: After a delay of no more than 4 seconds, TR1 transitioned into the Master state. IP packets transmitted by station A destined for station B were forwarded onto network 1 by TR1. The ping failed because the reverse path from B to A failed once the RUT is down.	

Test #	
Test VRRP.1.2	**Advanced VRRP Interoperability**
Purpose To verify that a router can interoperate with other VRRP implementations on multiple subnets.	
Comments on Test Procedure	
a. TR1 is configured as the Master on network 0, TR3 is configured as the Master on network 1 and TR2 is configured as the Master on network 2. VRRP is enabled on the RUT, TR1, TR2 and TR3. Valid IP packets are passed between stations A, B and C. Packets are observed on network 0 and network 1 and network 2. b. TR1 is disconnected from network 0 and TR2 is disconnected from network 2. After Master_Down_Interval, valid IP packets are passed between stations A, B and C. Packets are observed on network 0 and network 1 and network 2. c. TR1 is configured with an interface to network 0 with a Priority of 100 and an IP address of a value higher than that of the RUT. TR2 is configured with an interface on network 2 with a Priority of 100 and an IP address of a value higher than that of the RUT. TR1 is reconnected on network 0 and TR2 is reconnected on network 2. After Master_Down_Interval, valid IP packets are passed between stations A, B and C. Packets are observed on network 0 and network 1 and network 2.	
Comments on Test Results	RFC 3768 - Sections 3, 4 and 5
a. PASS: The RUT remained in the Backup state. Packets transmitted from each station were observed by the stations as follows: B → C via TR3 A → B via TR1 C → A via TR2 Packets were not observed on any other stations or via any other routes. b. PASS: The RUT transitioned to the Master state on network 0. TR3 was the Master on both network 1 and network 2. Packets transmitted from each station were observed by the stations as follows: A → B via the RUT (all replies were dropped) A → C via the RUT (all replies were dropped) B → C via TR3 C → B via TR3 Packets were not observed on any other stations or via any other routes. c. PASS: The RUT transitioned to the Backup state on network 0. Packets transmitted from each station were observed by the stations as follows: A → B via TR1 B → C via TR3 C → B via TR3 Packets were not observed on any other stations or via any other routes.	

Group 2: State Transition Diagram

The following tests cover the State Transition Diagram in section 6.3.

Test #		**Result**	
VRRP.2.1	**The Initialize State**	**a**	**PASS**
		b	**PASS**

Purpose: To verify that a router operates properly while in the Initialize state.

Comments on Test Procedure

a. VRRP is enabled on the RUT with a Priority of 255. The RUT is the owner of the virtual router IP address. Packets are observed on network 0.
b. VRRP is enabled on the RUT with a Priority of 254. The RUT is not the owner of the virtual router IP address. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1, 6.2, 6.3 and 6.4.1

a. The RUT transmitted an ADVERTISEMENT and broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router.
b. The RUT waited approximately Master_Down_Interval (3.0078125 seconds) before it transmitted an ADVERTISEMENT and broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router.

Test #		**Result**	
VRRP.2.2	**Packet Reception in the Backup State**	**a**	**PASS**
		b	**PASS**
		c	**PASS**

Purpose: To verify that a router properly discards frames destined to the virtual router while in the Backup state.

Comments on Test Procedure

a. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. Properly formatted ARP packets are transmitted for the IP address associated with the virtual router. Packets are observed on network 0.
b. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. Properly formatted IP packets are transmitted with a destination link layer MAC address equal to the virtual router MAC address, to a destination IP address on one of the RUT’s directly connected networks. Packets are observed on network 0.
c. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. An Echo Request is transmitted to the IP address associated with the virtual router. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1, 6.2, 6.3 and 6.4.2

a. The RUT did not respond to the ARP packets.
b. The RUT did not forward the packets with a destination link layer MAC address equal to the virtual router MAC address.
c. The RUT did not respond to the Echo Request.

Test #		Result	
VRRP.2.3	**Master Down in the Backup State**	**a**	**PASS**

Purpose: To verify that a router operates properly while in the Backup state.

Comments on Test Procedure

a. TR1 transmits ADVERTISEMENTS to the put the RUT in the Backup State, and then ceases transmission of ADVERTISEMENTS (without transmitting a last ADVERTISEMENT with Priority equal to zero). Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1, 6.2, 6.3 and 6.4.2

a. Approximately 4 seconds from when TR1 transmitted its last VRRP ADVERTISEMENT, the RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router, and transitioned to the Master state.

Test #		Result	
VRRP.2.4	**Advertisement Reception in the Backup State**	**a**	**PASS**
		b	**PASS**
		c	**PASS**
		d	**PASS**

Purpose: To verify that a router properly receives ADVERTISEMENTS while in the Backup state.

Comments on Test Procedure

a. TR1 transmits ADVERTISEMENTS to the put the RUT in the Backup State. TR1 transmits ADVERTISEMENTS with a Priority higher than that of the RUT. Packets are observed on network 0.
b. TR1 transmits ADVERTISEMENTS to the put the RUT in the Backup State. TR1 transmits ADVERTISEMENTS with a Priority equal to the RUT. Packets are observed on network 0.
c. TR1 transmits ADVERTISEMENTS to the put the RUT in the Backup State. TR1 stops transmitting ADVERTISEMENTS via a Shutdown Event (transmitting a last ADVERTISEMENT with a Priority equal to zero). Packets are observed on network 0.
d. TR1 transmits ADVERTISEMENTS to the put the RUT in the Backup State. TR1 transmits ADVERTISEMENTS with a Priority lower than that of the RUT. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1, 6.2, 6.3 and 6.4.2

a. The RUT did not transmit any ADVERTISEMENTS.
b. The RUT did not transmit any ADVERTISEMENTS.
c. The RUT set Master_Down_Timer to Skew_Time. When Master_Down_Timer fired, the RUT transmitted an ADVERTISEMENT and broadcast a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router before it transitioned to the Master state.
d. The RUT discarded the ADVERTISEMENT upon reception. After Master_Down_Interval, the Master_Down_Timer expired, the RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state.

Test #		Result	
VRRP.2.5	**Packet Reception in the Master State**	**a**	**PASS**
		b	**PASS**
		c	**PASS**
		d	**PASS**

Purpose: To verify that a router properly discards frames destined to the virtual router while in the Master state.

Comments on Test Procedure

a. The RUT transitions into the Master state. Properly formatted ARP packets are transmitted for the IP address associated with the virtual router. Packets are observed on network 0.
b. The RUT transitions into the Master state. An IP packet is transmitted with destination link layer MAC address equal to the virtual router MAC address to the destination IP address on one of the RUT's directly connected networks. Packets are observed on network 0.
c. The RUT transitions into the Master state. The RUT is configured so that it is not the owner of the IP address associated with the virtual router. An ICMP echo request is transmitted to the MAC address and destination IP address of the virtual router. Packets are observed on network 0.
d. The RUT transitions into the Master state. The RUT is configured so that it is the owner of the IP address associated with the virtual router. An ICMP echo request is transmitted to the MAC address and destination IP address of the virtual router. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1, 6.2, 6.3 and 6.4.3

a. The RUT responded to the ARP packet for the IP address associated with the virtual router. The MAC address given in the reply was the MAC address of the virtual link.
b. The RUT forwarded the packets with the destination link layer MAC address equal to the virtual router MAC address onto the appropriate network for the destination IP address.
c. The RUT did not reply to the ICMP echo request.
d. The RUT replied to the ICMP echo request.

Test #		Result	
VRRP.2.6	**Shutdown Event in the Master State**	**a**	**PASS**

Purpose: To verify that a router properly handles a shutdown event while in the Master state.

Comments on Test Procedure

a. VRRP is shutdown on the RUT. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1, 6.2, 6.3 and 6.4.2

a. The RUT transmitted an ADVERTISEMENT with a Priority equal to zero.

Test #		**Result**	
VRRP.2.7	**Advertisement Reception in the Master State**	**a**	**PASS**
		b	**PASS**
		c	**PASS**
		d	**PASS**
		e	**PASS**
		f	**PASS**

Purpose: To verify that a router properly receives ADVERTISEMENTS while in the Master state.

Comments on Test Procedure

a. The RUT transitions to the Master state. TR1 transmits an ADVERTISEMENT with a Priority higher than that of the RUT. Packets are observed on network 0.
b. The RUT transitions to the Master state. TR1 transmits an ADVERTISEMENT with a Priority lower than that of the RUT. Packets are observed on network 0.
c. The RUT transitions to the Master state. TR1 transmits an ADVERTISEMENT with a Priority equal to zero. Packets are observed on network 0.
d. The RUT transitions to the Master state. TR1 transmits an ADVERTISEMENT with a Priority equal to that of the RUT and a primary IP address higher than the primary IP address of the RUT. Packets are observed on network 0.
e. The RUT transitions to the Master state. TR1 transmits an ADVERTISEMENT with a Priority equal to that of the RUT and a primary IP address equal to the primary IP address of the RUT. Packets are observed on network 0.
f. The RUT transitions to the Master state. TR1 transmits an ADVERTISEMENT with a Priority equal to that of the RUT and a primary IP address less than the primary IP address of the RUT. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1, 6.2, 6.3 and 6.4.3

a. The RUT cancelled the Adver_Timer, set Master_Down_Timer to Master_Down Interval and transitioned to the Backup state. The RUT ceased transmission of ADVERTISEMENTS.
b. The RUT discarded the ADVERTISEMENTS transmitted by TR1 and remained in the Master state.
c. The RUT transmitted an ADVERTISEMENT and reset the Adver_Timer to Advertisement_Interval and remained in the Master state.
d. The RUT cancelled the Adver_Timer, set the Master_Down_Timer to Master_Down Interval and transitioned to the Backup state.
e. The RUT discarded the ADVERTISEMENTS transmitted by TR1 and remained in the Master state.
f. The RUT discarded the ADVERTISEMENTS transmitted by TR1 and remained in the Master state.

Group 3: Parameters Per Virtual Router

The following tests cover the values discussed in section 6.1.

Test #		**Result**	
VRRP.3.1	**Advertisement_Interval**	**a**	**FAIL**
		b	**FAIL**
Purpose: To observe the Advertisement_Interval value.			
Comments on Test Procedure			
a. The RUT is configured with the default value of the Advertisement_Interval, which is one second. The time interval between the ADVERTISEMENTS that the RUT transmits are recorded and observed. b. The RUT is configured with an Advertisement_Interval other than one second. The time interval between the ADVERTISEMENTS that the RUT transmits are recorded and observed.			
Comments on Test Results	RFC 3768 - Sections 5.3.7 and 6.1		
a. The time interval between the ADVERTISEMENTS that the RUT transmitted was 0.5 seconds. According to RFC 3768, *“If an ADVERTISEMENT is received, then : Reset the Adver_Timer to Advertisement_Interval.”* Therefore, the adver_timer should have been triggered every second. b. The time interval between the ADVERTISEMENTS that the RUT transmitted was 3 seconds. The Advertisement_Interval was set to 5 seconds. According to RFC 3768, *“If an ADVERTISEMENT is received, then : Reset the Adver_Timer to Advertisement_Interval.”* Therefore, the adver_timer should have been triggered every 5 seconds.			

Test #		Result	
VRRP.3.2	**Skew_Time**	**a**	**PASS**
		b	**PASS**
		c	**PASS**

Purpose: To observe the Skew_Time value.

Comments on Test Procedure

a. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. The RUT is configured with a Priority of 1. TR1 transmits a final ADVERTISEMENT with a Priority of zero. Packets are observed on network 0.
b. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. The RUT is configured with a Priority of 254. TR1 transmits a final ADVERTISEMENT with Priority of zero. Packets are observed on network 0.
c. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. The RUT is configured with a Priority of 100. TR1 transmits a final ADVERTISEMENT with Priority of zero. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1 and 6.4.2

a. Upon reception of an ADVERTISEMENT with a Priority of zero, the RUT set the Master_Down_Timer to Skew_Time. The RUT transmitted an ADVERTISEMENT with Master_Down_Timer fires. The time between the last ADVERTISEMENT transmitted from TR1 and the first ADVERTISEMENT transmitted from the RUT was 255/256 second (approximately one second).
b. Upon reception of an ADVERTISEMENT with a Priority of zero, the RUT set the Master_Down_Timer to Skew_Time. The RUT transmitted an ADVERTISEMENT with Master_Down_Timer fires. The time between the last ADVERTISEMENT transmitted from TR1 and the first ADVERTISEMENT transmitted from the RUT was 2/256 second (approximately 7.8 ms).
c. Upon reception of an ADVERTISEMENT with a Priority of zero, the RUT set the Master_Down_Timer to Skew_Time. The RUT transmitted an ADVERTISEMENT with Master_Down_Timer fires. The time between the last ADVERTISEMENT transmitted from TR1 and the first ADVERTISEMENT transmitted from the RUT was 156/256 second (approximately 609 ms).

Test #		Result	
VRRP.3.3	**Master_Down_Interval**	**a**	**PASS**
		b	**PASS**

Purpose: To observe the Master_Down_Interval value.

Comments on Test Procedure

a. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. TR1 ceases transmission of ADVERTISEMENTS (without transmitting a last ADVERTISEMENT with Priority of zero). Packets are observed on network 0.
b. The RUT is configured with an Advertisement_Interval of 4 seconds. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. TR1 ceases transmission of ADVERTISEMENTS (without transmitting a last ADVERTISEMENT with Priority of zero). Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1 and 6.4.2

a. ADVERTISEMENTS were not received during Master_Down_Interval causing the Master_Down_Timer to fire. The RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state. (Master_Down_Interval was calculated as (3x1) + Skew-Time (approximately 1 second) = 4 seconds.)
b. ADVERTISEMENTS were not received during Master_Down_Interval causing the Master_Down_Timer to fire. The RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state. (Master_Down_Interval was calculated as (3x4) + Skew-Time (approximately 1 second) = 13 seconds.)

Test #		Result	
VRRP.3.4	**Preempt_Mode**	**a**	**PASS**
		b	**PASS**

Purpose: To verify that a router properly implements Preempt_Mode.

Comments on Test Procedure

a. The RUT is configured with Preempt_Mode to True. While the RUT is in the INITIALIZE state, TR1 transmits ADVERTISEMENTS with a Priority less than that of the RUT. Packets are observed on network 0.
b. The RUT is configured with Preempt_Mode to False. While the RUT is in the INITIALIZE state, TR1 transmits ADVERTISEMENTS with a Priority less than that of the RUT. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - Sections 6.1, 6.4.1, 6.4.2 and 6.4.3

a. The RUT preempted TR1 and transitioned to the Master state. The RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state.
b. The RUT remained in the Backup state. The RUT did not originate any ADVERTISEMENTS.

Group 4: VRRP Transmission and Reception

The following tests cover the transmission and reception of VRRP packets.

Test #		Result	
VRRP.4.1	**Reception of Invalid TTL field**	**a**	**PASS**
Purpose: To verify that a router discards VRRP ADVERTISEMENTS with an invalid TTL field value.			
Comments on Test Procedure			
a. VRRP is enabled on the RUT. TR1 transmits VRRP packets with the IP TTL field value set to 255. TR1 transmits VRRP packets with the IP TTL field set to a value less than 255. Packets are observed on network 0.			
Comments on Test Results	RFC 3768 - Sections 5, 5.2.3, 6.4.2 and 7.1		
a. The RUT discarded the VRRP packets with the IP TTL not equal to 255. Within 4 seconds of TR1's last valid ADVERTISEMENT, the RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state.			

Test #		Result	
VRRP.4.2	**Reception of Invalid Version field**	**a**	**PASS**
Purpose: To verify that a router properly discards VRRP ADVERTISEMENTS containing an invalid version field.			
Comments on Test Procedure			
a. VRRP is enabled on the RUT. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. TR1 transmits VRRP packets with the version field equal to 2. TR1 transmits VRRP packets with the VRRP version field not equal to 2. Packets are observed on network 0.			
Comments on Test Results	RFC 3768 - 5, 5.3.1 and 7.1		
a. The RUT discarded the packets containing the version field not equal to 2. Within 4 seconds of TR1's last valid ADVERTISEMENT, the RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state.			

Test #		Result	
VRRP.4.5	**Reception of Invalid VRID field**	**a**	PASS

Purpose: To verify that a router properly discards datagrams containing an invalid VRID field.

Comments on Test Procedure

a. VRRP is enabled on the RUT. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. TR1 transmits VRRP packets with a valid VRID. TR1 transmits VRRP packets with an invalid VRID. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - 5, 5.3.3, 6.1, 6.4.2 and 7.1

a. The RUT discarded the packets containing the invalid VRID. Within 4 seconds of TR1's last valid ADVERTISEMENT, the RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state.

Test #		Result	
VRRP.4.6	**Reception of Invalid Auth Type Information**	**a**	PASS

Purpose: To verify that a router properly discards datagrams containing Auth Type that conflict with the local configuration.

Comments on Test Procedure

a. VRRP is enabled on the RUT. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. TR1 transmits VRRP packets with a VRRP authentication type 0. TR1 transmits VRRP packets with a VRRP authentication type 1. Packets are observed on network 0.

Comments on Test Results — RFC 3768 - 5, 5.3.6, 6.1, 6.4.2 and 7.1

a. The RUT discarded the packets with an authentication type 1. Within 4 seconds of TR1's last valid ADVERTISEMENT, the RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state.

Test #		Result	
VRRP.4.7	**Reception of Invalid Adver Interval Information**	**a**	**PASS**

Purpose: To verify that a router properly discards datagrams containing Adver Interval fields that conflict with the local configuration.

Comments on Test Procedure

a. VRRP is enabled on the RUT. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. TR1 transmits VRRP packets with an Adver Interval of 1 second. TR1 transmits VRRP packets with an Adver Interval of 7 seconds. Packets are observed on network 0.

Comments on Test Results — RFC 3768 -5, 5.3.7, 6.1, 6.4.2 and 7.1

a. The RUT discarded the packets with an Adver Interval of 7 seconds. Within 4 seconds of TR1’s last valid ADVERTISEMENT, the RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state.

Test #		Result	
VRRP.4.8	**Reception of Invalid Unknown Type Field**	**a**	**PASS**

Purpose: To verify that a router properly discards datagrams containing an unknown type field.

Comments on Test Procedure

a. VRRP is enabled on the RUT. TR1 transmits ADVERTISEMENTS to put the RUT in the Backup state. TR1 transmits VRRP packets with the Type field set to 1. TR1 transmits VRRP packets with the Type field set to an unknown value. Packets are observed on network 0.

Comments on Test Results — RFC 3768 -5, 5.3.2 and 6.4.2

a. The RUT discarded the packets with the unknown Type fields. Within 4 seconds of TR1’s last valid ADVERTISEMENT, the RUT transmitted an ADVERTISEMENT, broadcasted a gratuitous ARP request containing the virtual router MAC address for each IP address associated with the virtual router and transitioned to the Master state.

Test #		Result	
VRRP.4.9	**Proper Transmission of VRRP packets**	**a**	**PASS**

Purpose: To verify that a router transmits VRRP packets with the correct field values.

Comments on Test Procedure

a. VRRP is enabled on the RUT. The RUT transitions to the Master state. Packets are observed on network 0.

Comments on Test Results — RFC 3768 -5, 6, 6.4.3 and 7.

a. The RUT transmitted VRRP packets with the following field values:
  - TTL equal to 255
  - IP protocol number equal to 112
  - Type field equal to 1
  - VRRP version equal to 2
  - Priority field equal to 255 (when the RUT owns the IP address associated with the virtual router)
  - Source IP address equal to the interface primary IP address
  - Destination IP address equal to the VRRP multicast address (224.0.0.18)
  - Source MAC address equal to the virtual router MAC address (0:0:5e:0:1:1)
  - Destination Link Layer address equal to the VRRP link layer multicast address (1:0:5e:0:0:12)
  - The correct VRRP checksum