

IPv4 CONSORTIUM

RIPv2 Operations Test Report Revision 4.4

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Month Day, Year

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Mr(s). VENDOR,

Enclosed are the results from the Routing Information Protocol (RIP) 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 RIP requirements, put forth in RFCs 2453 and 2082. The tests performed are part of the RIP Test Suite, which is available on the UNH InterOperability Lab's website:

ftp://public.iol.unh.edu/pub/ipv4/testsuites/RIP Operations Description.pdf

During the testing process, the following issues were uncovered:

Test #	Result
<u>RIP 1.2 a, b:</u>	The next hop indicated was not the originator of the RIP Response.

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 <u>techniciana@iol.unh.edu</u> or by phone at +1-603-862-3941.

Regards,

Technician A



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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 explana- tion 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.



Group 1: Processing

The following tests cover portions of the Routing Information Protocol associated with the processing of packets.

Tes	st #					Re	sult
Tes	st RIP.1.1	Basic Response Processing				a	PASS
	rpose: Verify ding several ro	that a router performs the corrected entries.	rect processing	g on receipt of a properly	formatted R	IP Respo	onse in-
	mments on Te						
a.	The TR sent	a RIP Response with 3 RTEs to	to the All RIP	2 Routers Multicast Add	lress.		
Co	mments on Te	st Results	RI	C 2453 – Sections 3.9.2 and 3.	.10.1		
a.		nsmitted a triggered response to learned routes. The network as					

test software. The metrics were calculated correctly. The next hops from the original RTEs were learned, and included with each route in the RUT's routing table. They were not changed to indicate the RUT as next hop in the RUT's responses. The RUT included the learned routes in its periodic responses.



Те	st #			Re	esult
	st # st RIP.1.2	Next Hop Processing		a	FAIL
10	5t KII.1.2	Text Hop Trocessing		b a	FAIL
				c	PASS
D.,	rnoso. Vorify	that a router behaves correctly in save	eral cases where the next hop of a Route E	-	
		iginator of the packet.	that cases where the next hop of a Route E	and y shoul	iu de
	mments on Te				
	minents on re				
а. b. c.	ing table was A RIP Response nected network advertised. A RIP Response was transmitt	c checked to determine what next hop inse with a Route Entry was transmitted rk. The RUT's routing table was check onse was transmitted from R1 for some ted from R1 that included a Route Ent	ed. The next hop for this RTE was 0.0.0.0 was used for the route advertised. ed. The next hop for this RTE was not on cked to determine what next hop was used e network N with a next hop of R2. Anoth ry with a next hop on network N, which w checked to determine what next hop was u	a directly for the ro for RIP Re for a d	con- oute esponse irectly
	advertised.			ised for th	eroute
Co	4 T				
a.	The next hop		RFC 2453 – Sections 4.4 and appendix A e RIP Response. According to RFC 2453.		
	The next hop immediate new warded. Spe advertisemen over which th originator of The next hop The RUT sho The next hop	indicated was not the originator of th ext hop IP address to which packets to cifying a value of 0.0.0.0 in this field i at. An address specified as a next hop he advertisement is made." Therefore, the RIP Response. b indicated was not the originator of th bould have indicated that the next hop w	- !	y should b iginator of the logica ext hop w part a of th	e for- f the RIP l subnet as the his test.
a. b. c.	The next hop immediate new warded. Spe advertisemen over which th originator of The next hop The RUT sho The next hop	indicated was not the originator of th ext hop IP address to which packets to cifying a value of 0.0.0.0 in this field i at. An address specified as a next hop he advertisement is made." Therefore, the RIP Response. indicated was not the originator of th buld have indicated that the next hop we indicated was treated as 0.0.0.0 (the originator of the originator of the originater of the or	e RIP Response. According to RFC 2453, the destination specified by this rout entry ndicates that routing should be via the ori must, per force, be directly reachable on a the RUT should have indicated that the n e RIP Response. Refer to the quote from p vas the originator of the RIP Response.	y should b iginator of the logical ext hop w part a of th ince it wa	e for- f the RIP l subnet as the his test.
a. b. c.	The next hop immediate new warded. Spe advertisemen over which th originator of The next hop The RUT sho The next hop a directly con	e indicated was not the originator of th ext hop IP address to which packets to cifying a value of 0.0.0.0 in this field i et. An address specified as a next hop the advertisement is made." Therefore, the RIP Response. Indicated was not the originator of th buld have indicated that the next hop we bindicated was treated as 0.0.0.0 (the of mected network.	e RIP Response. According to RFC 2453, the destination specified by this rout entry ndicates that routing should be via the ori must, per force, be directly reachable on a the RUT should have indicated that the n e RIP Response. Refer to the quote from p vas the originator of the RIP Response.	y should b iginator of the logical ext hop w part a of th ince it wa	e for- f the RIP I subnet as the his test. s not on
a. b. c. <u>Ter</u>	The next hop immediate new warded. Spe advertisement over which the originator of The next hop The RUT shop The next hop a directly constant st #	indicated was not the originator of th ext hop IP address to which packets to cifying a value of 0.0.0.0 in this field i at. An address specified as a next hop he advertisement is made." Therefore, the RIP Response. indicated was not the originator of th buld have indicated that the next hop we indicated was treated as 0.0.0.0 (the originator of the originator of the originater of the or	e RIP Response. According to RFC 2453, the destination specified by this rout entry indicates that routing should be via the ori must, per force, be directly reachable on to the RUT should have indicated that the n e RIP Response. Refer to the quote from p vas the originator of the RIP Response. originator of the RIP Response, e.g., R1) s	y should b iginator oy the logical ext hop w part a of th ince it wa	e for- f the RIP I subnet as the his test. s not on
a. b. c. <u>Tes</u> <u>Pu</u>	The next hop immediate new warded. Spe advertisement over which the originator of The next hop The RUT shop The next hop a directly constant st #	b indicated was not the originator of the ext hop IP address to which packets to cifying a value of 0.0.0.0 in this field it. An address specified as a next hop the advertisement is made." Therefore, the RIP Response. b indicated was not the originator of the pull have indicated that the next hop we indicated was treated as 0.0.0.0 (the originator defined as the text of the pull have indicated that the next hop we indicated network. Subnet Mask Processing that a router correctly interprets and pull have processing that a router correctly interprets and pull have processing that a router correctly interprets and pull have processing that a router correctly interprets and pull have processing the text of the pull have processing that a router correctly interprets and pull have processing the pull have processing the pull have pull ha	e RIP Response. According to RFC 2453, the destination specified by this rout entry indicates that routing should be via the ori must, per force, be directly reachable on to the RUT should have indicated that the n e RIP Response. Refer to the quote from p vas the originator of the RIP Response. originator of the RIP Response, e.g., R1) s	y should b iginator oy the logical ext hop w part a of th ince it wa	e for- f the RIP I subnet as the his test. s not on
a. b. c. <u>Tes</u> <u>Pu</u>	The next hop immediate new warded. Spe advertisement over which the originator of The next hop The RUT shop The next hop a directly content st # st RIP.1.3 rpose: Verify mments on Tent	a indicated was not the originator of the ext hop IP address to which packets to cifying a value of 0.0.0.0 in this field is the ext hop in address specified as a next hop the advertisement is made." Therefore, the RIP Response. b indicated was not the originator of the originator of the originator of the originator of the originate o	e RIP Response. According to RFC 2453, the destination specified by this rout entry indicates that routing should be via the ori must, per force, be directly reachable on to the RUT should have indicated that the n e RIP Response. Refer to the quote from p vas the originator of the RIP Response. originator of the RIP Response, e.g., R1) s	y should b iginator oy the logical ext hop w part a of th ince it wa Re a 0. There v	e for- f the RIP I subnet as the his test. s not on esult PASS was one

a. The triggered response transmitted by the RUT on its other interfaces included the newly learned routes with subnet mask values appropriate to the natural network number.



			R	esult
Test RIP.1.4	Default Route Processing		a	PASS
			b	PASS
			с	PASS
			d	PASS
	that a router learns default routes.			
omments on 1	est Procedure			
The packets A RIP Resp 255.255.255 A RIP Resp transmitted RUT's routi	onse was transmitted with one RTE indi transmitted by the RUT were observed. onse was transmitted with one RTE indi .0. The packets transmitted by the RUT onse was transmitted from TR1 with one from TR2 with one RTE indicating a det ng table were observed. ute was configured on the RUT. The pa	cating a default route. The subnet ma were observed. RTE indicating a default route. A R fault route. The packets transmitted b	sk value was IP Response y the RUT a	s was then
Comments on T	est Results	RFC 2453 – Section 3.7 and RFC 1812 – S	ection 5243	
				0
c. The default	d not crash or generate invalid packets. route was not present twice in any RIP I			
c. The default		Responses sent by the RUT.		

			R	esult
Test RIP.1.5	Infinite Metric Processing		a	PASS
			b	PASS
Purpose: Ver	fy that a router behaves properly when the metric calculate	ed for a route is 16.		
Comments or	Test Procedure			
with two not in the b. The metri Entry with gave the r	ponse was transmitted with a Route Entry with metric 1. A RTEs. One RTE gave the route advertised in Step 1 with m RUT's table, with metric 15. The packets transmitted by th of or one of the interfaces on the RUT was set to 2. A RIP metric 1 to the interface in Step 5. A RIP Response was to bute advertised in Step 6 with metric 15; the other gave a route The packets transmitted by the RUT were observed.	etric 15. The other gav ne RUT were observed. Response was transmitter ransmitted with two RT	e a route t ed with a Es. One I	that was Route RTE
Comments or	Test Results RFC 2453 – Secti	on 392		
Comments of	Test Results Results See	5.7.2		
	d by the RUT.			
metric of	transmitted a triggered response giving the route that it lear 6. The other route present in the response transmitted in S 1 by the RUT.			
metric of	transmitted a triggered response giving the route that it lear 6. The other route present in the response transmitted in S		any resp	
metric of transmitte	transmitted a triggered response giving the route that it lear 6. The other route present in the response transmitted in S		any resp	onse
metric of transmitte Test # Test RIP.1.6	transmitted a triggered response giving the route that it lear 6. The other route present in the response transmitted in S d by the RUT.	Step 7 was not present in	any resp Re a	onse esult PASS
metric of transmitte Test # Test RIP.1.6 Purpose: Ven	transmitted a triggered response giving the route that it lean 6. The other route present in the response transmitted in S d by the RUT. Host Route Processing	Step 7 was not present in	any resp Re a	onse esult PASS
metric of transmitte Test # Test RIP.1.6 Purpose: Ver Comments or a. A RIP Re b. The RUT	 transmitted a triggered response giving the route that it learned in S. The other route present in the response transmitted in S. I by the RUT. Host Route Processing Ify that a router identifies and processes host routes correct	Step 7 was not present in ly.	Ra Ra b	esult PASS PASS d.
metric of transmitte Test # Test RIP.1.6 Purpose: Ver Comments or a. A RIP Re b. The RUT	In the intermediate and processes host routes correct in the response was transmitted with a host route. The packets transmitted with a route in the response was transmitted with a host route. The packets transmitted with a route in the response was transmitted with a host route. The packets transmitted with a route in the route in the response was transmitted with a host route. The packets transmitted with a route in the route in the response was transmitted with a host route. The packets transmitted with a route in the route in the response was transmitted with a host route. The packets transmitted with route entry. The packets transmitted by the RUT we have a route in the route in the response was transmitted by the RUT we have a route in the route entry. The packets transmitted by the RUT we have a route entry.	Step 7 was not present in ly. smitted by the RUT wer was transmitted with a ere observed.	Ra Ra b	esult PASS PASS d.



Tes	st #			Re	sult
	st # st RIP.1.7	Version Number Processing		a	PASS
100	KII.I. 7	version rumber r rocessing		b b	PASS
				<u>с</u>	PASS
				d d	PASS
Pu	rnose• Verify	that a router obeys the rules for processing RIP me	ssages of versions other than 2	.	IABB
	mments on Te		ssages of versions other than 2	·•	
0	millents on re	stribeedure			
a.	A DID vorsio	n 1 Response was transmitted including a Route Er	try for some network. The ne	akata tra	nemittad
a.		vere observed.	it y for some network. The par	ckets tra	iisiiitteu
b.		n 0 Response was transmitted including a Route Er	try for some network. The pa	ckets tra	nsmitted
υ.		vere observed.	it y for some network. The par	erets tra	iisiiittea
c.	•	n 1 Request was transmitted including a Route Entr	v the RUT did not have. The	packets	transmit-
•••		JT were observed.		puenets	
d.	•	n 2 Request was transmitted including a Route Entr	the RUT did not have. The	packets	transmit-
		JT were observed.		I	
	2				
Co	mments on Te	est Results RFC 2453 -	- Section 3.10.2, 4.6, and 5.1		
					r
a.	The RUT lea	rned the version 1 route advertised.			
b.	The RUT did	not learn the version 0 route advertised.			
c.	The RUT res	ponded with a RIP version 1 Response including th	e Route Entry with metric 16.		
d.	The RUT res	ponded with a RIP version 2 Response including th	e Route Entry with metric 16.		
Ter	st #			Do	cult

Test #			Re	sult
Test RIP.1.8	Family Identifier Processing		а	PASS
Purpose: Verify other than 2.	that a router properly handles RIF	P Responses that contain RTEs with Address Fa	mily Ider	ntifiers
Comments on Te	st Procedure			
than 2. Anot	her RIP Response was transmitter h Address Family Identifier set to	E that had the Address Family Identifier set to so that had a mix of RTEs, one with Address Fan something other than 2. The packets transmitt	nily Ident	ifier 2,
Comments on Te	st Results	RFC 2453 – Section 3.6 and 3.9.2		
	route the RUT had was the route uring this test.	e with Address Family Identifier 2. The RUT le	arned no	other



Test #				Re	esult
Test RIP.1	1.9	Route Tags Processing		a	PASS
				b	PASS
Purpose:	Verify	that a router properly learns and re-adve	rtises route tags.	•	•
Comment	ts on Te	st Procedure			
b. A RIP mitted from t	l by the P Respo l for rou the one me rout	nse was transmitted including several R RUT were observed. nse was transmitted including 2 RTEs, e tte 1, but with a lower metric and a diffe used in the previous step. Route 2 was a er used in Step 4, but with a different ro	ach with a route tag. Another RIP Resp rent route tag. This response was from allowed to expire. A response was then	ponse was a source o transmitte	trans- lifferent ed from
Comment	a on To	st Posults	RFC 2453 – Section 4.2		
uncha	inged.	t out the routes advertised in a triggered sed the route tag from the most recent re			
Test #				Re	esult
Test RIP.1		Triggered Response Processing		a b	PASS PASS
		that a router observes the rules regarding	g triggered responses.		
Comment	ts on Te	st Procedure			
subset observ b. A RIP mente	t of the ved. P Respo ed and th	nse was transmitted including several ro routes advertised in the first step with a nse was transmitted giving a route with ne response packet was transmitted again y the RUT were observed.	higher metric. The packets transmitted metric 1. Every second thereafter, the r	by the RU	JT were
Comment	ts on Te	st Results	RFC 2453 – Section 3.10.1, 3.10.2		
The tr step. 7 had ch	iggered The RU hanged	RUT sent a triggered response to all net response included only the routes that c UT did not transmit a triggered response due to split horizon/poisoned reverse pro- ited a random interval from 1 to 5 second	changed as a result of the response sent on the network to which TR1 was conn pocessing.	in the prevected, as r	vious



Test #			R	esult
Test RIP.1.11	Route Timeout Processing		a	PASS
			b	PASS
			с	PASS
			d	PASS
	y that a router performs route tin	neout correctly.		
Comments on '	Test Procedure			
 ted by the I A RIP Resp transmitted the RUT w A RIP Resp was transm by the RUT A RIP Resp RTE sent in ing the RTI 	UT were observed. onse was transmitted including a R' including the RTE sent in Step 4. M ere observed. onse was transmitted including a R' tted including the RTE sent in Step were observed. onse was transmitted including a R' . Step 12 with a metric of 16. 60 sec E sent in Step 12 with a metric of 16	of 16. More than 300 seconds elapsed and the TE for 1 route. 60 seconds elapsed. Another More than 300 seconds elapsed and the packets TE for 1 route. 240 seconds elapsed. Another 8. More than 300 seconds elapsed and the part TE for 1 route. A RIP Response was transmit conds elapsed. Another RIP Response was transmit. More than 120 seconds elapsed and the packets.	RIP Resp s transmit r RIP Res ckets trar ted incluc unsmitted	oonse was tted by sponse nsmitted ling the includ-
the RUT w		DEC 2452 Section 2.9.20.2		
		RFC 2453 – Section 3.8, 3.9.2		
Comments on a. The RUT to received. I route that v Responses b. In Step 5, t	Test Results ansmitted a triggered response for the was also included in periodic response as not updated by Step 2 expired aff with metric 16 for 120 seconds. The RUT advertised the learned route	RFC 2453 – Section 3.8, 3.9.2 he route that was expired after the RIP Respon- onses with metric 16 for 120 seconds after its of ter 180 seconds from Step 1 and was included for 60 seconds. In Step 6, the timeout timer f Γ advertised the learned route with the approp	expiration in period	n. The lic RIP try cre-
Comments on The RUT the received. If route that we received that we responses b. In Step 5, the ated in Step 180 second route with the route with the received the receiv	Test Results ansmitted a triggered response for the was also included in periodic response as not updated by Step 2 expired aff with metric 16 for 120 seconds. The RUT advertised the learned route 4 was restarted. In Step 7, the RUT is from when the RIP Response was metric of 16 for 120 seconds.	he route that was expired after the RIP Respon- onses with metric 16 for 120 seconds after its e- ter 180 seconds from Step 1 and was included for 60 seconds. In Step 6, the timeout timer f Γ advertised the learned route with the approp transmitted in Step 6. The RUT then advertis	expiration in period for the eminister metric riate metric ed the lea	try cre- ric for
 Comments on ¹ a. The RUT the received. If route that we received. If route that we responses b. In Step 5, the route with a second route with a content with a metre stopped. In stopped. In stopped. In stopped. 	Test Results ansmitted a triggered response for the was also included in periodic response as not updated by Step 2 expired aff with metric 16 for 120 seconds. The RUT advertised the learned route 4 was restarted. In Step 7, the RUT is from when the RIP Response was metric of 16 for 120 seconds. The RUT advertised the learned route is of 16 for 60 seconds. In Step 10, Step 11, the RUT advertised the learned the learned the learned the learned advertised the learned the	he route that was expired after the RIP Respon- onses with metric 16 for 120 seconds after its e- ter 180 seconds from Step 1 and was included for 60 seconds. In Step 6, the timeout timer f Γ advertised the learned route with the approp	expiration in period for the en- riate metri ed the learned ge-collect P Respon	h. The lic RIP try cre- ric for urned l route tion timer use was



Test #			Re	sult
Test RIP.1.12	Number of Entries Processing		a	PASS
			b	PASS
			с	PASS
			d	PASS
Purpose: Verify	that a router handles responses that contained	ain an unusual number of RTEs.		
Comments on Te				
 b. A RIP Reque c. A RIP Response given in the providence 	nse was transmitted with no RTEs. The est was transmitted with no RTEs. The points was transmitted with 25 valid RTEs. previous step. The packets transmitted by sponses were transmitted, each with 20 values.	A RIP Request was transmitted with the RUT were observed.	erved. e 25 valio	
Comments on Te	est Results	RFC 2453 – Section 3.9.1 and 3.10.2		
a. The empty re				

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mole

Tes	st #		Re	sult
	st RIP.1.13	Compatibility with v1 Switches Processing	a	PASS
			b	PASS
			с	PASS
			d	PASS
Pu	rpose: Verify	that a router behaves properly in each of the modes described for the v1 compatil	bility swi	
	mments on Te		2	
a. b.	sponse. The transmit a per RUT to transmit The RUT was messages. A 2 Response w try the RUT of packets transmit The RUT was messages. A 2 Response w try the RUT of	s configured to operate in RIP-1 Mode. Time elapsed to allow the RUT to transn RUT was configured to operate in RIP-1 Compatible Mode. Time elapsed to allo iodic response. The RUT was configured to operate in RIP-2 mode. Time elaps nit a periodic response. In each case, the packets transmitted by the RUT were of configured to accept only RIP-1 messages. The RUT was also configured to tra RIP version 2 Request was transmitted for a Route Entry the RUT does not have ras transmitted with a Route Entry. A RIP version 1 Request was then transmitted loes not have. Finally, a RIP version 1 Response was transmitted with a Route E nitted by the RUT were observed. configured to accept only RIP-2 messages. The RUT was also configured to tra RIP version 2 Request was transmitted for a Route Entry the RUT does not have as transmitted with a Route Entry. A RIP version 1 Request was then transmitted to transmitted with a Route Entry. A RIP version 1 Response was transmitted with a Route E nitted by the RUT were observed. configured to accept only RIP-2 messages. The RUT was also configured to tra RIP version 2 Request was transmitted for a Route Entry the RUT does not have the stransmitted with a Route Entry. A RIP version 1 Request was then transmitted loes not have. Finally, a RIP version 1 Response was transmitted with a Route E loes not have. Finally, a RIP version 1 Response was transmitted with a Route E	ow the RU ed to allo observed. unsmit RI A RIP d for a R ntry. Th unsmit RI A RIP d for a R	UT to ow the P-1 version oute En- e P-2 version oute En-
d.	The RUT was RIP-2 messag version 2 Res Route Entry t	nitted by the RUT were observed. s configured to accept both RIP-1 and RIP-2 messages. The RUT was also config es. A RIP version 2 Request was transmitted for a Route Entry the RUT does no ponse was transmitted with a Route Entry. A RIP version 1 Request was then tra he RUT does not have. Finally, a RIP version 1 Response was transmitted with a ransmitted by the RUT were observed.	ot have.	A RIP l for a
Co	mments on Te	st Results RFC 2453 – Section 4.6, 5.1		
a. b. c. d.	transmitted R Response Pac The RUT ign The RUT pro The RUT pro	RUT transmitted RIP-1 Response Packets to the Subnet Broadcast Address. In S IP-2 Response Packets to the Subnet Broadcast Address. In Step 5, the RUT tran- kets to the All RIP-2 Router Multicast Address. ored the version 2 messages. The RUT processed the version 1 messages normal cessed the version 2 messages normally. The RUT ignored the version 1 message cessed the version 2 messages normally. The RUT did not respond to the RIP ver- cessed the version 1 message normally.	nsmitted i lly. ges.	RIP-2

Test #		Re	esult
Test RIP.1.14	Full Table Request Processing	a	PASS
Purpose: Verify	that a router responds properly to full table RIP Requests.		
Comments on Te	st Procedure		
ent RTE to th	nse was transmitted including a valid RTE. Another RIP Response was transmitter RUT's other interface. A full table request was sent to each interface. The pactwere observed.		

Comments on Test Results	RFC 2453 – Section 3.9.1

a. In Step 3, the RUT transmitted response packets, including all of its learned and configured routes. Splithorizon/poisoned reverse processing was performed on the responses.

Test #		Re	sult
Test RIP.1.15	Specific Route Request Processing	a	PASS
		b	PASS
Purpose: Verify	that a router responds properly to specific RIP Requests.		
Comments on Te	st Procedure		
RTE to the R in the first tw were observe b. A RIP Respo RTE to the R	nse was transmitted including one RTE. Another RIP Response was transmitted UT's other interface. A specific unicast RIP Request was then transmitted for the steps, as well as another route that the RUT did not have. The packets transmitter	the RTEs tted by th with a sin e RTEs g	given e RUT ngle iven in
Comments on Te	st Results RFC 2453 – Section 3.9.1		
a. The RUT trai	assume that a response for the routes requested, filling in their metrics from its routing	ng table.	For the

- a. The RUT transmitted a response for the routes requested, filling in their metrics from its routing table. For the route that was not in its table, a metric of 16 was given. No Split-horizon/poisoned reverse processing was done on this response; metrics were given exactly as they were in the RUT's table.
- b. The RUT transmitted a response for the routes requested, filling in their metrics from its routing table. For the route that was not in its table, a metric of 16 was given. No Split-horizon/poisoned reverse processing was done on this response; metrics were given exactly as they were in the RUT's table.



Tes	4 #			Da	sult
Tes	t RIP.1.16	Simple Authentication Processing		a L	PASS
				b	PASS PASS
				c d	PASS
				e e	PASS
Рш	rnose• Verify	that a router properly processes a RIP au	thentication entry	C	IABB
		est Procedure	thentieuton entry.		
a. b. c. d. e.	thentication of The RUT was was transmitt by the RUT was was transmitt by the RUT was the RUT was with no author The RUT was	s configured not to perform RIP-2 auther entry and a Route Entry. The packets trans s configured to perform RIP-2 authentica end with an authentication header (correct were observed. s configured to perform RIP-2 authenticated with an authentication header (incorrect were observed. s configured to perform RIP-2 authenticated entication header and one Route Entry. The s configured to perform RIP-2 authenticated entication header and one Route Entry. The s configured to perform RIP-2 authenticated with two authentication headers and one d.	nsmitted by the RUT were observed. tion, with password ABCDEFGHIJKL. password) and a Route Entry. The pac- tion, with password ABCDEFGHIJKL. ect password) and a Route Entry. The pa- tion, with password ABCDEFGHIJKL. The packets transmitted by the RUT were tion, with password ABCDEFGHIJKL.	A RIP R kets trans A RIP R ackets tra A RIP R e observe A RIP R	Response mitted Response nsmitted Response d. Response
Car	mments on Te	of Descrife	RFC 2453 – Section 4.1, 5.2	$(\cap$	
a. b. c. d. e.	The RUT igr packet. The RUT lea The RUT did The RUT did	ored the response packet with an authent rned the Route Entry in the RIP Respons not learn the Route Entry in the RIP Res not learn the Route Entry in the RIP Res not crash or generate invalid packets. T	ication entry. The RUT did not learn th e. sponse.		
	50	SING			



Test #				Re	sult
Test RIP.1.17	UDP Port Processing			a	PASS
				b	PASS
Purpose: Verify	that a router correctly handles the prop	er UDP ports for RIP.		•	
Comments on T	est Procedure	_			
520. Anothe and to port 5 port 520 and	IP Request was transmitted for a route t er specific RIP Request was transmitted (20. A specific RIP Request was then tr to port 300. The packets transmitted b d to allow for a periodic RIP Response	for a route that the RU ansmitted for a route the y the RUT were observe from the RUT. A RIP	JT did not have, f hat the RUT did p ved. PResponse was tr	from UDP p not have, fro ransmitted w	oort 521 om UDP vith a
with a route	e RUT did not have, from UDP port 300 that the RUT did not have, from UDP p a route that the RUT did not have, from re observed.	ort 521 and to port 520	0. A RIP Respon	ise was then	trans-
with a route mitted with the RUT we	that the RUT did not have, from UDP p a route that the RUT did not have, from re observed.	ort 521 and to port 520	0. A RIP Respon port 300. The page	ise was then	trans-
with a route mitted with a the RUT we Comments on T a. In Step 1, th from UDP p to UDP port port that was b. In Step 5, th	that the RUT did not have, from UDP p a route that the RUT did not have, from re observed. est Results e RUT transmitted a RIP Response for t ort 520. In Step 2, the RUT transmitted 521 from UDP port 520. In Step 3, the	RFC 2453 – Section 3.6, he route specified with RUT did not respond	0. A RIP Respon port 300. The pace , 3.9.2 n a metric of 16, the route specified to the RIP Reque	to UDP port with a metrest sent to a	a trans- nitted by a 300 ric of 16 UDP
with a route mitted with a the RUT we Comments on T a. In Step 1, th from UDP p to UDP port port that was b. In Step 5, th	that the RUT did not have, from UDP p a route that the RUT did not have, from re observed. est Results e RUT transmitted a RIP Response for t ort 520. In Step 2, the RUT transmitted 521 from UDP port 520. In Step 3, the s not 520. e RUT transmitted a RIP Response to an	RFC 2453 – Section 3.6, he route specified with RUT did not respond	0. A RIP Respon port 300. The pace , 3.9.2 n a metric of 16, the route specified to the RIP Reque	to UDP port with a metrest sent to a	a trans- nitted by a 300 ric of 16 UDP
with a route mitted with a the RUT we Comments on T a. In Step 1, th from UDP p to UDP port port that was b. In Step 5, th	that the RUT did not have, from UDP p a route that the RUT did not have, from re observed. est Results e RUT transmitted a RIP Response for t ort 520. In Step 2, the RUT transmitted 521 from UDP port 520. In Step 3, the s not 520. e RUT transmitted a RIP Response to an	RFC 2453 – Section 3.6, he route specified with RUT did not respond	0. A RIP Respon port 300. The pace , 3.9.2 n a metric of 16, the route specified to the RIP Reque	to UDP port with a metrest sent to a ugh 8, the R	a trans- nitted by a 300 ric of 16 UDP

		inter the set of the set of the set				••	
		1				b	PASS
Pu	rpose: Verify	that a router uses the heuristic	for selecting betwee	en two routers advertisin	g the sai	me route	e with
the	e same metric.						
Co	omments on Te	st Procedure					
a.	A RIP Respo	nse was transmitted from TR1	containing a Route	Entry with a metric of 5.	30 sec	onds ela	upsed.
	A RIP Respo	nse was transmitted from TR2	containing the same	e Route Entry in Step 1 v	vith a me	etric of	5. The
	packets trans	nitted by the RUT were observed	ved.				
b.	A RIP Respo	nse was transmitted from TR1	containing a Route	Entry with a metric of 5.	90 sec	conds el	apsed.
		nea was transmitted from TP2					

b. A RIP Response was transmitted from TR1 containing a Route Entry with a metric of 5. 90 seconds elapsed. A RIP Response was transmitted from TR2 containing the same Route Entry in Step 1 with a metric of 5. The packets transmitted by the RUT were observed.

Comments on Test Results	RFC 2453 – Section 3.9.2

a. The RUT did not update the Route Entry specifying TR2 as the next hop.

b. The RUT updated the Route Entry specifying TR2 as the next hop.



Test #			Re	sult
Test RIP.1.19	Metric Processing		a	PASS
			b	PASS
	that a router properly handles RTEs that	are not better than the current ro	ute for that netw	ork.
Comments on T	est Procedure			
sponse was t transmitted l b. A RIP Response was t	onse was transmitted from TR1 containin ransmitted from TR2 containing the same by the RUT were observed. onse was transmitted from TR1 containin ransmitted from TR1 containing the same by the RUT were observed.	e Route Entry in Step 1 with a me g a Route Entry with a metric of (etric of 7. The pa	ackets Re-
Comments on T	est Results	RFC 2453 – Section 3.9.2		
Test #			Do	sult
Test RIP.1.20	Static Route Processing			PASS
	y that a router properly handles static rout	as with the PID wrotecal	b c	PASS PASS
Comments on T	* * *	es with the RIP protocol.		
observed. b. The static ro transmitted l	e was configured on one of the interfaces ute from Part A was allowed to remain co by the RUT were observed. e for network 133.178.119.0 was configu ransmitted containing a Route Entry for	onfigured. More than 300 second ured on one of the interfaces on the	ls elapsed. The p	packets Re-
sponse was	smitted by the RUT were observed.			
sponse was		RFC 2453 – Section 3.5		



Group 2: Validation

The following tests cover portions of the Routing Information Protocol associated with the validation of packets.

Test #			Re	esult
Test RIP.2.1	Network Validation		a	PASS
			b	PASS
Purpose: Verify	that a router ignores RTEs for invalid ne	etworks.		
Comments on Te	est Procedure			
Response wa Response wa sponse was th was then tran transmitted for the subnet br address follo b. A RIP Respo try. A RIP F entry. A RIP	nse was transmitted with an entry for a C s then transmitted with an entry for a Cla s then transmitted with an entry for the r nen transmitted with an entry for the all smitted for the loopback network address or the loopback host address followed by oadcast address followed by a valid entry wed by a valid entry. The packets transminse was transmitted with an entry for the Response was then transmitted for the ho P Response was then transmitted for the r ackets transmitted by the RUT were obse	ass E network address followed by a vali- network 0.0.0.1 followed by a valid entry is network followed by a valid entry. A ss followed by a valid entry. A RIP Resp a valid entry. A RIP Response was the y. A RIP Response was then transmitted nitted by the RUT were observed. e network of the RUT's interface followers address of the RUT's other interface followers to the RUT's other interface followers and the RUT's other interface followers the RUT's other interface followers	d entry. 7. A RIP RIP Response was n transmin l for a mu- ed by a va- ed by a va-	A RIP Re- ponse s then itted for ilticast alid en- alid
Comments on Te	est Results	RFC 2453 – Section 3.9.2		
essed normal	not add any of the invalid routes advert			-
Test #			D	esult
Test RIP.2.2	Metric Validation			PASS
			a	rass
<u> </u>	that a router correctly handles invalid va	alues of the metric field in the RTE.		
transmitted c RIP Respons	nse was transmitted containing a Route i ontaining a Route Entry for network1 wi e was transmitted containing a Route En mitted by the RUT were observed.	th metric 17, followed by a valid Route	Entry. A	nother
Comments on Te	est Results	RFC 2453 – Section 3.9.2		
a. The RUT did	l not expire the RTE for network1 or set cs advertised in the test. The valid route	the metric to 16. The RUT added none of		ites with



Test #		Re	sult
Test RIP.2.3:	Must Be Zero Fields Validation	а	PASS
Purpose: Verif	that a router discards RIP-1 packets that have data in the "must be zero" fields de	efined fo	r that
version of RIP.			
Comments on T	est Procedure		
version 1 R sponse was	RIP Response was transmitted with data in the unused header field, with a valid R P Response was transmitted containing data in the route tag field of the RTE. A vector that in the next hop field of the RTE. A version 1 RIP Response with data in the subnet mask field of the RTE. The packets transmitted by the RU	version 1 onse wa	RIP Re s then
Comments on T	est Results RFC 2453 – Section 3.6, 5		
a. The RUT ac	ded none of the routes advertised in the test.		
Test #		Re	sult
Test RIP.2.4	Command Number Validation	a	PASS
Purpose: Verif	that a router ignores RIP packets with invalid commands.		
ceoff was th with an unk	con was transmitted, including a Route Entry as would be expected in a RIP Response. en transmitted, including a Route Entry as would be expected in a RIP Response. nown command number was transmitted, including a Route Entry as would be exp The packets transmitted by the RUT were observed. RFC 1058 – Section 3.1	A RIP p	acket
	nored the commands in this test and added none of the new routes advertised.		
Test #		Re	sult
	Invalid Number of Entries Validation	Re	esult PASS
Test # Test RIP.2.5		a	PASS
Test # Test RIP.2.5	that a router does not encounter an error on receipt of a RIP Response with more	a	PASS

Comments on Test Results

RFC 2453 – Section 3.6

a. The RUT did not crash or generate any invalid packets.



T				T	14
Test #					sult
Test RIP.2.6	Source Address Validation			a	PASS
	that a router checks RIP Responses for	validity with regards to t	he source IP addr	ess.	
Comments on T	est Procedure				
RIP Respon then transm Response w Entry. A R	onse was transmitted, with a source addresse was then transmitted, with a multicast tted with a source address that is not on t as then transmitted with a source address P Response was then transmitted with a source address d a Route Entry. The packets transmitted	source address, and a Ro he directly connected ne the same as the RUT's r source address the same	oute Entry. A RIF twork, and a Rou receiving interface as the RUT's inte	P Respon te Entry e, and a	nse was . A RIP Route
Comments on 7	est Results	RFC 2453 – Section 3.9.2			
	d not learn any of the routes advertised in				
Test #				Re	sult
Test RIP.2.7	Next Hop Validation			а	PASS
transmitted, same as the	Test Procedure onse was transmitted, with a next hop equ with a multicast address as next hop. A l RUT's interface. A RIP Response was th nother network. The packets transmitted	RIP Response was then the the ten transmitted with a net transmitted	transmitted with a ext hop the same a	next ho	p the
Comments on 7	Test Results	RFC 2453 – Section 4.4			
	nored the RTEs with invalid Next Hops.				
	2004				



Group 3: Forwarding

The following tests cover portions of the Routing Information Protocol associated with the forwarding of packets.

Test #			Re	esult
Test RIP.3.1	Basic Forwarding		a	PASS
Purpose: Verif	y that a router can perform basic forwardi	ng functions.		
Comments on T	Cest Procedure			
An ICMP E Request wa	onse was transmitted with three RTEs: on cho Request was then transmitted, destine s then transmitted, destined for the networ nsmitted destined for a network the RUT observed.	ed for the host given in the host route. A rk given in the network route. An ICMP	n ICMP Echo Re	Echo equest
Comments on 7	est Results	RFC 1812 – Section 5.2.1.2		
was forward	led to the next hop given for the default re	or the network route. In Step 4, the ICMI pute.		lequest
was forward				lequest
Test #	led to the next hop given for the default ro			esult
Test # Test RIP.3.2	led to the next hop given for the default ro Priority Forwarding	oute.		
Test # Test RIP.3.2	led to the next hop given for the default ro Priority Forwarding y that a router prefers the best available ro	oute.	R	esult

Comments on Test Results RFC 1812 – Section 5.2.1.2

a. Each ICMP Echo Request was forwarded to the next hop specified in the most recently transmitted response packet.



Test #	<i>‡</i>			R	esult
Test 1	RIP.3.3	Expired Route		a	PASS
		-		b	PASS
Purp	ose: Verify	that a router does not use an expire	ed route for forwarding.	•	•
Com	nents on Te	est Procedure	~		
b. A	ansmitted f	nse was transmitted containing a de	efault route and a next hop of TR1. A RIP An ICMP Echo Request was transmitted de ed by the RUT were observed.	1	
Com	nents on Te	st Results	RFC 1812 – Section 5.2.1.2 and RFC 2453 – S	Section 3.8	
v b. T	alid.		forwarded to the next hop of TR1, as the rol forwarded to the next hop of TR1, as the rol		U

Group 4: MD5 Authentication

The following tests cover portions of the Routing Information Protocol that involve authentication of RIP messages by the MD5 algorithm.

Tes	t #			Re	sult
Tes	t RIP.4.1	Basic MD5 Authentication		а	PASS
				b	PASS
				с	PASS
Pu	rpose: Verify	that a router can perform basic MD5 aut	hentication processing functionality.		
Co	mments on Te	st Procedure			
a. b. c.	cation header The RUT wa sponse with a RUT were ob The RUT wa sponse with r were observe	s configured to perform MD5 authentica to authentication header and a Route Ent d.	e packets transmitted by the RUT were of tion, with a secret of ABCDEFGHIJKL. the Entry was transmitted. The packets t tion, with a secret of ABCDEFGHIJKL. ry was transmitted. The packets transm	bserved. A RIP Fransmitte	Re- d by the Re-
Co	mments on Te	st Results	RFC 2082 – Section 3		
a. b. c.	The RUT lea	ored the response packet with MD5 auth rned the route given in the MD5 authent not learn the route given in the un-authe	cated RIP Response.		



Sampl

Test #			Re	sult
Test RIP.4.2	Incorrect Digest		a	PASS
	-		b	PASS
			с	PASS
			d	PASS
	-	ges with MD5 authentication using an in-	correct di	gest.
Comments on Te	st Procedure			
 gle interface. digest for Ke b. The RUT wa sponse was tridigest by one c. The RUT wa sponse was tripackets transist d. The RUT wa sponse was tripackets transist 	A RIP Response was transmitted with a y ID 2, and a Route Entry. The packets s configured to perform MD5 authentica ansmitted with an authentication header , and a Route Entry. The packets transm s configured to perform MD5 authentica ansmitted with an authentication header mitted by the RUT were observed. s configured to perform MD5 authentica	tion, with a secret of ABCDEFGHIJKL. , an incorrect digest formed by incremen	D 1, but t A RIP F ting the c A RIP F oute Entr A RIP F	he Re- orrect Re- y. The Re-
Comments on Te	at Doculta	RFC 2082 – Section 3		
b. The RUT ign c. The RUT ign	ored the response message and did not he ored the response message and did not he ored the response message and did not he ored the response message and did not he	earn the advertised route.		
S				



Tes	t #			Re	sult
Tes	t RIP.4.3	Sequence Numbers a		a	PASS
				b	PASS
				с	PASS
				d	PASS
		that a router handles sequence numbers	properly.		
Col	mments on Te	st Procedure			
a. b.	transmitted b The RUT wa	s configured to perform MD5 authentica y the RUT were observed. s configured to perform MD5 authentica	tion, with password ABCDEFGHIJKL.	A RIP R	esponse
	then transmit metric. A RI	ed with an authentication header, a sequ ted with an authentication header, a sequ P Response was transmitted with an auth with a better metric. The packets transn	ence number N, and the same Route Entrentication header, a sequence number N	try with a	better
c.	The RUT wa was transmitt was transmitt	s configured to perform MD5 authentica ed with an authentication header, a sequ ed with an authentication header, a sequ	tion, with password ABCDEFGHIJKL. ence number N+1, and a Route Entry. A ence number N-1, and the same Route E	A RIP Res	sponse
d.	The RUT wa gle interface. sequence nur	packets transmitted by the RUT were obs s configured to perform MD5 authentica A RIP Response was transmitted with a nber N+1, and a Route Entry. A RIP Re neader for Key ID 2, a sequence number oserved.	tion, with two different keys (Key IDs 1 a properly formatted authentication head sponse was then transmitted with a prop	er for Ke erly form	y ID 1, a atted au-
Co	mments on Te	est Results	RFC 2082 – Section 3.1, 3.2.2		
a.		nsmitted periodic RIP Responses with pr e non-decreasing.	oper MD5 authentication. The sequence	numbers	in each
b.	1	P Response, the RUT learned the route a	advertised with the new metric.		
c.		rned the Route Entry in the RIP Respons		not learn	the
		with the new metric transmitted in Step 1			
d.	With each RI	P Response, the RUT learned the route a	advertised.		
	5				



Test #				Re	esult
Test RIP.4.4	Sequence Number Zero			a	PASS
				b	PASS
				с	PASS
Purpose: Verify	that a router handles a sequence nur	nber of zero properly.			•
Comments on T	est Procedure				
between the authentication ted. The part b. The RUT was sponse with seconds elap Route Entry c. The RUT was sponse with Response with	an authentication header, a sequence RUT and the Testing Station was dis on header, a sequence number of zero extets transmitted by the RUT were of as configured to perform MD5 auther an authentication header, a sequence used. A RIP Response with an auther with a better metric was transmitted. as configured to perform MD5 auther an authentication header, a sequence than authentication header, a sequence	connected and then rec , and the same Route E oserved. number of N, and a Ro number of Zero, and	onnected. A RIP Resonance on the same control of ABCDEFGHIJKL. South a better method of ABCDEFGHIJKL. South Entry was transmined by the RUT were of ABCDEFGHIJKL. South Entry was transmined by the same Route Entry	A RIP 1 itted. 30 and the s bbserved. A RIP 1 itted. A	ith an ransmit- Re- 0 same Re- RIP
Comments on T	ransmitted. The packets transmitted est Results	RFC 2082 – Section 3			
b. In Step 10, t	e RUT accepted the Route Entry and he RUT accepted the Route Entry an he RUT did not accept the Route Ent	d updated the metric.	c. 0		
Test #				Re	esult
Test RIP.4.5	UDP Checksums			a	PASS
				b	PASS
Purpose: Verify	that a router accepts MD5 authentic	ated RIP messages with	n varying UDP checks	sums.	
Comments on T			• •		
was transmitThe packetsb. The RUT was transmit	as configured to perform MD5 auther ted with a correct authentication hea- transmitted by the RUT were observ is configured to perform MD5 auther ted with a correct authentication hea- transmitted by the RUT were observ	ler, a Route Entry, and ed. atication, with password ler, a Route Entry, and	a random, incorrect, [™] d ABCDEFGHIJKL.	UDP che A RIP R	cksum. Lesponse
Comments on T	est Results	RFC 2082 – Section	3.2.1 and RFC 1812 – Secti	on 6.1	
a. The RUT di	d not learn the route advertised in the arned the route advertised in the RIP	RIP packet.	.2.1 anu Kr (1012 – Secti	011 0.1	



Tes	st #		R	esult
Tes	st RIP.4.6	Key Lifetime Expiry	а	PASS
			b	PASS
	<u> </u>	that a router handles key lifetime expiry properly.		
Co	mments on Te	est Procedure		
a. b.	lifetime of fiv correct MD5 then transmit the RUT wer The RUT wa lifetime of fiv of five minut seconds until header, a Roo transmitted fit	s configured to perform RIP-2 authentication, with password ABCDEFGHIJI we minutes. Every sixty seconds until Key ID 1 expired, a RIP Response was authentication header and a Route Entry. More than five minutes elapsed. A ted with a correct MD5 authentication header and same Route Entry. The pace e observed. s configured to perform RIP-2 authentication, with password ABCDEFGHIJI we minutes. One minute elapsed. Another key was configured with a Key ID es. The new key's lifetime was set to begin in one minute. One minute elaps Key ID 1 expired, a RIP Response was transmitted from TR1 with a correct 1 ate Entry, and a Key ID of 1. Every thirty seconds until Key ID 2 expired, a F rom TR2 with a correct MD5 authentication header, a Route Entry, and a Key and the packets transmitted by the RUT were observed.	transmitted RIP Respo kets transm KL, Key ID of 2 and a l ed. Every t MD5 auther RIP Respons	with a nse was nitted by 1, and a ifetime hirty ntication se was
Co	mments on Te			
a. b.	after the lifet sent in Step 3 In Step 7, the keys, while b	RUT learned the routes advertised in the RIP packets. The RUT advertised is oth keys were still alive. Following the expiry of Key ID 1, the RUT only tra	he RIP Res	ponse ing both
	using Key ID			