

SPIRENT. Communications

Inspired Innovation

Spirent TestCenter

RFC3918 组播组容量手工方式测试





测试拓扑示意图

如拓扑所示,STC 端口 P1 为组播源端口,P2/3/4 为组播客户端,组播客户端的端口分别加入不同的组播组,对应关系如下:

P2 -- 225. 0. 0. 1 - 10

P3 -- 225.0.0.11 - 20

P4 -- 225.0.0.21 - 30

首先按照拓扑所示,配置好被测设备 DUT。然后打开 Spirent TestCenter 软件,并 reserve 相应两个端口开始配置。

一、增加设备(组播源与组播客户端):

```
如下图所示,选择"All Devices",点击"Add…"按钮
```

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File Edit View Tools Actions Help						
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All Ports						
All Devices (Hosts, Routers,)	Filter by	device role	e: 🔜 All D	evices 🕎	Hosts 🛛 🚱 F	Routers
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🗄 🧶 Port //1/4						
Settings						

进入设备向导,选择要增加设备的 STC 端口。这里同时选择四个接口,如下图:

🎊 Create Devices - Select	t Ports	×
Steps Select Ports Select Protocols Select Encapsulation Configure Devices Preview	Select Ports Select ports to create devices on Show Port Type © Ethernet © POS/SDH © ATM Port //1/1 Port //1/2 Port //1/3 Port //1/4	
Reset -	< Back Next > Finish	Cancel
然后点击"Nex	t"进入下一步。在这个窗口不选择 Device 使用	目协议:

1	Create Devices - Selec	ct Protocols	×
	Steps Select Ports Select Protocols Select Encapsulation Configure Devices Preview	Select Protocols Select the protocols to enable on the devices Application protocols (e.g. HTTP, FTP, SIP and Video) are configured through the Protocol Technologies ✓ None (Traffic only device) Access Routing and MPLS Switching Protocol IP Versions Supported Name Enable IPv4 IPv6 (Dual Stz	-
	Reset 💌	< <u>B</u> ack <u>N</u> ext > <u>Finish</u> <u>C</u> ancel	

进入下一步,选择接口封装方式。这里选择 IPV4 不带 VLAN 方式即可。

Create Devices - Selec	t Encapsulation	×
Steps Select Ports Select Protocols Select Encapsulation Configure Devices Preview	Select Encapsulation Select encapsulation Upper Layer None IPv4 IPv6 IPv6 IPv4 and IPv6 (dual stack) Lower Layer Ethemet Number of VLAN Headers PPP/Cisco HDLC GRE over IPv4 ATM	
Reset V	< <u>B</u> ack <u>N</u> ext > <u>Finish</u>	Cancel
Steps Select Ports Select Protocols Select Encapsulation Configure Devices Preview	re Devices Configure Devices Configure device options Devices per port: 1 Total devices: 4 Device blocks per port: 1 Device blocks per port: 1 Device block mode: One network per block, multiple devices per network Device role: <none> Name: Device \$(BlockIndex) Ethernet Ethernet Enable RFC 4814 MAC addresses Random Seed: MAC address: 00:10:94:00:00:01 Step: per device=00:00:00:00:00:00:01 IPv4 IPv4 address: 7.0.0.2 Prefix length: 24 IPv4 gateway: 7.0.0.1 Gateway will use the network part of the IPv4 address. ToS/DiffServ (hex): C0 After generating devices Image: Image</none>	
Reset -	< Back Next > Finish	Cancel

按照拓扑图中的 IP 地址来进行填写相关设备参数。

每 STC 端口下配置一个 Device, "Devices Per port"数量为 1;
 IPv4 address 地址为 STC 跟路由器接口直连的地址。起始值为:
 0.0.2/24

3. 直连接口地址的 step 为 1.0.0.0。这样跟路由直连接口的 IP 地址 分别为 7.0.0.2 , 8.0.0.2, 9.0.0.2, 10.0.0.2;

下一步配置组播客户端 IGMP 相关参数,首先选择端口 2、3、4 下面的 Device,并使能 IGMP 如下图:

File Edit View Tools Actors Help Image: Configuration of the state of	🅙 Untitled.tcc - Spire	nt TestCenter									
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All Traffic Cenerators All Traffic Cenerators All Traffic Analyzers Port Name Port Seem Block Calculate Device 1 Port Name Name Port N/1/1 Port N/1/1 B- Port N/1/1 Port N/1/1 B- Port N/1/12 Port N/1/1 B- Port N/1/12 Port N/1/1 B- Port N/1/13 Port N/1/1 B- Port N/1/12 Port N/1/1 B- Port N/1/12 Port N/2 Port N/1/12 Port N/2 B- Port N/1/2 Device 2 Port N/12 Port N/2 B- Port N/1/2 Device 3 Composition 2 Calculate 2 Report Settings Port Name Port Name Add Composition 2 Add Select Device Active Multicast Groups Starting Group IP Port Name Active Group Groups Starting Group IP Composition Port Name Activ	All Multicast	Groups	Filter b	by device role:	All Devices	🔁 Hosts 🛛 🔮	Routers			Displaying 4 d	of 4 devices
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im Settings im 4 注意选择 IGMP 版本与 DUT 设置一致,这里选择 IGMP version2。 然后全选 Device 2、3、4,选择 "Edit Group Memberships…" 来增 加组播组。如下图: Zelect Device ● Add Opened Active Multicast Groups… ● Port Name Device ● Add Opened ● Port Name Active ● Manage Multicast Groups Starting Group IP ● Port Name Active ● Manage Multicast Groups Starting Group IP ● Port Name Active ● Manage Multicast Groups Starting Group IP ● Opened ● Add ● Device ● Active ● Manage ● Opened ● Opened ● Opened	🖭 🕘 Port //1	/4	Por	<i>t //1/4</i> Device	4 🔽	IGMPv2 🖸	0				
注意选择 IGMP 版本与 DUT 设置一致,这里选择 IGMP version2。 然后全选 Device 2、3、4,选择"Edit Group Memberships…"来增 加组播组。如下图: <pre></pre>	Settings				4						
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加払打住4。 外下含: Edit Group Memberships × Add × Delete * Manage Multicast Groups 論 Apply IGMP Group Memberships × Active Multicast Groups Starting Group IP Port Name Device Active Multicast Groups Starting Group IP	加加採加	加下因	र								
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	Port Name	Name	Active	Group	Groups	Starting	Group IP				
Clase											
										Clo	
										010	<u> </u>

点击增加,来为每一设备增加要加入的组。

Add IGMP/MLD Group Membe	rship X
Select a task	Add New Groups
Add new groups	Creates new multicast group(s) and maps these group(s) to the associated multicast host or router
C Use existing groups	
	2-> Starting group address: 225.0.0.1
	3 🔶 Group address increment: 0.0.0.1
	4 → Number of groups: 10 🛨
	Number of group blocks: 1
,	OK Cancel

增加组后结果如下:

Edi	t Group Memb	erships						×
Se	ect Devices 💌 🛛	🕂 Add 🗙 D	elete 🖏 M	anage Multicast (Groups	oply		
I	MP Group Mem	berships						
	Port Name	Device Name	Active	Multicast Group	Number of Groups	Starting Group IP		
►	1/2 (offline)	Host 2		Ipv4Group 1	10	225.0.0.1		
	1/3 (offline)	Host 3		Ipv4Group 2	10	225.0.0.11]	
	1/4 (offline)	Host 4		Ipv4Group 3	10	225.0.0.21	_	
]	
							_	
							_	
							•	Close

二、配置 RFC 3918 相关参数

首先,运行 RFC 3918 向导,菜单 Tools → Wizards…,然后选择 Test Wizards 下面的 RFC3918 Test Packages…。



选择参加 RFC 3918 测试的端口,这里选择四个端口:







Traffic Wizard					×
Select source netwo	ork and destination network			Service Se	pirent estCenter™ Component
Ports Frame Size Frame Traffic Load	Distribution Fully meshed Backbone Fully meshed Pair Filter Protocol: Device,Bfd,Rip,Lld ▼ Encapsulation: IPv4 Orientation Cunidirectional Switch Src/Dest Endpoints Mapping Cone-to-one Many-to-many Stream only generation Show All Headers	Source and Destination Source: (1) Source: (1) Source: (1) Source: (1) Source: (1) Source: (1) Source: (1) Source: (2) Source:	Select All	Destination: (3)	Select All
			<pre< td=""><td>vious Next> Finish</td><td>Cancel</td></pre<>	vious Next> Finish	Cancel

这里由于要建三个 StreamBlocks ,要注意在下一不选择"One Path per streamblock"。

Traffic Wizard		×
Setup general traf	fic configuration	Spirent TestCenter*
Ports Frame Size Frame Traffic Load Rx Port	General Stream block name prefix: StreamBlock 11 Frame Size (Bytes) (With CRC and Signature Field) Fixed Size: 128 Random Min: 128 C Increment Max: 256 Decrement Step: 1 Auto MIX Default Edit	 ✓ Vary Protocol & QOS Options Allow port to generate traffic to itself ✓ Expand stream blocks under ports ○ Multiple paths per streamblock One path per streamblock
		<previous next=""> Finish Cancel</previous>

其余页面逐个按 Next,缺省选择即可。之后回到 RFC 3918 Wizard。

Kicosto Test Package - Mult											
Steps	Multicast Traffic										
Select Wizard	select Multicast S sent to by the Multi	ticas	es that will t Sources	ser	d to the	defined groups. Select	Multicast Clie	ents that will Join th	e groups that a	ire being	
Select Test	Mariles Dark	in the		1-	14.1						
Select Ports	Monitor Ports	18	Add)	C De	elete	Z Ealt					
Configure Devices And		S	tream Bloc	:k	Layer F	ields	18		1	Î.	1
Multicast Traffic			State	A	tive	Name	Index	Controlled By	Source	Destination	Traffi
Aulticast Parameters		F				StreamBlock 7-1-1	0	generator	Host 1 (7	Ipv4Group 1	Pair
onfigure Test Options			0	0		StreamBlock 7-1-2	1	generator	Host 1 (7	Ipv4Group 2	Pair
Configure Multicast Group			۲	2		StreamBlock 7-1-3	2	generator	Host 1 (7	Ipv4Group3	Pair
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这里选择用于测试的流量,如果运行 RFC 3918 之前建立了其他流量, 这里可以去掉 Active 的选择。

Select Wizard Select Test Select Forts Configure Devices And Groups Multicast Traffic Multicast Traffic Multicast Barameters Configure Test Options Configure Test Options Configure Services And Broup Delay (seconds): 2 Leave Group Delay (seconds): 3 Multicast Group Addresses And Steps Base IP Address: 250.01 Base IP X6 Address: 100 Base IP X6 Address: 1100 Base IP X6 Step: 0.00.1: Group Increment: 11 Multicast Group Distribution Mode Eatency Type © FIFO © FILO © LIFO © ULO	teps	Multicast Parameters	
Select Test Select Forts Configure Devices And Groups Multicast Client Version: I Join Group Join/Leave Delay Multicast Group Diany (seconds): I Join Group Delay (seconds): I Jo	Select Wizard	Configure the Multicast test parameters that will be used in the RFC 3918 test	
	Select Wizard Select Test Select Ports Configure Devices And Groups Multicast Traffic Multicast Parameters Configure Test Options Configure Multicast Group Capacity Test	Multicast Client Version Client Version: GMPv2 Multicast Group Join/Leave Delay Join Group Delay (seconds): 15 2 Leave Group Delay (seconds): 15 3 Multicast Message Tx Rate: 1000 Multicast Group Addresses And Steps Base IP Address: 2250.01 Base IP Address: 1100 Base IP Address: 1100 Group Increment: 11 Multicast Group Distribution Mode Latency Type © FIFO © FILO © LIFO © LILO	

这里选择 RFC 3918 测试参数:

- 1. Join Group Delay: 发出加入报文多少秒后计算加入时延;
- 2. Leave Group Delay: 发出离开报文多少秒后计算离开时延;
- 3. Multicast Message Tx Rate: 组播消息发送的速率。

Select Wizard Select Test	Configure RFC 3918 Test Options Configure RFC 3918 test options	Arp and Learning	1	
Configure Devices And Groups Multicast Traffic Multicast Parameters Configure Test Options Configure Multicast Group Capacity Test	Number of Trials: 1 2 Duration (second): 60 Seconds 3 Test Start Delay (sec): 2 1 Frame Size (bytes) 4 Size: 128 Fixed Size: 128 1 Random Min: 128 Max: 1518 Step Start: 128 End: 1518 Step: 128 C Custom (Comma delimited, e.g. 64, 128, 256, 512, 1024, 1280, 1518) 128, 256, 512, 1024, 1280, 1518 Traffic Verification	L2 Learning Frequency Mode: Learning Frame Rate: Learning Frame Rate: Learning Repeat Count: C Same As Test C Fixed ARP Packet Rate: Retry Count: Results Results Collection Delay (sec): Tx Frame Rate: Tx Frame Count: C Abort test if traffic	Leam after topology chang 1000 5 5 Resulation 1000 15 15 100 100 100 115 100 100 115 115 110 110 110 1100 1100 110 110 110 110 110 1100 <	

Configuration Test Options 这个页面设置 RFC 3918 测试相关参数:

- 1. Number of Trials: 测试次数;
- 2. Duration: 每次测试时间多少秒;
- 3. Test Start Delay: 测试开始延时;

4. 设置测试帧长,这里有固定帧长、随机帧长、步进、客户自己填写 以及混合帧长的方式;

5. 设置 Arp 或者学习相关参数,需要根据被测试设备的要求填写; 接下来设置组播容量相关参数。

Coloritation
Select Wizard
Select Test Select Ports Configure Devices And Groups Multicast Traffic Multicast Parameters Configure Test Options Configure Multicast Group Capacity Test

1. 这里选择组播容量查询方式,可以选择二分法、步进或者组合方式,这里由于应用的手工方式的组播主机以及流量测试,因此选择 Step 方式;

 输入最大组的数量,这里输入需要测试最大的组的数量,注意这个 是全部断开组容量总和;

- 3. 初始测试组的数量,这里输入第一次测试组的数量;
- 4. 步长, 输入每次增加的组的数量;
- 5. 选择发送流量的方式: 固定、随机、步进以及手工方式。

"Run"按钮直接运行 RFC 3918 的测试,或者按"Finish"按钮后,在 STC 主界面的 Command Sequencer 里面点击绿色运行按钮来执行 RFC 3918 测试。

Command Sequencer 7 ×				
🔳 Edit Sequenter 🖬 🕨 🚺				
Command Name	P/F	Elapsed Time		
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Edit Stop Routine			*	
🛨 🖌 🖌 🖌 🖌 🖌	(00:00:00.781		
Sequencer Status: Idle Elapse	ed Tin	ne: 00:02:22.0	590	

三、在运行 RFC 3918 测试之后即可通过 Result Reporter 查看相关结果。