4 TestCenter 使用指导

4.1 基础使用向导

4.1.1 在 PC 机上安装控制程序(以 V3.70 为例)

(1) 源程序目录(以H盘为例进行说明):

₩ H: \		
和文件夹任务 ② 重命名这个文件夹 3.60_Setup_140714 該动这个文件夹	rtbits_setup	Testcenter 3 70_Setup_140708
(2)双击左键执行"TestCenter 应用程序"安装文件(可执行文件):	
🗀 H: \Testcenter 3.70_Setup_140708		
名称 🔺	大小 类型	修改日期
和文件夹任务 \land 💟 101729042. Spirent TestCenter Application	257,217 KB 应用程序	2013-6-22 9:08
创建一个新文件夹 ITCL 8.4.13 for Spirent TestCenter Automation	12,513 KB 应用程序	2010-6-10 9:38
NA这个文件夹发布到	18,883 KB 应用程序	2010-12-6 11:03
(3) 按提示步骤安装,安装过程状态加下。		
Spirent TestCenter Application - Installs	bield Vizard	
spirent restoenter apprication instail.	MIGIU VIZALU	
Setup Status		5.0
		States, Contract, Contract
	Contract of the local division of the local	
The InstallShield's (instd is remaring Spirent TestCenter Applicat	ion	-
The instalionielu wizaru is teritoving oplient Testcentel Applicat	iun	
Uninstalling		
C:\\Content\access_multicast\ppp\pppox_view_results.htm		
		-
InstallShield		
	Cano	el
	Conc	71 C
		7

(4) "TestCenter 应用程序"安装结束时,弹出如下对话框,选择[是]:



(5)进一步出现提示信息,选择[是]:

Question
Wave you already downloaded Spirent Device Commander installer from Spirent Communications support site? 尾①
(6)在第一步所说文件夹中,选择"TCL"安装文件,并按提示安装:
Select Spirent Device Commander Installer
查找范围(L): 🗁 Testcenter 3.70_Setup_140708 🛛 🔽 🔇 🌶 📂 🖽-
 Note: Note: Not
文件名(M): 文件名(M): 文件类型(T): Executable files (*. exe) ▼ 取消

(7)"TCL"安装结束:

TCL - InstallShield	Vizard
	TCL - InstallShield Wizard The InstallShield Wizard has successfully installed TCL. Click Finish to exit the wizard.
	< <u>B</u> ack Finish Cancel

(8) 安装 "WireShark 应用程序", 按提示进行即可。

(9) 启动 "TestCenter 应用程序", 设置 "TCL" 和 "Wireshark" 路径:

<i>>启动应用程序:



<ii> "TCL"路径:



<iii> "WireShark"路径(该步骤可选)



- 4.1.2 硬件安装及机箱加电
- (1) 安装板卡:



上图中共 4 个红色线框,上边两个红色线条框住的是机箱的左右两侧导轨,下边两条红色 线条框住的是板卡拉手条(用于承载板卡 PCB 的金属板)左右两边的边沿。

安装时将拉手条两边的边沿与两边导轨的开槽对齐,再慢慢将板卡推入机箱,直至拉手条前面板与机箱前面板平齐后,宁静固定螺栓。

(2) 连接电源线和网线,并开启电源开关:



"Ethernet"口为管理口,使用网线**直接连接**到管理 PC(任意一台装有"TestCenter Application"应用程序的 PC)或者通过管理网络(例如您办公室的局域网)连接 PC。

电源插口及开关见上图右侧圆圈,注意:开关"|"按下为开,跷起为关。

(3)如需同时使用两台机箱,还需要使用直连网线将两台仪表的"SPT SYNC"口连接起来,如下图:



下面一台为主(Master),上面一台为从(Slave),同步信号由主机输出,输入到从机,从 而两台机器共用主机的时钟源头。时钟同步网线可达 30 米,这种方式是几种时钟同步方式中, 误差最小的:

- Direct connection to a master chassis using a synchronization cable (highest priority)
- GPS ETR
- CDMA ETR
- NTP
- Chassis internal clock (lowest priority)

The chassis automatically switches to the most accurate timing source it can find.

多台机箱连接时,第二台的"SPT SYNC - OUT"接第三台的"SPT SYNC - IN",依次类推, 总的网线长度,不能长于 60 米。

(4) 连接测试仪与被测设备。

使用网线或者光纤,将测试仪前面的测试口,与被测设备(交换机、路由器、防火墙等)

的待测端口连接起来。

注:验证测试仪是否能够正常工作时,建议将测试仪的端口,两两之间用网线或者光纤直 接连接起来,称之为端口间环回。

(5) 给机箱加电:



按上图所示步骤,先将机箱"Power"按钮按下(机箱前面板左侧"Status"灯起初为红色), 等待 3~10 分钟(在此过程中,机箱前面板左侧"Status"灯会依次变为橙色、浅橙色、浅绿) 后,机箱启动完成(机箱前面板左侧"Status"变为纯绿色),。

然后板卡开始启动,板卡启动时,设备会发出轻微的"嘀"声,(板卡)前面板指示灯(上图3所示)由橙色依次变为浅橙、浅绿,直至纯绿,板卡启动需要8~15分钟。

注: TestCenter 的板卡支持热插拔,如需带电拔下板卡时,请先用区别针或者圆柱笔等尖头的物体,触动图中"5"处的"Hot Swap"按钮,"Status"等开始闪烁,大约 2~5 分钟后"Status" 灯会熄灭,此时可以取下板卡。

注:带电插入板卡时,直接插入即可,板卡开始启动时,设备会发出轻微"嘀"声。

4.1.3 连接机箱与应用程序、环回测试

(1) 设置"管理 PC" IP 地址:

为"管理PC"(思博伦标准叫法为"控制台")添加或修改 IP 地址,使得"管理PC"与 TestCenter 机箱 IP (机箱 IP 地址见机箱顶部标签)处于同一网段。

(2) 连接机箱与应用程序:

- <i>启动"管理 PC"上的"TestCenter Application"应用程序.
- <ii>关闭 "Welcome to Spirent TestCenter" 对话框。

<iii>注在主界面的对话框中,按下图操作:

Reserve Ports		Recent Files	
Connect to Chassis	and <u>Reserve Ports</u> 1 9 Offline Select Ports	Switch_loss_imix_1to2_0814.tcc Case1_thp_lat_loss_imix_2to1-08 Case1_thp_lat_loss_imix_2to1-oa	
Add New Port Set Manage Port Sets Reserve Recent Ports	Connection Name 192.168.0.97	Model	Status 4 右键 Expand or right-tick to connect
	Add Chassis Chassis <u>a</u> ddress: 192.168.097	A OK Cancel	Delete Chassis Add Multiple Chassis from a File

(3) 选择端口和缺省流量:

Select Ports				? <mark>x</mark>
Add Chassis Show Port	s: All Ports	-		
Connection Name	Model		Status	*
∃· ✔ 192.168.0.97	SPT-2U	10C Davy RIMCA 2001R	Connected	
Port 1	ZPORT	103 REV B (VISA-2001B	To Be Reserved To Be Reserved	
	1 2PORT	10G Rev B\MSA-200 1B	To Be Reserved To Be Reserved	
				-
Firmware Version: 3.70.440	6			
		2	3	
Add Offline Ports	Add Default <u>T</u> raffic:	L2 •	ок	Cancel

(4)建流**:**

<i>基于"RFC2544"模板建流:

Apply 最高目目の Techn	ologies The Perspective - The Sequencer 20 Reporter Wizards - 🗘 Summary Wizards Wizards RFC 2544 Select a wizard to use.
Wizards Filter: Clear Pevices	RFC 2544 Tests based on RFC 2544, Benchmarking Methodology for Network Interconnect Devices. The RFC 2544 with VLAN Network Device Benchmark Test Package is an essential tool enabling network testers to measure the performance of Layer 2 and Layer 3 switches and the networks on which they will be deployed. A component of the Spirent TestCenter, the test package provides a framework to test modern routing features within the guidelines of well- established standards.
Reset	< Back Next >

8 8 5 5 5 6 5 6 4	n 📲 📲 Technologies 🖶 Perspective 🗸 🔳 Sequencer 👰 Reporter 🎇 Wizards 🗸 Summary
	2 RFC 2544
😤 RFC 2544 - Select Test	
Steps Select Wizard Select Test Select Ports Configure Endpoints Configure Traffic Configure Test Options Frame Loss Parameters	Select Test Select the test(s) to perform Back-to-back Test Characterizes the ability of the DUT to process back-to-back frames. This test simulates popular network activity such as requests for large amounts of data over an Ethernet network, that may use a relatively small MTU size and that can result in many fragments being transmitted. ✓ Frame Loss Test 3 Determines the percentage of frames that should have been forwarded by a network device under steady state (constant) load that ware not forwarded due to lack of resources. Latency Test Determines the minimum, average, maximum transmit delay through the DUT. Throughput Test Determines the maximum rate at which none of the offered frames are dropped by the DUT. Test Options
	Enable Traffic Group Test Options
Reset -	<

<ii>达择测试仪端口:



<iii>添加 "Device"(可以理解为有独立 IP 的一台台主机<PC>,一个端口可以模拟多台主机)

i teps Select Wizard Select Test Select Ports		Configure Er Configure of Add X Delet	nd Points end points for t 1 e 2 Edit Inte	est traffic rface					
Configure Endpoints Configure Traffic	E	Port Name	Device	Device	Role	Incoming	Outgoing	Encapsulation	Router ID
Configure Test Options		Port //1/1	Device 1	1		Linto	Linko	EthernetII/IPv4	192.0.4.1
Frame Loss Parameters		Port //1/2	Device 2	1				EthernetII/IPv4	192.0.5.1
		Port //2/1	Device 3	1				EthernetII/IPv4	192.0.6.1
		Port //2/2	Device 4	1				EthernetII/IPv4	192.0.7.1

<iv>选择端口和协议:

Create Devices - Select Port	15			x
Steps Select Ports	Select Ports Select ports to create devices on			
Select Protocols Select Encapsulation Configure Devices Preview	Show Port Type © Ethernet POS/SDH ATM FC			
Reset V	< Back Next >	1		Enish Cancel
Steps Select Protocols	Select Protocols Select the protocols to enable on the devices Application protocols (e.g. HTTP, FTP, SIP and V	ideo) are configured throu	ugh the Application Layer Wizard	
Select Encapsulation Configure Devices	Vone (Traffic only device) Access Rou	ting and MPLS 🔲 Swit	ching	
Preview	Protocol Name	IP Enable IP	Versions Supported /4 IPv6 IPv4 & IPv6 (Dual Stack)	
Reset	< Back Next >	2		<u>Finish</u> <u>Cancel</u>

<v>选择封装:

Steps Select Ports Select Protocols	Select Encapsulation Select encapsulation	
Select Encapsulation Configure Devices Preview	Upper Layer None IPv4 IPv6 IPv6 (dual stack) Lower Layer Ethemet PPP/Cisco HDLC GRE over IPv4 ATM FC	

<vi>为主机配置 IP:

Create Devices - Configure	Devices	Address Step
Steps Select Ports Select Protocols Select Encapsulation Configure Devices Preview	Configure Devices Configure device options Devices per port: Device blocks per port: Device block mode: One network per block, multiple devices per network Device role: Chone> Name: Device \$(BlockIndex) Ethernet MAC address: 00.10.34:10:00.01 Step: per device=00:00:00:00:00:01 Bevice	Start value: 10.1.1.1 4 Step per device: 0.0.0.1 Port Step Determines the next value when stepping across ports. If no step is provided, the value will continue from where it left off. To repeat across ports, set the step per port to zero. Step per Port: 100.00 5 6 OK Cancel
Reset	IPv4 address: 10.1.1.1 2step: per device=0.0.0.1.per port=1.0.0.0 Prefix length: 24 IPv4 gateway: 10.1.1.1 Gateway will use the network part of the ToS/DiffServ (hex): C0 C C C C C C C C C C C C C C C C C C	T IPV4 address.

为简单器件,本例中每个端口只分配了一台主机(即"Device"),如需多台主机,修改上图中"1"标示的位置即可。

<vii>预览主机配置结果:

Select Protocols Select Encapsulation	ind d Pros						
	: UN Tage	of 1	D DO Pr	eview mode: Full	•	Options Page Filter	
Configure Devices							
review	Drag a column h	eader here to group	by that column.				1
	No	Port	Name	EthIIIf1.SrcMac	lpv4lf1.Addr	Ipv4lf1.Gateway	
	1	Port //1/1	Device 1	00:10:94:10:00:01	10.1.1.1	10.1.1.1	
	2	Port //1/2	Device 2	00:10:94:10:00:02	20.1.1.1	20.1.1.1	1
	3	Port //2/1	Device 3	00:10:94:10:00:03	30.1.1.1	30.1.1.1	-
	4	Port //2/2	Device 4	00:10:94:10:00:04	40.1.1.1	40.1.1.1	

<viii>返回流配置主流程继续配置,下图同步骤<iii>:

Steps Select Wizard	Н	Configure Er Configure	n d Points end points for te	est traffic					
Select Test Select Ports	E	Add Device Interface							
Configure Endpoints		Port Name	Device Name	IPv4 Address	IPv4 Modifier	IPv4 Prefix Length	IPv4 Default Gateway	IPv4 Gateway Modifier	Resolv Mac Ad
Configure Less Options	Þ	Port //1/1	Device 1	10.1.1.1	Step = 0.0.0.1	24	10.1.1.1	Step = 0.0.0.0	
Fidine Loss Faidmeters		Port //1/2	Device 2	20.1.1.1	Step = 0.0.0.1	24	20.1.1.1	Step = 0.0.0.0	
		Port //2/1	Device 3	. 30.1.1.1	Step = 0.0.0.1	24	30.1.1.1	Step = 0.0.0.0	
	-	Port //2/2	Device 4	. 40.1.1.1	Step = 0.0.0.1	24	40.1.1.1	Step = 0.0.0.0	

<ix>配置流对:

RFC 2544 - Configure Traffic Steps Select Wizard Select Test Select Ports Configure Endpoints	Configure Traffic Configure traffic to be Configuration Mode © Generate traffic based End Points I/P Header	transmitted when test is started.	e existing stream blocks or c	reate new stream blocks for the test	×
Configure Trante Configure Test Options Frame Loss Parameters	Distribution Pair Backbone Fully meshed Fiter Protocol: Device,FC Encapsulation: IPv4 Orientation Unidirectional Bidirectional	Sources: (1) Filter:	Select Multiple Ports Apply Clear	Destinations: (1) Filter: □ Port //1/1 □ Device 1 (10.1.1.1/24) □ Port //1/2 □ Port //1/2 □ Port //2/1 □ Device 2 (20.1.1.1/24) □ Port //2/1 □ Device 3 (30.1.1.1/24) □ Device 4 (40.1.1.1/24)	Select Multiple Ports Apply Clear 2
Reset -	Switch Src/Dest Endpoints Mapping One to one Please create network p	Pairs: (0) Device 1 (10.1.1.1/24)<->Device 2 (20.1 soint pair(s). a a a <td>Add Rer 1.1./24) 4</td> <td>nove Remove All</td> <td>Bun <u>C</u>ancel</td>	Add Rer 1.1./24) 4	nove Remove All	Bun <u>C</u> ancel

<x>配置学习包等测试选项:

iteps	Scheduling Latency Type	
Select Wizard	Start traffic delay (second): 2 O LILO	
Select Test	Stagger start (64 microseconds): 0 O LIFO (Store and forward)	
Select Ports	Delay after transmission (second): 15 O FIFO (Bit forwarding)	
Configure Endpoints	C Enable Learning	
Configure Traffic		
Configure Test Options	Mode:	
Frame Loss Parameters	Delay before learning (sec): 2	
	Rate (frames/sec): 1000 🚔 💿 Learn once	
	Repeat count: 5 C	
	C Learn every frame size	
	Learning Frame Size Clearn every iteration	
	Same As lest	
	C Enable Traffic Visition	
	Verification Frequency: Verify every iteration	
	TX Frame Count: TUU	
	✓ Abort test if traffic verification fails	
	Save detailed stream results with every iteration	
	││ ^{◎ Measure Jitter} │2 如需测试抖动,请选择	

<xi>配置测试流量、包长等测试参数:

🎉 RFC 2544 - Frame Loss Para	meters	x
Steps Select Wizard Select Test Select Ports Configure Endpoints Configure Traffic Configure Test Options Frame Loss Parameters	Frame Size (bytes) Number of trials: 1 测试一次 Trial Duration ③ ④ ③ Time (sec): ③ ④ ③ Bursts (frames): 1000 ④ 2 每次迭代测试30秒 ⑥ Custom (Comma delimited, e.g. 64, 128, 256, 512, 1024, 1280, 1518) ⑤ ④ Ital: 128 Gustom ④ Mix 3 测试七种包长	
	Traffic Load Load units: Percent (%) • Random Min: 10 Max: 50 Step Start 90 End: 100 Step: 5 4 Custom Comma delimited (e.g. 10.20.30) 10, 20, 50 Test Case Configuration	Ш
Reset	Image: Weak Load Loop after 2 passing iterations. 5 < Back	- - -

(5)运行测试、监控流量

Edit Sequence				916 J.
Command Name	1	P/F Start Time	Elapsed Time	
-	Benchmark Iterate Load Size 1	2014-09-11 21:45:47	00:00:00.387	
	Set Traffic Duration 1	2014-09-11 21:45:47	00:00:00.003	
	Clear All Results 1	2014-09-11 21:45:48	00:00:00.356	
-	Start Analyzer 1	2014-09-11 21:45:48	00:00:00.003	
	✔ Wait 1 (2 seconds)	2014-09-11 21:45:48	00:00:02.112	1
	🖌 Start Traffic 1	2014-09-11 21:45:50	00:00:00.599 🤈	
	🔁 Wait For Traffic Stop 1	2014-09-11 21:45:51	00:00:13.002	
- m	Wait 2 (15 seconds)		00:00:00.000	
	Stop Analyzer 1		00:00:00.000	
L.,	RFC 2544: Save Iteration Results 1	t	00:00:00.000	
Benchri	narkTestStopCommand 1			i i
Edit <u>S</u> top Routine]			C
equencer Status: Ru Trial 1 of 1, Frame Siz	unning ze: 64, Load Size: 95		Elapsed Time	: 00:01:30.87
Exposed Properties	Command Sequencer			
				中 :
sic Traffic:Results 1				

B	asic Counters	Errors	Triggers	Protocols	Undersize/Oversi	ze/Jumbo	PFC Counters	User Defined		
	Port Name	Tx L1	Rate (bps)	Rx L	1 Rate (bps) 3	Generato	or Count (Frames) Generator	Sig Count (Frames)	Rx Sig C
Þ	Port //1/1	8,961,	.131,574	8,90	1,096,744	58,288,8	14	58,288,814		60,179,8
	Port //1/2	8,961,	.096,561	8,96	51,131,780	60,919,5	40	60,919,540		61,613,8

(6) 查看结果并导出结果:

I	le Spirent TestCenter Results Repo	orter	۱.															
I	<u>File T</u> ools <u>R</u> eport <u>H</u> elp		-															
	🖥 🛎 🛅 💊 🔍 🚜 🚜 🗛 🗅	1 🗄 🗆	Þ) 🔊 🗄	1 🕄	🕘 Rows: 1	to	6	🕪 Iot	al Number	Of Rows	: 6						
I	ults	Gr	i d		4													
	2544-FL-Summary-1_2014-09-11_21-4	Y	X	CURRE	NT FILTE	RS :												
I	RFC 2544 Frame Loss Iest Resul	I	Id	Fra	Conf	Avg Frame Size		. Intende	Load (%)	Offered	Load (%)	Tx I	'rame Count	Rx	Frame Count	Frame Loss	Percent 1	Loss (%)
I	-	1	0	Fixed	64	64		. 90		87.501		781,	256, 834	781,	, 256, 834	0	0	
I	2	1	1	Fixed	64	64		. 95		93.663		836,	274, 883	836	, 274, 883	0	0	
I		1	2	Fixed	128	128		. 90		89.277		452,	416, 916	452	, 416, 916	0	0	
I		1	3	Fixed	128	128		. 95		94.873		480,	773, 480	480	, 773, 480	0	0	
I		1	4	Fixed	256	256		. 90		89.611		243,	508, 651	243	, 508, 651	0	0	
I		1	5	Fixed	256	256		. 95		94.521		256,	851,603	256,	, 851, 603	0	0	
I		1	6	Fixed	512	512		. 90		89.866		126,	690, 319	126	, 690, 319	0	0	
																	3	