

SmartFlow 软件安装及测试仪端口间环回测试

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1 SmartFlow 介绍

SmartFlow--全线速率 QoS 性能分析测试软件,主要用于分析基于策略的网络设备性能和行为。

SmartFlow 是业界第一个测试 QoS 和分析新一代基于策略的网络设备的性能与运行情况 的测试软件。SmartFlow 可以执行转发和策略测试。它利用 SmartMetrics 及 TeraMetrics 测试模块的分析功能生成不同服务级别的传输流,然后分析每个输入流的性能或测试设备 (或网络)转发巨量数据流的能力。它还能分析设备正确处理被测试网络或设备中所采用的 策略的能力。

SmartFlow 可以测试各种服务等级的性能,如 Diffserv、 IP 优先级、VLAN 优先级或协 议等。SmartFlow 可在每个端口上(最多为 640 个端口)产生和跟踪记录几千条流,并允许 用户按流或按分组记录结果。SmartFlow 能够显示图形化和详细日志结果,使用户可以记录 每个优先级段中的所有流,执行优先级对比,SmartFlow 能够自动生成测试脚本并支持自动 化测试。

SmartFlow 主要测试项目:

- ➢ 吞吐量(Throughput)
- ➢ Jumbo 测试(包括延迟、丢包和失序)
- ▶ 帧丢失(Frame Loss)
- ➢ 延迟(Latency)
- ➢ 延迟分布(Latency Distribution)
- ➤ 延迟变化(Latency Over Time)
- ➢ 延迟快照(Latency Snap Shot)
- ➢ SmartTracker 测试(智能 QoS 分析)

SmartFlow 关键特征:

- ➤ 在同一端口上支持 IPv6 及 IPv4/ IPv6 双栈混合测试。
- ➤ 在同一端口上支持 IGMP 组管理和组播/单播混合流量测试。
- ▶ 支持 IPv4/ IPv6 VLAN 堆栈。
- ▶ 支持 MPLS 标签堆栈。
- ▶ 支持 IMIX 并支持任意编辑新的模板。



- ▶ 支持用户指定和编辑任意协议头。
- ▶ 支持按流数据中任意两个字节进行 QoS 分析。
- ▶ 支持在 IP/ATM 混合流量 QoS 性能测试。
- > 支持时间定长和包数目定量的测试。
- 由于 SmartFlow 的灵活性和丰富的特征,可很容易的用于定制如下测试:
- ▶ 2 层交换机
- ▶ 2 层和 3 + 交换机和路由器
- ▶ 使用 DHCP 和 cable/DSL modems 的宽带接入应用



2 SmartFlow 软件安装

- (1) 进入到安装光盘目录,双击安装文件。
- (2)确认程序安装,点击"NEXT"。



(3) 安装协议界面,选择"I accept",点击"NEXT"

| SmartFlow 5.60 Setup | × |
|---|---------|
| License Agreement Please read the following license agreement carefully. | SPIRENT |
| BY ACCESSING OR EXECUTING THE SOFTWARE, YOU AGREE TO BE BOUND THE TERMS OF THIS AGREEMENT. Spirent Communications, Inc. ("Spirent") and its licensors provide the software contr on the media in the package and/or as part of the equipment supplied by Spirent ar modifications, enhancements to and/or replacements of such Software", together with associated documentation (the "Documentation") and license their use on the terms conditions set forth herein. LICENSE: Spirent grants you a nontransferable and nonexclusive license to use the I go not accept the terms of the license agreement I go not accept the terms of the license agreement | D BY |
| <back next=""></back> | Cancel |

(4)选择安装路径,点击"NEXT"。



| SmartFlow 5.60 Setup | X |
|---|---|
| Choose Destination Location | - |
| Select folder where setup will install files. | SPIRENT |
| Please enter the location where you would lik folder name or click the Browse button to finc | e to install the program. You may type a new I a new location. |
| C:\Program Files\SmartBits\SmartFlow | |
| | Browse |
| | |
| | |
| | |
| InstallShield | |
| | (Back Next) Cancel |
| | |

(5)选择"Complete"安装类型,点击"NEXT"。



(6) 设置程序在开始菜单中的名称(采用默认名称), 点击 "NEXT"。

| SmartFlow 5.60 Setup | × |
|---|---------|
| Select Program Folder Please select a program folder. | SPIRENT |
| Setup will add program icons to the Program Folder listed below. You may type a new for name, or select one from the existing folders list. Click Next to continue. Program Folder: | older |
| Existing Folders: Microsoft Office NetWaiting | |
| SmartBits Applications Windows Live WinRAR 阿里旺旺 时件 | |
| 管理工具 金山词霸 2006 | |
| < <u>B</u> ack <u>N</u> ext> C | ancel |

(7) 点击" Install ", 开始安装。



| SmartFlow 5.60 Setup | X |
|---|------------|
| Ready to Install the Program The wizard is ready to begin installation. | SPIRENT |
| Click Install to begin the installation. | |
| If you want to review or change any of your installation settings, click Back. Click Cance the wizard. | el to exit |
| InstallShield | ancel |

(8) 在弹出的界面中点击"是",安装完毕后在桌面上创建快捷方式。

| Questi | on | × |
|--------|--|---------|
| 2 | Would you like to create a shortcut of SmartFlow on your d | esktop? |
| | 是(1) 否(1) | |

(9) 确认 RPM 存放目录,点击"NEXT"。

| Sma | artFlow 5.60 Setup | X |
|-------|---|---------|
| Aı | pplication Installation | SPIRENT |
| | SmartFlow | |
| | The SmartFlow application has been successfully installed. For certain functionality, this application requires one or more RPM files to be installed on the TeraMetrics cards | |
| | The application RPM files can be found in: | |
| | 'C:\Program Files\SmartBits\SmartFlow\RPM' | |
| | | |
| | | |
| | < | |
| Insta | IIShield | |
| | < <u>Back</u> | ancel |

(10) 确认 Down load Manager 信息,点击"NEXT"。





(11) 在弹出的界面中点击 "Finish", 安装完毕

| SmartFlow 5.60 Setup | |
|----------------------|---|
| | InstallShield Wizard Complete The InstallShield Wizard has successfully installed SmartFlow. Click Finish to exit the wizard. |
| | < Back Finish Cancel |

3 基于 SmartFlow 的测试仪端口间环回测试

端口间环回测试指用双绞线(UTP-5)或光纤将 SmartBits 测试仪的两个端口(用户端口)直接连接起来,数据流不经过其他设备,用以验证测试仪自身功能。

注意:SmartBits 的模块(板卡)有的不支持自动翻转功能(Auto MDI-X),做端口间 环回测试时,需使用交叉网线连接,例如LAN-3101B。

3.1 测试方案



3.2 测试环境需求

- ▶ SmartBits测试仪 (SmartBits 600 机箱, LAN-3321A 板卡), 1 套。
- ▶ 测试仪控制台 (PC 机, Windows2000 或 XP 操作系统), 1 台。

- ➢ SmartBits测试软件(SmartFlow 5.5 Demo,运行于控制台上),1 套。
- ▶ 串口线,1条。
- ▶ 网线,若干。

3.3 测试环境搭建

使用双绞线(UTP-5)将 SmartBits 测试仪的两个端口(用户端口)直接连接起来,其他硬件安装请参考《SmartBits 硬件安装及机箱 IP 地址设定_Spirepair(V1.1)》相关章节。

3.4 详细测试步骤

3.4.1 启动 SmartFlow 软件并与机箱连接

(1)开始菜单\程序\SmartBits Applications\SmartFlow\SmartFlow, 合动
 SmartFlow应用软件,出现如下界面:



(2) 选择 Try, 进入 SmartFlow 主界面。



| 2009/20 - SEALAR TOA | | | | | | | | | |
|----------------------|---------------------------|--------------|------------|-----------------|-------------|-----------|------------------------|----------------|-------|
| le Edit Yiew Action | Setup Bun Icols Renglis | Melp | | | | | | | |
|) 📽 🔛 🗢 🕫 🚛 | መ መ 🖉 🖻 🗑 🖉 | © 🖬 🖬 | 8 | | | | | | |
| Setup and Run | Cards IPv4 Networks I | PVG XAR | ATH H | Multicast Gro | ups Seart | Flows 1 | est Setup DGP MPLS | LSP Options | |
| Certip and rear | Show columns for: 🔽 1 | Otherne: 🔽 🛛 | POS 🔽 | ATH 🔽 H | 7 | | | | |
| a 📩 | Tort Nodel | Test Los | d Interfa- | ce Read Stat | e Speed | Duple | z Auto Regotiation | Addr Resolutio | n Hal |
| | Post 1 LAN-33254 | St ep | Copper | Active | 1000K | Full | Force Symmetric | Trabled | 되 |
| Throughput | 2011 2 LAN-3325A | Step | Copper | Active | 1000K | Full | Force Symmetric | Trabled | 되 |
| | Post 3 LAN-3325A | Step | Copper | AC7148 | 1000K | Full | Force Symmetric | Trabled | 되 |
| 6 | Post 4 LAN-3325A | \$1 ep | Copper | Active | 1000K | Ful1 | Force Symmetric | Trabled | 4 |
| U | Post 5 LAN-3325A | \$149 | Copper | Active | 1000. | Ful1 | Force Symmetric | F Inabled | 12 |
| Junbo | POINT 6 LAN-3325A | \$1 ep | Copper | Active | 1000K | Full | Force Symmetric | Trabled | 9 |
| | 2011 7 LAN-3325A | 51 ep | Copper | Active | 10000 | Ful1 | Force Symmetric | F Enabled | 9 |
| | PORT 8 LAN-3325A | \$1.ep | Copper | Active | 1000X | Full | Force Symmetric | Tabled | 9 |
| V | 2011 9 LAN-3325A | \$1.ep | Copper | Active | 1000% | Ful1 | Force Symmetric | F Enabled | 5 |
| Frane Loss | 2011-10 LAN-3325A | \$149 | Copper | Active | 1000X | Ful1 | Force Symmetric | Trabled | 9 |
| | 2011 11 LAN-3325A | 5140 | Copper | Active | 1000% | Full | Force Symmetric | F Inabled | 되 |
| | 2011 12 LAN-3325A | \$1.4p | Copper | Active | 1000X | Ful1 | Force Symmetric | Trabled | P |
| | 2011 13 LAS-3325A | 51.4p | Copper | Active | 1000% | Ful1 | Force Symmetric | Trabled | 9 |
| Latency | 2011-14 LAN-3325A | 51 ep | Copper | Active | 10000 | Ful1 | Force Symmetric | Trabled | 5 |
| | 2011 15 LAN-3325A | Step | Copper | Active | 1000K | Full | Force Symmetric | Tabled | V |
| 12 | 2011 16 LAN-3325A | Step | Copper | Active | 1000K | Pull | Force Symmetric | Trabled | 4 |
| | 2011 17 LAN-3325A | Step | Copper | Active | 1000K | Full | Force Symmetric | Tabled | 4 |
| ancy Distribution | 2011 18 LAN-3325A | Step | Copper | Active | 1000K | Full | Force Symmetric | Trabled | A |
| | 2011 13 LAN-3325A | Step | Copper | Active | 1000K | Full | Force Symmetric | Trabled | P |
| | 2011 20 LAS-2025A | \$₹4p | Copper | Active | 1000K | Full | Force Symmetric | Trabled | 되 |
| 6 | 2011 21 LAS-1025A | St 4p | Copper | Active | 1000K | Full | Force Symmetric | Trabled | P |
| - U | 2011 22 LAS-2025A | \$₹4p | Copper | Active | 1000K | Full | Force Symmetric | Trabled | 4 |
| stency Over Time | Port 20 LAS-3025A | Step | Copper | Active | 1000K | Full | Force Symmetric | F Inabled | R |
| | Post 24 LAS-50254 | Step | Copper | Active | 1000K | Full | Force Symmetric | Trabled | R |
| | Post 25 LAN-3025A | Step | Copper | Active | 1000K | Full | Force Symmetric | Tabled | R |
| | 2011 26 LAS-1025A | Step | Copper | Active | 1000K | Full | Force Symmetric | er Inabled | |
| Results | < | | | | | | | | > |
| elp. press Fi | | | | | | | | Connections = | 0 0 |

(3) 设置 SmartBits 的连接地址:

<1> 菜单 "Setup " "Chassis Connections...",进入 "Setup SmartBits Connection "对话框,选择 "Add IP..."进入 IP Connection 对话框,选择 "IPv4", 在 "IP address "写入 SmartBits 的 IP 地址, "TCP Port "为:16385,在 Name 栏为 此连接命名,如 SMB600。

| 11 / L) 11 / O | COM Port | /IP Baud Rate/TC | P Port Name | dd Serial. |
|----------------|----------|--------------------|-------------|-----------------|
| ✔ IPV4 | 192.168. | 0.153 16385 | SMB600 | C |
| | | IP Connection | | Add Lr |
| | | | | <u>De</u> lete |
| | | • IPV4 | C IPV6 | Modify |
| | | IP address 192.16 | 68. 0. 153 | Move <u>U</u> p |
| | | TCP 118295 | | Move Dowr |
| | | 10303 | 2 | OK |
| | | Name (SMB600 | | |

<2> 通过 window 系统的 " ping 命令 " 来测试网络连接状态。



SPDI-TS-SMB-0936



注意:192.168.0.153 为 SmartBits 600 机箱控制端口的 IP 地址, PC 机 IP 地址需与之

位于同一网段,如192.168.0.100。

- (4) 连接 SmartFlow 与 Smartbits 机箱。
 - <1> 菜单 "Actions " "Connect"(快捷键为 F8)。

| 🤞 无标题 – Sma | rtFlow | | | | |
|--|-------------------------|---------------------------------|-----------------------------|-----------------------|----------|
| <u>F</u> ile <u>E</u> dit <u>V</u> iew | Action Setup Ru | un <u>T</u> ools Res <u>u</u> l | ts <u>H</u> elp | | |
| | Connect QCDisconnect | F8 Shift+F8 | | ? | |
| Setup and Rur | 🚥 <u>S</u> top Test | Shift+F5 | IPv6 WAN Z Etherne V P | ATM Mui OS ⊽A | lt TM |
| a | DHCP Request | | Test Loa Step | d Interface Copper | ļ |
| Throughput | 🐺 DHCP Status | | Step | Copper | 4 |
| AL. | Port 4 | LAN-3325A | Step Step | Copper Copper | 4 |
| Jumbo | Port 5 Port 6 | LAN-3325A LAN-3325A | Step Step | Copper | 4 |

<2> 连接成功后,右下角的连接状态显示为 "Connections=1",指示灯显示为绿

色。



SPDI-TS-SMB-0936

| 🔹 无标题 - SmartFlow | | | | | | | | |
|--|--|---------------|---|--|-----------------|---------|--|--|
| File Edit View Action Setup Bun Johls Benglts Help | | | | | | | | |
| | | | | | | | | |
| Setup and Run | Image: Serve and Run Cards IPvt Networks IPv6 NAN AIM Multicast Groups SeartFlows Test Setup NGP MFLS LSF Options Setup and Run Show columns for: Image: Test Setup NGP MFLS LSF Options | | | | | | | |
| The engliques | Port Hodel Test Lo 393600 2-1 LAN-3321A Step 393600 2-2 LAN-3321A Step | Copper Active | ate Speed Duple 1000X Full 1000X Full | Auto Regotiation Force Symmetric Force Symmetric | Addr Resolution | Beserr | | |
| ٢ | | | | | | | | |
| Frank Loss | | | | | | | | |
| Latency | | | | | | | | |
| Latency Distribution | | | | | | | | |
| Latency Over Time | | | | | | | | |
| Latency Susp Shot | | | | | | ~ | | |
| Results | | | | | Connecti | sos = 1 | | |

3.4.2 配置端口的工作模式

(1) 端口模式配置:

LAN-3321A 为双介质(光电互斥)板卡,端口有多种可选模式。本例中端口配置为电口 (Copper),使用如下两种工作模式分别测试:

<1> 1000M, 全双工。

| Cards | IPv | 4 Networks | s IPv6 W. | AN ATM | Multicast | Groups | SmartFlo | ws Test Setup BGP | MPLS LSP Options | |
|----------|------|------------|---------------|-----------|------------|---------------|----------|-----------------------|--------------------|-----------|
| Show | colu | mns for: | 🔽 Etherne | 🔽 POS | 🔽 ATM | 🗸 BGP | | | | |
| Port | | Nodel | Test Load | Interface | Read State | Speed | Duplex | Auto Negotiation | Addr Resolution | Multiuser |
| SMB600 2 | 271 | LAN-3321A | Step | Copper 💌 | Active | 1000 X | Full | Force Symmetric | Enabled | 🔽 Reserve |
| SMB600 3 | 2-2 | LAN-3321A | Step | Copper | Active | 1000 X | Full | Force Symmetric | Enabled | 🔽 Reserve |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

<2> 100M, 全双工。

| Cards IPv | 4 Networks | : IPv6 ₩ | AN ATM | Multicast | Groups | SmartFlo | ws Test Setup BGP | MPLS LSP Options | 5 | | |
|--|------------|-----------|-----------|------------|----------------|----------|-----------------------|--------------------|-----------|-----------------------------|--|
| Show columns for: 🔽 Etherne: 🔽 FOS 🔽 AIM 🔽 BGP | | | | | | | | | | | |
| Port | Model | Test Load | Interface | Read State | Speed | Duplex | Auto Negotiation | addr Resolution | Multiuser | lOGig DIC | |
| SMB600 2-1 | LAN-3321A | Step | Copper | Active | 100 M | Full | Enable | Enabled | Reserve | Enabled | |
| SMB600 2-2 | LAN-3321A | Step | Copper | Active | 100 M 💌 | Full | Enable | Enabled | 🔽 Reserve | Enabled | |
| | | | | | | | | | |) | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

注:测试方案中提到了 100M 和 1000M 两种吞吐量测试,测试除了本节所述的端口速率

外,其他设置与操作过程完全一致。

(2) 禁用地址解析:



| ●无标题 - SmartFlow | 0 | | | | | | | | | 2 | |
|-----------------------|----------------------|-------------------------|----------------|--------------------------------------|--|-----------------|---------------|--------------|-------------|-------------------|---|
| Eile Edit Lier Action | Eatup Bun | Icals for | uglis Be | dp | | | | | | | |
| 0000 | 田田司 | 1 10 14 | 10 0 | 9 8 8 | | | | | | | |
| Setup and Run | Curds I Shew to | Pel Katern Lunns For | in 194 | i I NAR ATR I Arter 17 POS 17 | halticaet Groups 1 ADB 17 Mil | law (Floor) 1 | est Setup 1 | or 1171 12 | 7 Options | 1 | |
| | Port COL 2-1 | Nodel Rifebblik | Pepler Full | Auto Negotiation | Addr Resolution | Rullinger | Totis Bit | Tre Capable | Initians | NAC Address | 1 |
| The enablerst | C601 2-2 | LAN-1131A | Pull | Beres Symmetris | - Inabled | - Beterre | - Inchied | f Enabled | 1001 | 00-00-02-00-00-01 | |
| 62 | | | | | | | - | | | | |

3.4.3 设置测试数据流

(1)在 Group 选项卡,选择 Group Wizard,弹出 Group Wizard-Traffic Selection 对话框, Type 选择 Unicast, IP Version 选择 IPv4, Pattern 选择 Pair,进入下一步。

| Cards IPv | 4 Networks IPv6 WAN | ATM Multic | ast Groups SmartFlo | ows Test Setup BGP | MPLS LSP 0pt |
|------------------|---|-------------------|-----------------------|------------------------|-------------------------|
| Kroup <u>M</u> i | zard. 🕂 🎊 [MIX Editor | · Sorted by Group | p 🗸 Rate | % 🔻 <u>(</u> alidate | Rati <u>C</u> oS Wizard |
| <u>A</u> dd | X Del | Transmitted b | it rate will be lower | than user-specified | bit rate unless : |
| G | roup Vizard - Traf | fic Selection | | | |
| | Traffic Selection : Select traffic type | and pattern: | | | |
| | Create flows with | ih custom frames | | | |
| | Type 🕞 Ui | nicast | C Multic | rast | |
| | IP Version | 24 | ⊂ IPv6 | | |
| | Pattern C B | ackbone | C Fully | meshed | |
| | | | | | |
| | | | C Waterf | | |
| | | | | | |
| | | | < 上一步 (B) 下一步 | •(图) > 取消 | |

(2) 在 A 列中选择端口 2-1 , 在 B 列中选择 2-2 端口 , Direction 选择 A<->B(双向流

量),点击_____这两个端口显示在右侧(Pair框),进入下一步。





| Traffic Con Configure | figuration: traffic pattern: | | | |
|---|--|--|--------------------------------|-----|
| A: SMB600 2-1 SMB600 2-2 | E: SMB600 2-1 MBRIN 2-2 |) | Pair: | |
| | | | utory y Thomas | |
| oup Vizard Iraffic Conf Configure | - Traffic Configur Tiguration: traffic pattern: | cation | | 2 |
| pup Vizard Fraffic Conf Configure : | - Traffic Configu iguration: traffic pattern: <u>B</u> : | cation | Pair: | 2 |
| pup Vizard Traffic Conf Configure | - Traffic Configur iguration: traffic pattern: <u>B</u> : | cation | Pairs Pairs SMB600 2-1, SMB600 | 2-2 |
| Dup Vizard Traffic Conf Configure : : | - Traffic Configur iguration: traffic pattern: B: B: Infigurati Reverse B | cation Cation | Pair: SMB600 2-1, SMB600 | 2-2 |

(3) 使用默认配置,进入下一步配置。



| Group Wizard - Characte | ristics 🔀 |
|---|---|
| Flows & Grouping: Enter flow characteristi | es: |
| Group name/Prefix Generate multiple group C TOS precedence D Diffserv cla VIAN priori: Variables | Flow A IP's next protocol IP's next protocol NONE IP' TCF/UDP source IP' ICF/UDP source IP' ICF/UDP destination IP' ICP/UDP destination IP' ICP/UDP destination IP' ICUSTOM frame IP' Image: Instrume in the CRC (bytes) IP' I28 Note: ATM flow has zero-byte |
| IPv4/IPv6 VLAN stacking Editor Stacker | g d VLAN ID(s) : Base |
| | 〈上一步 (8) 下一步 (8) 〉 取消 |

(4) 使用默认配置,进入下一步配置。

| Number of flows 1 SmartFlows • Non-cyclic SmartFlows • Cyclic SmartFlows Variable field • Source IP address • Destination IP address Multiflow pattern • Sequential • Staggered (RFC2889) | Note Non-cyclic SmartFlows are uniquely trackable on the receiving port. Cyclic SmartFlows can produce variations of data within each transmitted flow. In SmartFlow, they are tracked as a unit on the receiving port. The number of cyclic flows varies depending on the card, protocol, i.e., IFV6 and the tractional variable fields are available on SmartFlows Tab. |
|--|--|
| Plow Generation | DHCP Configuration |
| C Generate long flow names | Enable DHCP on Source IP |
| Generate short flow names | Enable DHCP on Destination |

(5)选择完成,此时测试数据流设置完成,在子窗口内显示已创建的测试流名称。



| Cards IPv4 Networks IPv6 WAN | ATM Multicast Groups SmartFlows Test Setup BGP MPLS LSP Options |
|--------------------------------|---|
| 🔉roup Wizard. 💦 🕅 IX Editor | Sorted by Group - Rate 🐒 - CoS Wizard PON Test Wizard |
| 📉 Add 🛛 🗙 Del | Transmitted bit rate will be lower than user-specified bit rate unless port |
| | |
| A Group | Flow Hame |
| A Group | Flow Hane |
| A Group | Flow Hame Image: A 2-1->2-2 Image: A 2-2->2-1 |

3.4.4 设置测试参数

(1) 设置要测试的包长度与测试时长,用户也可根据需要增减测试的包长种类。

| Cards IPv4 Networks IPv6 WAN | ATM Multi- | cast Groups Smar | tFlows (Test Setup) BG | P MPLS LSP 0 |
|---|---------------------------------|----------------------|--|------------------|
| Test Iterations Learning Individual Iterating across traffic load (Not | Tests SmartI for Throughpu | racker Sample It | eration DHCP -Traffic load (Includ | ing Throughput) |
| 💿 Step (all por | C Custom (| per port) | | |
| Min. load (%) 10 | Custom Load | s Per Port Table | Custom Loads Per Flo | w Table |
| Step load (%) 10 | | | | |
| Max. load (%) 100 | | | | |
| ✓ Iterating across frame sizes | <u></u> | | - | |
| (all flows, with | Custom (| all flows, with C | C Custom frame size: | s (per flo |
| Min. (bytes) 128 | Custom Fr | ame Sizes List | Custom Frame Sizes | Table |
| Step (bytes) 128 | | | e: (11) | |
| Max. (bytes) 1518 | | Custon France | Sizes (all ports | , |
| | | frame sizes | | |
| Iteration constants | C Fromo ac | 128 | | Close |
| Time (Sec.) 30 | Burst count | 256 512 1024 | | Ascending |
| Burst size 1 | Total frame | 1280 1518 | | Descending |
| (Packets per | [Burst size | | | Move Up |
| Miscellaneous | | | | Move Down |
| Custom Frames Table | Continuo | | | |
| | LOL TORRING | | | Remove |
| | | | | Default |
| | | -Add frame size- | | |
| | | 84 | Add | |
| | | | | |

(2) 设置最小、最大、初始速率百分比,本例为环回测试,都选100%。

| Cards IPv4 Networks IPv6 WAN | ATM Multicast Groups SmartFlows Test Setup BGP MPLS L |
|---------------------------------------|--|
| Test Iterations Learning Individual | 1 Tests SmartTracker Sample Iteration DHCP |
| Latency Distribution | Throughput |
| 8 Intervals (uSecs) | Test type Search Mode |
| 5 | Standard Sinary |
| 10 | C Asymmetric C Step |
| 20 | C Downstream C Combo |
| 100 | - Parameters |
| 150 | |
| | Initial rate 100.00000 |
| | Minimum rate 100 00000 |
| | |
| | Maximum rate (%) |
| | Step rate (%): 1 |
| Latency Over Time | Resolution (%): \$1.00000 |
| Time interval 1 | Backoff (%) 50 |
| SnapShot | Accentable 0 |
| Capture frames per 50 | frame loss (%): |
| Capture start 2 | |
| J | Continue beyond min or max 🔽 |
| -Latency options for Non-XD TeraMetr: | ics-based modules |
| • Min. Max. Sequencia | NOTE |
| Min, Av provide | γg, Max Latency and Sequencing will be ed simultaneously on TeraMetrics−based |
| C Average, Max | XD and 10 Gig modules. |



3.4.5 运行测试

(1) 点击左侧 "Setup and Run "一栏中 "Throughput "图标即可开始测试。



(2)测试开始后,在窗口底部状态栏显示当前测试运行信息,在快捷栏通过"STOP" 键可终止测试。



| | Secab Wan | T0012 Ve | sānes i | Terb | | | | | | | | | | | | | | |
|--|------------|----------|---------|---------------|---------|-------------|--------|---------|-----------|------|-------|---------------|--------|-----------|--------|-----------|-----------|--|
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| × × | | | | \mathcal{I} | | | | | | | | _ | | | | | | |
| Setup and Run | Inroughp | ut (%) | | | | | | | Page 1 | of 1 | • | ▶ <u>Next</u> | - | | | | | |
| Deculto | | | | Right cl | ick for | view (| | | | | | | | - | | | | |
| Results | Hano | | | Francis | | • d T = T = | TO DOT | TETABAS | ostiranas | Lort | co la | Thronghout | Tr for | Tr hns | Br far | Ry IS has | Br bns | |
| | Total | 12/04/09 | 20:13:3 | 2 64 | 100.00 | 0000 89 | 28570 | 8928570 | 0 | 0.00 | 0000 | 100.00000 | 297619 | 199999968 | 297619 | 109523792 | 199999968 | |
| <u>a</u> | à Group | 12/04/09 | 20:13:3 | 2 64 | 100.00 | 0000 89 | 28570 | 8928570 | 0 | 0.00 | 0000 | 100.00000 | 297619 | 199999968 | 297619 | 109523792 | 199999968 | |
| | A 2-1->2-2 | 12/04/09 | 20:13:5 | 12 64 | 100.00 | 0000 44 | 64285 | 4464285 | 0 | 0.00 | 0000 | B/A | 148810 | 99999984 | 148810 | 54761896 | 99999984 | |
| Throughput | A 2-2->2-1 | 12/04/09 | 20:13:3 | 12 64 | 100.00 | 0000 44 | 64285 | 4464285 | 0 | 0.00 | 0000 | H/A | 148810 | 99999984 | 148810 | 54761896 | 99999984 | |
| 14 | Total | 12/04/09 | 20:14:1 | 2 128 | 100.00 | 0000 50 | 67566 | 5067566 | 0 | 0.00 | 0000 | 100.00000 | 168919 | 199999938 | 168919 | 148648603 | 199999938 | |
| 19 <u>1</u> | à Group | 12/04/09 | 20:14:1 | 2 128 | 100.00 | 0000 50 | 67566 | 5067566 | C | 0.00 | 0000 | 100.00000 | 168919 | 199999938 | 168919 | 148648603 | 199999938 | |
| Turk | à 2=1=>2=2 | 12/04/09 | 20:14:1 | 2 128 | 100.00 | 0000 25 | 33783 | 2533783 | 0 | 0.00 | 0000 | H/A | 84459 | 99999969 | 84459 | 74324301 | 99999969 | |
| Junoo | A 2-2->2-1 | 12/04/09 | 20:14:1 | 2 128 | 100.00 | 0000 25 | 33783 | 2533783 | 0 | 0.00 | 0000 | H/A | 84459 | 99999969 | 84459 | 74324301 | 99999969 | |
| | Total | 12/04/09 | 20:14:5 | 2 256 | 100.00 | 0000 27 | 17390 | 2717390 | 0 | 0.00 | 0000 | 100.00000 | 90580 | 199999904 | 90580 | 172463685 | 199999904 | |
| ¥4 | å Group | 12/04/09 | 20:14:5 | 2 256 | 100.00 | 0000 27 | 17390 | 2717390 | 0 | 0.00 | 0000 | 100.00000 | 90580 | 199999904 | 90580 | 172463685 | 199999904 | |
| | A 2−1−>2−2 | 12/04/09 | 20:14:5 | 2 256 | 100.00 | 0000 13 | 58695 | 1358695 | 0 | 0.00 | 0000 | B/A | 45290 | 99999952 | 45290 | 86231843 | 99999952 | |
| rune Loss | A 2-2->2-1 | 12/04/09 | 20:14:5 | 2 256 | 100.00 | 0000 13 | 58695 | 1358695 | 0 | 0.00 | 0000 | B/A | 45290 | 99999952 | 45290 | 86231843 | 99999952 | |
| <i>a</i> | Total | 12/04/09 | 20:15:3 | 2 512 | 100.00 | 0000 14 | 09774 | 1409774 | 0 | 0.00 | 0000 | 100.00000 | 46992 | 199999938 | 46992 | 185714228 | 199999938 | |
| () | A Group | 12/04/09 | 20:15:3 | 2 512 | 100.00 | 0000 14 | 09774 | 1409774 | 0 | 0.00 | 0000 | 100.00000 | 46992 | 199999938 | 46992 | 185714228 | 199999938 | |
| Latoner | A 2-1->2-2 | 12/04/09 | 20:15:5 | 2 512 | 100.00 | 0000 7 | 04887 | 704887 | 0 | 0.00 | 0000 | H/A | 23496 | 99999969 | 23496 | 92857114 | 99999969 | |
| Latency | A 2-2->2-1 | 12/04/09 | 20:15:3 | 12 512 | 100.00 | 0000 7 | 04887 | 704887 | C | 0.00 | 0000 | H/A | 23496 | 99999969 | 23496 | 92857114 | 99999969 | |
| 1 | Total | 12/04/09 | 20:16:1 | 2 1024 | 100.00 | 0000 7 | 18390 | 718390 | 0 | 0.00 | 0000 | 100.00000 | 23946 | 199999776 | 23946 | 192720091 | 199999776 | |
| | å 6 roup | 12/04/09 | 20:16:1 | 2 1024 | 100.00 | 1000 7 | 18390 | /18390 | U | 0.00 | 0000 | 100.00000 | 23946 | 199999776 | 23946 | 192720091 | 199999116 | |
| w Distribution | x 2-1->2-2 | 12/04/09 | 20:16:1 | 2 1024 | 100.00 | 3000 3 | 29192 | 323132 | | 0.00 | 0000 | B/ R | 11973 | 99999888 | 11973 | 96360045 | 99999888 | |
| ency Over Time ency Snap Shot SnartTracker | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

3.4.6 查验测试结果

根据测试参数设置,SmartFlow 会自动进行相应的测试。待测试结束后,底部状态栏会 提示测试已完成,在左侧"Results"栏点击"Throughput"图标查看吞吐率测试结果。Loss 统计为0,表明测试仪这两个端口在相应速率下无丢包,工作正常。

| <u>F</u> ile <u>E</u> dit <u>V</u> iew <u>A</u> ction | <u>S</u> etup <u>R</u> un | <u>T</u> ools R | esults <u>H</u> elp | | | | | | | | | | | | |
|---|---------------------------|-----------------|---------------------|-----------|------------|------------|-------------------|-----------|----------|-----------------|----------|------------|----------|-----------|------------|
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| Setup and Run | <u>Through</u> | out (%) | | Right cli | ck for vie | wc | H 4 | Page 1 of | 1 > | ▶ <u>N</u> ext | • | J | | | |
| Results | Hane | т | ine F | rameSize | ILoad | TxFrames | ExFrancs L | ostFrames | Lost (%) | Throughput | Tx fps] | a bps | Ex fps E | x L3 bps | Rx bps |
| N | Total | 12/04/09 | 9 20:13:32 64 | | 100.00000 | 8928570 | 8928570 | 0 | 0.00000 | 100.00000 | 297619 | 199999968 | 297619 | 109523792 | 199999968 |
| | A Group | 12/04/09 | 9 20:13:32 64 | ł | 100.00000 | 8928570 | 8928570 | 0 | 0.00000 | 100.00000 | 297619 | 199999968 | 297619 | 109523792 | 199999968 |
| The on shout | A 2-1->2-2 | 12/04/09 | 9 20:13:32 64 | l. | 100.00000 | 4464285 | 4464285 | 0 | 0.00000 | N/A | 148810 | 99999984 | 148810 | 54761896 | 99999984 |
| The output | A 2-2->2-1 | 12/04/09 | 9 20:13:32 64 | ŀ | 100.00000 | 4464285 | 4464285 | 0 | 0.00000 | N/A | 148810 | 99999984 | 148810 | 54761896 | 99999984 |
| 14 | Total | 12/04/09 | 3 20:14:12 12 | 28 | 100.00000 | 5067566 | 5067566 | 0 | 0.00000 | 100.00000 | 168919 | 199999938 | 168919 | 148648603 | 199999938 |
| V C | A Group | 12/04/09 | 9 20:14:12 12 | 28 | 100.00000 | 5067566 | 5067566 | 0 | 0.00000 | 100.00000 | 168919 | 199999938 | 168919 | 148648603 | 199999938 |
| Tumbo | A 2-1->2-2 | 12/04/09 | 9 20:14:12 12 | 18 | 100.00000 | 2533783 | 2533783 | 0 | 0.00000 | N/A | 84459 | 99999969 | 84459 | 74324301 | 99999969 |
| 3 4110 0 | A 2-2->2-1 | 12/04/09 | 9 20:14:12 12 | 8 | 100.00000 | 2533783 | 2533783 | 0 | 0.00000 | N/A | 84459 | 99999969 | 84459 | 74324301 | 99999969 |
| | Total | 12/04/09 | 9 20:14:52 25 | 6 | 100.00000 | 2717390 | 2717390 | 0 | 0.00000 | 100.00000 | 90580 | 199999904 | 90580 | 172463685 | 199999904 |
| * | A Group | 12/04/09 | 9 20:14:52 25 | 96 | 100.00000 | 2717390 | 2717390 | 0 | 0.00000 | 100.00000 | 90580 | 199999904 | 90580 | 172463685 | 199999904 |
| Frame Loss | A 2-1->2-2 | 12/04/09 | 3 20:14:52 25 | 6 | 100.00000 | 1358695 | 1358695 | 0 | 0.00000 | N/A | 45290 | 99999952 | 45290 | 86231843 | 99999952 |
| | A 2-2->2-1 | 12/04/09 | 9 20:14:52 25 | ю. | 100.00000 | 1358695 | 1358695 | 0 | 0.00000 | N/A | 45290 | 99999952 | 45290 | 86231843 | 99999952 |
| 2 | Total | 12/04/09 | 9 20:15:32 51 | .2 | 100.00000 | 1409774 | 1409774 | U | 0.00000 | 100.00000 | 46992 | 14444448 | 46992 | 185714228 | 199999938 |
| () | a broup | 12/04/09 | 9 20:15:32 51 | .2 | 100.00000 | 1409774 | 1409774 | U | 0.00000 | 100.00000 | 46992 | 199999938 | 46992 | 185714228 | 199999938 |
| Latency | R 2-1->2-2 | 12/04/09 | 9 20:15:32 51 | .2 | 100.00000 | 704887 | 704887 | 0 | 0.00000 | N/ R | 23495 | 99999999 | 23495 | 92857114 | 99999999 |
| , | A 2-2->2-1 | 12/04/09 | 9 20:15:32 51 | . 2 | 100.00000 | 704887 | 704887 | 0 | 0.00000 | B/ 8 | 23495 | 33333999 | 23496 | 9285/114 | 3333399 |
| | lotal | 12/04/09 | 9 20:16:12 10 | 24 | 100.00000 | 718390 | 718390 | 0 | 0.00000 | 100.00000 | 23346 | 199999776 | 23946 | 192720091 | 199999776 |
| | A Group | 12/04/05 | 3 20:16:12 10 | 124 | 100.00000 | 718390 | 710390 | 0 | 0.00000 | 100.00000 | 23346 | 133333776 | 23346 | 192720091 | 1999999776 |
| Latency Distribution | A 2=2=22=1 | 12/04/05 | 3 20:16:12 10 | 124 | 100.00000 | 355155 | 355155 | 0 | 0.00000 | B/ R W/A | 11919 | 333330000 | 11070 | 96360043 | 33333000 |
| | R 2 2 72 1 | 12/04/05 | 20.16.12 10 | 000 | 100.00000 | 533133 | 535153 | | 0.00000 | 500 00000 | 10001 | 1000000007 | 10001 | 104150404 | 1000000007 |
| | A Case | 12/04/05 | 20.16.52 12 | 200 | 100.00000 | 576922 | 576 922 | | 0.00000 | 100.00000 | 1 92 91 | 199999627 | 19201 | 194159494 | 199999627 |
| | A 2-1->2-2 | 12/04/09 | 20:16:52 13 | 200 | 100.00000 | 200461 | 200461 | | 0.00000 | ¥/4 | 9615 | 99999912 | 9615 | 97075742 | 99999912 |
| S 20 1 | a 2-2->2-1 | 12/04/09 | 9 20:16:52 12 | 80 | 100.00000 | 288451 | 288451 | 0 | 0.00000 | W/a | 9615 | 99999813 | 9615 | 97076742 | 99999813 |
| Latency Over Time | Total | 12/04/09 | 9 20:17:32 15 | 18 | 100.00000 | 487646 | 487646 | ů. | 0.00000 | 100 00000 | 16255 | 199999879 | 16255 | 195058400 | 199999879 |
| | A Grown | 12/04/09 | 20.17.32 15 | 18 | 100.00000 | 487646 | 487646 | 0 | 0 00000 | 100 00000 | 16255 | 199999879 | 16255 | 195058400 | 199999879 |
| | 8 2-1->2-2 | 12/04/09 | 20.17.32 15 | 18 | 100 00000 | 243823 | 243823 | 0 | 0.00000 | N/A | 81.27 | 99999940 | 8127 | 97529200 | 99999940 |
| <u> </u> | A 2-2->2-1 | 12/04/09 | 20:17:32 15 | 18 | 100.00000 | 243823 | 243823 | 0 | 0.00000 | N/A | 81.27 | 99999940 | 8127 | 97529200 | 99999940 |
| | | | | | | | | | | | | | | | |
| Latency Snap Shot | | | | | | | | | | | | | | | |
| <u>a.</u> | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| Sindi (11 dekei | | | | | | | | | | | | | | | |
| | | | | | _ | | | | | | | | | | |
| | Chart | Summ | nary 🛄 Deta | il 🛄 St | ay Frames | Port Error | s 🔛 Pack | et Rate | | | | | | | |
| last Completed Suggessfull | | ~ < | _ | | | | | | | | | | | | |
| test compreted puccession | J . | | | | | | | | | | | | | | |

3.4.7 保存测试流量配置与测试结果

(1)保存流量配置:



(2) 导出测试结果:

| 🔕 flow_example - S | artFlow | | | | | | |
|---|--|--|--|--------------------|-------------------------------|------------------------------|------------------|
| <u>F</u> ile <u>E</u> dit <u>V</u> iew <u>A</u> ction | <u>S</u> etup <u>R</u> un <u>T</u> ool | Results <u>H</u> elp | | | | | |
| 🗋 🖻 📑 🔤 🕬 🕫 | 🛡 🗊 😵 🖥 | <u>1</u> . Export Curren | t View to File | | | | |
| Setup and Run | Throughput (9 | 2. Export Curren <u>3</u> . Export All Te | t Test to Files sts to Files | • | Page 1 of 1 | > > Mex | • |
| Results | Name | 4. Export Curren | t View to HTML | , ranes I | ostFranes Lost (| () Throughput | Tx fps Tx |
| | Total 12/0 A Group 12/0 | 7 <u>5</u> . Export Curren 7 <u>6</u> . Export All Te | t Test to HTML sts to HTML | Deta | il Re <u>s</u> ults on Displa | ay Only 100 | 297619 297619 |
| Throughput | A 2-1->2-2 12/0 A 2-2->2-1 12/0 | /09 20:13:32 64 /09 20:13:32 64 | 100.00000 4464285 100.00000 4464285 | LIA | Detail <u>R</u> esults | A A | 148810 148810 |
| 6 | Total 12/0 A Group 12/0 | //09 20:14:12 128 //09 20:14:12 128 | 100.00000 5067566 100.00000 5067566 | 5067566 5067566 | 0 0.000 | 00 100.00000 00 100.00000 | 168919 168919 |
| | A 2-1->2-2 12/0 | /09 20:14:12 128 | 100.00000 2533783 | 2533783 | 0 0.000 | 00 N/A | 84459 |

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| 保存类型(<u>T</u>): | Html files(*.htm) | |

4 参考资料

- (1) 思博伦《FT_SmartFlow_Overview.ppt》
- (2) 思博伦《SamrtFlow QoS Performance Tester》
- (3) 思博伦《SmartFlow User Guide》(Apr. 2008)

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2009-12-12