

Quality Engineering LAN Performance Report

Release No : 08I060003

Product Model	FWS-2150
Description	5 LAN ports Desktop Network Appliance
Test Configuration	<input checked="" type="checkbox"/> New product <input checked="" type="checkbox"/> System : FWS-2150 A0.2 <input checked="" type="checkbox"/> PCB : FWB-2150 A0.2 <input checked="" type="checkbox"/> BIOS : FWS-2150 BIOS Rev 0.5 (12/21/2007) <input checked="" type="checkbox"/> M/B Chipset : <input checked="" type="checkbox"/> North Bridge : VIA CN700 <input checked="" type="checkbox"/> South Bridge : VIA VT8237R <input checked="" type="checkbox"/> VGA Chipset : Integrated UniChrome™ Pro graphics <input checked="" type="checkbox"/> Audio Chipset : N/A <input checked="" type="checkbox"/> Ethernet Chipset : 5 x PCI 10/100 Realtek 8100C (2 port by pass) <input checked="" type="checkbox"/> I/O Chipset : ITE IT8712F-S <input checked="" type="checkbox"/> TV Chipset : N/A <input checked="" type="checkbox"/> Remark : Throughput test report for FWS-2150 A0.2
<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Pass with Deviation Comment: _____ _____	

2008/03/14

Issue date

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Manager

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1. Fedora Core Installation Guide (For DUT)

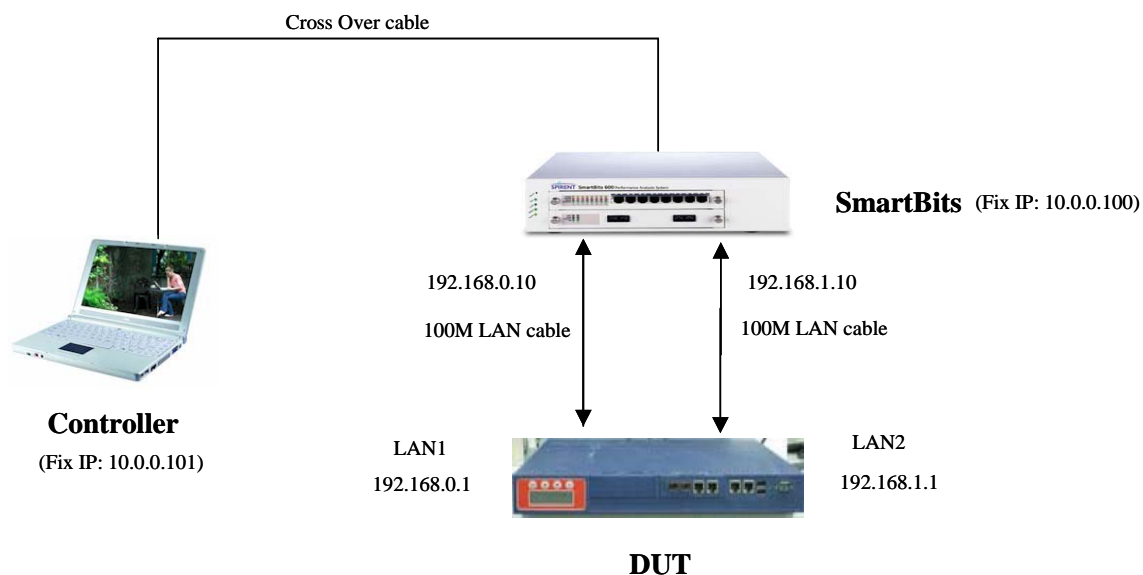
1. It is recommended to use Fedora Core 2.6.15-1.2054_FC5smp #1(Fedora Core 5) instead of Windows OS because of its high LAN quality
2. During Installation select “Remove all partitions on selected drives and create default layout”
3. Network Device→Edit→”Activate on boot” set to “Disable”
4. Hostname set to “manually”
5. The root account is used for administering the system, in the other words we must login system using “Root account”
6. System must include additional “Web server” task
7. Firewall must be “disabled”
8. Username account is not necessary
9. Installation finished

2. How to Setup Fedora Core Environment (For DUT)

1. When FC environment completed. First we have to confirm if each LAN port in DUT matches with the LAN device (eth#) in FC environment
2. It is necessary for LAN routing. Open “terminal” to use the command line and key in following instruction
[root@localhost ~]# echo 1 > /proc/sys/net/ipv4/ip_forward, then press enter
[root@localhost ~]# cat /proc/sys/net/ipv4/ip_forward”, then press enter
When we get the result 1 it means that we had already set the environment to become “Router mode”
3. Remember router mode will be disabled when restarting so we must ensure that step 2 will be done again when restarting system

3. SmartBits Test Base Network Environment

Figure-1



1. Prepare two LAN cables which length is 100M (Reference to RFC-2544).
2. For 100M LAN cable one end inserts to 1-1 port on SMB module-1, the other end to LAN1 port on DUT
3. Another cable one end inserts to 1-2 port on SMB module-1, the other end to LAN2 port on DUT
4. Connected controller (PC) and SMB with cross over LAN cable
5. Set fix IP on PC as 10.0.0.XXX except 10.0.0.100 in order to access SMB
6. Execute SmartFlow application on PC when “SmartBits Test Base Network Environment” got ready
7. If DUT has only 1 LAN port, we must use an external PCI or PCI-E Ethernet Card to expand

4. How to Setup SmartFlow Version 5.50.042.1

1. Manage connections→Add IP→

2. Press “Connect” button to continue. If it works it means controller (PC) has connected to SMB via cross over LAN cable

3. Setup and Run→Cards→Read State, Speed, Duplex, Auto Negotiation set as below table

Cards | IPv4 Networks | IPv6 | WAN | ATM | Multicast | Groups | SmartFlows | Test Setup

Show columns for: Ethernet POS ATM BGP

Port	Model	Test Load	Interface	Read State	Speed	Duplex	Auto Negotiation
AAEON 1-1	LAN-3324A	Step	Copper	Active	1000M	Full	Force Symmetric
AAEON 1-2	LAN-3324A	Step	Copper	Active	1000M	Full	Force Symmetric
AAEON 1-3	LAN-3324A	Step	Copper	Active	1000M	Full	Force Symmetric
AAEON 1-4	LAN-3324A	Step	Copper	Active	1000M	Full	Force Symmetric
AAEON 2-1	LAN-3324A	Step	Copper	Active	1000M	Full	Force Symmetric
AAEON 2-2	LAN-3324A	Step	Copper	Active	1000M	Full	Force Symmetric
AAEON 2-3	LAN-3324A	Step	Copper	Active	1000M	Full	Force Symmetric
AAEON 2-4	LAN-3324A	Step	Copper	Active	1000M	Full	Force Symmetric

Remark: 1. If LAN speed is gigabit then “Speed” column will set as 1000M and “Auto negotiation” as Force Symmetric, if not we should choose 100M/Force

2. Read State: Active means SMB allows other users to see this LAN port

4. Setup and Run→ IPv4 Networks set as below table (SMB 600B supports 8 LAN ports at the same time)

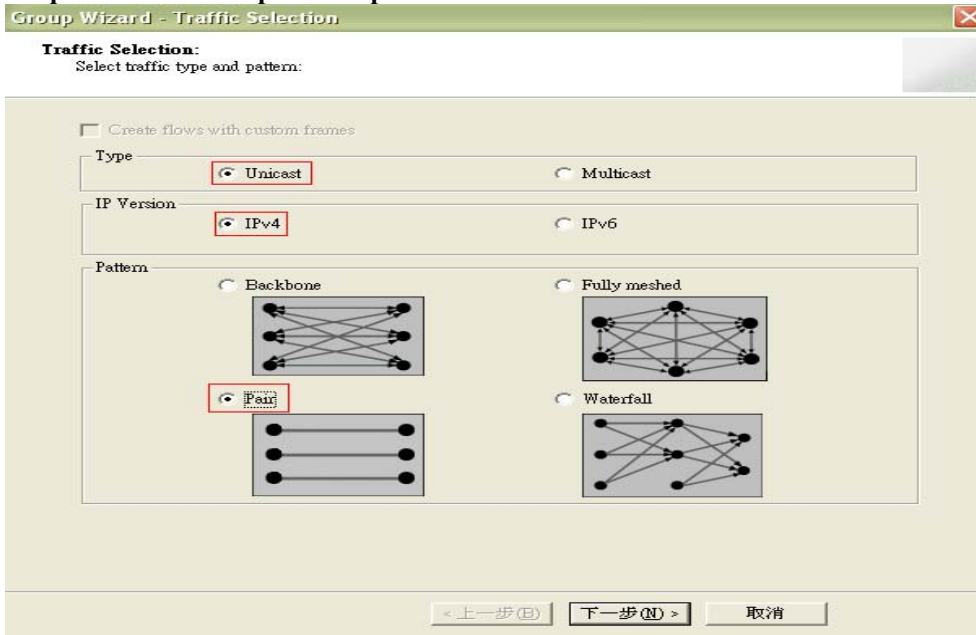
Cards | IPv4 Networks | IPv6 | WAN | ATM | Multicast | Groups | SmartFlows | Test Setup | BGP

Right-click on port or highlighted column for Network Wizard.

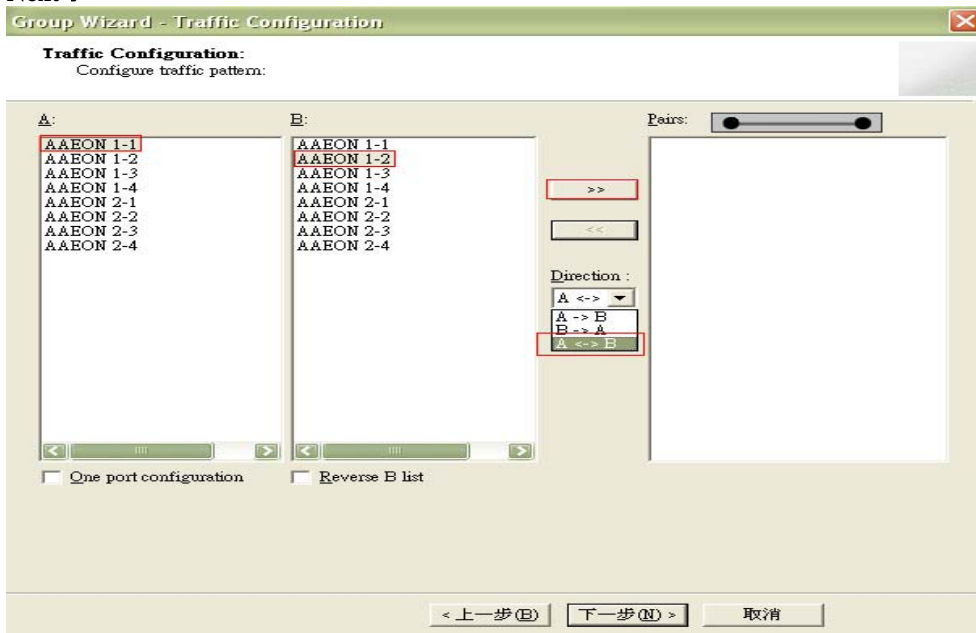
Port	Port IP Address	Network	Gateway	Subnet Mask	Wizard IP Address
AAEON 1-1	192.168.000.010	192.168.000.000	192.168.000.001	255.255.255.000	192.168.000.010
AAEON 1-2	192.168.001.010	192.168.001.000	192.168.001.001	255.255.255.000	192.168.001.010
AAEON 1-3	192.168.002.010	192.168.002.000	192.168.002.001	255.255.255.000	192.168.002.010
AAEON 1-4	192.168.003.010	192.168.003.000	192.168.003.001	255.255.255.000	192.168.003.010
AAEON 2-1	192.168.004.010	192.168.004.000	192.168.004.001	255.255.255.000	192.168.004.010
AAEON 2-2	192.168.005.010	192.168.005.000	192.168.005.001	255.255.255.000	192.168.005.010
AAEON 2-3	192.168.006.010	192.168.006.000	192.168.006.001	255.255.255.000	192.168.006.010
AAEON 2-4	192.168.007.010	192.168.007.000	192.168.007.001	255.255.255.000	192.168.007.010

Remark: Aaeon 1-1 ~ 1-4 belongs to SMB 600B Module_1, Aaeon 2-1 ~ 2-4 belongs to SMB 600B Module_2

5. Setup and Run → Groups → Group Wizard



Next →



Remark: Half and binary direction are necessary for throughput test

Next→

Next→then press “Finish” button

6. Setup and Run→Test Setup→Test Iterations

- Remark: 1. “Iterating across traffic load” will be use for all test except “Throughput” test
2. Duration Time 30 sec means that SMB will transmit test flow continuously for 30 seconds

7. Setup and Run→Test Setup→Learning

Cards | IPv4 Networks | IPv6 | WAN | ATM | Multicast | Groups | SmartFlows | Test Setup | BGP | MPLS LSP | Options

Test Iterations | Learning | Individual Tests | SmartTracker | Sample Iteration | DHCP

Rate (Packets/Sec) : Wait time before learning (Sec.) :

L2 Learning

Learning options : Learning packets sent per SRC address :

(Set to maximum variable count value if using cyclic flows.)

Note:
L2 learning option 'None' applies to L3 Address Resolution as well. In this case port will still do the Tx side learning.

Frame Size

Same as flow
 Fixed

L3 Learning

Address Resolution frequency

Between load iterations
 Between frame size iterations

Cyclic Address Resolution

Use Tx and Rx addresses
 Use Rx addresses only
 Reply with unique MAC address (Do not use for online testing)

Address Resolution Delay (Sec.)

Delay per test :
(20 Sec. for approx. >= 1200 streams)

Cyclic delay :
(30 Sec. for approx. >= 10K flows)

Note:
Address Resolution means ARP for IPv4 and Neighbor Discovery for IPv6.

8. Setup and Run→Test Setup→Individual Tests

Cards | IPv4 Networks | IPv6 | WAN | ATM | Multicast | Groups | SmartFlows | Test Setup | BGP | MPLS LSP | Options

Test Iterations | Learning | Individual Tests | SmartTracker | Sample Iteration | DHCP

Latency Distribution

8 Intervals (uSecs)	
5	
7	
10	
20	
50	
100	
150	
300	

Latency Over Time
Time interval (Sec) :

SnapShot
Capture frames per flow :
Capture start (Sec) :

Throughput

Test type

Standard
 Asymmetric
 Upstream then Downstream

Search Mode

Binary
 Step
 Combo

Parameters

Initial rate (%) :
Minimum rate (%) :
Maximum rate (%) :
Step rate (%) :
Resolution (%) :
Backoff (%) :
Acceptable frame loss (%) :

Continue beyond min or max

Latency options for Non-XD TeraMetrics-based modules

Min, Max, Sequencing
 Average, Max

NOTE
Min, Avg, Max Latency and Sequencing will be provided simultaneously on TeraMetrics-based XD and 10 Gig modules.

- Remark: 1. Backoff = 50% means that throughput test using dichotomy. It will increase 50% from former state which has no frame loss. Otherwise it will decrease 50%**
- 2. Acceptable frame loss = 0% means that throughput test will allow no failure**

9. Setup and Run→Options→General

General | Results

Global test options

Stop on error

Allow jumbo frame transmission

Check receive data integrity error

Track DUT padded frames

Stagger start (mSec) :

Full-mesh/Port pair test with > 64K streams (TeraMetrics-based cards)

Record stray frames

Delay before transmit (Sec) :
(first iteration only)

Delay between end of transmission and counter read (Sec) :

Random seed :

Standard Terametrics Scheduler

Advanced Terametrics Scheduler

MPLS testing




LSP setup timer (Sec) : Allow retry

Packet rate

Display Tx/Rx packet rate per port

Sampling interval (Sec):

Stepwise execution and debugging

On Run, Skip

Port setup

Learning

Flow setup

10. Setup and Run→Options→Results

General | Results

Frame Loss Filter

Report flow(s) with frame loss greater than or equal to

Frames

%

Result Sampling

Display flows in Summary views

Display flows in Detail view

Samples/Chart :

All Samples/Load :

Only add sampling data into database

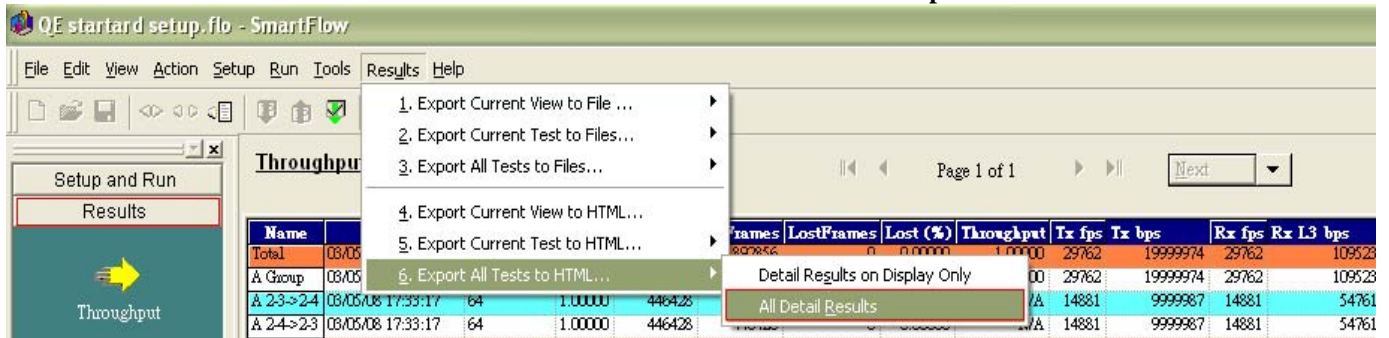
11. Setup and Run→Press “Throughput” button to start throughput test

12. Following photo is the detailed description during throughput test. We can see clearly that performance is 9.50781 while transmitted frame size is 64

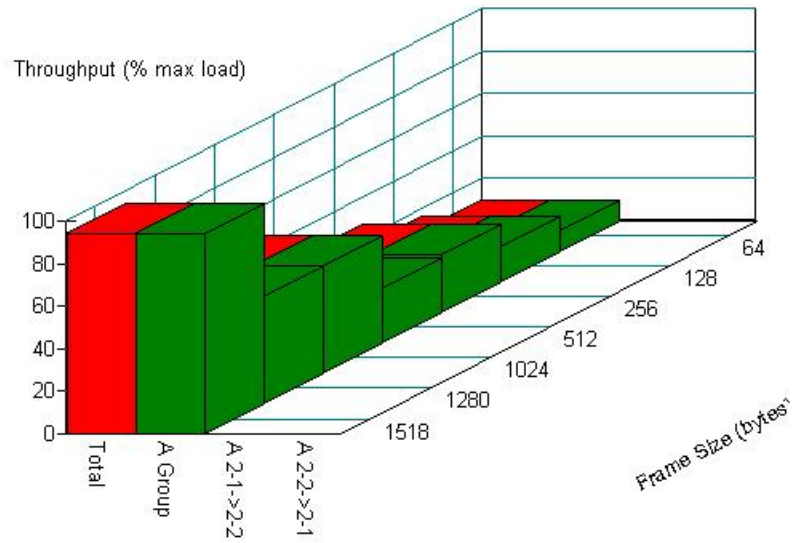
Name	Time	FrameSize	Iload	TxFrames	RxFrames	LostFrames	Lost (%)	Throughput	Tx fps	Tx bps	Rx fps	Rx L3 bps	Rx L2 bps
Total	08/05/08 13:05:50	64	1.00000	892856	892856	0	0.00000	1.00000	29762	19999974	29762	10952367	19999974
A Group	08/05/08 13:05:50	64	1.00000	892856	892856	0	0.00000	1.00000	29762	19999974	29762	10952367	19999974
A 2-1->2-2	08/05/08 13:05:50	64	1.00000	446428	446428	0	0.00000	N/A	14881	9999987	14881	5476183	9999987
A 2-2->2-1	08/05/08 13:05:50	64	1.00000	446428	446428	0	0.00000	N/A	14881	9999987	14881	5476183	9999987
Total	08/05/08 13:06:32	64	50.50000	45089284	25279961	19809923	43.98488	1.00000	150297	100999962	842645	310098495	566257686
A Group	08/05/08 13:06:32	64	50.50000	45089284	25279961	19809923	43.98488	1.00000	150297	100999962	842645	310098495	566257686
A 2-1->2-2	08/05/08 13:06:32	64	50.50000	22544642	13429489	9115153	40.43157	N/A	751488	504999981	447650	164735065	300820554
A 2-2->2-1	08/05/08 13:06:32	64	50.50000	22544642	11849672	10694770	47.43819	N/A	751488	504999981	394996	145358430	265437133
Total	08/05/08 13:07:14	64	25.75000	22991070	22987227	3843	0.01672	1.00000	766369	514999968	766241	281976651	514913885
A Group	08/05/08 13:07:14	64	25.75000	22991070	22987227	3843	0.01672	1.00000	766369	514999968	766241	281976651	514913885
A 2-1->2-2	08/05/08 13:07:14	64	25.75000	11495535	11498686	1849	0.01608	N/A	383185	257499984	383123	140989215	257458566
A 2-2->2-1	08/05/08 13:07:14	64	25.75000	11495535	11493541	1994	0.01735	N/A	383185	257499984	383118	140987436	257455318
Total	08/05/08 13:07:55	64	13.37500	11941964	11941550	414	0.00347	1.00000	398065	267499994	398052	146483013	267490720
A Group	08/05/08 13:07:55	64	13.37500	11941964	11941550	414	0.00347	1.00000	398065	267499994	398052	146483013	267490720
A 2-1->2-2	08/05/08 13:07:55	64	13.37500	5970982	5970732	250	0.00419	N/A	199033	133749997	199024	73240979	133744397
A 2-2->2-1	08/05/08 13:07:55	64	13.37500	5970982	5970818	164	0.00275	N/A	199033	133749997	199027	73242084	133746323
Total	08/05/08 13:08:37	64	7.18750	6417410	6417410	0	0.00000	7.18750	213914	143749984	213914	78720229	143749984
A Group	08/05/08 13:08:37	64	7.18750	6417410	6417410	0	0.00000	7.18750	213914	143749984	213914	78720229	143749984
A 2-1->2-2	08/05/08 13:08:37	64	7.18750	3208705	3208705	0	0.00000	N/A	106957	71874992	106957	39860115	71874992
A 2-2->2-1	08/05/08 13:08:37	64	7.18750	3208705	3208705	0	0.00000	N/A	106957	71874992	106957	39860115	71874992
Total	08/05/08 13:09:19	64	10.2812	9179686	9178748	938	0.01022	7.18750	305990	205624966	305958	112592642	205603955
A Group	08/05/08 13:09:19	64	10.2812	9179686	9178748	938	0.01022	7.18750	305990	205624966	305958	112592642	205603955
A 2-1->2-2	08/05/08 13:09:19	64	10.2812	4589643	4589020	823	0.01798	N/A	152995	102812483	152967	56291979	102794048
A 2-2->2-1	08/05/08 13:09:19	64	10.2812	4589643	4589728	115	0.00251	N/A	152995	102812483	152991	56300663	102809907
Total	08/05/08 13:10:01	64	8.73437	7798548	7798548	0	0.00000	8.73438	259952	174687475	259952	95662189	174687475
A Group	08/05/08 13:10:01	64	8.73437	7798548	7798548	0	0.00000	8.73438	259952	174687475	259952	95662189	174687475
A 2-1->2-2	08/05/08 13:10:01	64	8.73437	3899274	3899274	0	0.00000	N/A	129976	87343738	129976	47831094	87343738
A 2-2->2-1	08/05/08 13:10:01	64	8.73437	3899274	3899274	0	0.00000	N/A	129976	87343738	129976	47831094	87343738
Total	08/05/08 13:10:42	64	9.50781	8489118	8489118	0	0.00000	9.50781	282971	190156243	282971	104133181	190156243
A Group	08/05/08 13:10:42	64	9.50781	8489118	8489118	0	0.00000	9.50781	282971	190156243	282971	104133181	190156243
A 2-1->2-2	08/05/08 13:10:42	64	9.50781	4244559	4244559	0	0.00000	N/A	141485	95078122	141485	52066590	95078122
A 2-2->2-1	08/05/08 13:10:42	64	9.50781	4244559	4244559	0	0.00000	N/A	141485	95078122	141485	52066590	95078122
Total	08/05/08 13:11:24	128	1.00000	506756	506756	0	0.00000	1.00000	16892	19999970	16892	14864843	19999970
A Group	08/05/08 13:11:24	128	1.00000	506756	506756	0	0.00000	1.00000	16892	19999970	16892	14864843	19999970
A 2-1->2-2	08/05/08 13:11:24	128	1.00000	253378	253378	0	0.00000	N/A	8446	9999985	8446	7432421	9999985
A 2-2->2-1	08/05/08 13:11:24	128	1.00000	253378	253378	0	0.00000	N/A	8446	9999985	8446	7432421	9999985

Remark: Iload (%) means "performance"

12. When finished test we can save the result from command line: Results→6. Export All Tests to HTML→All Detail Results.



13. Browse the whole result in index.htm file, in following summary ILoad was shown 9.5078125



Throughput vs Frame Size

Load on Frame size 64

<u>Name/Framesize</u>	<u>64</u>	<u>128</u>	<u>256</u>	<u>512</u>	<u>1024</u>	<u>1280</u>	<u>1518</u>
Total	9.5078125	16.46875	26.5234375	24.9765625	49.7265625	49.7265625	93.8125
A Group	9.5078125	16.46875	26.5234375	24.9765625	49.7265625	49.7265625	93.8125
A 2-1->2-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A 2-2->2-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DUT Platform Information:

System	FWS-2150 A0.2
PCB Model / Version	FWB-2150 A0.2
BIOS	FWS-2150 Rev 0.5 (12/21/2007)
Operating System	Fedora Core 2.6.15-1.2054_FC5smp #1 (Fedora Core 5)
CPU	VIA Eden ULV 500MHz
Memory	KINGMAX DDR2-533 SDRAM 512MB (KINGMAX KKEA88I4NAU)
SATA HDD	N/A
Primary IDE Master	FUJITSU MHV2060AT 2.5" IDE HDD 60GB
Primary IDE Slave	N/A
CRT	ViewSonic E70
LCD	N/A
Compact Flash	N/A
Backplane	N/A
Riser Card	N/A
Chipset Software	N/A
Graphics Media	Fedora Core 5 Default setting
LAN	LAN1→PCI 10/100 Realtek 8100C: Fedora Core 5 Default setting
	LAN2→PCI 10/100 Realtek 8100C: Fedora Core 5 Default setting
	LAN3→PCI 10/100 Realtek 8100C: Fedora Core 5 Default setting
	LAN4→PCI 10/100 Realtek 8100C: Fedora Core 5 Default setting
	LAN5→PCI 10/100 Realtek 8100C: Fedora Core 5 Default setting
Audio Driver	N/A
Power Supply	DC Adapter ENG 3A-621DA19 INPUT:100-240V , 50-60Hz , 1.5A OUTPUT:19V / 3.16A

SMB Platform Information:

Chassis	SPIRENT Smartbits 600B
Chassis Version	2.80.003 (Cur) 2.50.000
Chassis Serial #	06014047
Library	6.00-29
API	5.50.42.01
File	0550042
Module	2 * LAN-3324A SmartMetrics XD 4-Port 10/100/1000Base-T Gigabit Ethernet
Test Software	SmartFlow5.50.42.1

Test Purpose:

1. To determine the DUT throughput as defined in RFC 1242.
2. All tests must be complied with RFC-2544 & RFC-1242

Test Procedure:

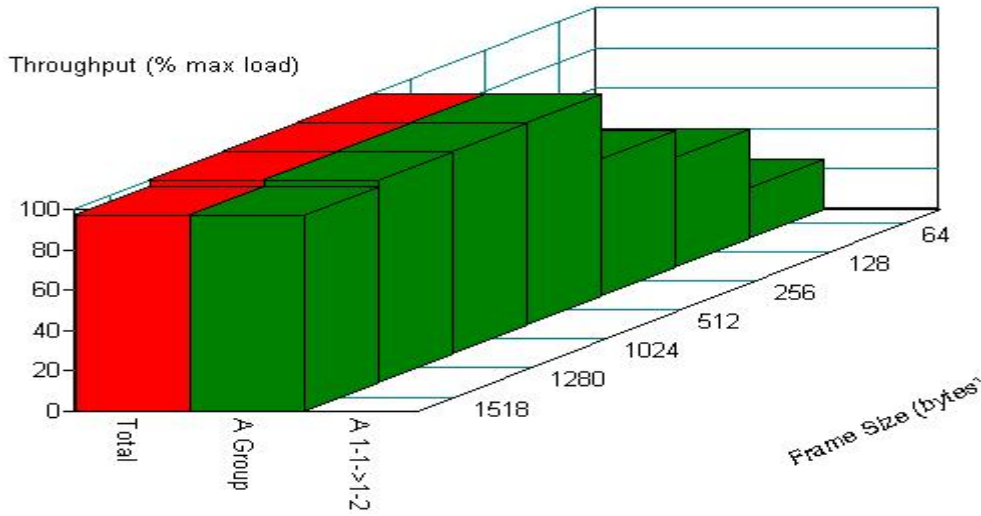
Send a specific number of frames at a specific rate through the DUT and then count the frames that are transmitted by the DUT. If the count of offered frames is equal to the count of received frames, the fewer frames are received than were transmitted, the rate of the offered stream is reduced and the test is rerun (Defined in RFC 2544)

Test Key Point:

Minimum LAN requirement: 2 port
 Frame size: 64, 128, 256, 512, 1024, 1280, 1518 bytes
 Direction: Half, Dual
 Tolerable packet loss rate: 0%
 Iteration constants: 30 sec
 DUT environment: Fedora Core Router Mode

Test Result:

1. Half Direction (LAN1: PCI 10/100 Realtek 8100C Ethernet → LAN2: PCI 10/100 Realtek 8100C Ethernet)

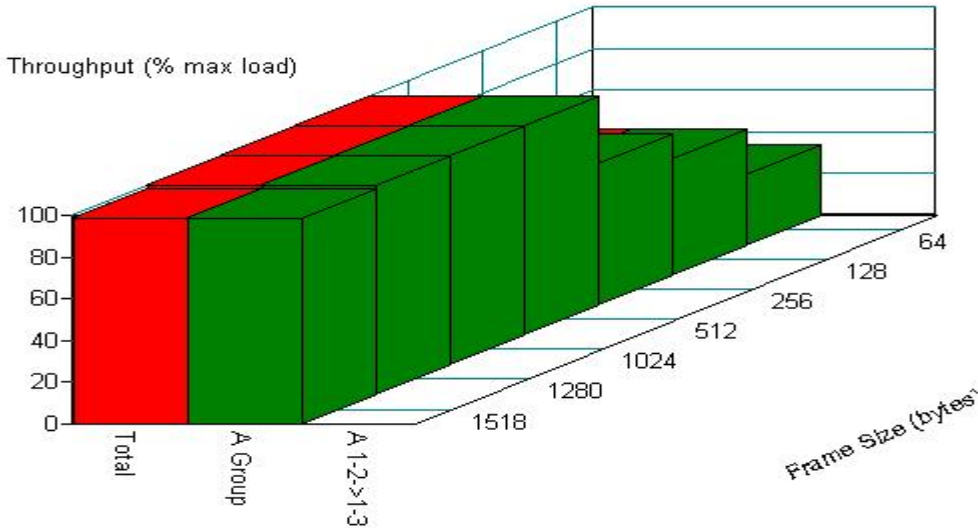


Throughput vs Frame Size

Throughput Table

Framesize	64	128	256	512	1024	1280	1518
Name							
Total	24.203125	53.59375	67.515625	100	100	100	96.90625
A Group	24.203125	53.59375	67.515625	100	100	100	96.90625
A 1-1→1-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A

2. Half Direction (LAN2: PCI 10/100 Realtek 8100C Ethernet → LAN3: PCI 10/100 Realtek 8100C Ethernet)

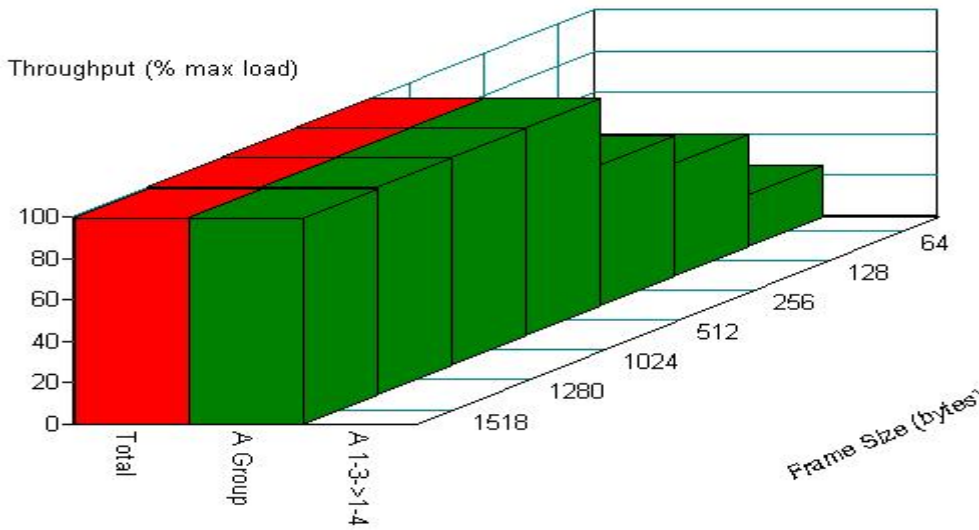


Throughput vs Frame Size

Throughput Table

Framesize	64	128	256	512	1024	1280	1518
Name							
Total	33.484375	55.140625	67.515625	100	100	100	98.453125
A Group	33.484375	55.140625	67.515625	100	100	100	98.453125
A 1-2→1-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3. Half Direction (LAN3: PCI 10/100 Realtek 8100C Ethernet → LAN4: PCI 10/100 Realtek 8100C Ethernet)

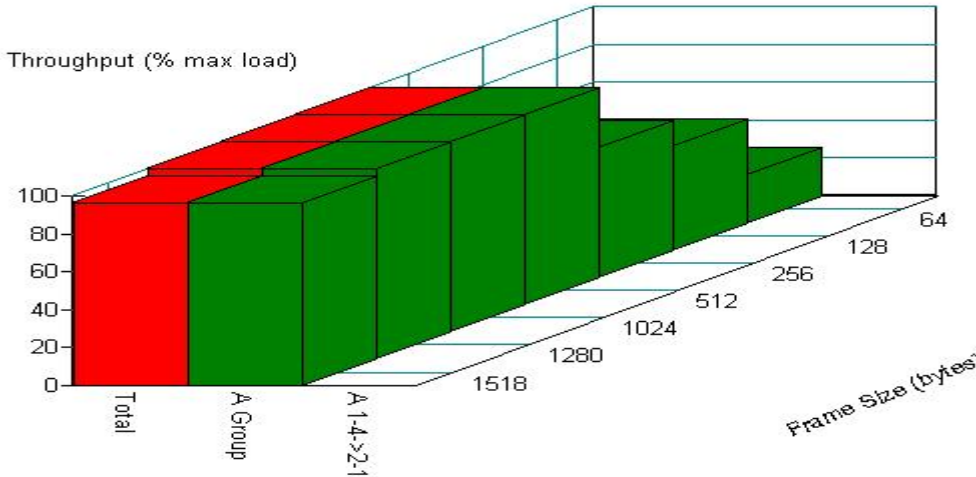


Throughput vs Frame Size

Throughput Table

Framesize	64	128	256	512	1024	1280	1518
Name							
Total	24.203125	53.59375	67.515625	100	100	100	99.2265625
A Group	24.203125	53.59375	67.515625	100	100	100	99.2265625
A 1-3 to 1-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4. Half Direction (LAN4: PCI 10/100 Realtek 8100C Ethernet → LAN5: PCI 10/100 Realtek 8100C Ethernet)

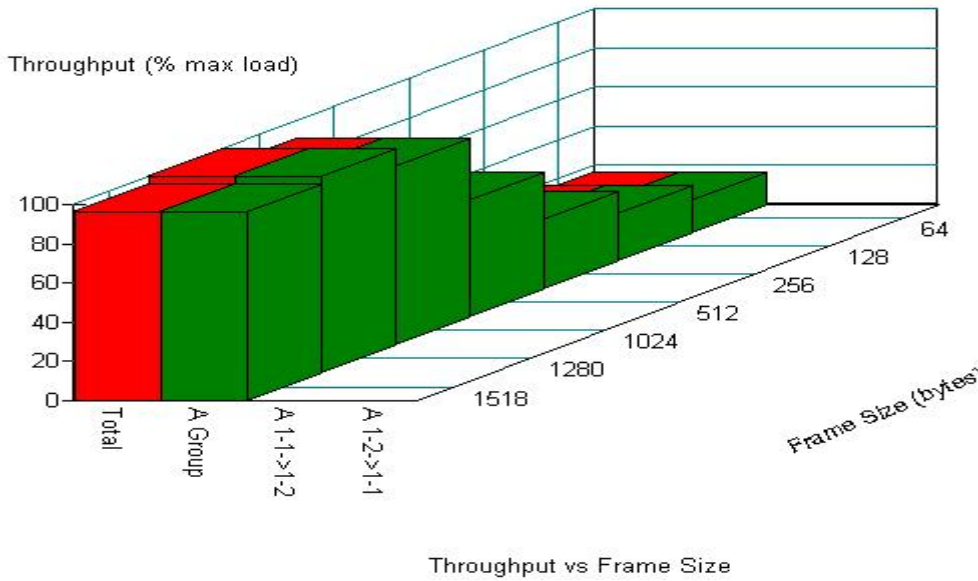


Throughput vs Frame Size

Throughput Table

Framesize	64	128	256	512	1024	1280	1518
Name							
Total	24.9765625	54.3671875	68.2890625	100	100	100	96.1328125
A Group	24.9765625	54.3671875	68.2890625	100	100	100	96.1328125
A 1-4 to 2-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

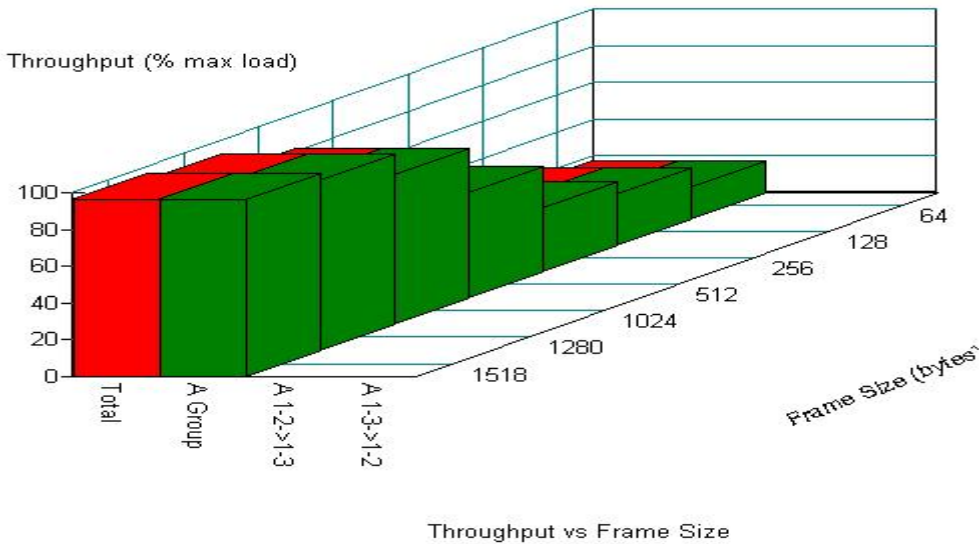
5. Binary Direction (LAN1: PCI 10/100 Realtek 8100C Ethernet → LAN2: PCI 10/100 Realtek 8100C Ethernet)



Throughput Table

Framesize	64	128	256	512	1024	1280	1518
Name							
Total	16.46875	23.4296875	35.03125	59.0078125	90.71875	100	96.1328125
A Group	16.46875	23.4296875	35.03125	59.0078125	90.71875	100	96.1328125
A 1-1→1-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A 1-2→1-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

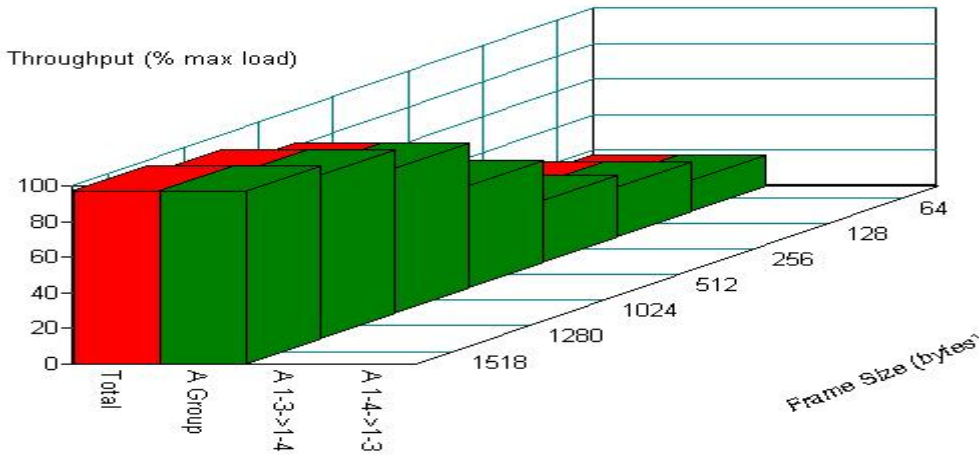
6. Binary Direction (LAN2: PCI 10/100 Realtek 8100C Ethernet → LAN3: PCI 10/100 Realtek 8100C Ethernet)



Throughput Table

Framesize	64	128	256	512	1024	1280	1518
Name							
Total	17.2421875	27.296875	34.2578125	56.6875	80.6640625	92.265625	96.1328125
A Group	17.2421875	27.296875	34.2578125	56.6875	80.6640625	92.265625	96.1328125
A 1-2→1-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A 1-3→1-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A

7. Binary Direction (LAN3: PCI 10/100 Realtek 8100C Ethernet → LAN4: PCI 10/100 Realtek 8100C Ethernet)

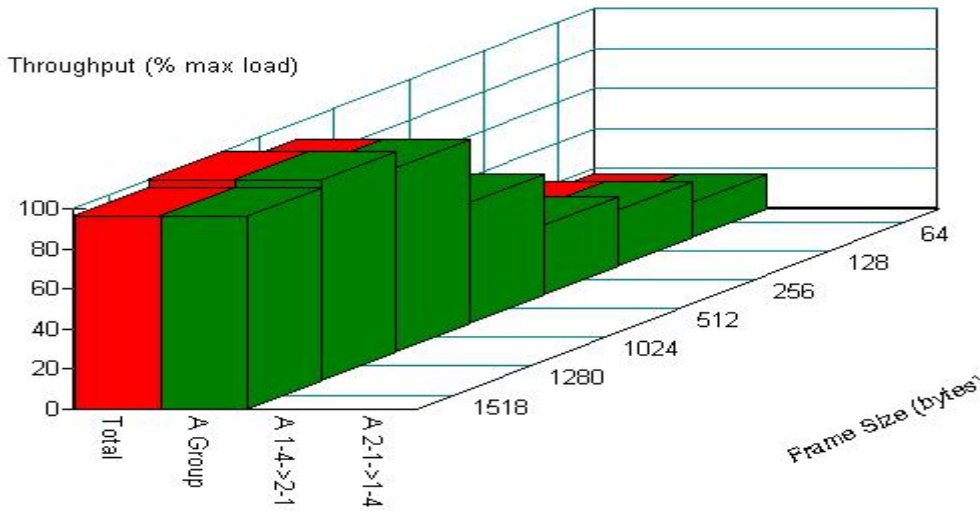


Throughput vs Frame Size

Throughput Table

Framesize	64	128	256	512	1024	1280	1518
Name							
Total	17.2421875	27.296875	34.2578125	56.6875	80.6640625	91.4921875	96.90625
A Group	17.2421875	27.296875	34.2578125	56.6875	80.6640625	91.4921875	96.90625
A 1-3 → 1-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A 1-4 → 1-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A

8. Binary Direction (LAN4: PCI 10/100 Realtek 8100C Ethernet → LAN5: PCI 10/100 Realtek 8100C Ethernet)



Throughput vs Frame Size

Throughput Table

Framesize	64	128	256	512	1024	1280	1518
Name							
Total	17.2421875	27.296875	34.2578125	59.78125	91.4921875	100	96.1328125
A Group	17.2421875	27.296875	34.2578125	59.78125	91.4921875	100	96.1328125
A 1-4 → 2-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A 2-1 → 1-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A