

SharkFest '16

Top 5 False Positives

Thursday, June 16, 2016



Jasper Bongertz

Expert Analyst | Airbus Defence and Space CyberSecurity

Agenda

1. **Negative Delta Times**
2. **Frame size and checksum problems**
3. **Retransmissions and Duplicate ACKs**
4. **Zero Window**
5. **Retransmission cost**

1. Negative Delta Times



1 - Wireshark Demo

No.	IF	Source	Destination	Protocol	Info	Length	TCP Flags	Delta Time	Relative Time	Absolute Time
1	0	81.209.179.69	37.201.152.244	TCP	80→15668 [SYN, ACK] Seq=0 Ack=1 Win=8192 Len=0 MSS=1460 WS=256 SACK_PERM=1	66	.....A..S.	0.000000	0.000000	2013-05-22 00:25:37.457203
2	1	37.201.152.244	81.209.179.69	TCP	15668→80 [SYN] Seq=0 Win=8192 Len=0 MSS=1460 WS=4 SACK_PERM=1	66	.....S.	-0.007976	-0.007976	2013-05-22 00:25:37.449227
3	0	81.209.179.69	37.201.152.244	HTTP	[TCP ACKed unseen segment] HTTP/1.1 200 OK (text/html)	347	.....AP...	0.056228	0.040252	2013-05-22 00:25:37.505455
4	1	37.201.152.244	81.209.179.69	TCP	15668→80 [ACK] Seq=1 Ack=1 Win=65700 Len=0	60	.....A....	-0.047916	0.000336	2013-05-22 00:25:37.457539
5	1	37.201.152.244	81.209.179.69	HTTP	GET / HTTP/1.1	453	.....AP...	0.037275	0.037611	2013-05-22 00:25:37.494814
6	0	81.209.179.69	37.201.152.244	HTTP	[TCP ACKed unseen segment] HTTP/1.1 404 Not Found (text/html)	463	.....AP...	0.170705	0.216315	2013-05-22 00:25:37.673519
7	1	37.201.152.244	81.209.179.69	HTTP	GET /favicon.ico HTTP/1.1	404	.....AP...	-0.007980	0.208336	2013-05-22 00:25:37.665539
8	1	37.201.152.244	81.209.179.69	TCP	15668→80 [ACK] Seq=750 Ack=703 Win=64996 Len=0	60	.....A....	0.209000	0.417336	2013-05-22 00:25:37.874539
9	0	81.209.179.69	37.201.152.244	TCP	80→15668 [FIN, ACK] Seq=703 Ack=750 Win=130816 Len=0	60	.....A...F	5.307160	5.724504	2013-05-22 00:25:43.181707
10	1	37.201.152.244	81.209.179.69	TCP	15668→80 [ACK] Seq=750 Ack=704 Win=64996 Len=0	60	.....A....	0.000303	5.724807	2013-05-22 00:25:43.182010
11	1	37.201.152.244	81.209.179.69	TCP	15668→80 [FIN, ACK] Seq=750 Ack=704 Win=64996 Len=0	60	.....A...F	0.000001	5.724808	2013-05-22 00:25:43.182011
12	0	81.209.179.69	37.201.152.244	TCP	80→15668 [ACK] Seq=704 Ack=751 Win=130816 Len=0	60	.....A....	0.011008	5.735816	2013-05-22 00:25:43.193019



2. Frame size and checksum problems

2 - Wireshark Demo

No.	IF	Source	Destination	Protocol	Info	Length	TCP Flags
1	e	192.168.124.100	192.168.124.2	TCP	53244→902 [SYN] Seq=0 Win=8192 [TCP CHECKSUM INCORRECT] Len=0 MSS=1460 WS=4 SA...	66	.....S..
2	e	192.168.124.2	192.168.124.100	TCP	902→53244 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=12 SACK_PERM=1	66	.....A..S.
3	e	192.168.124.100	192.168.124.2	TCP	53244→902 [ACK] Seq=1 Ack=1 Win=65700 [TCP CHECKSUM INCORRECT] Len=0	54	.....A....
4	e	192.168.124.2	192.168.124.100	TCP	902→53244 [PSH, ACK] Seq=1 Ack=1 Win=65536 Len=132	186	.....AP....
5	e	192.168.124.100	192.168.124.2	TCP	53244→902 [PSH, ACK] Seq=1 Ack=133 Win=65568 [TCP CHECKSUM INCORRECT] Len=55	109	.....AP....
6	e	192.168.124.2	192.168.124.100	TCP	902→53244 [PSH, ACK] Seq=133 Ack=56 Win=65536 Len=1083	1137	.....AP....
7	e	192.168.124.100	192.168.124.2	TCP	53244→902 [PSH, ACK] Seq=56 Ack=1216 Win=64404 [TCP CHECKSUM INCORRECT] Len=326	380	.....AP....
8	e	192.168.124.2	192.168.124.100	TCP	902→53244 [PSH, ACK] Seq=1216 Ack=382 Win=65536 Len=59	113	.....AP....
9	e	192.168.124.100	192.168.124.2	TCP	53244→902 [PSH, ACK] Seq=382 Ack=1275 Win=64424 [TCP CHECKSUM INCORRECT] Len=1...	155	.....AP....
10	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1275 Ack=483 Win=65536 Len=0	60	.....A....
11	e	192.168.124.100	192.168.124.2	TCP	53244→902 [PSH, ACK] Seq=483 Ack=1275 Win=64424 [TCP CHECKSUM INCORRECT] Len=53	107	.....AP....
12	e	192.168.124.2	192.168.124.100	TCP	902→53244 [PSH, ACK] Seq=1275 Ack=536 Win=65536 Len=69	123	.....AP....
13	e	192.168.124.100	192.168.124.2	TCP	53244→902 [PSH, ACK] Seq=536 Ack=1344 Win=64356 [TCP CHECKSUM INCORRECT] Len=2...	318	.....AP....
14	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1344 Ack=800 Win=65536 Len=0	60	.....A....
15	e	192.168.124.100	192.168.124.2	TCP	53244→902 [PSH, ACK] Seq=800 Ack=1344 Win=64356 [TCP CHECKSUM INCORRECT] Len=9...	990	.....AP....
16	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1344 Ack=1736 Win=64512 Len=0	60	.....A....
17	e	192.168.124.2	192.168.124.100	TCP	902→53244 [PSH, ACK] Seq=1344 Ack=1736 Win=65536 Len=264	318	.....AP....
18	e	192.168.124.100	192.168.124.2	TCP	53244→902 [PSH, ACK] Seq=1736 Ack=1608 Win=65700 [TCP CHECKSUM INCORRECT] Len=...	318	.....AP....
19	e	192.168.124.100	192.168.124.2	TCP	53244→902 [PSH, ACK] Seq=2808 Ack=1608 Win=65700 [TCP CHECKSUM INCORRECT] Len=...	4434	.....AP....
20	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=4920 Win=62464 Len=0	60	.....A....
21	e	192.168.124.100	192.168.124.2	TCP	53244→902 [ACK] Seq=6380 Ack=1608 Win=65700 [TCP CHECKSUM INCORRECT] Len=5840	5894	.....A....
22	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=10760 Win=56832 Len=0	60	.....A....
23	e	192.168.124.100	192.168.124.2	TCP	53244→902 [ACK] Seq=12220 Ack=1608 Win=65700 [TCP CHECKSUM INCORRECT] Len=11608	11734	.....A....
24	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=15148 Win=52224 Len=0	60	.....A....
25	e	192.168.124.100	192.168.124.2	TCP	53244→902 [ACK] Seq=23900 Ack=1608 Win=65700 [TCP CHECKSUM INCORRECT] Len=8760	8814	.....A....
26	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=20980 Win=46592 Len=0	60	.....A....
27	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=23900 Win=43520 Len=0	60	.....A....
28	e	192.168.124.100	192.168.124.2	TCP	53244→902 [ACK] Seq=32660 Ack=1608 Win=65700 [TCP CHECKSUM INCORRECT] Len=17520	17574	.....A....
29	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=26820 Win=40448 Len=0	60	.....A....
30	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=32660 Win=34816 Len=0	60	.....A....
31	e	192.168.124.100	192.168.124.2	TCP	53244→902 [ACK] Seq=50180 Ack=1608 Win=65700 [TCP CHECKSUM INCORRECT] Len=16060	16114	.....A....
32	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=37040 Win=30280 Len=0	60	.....A....
33	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=42880 Win=24576 Len=0	60	.....A....
34	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=48720 Win=18944 Len=0	60	.....A....
35	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=54560 Win=12800 Len=0	60	.....A....
36	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=60400 Win=7168 Len=0	60	.....A....
37	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1508 Ack=66240 Win=1024 Len=0	60	.....A....
38	e	192.168.124.2	192.168.124.100	TCP	[TCP Window Update] 902→53244 [ACK] Seq=1608 Ack=66240 Win=65536 Len=0	60	.....A....
39	e	192.168.124.100	192.168.124.2	TCP	53244→902 [ACK] Seq=66240 Ack=1608 Win=65700 [TCP CHECKSUM INCORRECT] Len=64248	64294	.....A....
40	e	192.168.124.2	192.168.124.100	TCP	902→53244 [ACK] Seq=1608 Ack=71560 Win=59392 Len=0	60	.....A....

False Positive 2 explained

The offloading effect



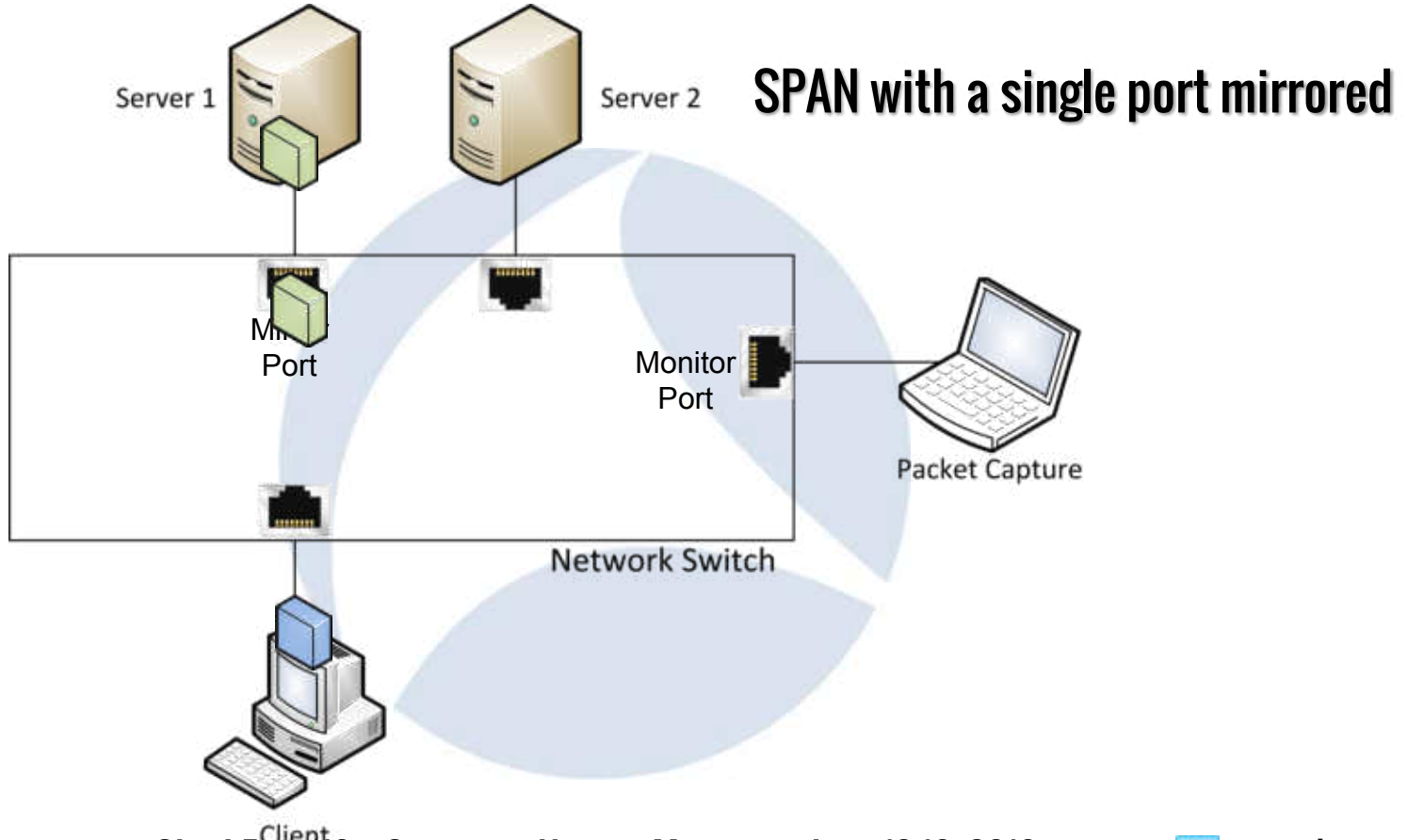
3. Retransmissions and Dup ACKs



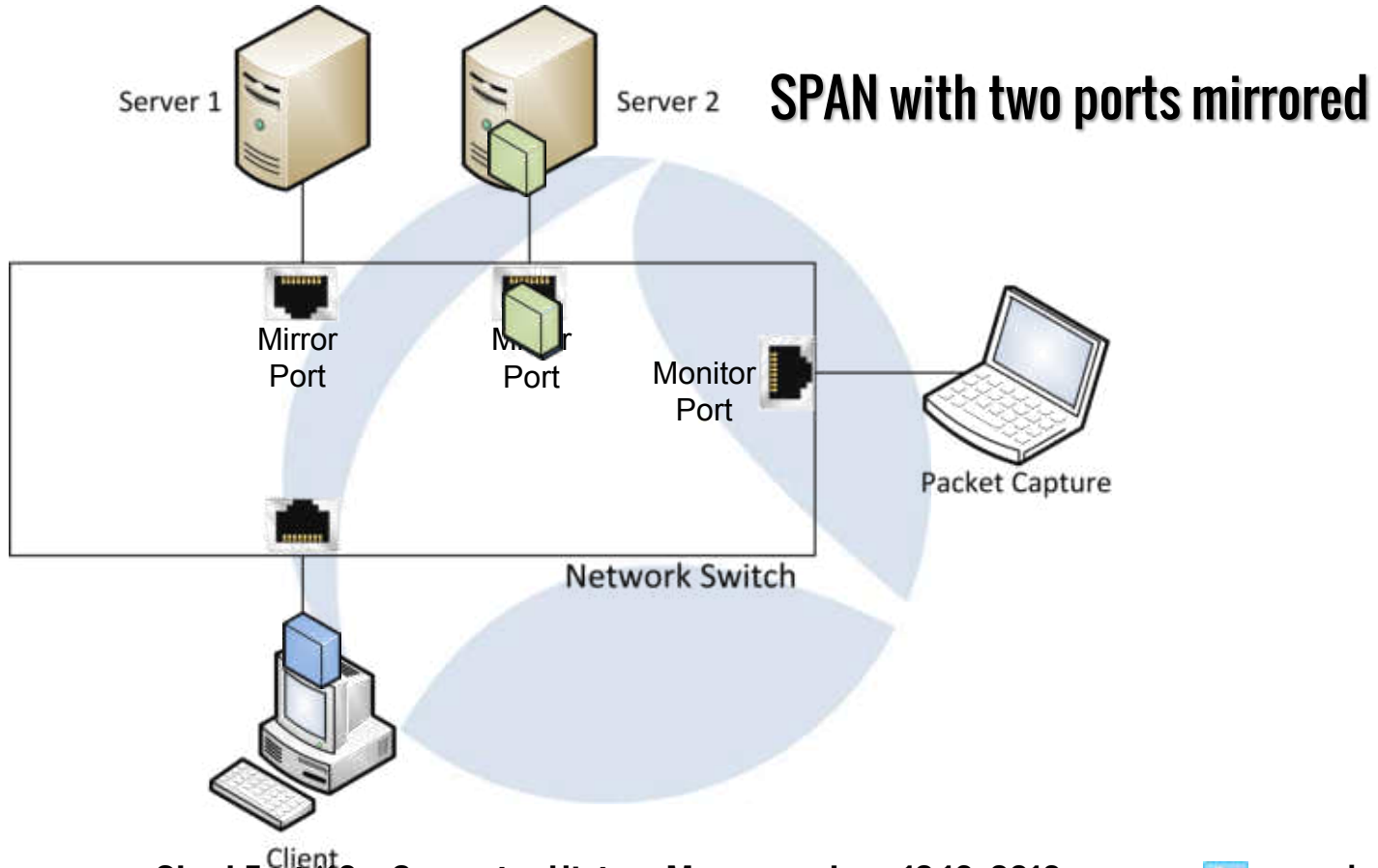
3 - Wireshark Demo

No.	IF	Source	Destination	Protocol	Info	Length	TCP Flags	Delta Time
1	0	192.168.1.1	10.0.0.1	SMB	Read AndX Request, FID: 0x402b, 16384 bytes at offset 66441216	121	.....AP...	0.000000
2	0	192.168.1.1	10.0.0.1	TCP	[TCP Retransmission] 1145→445 [PSH, ACK] Seq=1 Ack=1 Win=64512 Len=63	121	.....AP...	0.000013
3	0	10.0.0.1	192.168.1.1	NBSS	Session message[Packet size limited during capture]	1518	.....A....	0.000201
4	0	10.0.0.1	192.168.1.1	TCP	[TCP Retransmission] 445→1145 [ACK] Seq=1 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000013
5	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] 445→1145 [ACK] Seq=1461 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000013
6	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] 445→1145 [ACK] Seq=2921 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000014
7	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] [TCP Out-Of-Order] 445→1145 [ACK] Seq=1461 Ack=64 Win=	1518	.....A....	0.000012
8	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] 445→1145 [ACK] Seq=4381 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000013
9	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] [TCP Out-Of-Order] 445→1145 [ACK] Seq=2921 Ack=64 Win=	1518	.....A....	0.000012
10	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] 445→1145 [ACK] Seq=5841 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000012
11	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] [TCP Out-Of-Order] 445→1145 [ACK] Seq=4381 Ack=64 Win=	1518	.....A....	0.000012
12	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] [TCP Retransmission] 445→1145 [ACK] Seq=5841 Ack=64 Wi	1518	.....A....	0.000014
13	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] 445→1145 [ACK] Seq=7301 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000012
14	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] [TCP Retransmission] 445→1145 [ACK] Seq=7301 Ack=64 Wi	1518	.....A....	0.000012
15	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] 445→1145 [ACK] Seq=8761 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000013
16	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] [TCP Retransmission] 445→1145 [ACK] Seq=8761 Ack=64 Wi	1518	.....A....	0.000012
17	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] 445→1145 [ACK] Seq=10221 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000012
18	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] [TCP Retransmission] 445→1145 [ACK] Seq=10221 Ack=64 W	1518	.....A....	0.000013
19	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] 445→1145 [ACK] Seq=11681 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000014
20	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] 445→1145 [ACK] Seq=13141 Ack=64 Win=64177 Len=1460	1518	.....A....	0.000017
21	0	10.0.0.1	192.168.1.1	TCP	[Continuation to #3] [TCP Out-Of-Order] 445→1145 [ACK] Seq=11681 Ack=64 Wi	1518	.....A....	0.000017

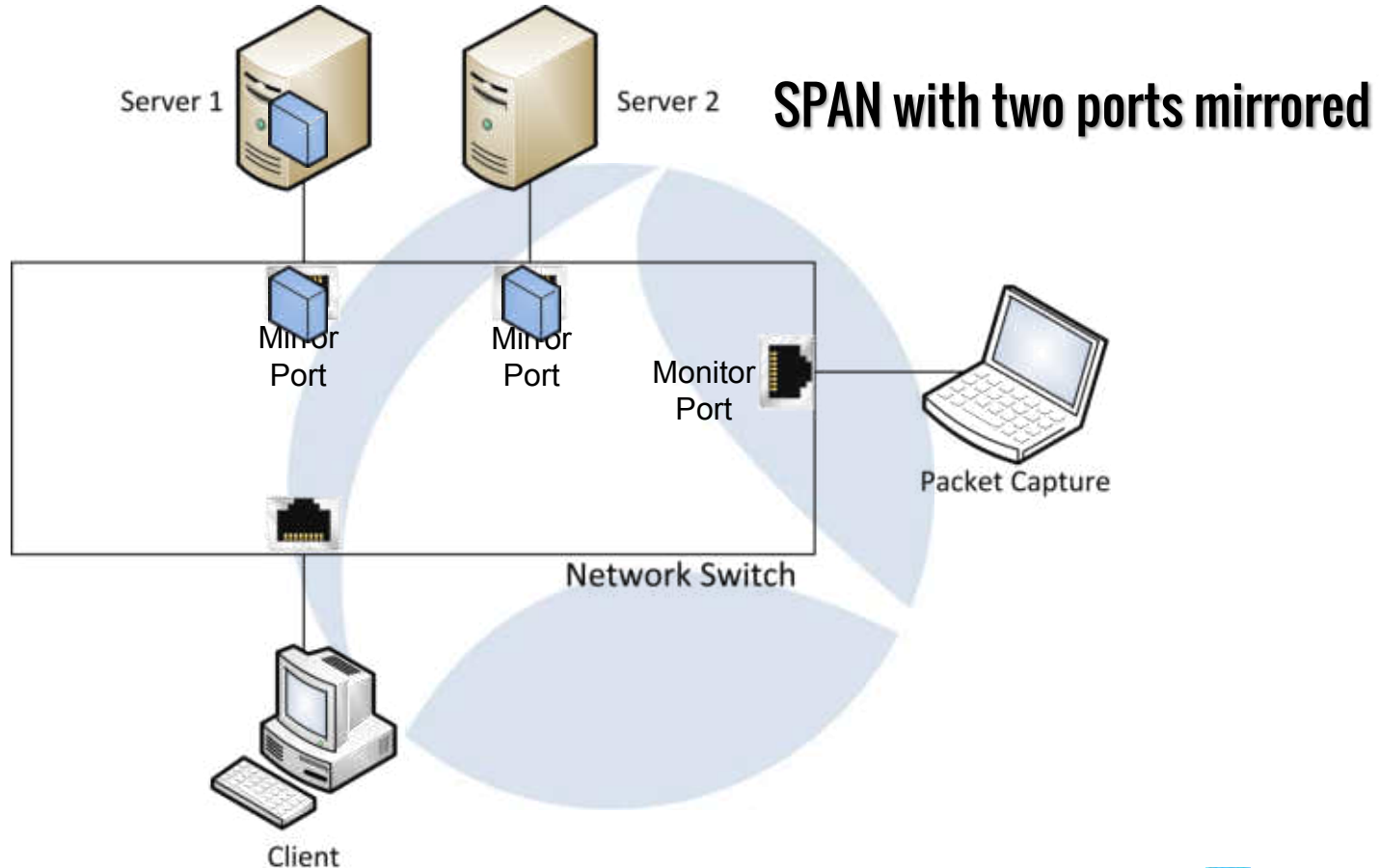
False Positive 3 explained (1/3)



False Positive 3 explained (2/3)



False Positive 3 explained (3/3)



4. Zero Window



4 - Wireshark Demo

No.	IF	Source	Destination	Protocol	Info	Length	TCP Flags	Delta Time	Relative Time
1	0	192.168.0.10	10.0.0.1	TCP	1033→9100 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 SACK_PERM=1	62	.....S.	0.000000	0.000000
2	0	10.0.0.1	192.168.0.10	TCP	9100→1033 [SYN, ACK] Seq=0 Ack=1 Win=1460 Len=0 MSS=1460	60	.....A..S.	0.000122	0.000122
3	0	192.168.0.10	10.0.0.1	TCP	1033→9100 [ACK] Seq=1 Ack=1 Win=65535 Len=0	60	.....A....	0.000005	0.000127
4	0	192.168.0.10	10.0.0.1	TCP	[TCP Window Full] 1033→9100 [ACK] Seq=1 Ack=1 Win=65535 Len=1460	1514	.....A....	0.000978	0.001105
5	0	10.0.0.1	192.168.0.10	TCP	9100→1033 [ACK] Seq=1 Ack=1461 Win=1460 Len=0	60	.....A....	0.000327	0.001432
6	0	192.168.0.10	10.0.0.1	TCP	[TCP Window Full] 1033→9100 [ACK] Seq=1461 Ack=1 Win=65535 Len=1460	1514	.....A....	0.000204	0.001636
7	0	10.0.0.1	192.168.0.10	TCP	[TCP ZeroWindow] 9100→1033 [ACK] Seq=1 Ack=2921 Win=0 Len=0	60	.....A....	0.196925	0.198561
8	0	192.168.0.10	10.0.0.1	TCP	[TCP ZeroWindowProbe] 1033→9100 [ACK] Seq=2921 Ack=1 Win=65535 Len=1	60	.....A....	2.288995	2.487556
9	0	10.0.0.1	192.168.0.10	TCP	[TCP ZeroWindowProbeAck] [TCP ZeroWindow] 9100→1033 [ACK] Seq=1 Ack=2921 Win=0 Len=0	60	.....A....	0.132047	2.619603
10	0	10.0.0.1	192.168.0.10	TCP	[TCP Window Update] 9100→1033 [ACK] Seq=1 Ack=2921 Win=1460 Len=0	60	.....A....	0.302639	2.922242
11	0	192.168.0.10	10.0.0.1	TCP	1033→9100 [ACK] Seq=2921 Ack=1 Win=65535 Len=1460	1514	.....A....	0.000198	2.922440
12	0	192.168.0.10	10.0.0.1	TCP	1033→9100 [ACK] Seq=4381 Ack=1 Win=65535 Len=1460	1514	.....A....	0.000009	2.922449
13	0	10.0.0.1	192.168.0.10	TCP	9100→1033 [ACK] Seq=1 Ack=5841 Win=16060 Len=0	60	.....A....	0.001059	2.923508
14	0	192.168.0.10	10.0.0.1	TCP	1033→9100 [ACK] Seq=5841 Ack=1 Win=65535 Len=1460	1514	.....A....	0.000203	2.923711
15	0	192.168.0.10	10.0.0.1	TCP	1033→9100 [ACK] Seq=7301 Ack=1 Win=65535 Len=1460	1514	.....A....	0.000007	2.923718
16	0	192.168.0.10	10.0.0.1	TCP	1033→9100 [ACK] Seq=8761 Ack=1 Win=65535 Len=1460	1514	.....A....	0.000006	2.923724
17	0	10.0.0.1	192.168.0.10	TCP	9100→1033 [ACK] Seq=1 Ack=10221 Win=16060 Len=0	60	.....A....	0.000681	2.924405

5. Retransmission cost




5 - Wireshark Demo

No.	IF	Source	Destination	Protocol	Info	Length	TCP Flags	Delta Time	Relative Time
1	0	192.168.1.44	93.184.220.20	TCP	59707→80 [SYN] Seq=0 win=65535 Len=0 MSS=1460 WS=2 TSval=751518334 TSecr=0	78	.....S.	0.000000	0.000000
2	0	93.184.220.20	192.168.1.44	TCP	80→59707 [SYN, ACK] Seq=0 Ack=1 Min=14600 Len=0 MSS=1452 SACK_PERM=1 WS=64	66	.....A..S.	0.050812	0.050812
3	0	192.168.1.44	93.184.220.20	TCP	59707→80 [ACK] Seq=1 Ack=1 Len=0	54	.....A....	0.000157	0.051669
4	0	192.168.1.44	93.184.220.20	HTTP	GET /sample128k.html?r=0.7709725811462 HTTP/1.1	410	.....A.P..	0.001215	0.059384
5	0	93.184.220.20	192.168.1.44	TCP	80→59707 [ACK] Seq=1 Ack=357 Min=15680 Len=0	60	.....A....	0.059001	0.118385
6	0	93.184.220.20	192.168.1.44	HTTP	HTTP/1.1 200 OK (text/html)	1506	.....A....	0.002099	0.121284
7	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.001117	0.122401
8	0	192.168.1.44	93.184.220.20	TCP	59707→80 [ACK] Seq=357 Ack=2905 Win=65340 Len=0	54	.....A....	0.000101	0.122502
9	0	93.184.220.20	192.168.1.44	HTTP	[TCP Previous segment not captured] Continuation	1506	.....A....	0.004806	0.127300
10	0	192.168.1.44	93.184.220.20	TCP	[TCP Window update] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000058	0.127366
11	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.001669	0.129035
12	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #01] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000041	0.129077
13	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.002409	0.131486
14	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #02] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000047	0.131533
15	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.001550	0.133003
16	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #03] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000040	0.133123
17	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.001110	0.134233
18	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #04] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000043	0.134276
19	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.002494	0.136770
20	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #05] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000040	0.136810
21	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.001617	0.138427
22	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #06] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000043	0.138470
23	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.040578	0.179648
24	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #07] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000068	0.179714
25	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.001521	0.180637
26	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #08] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000035	0.180672
27	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.000791	0.181463
28	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #09] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000034	0.181497
29	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.002702	0.184199
30	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #10] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000032	0.184231
31	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.001528	0.185759
32	0	192.168.1.44	93.184.220.20	TCP	[TCP Dup ACK #11] 59707→80 [ACK] Seq=357 Ack=2905 Win=66792 Len=0 SLE=431	66	.....A....	0.000030	0.185789
33	0	93.184.220.20	192.168.1.44	HTTP	[TCP Fast Retransmission] Continuation	1506	.....A....	0.002328	0.188117
34	0	192.168.1.44	93.184.220.20	TCP	59707→80 [ACK] Seq=357 Ack=21781 Min=47916 Len=0	54	.....A....	0.000039	0.188156
35	0	93.184.220.20	192.168.1.44	HTTP	Continuation	1506	.....A....	0.001500	0.189951

Some helpful links...

- **Have questions about Wireshark?**
 - go to <https://ask.wireshark.org>
- **Want to grab the Sharkfest 2016 copy of TraceWrangler?**
 - go to <https://goo.gl/FK0N9I>
 - otherwise visit <https://www.tracewrangler.com>
- **Want to read up on network analysis topics?**
 - go to <https://blog.packet-foo.com>

A close-up, low-angle shot of a shark's mouth, showing rows of sharp, pointed teeth. The lighting is dramatic, with the teeth appearing bright against a dark background. The shark's skin is visible at the top of the frame.

Q&A

Mail: jasper@packet-foo.com

Web: blog.packet-foo.com

Twitter: [@packetjay](https://twitter.com/@packetjay)