

EXPERIMENT 5

Aim :

Show and Analyse the Trace Format of NS2.

Trace Files & Description :

The file written by an application to store coverage information or overall network information in NS2, it is known as trace file. The **extension** for trace file is **.tr**. For all the programs written in NS2, a unique trace file is generated by user. The format of trace string consists of 12 fields which are shown below.

event	time	from node	to node	pkt type	pkt size	flags	fid	src addr	dst addr	seq num	pkt id
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Format of Trace File :

1. Event or Type Identifier –

+ : packet enqueue event

- : packet deque event

r : packet reception event

d : packet drop event

c : packet collision at the MAC level

2. Time – at which the packet tracing string is created

3. & 4. Source & Destination Node – source and destination ID's of tracing objects

5. Packet Name – name of the packet type

6. Packet Size – size of packet in bytes

7. Flags – 7 digit flag string

“-” : disable

1st = “E” : ECN (Explicit Congestion Notification) echo is enabled

2nd = “P” : priority in the IP header is enabled

3rd : not in use

4th = “A” : Congestion action

5th = “E” : Congestion has occurred

6th = “F” : TCP fast start is used

7th = “N” : Explicit Congestion Notification (ECN) is on

8. Flow ID – it shows the ID of packet

9. & 10. Source & Destination Address – the format of these two fields is “**a.b**”, where “**a**” is the address and “**b**” is the port

11. Sequence Number – it shows the sequence number

12. Packet Unique ID – the last field shows the unique ID of packet

Trace File Description :

s - send packet

r - received packet

d - packet dropped

f - packet forwarded

c - collision of packet at MAC level

t - time at which packet tracing started

Hs - ID of hop

Hd - ID of next hop towards destination

Ni - Node ID

Nx, Ny, Nz - Coordinates of nodes situated

Ne - Node energy level

NI - Trace level

Nw - Reason of the event

AGT – Agent

RTR – Routing

END - DROP End of Simulation

COL - DROP MAC Collision

DUP - DROP MAC Duplicate

DERR - DROP MAC Packet Error

RET - DROP MAC Retry Count Exceed

STA - DROP MAC Invalid State

BSY - DROP MAC Busy

NRTE - DROP RTR - NO ROUTE

LOOP - DROP RTR ROUTE LOOP

TTL - DROP RTR TTL has reached Zero

TOUT - DROP RTR - QTIME OUT Expired

Is - Source address of source port

Id - Destination address of destination port

II - Packet Size

If - Flow ID

Ii - Unique ID

Iv - TTL value next hop into

MAC Layer Information :

Ma - MAC Layer Duration

Md - Destination Ethernet Address

Ms - Source Ethernet Address

Mt - Ethernet Type

Packet Information :

-P arp - Address Resolution Protocol

-Po - ARP Request / Reply

Pm - Source MAC Address

Ps - Source Address

Pa - Destination MAC Address

Pd - Destination Address

Pn - Nodes Trans versed

Pq – Flag

Pi - Route Request Sequence Number / Sequence Number

Pp – Flag

Pl - Reply Length

Pe - src of source routing

Pw - Error Report Flag

Pc - Report to whom

Pb - Link error from link a to link b

-P cbr - CBR data

Pf – how many level packet leave

Po - Optimal Number of Forward

-P TCP - TCP flow

-Ps - sequence number

Pu – acknowledgement

Pf - Packet Failure

Screen Shots :

```
C:\Users\alama\Desktop> out.tr
1 + 0.1.0.1 tcp 40 ----- 0 0.0 1.0 0 0
2 - 0.1.0.1 tcp 40 ----- 0 0.0 1.0 0 0
3 r 0.10416 0 1 tcp 40 ----- 0 0.0 1.0 0 0
4 + 0.10416 1 0 ack 40 ----- 0 1.0 0.0 0 1
5 - 0.10416 1 0 ack 40 ----- 0 1.0 0.0 0 1
6 r 0.10832 1 0 ack 40 ----- 0 1.0 0.0 0 1
7 + 0.10832 0 1 tcp 1040 ----- 0 0.0 1.0 1 2
8 - 0.10832 0 1 tcp 1040 ----- 0 0.0 1.0 1 2
9 + 0.10832 0 1 tcp 1040 ----- 0 0.0 1.0 2 3
10 - 0.11248 0 1 tcp 1040 ----- 0 0.0 1.0 2 3
11 r 0.11648 0 1 tcp 1040 ----- 0 0.0 1.0 1 2
12 + 0.11648 1 0 ack 40 ----- 0 1.0 0.0 1 4
13 - 0.11648 1 0 ack 40 ----- 0 1.0 0.0 1 4
14 r 0.12064 0 1 tcp 1040 ----- 0 0.0 1.0 2 3
15 + 0.12064 1 0 ack 40 ----- 0 1.0 0.0 2 5
16 - 0.12064 1 0 ack 40 ----- 0 1.0 0.0 2 5
17 r 0.12064 1 0 ack 40 ----- 0 1.0 0.0 1 4
18 + 0.12064 0 1 tcp 1040 ----- 0 0.0 1.0 3 6
19 - 0.12064 0 1 tcp 1040 ----- 0 0.0 1.0 3 6
20 + 0.12064 0 1 tcp 1040 ----- 0 0.0 1.0 4 7
21 r 0.1248 1 0 ack 40 ----- 0 1.0 0.0 2 5
22 + 0.1248 0 1 tcp 1040 ----- 0 0.0 1.0 5 8
23 + 0.1248 0 1 tcp 1040 ----- 0 0.0 1.0 6 9
24 - 0.1248 0 1 tcp 1040 ----- 0 0.0 1.0 4 7
25 r 0.1288 0 1 tcp 1040 ----- 0 0.0 1.0 3 6
26 + 0.1288 1 0 ack 40 ----- 0 1.0 0.0 3 10
27 - 0.1288 1 0 ack 40 ----- 0 1.0 0.0 3 10
28 - 0.12896 0 1 tcp 1040 ----- 0 0.0 1.0 5 8
29 r 0.13296 0 1 tcp 1040 ----- 0 0.0 1.0 4 7
30 + 0.13296 1 0 ack 40 ----- 0 1.0 0.0 4 11
31 - 0.13296 1 0 ack 40 ----- 0 1.0 0.0 4 11
32 r 0.13296 1 0 ack 40 ----- 0 1.0 0.0 3 10
33 + 0.13296 0 1 tcp 1040 ----- 0 0.0 1.0 7 12
```

Wired Network Trace File

```
C:\Users\alama\Desktop> xwrls-simple.tr
1 s 0.032821055 _1_ RTR --- 0 message 32 [0 0 0 0] ----- [1:255 -1:255 32 0]
2 s 0.178591360 _2_ RTR --- 1 message 32 [0 0 0 0] ----- [2:255 -1:255 32 0]
3 s 1.113402886 _0_ RTR --- 2 message 32 [0 0 0 0] ----- [0:255 -1:255 32 0]
4 M 10.00000 0 (5.00, 5.00, 0.00), (250.00, 250.00), 3.00
5 s 10.000000000 _0_ AGT --- 3 tcp 40 [0 0 0 0] ----- [0:0 1:0 32 0] [0 0] 0 0
6 r 10.000000000 _0_ RTR --- 3 tcp 40 [0 0 0 0] ----- [0:0 1:0 32 0] [0 0] 0 0
7 s 12.530838300 _0_ RTR --- 4 message 32 [0 0 0 0] ----- [0:255 -1:255 32 0]
8 s 13.000000000 _0_ AGT --- 5 tcp 40 [0 0 0 0] ----- [0:0 1:0 32 0] [0 0] 0 0
9 r 13.000000000 _0_ RTR --- 5 tcp 40 [0 0 0 0] ----- [0:0 1:0 32 0] [0 0] 0 0
10 s 13.830059915 _2_ RTR --- 6 message 32 [0 0 0 0] ----- [2:255 -1:255 32 0]
11 s 14.280428760 _1_ RTR --- 7 message 32 [0 0 0 0] ----- [1:255 -1:255 32 0]
12 M 15.00000 1 (490.00, 285.00, 0.00), (45.00, 285.00), 5.00
13 s 19.000000000 _0_ AGT --- 8 tcp 40 [0 0 0 0] ----- [0:0 1:0 32 0] [0 0] 0 0
14 r 19.000000000 _0_ RTR --- 8 tcp 40 [0 0 0 0] ----- [0:0 1:0 32 0] [0 0] 0 0
15 s 25.369352037 _0_ RTR --- 9 message 32 [0 0 0 0] ----- [0:255 -1:255 32 0]
16 r 25.370532808 _2_ RTR --- 9 message 32 [0 ffffffff 0 800] ----- [0:255 -1:255 32 0]
17 s 26.386541965 _2_ RTR --- 10 message 32 [0 0 0 0] ----- [2:255 -1:255 32 0]
18 r 26.387502727 _0_ RTR --- 10 message 32 [0 ffffffff 2 800] ----- [2:255 -1:255 32 0]
19 s 27.274269018 _1_ RTR --- 11 message 32 [0 0 0 0] ----- [1:255 -1:255 32 0]
20 s 31.000000000 _0_ AGT --- 12 tcp 40 [0 0 0 0] ----- [0:0 1:0 32 0] [0 0] 0 0
21 r 31.000000000 _0_ RTR --- 12 tcp 40 [0 0 0 0] ----- [0:0 1:0 32 0] [0 0] 0 0
22 s 37.379995458 _2_ RTR --- 13 message 32 [0 0 0 0] ----- [2:255 -1:255 32 0]
23 r 37.381016115 _0_ RTR --- 13 message 32 [0 ffffffff 2 800] ----- [2:255 -1:255 32 0]
24 r 37.381016233 _1_ RTR --- 13 message 32 [0 ffffffff 2 800] ----- [2:255 -1:255 32 0]
25 s 37.425885784 _0_ RTR --- 14 message 32 [0 0 0 0] ----- [0:255 -1:255 32 0]
26 r 37.427046440 _2_ RTR --- 14 message 32 [0 ffffffff 0 800] ----- [0:255 -1:255 32 0]
27 s 38.426532792 _0_ RTR --- 15 message 32 [0 0 0 0] ----- [0:255 -1:255 32 0]
28 r 38.427533439 _2_ RTR --- 15 message 32 [0 ffffffff 0 800] ----- [0:255 -1:255 32 0]
29 s 40.045941996 _1_ RTR --- 16 message 32 [0 0 0 0] ----- [1:255 -1:255 32 0]
30 r 40.046982728 _2_ RTR --- 16 message 32 [0 ffffffff 1 800] ----- [1:255 -1:255 32 0]
31 s 40.493686470 _2_ RTR --- 17 message 32 [0 0 0 0] ----- [2:255 -1:255 32 0]
32 r 40.494587098 _0_ RTR --- 17 message 32 [0 ffffffff 2 800] ----- [2:255 -1:255 32 0]
33 r 40.494587195 _1_ RTR --- 17 message 32 [0 ffffffff 2 800] ----- [2:255 -1:255 32 0]
```

Wireless Network Trace File