# NS-2 Trace Formats

From Nsnam

This document lists various trace formats used by the NS-2 Network Simulator. The information is based on NS2 version 2.1b9a. The best effort has been made to document correctly all of the trace formats, but **be warned that this list is not complete, and may contain errors**. If you find any errors or omissions, please edit this page to fix the problems.

The various traces begin with a single character or abbreviation that indicates the type of trace, followed by a fixed or variable trace format. The tables listing the trace formats differ between fixed and variable trace formats:

- For fixed trace formats, the table lists the event the triggers the trace under the Event heading and the characters that start the trace under the Abbreviation heading. The format is listed across the last two columns, and the the type and value for each element of the format are listed beneath under the Type and Value headings. Some events have multiple trace formats.
- For variable trace formats, the table lists the event the triggers the trace under the Event heading and the characters that start the trace under the Abbreviation heading. The last three columns list the possible flags, types, and values for the event under the Flag, Type, and Value headings.

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## Normal trace formats

This information comes from "The *ns* Manual" "Trace and Monitoring Support: Trace File Format" chapter. This trace is used normal wired operations. The trace starts with one of four possible characters.

The tables that list the additional wireless trace information do not have an Abbreviation column, since the information is appended to the end of the regular wireless trace format.

| Event | Abbreviation | Type | Value |
|---|---|---|---|
| Normal Event | r: Receive<br>d: Drop<br>e: Error<br>+: Enqueue<br>-: Dequeue | `%g %d %d %s %d %s %d %d.%d %d.%d %d %d` | |
| | | double | Time |
| | | int | (Link-layer) Source Node |
| | | int | (Link-layer) Destination Node |
| | | string | Packet Name |

| | | | |
|---|---|---|---|
| | | int | Packet Size |
| | | string | Flags |
| | | int | Flow ID |
| | | int | (Network-layer) Source Address |
| | | int | Source Port |
| | | int | (Network-layer) Destination Address |
| | | int | Destination Port |
| | | int | Sequence Number |
| | | int | Unique Packet ID |

The flags are read as follow (the "value" is displayed instead of `-` if flag is set). Each row is one of the "slots", from left to right. From from ns/trace/trace.cc (https://web.archive.org/web/20150609030727/http://nsnam.cvs.sourceforge.net/nsnam/ns-2/trace/trace.cc?revision=1.81&view=markup#l_252) .

| Value | Meaning |
|---|---|
| C | ECN-echo |
| P | pri_ (supposedly unused) |
| - | |
| A | Congestion Action |
| E | Congestion Experienced (CE) |
| F | Fast Start |
| N | ECN-capable |
| *SCTP-only* | |

Depending on the packet type, the trace may log additional information:

| Event | Type | Value |
|---|---|---|
| TCP Trace | `%d 0x%x %d %d` | |
| | int | Ack Number |
| | hexadecimal | Flags (Used by FullTCP)<br>FIN=0x01, SYN=02, PUSH=08, ACK=10, ECE=40, CWR=80 |
| | int | Header Length |
| | int | Socket Address Length |
| Satellite Trace | `%.2f %.2f %.2f %.2f` | |
| | double | Source Latitude |
| | double | Source Longitude |
| | double | Destination Latitude |
| | double | Destination Longitude |

# Wireless Trace Formats

This section covers the various wireless trace format:

- Old Wireless Trace Formats
- New Wireless Trace Formats
- AODV Trace Formats

- DSDV Trace Formats
- DSR Trace Formats
- TORA Trace Formats
- Mobile node movement and energy trace formats

## Old Wireless Trace Formats

This information comes from "The *ns* Manual" "Mobile Networking in ns: Trace Support" chapter, and the "trace/cmu-trace.cc" file. Wireless traces begin with one of four characters followed by one of two different trace formats, depending on whether the trace logs the X and Y coordinates of the mobile node.

| Event | Abbreviation | Type | Value |
|---|---|---|---|
| Wireless Event | s: Send<br>r: Receive<br>d: Drop<br>f: Forward | `%.9f %d (%6.2f %6.2f) %3s %4s %d %s %d [%x %x %x %x]` | |
| | | `%.9f _%d_ %3s %4s %d %s %d [%x %x %x %x]` | |
| | | double | Time |
| | | int | Node ID |
| | | double | X Coordinate (If Logging Position) |
| | | double | Y Coordinate (If Logging Position) |
| | | string | Trace Name |
| | | string | Reason |
| | | int | Event Identifier |
| | | string | Packet Type |
| | | int | Packet Size |
| | | hexadecimal | Time To Send Data |
| | | hexadecimal | Destination MAC Address |
| | | hexadecimal | Source MAC Address |
| | | hexadecimal | Type (ARP, IP) |

Some older versions of NS2 (such as 2.1b5) have five hexidecimal values between the square braces. The first hexidecimal value is the MAC frame control information, and the remaining hexidecimal values are the same as listed above.

Depending on the packet type, the trace may log additional information:

| Event | Type | Value |
|---|---|---|
| ARP Trace | `------- [%s %d/%d %d/%d]` | |
| | string | Request or Reply |
| | int | Source MAC Address |
| | int | Source Address |
| | int | Destination MAC Address |
| | int | Destination Address |
| DSR Trace | `%d [%d %d] [%d %d %d %d->%d] [%d %d %d %d->%d]` | |
| | int | Number Of Nodes Traversed |
| | int | Routing Request Flag |
| | int | Route Request Sequence Number |
| | int | Routing Reply Flag |
| | int | Route Request Sequence Number |
| | | |

| | | |
|---|---|---|
| | int | Reply Length |
| | int | Source Of Source Routing |
| | int | Destination Of Source Routing |
| | int | Error Report Flag (?) |
| | int | Number Of Errors |
| | int | Report To Whom |
| | int | Link Error From |
| | int | Link Error To |
| AODV Trace | `[0x%x %d %d [%d %d] [%d %d]] (REQUEST)` | |
| | hexadecimal | Type |
| | int | Hop Count |
| | int | Broadcast ID |
| | int | Destination |
| | int | Destination Sequence Number |
| | int | Source |
| | int | Source Sequence Number |
| | `[0x%x %d [%d %d] %f] (%s)` | |
| | hexadecimal | Type |
| | int | Hop Count |
| | int | Destination |
| | int | Destination Sequence Number |
| | double | Lifetime |
| | string | Operation (REPLY, ERROR, HELLO) |
| TORA Trace | `[0x%x %d] (QUERY)` | |
| | hexadecimal | Type |
| | int | Destination |
| | `0x%x %d (%f %d %d %d %d) (UPDATE)` | |
| | hexadecimal | Type |
| | int | Destination |
| | double | Tau |
| | int | Oid |
| | int | R |
| | int | Delta |
| | int | ID |
| | `[0x%x %d %f %d] (CLEAR)` | |
| | hexadecimal | Type |
| | int | Destination |
| | double | Tau |
| | int | Oid |
| IP Trace | `------- [%d:%d %d:%d %d %d]` | |
| | int | Source IP Address |
| | int | Source Port Number |
| | int | Destination IP Address |
| | | |

| | | |
|---|---|---|
| | int | Destination Port Number |
| | int | TTL Value |
| | int | Next Hop Address, If Any |
| TCP Trace | `[%d %d] %d %d` | |
| | int | Sequence Number |
| | int | Acknowledgment Number |
| | int | Number Of Times Packet Was Forwarded |
| | int | Optimal Number Of Forwards |
| CBR Trace | `[%d] %d %d` | |
| | int | Sequence Number |
| | int | Number Of Times Packet Was Forwarded |
| | int | Optimal Number Of Forwards |
| IMEP Trace | `[%c %c %c 0x%04x]` | |
| | char | Acknowledgment Flag |
| | char | Hello Flag |
| | char | Object Flag |
| | hexadecimal | Length |
| RCA Trace (from MIT Leach code) | `------- [%c %d %d %d]` | |
| | char | Operation (A, R, D) |
| | int | RCA Source |
| | int | RCA Link Destination |
| | int | RCA MAC Destination |

## New Wireless Trace Formats

This information comes from "The *ns* Manual" (http://www.isi.edu/nsnam/ns/doc/) "Mobile Networking in ns: Revised format for wireless traces" chapter, and the "trace/cmu-trace.cc" file. Similar to the old format, in the new format wireless traces begin with one of four characters. This is followed by flag/value pairs similar to NAM traces. The first letter of flags with two letters designates the flag type:

- N: Node Property
- I: IP Level Packet Information
- H: Next Hop Information
- M: MAC Level Packet Information
- P: Packet Specific Information

| Event | Abbreviation | Flag | Type | Value |
|---|---|---|---|---|
| Wireless Event | s: Send<br>r: Receive<br>d: Drop<br>f: Forward | -t | double | Time (* For Global Setting) |
| | | -Ni | int | Node ID |
| | | -Nx | double | Node X Coordinate |
| | | -Ny | double | Node Y Coordinate |
| | | -Nz | double | Node Z Coordinate |
| | | -Ne | double | Node Energy Level |
| | | -Nl | string | Network trace Level (AGT, RTR, MAC, etc.) |
| | | -Nw | string | Drop Reason |
| | | -Hs | int | Hop source node ID |
| | | | | |

| | | | | |
|---|---|---|---|---|
| | | -Hd | int | Hop destination Node ID, -1, -2 |
| | | -Ma | hexadecimal | Duration |
| | | -Ms | hexadecimal | Source Ethernet Address |
| | | -Md | hexadecimal | Destination Ethernet Address |
| | | -Mt | hexadecimal | Ethernet Type |
| | | -P | string | Packet Type (arp, dsr, imep, tora, etc.) |
| | | -Pn | string | Packet Type (cbr, tcp) |

Note that the value for the -Hd flag may be -1 or -2. -1 means that the packet is a broadcast packet, and -2 means that the destination node has not been set. -2 is typically seen for packets that are passed between the agent (-Nl AGT) and routing (-Nl RTR) levels.

Depending on the packet type, the following flags may be used:

| Event | Flag | Type | Value |
|---|---|---|---|
| ARP Trace | -Po | string | Request or Reply |
| | -Pms | int | Source MAC Address |
| | -Ps | int | Source Address |
| | -Pmd | int | Destination MAC Address |
| | -Pd | int | Destination Address |
| DSR Trace | -Ph | int | Number Of Nodes Traversed |
| | -Pq | int | Routing Request Flag |
| | -Ps | int | Route Request Sequence Number |
| | -Pp | int | Routing Reply Flag |
| | -Pn | int | Route Request Sequence Number |
| | -Pl | int | Reply Length |
| | -Pe | int->int | Source->Destination Of Source Routing |
| | -Pw | int | Error Report Flag (?) |
| | -Pm | int | Number Of Errors |
| | -Pc | int | Report To Whom |
| | -Pb | int->int | Link Error From Link A to Link B |
| AODV Trace | -Pt | hexadecimal | Type |
| | -Ph | int | Hop Count |
| | -Pb | int | Broadcast ID |
| | -Pd | int | Destination |
| | -Pds | int | Destination Sequence Number |
| | -Ps | int | Source |
| | -Pss | int | Source Sequence Number |
| | -Pl | double | Lifetime |
| | -Pc | string | Operation (REQUEST, REPLY, ERROR, HELLO) |
| TORA Trace | -Pt | hexadecimal | Type |
| | -Pd | int | Destination |
| | -Pa | double | Time |
| | -Po | int | Creator ID |
| | -Pr | int | R |

| | | | |
|---|---|---|---|
| | -Pe | int | Delta |
| | -Pi | int | ID |
| | -Pc | string | Operation (QUERY, UPDATE, CLEAR) |
| IP Trace | -Is | int.int | Source Address And Port |
| | -Id | int.int | Destination Address And Port |
| | -It | string | Packet Type |
| | -Il | int | Packet Size |
| | -If | int | Flow ID |
| | -Ii | int | Unique ID |
| | -Iv | int | TTL Value |
| TCP Trace | -Ps | int | Sequence Number |
| | -Pa | int | Acknowledgment Number |
| | -Pf | int | Number Of Times Packet Was Forwarded |
| | -Po | int | Optimal Number Of Forwards |
| CBR Trace | -Pi | int | Sequence Number |
| | -Pf | int | Number Of Times Packet Was Forwarded |
| | -Po | int | Optimal Number Of Forwards |
| IMEP Trace | -Pa | char | Acknowledgment Flag |
| | -Ph | char | Hello Flag |
| | -Po | char | Object Flag |
| | -Pl | hexadecimal | Length |

## AODV Trace Formats

AODV traces begin with an "A", followed by the AODV trace. This information comes from the "aodv/aodv_logs.cc" source file.

| Event | Abbreviation | Type | Value |
|---|---|---|---|
| Delete Link | A | `%.9f _%d_ deleting LL hop to %d (delete %d is %s)` | |
| | | double | Time |
| | | int | Index |
| | | int | Destination |
| | | int | Deleted Link Count |
| | | string | Link State (VALID, INVALID) |
| Broken Link | A | `%.9f _%d_ LL unable to deliver packet %d to %d (%d) (reason = %d, ifqlen = %d)` | |
| | | double | Time |
| | | int | Index |
| | | int | Unique Packet ID |
| | | int | Next Hop |
| | | int | Broken Link Count |
| | | int | Transmit Reason |
| | | int | Queue Length |
| Keeping Bad Link | A | `%.9f _%d_ keeping LL hop to %d (keep %d is %s)` | |
| | | double | Time |

| | | | |
|---|---|---|---|
| | | int | Index |
| | | int | Destination |
| | | int | Kept Bad Link Count |
| | | string | Link State (VALID, INVALID) |

## DSDV Trace Formats

DSDV traces begin with a "V", followed by additional characters to indicate the exact DSDV trace. This information comes from the "dsdv/dsdv.cc" source file.

| Event | Abbreviation | Type | Value |
|---|---|---|---|
| Trace Packet | VPU<br>VTU | `%.5f _%d_ [%d] (%d,%d,%d) ...` | |
| | | double | Time |
| | | int | Reporting Address |
| | | int | Count |
| | | int | Destination |
| | | int | Distance (Metric) |
| | | int | Sequence Number |
| Periodic Callback | VPC | `%.5f _%d_` | |
| | | double | Time |
| | | int | Reporting Address |
| Timeout | VTO | `%.5f _%d_ %d->%d` | |
| | | double | Time |
| | | int | Reporting Address |
| | | int | Reporting Address (Should be Source???) |
| | | int | Routing Table Destination |
| | | `%.5f _%d_ marking %d` | |
| | | double | Time |
| | | int | Reporting Address |
| | | int | Routing Table Destination |
| Lost Link | VLL | `%.8f %d->%d lost at %d` | |
| | | double | Time |
| | | int | Source |
| | | int | Destination |
| | | int | Reporting Address |
| Lost Packet | VLP | `%.5f %d:%d->%d:%d lost at %d [hop %d]` | |
| | | double | Time |
| | | int | Source |
| | | int | Source Port |
| | | int | Destination |
| | | int | Destination Port |
| | | int | Reporting Address |
| | | int | Routing Table Destination |
| Change Table | VCT | `%.5f _%d_ %d` | |
| | | | |

| | | | |
|---|---|---|---|
| | | double | Time |
| | | int | Reporting Address |
| | | int | Routing Table Destination |
| Weighted Settling Time | VWST | `%.12lf frm %d to %d wst %.12lf nxthp %d [of %d]` | |
| | | double | Time |
| | | int | Reporting Address |
| | | int | Routing Table Destination |
| | | double | Weighted Settling Time |
| | | int | Next Hop |
| | | int | Distance (Metric) |
| Update Route | VSD<br>VSU | `%.5f _%d_ (%d,%d->%d,%d->%d,%d->%d,%f)` | |
| | | double | Time |
| | | int | Reporting Address |
| | | int | Old Destination |
| | | int | Old Distance (Metric) or -1 |
| | | int | New Distance (Metric) |
| | | int | Old Sequence Number or -1 |
| | | int | New Sequence Number |
| | | int | Old Hop or -1 |
| | | int | New Hop |
| | | double | When Okay To Advertise This Route |
| Queue Packet | VBP | `%.5f _%d_ %d:%d -> %d:%d` | |
| | | double | Time |
| | | int | Reporting Address |
| | | int | Source Address |
| | | int | Source Port |
| | | int | Destination Address |
| | | int | Destination Port |
| Routing Packets Outside Domain | VFP | `%.5f _%d_ %d:%d -> %d:%d` | |
| | | double | Time |
| | | int | Reporting Address |
| | | int | Source Address |
| | | int | Source Port |
| | | int | Destination Address |
| | | int | Destination Port |
| Table Dump | VTD | `%.5f %d:%d` | |
| | | double | Time |
| | | int | Reporting Address |
| | | int | Source Address |
| | | int | Source Port |

## DSR Trace Formats

DSR traces begin with an "S", which may be followed by additional characters to indicate the exact DSR trace. Each trace has one or more formats. This information comes from the "dsr/dsragent.cc", "dsr/linkcache.cc", "dsr/mobicache.cc", "dsr/routecache.cc", and "dsr/simplecache.cc" source files.

| Event | Abbreviation | Type | Value |
|---|---|---|---|
| Send | S | `%.9f _%s_ originating %s -> %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Source |
| | | string | Destination |
| Have A Route | S$hit | `%.5f _%s_ %s -> %s %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Source |
| | | string | Destination |
| | | string | Route |
| Don't Have A Route | S$miss | `%.5f _%s_ %s -> %s` | |
| | | double | Time |
| | | string | ID |
| | | string | ID (Should be Source???) |
| | | string | Destination |
| Configuration parameters. All strings are either "on" or "off" | Sconfig | `%.5f tap: %s snoop: rts? %s errs? %s` | |
| | | double | Time |
| | | string | Use TAP |
| | | string | Snoop Source Routes |
| | | string | Snoop Forwarded Errors |
| | | `%.5f salvage: %s !bd replies? %s` | |
| | | double | Time |
| | | string | Salvage With Cache |
| | | string | Don't Salvage Bad Replies |
| | | `%.5f grat error: %s grat reply: %s` | |
| | | double | Time |
| | | string | Propagate Last Error |
| | | string | Send Grat Replies |
| | | `%.5f $reply for props: %s ring 0 search: %s` | |
| | | double | Time |
| | | string | Reply From Cache On Propagating |
| | | string | Ring Zero Search |
| | | `%.5f using MOBICACHE` | |
| | | double | Time |
| | | `%.5f using LINKCACHE` | |
| | | double | Time |
| Debug message | Sdebug | `%.5f _%s_ stuck into send buff %s -> %s` | |
| | | double | Time |

| | |
|---|---|
| string | ID |
| string | Source |
| string | Destination |
| `%.5f _%s_ checking for route for dst %s` | |
| double | Time |
| string | ID |
| string | Destination |
| `%.5f _%s_ sendbuf pkt to %s liberated by handlePktWOSR` | |
| double | Time |
| string | ID |
| string | Destination |
| `%.9f _%s_ splitting %s to %s` | |
| double | Time |
| string | ID |
| string | Route |
| string | Route Copy |
| `%.9f _%s_ liberated from sendbuf %s->%s %s` | |
| double | Time |
| string | ID |
| string | Source |
| string | Destination |
| string | Route |
| `%.5f _%s_ unwrapping nested route error` | |
| double | Time |
| string | ID |
| `_%s_ tap saw error %d` | |
| string | ID |
| int | Header UID |
| `_%s_ tap saw route reply %d  %s` | |
| string | ID |
| int | Header UID |
| string | Reply Path |
| `_%s_ tap saw route use %d %s` | |
| string | ID |
| int | Header UID |
| string | Route |
| `%s consider grat arp for %s` | |
| string | ID |
| string | Route |
| `_%s_ not bothering to send route error to ourselves` | |
| string | ID |
| `%.5f _%s_ sending into dead-link (nest %d)` | |

| | | | |
|---|---|---|---|
| | | tell %d %d -> %d | |
| | | double | Time |
| | | string | ID |
| | | int | Number Of Route Errors |
| | | int | Report To Address |
| | | int | From Address |
| | | int | To Address |
| | | %.9f _%s_ adding %s [%d %.9f] ... | |
| | | double | Time |
| | | string | ID |
| | | string | Path |
| | | int | Link Type |
| | | double | Time Added |
| | | %.9f _%s_ checking %s [%d %.9f] ... | |
| | | double | Time |
| | | string | ID |
| | | string | Path |
| | | int | Link Type |
| | | double | Time Added |
| | | %.9f _%s_ freshening %s->%s to %d %.9f | |
| | | double | Time |
| | | string | ID |
| | | string | Path |
| | | string | Next Path |
| | | int | Link Type |
| | | double | Time Added |
| Errors | SDFU | %.5f _%s_ dumping maximally nested error %s %d -> %d | |
| | | double | Time |
| | | string | ID |
| | | string | Tell ID |
| | | int | From |
| | | int | To |
| | | ran off the end of a source route | |
| | | non route containing packet given to acceptRouteReply | |
| | | route error beyond end of source route???? | |
| | | route error forwarding route request???? | |
| Flowstate | SFs | %.9f _%s_ %d [%s -> %s] %d(%d) to %d | |
| | | double | Time |
| | | string | ID |
| | | int | Header UID |
| | | string | Source |
| | | string | Destination |

| | | | |
|---|---|---|---|
| | | int | Flow ID |
| | | int | Flow Header |
| | | int | Next Hop |
| Established Flowstate | SFESTs | %.9f _%s_ %d [%s -> %s] %d(%d) to %d %s | |
| | | double | Time |
| | | string | ID |
| | | int | Header UID |
| | | string | Source |
| | | string | Destination |
| | | int | Flow ID |
| | | int | Flow Header |
| | | int | Next Hop |
| | | string | Addresses |
| Flow ARS | SFARS | %.9f _%s_ %d [%s -> %s] %d %d | |
| | | double | Time |
| | | string | ID |
| | | int | Header ID |
| | | string | Source |
| | | string | Destination |
| | | int | Flow ID |
| | | int | Amt |
| Flow Error | SFEr | %.9f _%s_ from %d re %d : %d [%d] | |
| | | double | Time |
| | | string | ID |
| | | int | Source |
| | | int | Flow Destination |
| | | int | Flow ID (-1 For Default) |
| | | int | Count (-1 For No Flow Index) |
| Unknown Flow | SFErr | %.5f _%s_ %d -> %d : %d | |
| | | double | Time |
| | | string | ID |
| | | int | Source |
| | | int | Flow Destination |
| | | int | Flow ID |
| Flow Forward | SFf | %.9f _%s_ %d [%s -> %s] %d to %d | |
| | | double | Time |
| | | string | ID |
| | | int | Header ID |
| | | string | Source |
| | | string | Destination |
| | | int | Flow ID |
| | | int | Next Hop |
| Interface Queue | SIFQ | %.5f _%s_ len %d | |
| | | | |

| | | | |
|---|---|---|---|
| | | double | Time |
| | | string | ID |
| | | int | Queue Length |
| Send Out Packet With Route | SO | `%.9f _%s_ originating %s %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Protocol Name |
| | | string | Route |
| Route Cache - Summary | SRC | `%.9f _%s_ cache-summary %d %d %d %d | %d %.9f %d %d | %d %d %d %d %d | %d %d %d %d %d | %d %d %d %d %d %d %.9f` | |
| | | `%.9f _%s_ cache-summary %d %d %d %d | %d %.9f %d %d | %d %d %d %d %d | %d %d %d %d %d | %d %d %d %d %d %d` | |
| | | double | Time |
| | | string | ID |
| | | int | Route Count |
| | | int | Route Bad Count |
| | | int | Subroute Count |
| | | int | Subroute Bad Count |
| | | int | Link Bad Count |
| | | double | Average Bad Time Per Link |
| | | int | Link Bad Tested |
| | | int | Link Good Tested |
| | | int | Route Add Count |
| | | int | Route Add Bad Count |
| | | int | Subroute Add Count |
| | | int | Subroute Add Bad Count |
| | | int | Link Add Tested |
| | | int | Route Notice Count |
| | | int | Route Notice Bad Count |
| | | int | Subroute Notice Count |
| | | int | Subroute Notice Bad Count |
| | | int | Link Notice Tested |
| | | int | Route Find Count |
| | | int | Route Find For Me |
| | | int | Route Find Bad Count |
| | | int | Route Find Miss Count |
| | | int | Subroute Find Count |
| | | int | Subroute Find Bad Count |
| | | double | Link Good Time (Only In First Format) |
| Route Cache - Node Cache Dump (only with patch) | SRC | `%.9f _%s_ cache-dump p %d %d | %d %d %d %s | ... | s %d %d | %d %d %d %s | ... |` | |
| | | double | Time |
| | | int | Source Node |

| | | | |
|---|---|---|---|
| | | int | Primary Cache Current Size |
| | | int | Primary Cache Maximum Size |
| | | int | Cache Entry Index |
| | | int | Cache Entry Length |
| | | int | Cache Entry Address |
| | | string | Cache Entry Dump |
| | | int | Secondary Cache Current Size |
| | | int | Secondary Cache Maximum Size |
| | | int | Cache Entry Index |
| | | int | Cache Entry Length |
| | | int | Cache Entry Address |
| | | string | Cache Entry Dump |
| Route Cache - Node Cache Dump, No Primary Cache (only with patch) | SRC | `%.9f _%s_ cache-dump s %d %d \| %d %d %d %s \| ... \|` | |
| | | double | Time |
| | | int | Source Node |
| | | int | Secondary Cache Current Size |
| | | int | Secondary Cache Maximum Size |
| | | int | Cache Entry Index |
| | | int | Cache Entry Length |
| | | int | Cache Entry Address |
| | | string | Cache Entry Dump |
| Route Cache - Find Route Cache Hit | SRC | `%.9f _%s_ $hit for %s in %s %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Destination |
| | | string | Primary Or Secondary Cache |
| | | string | Route |
| Route Cache - Find Route Cache Miss | SRC | `%.9f _%s_ find-route [%d] %s->%s miss %d %.9f` | |
| | | double | Time |
| | | string | ID |
| | | int | Hardcoded Zero |
| | | string | ID (Should Be Source???) |
| | | string | Destination |
| | | int | Hardcoded Zero |
| | | double | Hardcoded Zero |
| Route Cache - New Route Contains Cached Route | SRC | `%.9f _%s_ %s suffix-rule (len %d/%d) %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Cache Name (primary, secondary) |
| | | int | Path Length |
| | | int | Route Length |
| | | string | Route Dump |

| | | | |
|---|---|---|---|
| Route Cache - New Route Contained In Cache | SRC | `%.9f _%s_ %s prefix-rule (len %d/%d) %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Cache Name (primary, secondary) |
| | | int | Path Length |
| | | int | Route Length |
| | | string | Route Dump |
| Route Cache - Discard Route | SRC | `%.9f _%s_ %s evicting %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Name |
| | | string | Dumped Route |
| Route Cache - Discard Route | SRC | `%.9f _%s_ evicting %d %d %s` | |
| | | double | Time |
| | | string | ID |
| | | int | Route Length -1 |
| | | int | Number Of Bad Routes |
| | | string | Name |
| Route Cache - Add Route After Dumping Route | SRC | `%.9f _%s_ while adding %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Name |
| | | string | Added Path |
| Route Cache - Truncating Route To Remove Dead Link | SRC | `%.9f _%s_ %s truncating %s %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Name |
| | | string | Route |
| | | string | Owner |
| Route Cache - Truncated Or Removed Route With Dead Link | SRC | `%.9f _%s_ to %s %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Route |
| | | string | Owner |
| Route Cache - Dead Link | SRC | `%.9f _%s_ dead link %s->%s` | |
| | | double | Time |
| | | string | ID |
| | | string | From |
| | | string | To |
| Route Cache - Dead Link | SRC | `%.9f _%s_ %s [%d %d] %s->%s dead %d %.9f` | |
| | | double | Time |
| | | string | ID |
| | | string | Operation In Progress (add-route, notice-route, find-route, dead-link, evicting-route, check-cache) |

| | | | |
|---|---|---|---|
| | | int | Route Length |
| | | int | Route Index |
| | | string | Route |
| | | string | Next Route |
| | | int | Link Type |
| | | double | Time Added |
| Route Cache - Resurrected Link | SRC | `%.9f _%s_ resurrected-link [%d %d] %s->%s dead %d %.9f` | |
| | | double | Time |
| | | string | ID |
| | | int | Route Length |
| | | int | Route Index |
| | | string | Route |
| | | string | Next Route |
| | | int | Link Type |
| | | double | Time Added |
| Route Cache - Add Route | SRC | `%.9f _%s_ adding rt %s from %s` | |
| | | double | Time |
| | | string | ID |
| | | string | Route |
| | | string | From |
| Route Cache - Dump Dijkstra | SRC | `%.9f _%s_ dijkstra *%d* %d,%d,%d ...` | |
| | | double | Time |
| | | string | ID |
| | | int | Destination |
| | | int | Index |
| | | int | Estimated Shortest Path To Vertex (d) |
| | | int | Predecessors For Vertex (pi) |
| Route Cache - Dump Link | SRC | `%.9f _%s_ dump-link %d->%d, ...` | |
| | | double | Time |
| | | string | ID |
| | | int | Index |
| | | int | Link Destination |
| Route Cache - Cache Expire Bits | SRC | `%.9f _%s_ cache-expire-bits %d %d %d %d` | |
| | | double | Time |
| | | string | ID |
| | | int | Expire Stats 0 |
| | | int | Expire Stats 1 |
| | | int | Expire Stats 2 |
| | | int | Expire Stats 3 |
| Route Request/Reply | SRR | `%.5f _%s_ dropped %s #%d (ignored)` | |
| | | double | Time |
| | | string | ID |
| | | | |

| | |
|---|---|
| string | Source |
| int | Route Request Sequence |
| `%.9f _%s_ discarding %s #%d (ifq length %d)` | |
| double | Time |
| string | ID |
| string | Source |
| int | Route Request Sequence |
| int | Queue Length |
| `%.9f _%s_ discarding %s #%d (free air time %f)` | |
| double | Time |
| string | ID |
| string | Source |
| int | Route Request Sequence |
| int | Free Air Time |
| `%.5f _%s_ dropped %s #%d (prop limit exceeded)` | |
| double | Time |
| string | ID |
| string | Source |
| int | Route Request Sequence |
| `%.5f _%s_ dropped %s #%d (SR full)` | |
| double | Time |
| string | ID |
| string | Source |
| int | Route Request Sequence |
| `%.5f _%s_ rebroadcast %s #%d ->%s %s` | |
| double | Time |
| string | ID |
| string | Source |
| int | Route Request Sequence |
| string | Destination |
| string | Route |
| `%.9f _%s_ cache-reply-sent %s -> %s #%d (len %d) %s` | |
| double | Time |
| string | ID |
| string | Source |
| string | Destination |
| int | Request Sequence Number |
| int | Route Length |
| string | Route |
| `%.5f _%s_ RR-not-sent %s -> %s` | |
| double | Time |
| string | ID |
| string | Route Request Source |

| | |
|---|---|
| string | Route Request Destination |
| `%.5f _%s_ new-request %d %s #%d -> %s` | |
| double | Time |
| string | ID |
| int | Maximum Propagation |
| string | Source |
| int | Route Request Sequence |
| string | Destination |
| `%.9f _%s_ reply-sent %s -> %s #%d (len %d) %s` | |
| double | Time |
| string | ID |
| string | Source |
| string | Destination |
| int | Route Request Sequence |
| int | Route Length |
| string | Route |
| `%.9f _%s_ reply-received %d from %s  %s #%d -> %s %s` | |
| double | Time |
| string | ID |
| int | Good Reply (0, 1) |
| string | Source |
| string | First Reply Route |
| int | Route Request Sequence |
| string | Last Reply Route |
| string | Reply Route |
| `%.9f _%s_ dead-link tell %d  %d -> %d` | |
| double | Time |
| string | ID |
| int | Report To Address |
| int | From Address |
| int | To Address |
| `%.9f _%s_ gratuitous-reply-sent %s -> %s (len %d) %s` | |
| double | Time |
| string | ID |
| string | Source |
| string | Destination |
| int | Route Length |
| string | Route |
| `%.5f _%s_ --- %d dropping bad-reply %s -> %s` | |
| double | Time |
| string | ID |
| int | Header UID |

| | | | |
|---|---|---|---|
| | | string | Source |
| | | string | Destination |
| Salvage | Ssalv | %.5f _%s_ salvaging %s -> %s --- %d with %s | |
| | | double | Time |
| | | string | ID |
| | | string | Source |
| | | string | Destination |
| | | int | Header UID |
| | | string | Route |
| | | %.5f _%s_ adding to SB --- %d %s -> %s [%d] | |
| | | double | Time |
| | | string | ID |
| | | int | Header UID |
| | | string | Source |
| | | string | Destination |
| | | int | Salvaged |
| | | %.5f _%s_ dropping --- %d %s -> %s [%d] | |
| | | double | Time |
| | | string | ID |
| | | int | Header UID |
| | | string | Source |
| | | string | Destination |
| | | int | Salvaged |
| Packet dropped by send buffer in DSR agent | Ssb | %.5f _%s_ dropped %s -> %s | |
| | | double | Time |
| | | string | ID |
| | | string | Source |
| | | string | Destination |
| Send Failure | SSendFailure | %.9f _%s_ %d %d %d:%d %d:%d %s->%s %d %d %d %d %s | |
| | | double | Time |
| | | string | ID |
| | | int | Header UID |
| | | int | Protocol Type |
| | | int | Source |
| | | int | Source Port |
| | | int | Destination |
| | | int | Destination Port |
| | | string | From ID |
| | | string | To ID |
| | | int | Hops: From -> To |
| | | int | Hops: Source -> Destination |
| | | int | Hops: From -> Destination |
| | | int | Number Of Addresses |

| | | | |
|---|---|---|---|
| | | string | Header |
| Transmit Failed | SxmitFailed | %.5f _%s_ %d->%d god okays #%d | |
| | | double | Time |
| | | string | ID |
| | | int | From ID |
| | | int | To ID |
| | | int | Number of Wrong Link Errors |
| Maximally Nested Flow Error | SYFU | %.5f _%s_ dumping maximally nested Flow error %d -> %d | |
| | | double | Time |
| | | string | ID |
| | | int | Source |
| | | int | Flow Destination |
| Attempted To Add Bad Route To Cache | | %.9f _%s_ adding bad route to cache %s %s | |
| | | double | Time |
| | | string | ID |
| | | string | Source |
| | | string | Route |

## TORA Trace Formats

TORA traces begin with a "T", followed by one of several formats. This information comes from the "tora/tora.cc", "tora/tora_api.cc", and "tora/tora_io.cc" source files.

| Event | Abbreviation | Type | Value |
|---|---|---|---|
| TORA Event | T | %.9f _%d_ tora sendQRY %d | |
| | | double | Time |
| | | int | Address |
| | | int | ID |
| | | %.9f _%d_ QRY %d for %d (rtreq set) | |
| | | double | Time |
| | | int | Address |
| | | int | TORA Destination Index |
| | | int | Index |
| | | %.9f _%d_ tora enq %d->%d | |
| | | double | Time |
| | | int | Address |
| | | int | Source |
| | | int | Destination |
| | | %.9f _%d_ received `UPD` from non-neighbor %d | |
| | | double | Time |
| | | int | Address |
| | | int | Source |
| | | %.9f _%d_ received `CLR` from non-neighbor %d | |
| | | | |

| | | | |
|---|---|---|---|
| | | double | Time |
| | | int | Address |
| | | int | Source |

### Mobile node movement and energy trace formats

Mobile node traces begin with "M" or "N". This information comes from the "common/mobilenode.cc" source file.

| Event | Abbreviation | Type | Value |
|---|---|---|---|
| Mobile Node Movement | M | `%.5f %d (%.2f, %.2f, %.2f), (%.2f, %.2f), %.2f` | |
| | | double | Time |
| | | int | Address (Node ID?) |
| | | double | X Coordinate |
| | | double | Y Coordinate |
| | | double | Z Coordinate |
| | | double | Destination X Coordinate |
| | | double | Destination Y Coordinate |
| | | double | Movement Speed |
| Mobile Node Energy | N | `-t %f -n %d -e %f` | |
| | | double | Time |
| | | int | Address (Node ID?) |
| | | double | Energy |

# NAM Trace Formats

The general format for a NAM trace is a single letter abbreviation followed by one or more flag/value pairs. This information comes from "The *ns* Manual" (http://www.isi.edu/nsnam/ns/doc/) "Nam Trace" chapter. It can also be generated by running "nam -p". Note that all flags may not be used every time.

| Event | Abbreviation | Flag | Type | Value |
|---|---|---|---|---|
| Comment -- this line is ignored | # | | | |
| Dummy event to be used in time synchronization | T | -t | time | Time |
| Node | n | -t | time | Time |
| | | -s | int | Node ID |
| | | -u | double | X Velocity |
| | | -U | double | X Velocity |
| | | -V | double | Y Velocity |
| | | -v | shape | Shape (circle, box, hexagon) |
| | | -c | color | Color |
| | | -z | double | Size Of Node |
| | | -a | int | Address |
| | | -x | double | X Location |
| | | -y | double | Y Location |
| | | -Z | double | Z Location (Not |

| | | | | |
|---|---|---|---|---|
| | | | | Supported) |
| | | -i | color | Label Color |
| | | -b | string | Label |
| | | -l | string | Label |
| | | -o | color | Previous Color |
| | | -S | string | State (UP, DOWN, COLOR) |
| | | -L | string | Previous Label |
| | | -p | string | Label Location |
| | | -P | string | Previous Label Location |
| | | -i | color | Inside Label Color |
| | | -I | color | Previous Inside Label Color |
| | | -e | color | Label Color |
| | | -E | color | Previous Label Color |
| | | -T | double | Duration Of Movement |
| | | -w | flag | Wireless Node |
| Link | l | -t | time | Time |
| | | -s | int | Source ID |
| | | -d | int | Destination ID |
| | | -r | double | Transmission Rate |
| | | -D | double | Delay |
| | | -h | double | Length |
| | | -O | orientation | Orientation |
| | | -b | string | Label |
| | | -c | color | Color |
| | | -o | color | Previous Color |
| | | -S | string | State (UP, DOWN) |
| | | -l | string | Label |
| | | -L | string | Previous Label |
| | | -e | color | Label Color |
| | | -E | color | Previous Label Color |
| Packet | h: Hop<br>r: Receive<br>d: Drop Line<br>+: Enqueue<br>-: Dequeue | -t | time | Time |
| | | -s | int | Source ID |
| | | -d | int | Destination ID |
| | | -e | int | Extent |
| | | -a | int | Packet Color Attribute ID |
| | | -i | int | ID |
| | | -l | int | Energy |
| | | -c | string | Conversation |
| | | -x | comment | Comment |
| | | -p | string | Packet Type |

| | | | | |
|---|---|---|---|---|
| | | -k | string | Packet Type |
| | | -y | comment | |
| | | -S | int | |
| | | -m | int | |
| | | -f | int | |
| Session | E: Enqueue<br>D: Dequeue<br>P: Drop | -t | time | Time |
| | | -s | int | Source ID |
| | | -d | int | Destination ID |
| | | -e | int | Extent |
| | | -a | int | Attribute |
| | | -i | int | ID |
| | | -l | int | Energy |
| | | -c | string | Conversation |
| | | -x | comment | Comment |
| | | -p | string | Packet Type |
| | | -k | string | Packet Type |
| Agent | a | -t | time | Time |
| | | -s | int | Source ID |
| | | -d | int | Destination ID |
| | | -x | flag | Remove Agent |
| | | -n | string | Agent Name |
| Feature | f | -t | time | Time |
| | | -s | int | Source ID |
| | | -d | int | Destination ID |
| | | -x | flag | Remove Feature |
| | | -T | char | Type |
| | | -n | string | Name |
| | | -a | string | Agent |
| | | -v | string | Value |
| | | -o | string | Previous Value |
| Group | G | -t | time | Time |
| | | -n | string | Name |
| | | -i | int | Node ID |
| | | -a | int | Group ID |
| | | -x | flag | Remove From Group |
| Lan link | L | -t | time | Time |
| | | -s | int | Source ID |
| | | -d | int | Destination ID |
| | | -o | orientation | Orientation |
| | | -O | orientation | Orientation |
| Mark node | m | -t | time | Time |
| | | -n | string | Name |
| | | -s | int | Node ID |

| | | | | |
|---|---|---|---|---|
| | | -c | string | Color |
| | | -h | string | Shape (circle, square, hexagon) |
| | | -X | flag | Remove Mark |
| Routing event | R | -t | time | Time |
| | | -s | int | Source ID |
| | | -d | int | Destination ID |
| | | -g | int | Multicast Group |
| | | -p | packet source | Packet Source ID Or * |
| | | -n | flag | Negative Cache |
| | | -x | flag | This Route Timed Out |
| | | -T | double | Timeout |
| | | -m | string | Mode (IIF Or OIF) |
| Execute tcl expression | v | -t | time | Time |
| | | -e | tcl expression | Tcl Script |
| Set trace file version | V | -t | time | Time |
| | | -v | string | Version |
| | | -a | int | Attribute |
| Use nam graph | N | | | |
| Wireless range | W | -t | time | Time |
| | | -x | int | X |
| | | -y | int | Y |
| Energy status -- for future use | g | -t | time | Time |
| Hierarchical address space configuration -- initialization only | A | -t | time | Time |
| | | -n | int | Hierarchy |
| | | -p | int | Port Shift |
| | | -o | hexadecimal | Port Mask |
| | | -c | int | Multicast Shift |
| | | -a | int | Multicast Mask |
| | | -h | int | Hierarchy |
| | | -m | int | Node Shift |
| | | -s | int | Node Mask |
| Color table configuration -- initialization only | c | -t | time | Time |
| | | -i | int | ID |
| | | -n | string | Color |
| Create packet queue -- initialization only | q | -t | time | Time |
| | | -s | int | Source ID |
| | | -d | int | Destination ID |
| | | -a | orientation | Orientation |
| Layout lan | X | -t | time | Time |
| | | -n | string | Name |
| | | -r | double | Rate |

| | | | | |
|---|---|---|---|---|
| | | -D | double | Delay |
| | | -o | orientation | Orientation |
| | | -O | orientation | Orientation |

For Packet events (entries starting with "h", "r", "d", "+", or "-"), the comment field (field after "-x" has the following format:

| Event | Type | Value |
|---|---|---|
| Node Trace | {%s.%s %s.%s %d %s %s} | |
| | string | Source Node Address |
| | string | Source Node Port |
| | string | Destination Node Address |
| | string | Destination Node Port |
| | int | Sequence Number |
| | string | Flags |
| | string | Packet Name |

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