NAME

mtr-packet - send and receive network probes

DESCRIPTION

mtr-packet is a tool for sending network probes to measure network connectivity and performance. Many network probes can be sent simultaneously by a single process instance of **mtr-packet** and additional probes can be generated by an instance of **mtr-packet** which already has network probes in flight. It is intended to be used by programs which invoke it with Unix pipes attached to its standard input and output streams.

mtr-packet reads command requests from *stdin*, each separated by a newline character, and responds with command replies to *stdout*, also each separated by a newline character. The syntactic structure of requests and replies are the same. The following format is used:

TOKEN COMMAND [*ARGUMENT-NAME ARGUMENT-VALUE* ...]

TOKEN is a unique integer value. The same value will be used as the *TOKEN* for the response. This is necessary for associating replies with requests, as commands may be completed in a different order than they are requested. The invoker of **mtr-packet** should always use the *TOKEN* value to determine which command request has completed.

COMMAND is a string identifying the command request type. A common command is **send-probe**, which will transmit one network probe.

ARGUMENT-NAME strings and *ARGUMENT-VALUE* strings always come in pairs. It is a syntactic error to provide an *ARGUMENT-NAME* without a corresponding *ARGUMENT-VALUE*. Valid *ARGUMENT-NAME* strings depend on the *COMMAND* being used.

REQUESTS

send-probe

Send a network probe to a particular IP address. Either an **ip-4** or **ip-6** argument must be provided. A valid **send-probe** command will reply with **reply**, **no-reply**, or **ttl-expired**.

The following arguments may be used:

ip-4 *IP-ADDRESS*

The Internet Protocol version 4 address to probe.

ip-6 *IP-ADDRESS*

The Internet Protocol version 6 address to probe.

protocol *PROTOCOL*

The protocol to use for the network probe. **icmp**, **sctp**, **tcp**, and **udp** may be used. The default protocol is **icmp.**

port *PORT-NUMBER*

The destination port to use for **sctp**, **tcp**, or **udp** probes.

local-ip-4 *IP-ADDRESS*

> The local Internet Procol version 4 address to use when sending probes.

local-ip-6 *IP-ADDRESS*

> The local Internet Protocol version 6 address to use when sending probes.

local-port *PORT-NUMBER*

> For **udp** probes, the local port number from which to send probes.

timeout *TIMEOUT-SECONDS*

> The number of seconds to wait for a response to the probe before discarding the probe as lost, and generating a **no-reply** command reply.

ttl *TIME-TO-LIVE*

> The time-to-live value for the Internet Protocol packet header used in constructing the probe. This value determines the number of network hops through which the probe will travel before a response is generated by an intermediate network host.

size *PACKET-SIZE*

> The size of the packet used to send the probe, in bytes, including the Internet Protocol header and transport protocol header.

bit-pattern *PATTERN-VALUE*

> The packet payload is filled with bytes of the value specified. Valid pattern values are in the range 0 through 255.

tos *TYPE-OF-SERVICE*

> In the case of IPv4, the "type of service" field in the IP header is set to this value. In the case of IPv6, the "traffic class" field is set.

mark *ROUTING-MARK*

The packet mark value to be used by mark-based routing. (Available only on Linux.)

check-support
Check for support for a particular feature in this version of **mtr-packet** and in this particular operating environment. **check-support** will reply with **feature-supported**. A **feature** argument is required.

feature *FEATURE-NAME*

The name of a feature requested.

Some features which can be checked are **send-probe**, **ip-4**, **ip-6**, **icmp**, **sctp**, **tcp**, **udp**, and **mark**. The feature **version** can be checked to retrieve the version of **mtr-packet**.

REPLIES
reply   The destination host received the **send-probe** probe and replied. Arguments of **reply** are:

ip-4 *IP-ADDRESS*

The Internet Protocol version 4 address of the host which replied to the probe.

ip-6 *IP-ADDRESS*

The Internet Protocol version 6 address of the host which replied to the probe.

round-trip-time *TIME*

The time which passed between the transmission of the probe and its response. The time is provided as a integral number of microseconds elapsed.

no-reply
No response to the probe request was received before the timeout expired.

ttl-expired
The time-to-live value of the transmitted probe expired before the probe arrived at its intended destination. Arguments of **ttl-expired** are:

ip-4 *IP-ADDRESS*

The Internet Protocol version 4 address of the host at which the time-to-live value expired.

ip-6 *IP-ADDRESS*

The Internet Protocol version 6 address of the host at which the time-to-live value expired.

round-trip-time *TIME*

The time which passed between the transmission of the probe and its response. The time
is provided as a integral number of microseconds elapsed.

mpls *MPLS-LABEL-LIST*

A list of Multiprotocol Label Switching values returned with the probe response. If the
mpls argument is present, one or more MPLS labels will be represented by a comma sep-
arated list of values. The values are provided in groups of four. The first four values in
the list correspond to the first MPLS label, the next four values correspond to the second
MPLS label, and so on. The values are provided in this order: *label*, *traffic-class*, *bottom-
of-stack*, *ttl*.

no-route
There was no route to the host used in a **send-probe** request.

network-down
A probe could not be sent because the network is down.

probes-exhausted
A probe could not be sent because there are already too many unresolved probes in flight.

permission-denied
The operating system denied permission to send the probe with the specified options.

invalid-argument
The command request contained arguments which are invalid.

feature-support
A reply to provided to **check-support** indicating the availability of a particular feature. The argu-
ment provided is:

support *PRESENT*

In most cases, the *PRESENT* value will be either **ok**, indicating the feature is supported,
or **no**, indicating no support for the feature.

In the case that **version** is the requested *FEATURE-NAME*, the version of **mtr-packet** is
provided as the *PRESENT* value.

EXAMPLES

A controlling program may start **mtr-packet** as a child process and issue the following command on *stdin*:

42 send-probe ip-4 127.0.0.1

This will send a network probe to the loopback interface. When the probe completes, **mtr-packet** will pro-
vide a response on *stdout* such as the following:

42 reply ip-4 127.0.0.1 round-trip-time 126

This indicates that the loopback address replied to the probe, and the round-trip time of the probe was 126 microseconds.

In order to trace the route to a remote host, multiple **send-probe** commands, each with a different **ttl** value, are used.

        11 send-probe ip-4 8.8.8.8 ttl 1
        12 send-probe ip-4 8.8.8.8 ttl 2
        13 send-probe ip-4 8.8.8.8 ttl 3
        ...

Each interemediate host would respond with a **ttl-expired** message, and the destination host would respond with a **reply**:

        11 ttl-expired ip-4 192.168.254.254 round-trip-time 1634
        12 ttl-expired ip-4 184.19.243.240 round-trip-time 7609
        13 ttl-expired ip-4 172.76.20.169 round-trip-time 8643
        14 ttl-expired ip-4 74.40.1.101 round-trip-time 9755
        15 ttl-expired ip-4 74.40.5.126 round-trip-time 10695
        17 ttl-expired ip-4 108.170.245.97 round-trip-time 14077
        16 ttl-expired ip-4 74.40.26.131 round-trip-time 15253
        18 ttl-expired ip-4 209.85.245.101 round-trip-time 17080
        19 reply ip-4 8.8.8.8 round-trip-time 17039

Note that the replies in this example are printed out of order. (The reply to probe 17 arrives prior to the reply to probe 16.) This is the reason that it is important to send commands with unique token values, and to use those token values to match replies with their originating commands.

LANGUAGE BINDINGS
A Python 3.x package for sending asynchronous network probes using mtr-packet is available. See ⟨https://pypi.org/project/mtrpacket/⟩

CONTACT INFORMATION
For the latest version, see the mtr web page at ⟨http://www.bitwizard.nl/mtr/⟩

For patches, bug reports, or feature requests, please open an issue on GitHub at: ⟨https://github.com/traviscross/mtr⟩.

SEE ALSO
mtr(8), **icmp**(7), **tcp**(7), **udp**(7), TCP/IP Illustrated (Stevens, ISBN 0201633469).