A BNF for Traceroute output

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Abstract

This short document provides a BNF (Backus Naur Form) for the `traceroute` command output, which can be used as a basis to build a robust parser. It is based on the analysis of the source code of the traceroute command offered by the Debian source package as of version 2.0.12.

1 BNF for `traceroute` output

```
traceroute ::= header { hops } | error

error ::= STRING

header ::= "traceroute" "to" STRING(ip) "(" STRING(dns) ")" "," UNSIGNED "hops" "max" "," UN

hop ::= INTEGER { probe }

probe ::= sa_family [ FLOAT(rtt) "ms" ] [ icmperr ]

sa_family ::= "*" | [ [ addr ] [ "<" ext ">" ] [ "'-" INTEGER(backhops) "'" ] ]

addr ::= STRING(ip) [ "(" STRING(dns) ")" ] [ "[" asn "]" ]

asn ::= "!!" | INTEGER { "/" INTEGER }          /* two or many ? */ /* quid des "*" */

ext ::= /* mpls extensions */

icmperr ::= "!N" | "!H" | "!X" | "!P" | "!F-" INTEGER(info) | "!S" | "!V" | "!C" | "!<" UNSI
```

Figure 1:

2 ICMP error messages

Few ICMP error messages are given in the `traceroute` output, and most of them stand for several ICMP types and codes. In order to facilitate the analysis of `traceroute` output, and as a reference, we give here a table of all the ICMP error messages and related ICMP message type and codes, for both IPv4 (Figure 2) and IPv6 (Figure 2) packets.

message	type	code	comment
	ICMP_TIME_EXCEEDED	*	expected answer
	ICMP_EXC_TTL	*	expected answer
!N	ICMP_DEST_UNREACH	ICMP_UNREACH_NET	
"	"	ICMP_UNREACH_NET_UNKNOWN	
"	"	ICMP_UNREACH_ISOLATED	
"	"	ICMP_UNREACH_TOSNET	
!H	"	ICMP_UNREACH_HOST	
"	"	ICMP_UNREACH_HOST_UNKNOWN	
"	"	ICMP_UNREACH_TOSHOST	
!X	"	ICMP_UNREACH_NET_PROHIB	
"	"	ICMP_UNREACH_HOST_PROHIB	
"	"	ICMP_UNREACH_FILTER_PROHIB	
	"	ICMP_UNREACH_PORT	dest host is reached
!P	"	ICMP_UNREACH_PROTOCOL	
"!F-%d", info	"	ICMP_UNREACH_NEEDFRAG	
!S	"	ICMP_UNREACH_SRCFAIL	
!V	"	ICMP_UNREACH_HOST_PRECEDENCE	
!C	"	ICMP_UNREACH_PRECEDENCE_CUTOFF	
"!<%u>", code	"	*	default
"!<%u-%u>, type, code	*	*	

Table 1: IPv4 ICMP error codes

message	type	code	comment
	ICMP6_TIME_EXCEEDED	ICMP6_TIME_EXCEED_TRANSIT	
!N	ICMP6_DST_UNREACH	ICMP6_DST_UNREACH_NOROUTE	
!H	"	ICMP6_DST_UNREACH_BEYONDSCOPE	
"	"	ICMP6_DST_UNREACH_ADDR	
!X	"	ICMP6_DST_UNREACH_ADMIN	
"	"	ICMP6_DST_UNREACH_NOPORT	dest host is reached
"!<%u>", code	"	*	
"!F-%d", info	ICMP6_PACKET_TOO_BIG	*	
"!<%u-%u>, type, code	*	*	

Table 2: IPv6 ICMP error codes

```
/*  clear this probe (as actually the previous hop answers here)
  but fill its 'err_str' by the info obtained. Ugly, but easy...
*/
traceroute.c: snprintf (pb->err_str, sizeof(pb->err_str)-1, "F=%d", ee->ee_info);
```

3   Concluding remarks

As a first draft, this BNF might be subject to errors and changes in subsequent release of `traceroute`. Please, don't hesitate to share any error or comment about it; especially when related to disambiguations of the grammar.