About myself

Petr Vorel

- SUSE employee since 2016 (Linux kernel testing)
- LTP and iputils upstream developer
- Contributor to various open source projects (including Linux kernel) since 2012
Survey

Who has used?
- ping
- arping
- tracepath
- clockdiff
iputils history
Alexey Kuznetsov (1999–2002, 22 releases)

- iputils project founder, first maintainer, former Linux kernel network and iproute2 upstream developer
- First release Jan 1999 iputils-ss990107.tar.gz (sources lost)
- First downloadable release Apr 1999 iputils-ss990417.tar.gz
- Latest release Sep 2002 iputils-ss020927.tar.gz
- Unreleased Nov 2002 iputils-ss021109-try.tar.bz2
- Code author: arping, tracepath, tracepath6
- Ported BSD sources to Linux: clockdiff, ping, ping6, rdisc, traceroute6
- netdev@vger.kernel.org mailing list
iputils history
Hideaki Yoshifuji (2006–2015, 17 releases)

- 2nd iputils maintainer, former Linux kernel network upstream developer – IPv6
- First release Apr 2006 iputils-s20060425.tar.bz2
- Latest release on sourceforge.net Dec 2012 iputils-s20121221.tar.bz2
- Latest release Dec 2015 iputils-s20151218.tar.bz2 (not on sourceforge.net, probably not widely adopted)
- Huge development
- IPv6 support
- uClibc libc support
- Started to use git (sourceforge.net and self hosting)
- netdev@vger.kernel.org mailing list
iputils on github

- **David Heidelberg** (2014–2018, 7 releases)
  - Founder of iputils fork on github (announced Apr 2014 on netdev ML)
  - 3rd iputils maintainer
  - First release **s20140419**
  - Last release **s20180629**
  - Upstream patches from linux distributions
  - License cleanup
  - *musl libc* support
  - Build tests on Travis CI

- **Jan Synáček** (2012–2019, mostly ping bugfixes)

- **Pavel Šimerda** (2015–2016, ping improvements)
  - 9fd870a ("ping: handle single protocol systems")
  - ebad35f ("ping: merge `ping6` command into `ping`")
  - 37953bf ("make `getaddrinfo()` and `getnameinfo()` usage consistent")
iputils on github

- Sami Kerola (2017–2021, 2 releases)
  - 4rd iputils maintainer
  - First release s20190324
  - Last release s20190515
  - Improve and modernize the code, bug fixes
  - meson build system
  - Time struct improvements

- Noah Meyerhans (since 2014, Debian iputils maintainer since 2001)

- Yuri Chornoivan (since 2020)
  - Localization on Fedora Weblate (now 12 languages)

- Petr Vorel (since 2017, 8 releases, the current iputils maintainer)

- Many other contributors (∼138 contributors in git history, including Linux kernel network developers)
Current tools

- **ping** – send ICMP ECHO_REQUEST to a network host
- **arping** – send ARP REQUEST to a neighbour host
- **tracepath** – traces path to a network host discovering **MTU** along this path
- **clockdiff** – measure clock difference between hosts
**ping** – send **ICMP ECHO_REQUEST** to a network host

**BSD-3-Clause**
- Author: Mike Muuss (U. S. Army Ballistic Research Lab.)
- Code originated from **1983**
- Most important iputils tool
- **SOCK_DGRAM** (ICMP datagram socket), **SOCK_RAW** (raw socket – non-root user only with capability or setuid)

```
$ ping -c2 suse.com
PING suse.com (65.9.95.109) 56(84) bytes of data.
64 bytes from server-65-9-95-109.prg50.r.cloudfront.net (65.9.95.109):
icmp_seq=1  ttl=243  time=15.0 ms
64 bytes from server-65-9-95-109.prg50.r.cloudfront.net (65.9.95.109):
icmp_seq=2  ttl=243  time=11.0 ms
--- suse.com ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 10.999/12.995/14.991/1.996 ms
```
arping – send ARP REQUEST to a neighbour host
GPL-2.0-or-later

- Alexey Kuznetsov, later modified by YOSHIFUJI Hideaki (more options)
- IPv4 only (for IPv6 use ndisc6)

1 $ arping -c2 192.168.1.1
2 ARPING 192.168.10.1 from 192.168.10.133 eth0
3 Unicast reply from 192.168.10.1 [00:B0:D0:63:C2:26] 1.602ms
4 Unicast reply from 192.168.10.1 [00:B0:D0:63:C2:26] 1.766ms
5 Sent 2 probes (1 broadcast(s))
6 Received 2 response(s)
**tracepath** – traces path to a network host discovering MTU along this path

GPL-2.0-or-later

- Alexey Kuznetsov, later modified by YOSHIFUJI Hideaki (more options)

```bash
$ tracepath suse.com
1?: [LOCALHOST]                        pmtu 1500
1:  _gateway                           1.285ms
...
5:  185.243.124.9                       35.055ms
6:  netx1.sferianet.cz                  16.661ms
7:  cust-sferia-net.superhosting.cz     18.282ms
...
12: be2318.ccr32.bio02.atlas.cogentco.com 49.998ms asymm 13
...
30: no reply                           
   Too many hops: pmtu 1500
   Resume: pmtu 1500
```
clockdiff – measure clock difference between hosts

BSD-3-Clause

- 1985, unknown author
- IPv4 only

```
# clockdiff 192.168.10.1

host=192.168.10.1 rtt=8(16)ms/1ms delta=81202ms/81201ms Tue Jan 11 20:47:08 2024
```
## Removed tools (2021)

<table>
<thead>
<tr>
<th>Tool</th>
<th>Removed</th>
<th>Last release</th>
<th>Replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>ninfod</td>
<td>8f0d897</td>
<td>20211215</td>
<td>experimental unused protocol</td>
</tr>
<tr>
<td>rarpd</td>
<td>fba7b62</td>
<td>20211215</td>
<td>superseded by DHCP protocol</td>
</tr>
<tr>
<td>rdisc</td>
<td>7447806</td>
<td>20211215</td>
<td>superseded by DHCP protocol</td>
</tr>
<tr>
<td>tftpd</td>
<td>341975a</td>
<td>20210722</td>
<td>tftp-hpa, dnsmasq</td>
</tr>
<tr>
<td>traceroute6</td>
<td>a139421</td>
<td>20210722</td>
<td>mtr, traceroute, tracepath</td>
</tr>
</tbody>
</table>
Other projects

- **fping** – enhanced ping :)  
  - Ping any number of targets  
  - Output is designed to be easy to parse (scripts)  
  - Output is minimal by default (*example.com* is alive), use `-l`, `-l--loop` for ping like output  
  - By default no reverse-DNS lookup, can be forced (`-n`, `--name` – IP address only, `-d`, `--rdns` – also for hostnames)  
  - Options incompatible with ping  
  - Use also long options

- **mtr** – ping + traceroute  
  - ncurses, GUI  
  - `SOCK_DGRAM`, `SOCK_RAW`  
  - Also for FreeBSD
Other projects

- **BusyBox** – low resources implementation (embedded)
  - Partly compatible (only some functionality implemented)
  - Requires root (no capability or setuid)
  - `arping`
  - `ping` (SOCK_RAW only)
  - `traceroute`

- **inetutils** (GNU)
  - `ping` – no dual stack in a single binary (`ping` IPv4 only, `ping6` IPv6 only)
  - `traceroute`
  - Not much active development nowadays
Future

- Rewrite (modern C, fix design)
- All but ping is neglected
- Remove `clockdiff`, `tracepath`?
- Reviewers, network developers wanted
- Tests
- JSON output
- Color output
- Long options
Questions

Thank you!
Links

- Current iputils upstream
  https://github.com/iputils/iputils
- fping
  https://fping.org/
- mtr
  https://www.bitwizard.nl/mtr/
- BusyBox
  https://busybox.net/
- inetutils
  https://www.gnu.org/software/inetutils/
  http://www(skbuff.net/iputils/
- Alexey Kuznetsov’s iputils releases (1999–2002)