

**NAME**

**sc\_bdrmap** — scamper driver to map first hop border routers of networks

**SYNOPSIS**

```
sc_bdrmap [ -6ADi] [ -a ip2as-file] [ -c allyconf] [ -f firsthop] [ -l log-file]
[ -o output-file] [ -O option] [ -p port] [ -U unix] [ -R unix]
[ -v vpases] [ -x ixp-file]

sc_bdrmap [ -6] [ -a ip2as-file] [ -d dump] [ -g delegated-file] [ -n names-file]
[ -r relationships-file] [ -v vpases] [ -x ixp-file] [file ...]
```

**DESCRIPTION**

The **sc\_bdrmap** utility provides the ability to connect to a running **scamper(1)** instance and use it to map the first hop border routers of networks using the "bdrmap" technique. **sc\_bdrmap** uses targeted traceroutes, alias resolution techniques, knowledge of traceroute idiosyncrasies, and codification of topological constraints in a structured set of constraints, to correctly identify interdomain links at the granularity of individual border routers. **sc\_bdrmap** operates in two distinct modes: data collection, and data analysis.

In the data collection mode, **sc\_bdrmap** uses Paris traceroute with ICMP-echo probes to trace the paths towards every distinct address block, using a stop-set to avoid re-probing portions of paths that do not provide useful constraints for the first hop border routers, as well as alias resolution techniques (Mercator, Ally, Prefixscan, and the Too-Big-Trick) to collapse the interface graph into a router-level topology. **sc\_bdrmap** will also use probes with the record-route and pre-specified timestamp IP-level options to collect additional information on the return path from a router, where the probes are usable.

In the data analysis mode, **sc\_bdrmap** uses the collected data to infer a router-level topology of the hosting network and the interconnecting routers belonging to the hosting network's neighbors.

The supported options to **sc\_bdrmap** are as follows:

- 6** specifies that **sc\_bdrmap** should infer IPv6 border routers, and that the input files are for the IPv6 topology. This feature is currently work in progress.
- a** *ip2as-file* specifies the IP prefix to Autonomous System (AS) mapping file that **sc\_bdrmap** should use when collecting and analysing topology data. See the examples section for a description of how this file must be formatted.
- A** specifies the AS numbers (ASNs) that **sc\_bdrmap** should collect data towards. This option is useful for testing and debugging.
- c** *allyconf* specifies the number of times that **sc\_bdrmap** should repeat pair-wise alias inferences that were made implying a central shared IP-ID counter. By default, each pair of aliases is tested five additional times at 5 minute intervals because two IP addresses belonging to two different routers could happen to return IP-ID values that imply a central shared IP-ID counter.
- d** *dump* specifies the dump ID to use to analyze the collected data. Currently, ID values 1 (routers) and 2 (traces) are valid, which dumps inferred routers and annotated traceroute paths, respectively.
- D** causes **sc\_bdrmap** to detach and become a daemon.
- f** *firsthop* specifies the first hop in a traceroute path that **sc\_bdrmap** should begin at when collecting traceroute paths. If **sc\_bdrmap** is being run behind a NAT router, the private IP address of that router is uninteresting, and this option allows that hop to be skipped.

- g** *delegated-file*  
specifies an IP address delegations file that can be provided to **sc\_bdrmap** to allow inferences in the analysis phase of who operates unrouted IP address space.
- i**  
specifies the IP addresses that **sc\_bdrmap** should collect data towards. This option is useful for testing and debugging.
- l** *log-file*  
specifies the name of a file to log progress output from **sc\_bdrmap** generated at run time.
- n** *names-file*  
specifies the name of a file containing IP address to domain name system names.
- o** *output-file*  
specifies the name of the output file to be written during the data collection phase. The output file will use the `warts(5)` format.
- O** *option*  
allows the behavior of **sc\_bdrmap** to be further tailored. The current choices for this option are:
  - **dumpborders**: only dump inferred border routers, not all VP routers.
  - **dumponedsts**: further annotate routers that were only observed towards one AS.
  - **dumptracesets**: dump the traceroutes observed towards networks where no topology was observed to be routed by a neighbor network.
  - **impatient**: probe the destination ASes in order of number of address blocks, so that the probing will complete fastest.
  - **nogss**: do not use a global stop set when collecting topology.
  - **noipopts**: do not probe with IP record route and IP prespecified timestamp options.
  - **nomerge**: do not analytically merge IP interfaces to routers based on common adjacent neighbor routers.
  - **noself**: do not report links to other routers operated by the network hosting the vantage point.
  - **randomdst**: probe a random address in each address block, rather than the first.
- p** *port*  
specifies the port on the local host where `scamper(1)` is accepting control socket connections.
- r** *relationships-file*  
specifies the AS relationships file which is used in the analysis phase to reason about who owns each router in the observed topology.
- R** *unix*  
specifies the name of a unix domain socket where a remote `scamper(1)` instance is accepting remote control socket connections.
- U** *unix*  
specifies the name of a unix domain socket where a local `scamper(1)` instance is accepting control socket connections.
- v** *vpases*  
specifies the name of a file, or a list of ASes, that represent the network hosting the vantage point.
- x** *ixp-file*  
specifies the name of a file that contains a list of prefixes used by an IXP to enable interconnection at their facilities.

## EXAMPLES

Given a set of prefixes with origin AS in a file named `ip2as.txt`, a list of VP ases in `vpases.txt`, a list of IXP prefixes in `ixp.txt`, and a `scamper(1)` instance listening on port 31337 configured to probe at 100 packets

per second started as follows:

```
scamper -P 31337 -p 100
```

the following command will collect raw topology data to support inference of border routers for the network hosting the vantage point, storing raw data into `bdrmap.warts`, and logging run-time information into `logfile1.txt`:

```
sc_bdrmap -p 31337 -o bdrmap.warts -l logfile1.txt -a ip2as.txt -v  
vpases.txt -x ixp.txt
```

To infer border routers from the collected data, using the same input files as above, with a set of AS relationships contained in `asrel.txt`, and a set of prefix delegations assembled from the Regional Internet Registry (RIR) Statistics files in `delegated.txt`:

```
sc_bdrmap -d routers -a ip2as.txt -g delegated.txt -r asrel.txt -v  
vpases.txt -x ixp.txt bdrmap.warts >bdrmap.routers.txt
```

To view annotated traceroutes stored in `bdrmap.warts` with IP to DNS names information stored in `names.txt`:

```
sc_bdrmap -d traces -a ip2as.txt -v vpases.txt -x ixp.txt -n  
names.txt bdrmap.wart >bdrmap.traces.txt
```

## SEE ALSO

`scamper(1)`, `sc_ally(1)`, `sc_speedtrap(1)`, `sc_wartsdump(1)`, `sc_warts2text(1)`,  
`sc_warts2json(1)`

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## AUTHOR

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