NAME

sc_bdrmap — scamper driver to map first hop border routers of networks

SYNOPSIS

sc_bdrmap [-6ADi] [-a *ip2as-file*] [-c *allyconf*] [-C *flowid*] [-f *firsthop*] [-l *log-file*] [-M *ipmap-file*] [-o *output-file*] [-O *option*] [-p *port*] [-U *unix-local*] [-R *unix-remote*] [-S *srcaddr*] [-V *vpases*] [-x *ixp-file*]

sc_bdrmap [-6] [-a *ip2as-file*] [-d *dump*] [-g *delegated-file*] [-M *ipmap-file*] [-n *names-file*] [-r *relationships-file*] [-V *vpases*] [-x *ixp-file*] [*file ...*]

sc_bdrmap [-?v]

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 topologicial 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:

-?
: prints a list of command line options and a synopsis of each.

-v
: prints the version of **sc_bdrmap** and exits.

-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.

-C *flowid*
: specifies the checksum that scamper should use in ICMP probes, or the source port that scamper should use in UDP probes, so that traceroutes to the same destination will also use the same flowid. By default, the flowid is 0x420.

`-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.

`-M` *ipmap-file*
: specifies the name of a file containing individual IP address to ASN mappings, which override heuristics inferring if the IP address is from a reserved address, or an IXP address.

`-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.
  - **noalias:** do not do alias resolution probes when collecting topology data.
  - **nogss:** do not use a global stop set when collecting topology data.
  - **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.
  - **udp:** probe using UDP traceroute probes.

`-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-remote*
: specifies the name of a unix domain socket where a remote *scamper*(1) instance is accepting remote control socket connections. The unix-remote parameter can either be a unix domain socket for a single remote *scamper*(1) instance, or be a *sc_remoted*(1) mux socket with the name of the

remote VP encoded after a trailing slash.

`-S` *srcaddr*
: specifies the source address that *scamper*(1) should use in probes.

`-U` *unix-local*
: 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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