rtbrick BNG Blaster

Open Source Network Tester

Christian Giese | Field Services and Software Engineer | RtBrick

RtBrick

Disaggregated Routing (Core) and Access (BNG)

Routers today:

Integrated systems

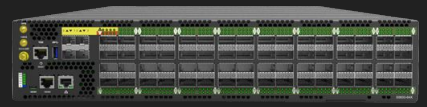
Software locked to hardware

Inflexible and expensive

Disaggregation

rtbrick Container

- **Interfaces** CLI, REST, TSDB ...
- **Micro Services** BGP, ISIS, OSPF, PPPoE, L2TP, ...
- **Brick Data Store (BDS)**
- **Linux (Container)**
- **Linux (Host)**



ufiSpace

DELTA

Disaggregated networks

Open API

Carrier grade

State of the art routing and access protocol stack

+

Off-the-shelf “bare-metal” switches

https://www.rtbrick.com

Why do we build our own network tester?

- No open source alternative
- Scripting around Linux PPP or Scapy did not scale

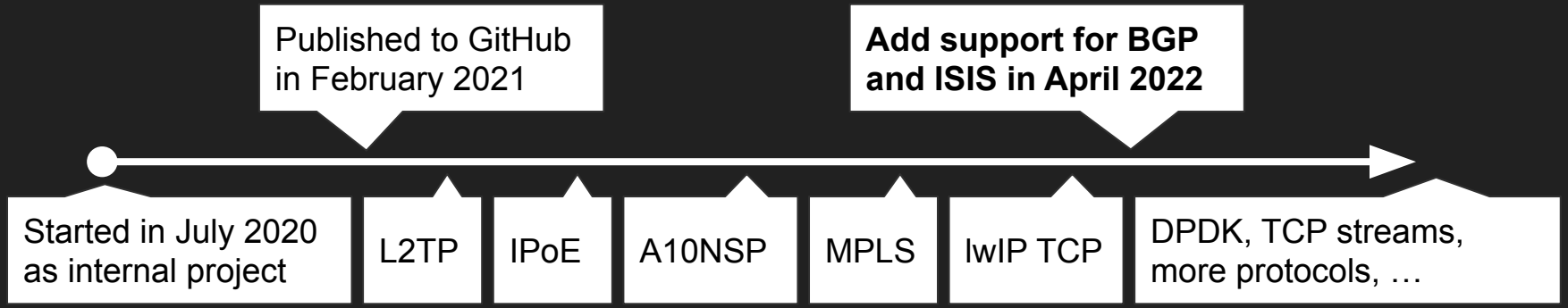
What about commercial network testers?

- Missing features
- Some features supported on HW platform only
- Enormous costs and license restrictions
- Large resource footprint of virtual platforms
- Limited automation possibilities
- Huge administrative overhead

BNG Blaster

rtbrick

- Open Source Network Tester (BSD-3 License)
- Started as BNG Access Protocol Tester
- Advanced with Traffic Generator and Routing Protocols
- Continuously improved and actively maintained
- …



2 Years of work, >600 commits, >30K Lines of C Code, …

Features

rtbrick

- Emulates massive sessions with low CPU and memory footprint
- Runs on every modern linux, virtual machines and containers
- All protocols implemented in user-space and optimized for performance
- Automation friendly API
- …

Access Protocols

- Emulate massive PPPoE and IPoE (DHCP) clients
- Emulate L2TPv2 LNS servers with different behaviors
- Emulate A10NSP interfaces for L2BSA testing
- Included multicast and IPTV test suite
- Verify legal interception (LI) traffic
- …

Routing Protocols

- Emulate ISIS topologies with thousands of nodes
- Support for ISIS Segment Routing
- Setup thousands of BGP sessions with millions of prefixes
- Verify MPLS labels for millions of flows
- …

Traffic Generator

- Generate and track millions of traffic flows
- Verify your QoS configuration
- Verify all forwarding states
- Measure convergence times and loss
- …

What can you do with BNG Blaster?

PPPoE Scaling

```
F1: Select View  F7/F8: Start/Stop Traffic  F9: Terminate Sessions
F2: Network Interface  Left/Right: Access Interface
```

```
Sessions            8000 (8000 PPPoE / 0 IPoE)
  Established       8000 [############################################################]
  Outstanding          0 [                                                            ]
  Terminated           0 [                                                            ]
  DHCPv6       8000/8000 [############################################################]
  Setup Time       60158 ms
  Setup Rate      132.98 CPS (MIN: 43.85 AVG: 146.56 MAX: 172.91)
  Flapped              4

Traffic Flows Verified
  Session    48000/48000 [############################################################]

Network Interface ( SN-2-S1 )
  Tx Packets                  50147699 |  24000 PPS      20352 Kbps
  Rx Packets                  43743288 |  24010 PPS      20872 Kbps
  Tx Session Packets          17199938 |   8000 PPS
  Rx Session Packets          14978975 |   8004 PPS       2423 Loss
  Tx Session Packets IPv6     17195617 |   8000 PPS
  Rx Session Packets IPv6     14976795 |   8002 PPS       3150 Loss
  Tx Session Packets IPv6PD   15751069 |   8000 PPS
  Rx Session Packets IPv6PD   13786365 |   8002 PPS       2851 Loss
  Tx Multicast Packets              0 |      0 PPS

Access Interface ( SN-5-L1 SN-6-L1 )
  Tx Packets                  25869196 |  12304 PPS      11548 Kbps
  Rx Packets                  22334198 |  12419 PPS      11357 Kbps
  Tx Session Packets           8601108 |   4000 PPS
  Rx Session Packets           7260496 |   4000 PPS     223890 Loss 0 Wrong Session
  Tx Session Packets IPv6      8598898 |   4000 PPS
  Rx Session Packets IPv6      7258579 |   4000 PPS     224842 Loss 0 Wrong Session
  Tx Session Packets IPv6PD    7885447 |   4000 PPS
  Rx Session Packets IPv6PD    6892443 |   3999 PPS       1410 Loss 0 Wrong Session
  Rx Multicast Packets              0 |      0 PPS          0 Loss
```

```
Apr 07 14:02:47.321831 ISIS L1 adjacency UP on interface SN-2-S1
Apr 07 14:02:47.971844 Resolve network interfaces
Apr 07 14:02:47.972031 All network interfaces resolved
Apr 07 14:02:48.914707 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) state changed from idle -> connect
Apr 07 14:02:48.915010 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) state changed from idle -> connect
Apr 07 14:02:48.915146 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) state changed from idle -> connect
Apr 07 14:02:48.915279 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) state changed from idle -> connect
Apr 07 14:03:06.372736 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) state changed from connect -> opensent
Apr 07 14:03:06.372916 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) state changed from connect -> opensent
Apr 07 14:03:06.373024 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) state changed from connect -> opensent
Apr 07 14:03:06.373124 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) state changed from connect -> opensent
Apr 07 14:03:06.377798 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) open message received with peer AS: 3320, holdtime: 180s
Apr 07 14:03:06.377926 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) state changed from opensent -> openconfirm
Apr 07 14:03:06.378032 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) state changed from openconfirm -> established
Apr 07 14:03:06.378149 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) open message received with peer AS: 3320, holdtime: 180s
Apr 07 14:03:06.378238 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) state changed from opensent -> openconfirm
Apr 07 14:03:06.378346 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) state changed from openconfirm -> established
Apr 07 14:03:06.378466 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) open message received with peer AS: 3320, holdtime: 180s
Apr 07 14:03:06.378560 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) state changed from opensent -> openconfirm
Apr 07 14:03:06.378653 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) state changed from openconfirm -> established
Apr 07 14:03:06.378771 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) open message received with peer AS: 3320, holdtime: 180s
Apr 07 14:03:06.378864 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) state changed from opensent -> openconfirm
Apr 07 14:03:06.378948 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) state changed from openconfirm -> established
Apr 07 14:03:07.379162 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) raw update start
Apr 07 14:03:07.379335 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) raw update start
Apr 07 14:03:07.379429 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) raw update start
Apr 07 14:03:07.379516 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) raw update start
Apr 07 14:03:07.725053 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) raw update stop after 0s
Apr 07 14:03:07.725239 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) raw update stop after 0s
Apr 07 14:03:07.827023 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) raw update stop after 0s
Apr 07 14:03:07.827170 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) raw update stop after 0s
Apr 07 14:04:18.133407 ALL SESSIONS ESTABLISHED
Apr 07 14:15:10.823101 ALL SESSION TRAFFIC FLOWS VERIFIED
```

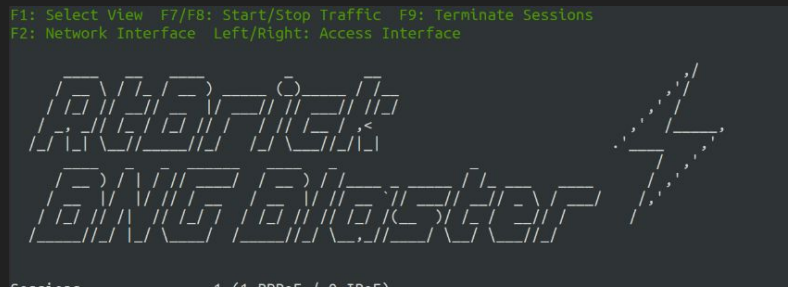
IPTV Tests

```
F1: Select View  F7/F8: Start/Stop Traffic  F9: Terminate Sessions
F2: Network Interface  Left/Right: Access Interface

Sessions              10 (10 PPPoE / 0 IPoE)
  Established         10 [##############################################################]
  Outstanding          0 [                                                              ]
  Terminated           0 [                                                              ]
  DHCPv6           10/10 [##############################################################]
  Setup Time         160 ms
  Setup Rate       62.50 CPS (MIN: 62.50 AVG: 62.50 MAX: 62.50)
  Flapped              0

Traffic Flows Verified
  Session          60/60 [##############################################################]

Network Interface ( SN-2-S1 )
  Tx Packets                  515969 |   7874 PPS       5686 Kbps
  Rx Packets                    8071 |    244 PPS        770 Kbps
  Tx Session Packets             330 |     10 PPS
  Rx Session Packets             330 |     10 PPS          0 Loss
  Tx Session Packets IPv6        330 |     10 PPS
  Rx Session Packets IPv6        330 |     10 PPS          0 Loss
  Tx Session Packets IPv6PD      330 |     10 PPS
  Rx Session Packets IPv6PD      330 |     10 PPS          0 Loss
  Tx Multicast Packets        514830 |   7842 PPS

Access Interface ( SN-5-L1 SN-6-L1 )
  Tx Packets                     610 |     16 PPS         15 Kbps
  Rx Packets                  129756 |   5509 PPS       4497 Kbps
  Tx Session Packets             165 |      5 PPS
  Rx Session Packets             165 |      5 PPS          0 Loss 0 Wrong Session
  Tx Session Packets IPv6        165 |      5 PPS
  Rx Session Packets IPv6        165 |      5 PPS          0 Loss 0 Wrong Session
  Tx Session Packets IPv6PD      165 |      5 PPS
  Rx Session Packets IPv6PD      165 |      5 PPS          0 Loss 0 Wrong Session
  Rx Multicast Packets        100705 |   3923 PPS          0 Loss
```

```
Apr 07 21:05:38.123195 IGMP (ID: 8) ZAPPING 164 ms join delay for group 232.27.72.136
Apr 07 21:05:38.124777 IGMP (ID: 8) ZAPPING leave 232.27.72.136 join 232.27.72.137
Apr 07 21:05:38.623139 IGMP (ID: 10) ZAPPING 164 ms join delay for group 232.27.72.135
Apr 07 21:05:38.624216 IGMP (ID: 10) ZAPPING leave 232.27.72.135 join 232.27.72.136
Apr 07 21:05:39.123546 IGMP (ID: 1) ZAPPING 143 ms join delay for group 232.27.72.129
Apr 07 21:05:39.124928 IGMP (ID: 1) ZAPPING 5000 ms leave delay for group 232.27.72.128
Apr 07 21:05:39.126406 IGMP (ID: 1) ZAPPING leave 232.27.72.129 join 232.27.72.130
Apr 07 21:05:39.623571 IGMP (ID: 3) ZAPPING 146 ms join delay for group 232.27.72.133
Apr 07 21:05:39.624833 IGMP (ID: 3) ZAPPING 4999 ms leave delay for group 232.27.72.132
Apr 07 21:05:39.625927 IGMP (ID: 3) ZAPPING leave 232.27.72.133 join 232.27.72.134
Apr 07 21:05:40.123610 IGMP (ID: 5) ZAPPING 155 ms join delay for group 232.27.72.131
Apr 07 21:05:40.124730 IGMP (ID: 5) ZAPPING 154 ms leave delay for group 232.27.72.130
Apr 07 21:05:40.125811 IGMP (ID: 5) ZAPPING leave 232.27.72.131 join 232.27.72.132
Apr 07 21:05:40.623452 IGMP (ID: 7) ZAPPING 176 ms join delay for group 232.27.72.133
Apr 07 21:05:40.624877 IGMP (ID: 7) ZAPPING 175 ms leave delay for group 232.27.72.132
Apr 07 21:05:40.626060 IGMP (ID: 7) ZAPPING leave 232.27.72.133 join 232.27.72.134
Apr 07 21:05:41.123576 IGMP (ID: 9) ZAPPING 97 ms join delay for group 232.27.72.137
Apr 07 21:05:41.125211 IGMP (ID: 9) ZAPPING 96 ms leave delay for group 232.27.72.136
Apr 07 21:05:41.126760 IGMP (ID: 9) ZAPPING leave 232.27.72.137 join 232.27.72.128
Apr 07 21:05:41.625870 IGMP (ID: 2) ZAPPING 117 ms join delay for group 232.27.72.130
Apr 07 21:05:41.627185 IGMP (ID: 2) ZAPPING 116 ms leave delay for group 232.27.72.129
Apr 07 21:05:41.628248 IGMP (ID: 2) ZAPPING leave 232.27.72.130 join 232.27.72.131
Apr 07 21:05:42.125472 IGMP (ID: 4) ZAPPING 138 ms join delay for group 232.27.72.128
Apr 07 21:05:42.126772 IGMP (ID: 4) ZAPPING 135 ms leave delay for group 232.27.72.137
Apr 07 21:05:42.127822 IGMP (ID: 4) ZAPPING leave 232.27.72.128 join 232.27.72.129
Apr 07 21:05:43.126370 IGMP (ID: 8) ZAPPING 88 ms join delay for group 232.27.72.137
Apr 07 21:05:43.127777 IGMP (ID: 8) ZAPPING 87 ms leave delay for group 232.27.72.136
Apr 07 21:05:43.128961 IGMP (ID: 8) ZAPPING leave 232.27.72.137 join 232.27.72.128
Apr 07 21:05:43.625471 IGMP (ID: 10) ZAPPING 152 ms join delay for group 232.27.72.136
Apr 07 21:05:43.626696 IGMP (ID: 10) ZAPPING 151 ms leave delay for group 232.27.72.135
Apr 07 21:05:43.628088 IGMP (ID: 10) ZAPPING leave 232.27.72.136 join 232.27.72.137
Apr 07 21:05:44.627461 IGMP (ID: 3) ZAPPING 141 ms join delay for group 232.27.72.134
Apr 07 21:05:44.628741 IGMP (ID: 3) ZAPPING 137 ms leave delay for group 232.27.72.133
Apr 07 21:05:44.630093 IGMP (ID: 3) ZAPPING leave 232.27.72.134 join 232.27.72.135
Apr 07 21:05:46.128266 IGMP (ID: 9) ZAPPING 104 ms join delay for group 232.27.72.128
Apr 07 21:05:46.129496 IGMP (ID: 9) ZAPPING 102 ms leave delay for group 232.27.72.137
Apr 07 21:05:46.130609 IGMP (ID: 9) ZAPPING leave 232.27.72.128 join 232.27.72.129
Apr 07 21:05:46.629512 IGMP (ID: 2) ZAPPING 123 ms join delay for group 232.27.72.131
Apr 07 21:05:46.630885 IGMP (ID: 2) ZAPPING 121 ms leave delay for group 232.27.72.130
Apr 07 21:05:46.632214 IGMP (ID: 2) ZAPPING leave 232.27.72.131 join 232.27.72.132
Apr 07 21:05:48.130445 IGMP (ID: 8) ZAPPING 194 ms join delay for group 232.27.72.128
Apr 07 21:05:48.132000 IGMP (ID: 8) ZAPPING 194 ms leave delay for group 232.27.72.137
Apr 07 21:05:48.133608 IGMP (ID: 8) ZAPPING leave 232.27.72.128 join 232.27.72.129
Apr 07 21:05:48.629500 IGMP (ID: 10) ZAPPING 110 ms join delay for group 232.27.72.137
Apr 07 21:05:48.630752 IGMP (ID: 10) ZAPPING 107 ms leave delay for group 232.27.72.136
Apr 07 21:05:48.631847 IGMP (ID: 10) ZAPPING leave 232.27.72.137 join 232.27.72.128
Apr 07 21:05:49.631484 IGMP (ID: 3) ZAPPING 123 ms join delay for group 232.27.72.135
Apr 07 21:05:49.632775 IGMP (ID: 3) ZAPPING 121 ms leave delay for group 232.27.72.134
```

BGP Setup and Teardown

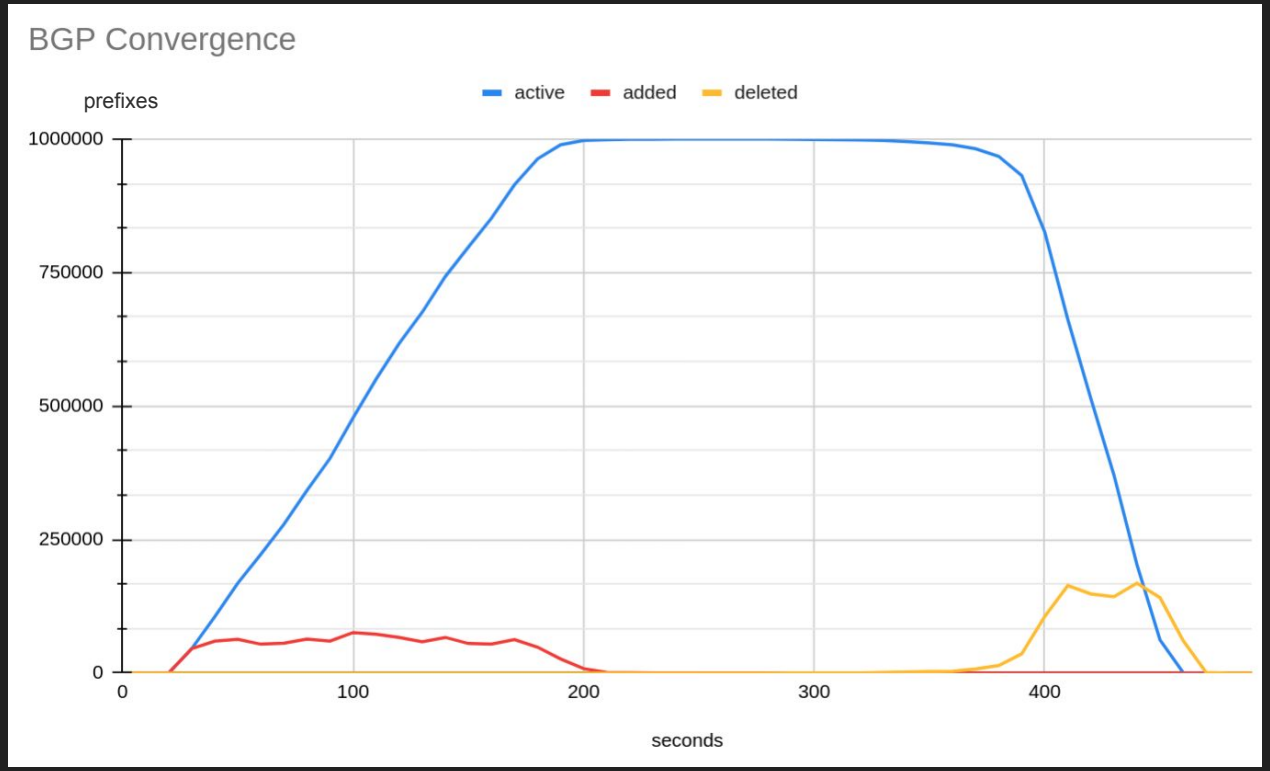
```
F1: Select View  F7/F8: Start/Stop Traffic  F9: Terminate Sessions
F2: Network Interface  Left/Right: Access Interface
```



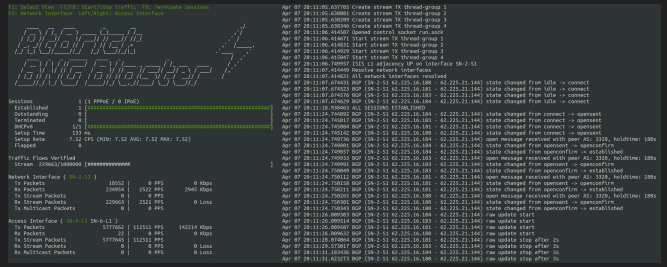
```
Sessions                1 (1 PPPoE / 0 IPoE)
  Established           1 [############################################################]
  Outstanding           0 [                                                            ]
  Terminated            0 [                                                            ]
  DHCPv6              1/1 [############################################################]
  Setup Time          133 ms
  Setup Rate         7.52 CPS (MIN: 7.52 AVG: 7.52 MAX: 7.52)
  Flapped               0

Traffic Flows Verified
  Stream  229663/1000000 [##############                                              ]

Network Interface ( SN-2-S1 )
  Tx Packets                    10552 |      0 PPS          0 Kbps
  Rx Packets                   234954 |   2522 PPS       2945 Kbps
  Tx Stream Packets                 0 |      0 PPS
  Rx Stream Packets            229663 |   2521 PPS          0 Loss
  Tx Multicast Packets              0 |      0 PPS

Access Interface ( SN-5-L1 SN-6-L1 )
  Tx Packets                  5777662 | 112511 PPS     142214 Kbps
  Rx Packets                       22 |      0 PPS          0 Kbps
  Tx Stream Packets           5777645 | 112511 PPS
  Rx Stream Packets                 0 |      0 PPS          0 Loss
  Rx Multicast Packets              0 |      0 PPS          0 Loss
```

```
Apr 07 20:11:05.637705 Create stream TX thread-group 1
Apr 07 20:11:05.638081 Create stream TX thread-group 2
Apr 07 20:11:05.638209 Create stream TX thread-group 3
Apr 07 20:11:05.638346 Create stream TX thread-group 4
Apr 07 20:11:06.414507 Opened control socket run.sock
Apr 07 20:11:06.414671 Start stream TX thread-group 1
Apr 07 20:11:06.414831 Start stream TX thread-group 2
Apr 07 20:11:06.414929 Start stream TX thread-group 3
Apr 07 20:11:06.415047 Start stream TX thread-group 4
Apr 07 20:11:06.749957 ISIS L1 adjacency UP on interface SN-2-S1
Apr 07 20:11:07.414449 Resolve network interfaces
Apr 07 20:11:07.414621 All network interfaces resolved
Apr 07 20:11:07.674431 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) state changed from idle -> connect
Apr 07 20:11:07.674523 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) state changed from idle -> connect
Apr 07 20:11:07.674576 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) state changed from idle -> connect
Apr 07 20:11:07.674629 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) state changed from idle -> connect
Apr 07 20:11:18.938463 ALL SESSIONS ESTABLISHED
Apr 07 20:11:24.744892 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) state changed from connect -> opensent
Apr 07 20:11:24.745017 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) state changed from connect -> opensent
Apr 07 20:11:24.745084 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) state changed from connect -> opensent
Apr 07 20:11:24.745142 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) state changed from connect -> opensent
Apr 07 20:11:24.749736 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) open message received with peer AS: 3320, holdtime: 180s
Apr 07 20:11:24.749801 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) state changed from opensent -> openconfirm
Apr 07 20:11:24.749857 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) state changed from openconfirm -> established
Apr 07 20:11:24.749933 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) open message received with peer AS: 3320, holdtime: 180s
Apr 07 20:11:24.749991 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) state changed from opensent -> openconfirm
Apr 07 20:11:24.750049 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) state changed from openconfirm -> established
Apr 07 20:11:24.750112 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) open message received with peer AS: 3320, holdtime: 180s
Apr 07 20:11:24.750158 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) state changed from opensent -> openconfirm
Apr 07 20:11:24.750211 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) state changed from openconfirm -> established
Apr 07 20:11:24.750265 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) open message received with peer AS: 3320, holdtime: 180s
Apr 07 20:11:24.750301 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) state changed from opensent -> openconfirm
Apr 07 20:11:24.750343 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) state changed from openconfirm -> established
Apr 07 20:11:26.009383 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) raw update start
Apr 07 20:11:26.009514 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) raw update start
Apr 07 20:11:26.009587 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) raw update start
Apr 07 20:11:26.009632 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) raw update start
Apr 07 20:11:28.074064 BGP (SN-2-S1 62.225.16.181 - 62.225.21.144) raw update stop after 2s
Apr 07 20:11:29.573017 BGP (SN-2-S1 62.225.16.183 - 62.225.21.144) raw update stop after 3s
Apr 07 20:11:31.183436 BGP (SN-2-S1 62.225.16.184 - 62.225.21.144) raw update stop after 5s
Apr 07 20:11:31.623273 BGP (SN-2-S1 62.225.16.180 - 62.225.21.144) raw update stop after 5s
```

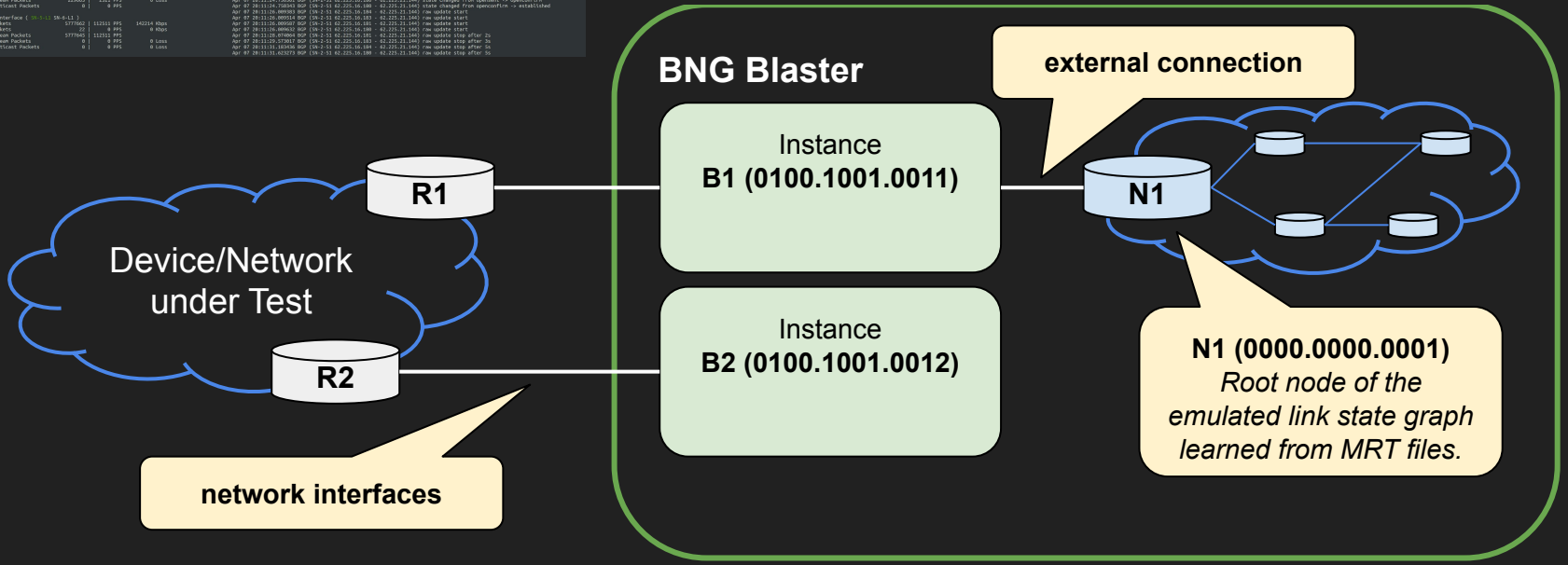
BGP Setup and Teardown



ISIS Scaling

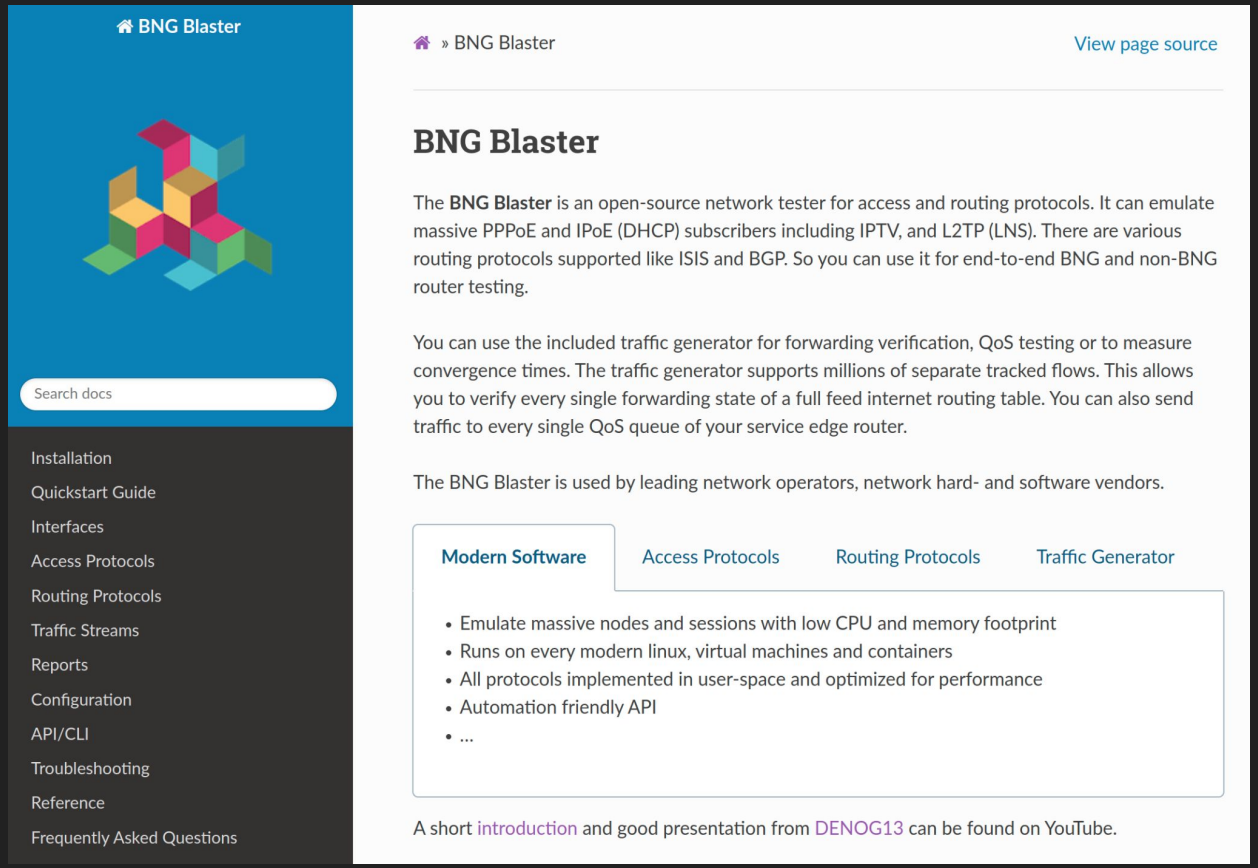



```
$ lspgen -K secret -T md5 -C 0204.0000.0001 -c 10000 -e 1000 --seed 1337
Apr 07 21:53:37.939517 Add context for instance default, protocol isis, topology unicast
Apr 07 21:53:37.939786 Add connector to 0x20400000001
Apr 07 21:53:37.939806 LSP generation parameters
Apr 07 21:53:37.939816  Area 49.0001/24
Apr 07 21:53:37.939824  Level 1, sequence 0x1, lsp-lifetime 65535
Apr 07 21:53:37.939833  Authentication-key secret, Authentication-type md5
Apr 07 21:53:37.939846  IPv4 Node Base Prefix 192.168.0.0/32
Apr 07 21:53:37.939856  IPv4 Link Base Prefix 172.16.0.0/31
Apr 07 21:53:37.939866  IPv4 External Base Prefix 10.0.0.0/28
Apr 07 21:53:37.939898  IPv6 Node Base Prefix fc00::c0a8:0/128
Apr 07 21:53:37.939925  IPv6 Link Base Prefix fc00::ac10:0/127
Apr 07 21:53:37.939942  IPv6 External Base Prefix fc00::a00:0/124
Apr 07 21:53:37.939964  SRGB base 10000, range 2000
Apr 07 21:53:37.939985 Generating a graph of 10000 nodes and 20000 links
Apr 07 21:53:41.512756  Root node 1921.6800.0000.00
```



How to start with BNG Blaster?

https://rtbrick.github.io/bngblaster



Who is using BNG Blaster?

rtbrick

The BNG Blaster is used by leading network operators, network hardware and software vendors …

ACCESS 4.0

… and many more!

Roadmap

rtbrick

- BNG Blaster Controller
- BGP Authentication (MD5 and TCP-AO)
- BGP Scaling Enhancements (>1000 sessions)
- TCP Traffic Streams (> 1M streams)
- DPDK/XDP (>10M PPS)
- …

We will constantly add more features and protocols:
LLDP, BFD, PIM, LDP, RSVP, OSPF, …

rtbrick

We want you!

Contribute to the project and share your experience!

https://github.com/rtbrick/bngblaster

Questions?

bngblaster@rtbrick.com