LnetD network discovery

Based on IGP information

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https://github.com/cpmarvin/lnetd

About me/project

Network engineer focused on SP networks

- Changed quite a few jobs(small and big ISPs) , need to learn their network fast.
- Not all of them had tools / diagrams <insert shock gif here >
- Some had but limited access to new hire's :) , so no day one topology for me.
- Worked with all 3 big modeling tools (Car... , Wan..., Pa....) <- those are better go buy one

Build one based on information from ISIS MPLS-TE extensions

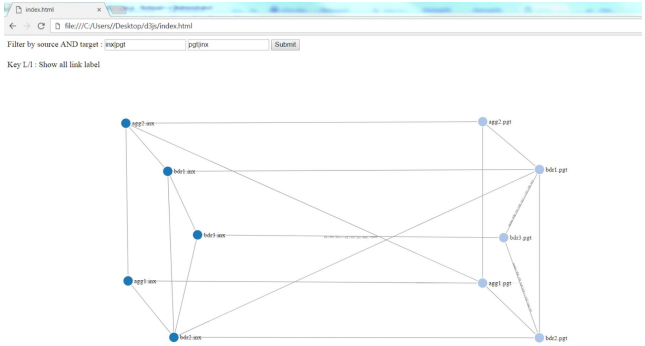
- ISIS speaker/parser (no hello/lsp auth) - legacy (fire up a vMX/XRV)
- JNP XML (see next slide)
- IOS XR (netconf links and routers via mpls-te yang oper model)
- BGP-LS (maybe in the future)

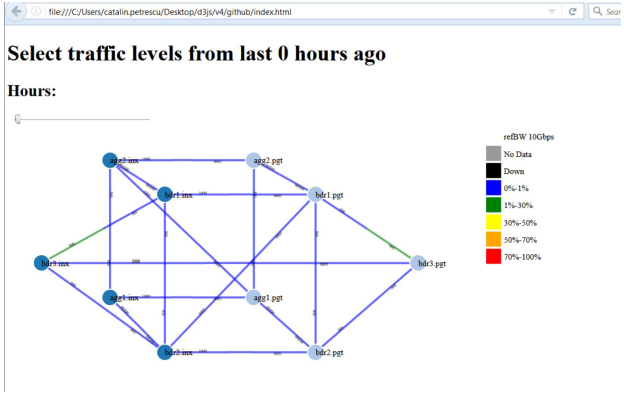
Started as a fork of eNMS (https://github.com/afourmy/eNMS) <- big thanks , go check his project out

- Frontend bootstrap html
- Backend python flask
- D3js for network graphs using parallel links (someone did half of the math for me https://webiks.com/d3-js-force-layout-straight-parallel-links/)

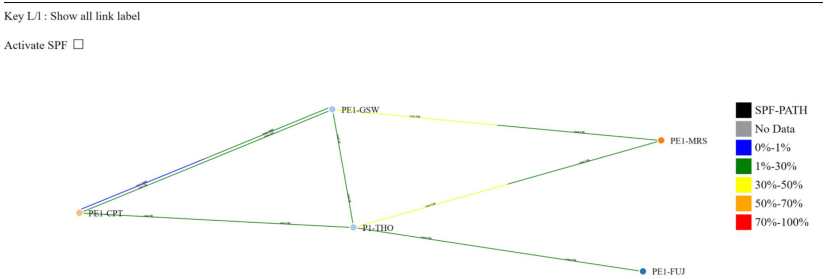
History

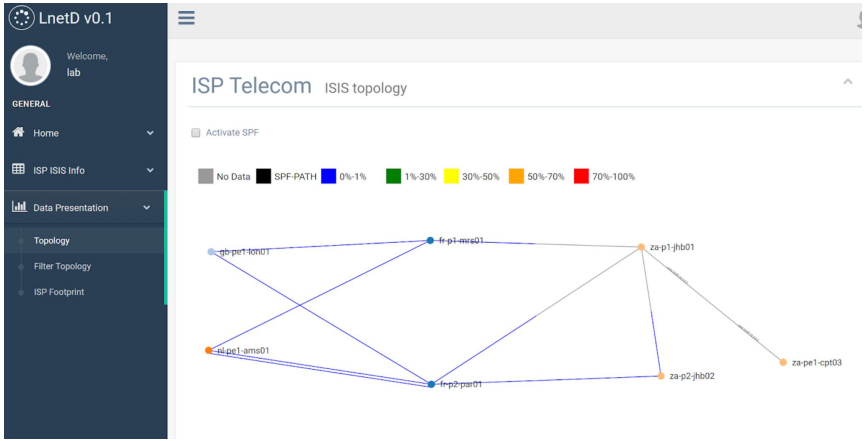
2017





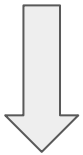
2018





Topology acquisition - JNP XML

```
lab@ke-pe3-nbi> show isis database ke-pe2-nbi.00-00 extensive | display xml | find "IS extended neighbor:"
                    <reachability-tlv heading="IS extended neighbor:">
                        <address-prefix>ke-pe3-nbi.00</address-prefix>
                        <metric>10</metric>
                        <isis-reachability-subtlv>
                            <address>10.2.3.2</address>
                        </isis-reachability-subtlv>
                        <isis-reachability-subtlv>
                            <neighbor-prefix>10.2.3.3</neighbor-prefix>
                        </isis-reachability-subtlv>
```



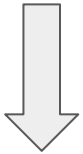
Sqlite3 Database

```
sqlite> select * from rpc_links where source='ke-pe2-nbi' and l_ip='10.2.3.2';
index|source|target|metric|l_ip|r_ip|l_ip r_ip
17 ke-pe2-nbi|ke-pe3-nbi|10|10.2.3.2|10.2.3.3|('10.2.3.2', '10.2.3.3')
```

Topology acquisition - XR Netconf XML

```
<isis xmlns="http://cisco.com/ns/yang/Cisco-IOS-XR-clns-isis-oper">
 <instances>
  <instance>
   <instance-name>64</instance-
   <host-names>
    <host-name>
     <system-id>0000.0000.0002<
     <host-name>ke-pe2-nbi</hos
    </host-name>
    <host-name>
     <system-id>0000.0000.0003<
     <host-name>ke-pe3-nbi</hos
    </host-name>
```

```
<topology-node-link>
  <topology-link-type>p2p</topology-link-type>
  <topology-link-interface-address>10.2.3.2</topology-link-interface-address>
  <topology-link-interface-id>331</topology-link-interface-id>
  <topology-link-neighbor-address>10.2.3.3</topology-link-neighbor-address>
  <topology-link-neighbor-id>331</topology-link-neighbor-id>
  <topology-link-neighbor-system-id>0000.0000.0003.00</topology-link-neighbor-system-id>
  <topology-link-neighbor-node-id>2</topology-link-neighbor-node-id>
  <topology-link-neighbor-generation>53688</topology-link-neighbor-generation>
  <topology-link-fragment-id>0</topology-link-fragment-id>
  <topology-link-te-metric>10</topology-link-te-metric>
  <topology-link-igp-metric>10</topology-link-igp-metric>
```

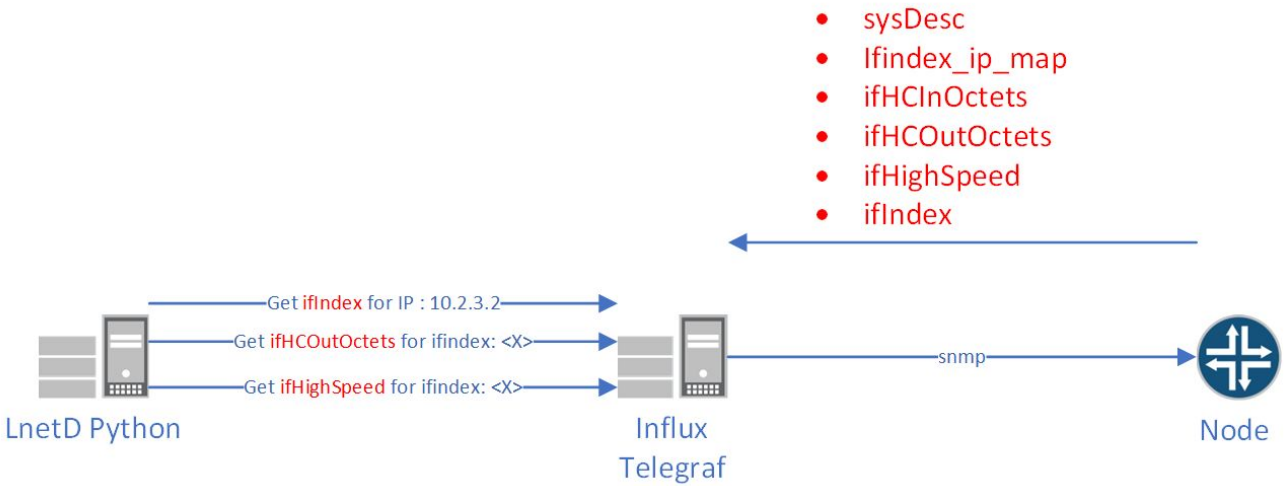


Sqlite3 Database

```
sqlite> select * from rpc_links where source='ke-pe2-nbi' and l_ip='10.2.3.2';
index|source|target|metric|l_ip|r_ip|l_ip_r_ip
17|ke-pe2-nbi|ke-pe3-nbi|10|10.2.3.2|10.2.3.3|('10.2.3.2', '10.2.3.3')
```

Data enrichment

ifHighSpeed = Capacity
ifHCoutOctets = Util
ifIndex = l_int

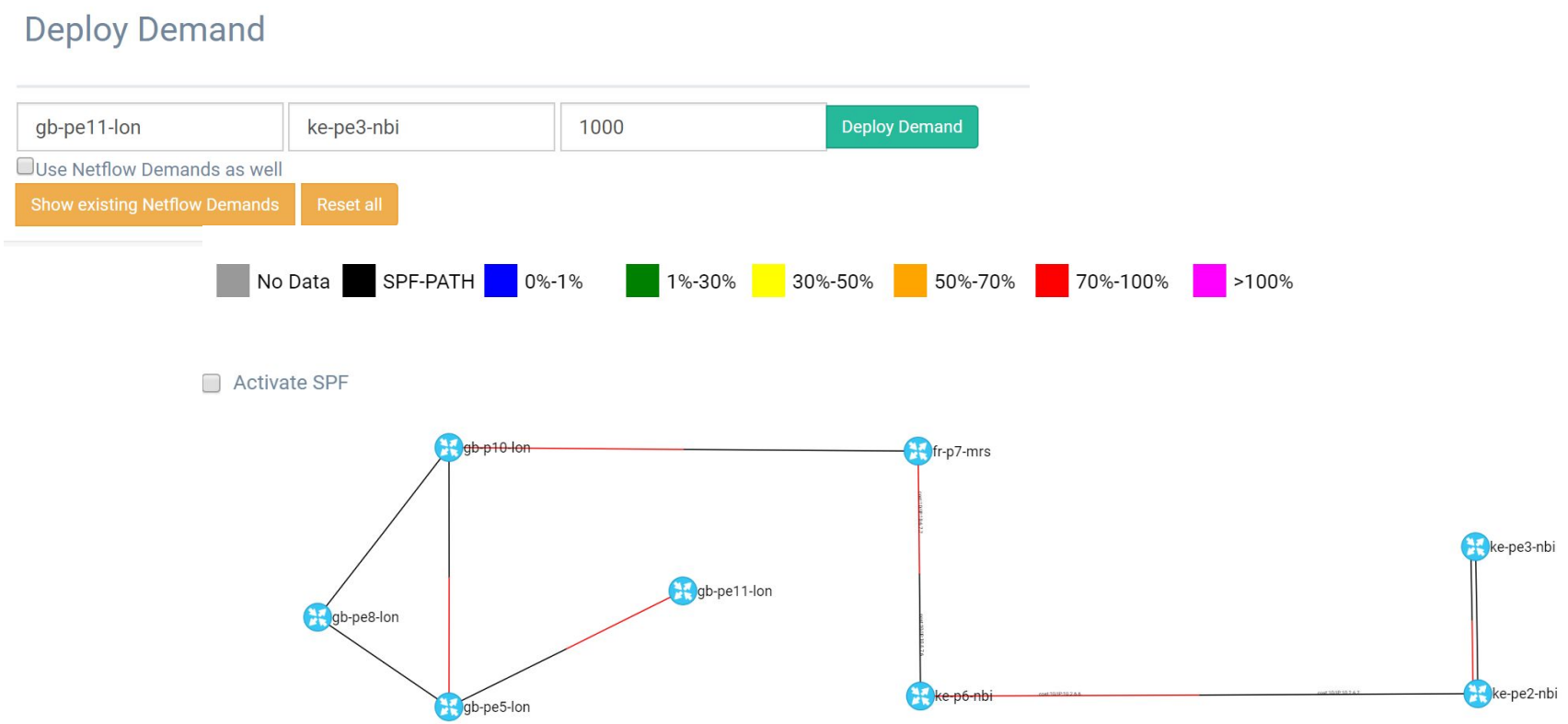



```
index|source|target|metric|l_ip|r_ip|l_ip_r_ip|l_int|util|capacity|errors
17|ke-pe2-nbi|ke-pe3-nbi|10|10.2.3.2|10.2.3.3|('10.2.3.2', '10.2.3.3')|523|4102|1000|0
```

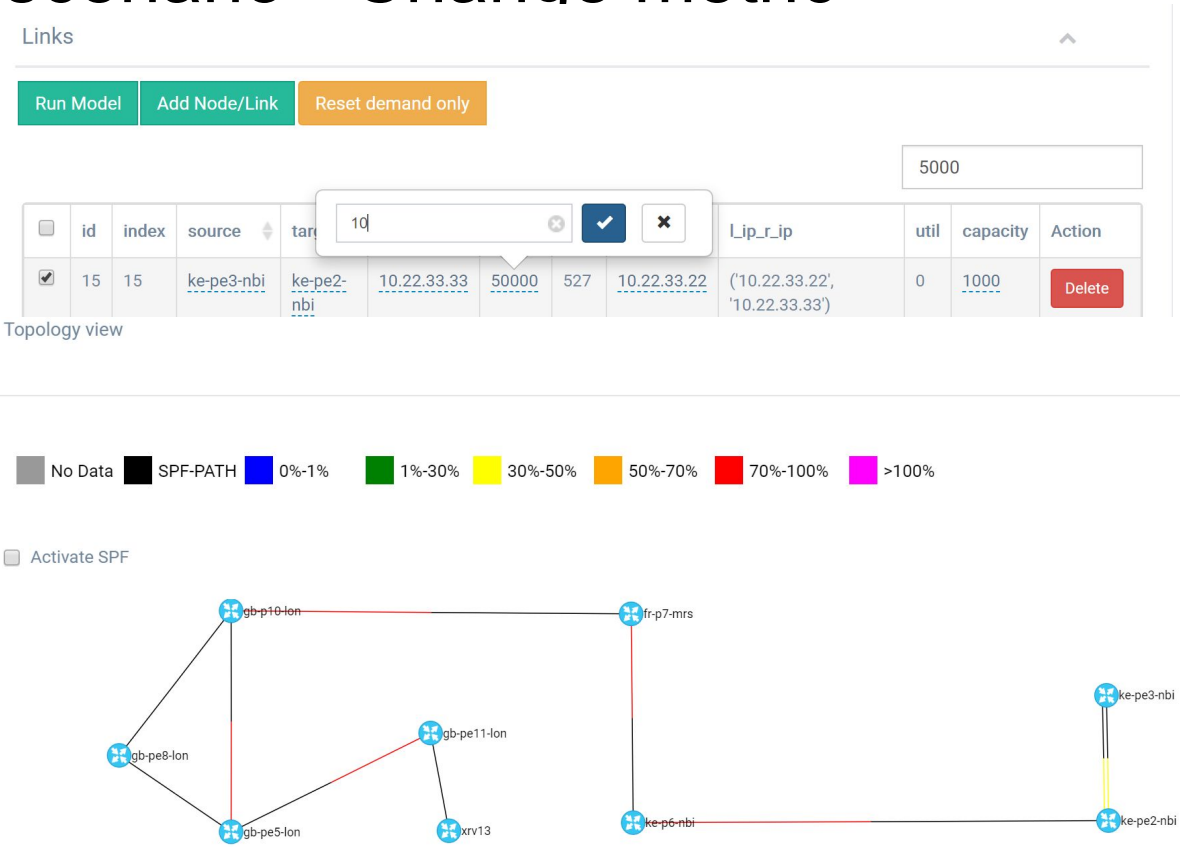
D3js Network Graph

D3js Network Graph - SPF Calculation

What if scenario - Capacity planning , add demand



What if scenario - Change metric

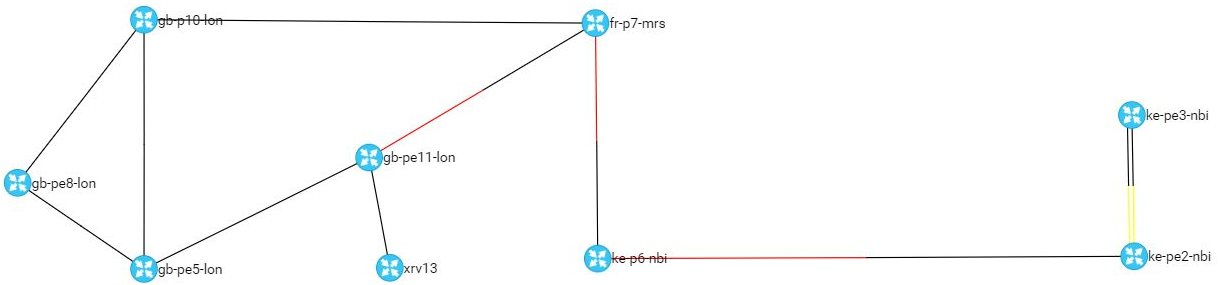


What if scenario - Add IGP Links / RSVP-TE Tunnels

Topology view

No Data | SPF-PATH | 0%-1% | 1%-30% | 30%-50% | 50%-70% | 70%-100% | >100%

Activate SPF

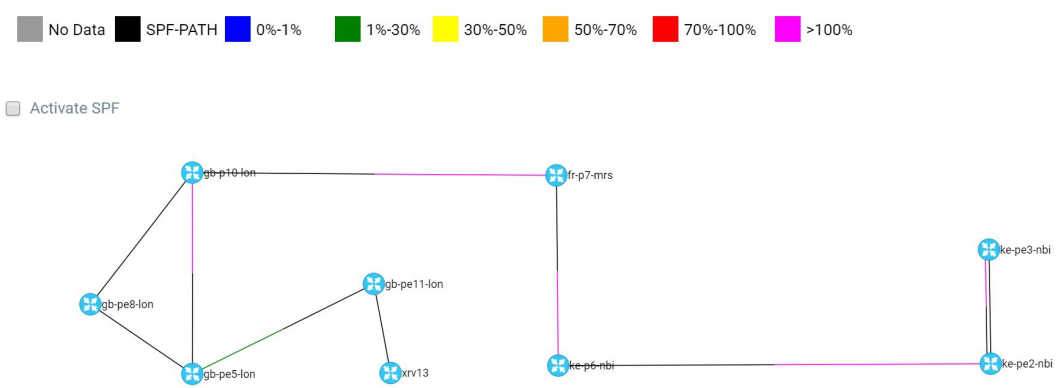


What if scenario - Add netflow based demands

Netflow Demands

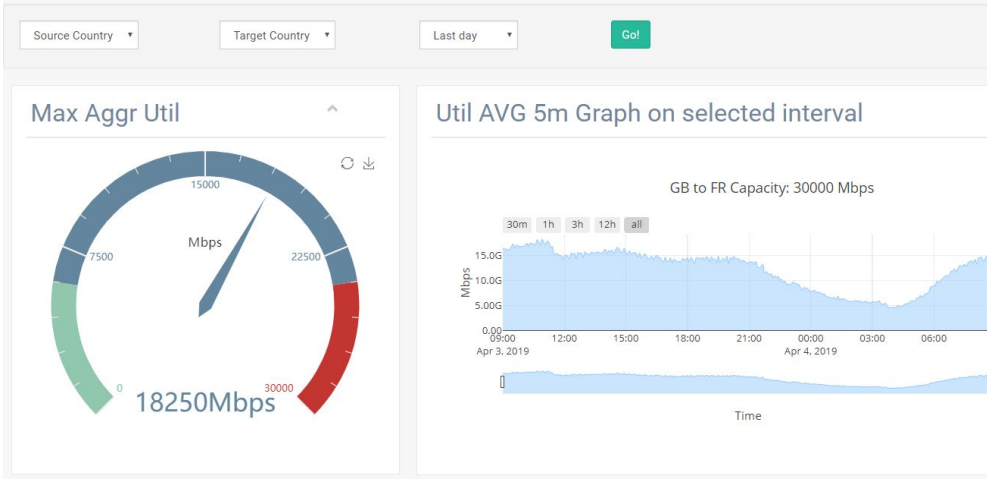
Source	Target	Demand(bps)
ke-pe3-nbi	gb-pe5-lon	17432240
ke-pe3-nbi	ke-p6-nbi	17062613
ke-pe3-nbi	ke-pe2-nbi	14168026
ke-pe3-nbi	ke-pe2-nbi	
ke-pe3-nbi	ke-p6-nbi	

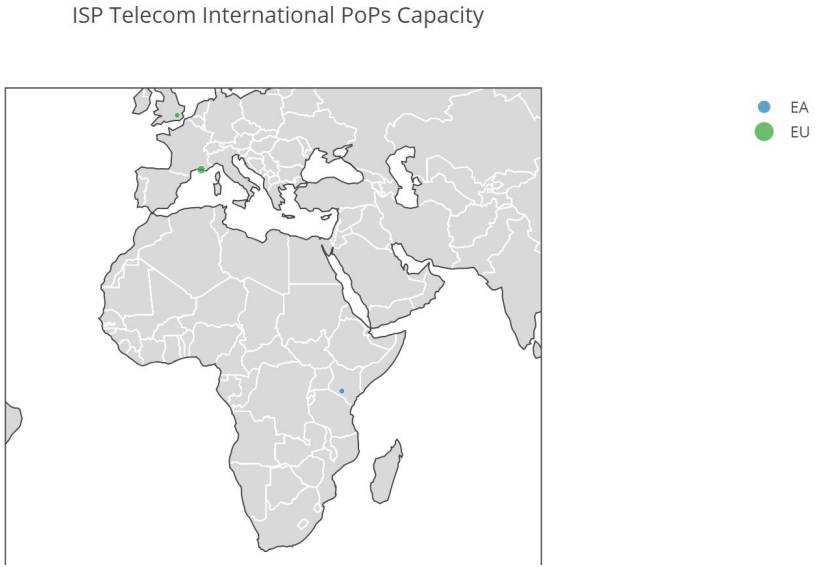
Topology view



Other features

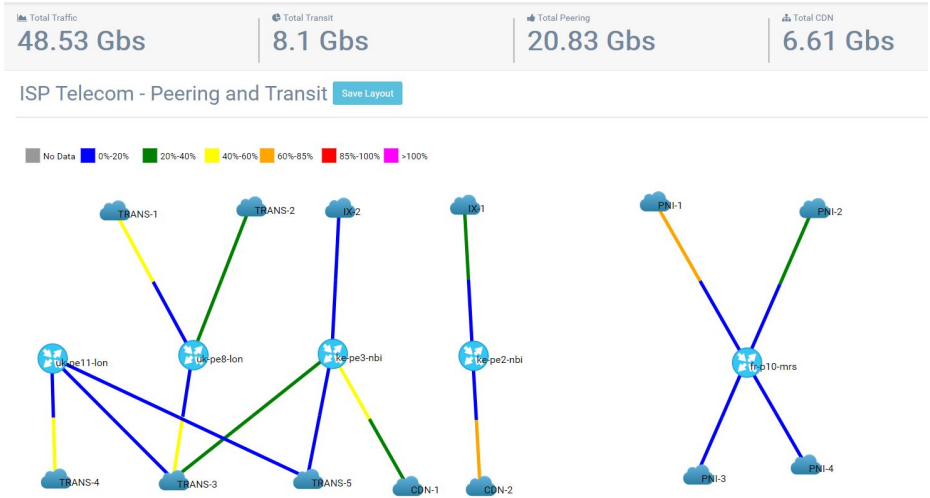
- CC to CC capacity and util (dummy data)
- PoP Map (dummy data)

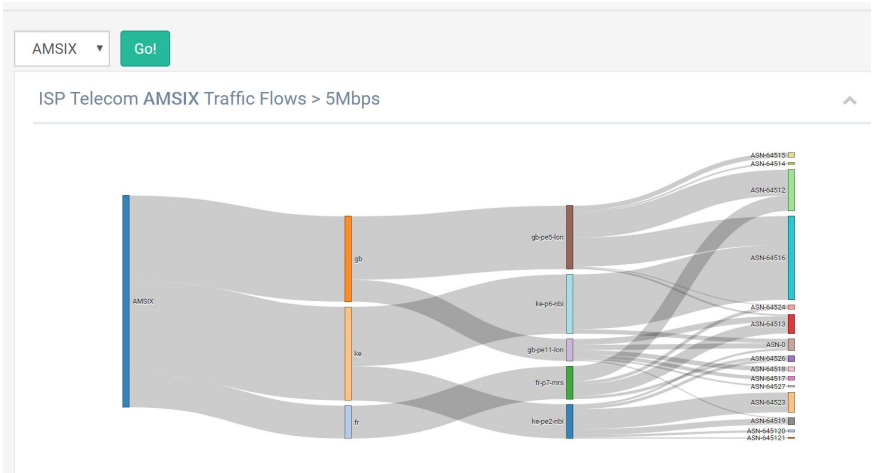




Other features

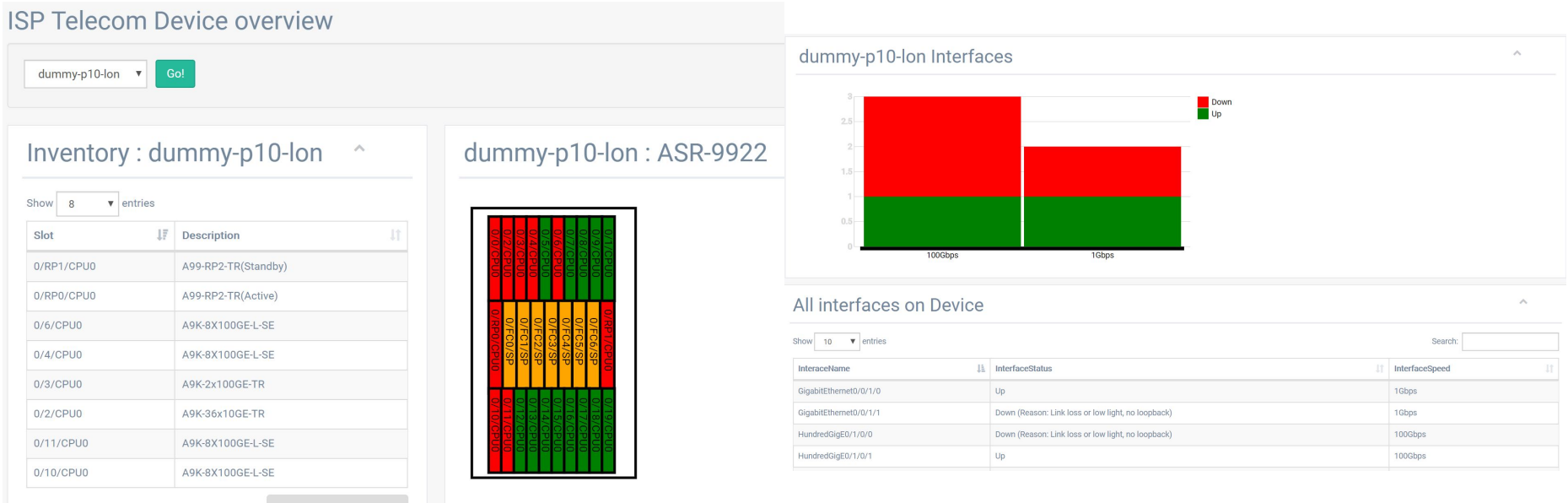
- P&T capacity map (dummy data)
- Netflow Data (dummy data)





Other features

- Device/Interface Inventory



Other features

- BGP Peer Inventory
- Traffic forecast

ISP Telecom

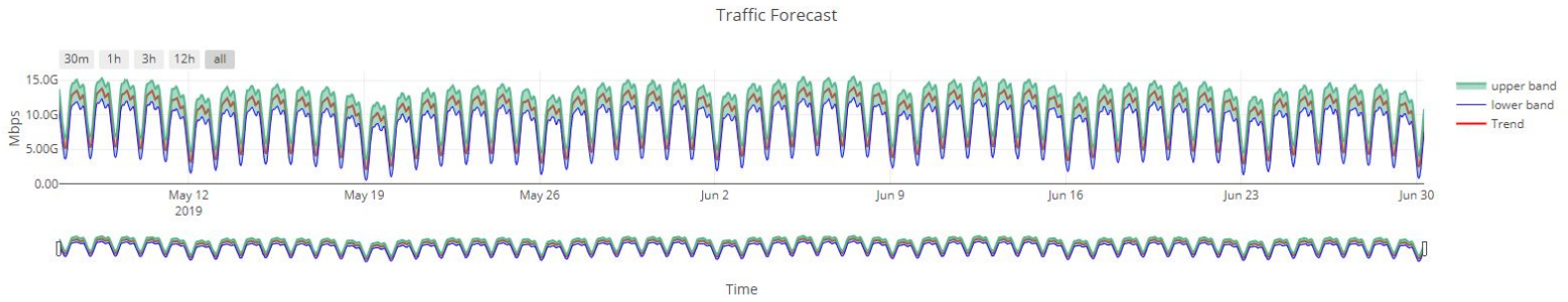
BGP PEERS

Show 10 entries Search:

Router	Neighbour	Neighbour IP	Remote ASN	UP	Type	PXL RCV	IX	Uptime
ke-pe3-nbi	PEER1-ASN2	10.2.2.2	2	1	peering	0	IX-LINX01	36 days 07:12:00
ke-pe3-nbi	iBGP-R5	10.5.5.5	1	1	internal	0	n/a	25 days 05:06:00
ke-pe3-nbi	iBGP-R7	10.7.7.7	1	1	internal	0	n/a	25 days 05:06:00
ke-pe3-nbi	iBGP-R8	10.8.8.8	1	1	internal	4	n/a	0 days 00:20:00
ke-pe3-nbi	iBGP-R11	10.11.11.11	1	1	internal	1	n/a	0 days 00:18:00
ke-pe3-nbi	iBGP-R13	10.13.13.13	1	1	internal	0	n/a	0 days 00:17:00
ke-pe3-nbi	IPT-CST-ASN22	10.22.22.22	22	0	customer	-1	n/a	3 days 23:50:00

Previous 1 Next

Traffic Forecast with fbProphet Forecast



Demo time

demo.lnetd.co.uk