

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

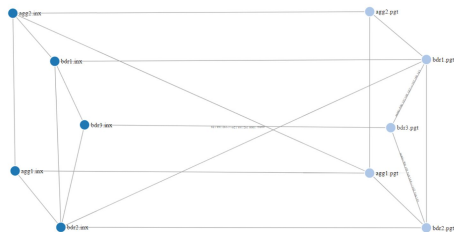
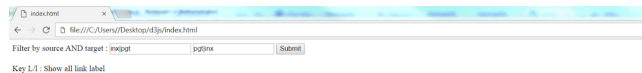
- ❑ ISIS speaker/parser (no hello/lsp auth) - legacy (fire up a vMX/XRV)
- ❑ JNP XML (see next slide)
- ❑ IOS XR (netconf links and routers via mpls-te yang oper model)
- ❑ BGP-LS (maybe in the future)

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/>)

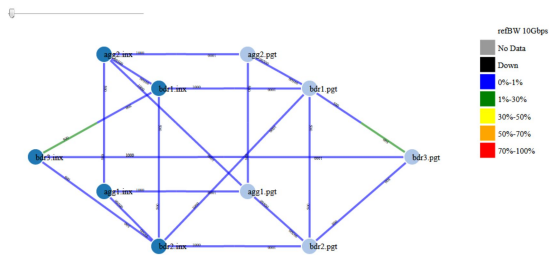
History

2017



Select traffic levels from last 0 hours ago

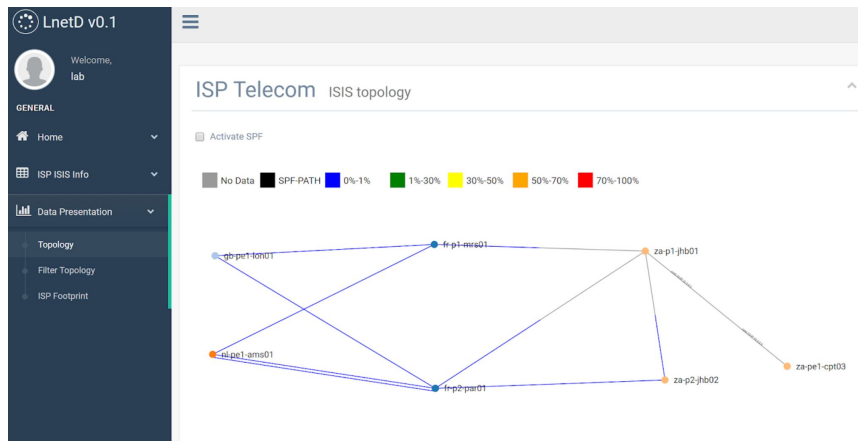
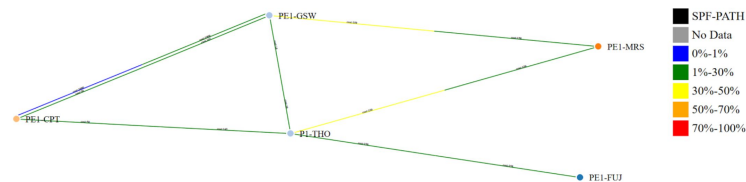
Hours:



2018

Key L1 : Show all link label

Activate SPF ☐



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-name>
      <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>
      </host-names>
      <topology-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>
      </topology-link>
    </instance>
  </instances>
</isis>
```



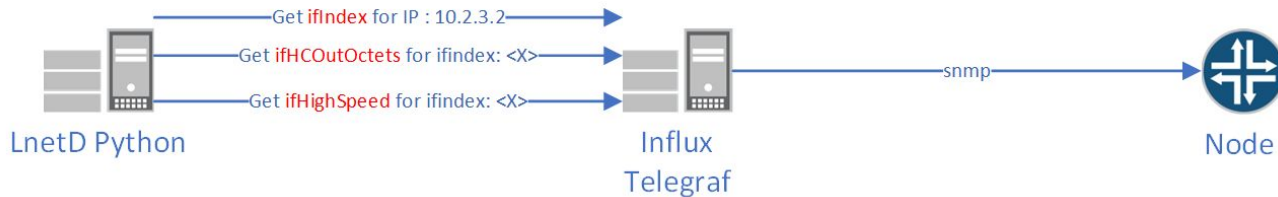
Sqlite3 Database

```
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 = I_int

- sysDesc
- Iindex_ip_map
- ifHCInOctets
- ifHCOutOctets
- ifHighSpeed
- ifIndex



```
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

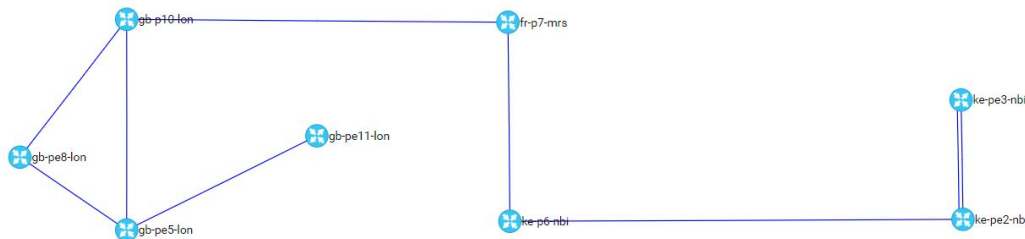
ISP Telecom

Topology

Save Layout

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

☐ Activate SPF ☐ Dynamic Topology



D3js Network Graph - SPF Calculation

ISP Telecom

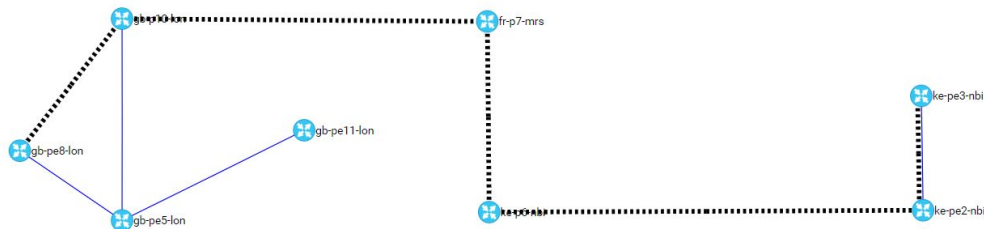
Topology

Save Layout

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

☒ Activate SPF ☐ Dynamic Topology

SPF between Source: gb-pe8-lon Target: ke-pe3-nbi



What if scenario - Capacity planning , add demand

Deploy Demand

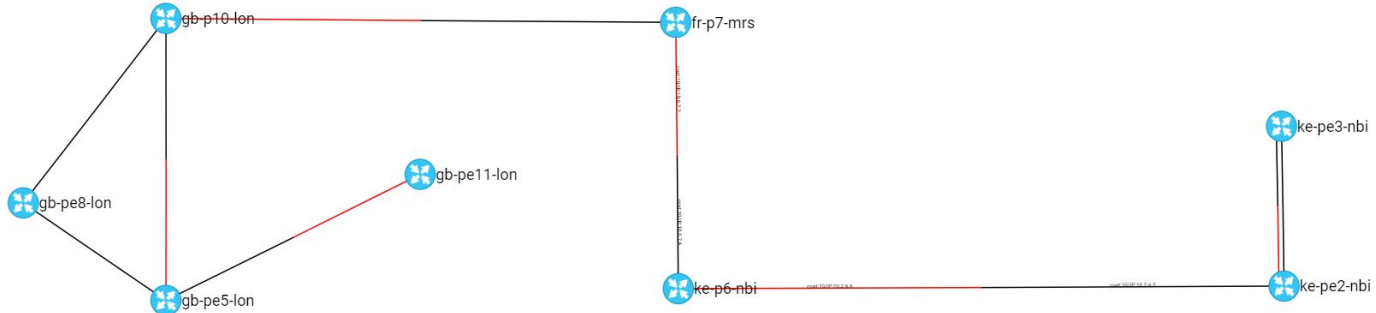
gb-pe11-lon	ke-pe3-nbi	1000	Deploy Demand
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☐ Use Netflow Demands as well

Show existing Netflow Demands Reset all

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

☐ Activate SPF



What if scenario - Change metric

Links

Run Model Add Node/Link Reset demand only

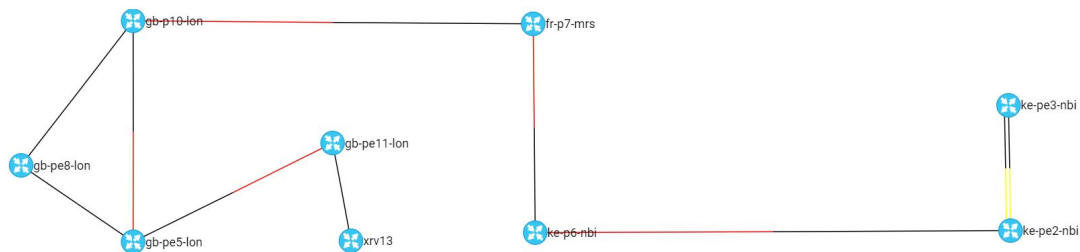
5000

<input type="checkbox"/>	id	index	source	target	util	capacity	Action					
<input checked="" type="checkbox"/>	15	15	ke-pe3-nbi	ke-pe2-nbi	10.22.33.33	50000	527	10.22.33.22	('10.22.33.22', '10.22.33.33')	0	1000	Delete

Topology view

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

☐ Activate SPF

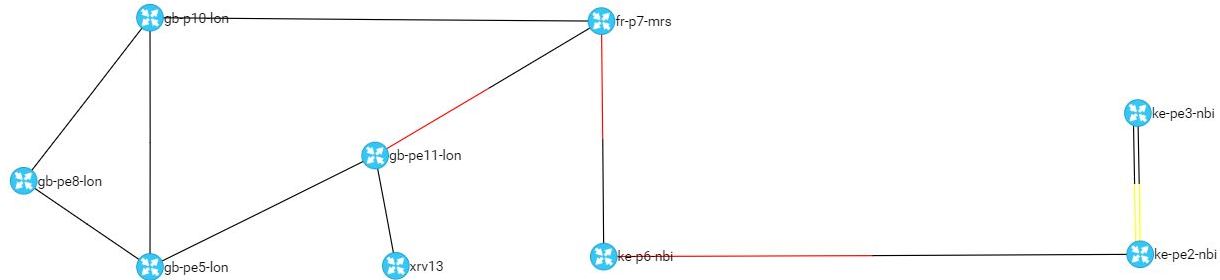


What if scenario - Add IGP Links / RSVP-TE Tunnels

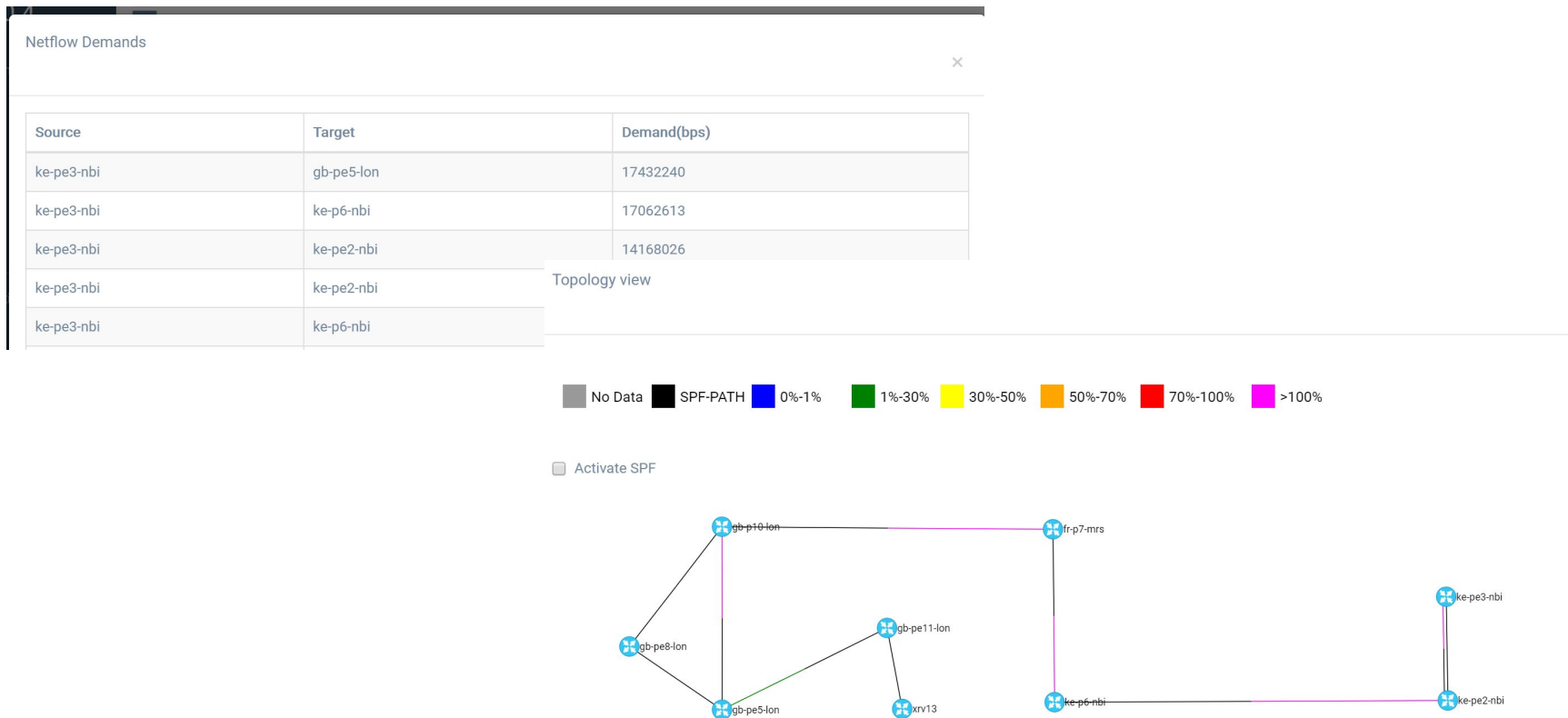
Topology view



☐ Activate SPF

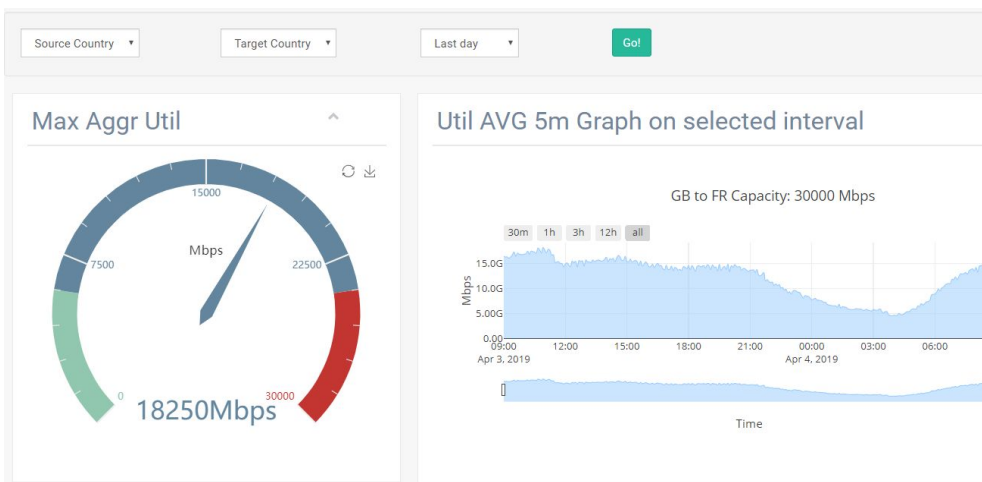


What if scenario - Add netflow based demands



Other features

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

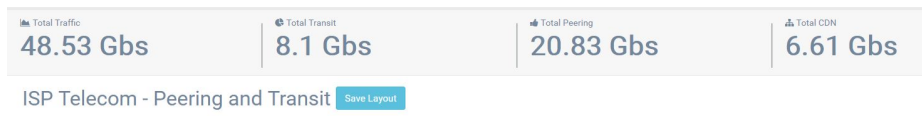


ISP Telecom International PoPs Capacity

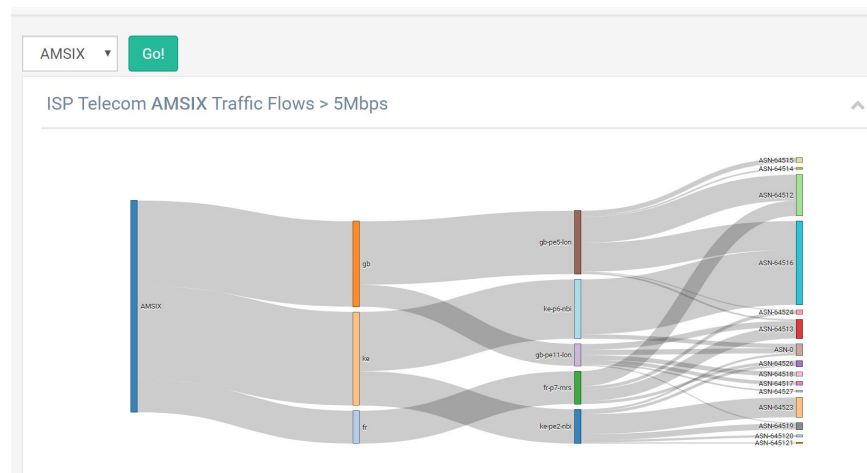
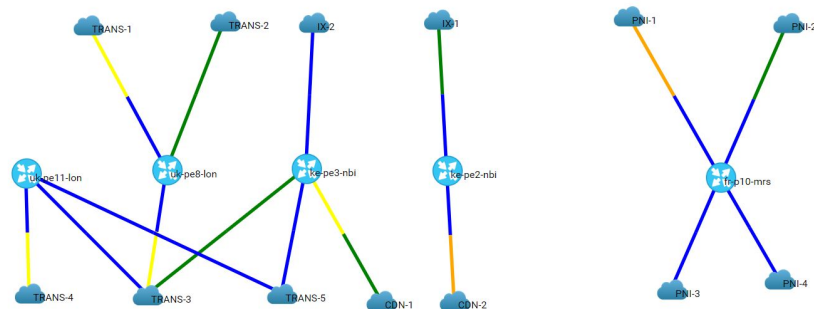


Other features

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



Legend: No Data (grey), 0%-20% (blue), 20%-40% (green), 40%-60% (yellow), 60%-85% (orange), 85%-100% (red), >100% (pink)



Other features

- Device/Interface Inventory

ISP Telecom Device overview

dummy-p10-lon

Go!

Inventory : dummy-p10-lon

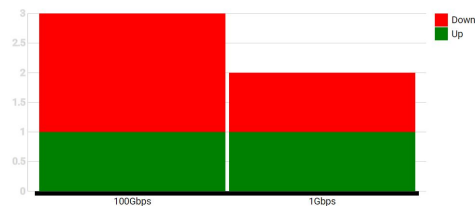
Show 8 entries

Slot	Description
0/RP1/CPU0	A99-RP2-TR(Standby)
0/RP0/CPU0	A99-RP2-TR(Active)
0/6/CPU0	A9K-8X100GE-L-SE
0/4/CPU0	A9K-8X100GE-L-SE
0/3/CPU0	A9K-2x100GE-TR
0/2/CPU0	A9K-36x10GE-TR
0/11/CPU0	A9K-8X100GE-L-SE
0/10/CPU0	A9K-8X100GE-L-SE

dummy-p10-lon : ASR-9922



dummy-p10-lon Interfaces



All interfaces on Device

Show 10 entries

Search:

InterfaceName	InterfaceStatus	InterfaceSpeed
GigabitEthernet0/0/1/0	Up	1Gbps
GigabitEthernet0/0/1/1	Down (Reason: Link loss or low light, no loopback)	1Gbps
HundredGigE0/1/0/0	Down (Reason: Link loss or low light, no loopback)	100Gbps
HundredGigE0/1/0/1	Up	100Gbps

Other features

- BGP Peer Inventory
- Traffic forecast

ISP Telecom

BGP PEERS

Show 10 entries

Search:

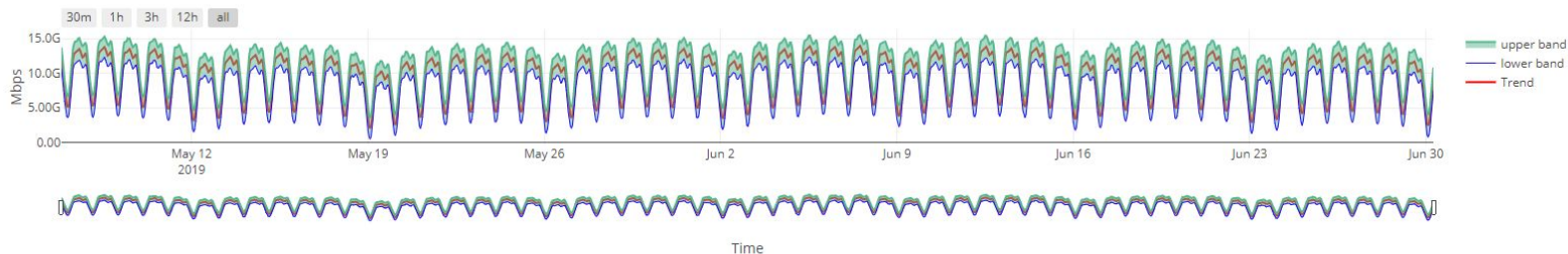
Router	Neighbour	Neighbour IP	Remote ASN	UP	Type	PXL RCV	IX	Uptime
ke-pe3-nbi	PEER1-ASN2	10.2.2.2	2	1	peering	0	IX-LINX01	36 days 07:12:00
ke-pe3-nbi	iBGP-R5	10.5.5.5	1	1	internal	0	n/a	25 days 05:06:00
ke-pe3-nbi	iBGP-R7	10.7.7.7	1	1	internal	0	n/a	25 days 05:06:00
ke-pe3-nbi	iBGP-R8	10.8.8.8	1	1	internal	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

Traffic Forecast



Demo time

demo.inetd.co.uk

