



LINX108

Technology

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Technology

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Technology team overview

Technology team overview

- At LINX 107 we presented projects and ideas that had:
 - A direct impact on members
 - Internal projects to improve the network, operations and efficiencies
 - Member driven ideas and initiatives
- In December we adopted a Scaled Agile Framework (SAFe)
- In January we set about prioritising our deliverables for the first program increment (PI) which runs for 12 weeks, 21st January to the 13th April



The epics and features we all agreed that would need to be done, or at least started, are a mixture of member projects, internal improvements and new business initiatives

Program board



Objectives

Aggregated PI Objectives

Objective/Goal	Level (committed/ stretch)	Status IN PROGRESS COMPLETE NOT HAPPENING	Business Value assigned	Business Value achieved	Team(s)
Billing system (30-day billing trigger)	committed	IN PROGRESS	9		
Billing system(2020 promotion scheme automated billing)	committed		8		
Billing system (CRM restrictions)	committed		7		
Billing system (reconciliation)	stretch		9		
4th Site LINXManchester AIS, launch, sales campaign, promotions	committed	IN PROGRESS	6		
Telehouse Agreement Projects: Migrate all members from N10 to N9	committed	IN PROGRESS	8		
Telehouse Agreement Projects: Migrate all existing LINX infrastructure (ILKs)	committed		10		
LD6 Member migrations: Migrate all 100G & 10G members from LON1 LD4 to LD6	committed	IN PROGRESS	9		
LD6 Member migrations: Review plan to migrate 1G members on LON1 LD4 to LD6	committed		5		
Security programme: Present architectural design for SSO	committed		6		
Security programme: Collaborate with HHD to architect a replacement FW2	committed		7		
LINX 108 hosting & connectivity	committed	IN PROGRESS	9		
Euro-IX meeting hosting & connectivity	committed		6		
EPF meeting hosting & connectivity	committed		9		
RPKI Deployment: Deploy RPKI for LINX Manchester	committed	IN PROGRESS	10		
Route server migrations to ubuntu	committed	IN PROGRESS	10		
LON2 Automation-1: OcNoS 1.3.8 testing for NCA 2: code validation & 3: update MAC address in readiness for roll out in PI2	committed		7		
Test Junos 18.2xx bug fix release for MX10K and upgrade MX10K	committed		6		
Ocnos 1.3.6 SW 1: testing and 2: roll out on 5812's and replacement of memory module	committed	IN PROGRESS	9		
Old stats retirement 1: review of requirements and 2: replacement options	committed	IN PROGRESS	7		

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Projects – member facing & internal

Technology - prioritised epics and features

- Member Experience
 - Portal features and improvements
- Tools
 - Route Servers, Quagga to BIRD migrations
 - RPKI deployment
 - Route server, looking glass migration to Alice
 - Route collector, looking glass migration to Alice
- New Services & Products
 - Private VLAN, close user groups, new product offering
 - Private VLAN, added reseller functionality
 - IX-API phase 2 development

Technology - prioritised epics and features

> Systems

- > Billing systems replacement
- > Service inventory externalization project

> Company performance

- > Business impact analysis, BCP and risk

> Datacentres

- > Telehouse partnership (various features)
- > Equinix, slough, LD6 build
- > NoVA, evoswitch migration to Iron mountain
- > New site in linx-wales
- > 4th site in linx-manchester go-live

Technology - prioritised epics and features

- Keeping the network going
 - Junos upgrades
 - Optical transmission deployment, smartoptics, LON2
 - MX10K project, clean up and snagging
 - MX10K project, PTX removal
 - EVPN validation and PoC review
 - Hardware replacement for network probes
- Efficiencies
 - LON2 automation improvements

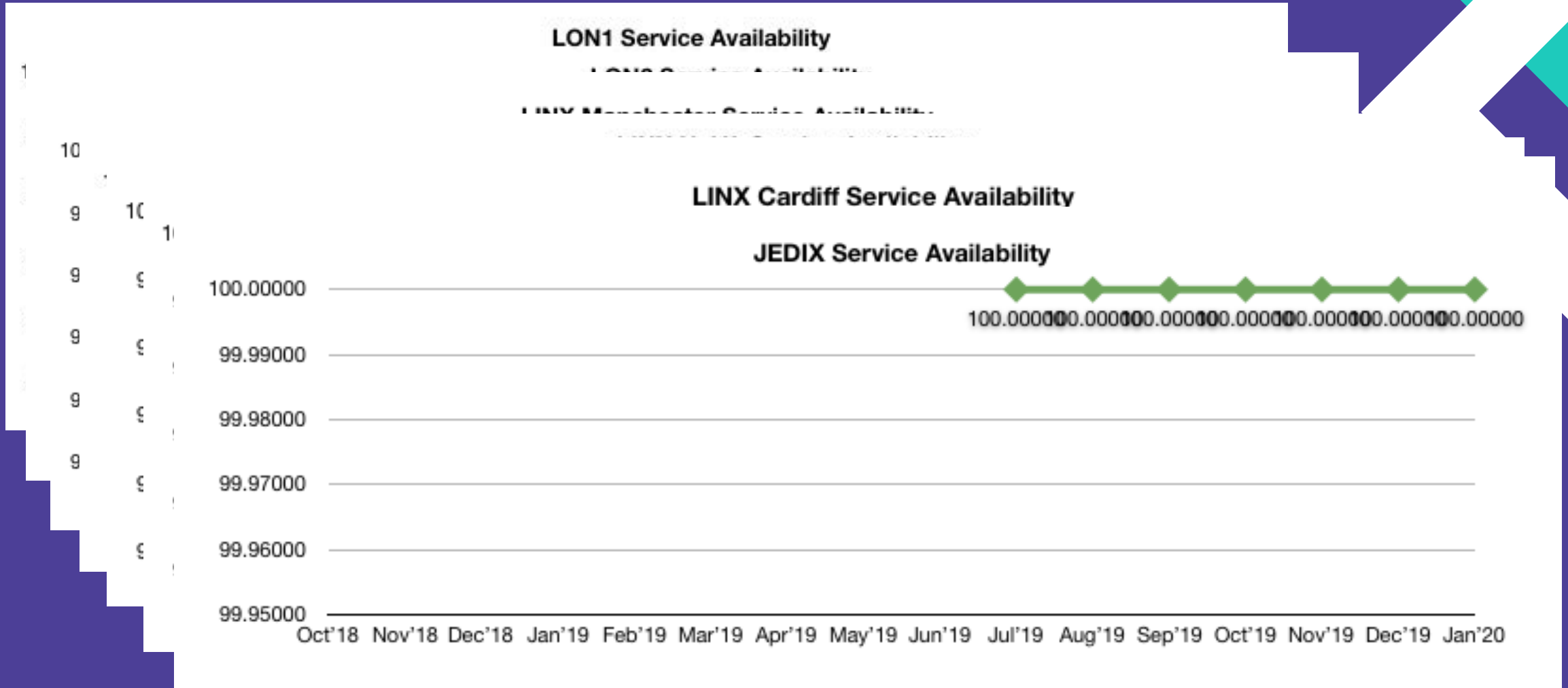
Technology - prioritised epics and features

- Plus a number of non-technology epics and features across, finance, sales, marketing and events planning

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Service issues

Network availability



Service issues

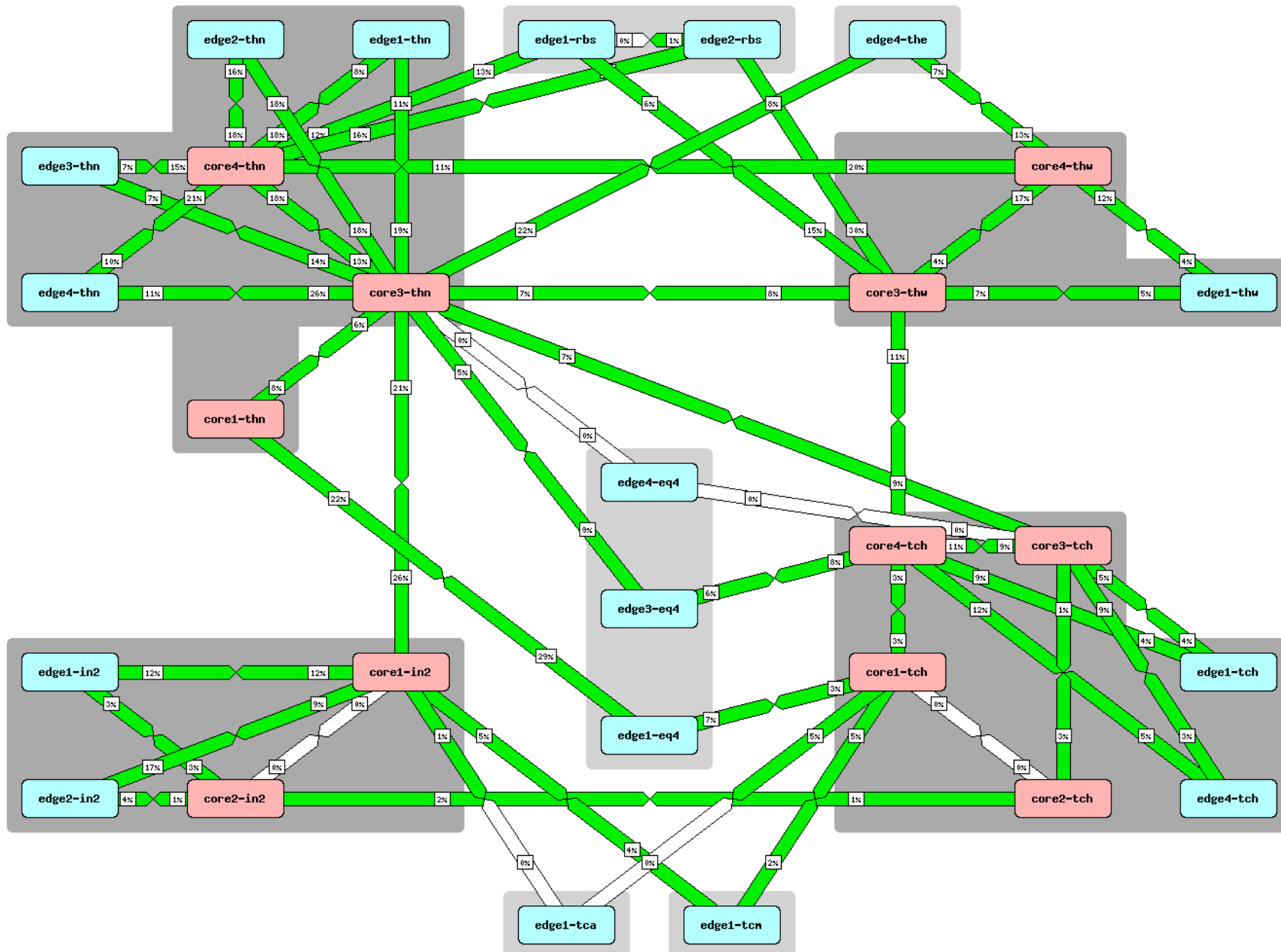
- 10/Dec/2019 – LON1: BGP flap on rs3.linx.net
 - Triggered by invalid BGP large community, resulting in a number of member BGP sessions being reset
- 24/Jan/2020 - LON1: Brief member outage on edge1-thn
 - Caused by a crash of the member facing linecard (16x10G, Agent Smith) in Slot 2 of the edge router
- 19/Feb/2020 – LON1: Packet loss caused by PFE crash on core3-tch
 - Hardware error on one of the PFEs on a 24x100G linecard. Resulting effort to clear the issue resulted in packets being black holed on impacted ports

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Network developments

Network developments

- LON1
 - Continuation of our MX10k network project
 - All MX10K routers fully in Service
 - Further PTXs removed from network

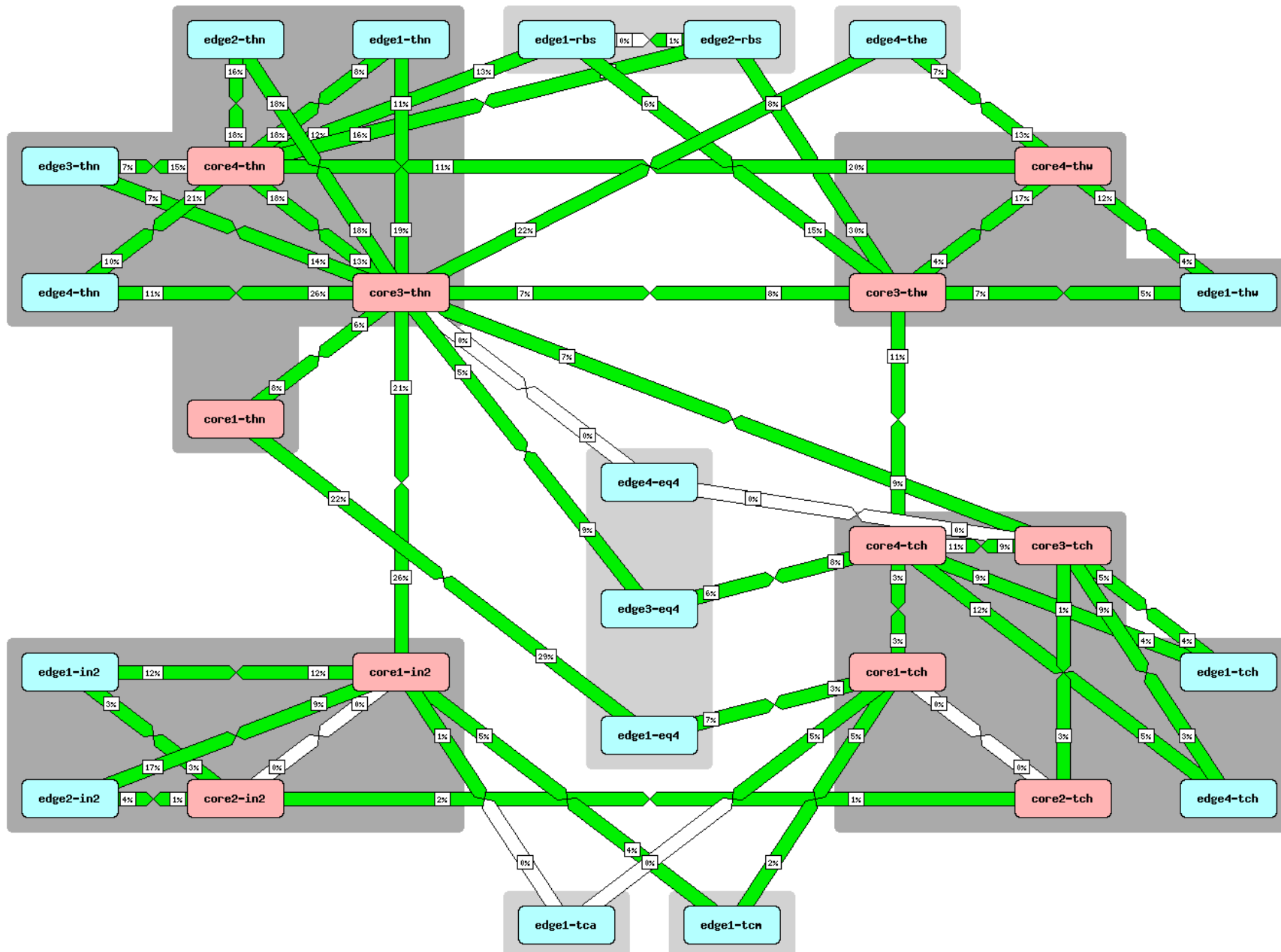


Network developments - Telehouse East

- Consolidation of Rack Space in Telehouse East and simplification of network
 - We currently have two suites in TFM50 (Telehouse East)
 - New LON1 Edge router has been installed in N9
 - All members from edge1, edge2 and edge 3 in N10 have been moved to the new edge router (edge4-the)

Network developments – Equinix Slough

- Capacity increase at Equinix Slough
 - Existing setup consisted of original racks in LD4 and a single separate rack on the first floor in LD4 used for 100G ports on LON1
 - New racks in LD6 together with two new High Density Edge routers deployed in LD6
 - All LON1 100G member ports have been migrated to LD6
 - Single rack at LD4 fully decommissioned and handed back to Equinix
 - Existing LON1 10G members will be moved to LD6 over coming weeks



Network developments

- Manchester
 - New site at the Teledata site fully in service
 - Initial build consists of two Extreme Networks X670 switches, providing 1G and 10G service
 - Connected at 4x10G initially

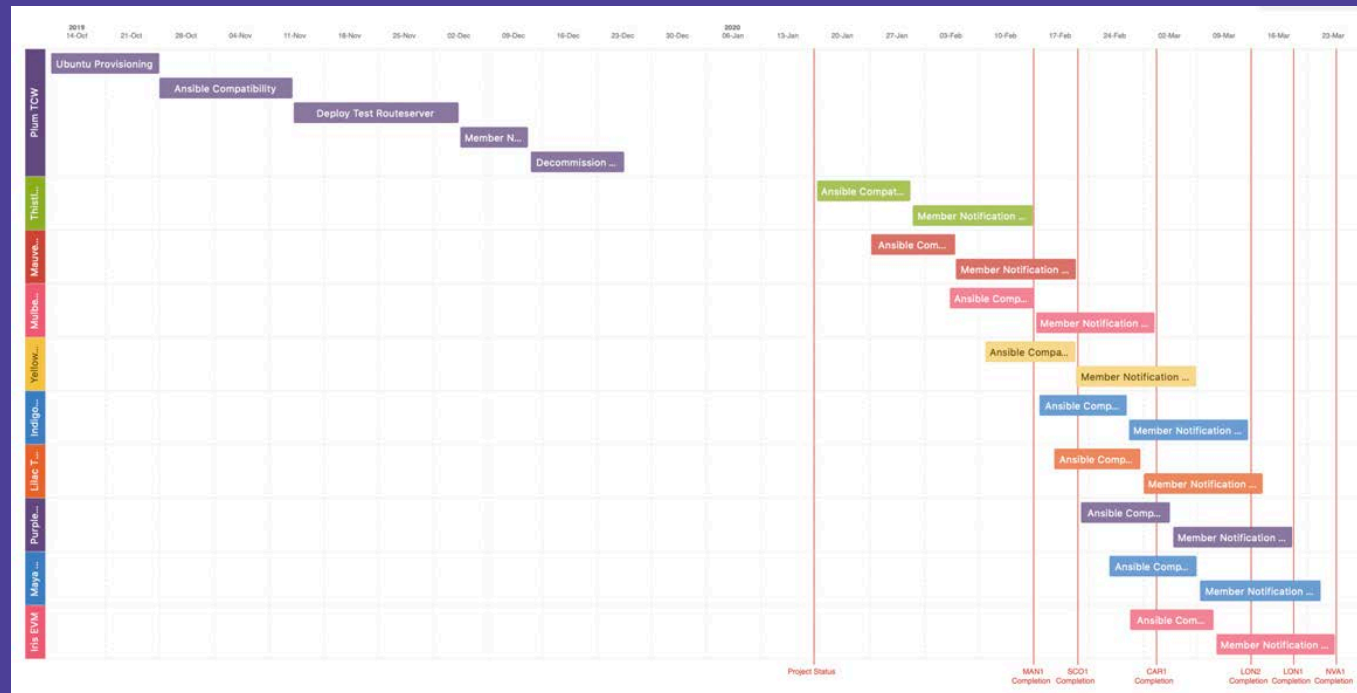
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Tooling and services

Tooling and services

➤ Route Servers

- Retiring of Quagga and move to Ubuntu as OS
- Full automation of config generation based on data from Services database



Server	Type	LAN	IPv4 Address	IPv6 Address
rs1.lon1	BIRD	LINX LON1	195.66.225.230	2001:7f8:4::220a:1
rs3.lon1	Quagga	LINX LON1	195.66.225.231	2001:7f8:4::220a:2
rs2.lon2	BIRD	LINX LON2	195.66.237.231	2001:7f8:4:1::220a:1
rs4.lon2	Quagga	LINX LON2	195.66.237.230	2001:7f8:4:1::220a:2
rs1.man1	BIRD	LINX Manchester	195.66.244.230	2001:7f8:4:2::220a:1
rs2.man1	BIRD	LINX Manchester	195.66.244.231	2001:7f8:4:2::220a:2
rs1.car1	BIRD	LINX Cardiff	195.66.228.230	2001:7f8:4:4::220a:1
rs1.sco1	BIRD	LINX Scotland	195.66.246.230	2001:7f8:4:3::220a:1
rs1.nva1	BIRD	LINX NoVA	206.55.196.230	2001:504:31::220a:1
rs2.nva1	Quagga	LINX NoVA	206.55.196.231	2001:504:31::220a:2

RPKI on Route Servers

- RPKI deployed in combination with the existing IRR based validation
- We are using Routinator to build a ROA table from the IRR trust anchors
- A prefix is only passing validation in the following 2 scenarios:
 - Scenario 1
 - The prefix has a valid origin ASN in the AS-SET (IRR)
 - RPKI returns Valid
 - Scenario 2
 - The prefix has a valid origin ASN in the AS-SET (IRR)
 - The prefix has a correct route-object and is part of the AS-SET (IRR)
 - RPKI returns unknown
- Result of tests always shown through the tagged communities

RPKI on Route Servers

Fully deployed on Manchester Route Servers on February 20th.

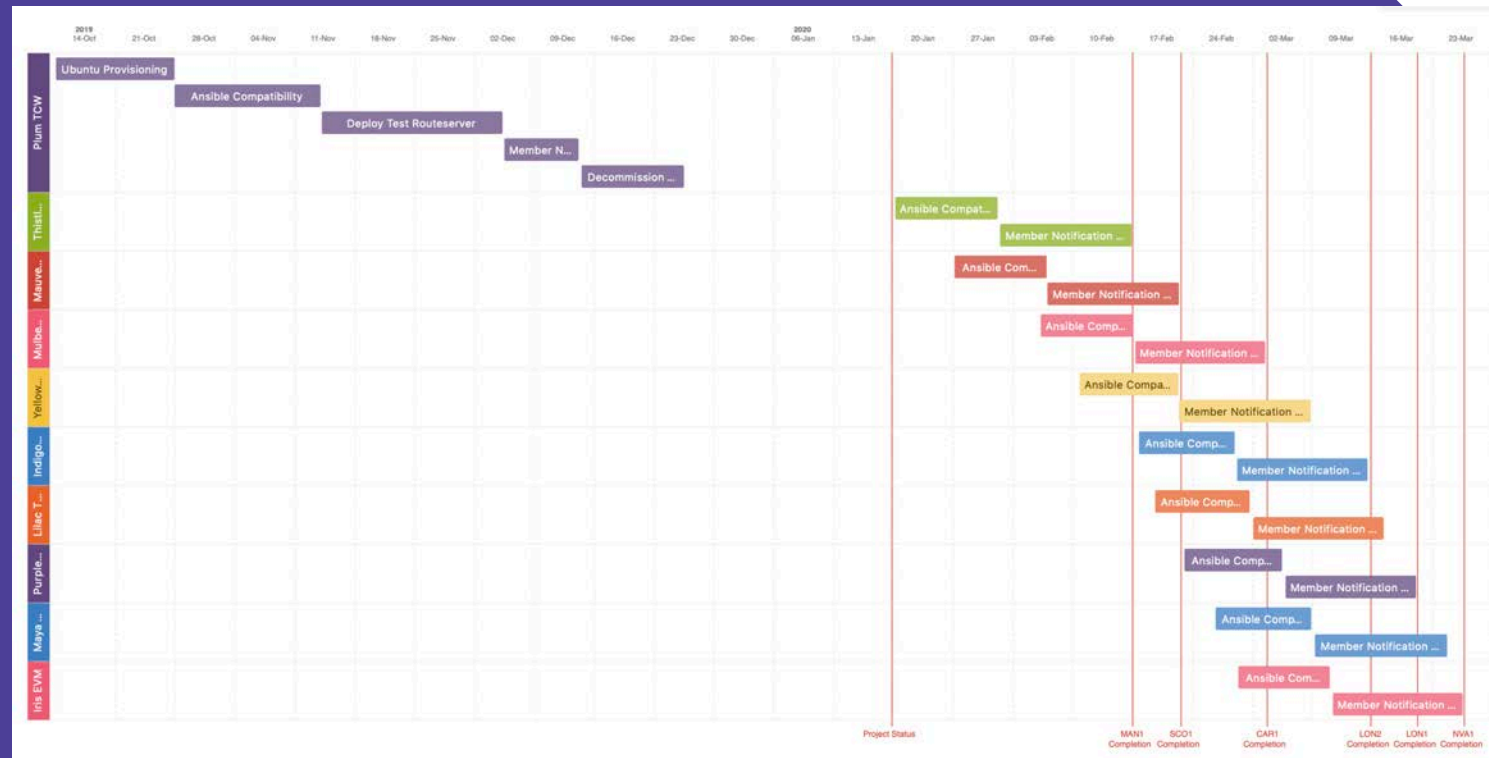
Route Server	Prefixes seen	Passing Validation	Valid OriginAS and RPKI Valid	Valid Origin, valid route object and RPKI Unknown
rs1.man1	79770	63333	13188	50114
rs2.man1	79082	62649	12977	49672

Before RPKI

rs1.man1	78777	61410	n/a	n/a
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RPKI on Route Servers

All other LANs will be completed over the coming weeks and completed by end of March.



Looking Glass, Collectors,

- Next steps of the project:
 - Replacing existing Looking Glass with Alice-LG
 - LAB testing and system integration is being completed at the moment
 - Work expected to start during next Program Increment (PI)
 - Replacing Cisco based Route Collectors with Bird and at the same time also moving to Alice-LG for collectors
- As part of the Portal improvements, Members will get access to their route server specific data and settings



Thank you

