Network Configuration Automation at LINX
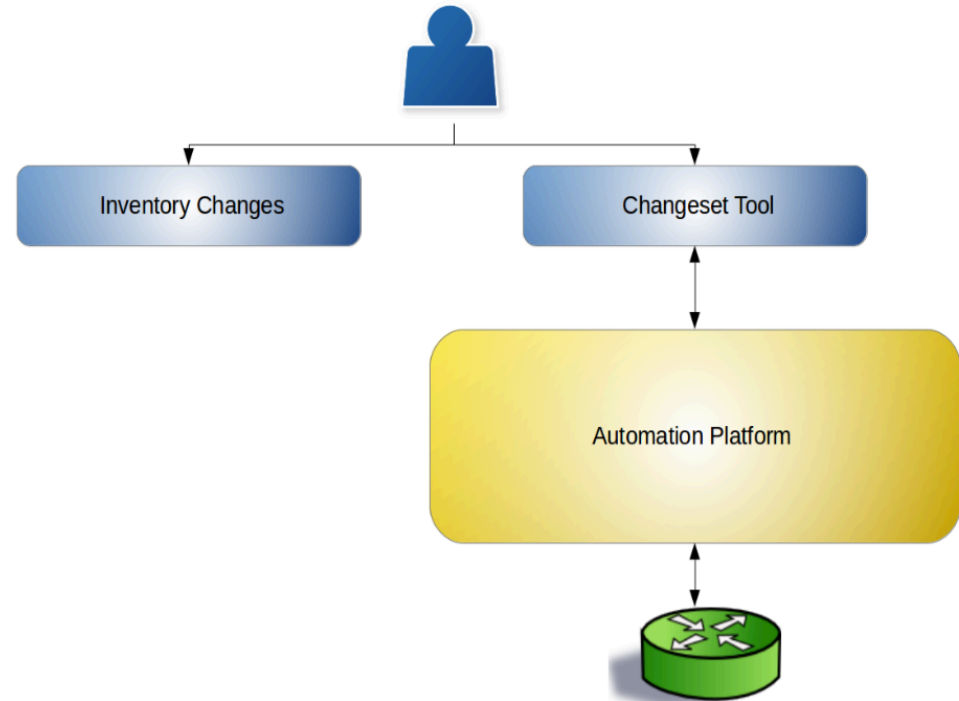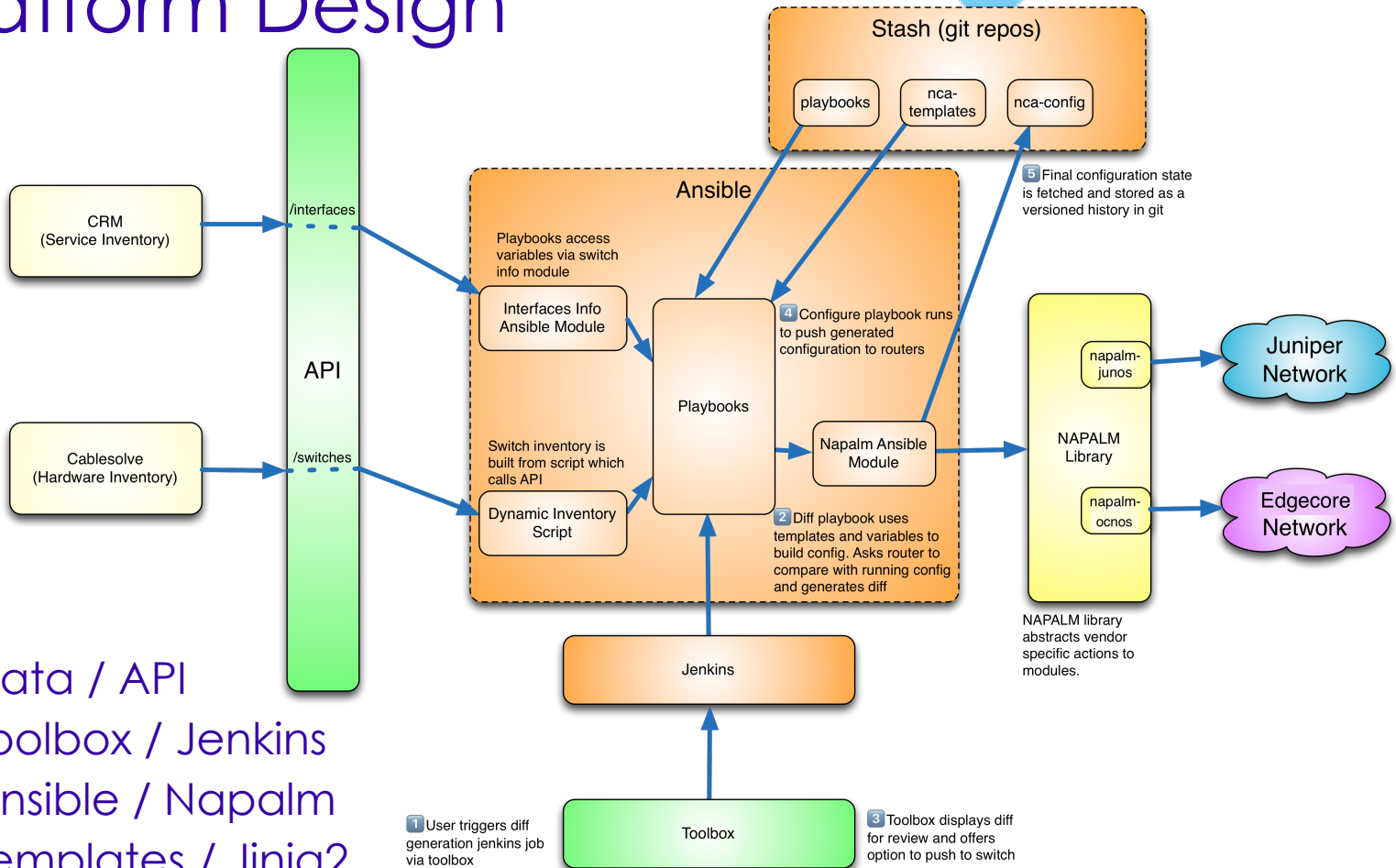
A Data Driven approach to
Network Configuration

User Journey

› **Inventory Data changes**

› **Changeset Tool**
    › Select LAN / Device(s)
    › Generate new Diffs
    › Review the Diffs
    › Deploy the new configs

Platform Design

> › Data / API
> › Toolbox / Jenkins
> › Ansible / Napalm
> › Templates / Jinja2
> › Git / Log server

Stash (git repos)
- playbooks
- nca-templates
- nca-config

CRM (Service Inventory)

Cablesolve (Hardware Inventory)

API
- /interfaces
- /switches

Ansible

Playbooks access variables via switch info module

Interfaces Info Ansible Module

Switch inventory is built from script which calls API

Dynamic Inventory Script

Playbooks

5 Final configuration state is fetched and stored as a versioned history in git

4 Configure playbook runs to push generated configuration to routers

Napalm Ansible Module

2 Diff playbook uses templates and variables to build config. Asks router to compare with running config and generates diff

NAPALM Library
- napalm-junos
- napalm-ocnos

NAPALM library abstracts vendor specific actions to modules.

Juniper Network

Edgecore Network

Jenkins

Toolbox

1 User triggers diff generation jenkins job via toolbox

3 Toolbox displays diff for review and offers option to push to switch

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Challenges

› **Cross team project**
  › Software
  › Network
  › Systems

› **Knowledge share**
  › Network configuration
  › Development practices
  › Hands on workshops

› **Preparation / Validation**
  › Data model review
  › Validation of existing data
  › Review of processes
  › Evaluation / Testing
  › Template generation

› **Safeguards**

› **Future development**

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Safeguards

- **Locking mechanism**
  - API / Ansible

- **Jenkins jobs / Ansible**
  - Logs, Serialized deploys, Limits

- **Timings / Race conditions**
  - Diff => Deploy

- **Validations**

- **Manual configurations**

- **Logs**
  - API, Changeset tool
  - Template changes
  - Config changes
  - Deploy history

- **Permissions**
  - Access to tools
  - Ability to perform changes

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Developments

› **Dedicated test environments**
  › Data (dedicated physical and service inventory systems)
  › Changeset tool (user, integration)
  › API / Data changes (fixed data set – expected result)
  › Template development (Virtual and Physical lab devices)

› **Automated tests**
  › Software Devs: API changes, Changeset tool, Ansible modules
  › Network Devs: Template changes (Prs, Automated tests)

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Initial Metrics (LON1)
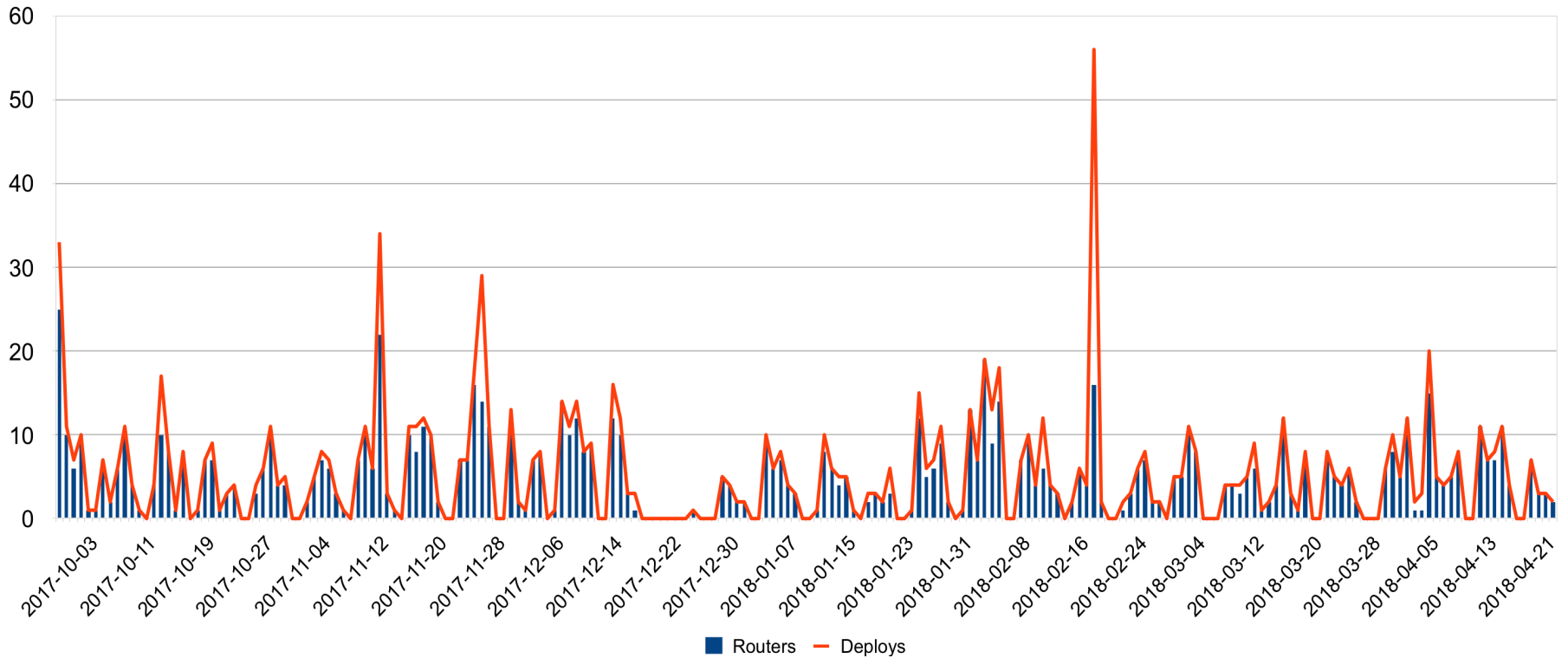
Any Questions?

Thank you
for your attention
for further questions, email: eleni@linx.net and riccardo@linx.net

marketing@linx.net 07133 207705 facebook.com/LondonInternetExchange twitter.com/linx_network linkedin.com/company/linx