HEAnet status report
TNC2025 - Brighton

Workflow Orchestrator
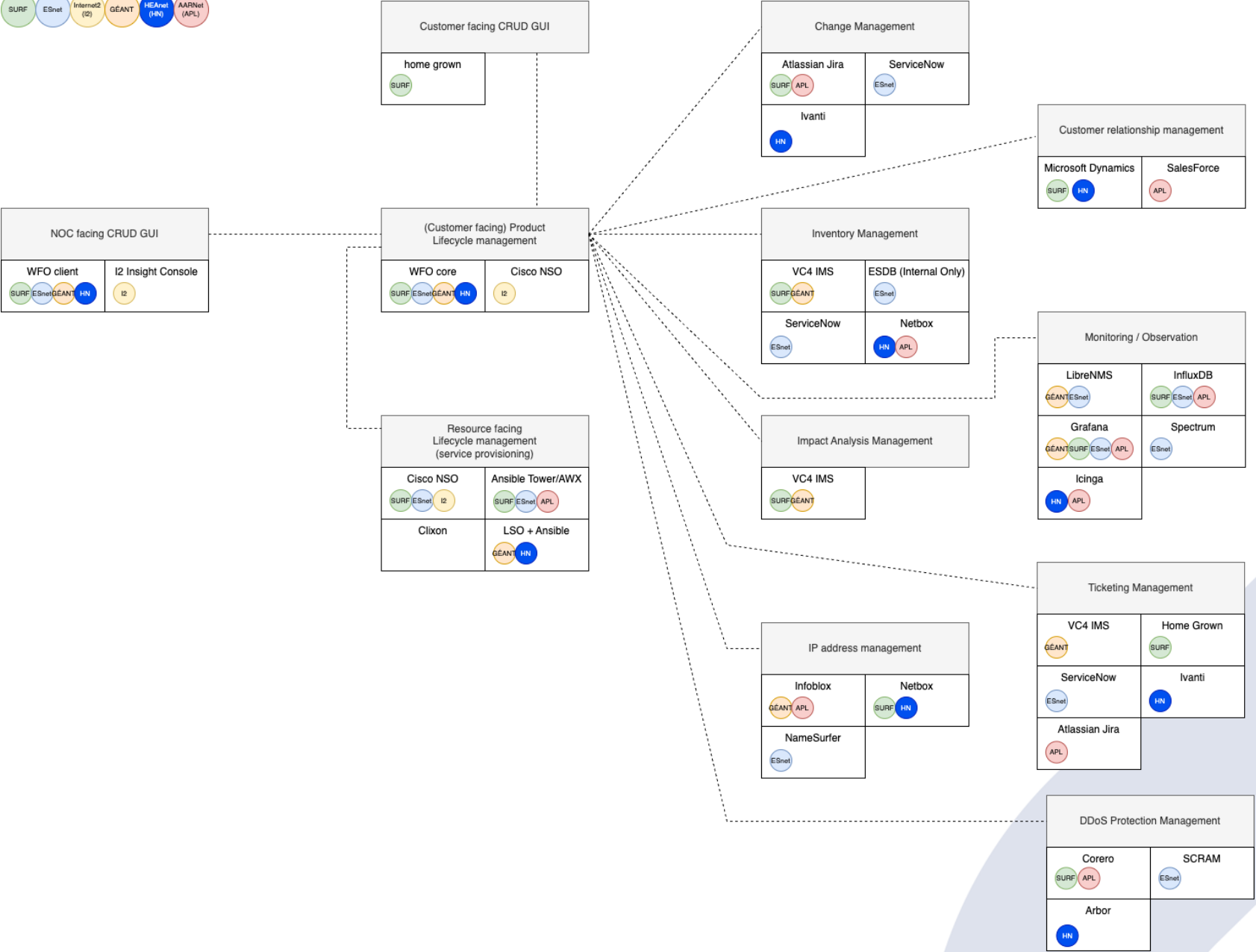
The OSS/BSS Stack

GNA-G Automation Working Group
Overview of automated components in use at the GNA-G Automation Working Group participating NRENs
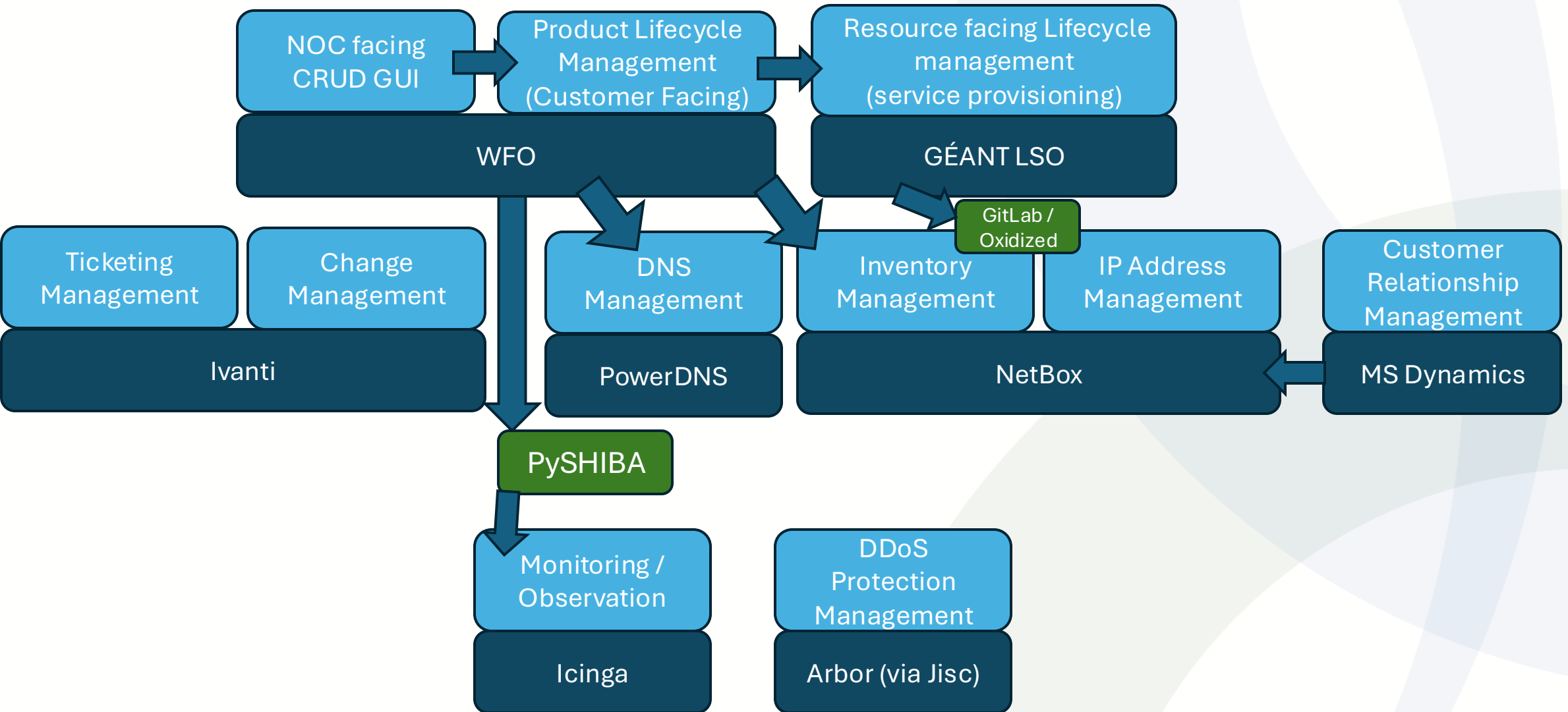**version 4 - may 2024**

please note that components are only listed if actually used in the automation process to deliver services to customers

Included NRENs in this version are (if available links to architecture mappings are included):

SURF | ESnet | Internet2 (I2) | GÉANT | HEAnet (HN) | AARNet (APL)

Customer facing CRUD GUI
- home grown — SURF

NOC facing CRUD GUI
- WFO client — SURF ESnet GÉANT HN
- I2 Insight Console — I2

(Customer facing) Product Lifecycle management
- WFO core — SURF ESnet GÉANT HN
- Cisco NSO — I2

Resource facing Lifecycle management (service provisioning)
- Cisco NSO — SURF ESnet I2
- Ansible Tower/AWX — SURF ESnet APL
- Clixon
- LSO + Ansible — GÉANT HN

Change Management
- Atlassian Jira — SURF APL
- ServiceNow — ESnet
- Ivanti — HN

Inventory Management
- VC4 IMS — SURF GÉANT
- ESDB (Internal Only) — ESnet
- ServiceNow — ESnet
- Netbox — HN APL

Impact Analysis Management
- VC4 IMS — SURF GÉANT

IP address management
- Infoblox — GÉANT APL
- Netbox — SURF HN
- NameSurfer — ESnet

Customer relationship management
- Microsoft Dynamics — SURF HN
- SalesForce — APL

Monitoring / Observation
- LibreNMS — GÉANT ESnet
- InfluxDB — SURF ESnet APL
- Grafana — GÉANT SURF ESnet APL
- Spectrum — ESnet
- Icinga — HN APL

Ticketing Management
- VC4 IMS — GÉANT
- Home Grown — SURF
- ServiceNow — ESnet
- Ivanti — HN
- Atlassian Jira — APL

DDoS Protection Management
- Corero — SURF APL
- SCRAM — ESnet
- Arbor — HN

HEAnet — Ireland's National Education & Research Network

CONNECTING EDUCATION EMPOWERING RESEARCH

HEAnet OSS/BSS 2025

Workflow Orchestrator facts

- UI version **2.14.0** in Production (as at end of May 2025)

- Orchestrator Core version **3.1.1** (without web sockets and celery for the moment but this is changing imminently).

- **25** different products

Total number of products
25

- **52** different workflows (All Create and Terminates in active use, Modify and Validate workflows are still a WIP)

- **1426** active subscriptions in PRODUCTION!

Total active subscriptions
1426

Tasks Completed since TNC 2024 (via automation)

- Imported **282 routers** as new node subscriptions which have subsequent entries in NetBox and PowerDNS and the various monitoring systems, etc.

- Imported **663 client ports** added as subscriptions with equivalent entries updated in NetBox and PowerDNS

- All day-to-day client-facing services (not inclusive of data centre currently) are provisioned in production via a Workflow Orchestrator workflow!

- Contributed to the upstream ansible library a module to allow updating a GitLab repo via api in an ansible playbook – **kudos Anna Wilson**
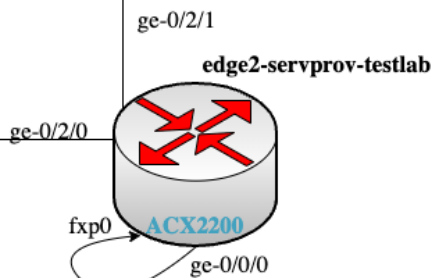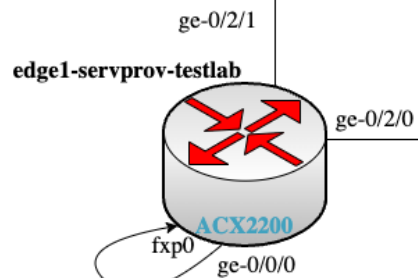
Demo
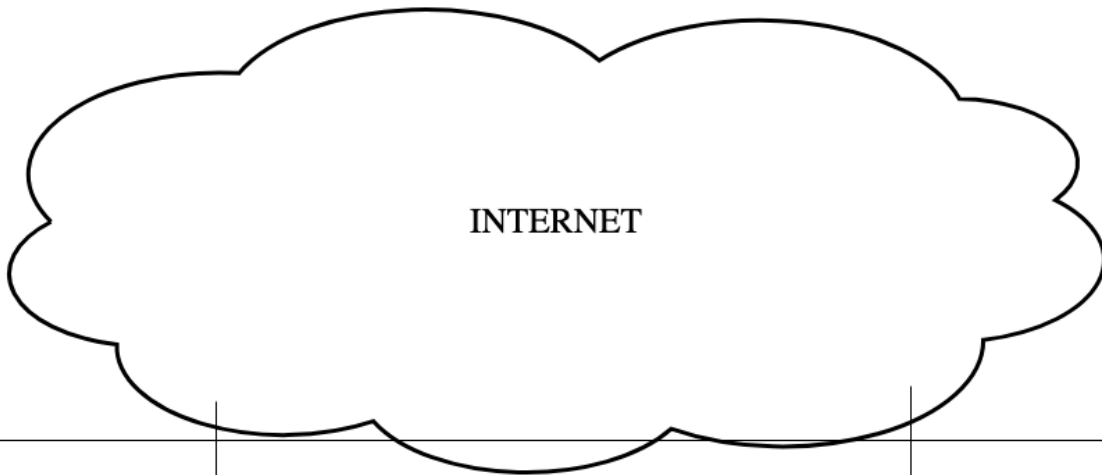
DEMO Network

2x Juniper ACX2200 routers

Both routers running MPLS

Both within the same test ASN

Each fxp0 looped back to ge-0/0/0

Left terminal:

```
ssh edge1-servprov-testlab

        +---------------------------------------------+
        |                                             |
        |                  HEAnet Ltd.                |
        |                  -----------                |
        |                                             |
        |             edge1-servprov-testlab          |
        |     Service Provision Project Testlab, RACK5, ND2
        |                                             |
        |                                             |
        |          Problems to: noc@heanet.ie         |
        |          Tel:   +353.1.6609040              |
        |          Fax:   +353.1.6603666              |
        |                                             |
        |          Unauthorised Access Prohibited     |
        |                                             |
        +---------------------------------------------+

(heanet@edge1-servprov-testlab) Password:
Last login: Tue Mar 18 16:14:46 2025 from 2001:770:b7::101d
--- JUNOS 20.4R3.8 built 2021-09-07 17:14:52 UTC
heanet@edge1-servprov-testlab> show configuration interfaces ge-0/0/0
description "(UN) Link to fxp0 on this router using 192.168.25.1/24";
mtu 9192;
encapsulation ethernet-ccc;

heanet@edge1-servprov-testlab>
```

Right terminal:

```
ssh edge2-servprov-testlab

        +---------------------------------------------+
        |                                             |
        |                  HEAnet Ltd.                |
        |                  -----------                |
        |                                             |
        |             edge2-servprov-testlab          |
        |     Service Provision Project Testlab, RACK5, ND2
        |                                             |
        |          Problems to: noc@heanet.ie         |
        |          Tel:   +353.1.6609040              |
        |          Fax:   +353.1.6603666              |
        |                                             |
        |          Unauthorised Access Prohibited     |
        |                                             |
        +---------------------------------------------+

(heanet@edge2-servprov-testlab) Password:
Last login: Tue Mar 18 16:14:50 2025 from 2001:770:b7::101d
--- JUNOS 20.4R3.8 built 2021-09-07 17:14:52 UTC
heanet@edge2-servprov-testlab> show configuration interfaces ge-0/0/0
description "(UN) Link to fxp0 on this router using 192.168.25.2/24";
mtu 9192;
encapsulation ethernet-ccc;

heanet@edge2-servprov-testlab>

heanet@edge2-servprov-testlab>
```

What do we plan to achieve before TNC26?

- Validation workflows (this is in pre-planning at present)
- Create, modify, terminate and validate workflows for the data centre network services
- Ad-hoc operation workflows e.g. RMA, traffic drain, etc.
- Migration of stack to Kubernetes (still Docker today)
- Repoint existing workflows to new downstream monitoring and observation tooling when live

HEAnet
Ireland's National Education & Research Network

CONNECTING
EDUCATION
EMPOWERING
RESEARCH

Learnings to Date

- Starting out takes time – 6 months for 1st meaningful workflow
- Team requires collaboration of Network Engineers + Developers
- Difficult to Outsource work
- Should have bulk loaded data earlier in project
- Collaboration with SURF/GEANT/ESNet has been invaluable

HEAnet
Ireland's National Education & Research Network

CONNECTING EDUCATION EMPOWERING RESEARCH