

# Automation at The Gathering

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Oslo, November 2023



# The Gathering?

- A gathering of thousands of youth in Vikingskipet every autumn
- For the digital hobbies
- “Norway cup for computer nerds”



# 100% volunteer work



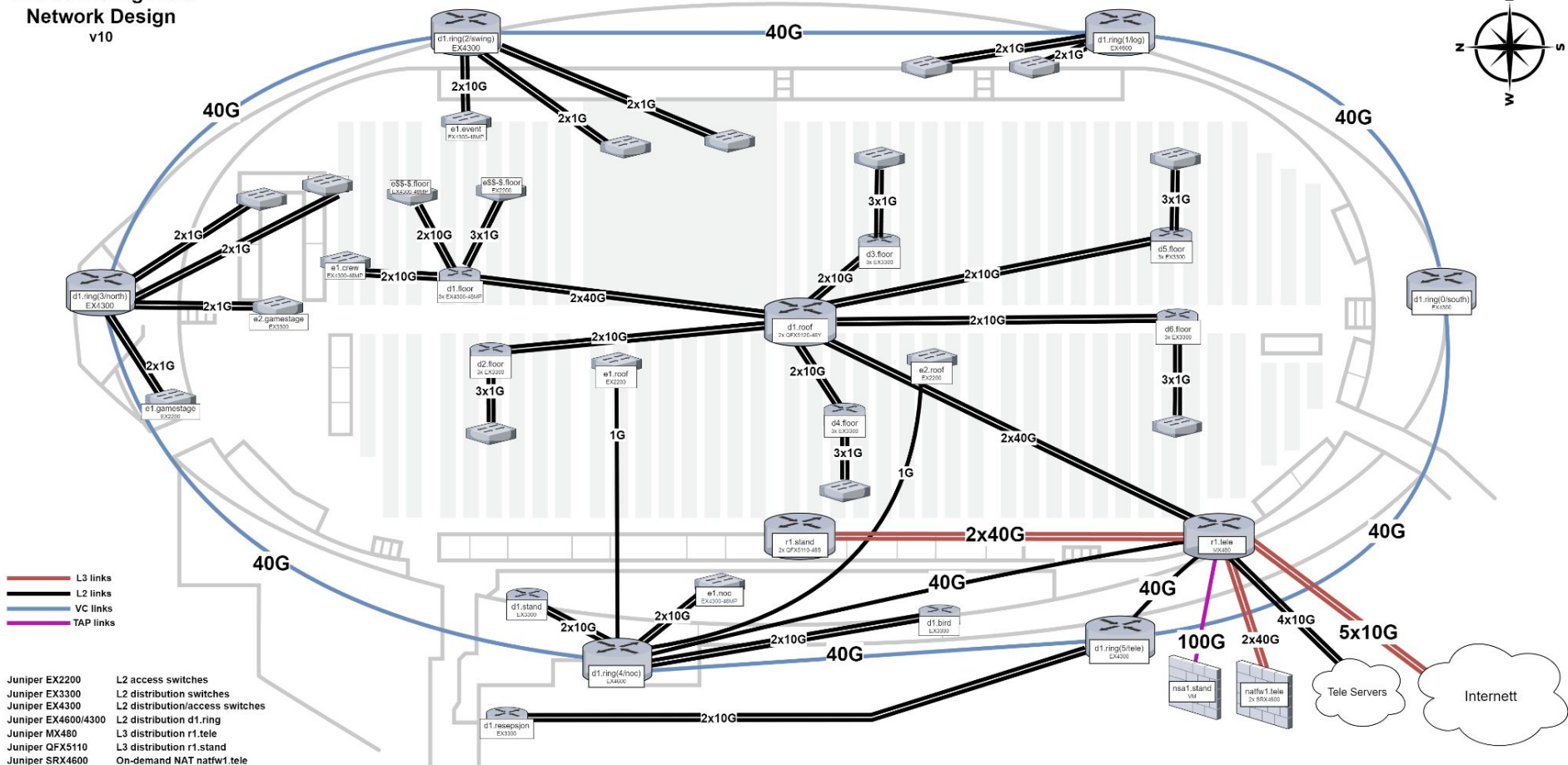
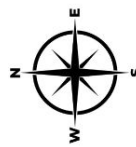
# The network in a nutshell

- “The floor”, 100+ aging EX2200s.
- “The rest”, 20-40 corner-case-deployments for support functions
- Core: Borrowed MX, some QFX for distribution, some EX3300/EX4300, more borrowed SRXes for CGNAT



# The Gathering 2023 Network Design

v10

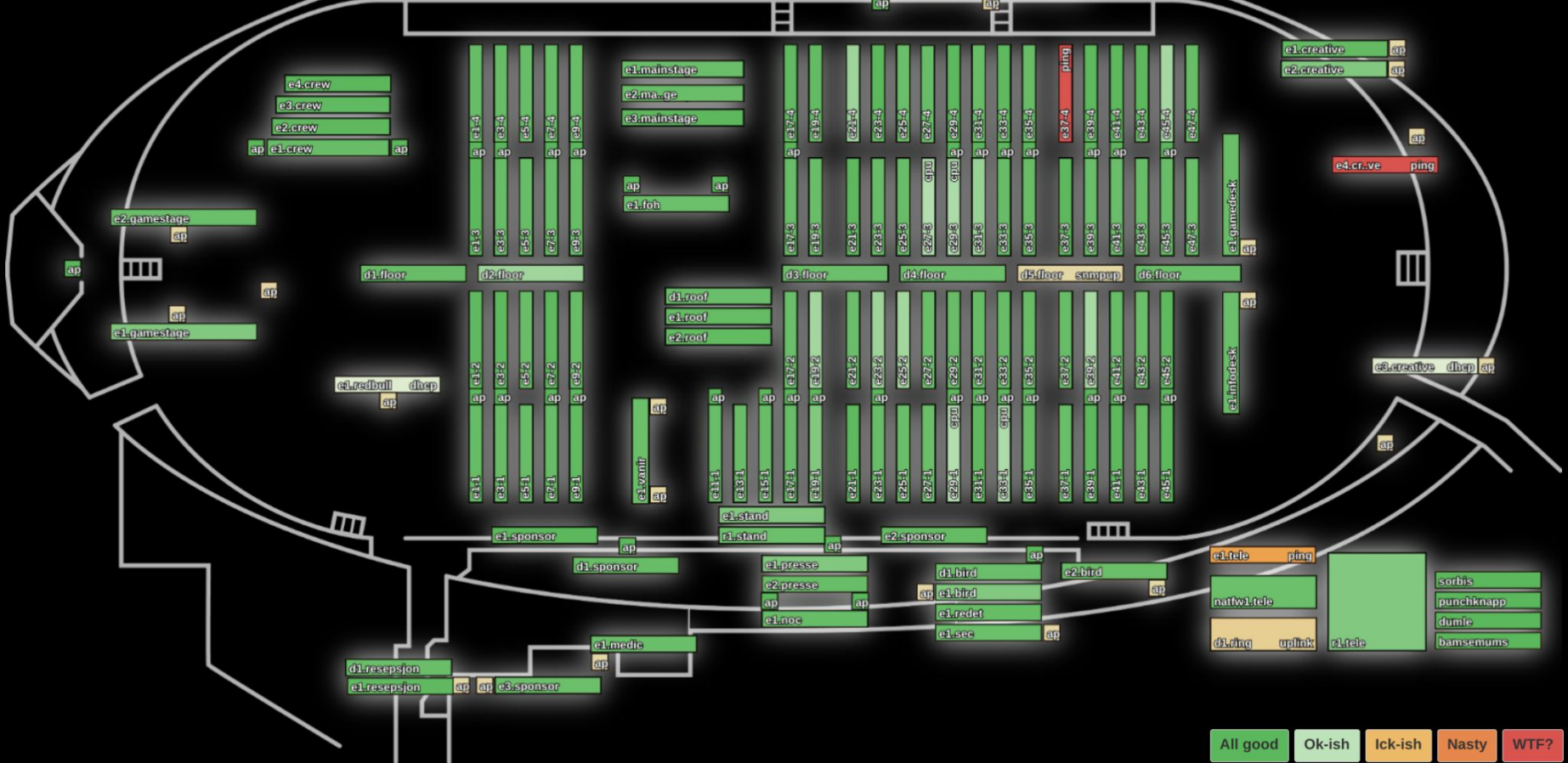


- L3 links
- L2 links
- VC links
- TAP links

- Juniper EX2200 L2 access switches
- Juniper EX3300 L2 distribution switches
- Juniper EX4300 L2 distribution/access switches
- Juniper EX4600/4300 L2 distribution d1.ring
- Juniper MX480 L3 distribution r1.ring
- Juniper QFX5110 L3 distribution r1.stand
- Juniper SRX4600 On-demand NAT natfw1.tele
- NSA nsa1.tele

Fri Apr 07 2023 18:00:00

# Health



# Constraints?

- A weekend to deploy everything!
- A day to tear it down again
- From 0 to thousands of VERY demanding (but polite!) users.
- Maximum a few hours to actually test it.
- VERY limited budget. We love our partners!



PETITION FOR  
INTERNET ~~FOR~~ BACK (PIs)

Olav B  
Lars V. Myhre  
Svend Oves  
Benjamin M. Simonsen  
Ole Jakobsen  
Vegar Myrnes  
Sindre  
Line  
Alexander  
STENT  
Knut Børhaug  
dudvig S. Hagberg  
Johannes L. E. Eriksen  
Markus T. H.  
Kevin Johansen

Jørgen J  
Hans Petter Austråttne  
Espen Fremstad  
Perk Røstad  
Jørgen Klemsen  
Leo Vindenes  
Sigurd Rognar  
Sebastian K  
Aleksander  
Knut  
Arne  
marcus  
Torbjørn

Danjer V  
Petter H.  
Johann GARDING  
Simon Gjørring  
Kristian  
Kaia

PETITION FOR INTERNET BACK (PIs) 1/2

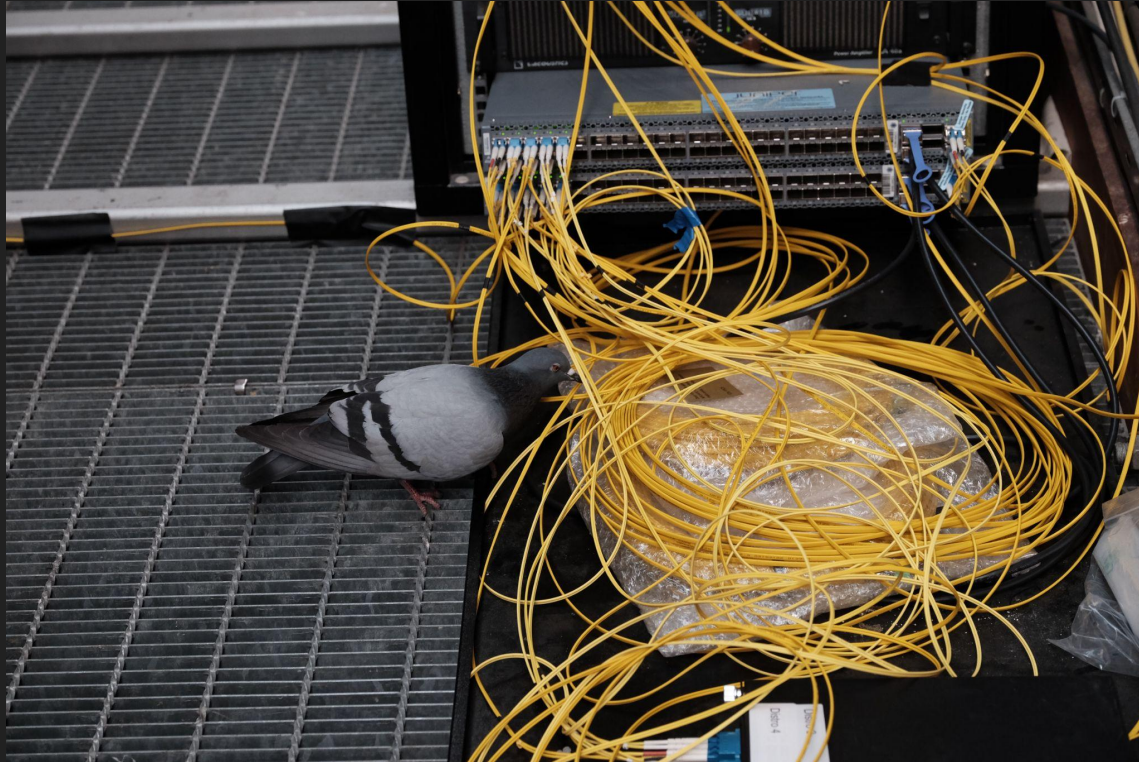
Maks Holm  
Børge O. O. O.  
Harald Steenslid  
Lasse Brekken  
Matthias Holm  
Jensin Holm  
Kristoffer Holm  
Johan Skovs  
Anders Ljung  
CHRISTINA HVIISTAD  
MARTIN ANDERSEN



# Oh, and some other constraints



# IP over Avian Carrier?



# Automate or go home

- Automation started with the identical floor switches. Zero touch provisioning, etc.
- Gradually expanded.
- TG23: 100% template-based, access to core



# Step 1: Inventory first

- Switched to Netbox for inventory. Planning is first done in confluence, then migrated to netbox.
- Home brew monitoring, used to be inventory too
- Jinja2 templates



# Inventory

- If it's not in netbox, it doesn't exist.
- Makes it trivial to quickly deploy new equipment
- Everything is standardized
- Makes it a nightmare to figure out what Sjur did with seven levels of nesting



# Templating

```
system {
  host-name {{ switch_name }};
  domain-name tg23.gathering.org;
  root-authentication {
    encrypted-password "{{ v.root_pw }}"; ## SECRET-DATA
  }
  name-server {
    {% for n in v.nameservers %}
    {{n}};
    {% endfor %}
  }
  tacplus-server {
    {{ v.tacplusserver }} {
      secret {{ v.tacplus_secret }}: ## SECRET-DATA
```



# Step 2: Zero touch provisioning

- Inventory knows what switch is connected where
- Deploy an access switch? Add it in nextbox, pick up a switch, plug it in, done.
- Adding a switch is scripted too
- How? DHCP, option 82 and templating.



# ZTP at TG15:

- Jonas **wrote** a DHCP server from scratch to support option 82 and whatnot. (Still amazes me)
- Now: Uses stock DHCP daemon, return a url pointing to our templating engine



# The important bit: GRADUAL introduction of automation

- We started with ztp on the edge switches used by participants and have very slowly, year over year, added more.
- Too much automation causes a high risk of complex troubleshooting



# Step 3: Ansible and more

- If a change is made to a template, we use ansible to re-deploy configuration (AWX).
- Re-deploy configuration on a single device?  
Single click in our monitoring solution.
- Feature request: Confirmation dialog.





M

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Filter

X

?

Go!

2906 IPv4 clients | 2086 IPv6 clients

## Switch info e31-3

Summary

Ports

SNMP

Links

Edit settings

Health (lower is better)	31 (Temp)
Management IP	151.216.130.80 / 2a06:5841:f:10:3::80
Management network	edge-mgmt.floor.r1.tele vlan: 666
Management subnet IPv4	151.216.130.0/24
Management subnet IPv6	2a06:5841:f:10::/64
Management net router	Not set
Traffic network	e31-3 vlan: 1553
Traffic subnet IPv4	88.92.13.64/26
Traffic subnet IPv6	2a06:5844:e:553::/64
Traffic net router	Not set
Uplinks (live/configured)	3 / 3
Client ports (live/total)	15 / 44
Non-uplink ports (live/total)	32 / 64
Temperature	31°C
Latency(ms)	8.611 (v4: 4.261 )
Distro-port	d3.floor ae-0/0/14.0 (👉 up!)



### Switch info e31-3

Summary Ports SNMP **Links** Edit settings

<http://gondul.tg23.gathering.org/api/templates/magic.conf/switch=e31-3> copy url

<http://185.110.148.105/api/templates/magic.conf/switch=e31-3> copy url

<http://gondul.tg23.gathering.org/api/write/fap/e31-3> copy url

[ssh://\[2a06:5841:f10:3::80\]](ssh://[2a06:5841:f10:3::80]) copy url

<ssh://151.216.130.80> copy url



# Template development

- Pull-request based development
- Create pr, github actions compiles examples and shows `_compiled_diff`.



@@ -28,6 +28,21 @@ interfaces {

```
28     {% if 'multirate' in v.switch_tags %}
29     member-range ge-0/0/0 to ge-0/0/23;
30     member-range mge-0/0/24 to mge-0/0/43;
```

```
31     {% else %}
32     member-range ge-0/0/0 to ge-0/0/43;
33     {% endif %}
```

```
28     {% if 'multirate' in v.switch_tags %}
29     member-range ge-0/0/0 to ge-0/0/23;
30     member-range mge-0/0/24 to mge-0/0/43;
```

```
31 +     {% elif 'net-event-activites' and 'net-event-artnet' in
      v.switch_tags %}
32 +     member-range ge-0/0/0 to ge-0/0/27;
33 +     member-range ge-0/0/36 to ge-0/0/43;
34 +     {% elif 'net-location-beredskap' in v.switch_tags %}
35 +     member-range ge-0/0/0 to ge-0/0/23;
36 +     member-range ge-0/0/28 to ge-0/0/43;
37 +     {% elif 'net-event-activites' in v.switch_tags %}
38 +     member-range ge-0/0/0 to ge-0/0/27;
39 +     member-range ge-0/0/32 to ge-0/0/43;
40 +     {% elif 'net-event-artnet' in v.switch_tags %}
41 +     member-range ge-0/0/0 to ge-0/0/31;
42 +     member-range ge-0/0/36 to ge-0/0/43;
43 +     {% elif 'net-event-arena' in v.switch_tags %}
44 +     member-range ge-0/0/0 to ge-0/0/35;
45 +     member-range ge-0/0/40 to ge-0/0/43;
```

```
46     {% else %}
47     member-range ge-0/0/0 to ge-0/0/43;
48     {% endif %}
```

Attempt 1 - 2023-04-04T11:32:48

### Tech Templates Summary 📝

Please review the diffs below before merging the pull request.  
Only config scenarios that has changes will be shown here.  
This step HAS to be manually done as we cant lint junos configs automagically

👉 2 Changes, 0 Errors

### Changes

▼ 😊 s1.secbua - net-location-beredskap tag, wifi tag

```
diff --git a/s1.secbua_main.conf b/s1.secbua_new.conf
index 00889c3..c6a9af1 100644
--- a/s1.secbua_main.conf
+++ b/s1.secbua_new.conf
@@ -245,7 +245,8 @@ protocols {

  interfaces {
    interface-range edge-ports {
-     member-range ge-0/0/0 to ge-0/0/43;
+     member-range ge-0/0/0 to ge-0/0/23;
+     member-range ge-0/0/28 to ge-0/0/43;
      description "C: s1.secbua - VLAN 117";
      unit 0 {
        family ethernet-switching {
```



▶ 😊 s1.event - 10-uplink tag



# Questions?

