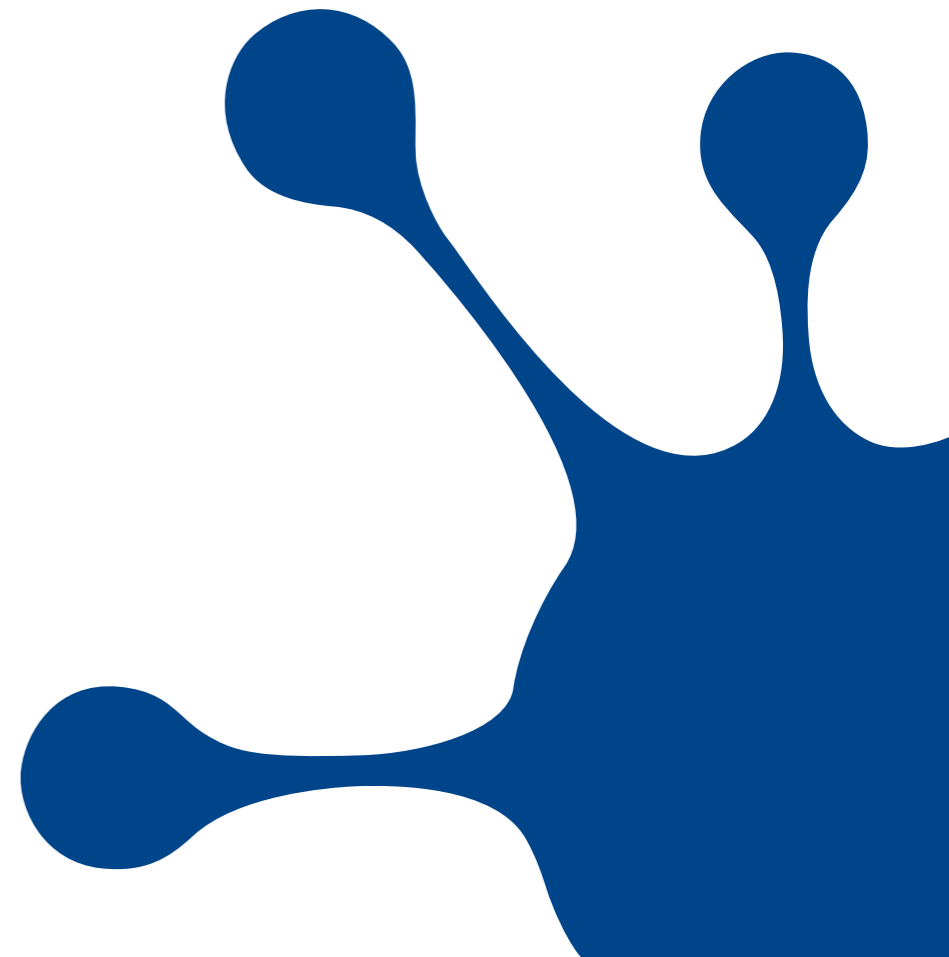
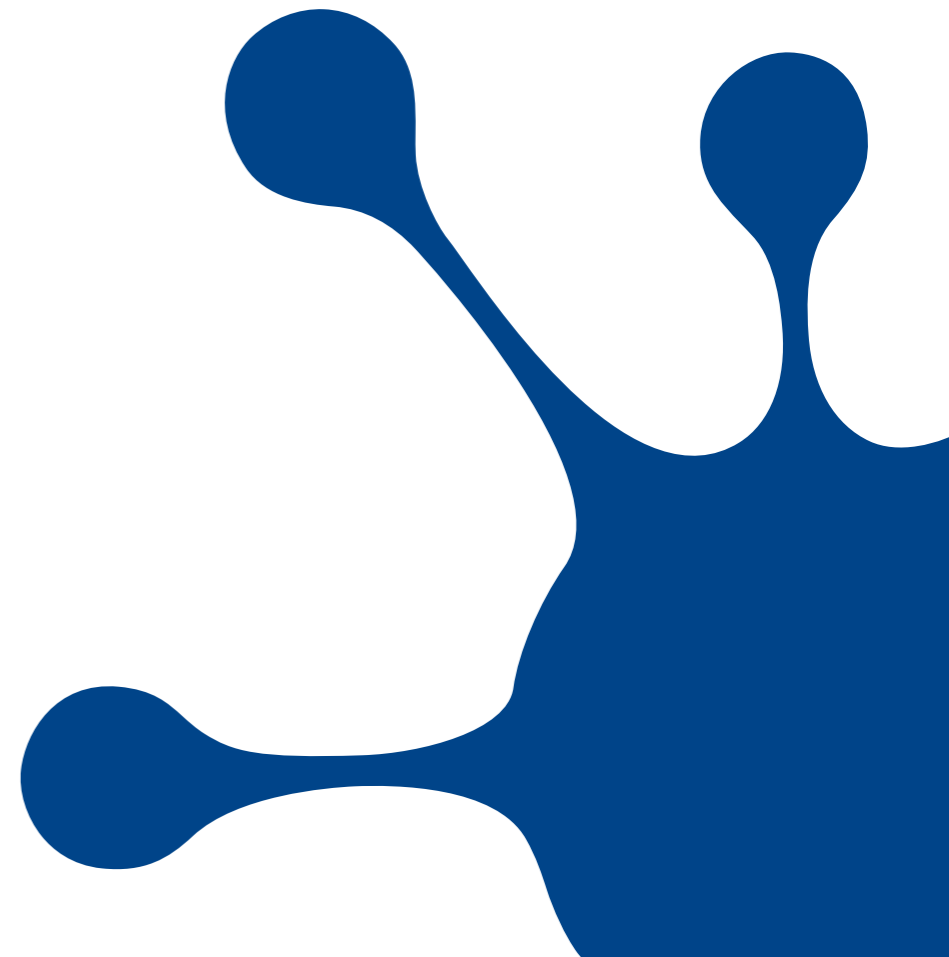


NETNOD MEMBERS MEETING

2014-10-01/02



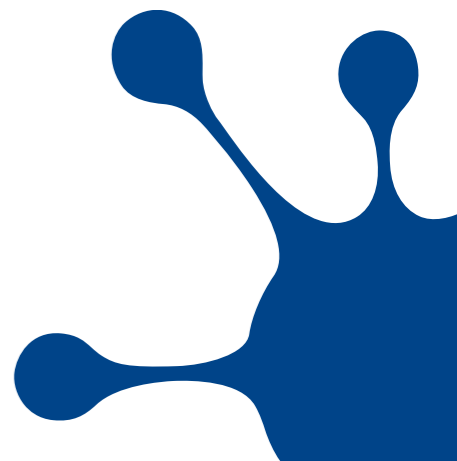
ACTIVITY UPDATE



Changes to the Netnod board

The TU-Foundation, owner of Netnod in June extended the Netnod board with four new members

- Represents a wider group of stakeholders



Netnod board extended!



DENNIS DAVIDSSON
CHAIRMAN OF THE BOARD



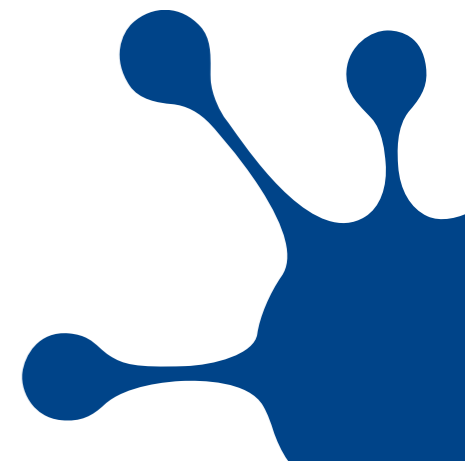
CHRISTIAN KAUFMANN
MEMBER OF THE BOARD



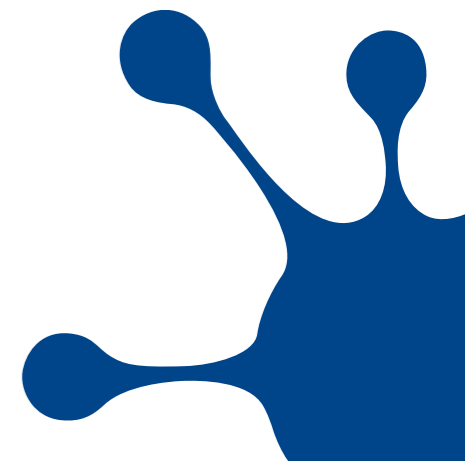
KAREN ROSE
MEMBER OF THE BOARD



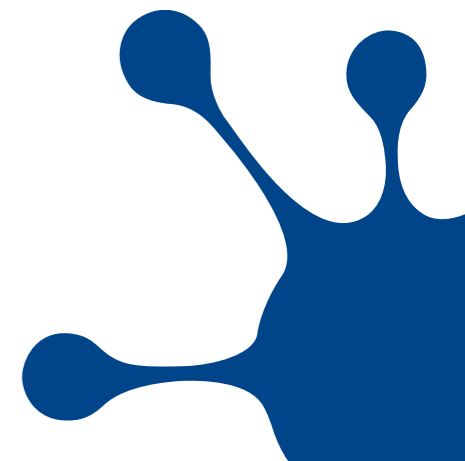
MATHIEU WEIL
MEMBER OF THE BOARD



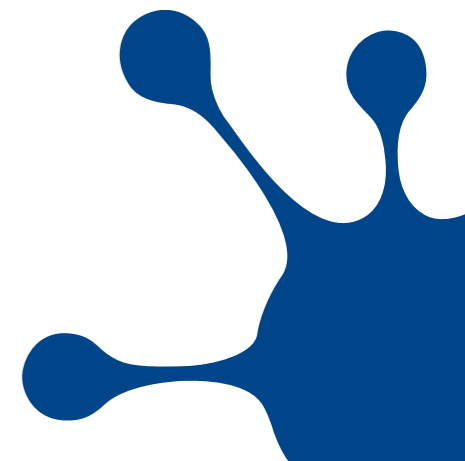
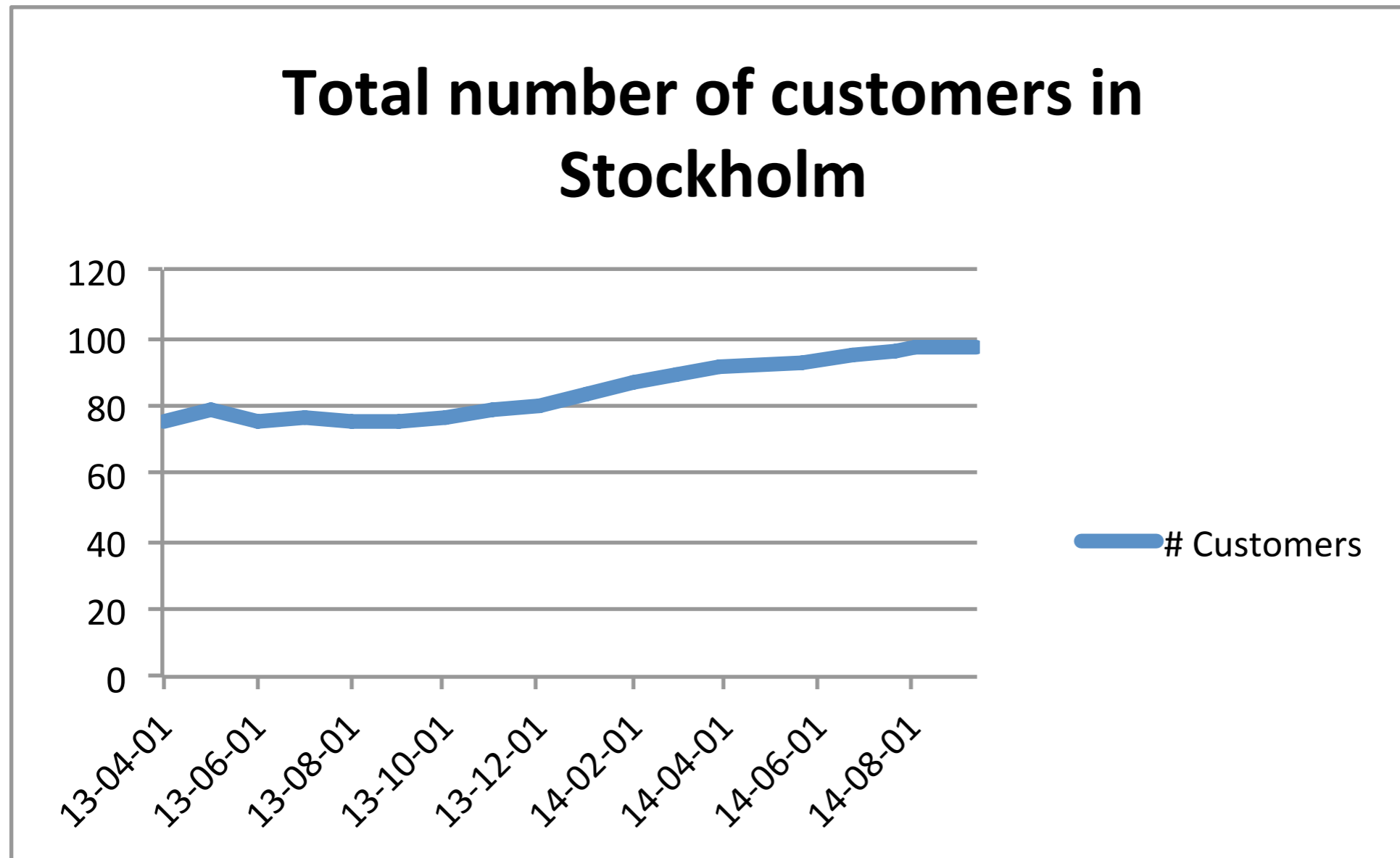
TU-Foundation board



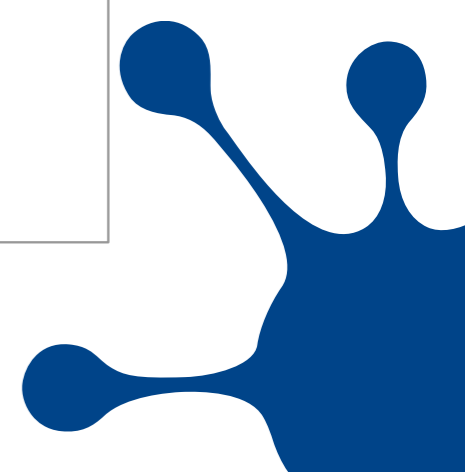
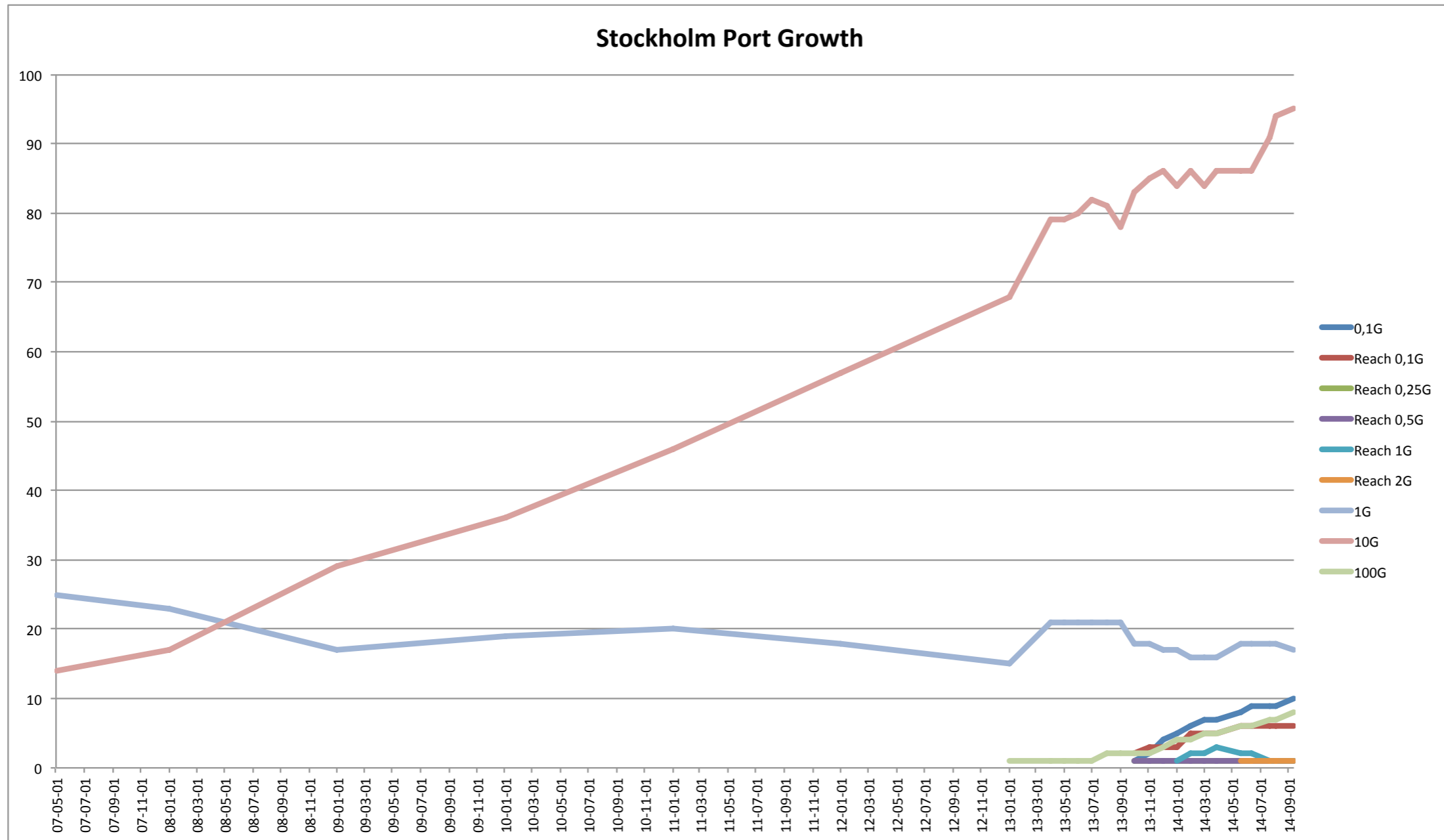
Complete Netnod board



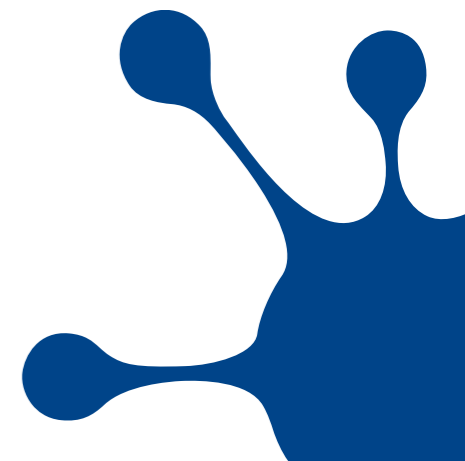
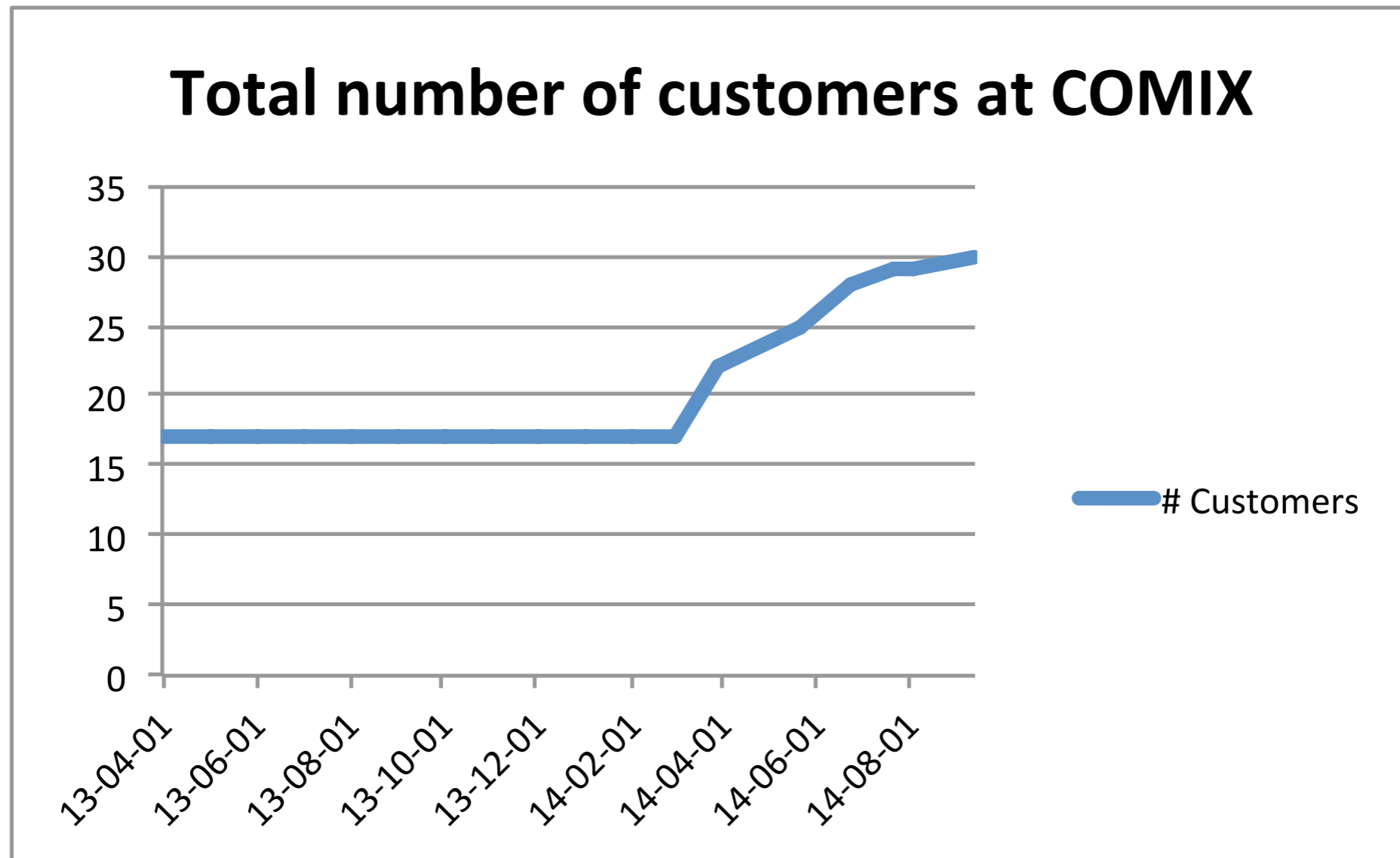
Stockholm customer growth



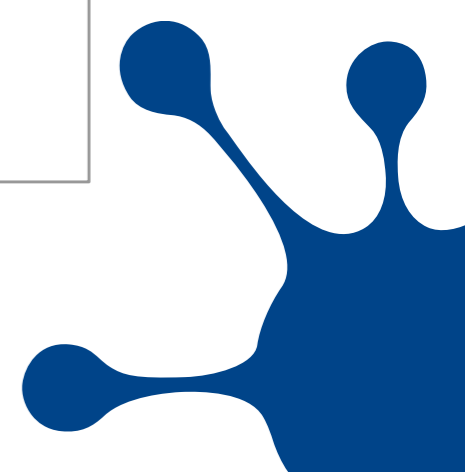
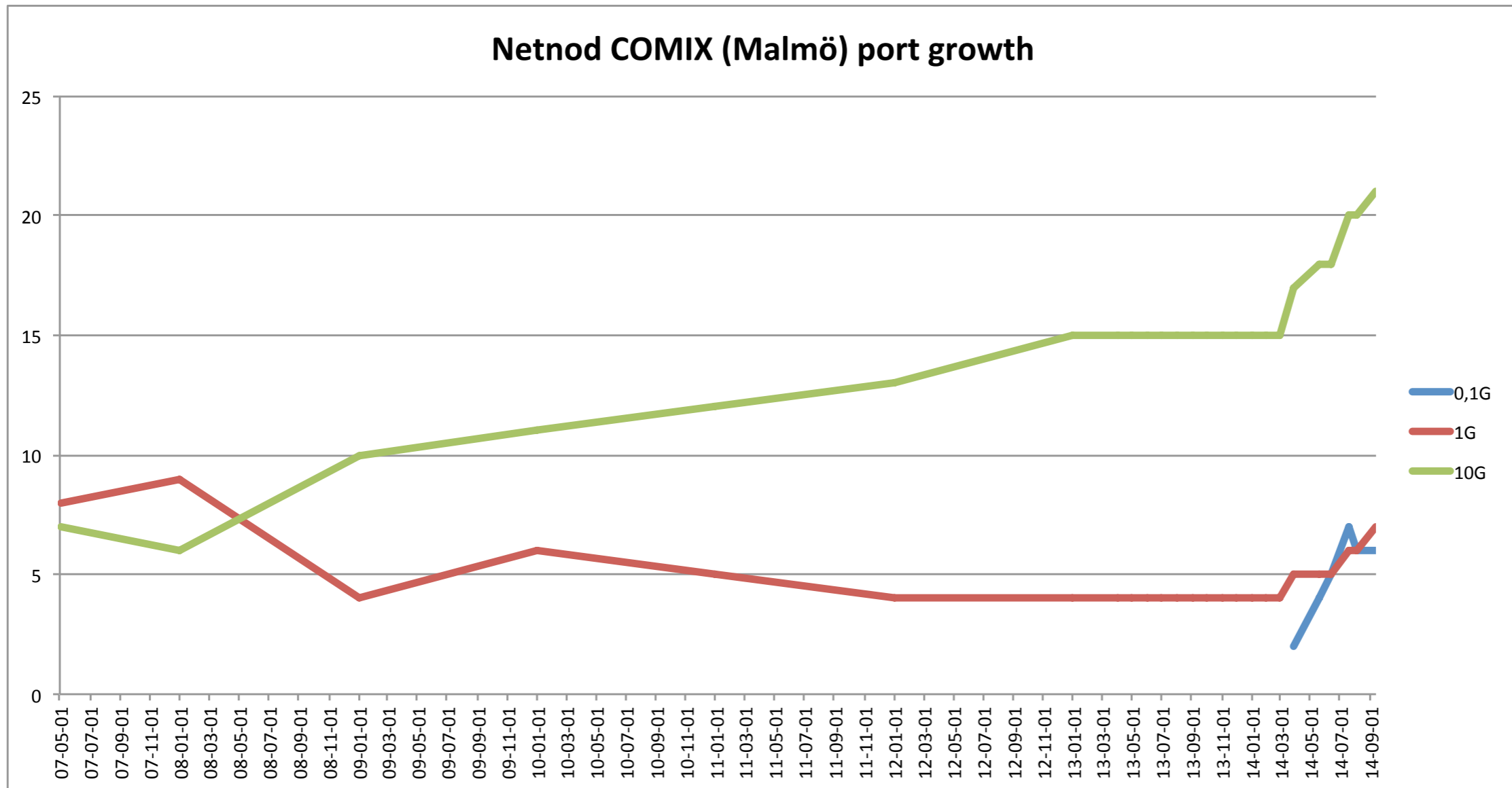
Stockholm port growth



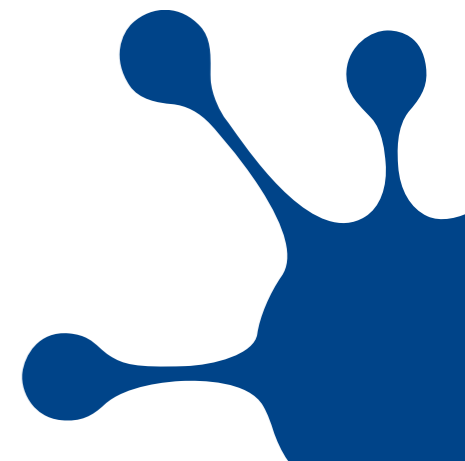
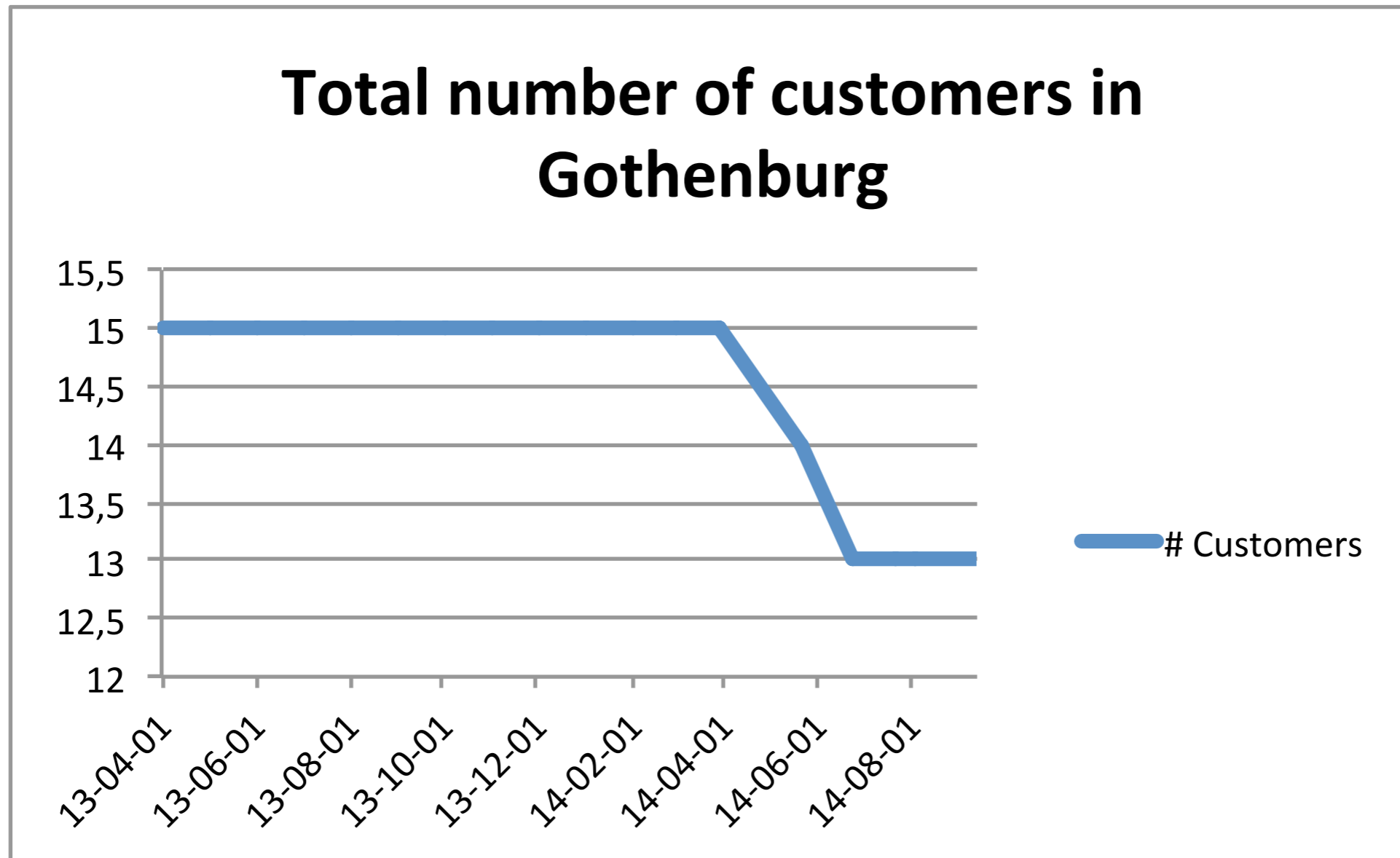
COMIX Customer growth



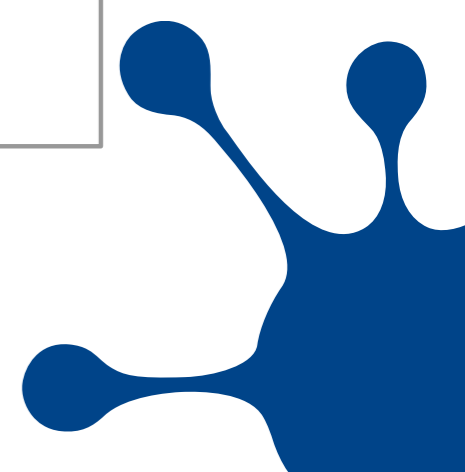
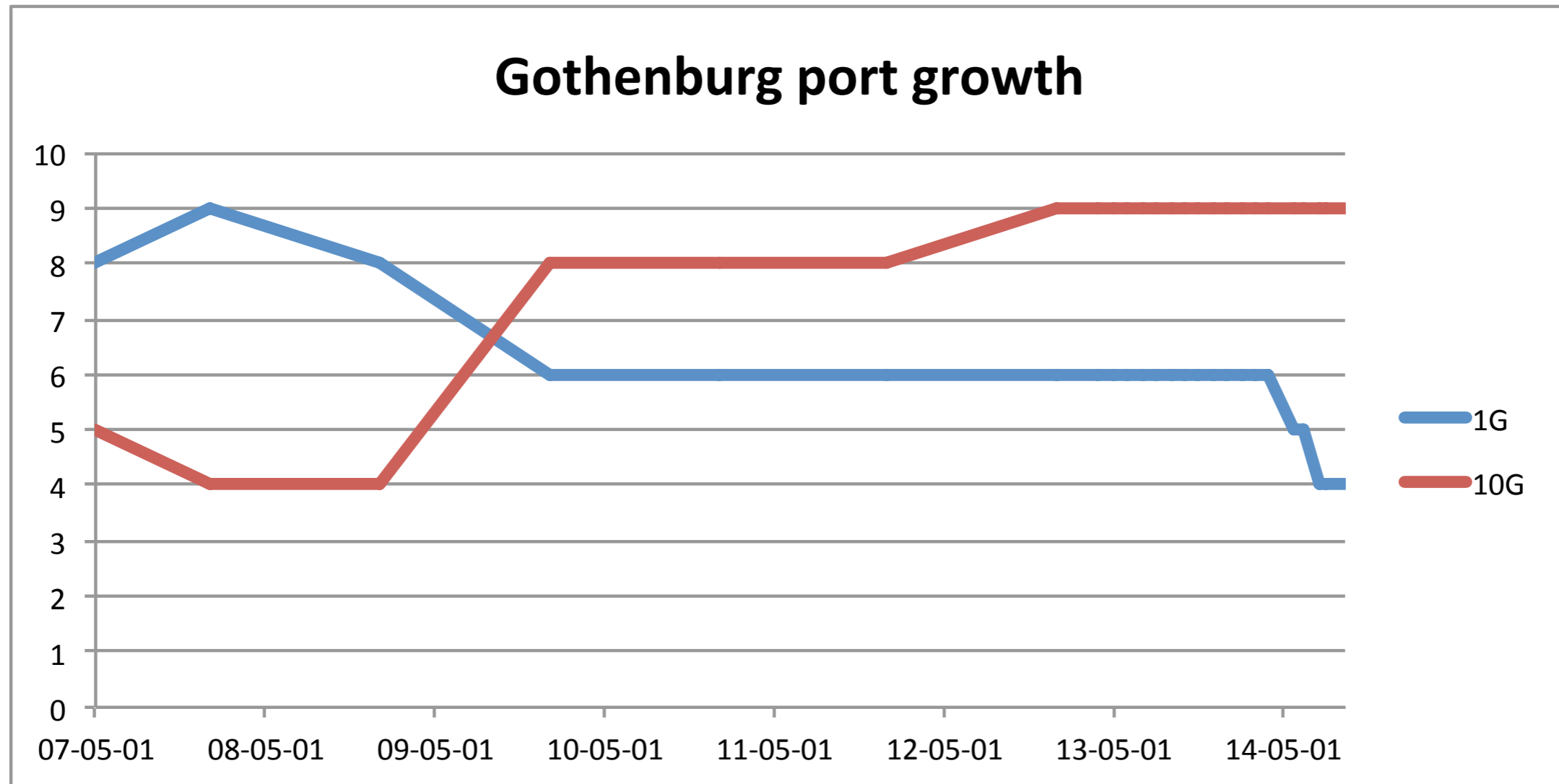
COMIX port growth



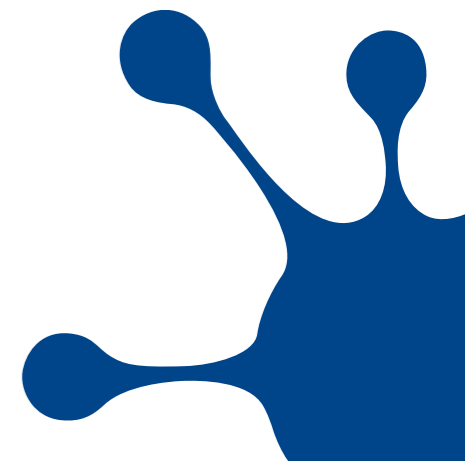
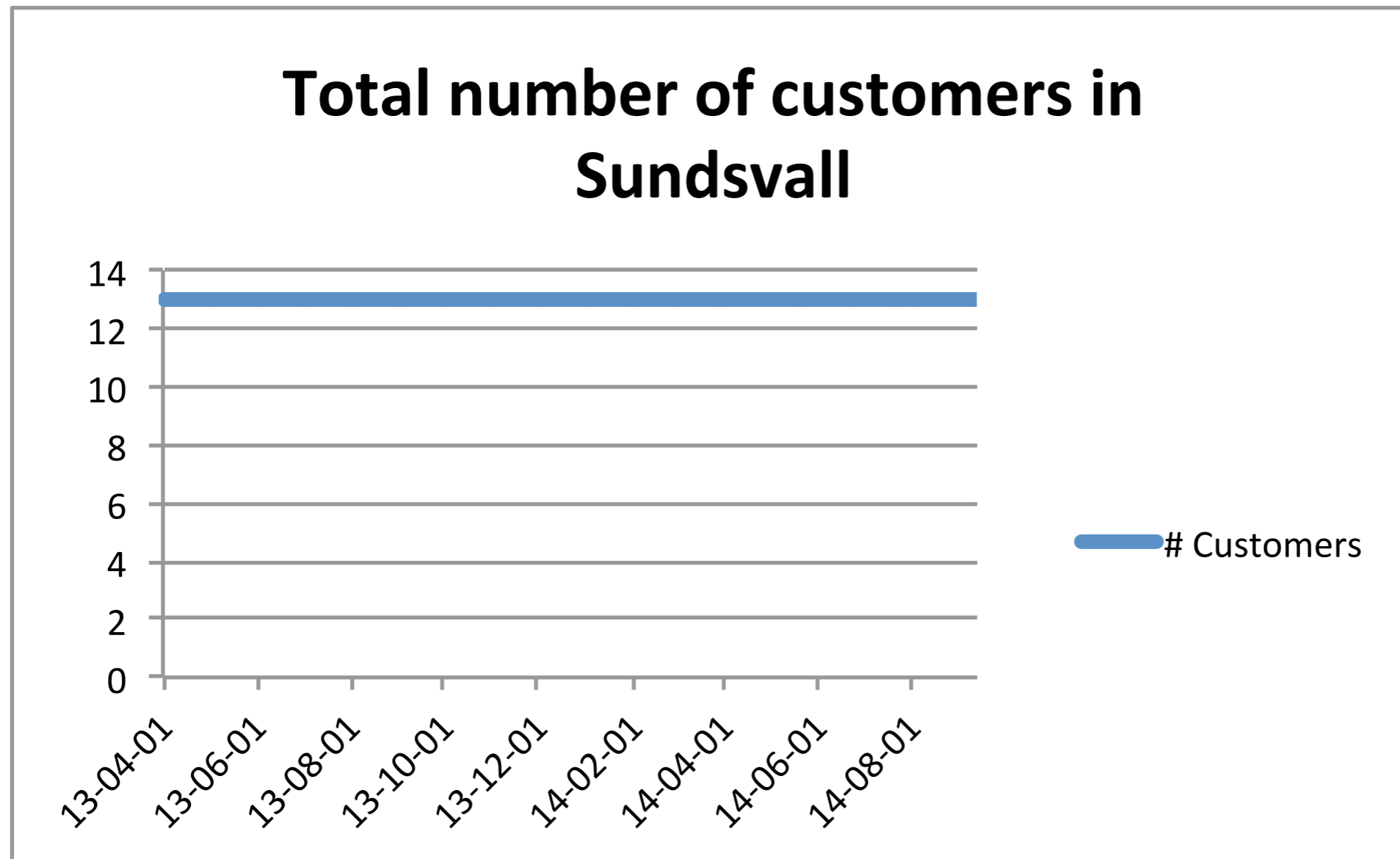
Gothenburg Customer growth



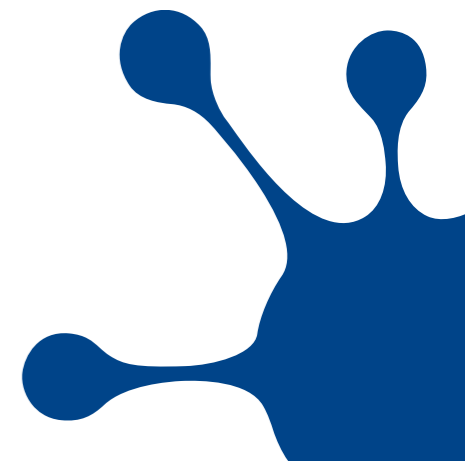
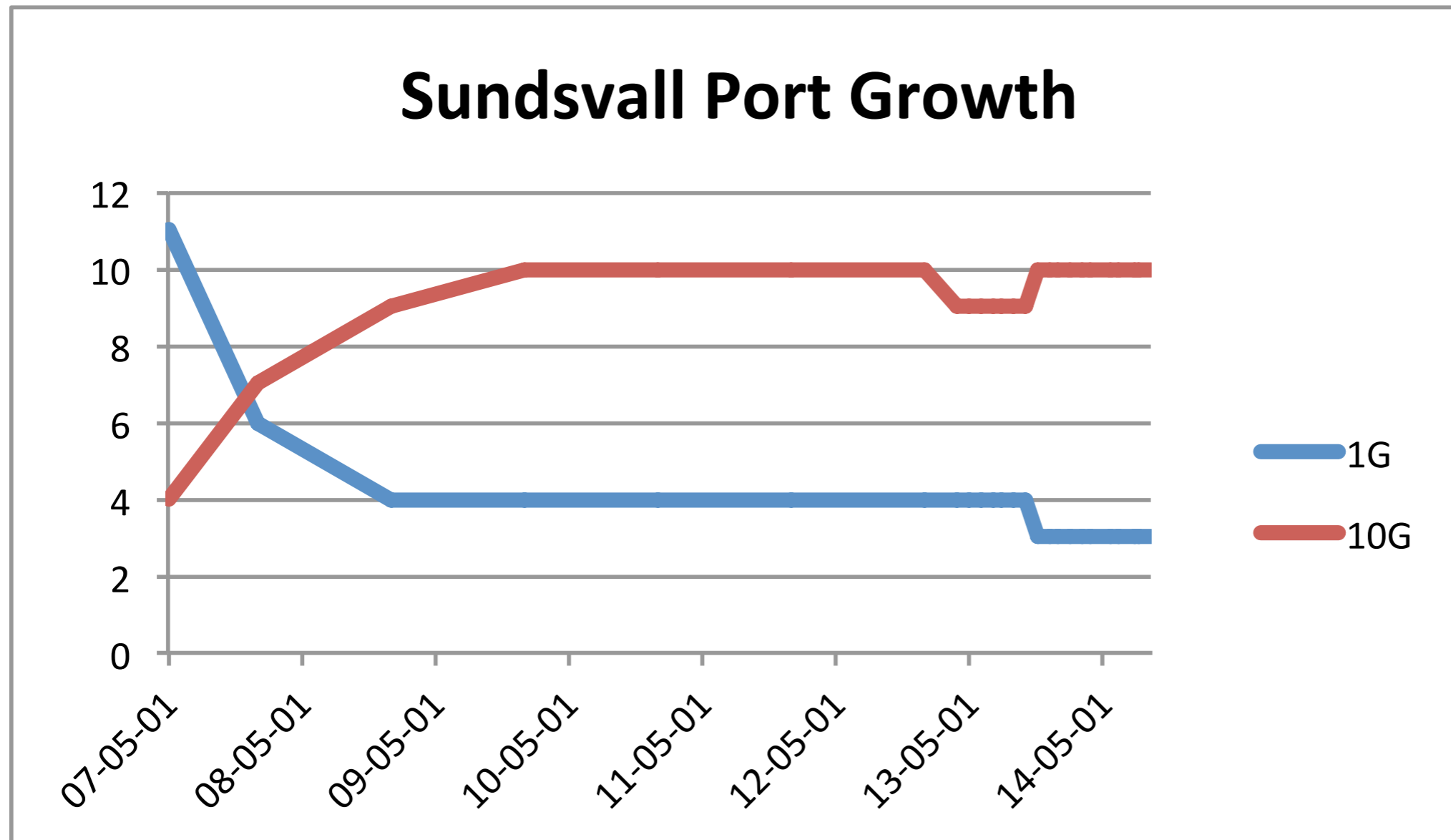
Gothenburg port growth



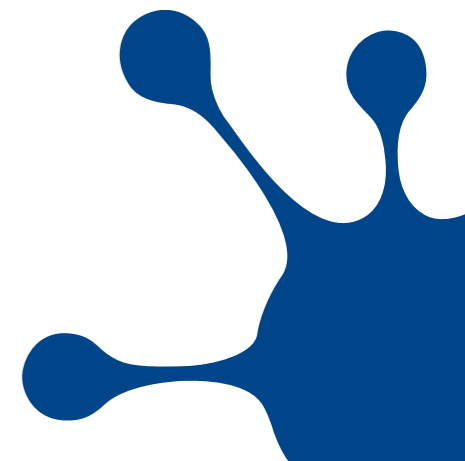
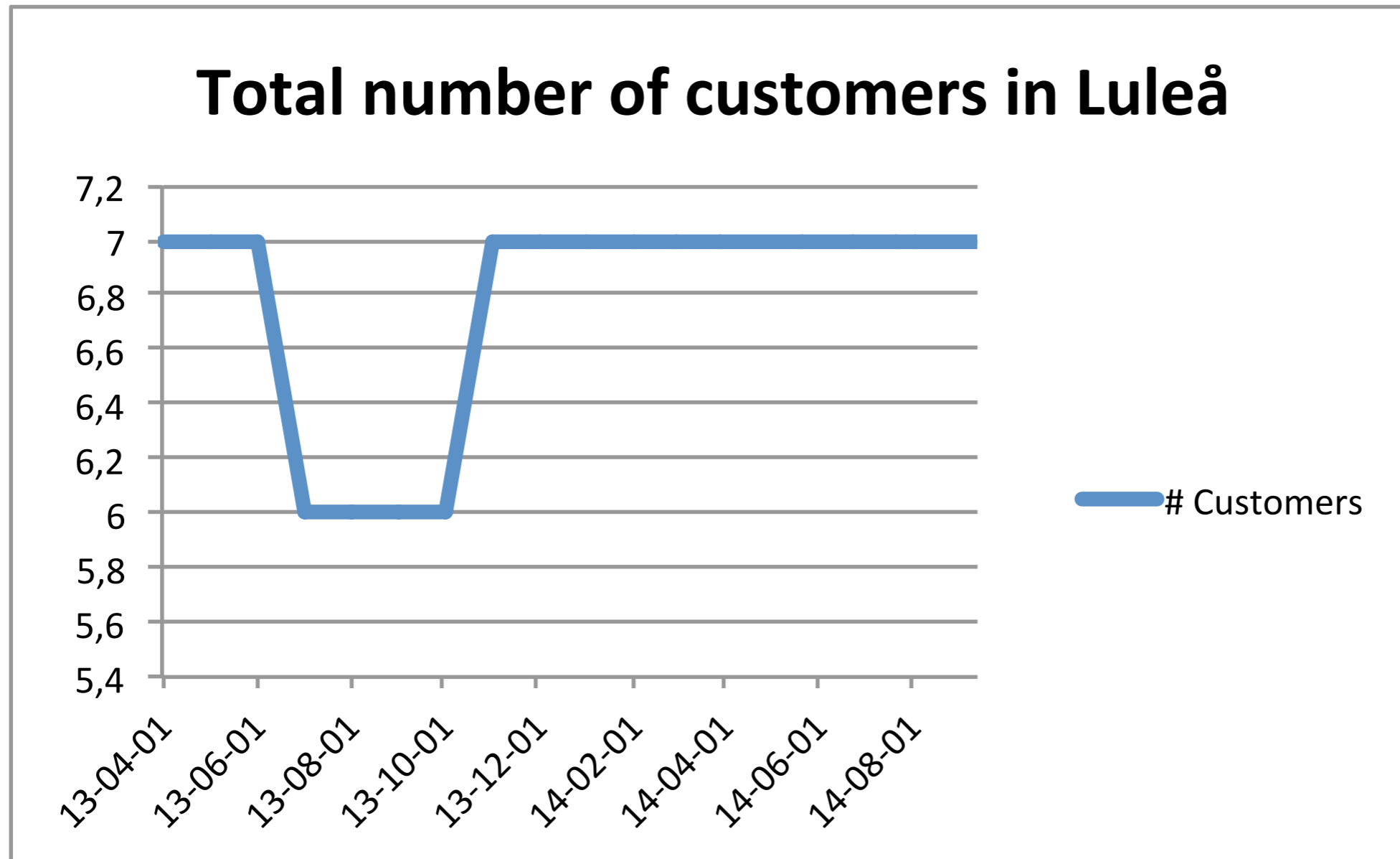
Sundsvall customer growth



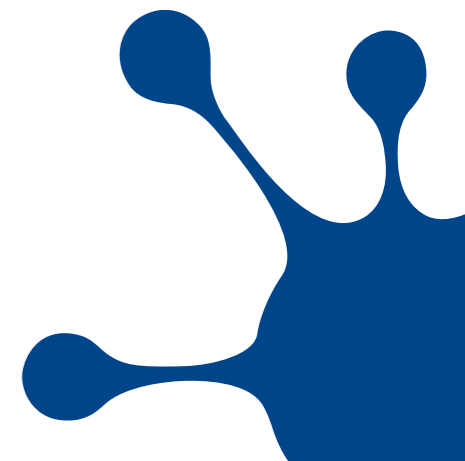
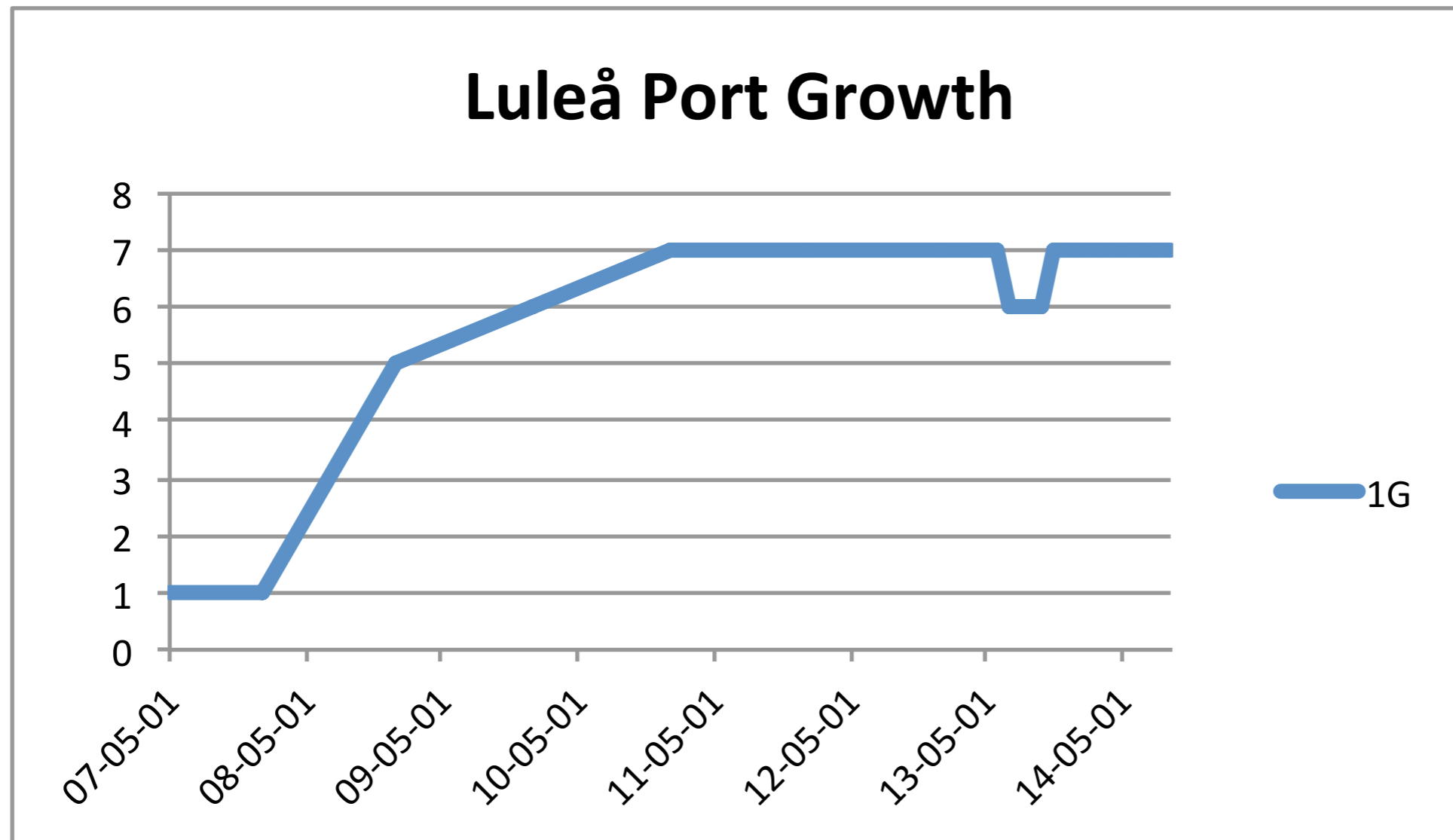
Sundsvall port growth



Luleå customer growth



Luleå port growth



Sites with own presence

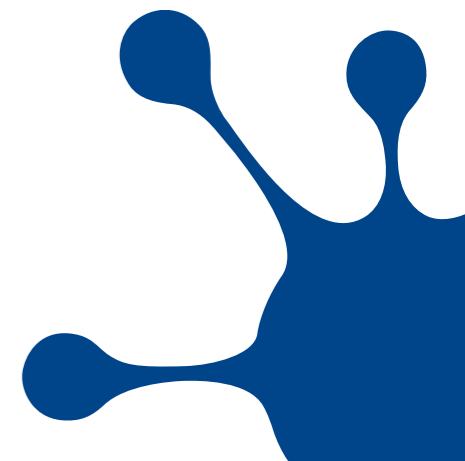
INTERXION, PORTLANE NACKA, TELECIITY BROMMA AND TELECIITY SKÖNDAL

- Covered with DWDM systems, used for backhaul
- KN7 now live as well!

ALL HAVE ON-NET PRICING!

WILL ADD NEW SITES SOON

- Availo



100GE Status

CURRENT SOLUTION

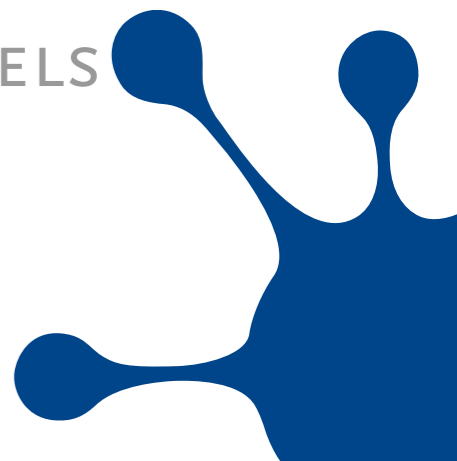
- 100GE-LR4 optics as client optics
- Any address in Stockholm
- 1 025 000 SEK / year

BUILT USING CUBEOPTICS AMPLIFIERS

ON REQUEST WE ALSO OFFER 100GE-ER4 AS ALTERNATIVE

100GE PRICE FOR OUTSIDE STOCKHOLM COMING

THIS FALL WE WILL INVESTIGATE ALTERNATIVE DELIVERY MODELS
FOR 100GE IN STOCKHOLM



100Mbps ports

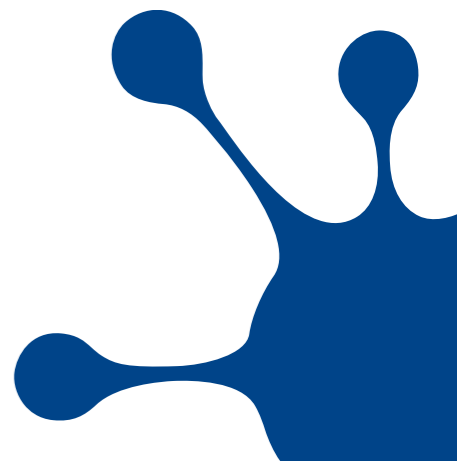
IN LOCATIONS WHERE WE HAVE OUR OWN PRESENCE

- InterXion, Portlane Nacka, Stokab KN7, Telecity Bromma, Telecity Sköndal,
- And soon at Availo

2x100MBPS PORTS FOR FREE

- Implemented as 1GE ports rate-limited to 100Mbps

ALSO AVAILABLE OUTSIDE STOCKHOLM



Staff

Strategic Account Manager

- **Martin Eriksson started in May**



Datacenter engineering

- **Jörgen Thun started in August**



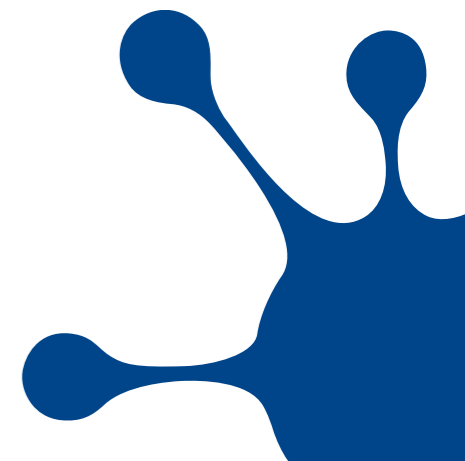
Communications Officer

- **Alexander Borodin started in September**



Executive Assistant

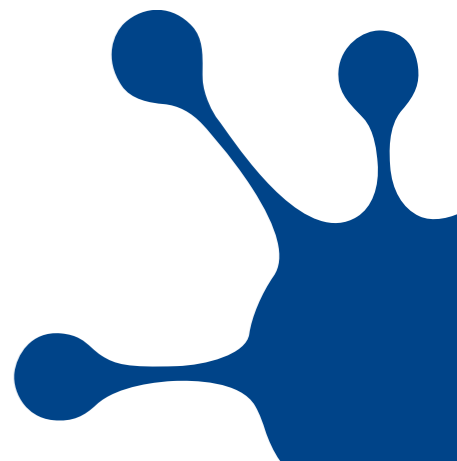
- **Nathalie Alberti Fidani will start in November**



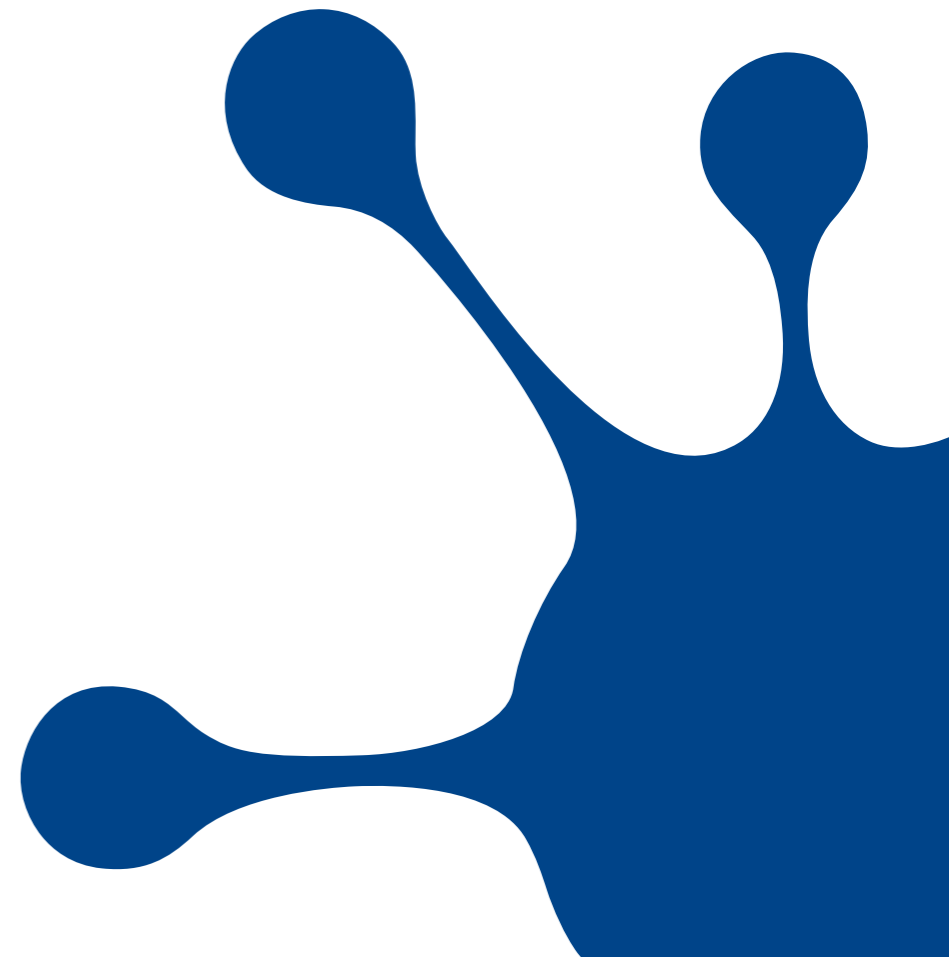
Staff

Open Positions

- 2 junior engineering positions in operations
- 1 Developer position in R&D
- More information will be posted on www.netnod.se



OPERATIONAL UPDATE IX



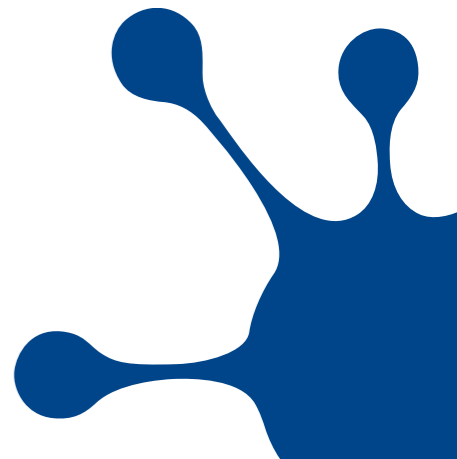
Software upgrade

Planned maintenance for all IXes with software upgrade

Fixes 100GE bug

Planned for

- **STH-B - Done**
- **STH-A**
 - Start time: 2014-10-09 07.00 CEST
 - End time: 2014-10-09 08.00 CEST
- **SVL & GBG**
 - Start time: 2014-10-13 07.00 CEST
 - End time: 2014-10-13 08.00 CEST
- **COMIX**
 - Start time: 2014-10-14 07.00 CEST
 - End time: 2014-10-14 08.30 CEST



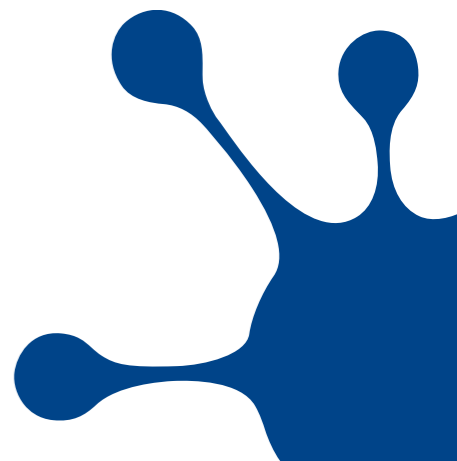
COMIX outage Thursday 25/9

Short outage on the link across the bridge

Occurred when a new 100GE-SR10 CFP was installed at Telia Telehouse

Switched halted and required a cold reboot

Working with Brocade to investigate cause and preventive actions

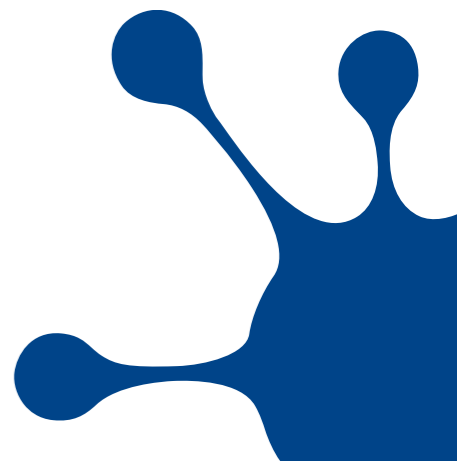


COMIX rebuild

Due to need for more capacity and to add more redundancy we are rebuilding the link across the bridge

- Will be running 100GE DWDM system
- Will be running on two different fibers in the bridge

Installation planned for October



Higher density rebuild

To add more capacity / increase port density in Stockholm

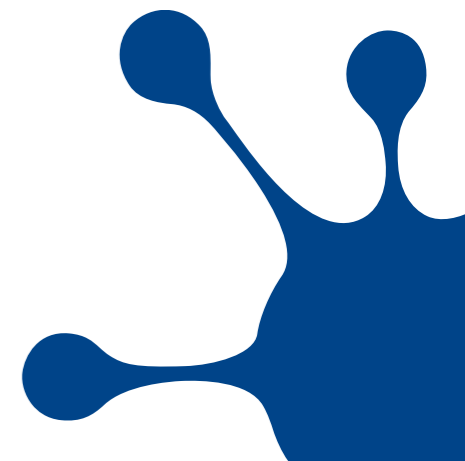
- We are moving to 2x100GE cards
- Replacing 20x1GE, 4x10GE, 8x10GE cards with 20-port cards

Will require a nightly outage per side in Stockholm

Will include

- Recabling
- Card replacement
- Software upgrade

Planned for November



Change of MTU size

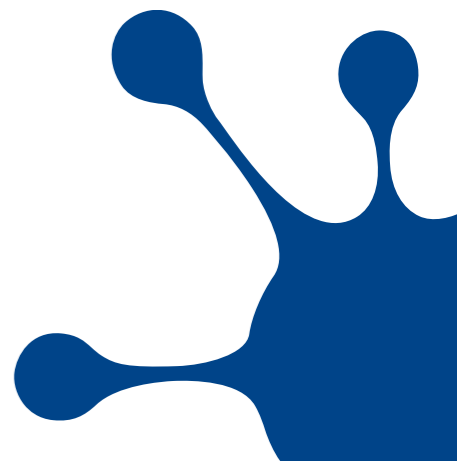
Currently two VLANs with different MTU, 1500 and 4470

4470 chosen for historical reasons

Some demand to move to 9k MTU instead

Will pose an operational challenge

- Several options exists
- Which do you prefer?



Change of MTU size - Options

1. Flag day

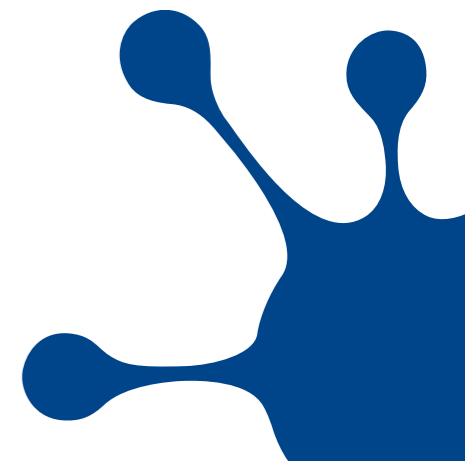
- We list all active ports (with traffic) on 4470
- In given window MTU is reconfigured

2. Long tail migration

- We run three VLANs, 1500, 4470 and 9K during a long migration period

3. Migration window

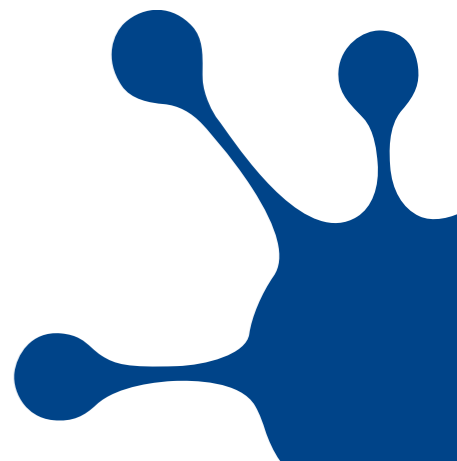
- We run three VLANS, 1500, 4470 and 9K for 1-4 weeks



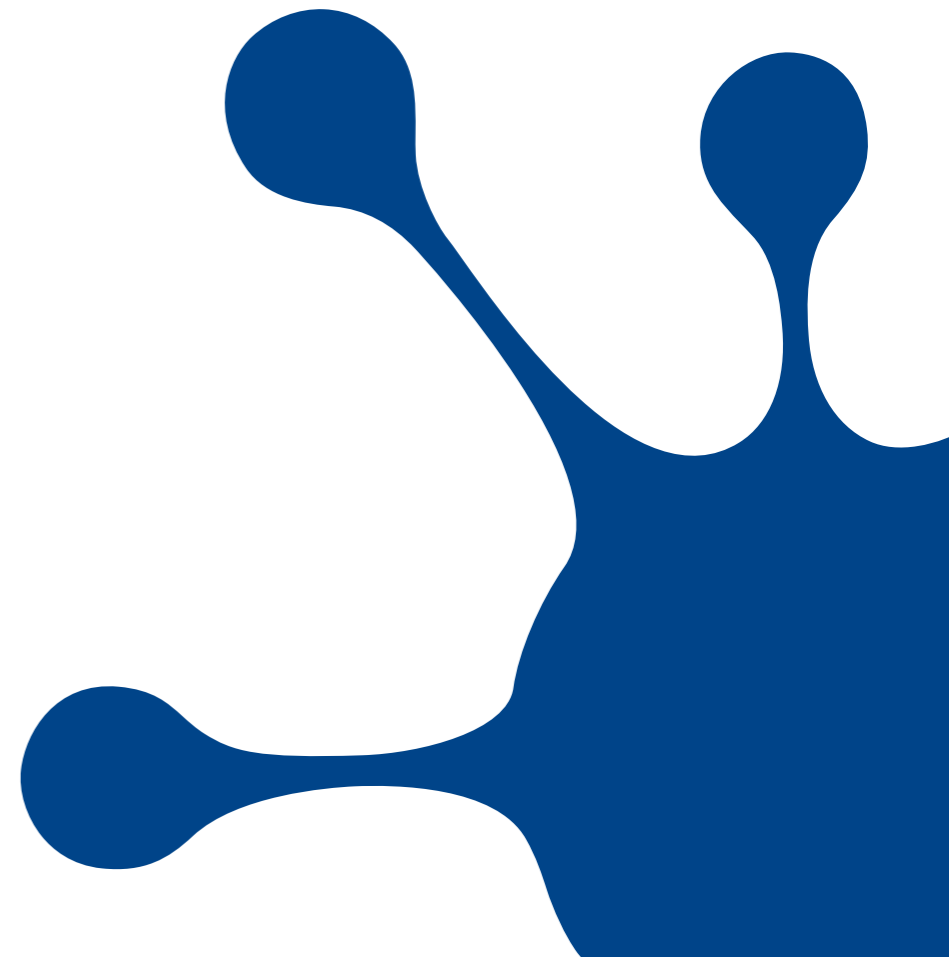
Change of MTU size

WILL POST QUESTION TO TECH-L@NETNOD.SE

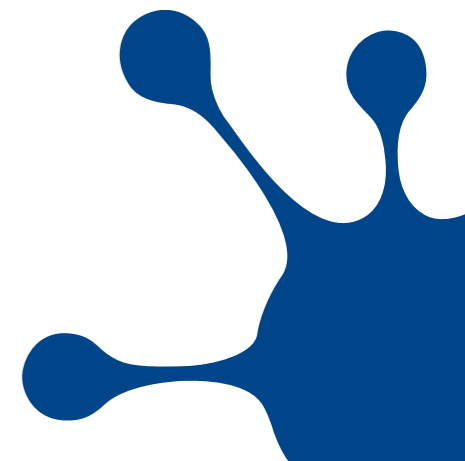
Are you on the Netnod mailing lists?



OPERATIONAL UPDATE DNS



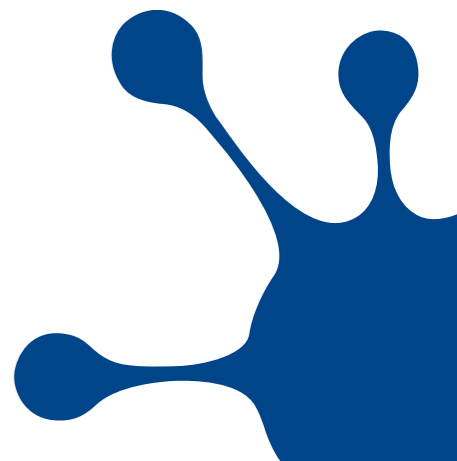
Locations



Network setup

52 locations world wide

- Open peering policy
- 14299 (12705) Possible BGP sessions
- With 2075 (1897) ASNs



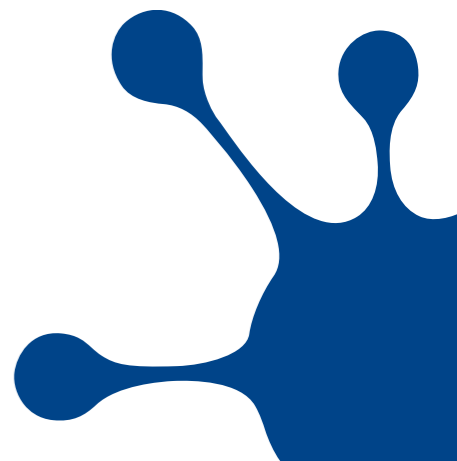
Future

NEW SITES

- Belgrade

UPCOMING OR DISCUSSED SITES

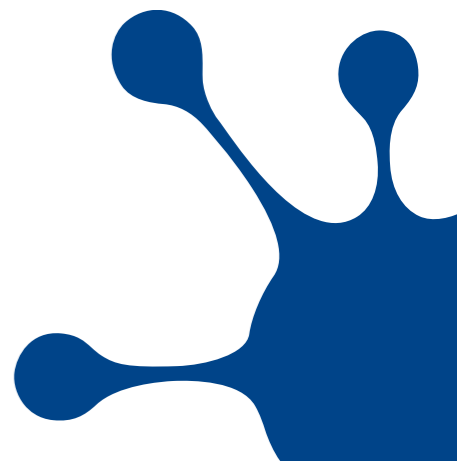
- COMIX, Yeakterinburg, Mombasa, Cairo
- And many more



Activities

DSC / PACKETQ

- Quite a few modifications made by Netnod and contributed back to the open source package
- Yet more modifications to match our needs and that we are using internally only for users of the anycast service
- Operational



Virtualization

“NANOSITES”

- Today a site is approx 10U of equipment
- Easier to deploy, less foot print and cheaper if virtualized
- Requires extensive testing and new provisioning
- In final works - plan for first sites before the end of the year

PLAN FOR 1 NEW SITE A MONTH NEXT YEAR

- Aggressive roll-out schedule
- Will focus on Africa and Latin-America
- But we have a long backlog

