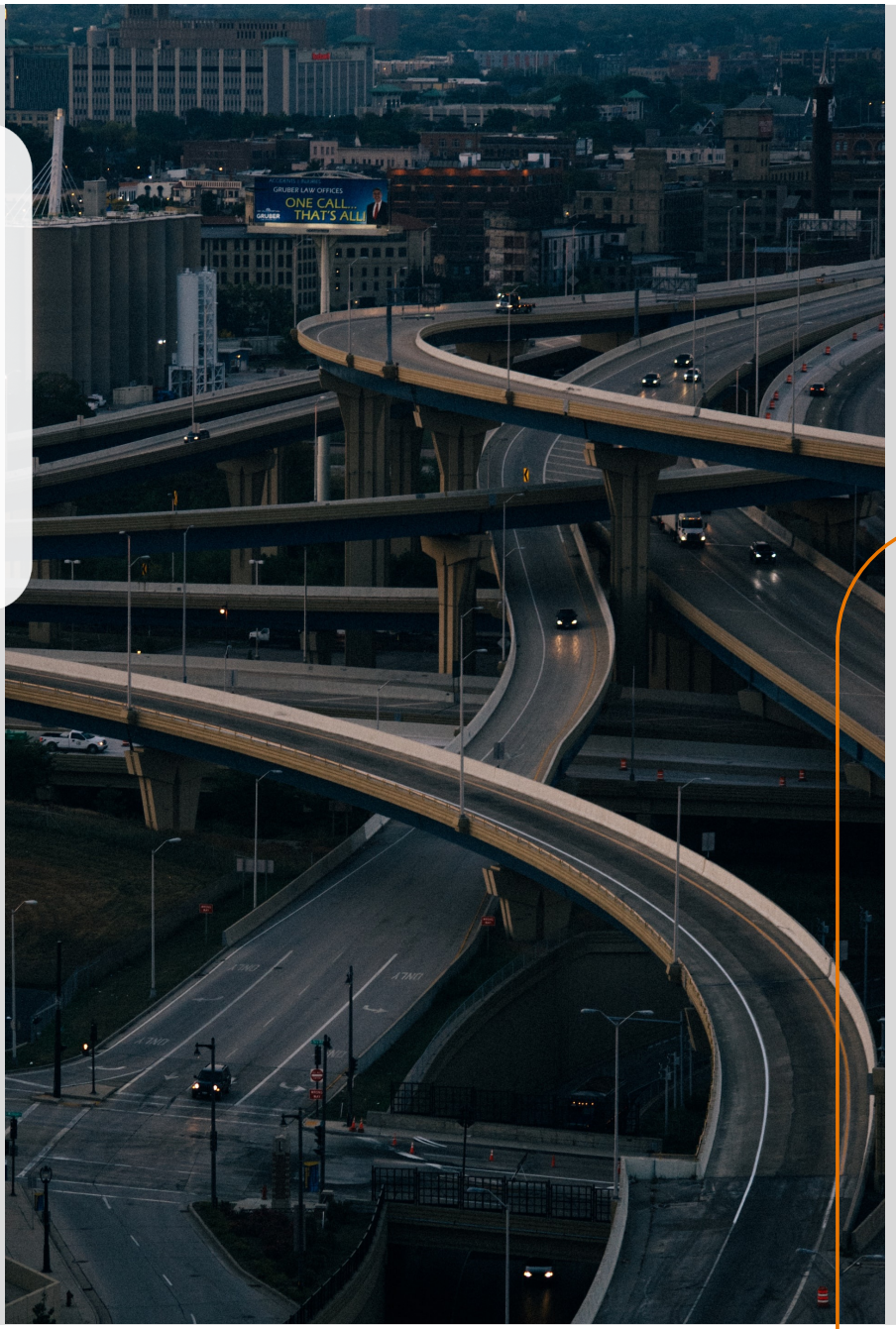
GREN ENGINEERING ADVANCEMENT – GNA-G WORKGROUP

How to beter utilize international link capacity



Intro

- Pieter de Boer – Technical Product Manager Neterlight/Networkexpert International @SURF
- Before 3rd line networkengineer for SURF(net) NOC (@SURF (2016-2021), Support Engineer @Telindus (2011-2016), Senior Network Engineer at SARA (today SURF) (2003-2011))
- Been involved in Netherlight since day one
  - 2001 as an Intern commissioned gear around first OC48 research link (Amsterdam-Chicago)
- So in short 18 years as 3rd line SURF(net) NOC engineer in the pocket (some more as Netherlight engineer)
- Also involved in SCinet routing team since 2002
  - Layer-2 circuits dragged into Super Computing is somewhat of a challenge
- Warning this talk might have a European focus, but hack live there

Challenges seen as an engineer

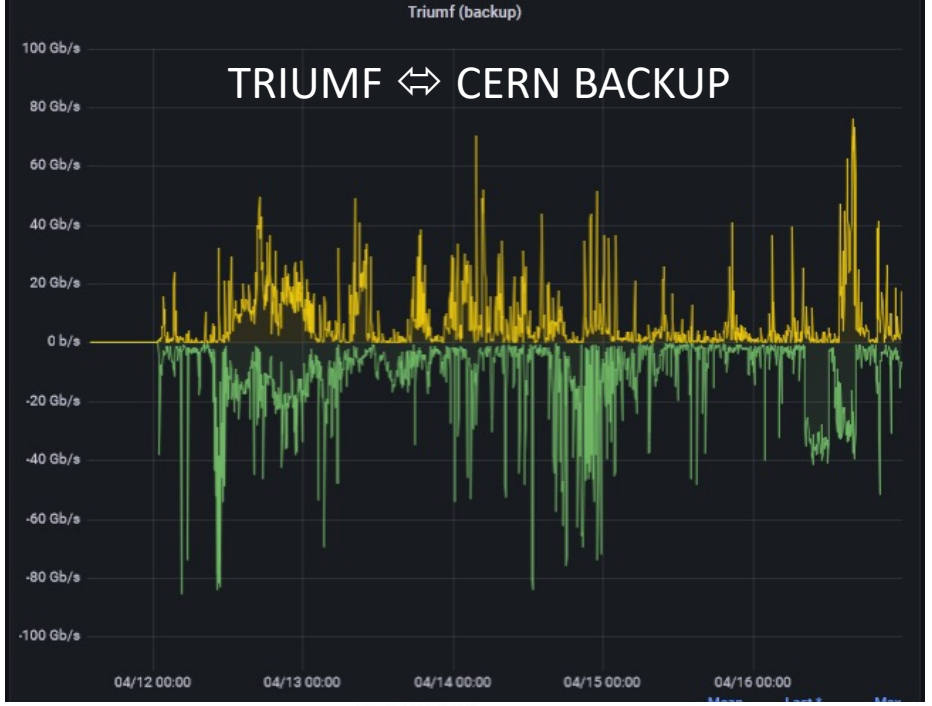
- As engineer fed up with:
  - 200 e-mail long service turn up threads
    - For instance AER Rusia backups took months (still ongoing, month 10)
  - Debugging when broken
    - Everybody configuring an IP address in the service
    - Some partners can not even see mac-addresses
  - Don’t wanna talk about Super Computing 2011 spanning-tree hell
  - Lack of redundancy, some links congested others under utilized
- In ANA-engineering working on better (or more) backups
  - Cumbersome process

What would we need to do better

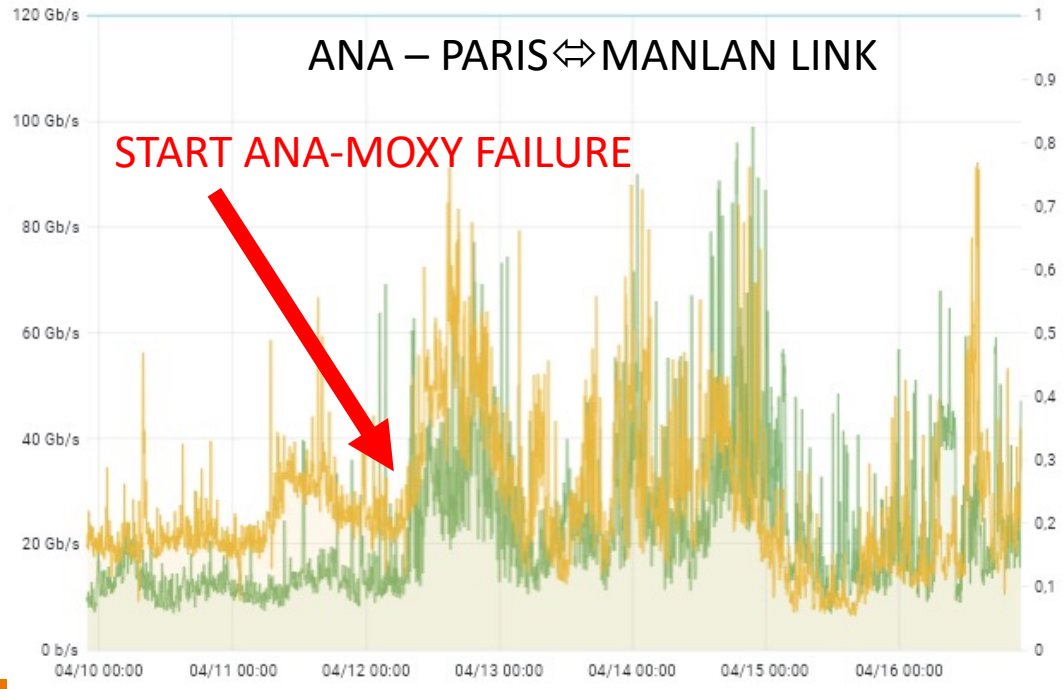
- So we’re all running MPLS enabled networks and still doing legacy vlan’s to interconenct
- Backups are an issue / better insight in traffic flows
- Better coordinate which services are around, what is there purpose
  - Getting them provisioned is easy
  - Getting them removed, found a ton of corpses (one end removed, next ANA partner still has service (or history...))
- Better utilize available links in systems link ANA, AER
- Redundancy and avoid congestion

For instance – ANA Amsterdam-Moxy is down, right now ➔ forecast till May 4th

- Amsterdam – Montreal ANA link down since 12 April
- After EXA maintenance, took EXA 12 hours to figure out Halifax, Canada – South Port, UK is down
- Ship will sail morning April 18th
- On location and start repairs ETA April 30th
- Current forecast service recovery May 4th!!! (weather permitting)
- A big user Triumf – CERN LHC has a backup service via Paris – Manlan ANA
- It's probably not hard to figure the Triumf service is maxing out the Paris⇔Manlan ANA link
- There are other ANA links (the system has 1Tbit) that have ample capacity
- NL-T1 ⇔ Canarie LHCONE traffic now via GEANT LHCONE peering (SURF AP1)



Traffic Stats



Autogole / Sense

- Around for a while
- Needs a (semi) automated network
- Various stages of automation

- Valuable tool, it has topology!!!
- It has an API
- It checks service activation

What is the plan with this workgroup???

- Try to advance how we run stuff by:
  - Identifying (possible) better solutions
  - Try them
  - Learn, what are the challenges, what does work, what doesn’t, what else is needed
  - Disseminate learned lessons to groups like ANA-Engineering, AER-Engineering, APOnet, others...

What do we want to achieve

- Ease of operation of services over international links
- Better redundancy
- Avoid services corpses
- Enable better insight in services

What do we need for this workgroup

- Idea’s (the more the better)
- Engineers to work/test them
- Open Exchanges that want to be involved
- Earlier I’ve talked to all ANA partners (at Nordunet 2022, SC22 and I2 TechEX)

Is there a plan

- Well, some
- I’m interested what multidomain MPLS, with Segment routing and/or a PCE can do
  - Most of us run some MPLS enabled network
  - A PCE can reroute flows, avoid congestion
  - Segment routing, allow you to get a specific path
- Want to try this step by step, see what work, what doesn’t, etcetera
- This for sure shouldn’t be the only one!!!
- There are some interesting differences on opposite ends of the Atlantic
- Open/interested in other solutions

First things first

- Get interested organisations
- Get engineers willing to do work
- Subscribe (both) on mailing list https://lists.gna-g.net/postorius/lists/gren-engineering-wg.lists.gna-g.net/
- Brainstorm on possible solutions
- Investigate which plans we want to investigate (preferably all)
- Try, fail, try again, fail harder and eventually improve

Status

- Tried to schedule first call ➔ failed due to too much work
- Trying to get more interested folks on the mailinglist
- Will send out new invite for call soon
- We've talked with University of Amsterdam MNS (Multiscale Networked Systems) group ➔ they're interested and want to participate

Other things of interest

- SURF has a pop at CERN
- So has Nordunet, PSNC, GEANT, ESnet (and probably more)
- We all bring our own gear ➔ not really green / power efficient
- Why not virtualize gear
  - Juniper node slicing looked promising ➔ not sure where it went
  - Should we look into NFV (Network Function Virtualization) so we can share
    - SURF is planning a proof of concept

Questions/Suggestions/Comments???

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Driving innovation together

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