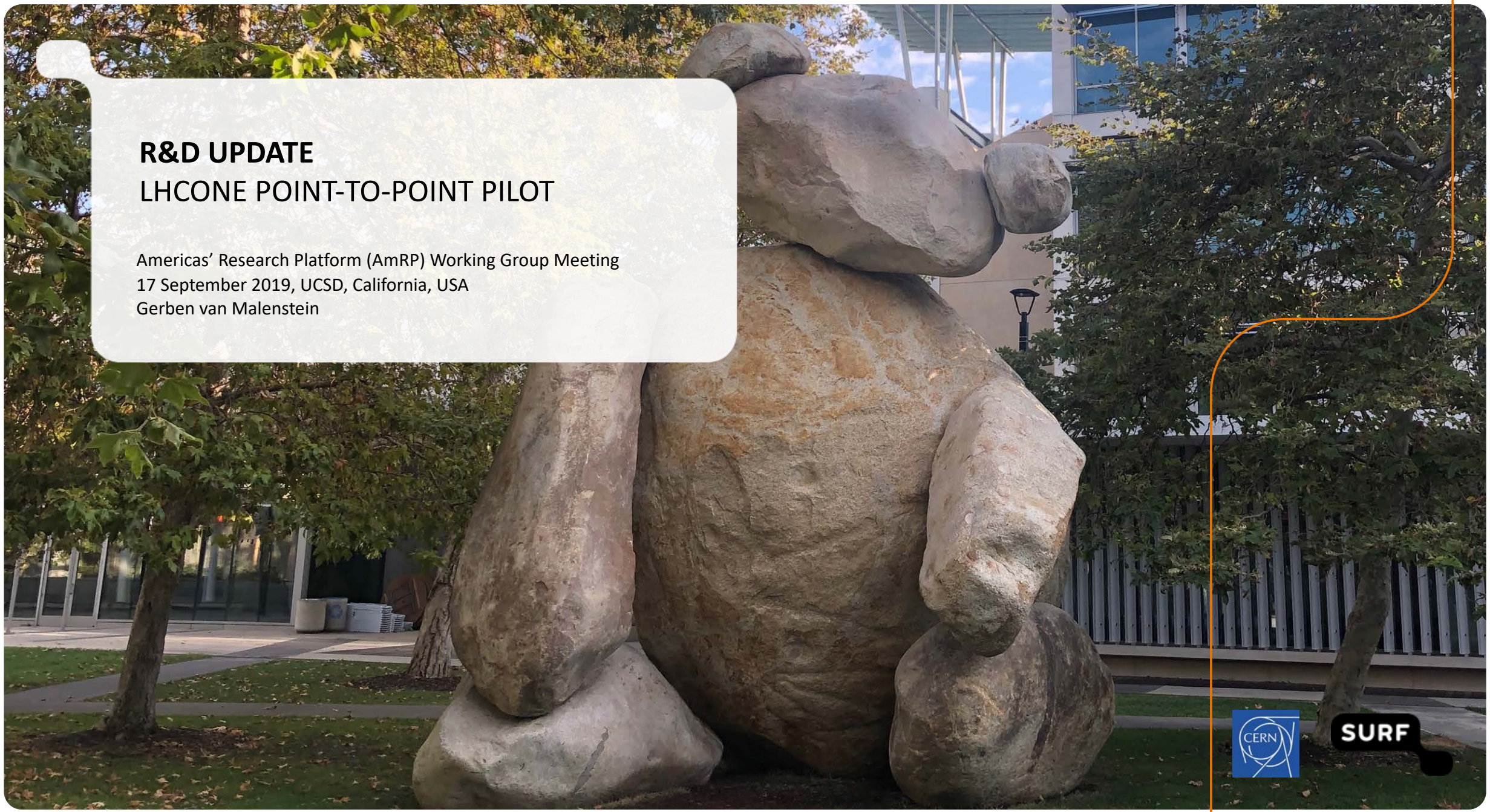


R&D UPDATE
LHCONE POINT-TO-POINT PILOT

Americas' Research Platform (AmRP) Working Group Meeting
17 September 2019, UCSD, California, USA
Gerben van Malenstein

Observations

- **Software driving the network, in production now: per domain**

  enables orchestration: integration of multiple resource types

  enables composed services: compute + storage + network + workflows + …

  automated network provisioning available as a building block

- **Network Function Virtualisation**

  as a driver for R&E networks to expand into science facilities

- **Data Transfer Nodes as a piece of a broader concept: ‘Data Exchange’**

  data transfer nodes not converging in terms of standards

  Data Exchange: move secured data to compute or move compute to secured data

  Data Exchange concept: not directly applicable to LHC because data is not sensitive

- **HL-LHC is coming towards our networks, just as SKA and other large science disciplines**

  seeing LHCONE as an example blueprint network for other clearly defined communities

LHCONE Point-to-Point pilot: what is out there?

- Communication between networks and data transfer node owners
- Bi-weekly meetings

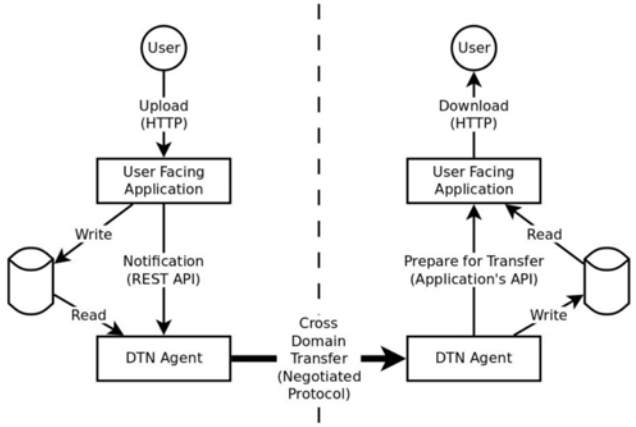
- Substrates
- AutoGOLE operating
- Data Transfer Nodes (DTNs) placed in US and EU

  albeit using different software stacks, talking different protocols

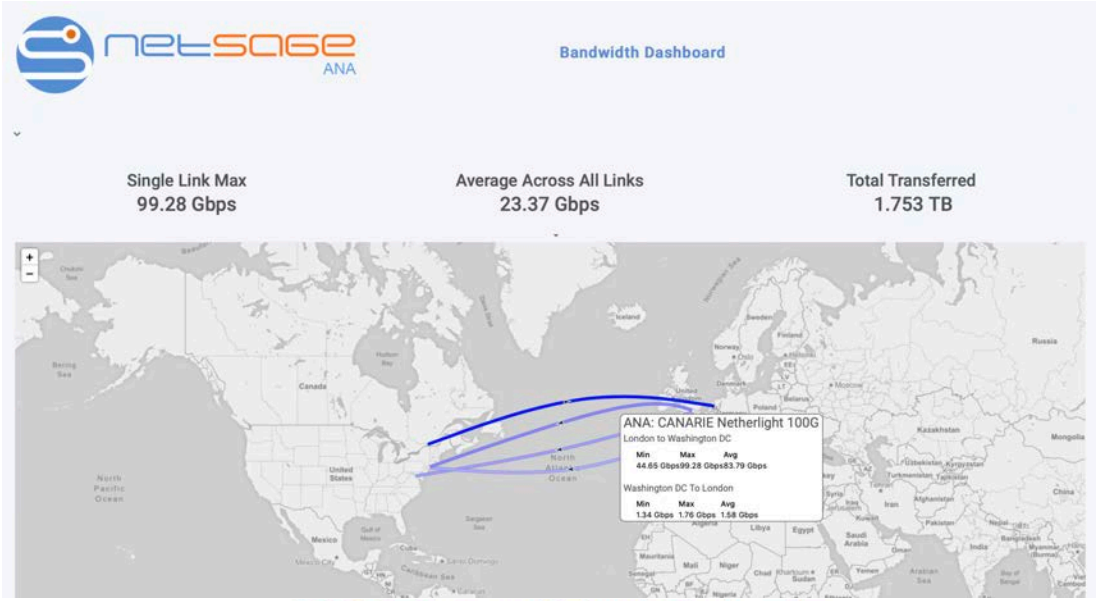
- LHCONE operational network: please visit Bill Johnston's talk on Thursday,
  'LHCONE - A global overlay network for the LHC and High Energy Physics - *What it is and Why it Works*'

LHCONE Point-to-Point pilot activities 2019

- **Connecting DTNs for research:**
  - CERN (CH)
  - SURF / NetherLight (NL)
  - KLM (NL)
  - UvA (NL)
  - StarLight (USA)
  - PacificWave (USA)



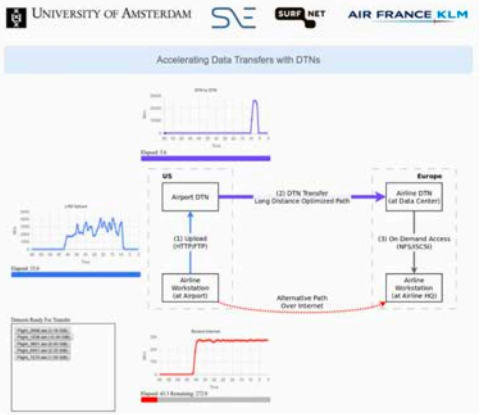
- Experiment by University of Amsterdam on FileSender and OwnCloud DTN integration [1]
- Demo at SC'18 'Building User Friendly Data Transfer Nodes' [2]
- **SCinet NRE SC'19 proposal submitted by Harvey Newman**



SNE System and Network Engineering

DTN Demonstration

- Workstations not optimized for long distance transfers can benefit by using an optimized path with DTNs
- Scenario shows a file transfer from a workstation in the US to a workstation in Europe
- Compares a file transfer over an optimized path with DTNs versus path over the internet
- Indirect path utilizing DTNs achieves substantially better performance then a file transfer directly between the workstations
- Just one example of how DTNs can act as an interface to a path optimized for a specific data transfer



[1] https://sc.delaat.net/sc18/index.html#2
[2] https://sc.delaat.net/sc18/demo02/index.html

LHCONE Point-to-Point pilot & AutoGOLE

- MEICAN has been chosen for the dynamic provisioning of circuits on a multi domain network. MEICAN software development is done by RNP.

- Dynamic ANA planned for this year, expecting scaling up to other regions

- Expanding AutoGOLE with connectivity to DTNs

  through SENSE?

- More on this in the AutoGOLE Workshop on Thursday

LHCONE Point-to-Point pilot improvements

- Interoperability between DTNs, standardisation is needed (!)
- Possibly leveraging SENSE from prototype to production state: e.g. adding L3VPN, DTNs, further inter-application workflows.
- Targeting as a prototype:
- T1. single set of DTNs
- T2. larger set of DTNs, not very complicated
- T3. multidomain demo at SC, using DTN-RM (Resource Managers)
- Defining the relationship between NSI, SENSE and MEICAN:
  both technical and in time / innovation phases
- At AutoGOLE Workshop on Thursday:
  discuss role and relation of SENSE/NSI/AutoGOLE and future directions.

Umeå LHC meeting – 4 and 5 June, 2019

- Presentation summary:

https://indico.cern.ch/event/772031/attachments/1862908/3062207/LHCOPNE-20190608-Umea-meeting-report-v1.1.pdf

- Presentations given:

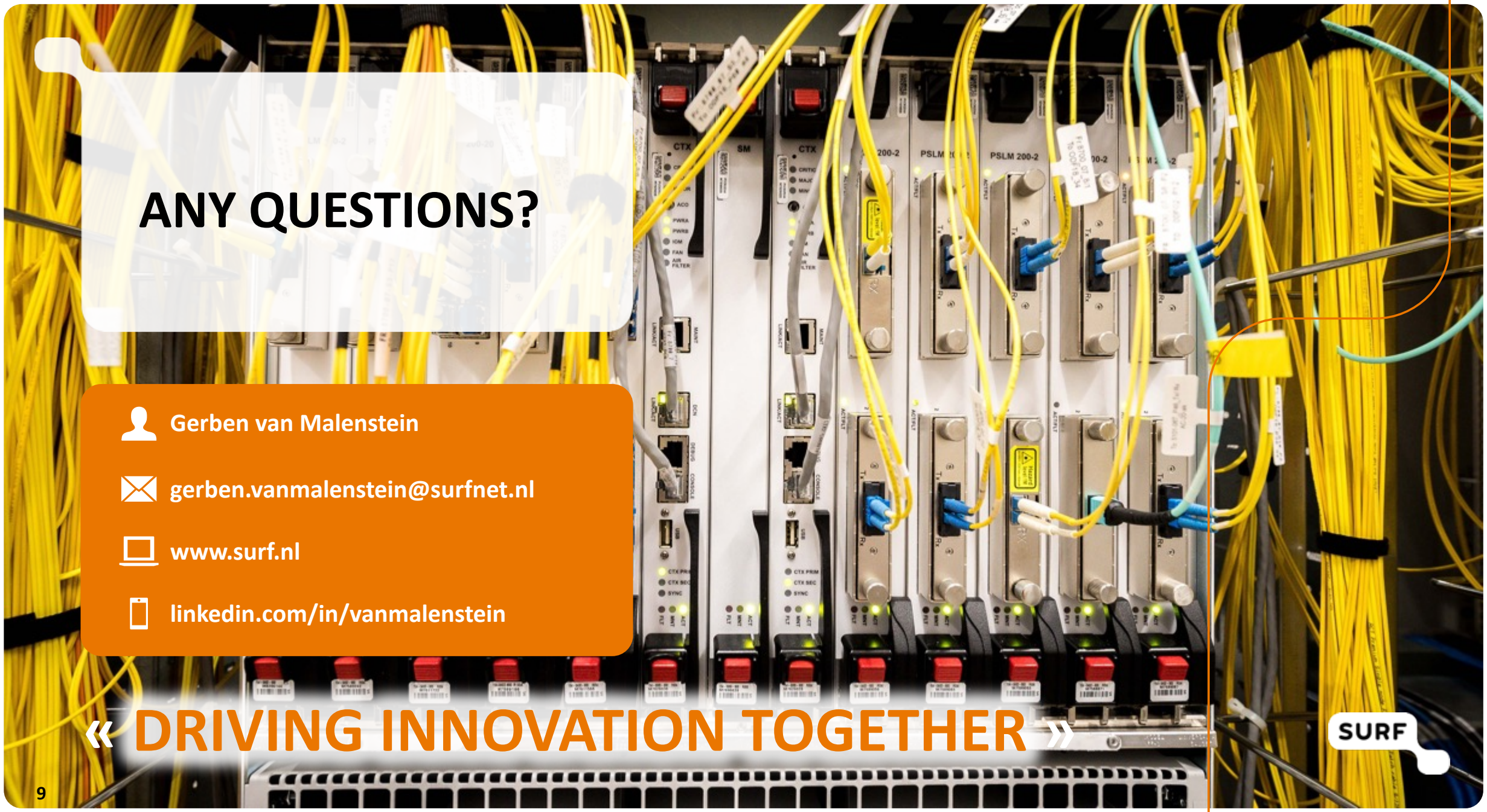
https://indico.cern.ch/event/772031/

Save the date

- The next LHCOPN/ONE meeting will be held at CERN on the 1**3-14 of January 2020**

- It will be in the form of a workshop, where our community can meet LHC experiments and WLCG representatives to better understand network requirements for Run3 and Run4 of the LHC.

- The agenda will take shape here: https://indico.cern.ch/event/828520/



ANY QUESTIONS?

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