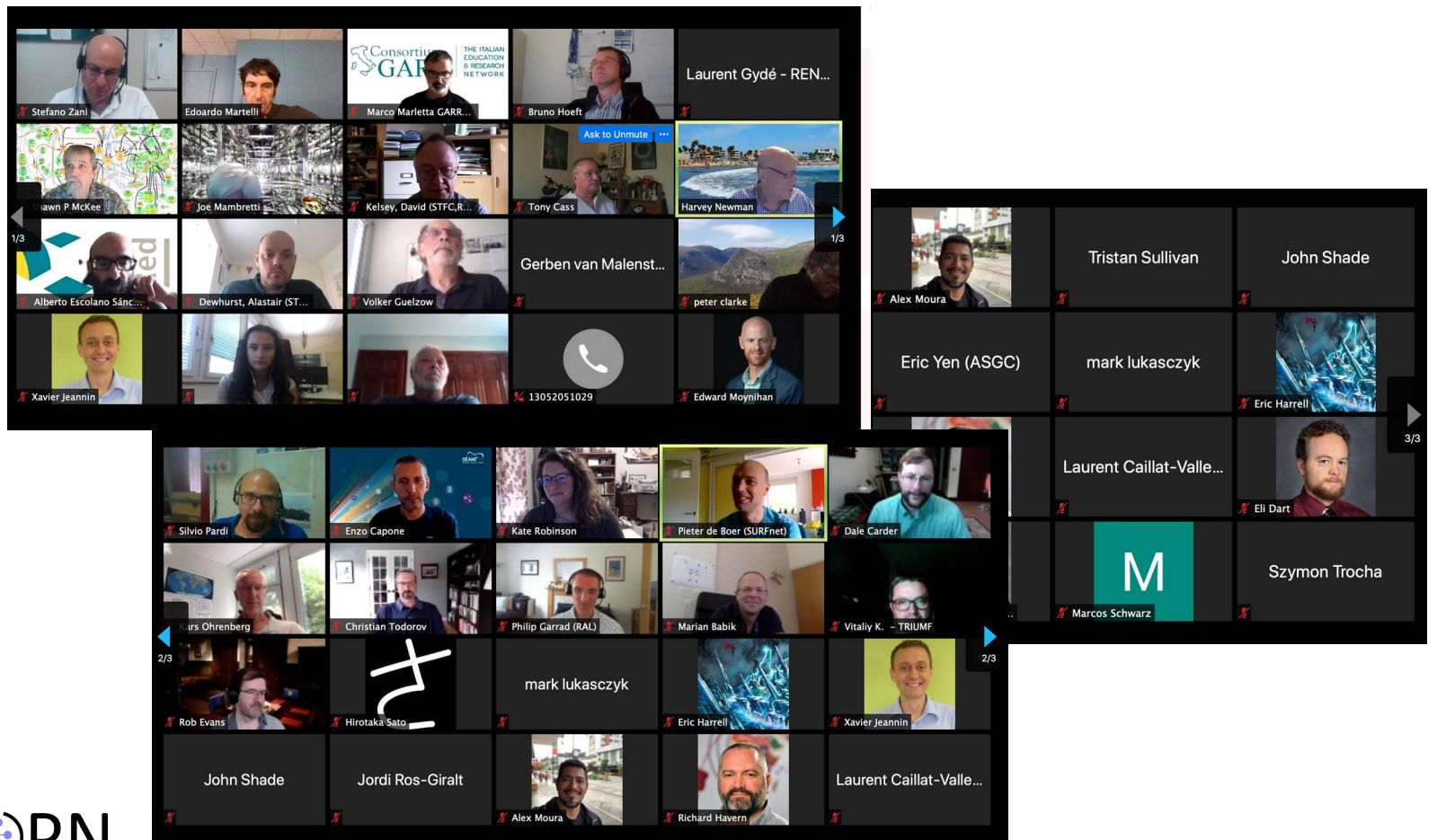
LHCOPN-LHCONE meeting #45 summary notes

Virtual meeting
2nd September 2020 – v1.0
edoardo.martelli@cern.ch

Venue

- On video conference only, for the second time
- Two session of 3hours in two days



Participants

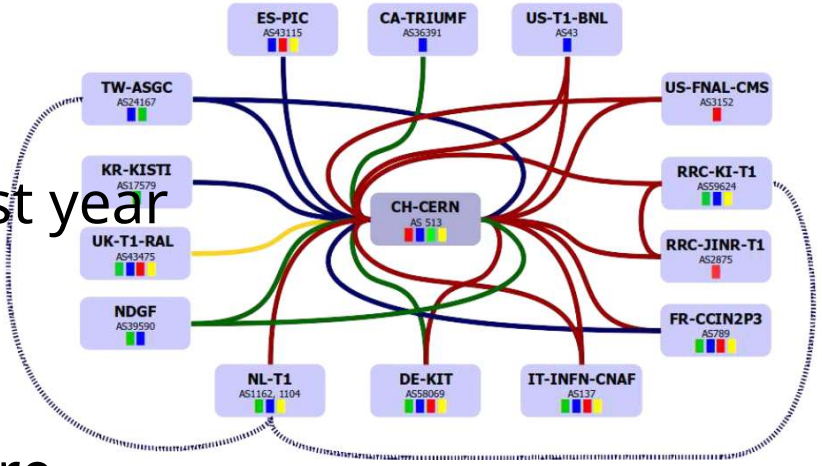
Average of 60 participants on both days

Some numbers:

- 31 Institutes
- 3 Collaborations
- 17 Research Networks

(rough numbers, could be more)

LHCOPN update

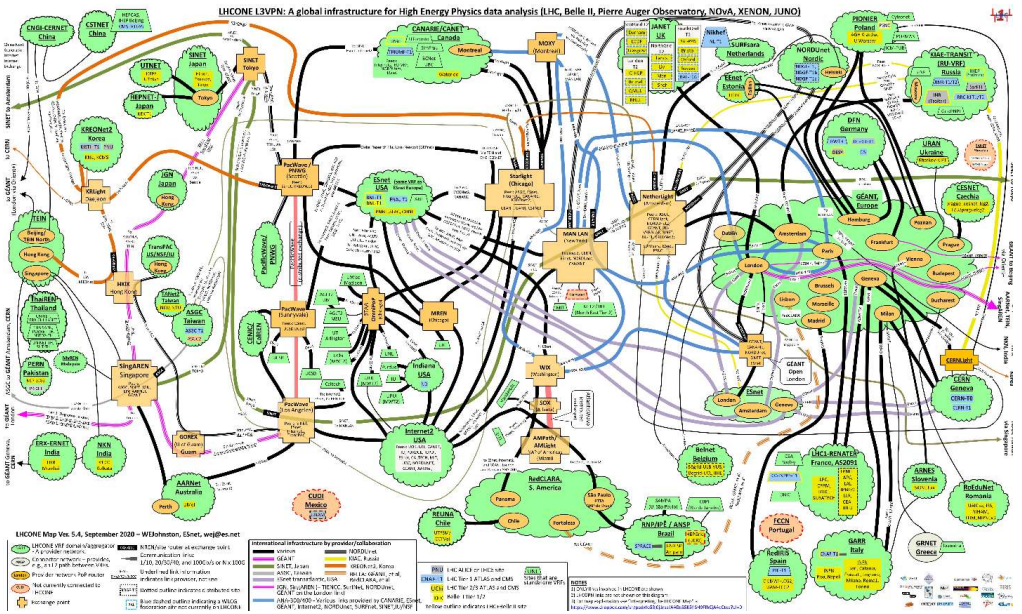


- **Data movement:** moved 286PB in the last year
- **Total bandwidth**: 1.1Tbps to the Tier0
- **CH-CERN**:
  - on-going tender for new computer centre
  - GEANT uplinks being upgraded to 2x100G (total bandwidth 400G)
- **UK-T1-RAL**: link to CERN will be upgraded to 100G. Link delivered, expected in production by October 2020
- **CA-TRIUMF**: new 20G links to SFU
- **LS2 and Run3**: 4 months delay on original schedule because of lockdown

Slides https://indico.cern.ch/event/932306/contributions/3917860/attachments/2103298/3536640/LHCOPNE-20200916-45-LHCOPN-update.pdf

LHCONE L3VPN status - update

- No changes in the last 6 months:
  - 12 Tier 1s
  - 94 Tier 2/3
  - 29 R&E operators
- Some slight reduction in overall traffic
- COVID lockdown doesn't seem to have affected the data movement



New version of LHCONE map

Slides: https://indico.cern.ch/event/932306/contributions/3917850/attachments/2103471/3537365/2020-9-16_ECapone_LHCONE_L3VPN.pdf

BelleII update

- A first analysis of all tape systems has been completed with a good feedback in terms of tape performance.
- Global network connecting KEK vs all data center, stressing SINET 100G links and LHCONE, has demonstrate to be reliable, and the performance in line with the requirements.
- Network Data Challenge performance has been confirmed and in some case improved (UVic)
- Enabling “Activity” view on Grafana has improved the readability of network traffic.

100G Global Ring runned by SINET

Slides: https://indico.cern.ch/event/932306/contributions/4016461/attachments/2103435/3536923/BelleII%20update%20-%20LHCONE_LHCOPN%202020.pdf

Database for LHCONE prefixes

Evaluated two solutions for a database where to store LHCONE prefixes:

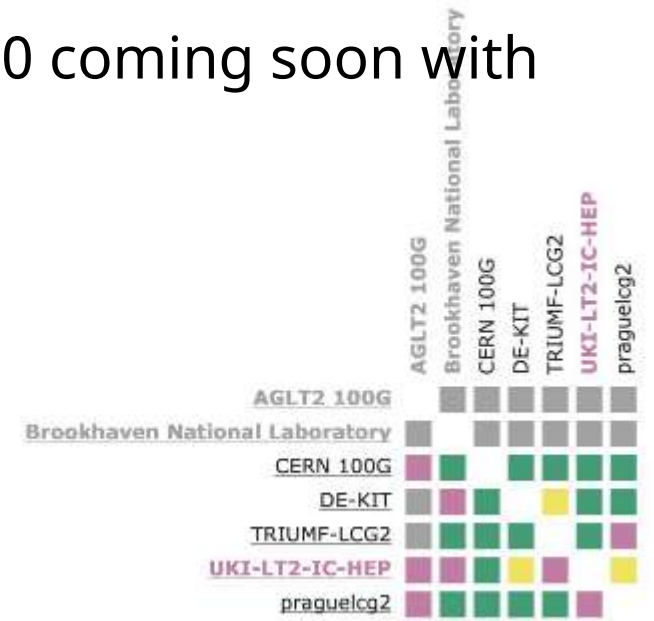
- IRR Internet Routing Registries (whois)
- CRIC Computing Resources Information Catalogue (WLCG)

- Large preference for IRR, because already used by Network Operators
- CRIC could updates its LHCONE prefixes from the IRR (or CRIC could be updated by sites and generate a route-set for the IRR?)
- Implementation will start soon

Slides:
https://indico.cern.ch/event/932306/contributions/3917877/attachments/2103347/3536942/LHCOPNE-20200916-45-LHCONE-prefixes-database.pdf

perfSONAR and monitoring update

- Comprehensive network monitoring platform operated by OSG and WLCG: 288 perfSONAR instances, testing over 5000 links, IPv4 and IPv6
- perfSONAR: latest version 4.2.4. Version 4.3.0 coming soon with Python3 support
- Only 7 probes in 100G mesh, looking for more participants
- New dashboards made in Kibana



Slides: https://indico.cern.ch/event/932306/contributions/3937533/attachments/2101755/3538811/LHCOPN_LHCONE%20perfSONAR%20Update%202020fall%20%281%29.pdf

LHCOPN AUP update

A Working Group is reviewing the AUP. Improvements will concern:

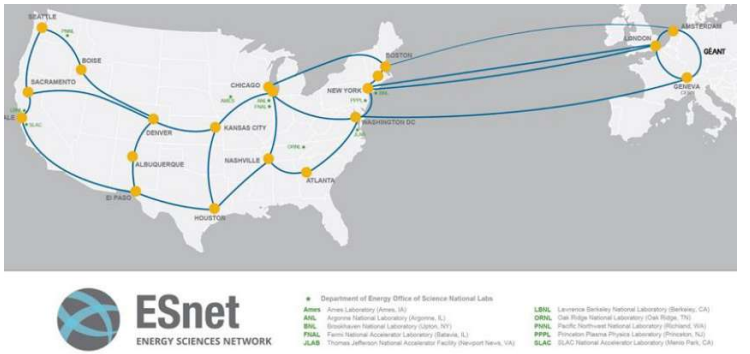
- role and responsibilities
- timing to ban problematic site
- need for ticketing system

Some feedback received from the mailing list

The WG will produce a new version to be discussed at the next LHCONE meeting

Slides:
https://indico.cern.ch/event/932306/contributions/3917857/attachments/2103436/3536925/LHCONE%20AUP%20-%20proposed%20modifications%20and%20survey%20responces.pdf

ESnet requirement process



Presented ESnet requirements review program. It will be use to plan the capacity of the ESnet network in the coming years.

- Formal mechanism via a written case study and in-person discussion, to determine shared understanding of networking needs.
- Formal analysis report to be used in future solicitations and strategic plans
- Several case studies from LHC experiments at the HEP review– ATLAS, CMS, combined operations, HL-LHC

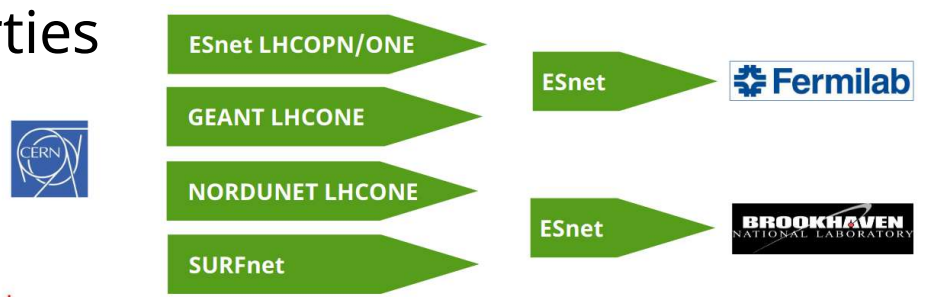
Slides: https://indico.cern.ch/event/932306/contributions/4011998/attachments/2103383/3536796/LHCOPNE-20200916-45-Network-challenges.pdf

WLCG network challenges

The ESnet reviews triggered the discussion on the need to demonstrate the ability to use the network capacity required for HL-LHC:

- 4 Tbps out of the Tier0
- 1Tbps across the Atlantic
- 1Tbps from each Tier1 to the Tier2s
- 1Tbps to HPC centres

A set of challenges and the calendar when to run them will be agreed among all the interested parties



Slides: https://indico.cern.ch/event/932306/contributions/4011998/attachments/2103383/3536796/LHCOPNE-20200916-45-Network-challenges.pdf

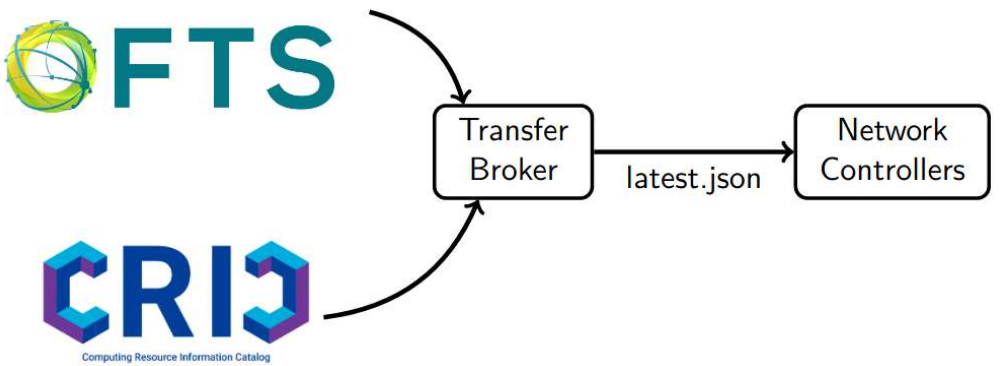
NOTED update

Presented the latest achievements of the NOTED project

The Transfer Broker is being implemented based of comparison of data from FTS and the network monitoring: several FTS parameters have to be taken into account to identify a large file transfer

CRIC is used to identify the IP addresses of the storage nodes involved in a transfer

A prototype will soon be availble



Slides: https://indico.cern.ch/event/932306/contributions/3937488/attachments/2104442/3538831/NOTED__Waczynska_17_09_20.pdf

Research Network Technology WG

Working group that aims to address the main concerns expressed by the LHC experiments.

Focusing now on Packet Marking to make network use visible:
- decided to use the IPv6 flow-label field for marking (20 bits)
- proposed a schema to identify Science-Domain (8 bits) and Application/Type (6 bits)

Seeking large involvement to implement packet marking in applications
- targeting perfSONAR and Xrootd. Others will follow

Work needed on how to consume those bits

Slides:
https://indico.cern.ch/event/932306/contributions/3937507/attachments/2104416/3538776/Research%20Networking%20Technical%20Working%20Group%20Update.pdf

HEP/ESnet requirement review

Overview of R&D activities on Computing, Storage and Networking for HL-LHC
- On networking: need for Tbps links including transatlantic

The ESnet Requirements review:
- Editing on going, to be completed by October 2020
- 13 case studies, 4 specific to LHC
- ATLAS requirments: Tbps capacity, exploit new network capabilities, understand network utilisation
- CMS requirements: large transatlantic bandwidth CERN-FNAL, explore caching, collaborate with R&D projects like SENSE and AutoGOLE

Capacity requirement analyses: 16x more transatlantic bandwidth needed by 2028

Slides:
https://indico.cern.ch/event/932306/contributions/3938361/attachments/2103816/3537947/ESNetRequirementsReview_NetworkIssuesNowtoHLLHC_hbn091620s.pdf

DTNs and AUTOGOLE update

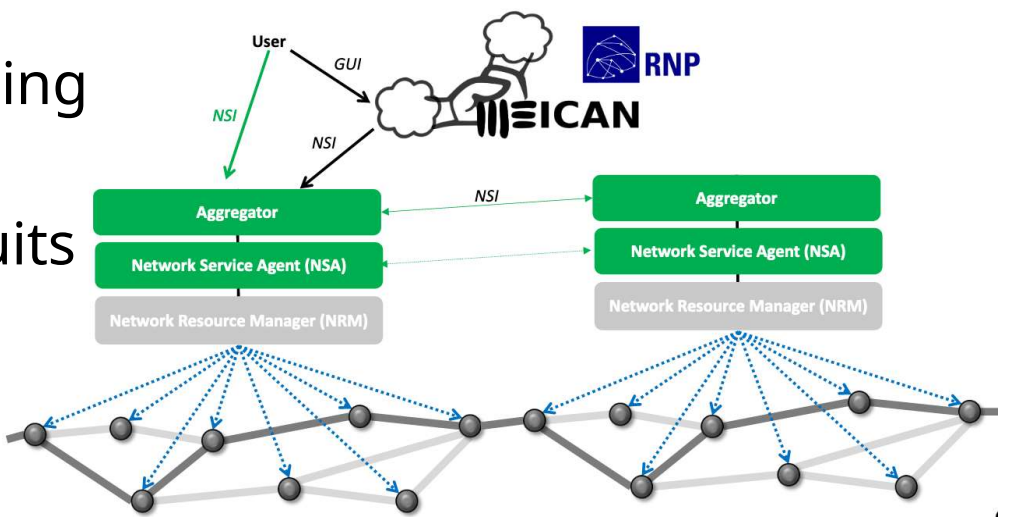
GNA-G AutoGOLE

Multi domain network circuit provisioning system

- Tested data plane connectivity between CERN, Seattle, LA

Working on

- integration with SENSE services
- design and deployment of monitoring system
- Dynamic ANA (provisioning of circuits over ANA transatlantic links)



Slides:
https://indico.cern.ch/event/932306/contributions/3937482/attachments/2104432/3538813/Gerben%20van%20Malenstein%20-%20LHC%20AutoGOLE%20SENSE%20update%20september%202020.pdf

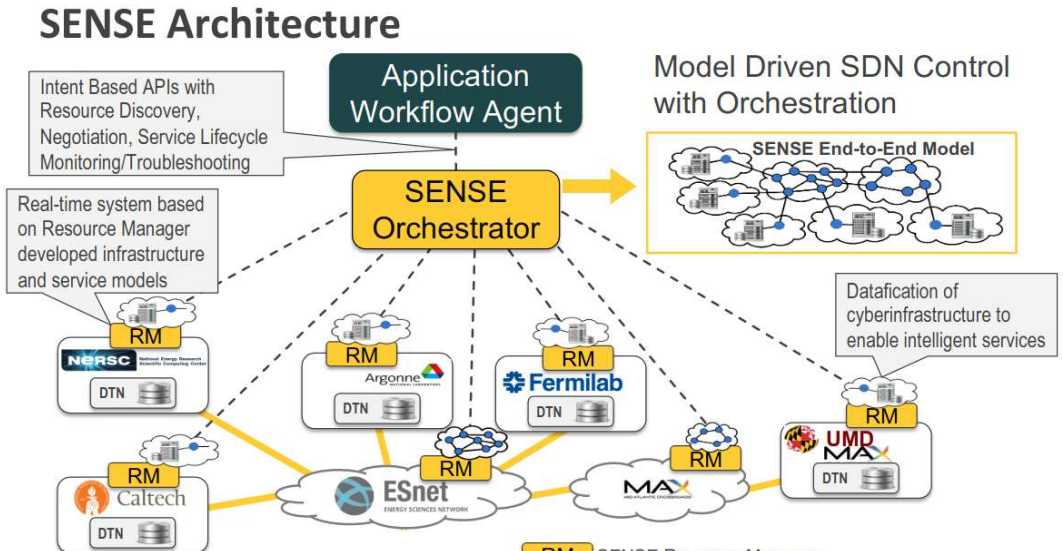
SENSE project update

SENSE is the new network and service provisioning system of ESnet

It is based on the SENSE orchestrator which interfaces with the Resource Managers of the different domains to provision resources

It is used to produce not only connectivity links (L2, L3), but also network services, like DTN services at remote sites

Based on open Markup languages developed by OGF and ESnet



Slides: https://indico.cern.ch/event/932306/contributions/3938362/attachments/2104578/3539052/SENSE-LHCOPN_LHCONE-45-2020-09-17.pdf

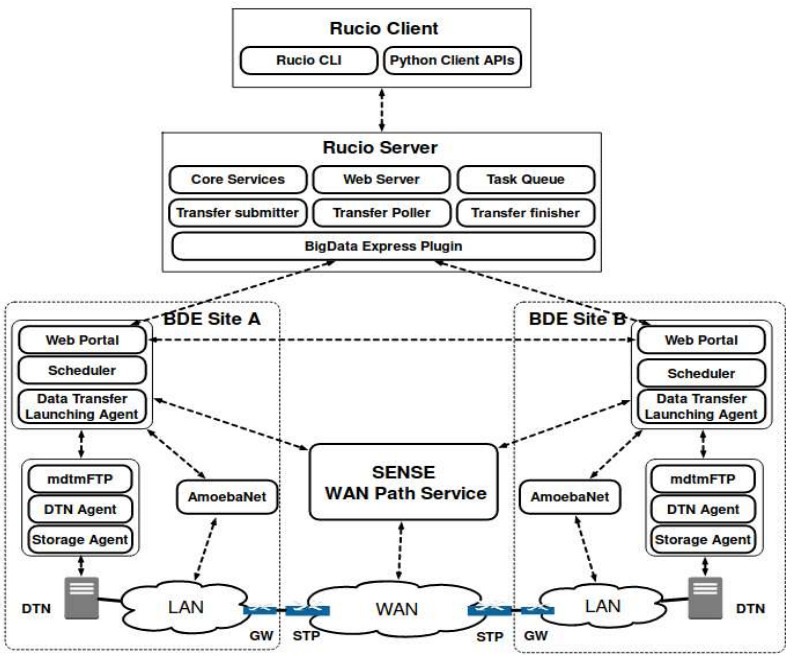
Nextgen data service platform: ROBIN

Platform that integrates Rucio, BigData-Express and SENSE

Rucio data moves are implemented using the BigData-Express DTN service over dynamic circuit provisioned by SENSE

Special focus on security

Working on prototype using DTNs at CERN and FNAL. It will be compared to Rucio-FTS data transfers



Slides:
https://indico.cern.ch/event/932306/contributions/3985625/attachments/2103796/3539264/The%20Next%20Generation%20Data%20Service%20Platform.pdf

Conclusions

Summary

LHCOPN:

- Run3 most likely delayed of 4 months
- Traffic at the same level as previous year

LHCONE:

- No traffic reduction during Covid lockdown
- A new AUP is being drafted. It will be discussed at the next meeting
- Database for LHCONE prefixes: evaluated CRIC and IRR
- Proposal to run network challenges to meet HL-LHC data transfer requirements

BelleII:

- Successful data challenge over LHCONE and SINET

R&D:

- NOTED presented the method used to identify large data transfers in FTS
- The RNTWG presented a proposal to use the IPv6 flowlabel field to tag packets
- Overview of network requirements received from the LHC Experiments
- Presented new network service management tools: AutoGOLE, SENSE and ROBIN

Actions for next meeting

- Prepare proposal for new LHCONE AUP
- Implement database for LHCONE prefixes
- Propose plan for data challenges

Next Meetings

Next meeting: co-located with HEPiX spring 2021 during the week 15-19 of March 2021 at ASGC Taipe (TW). If travel restrictions persist, it will be virtual again.

Following meeting:
- co-located with NORDUnet conference in September 2021

References

Meeting agenda and presentations:

https://indico.cern.ch/e/lhcopne45

Questions?

edoardo.martelli@cern.ch