



中国科学院高能物理研究所
Institute of High Energy Physics
Chinese Academy of Sciences

IHEP Tier1 update

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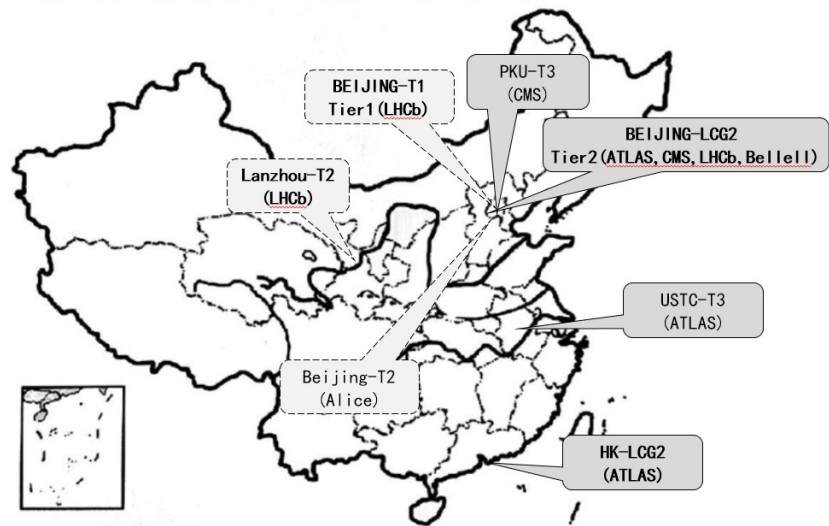
IHEPCC

LHCOPNE#52 in Catania



Overview of WLCG Sites in China

- **LHCb Tier1@IHEP is ready to run**
 - LHCOPN 20G link
 - 3216 CPU cores and 3.2PB disk storage
- **Two Tier2 new sites are under construction**
 - LHCb Tier2 in Lanzhou Univ.
 - 2G dedicated link
 - 3500 CPU cores and 3PB disk storage
 - Alice Tier2 in IHEPCC
 - The Alice Tier2 site will be moved from CCNU(Wuhan) to IHEPCC (Beijing)
 - 1152 CPU cores and 840TB disk storage
- **Chinese Tier-2 Site Federation**
 - ATLAS, CMS, LHCb, BELLEII, JUNO, CEPC
 - 4472 CPU cores and 1050TB disk storage
- **Two Tier3**



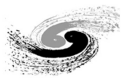


Current Network Status

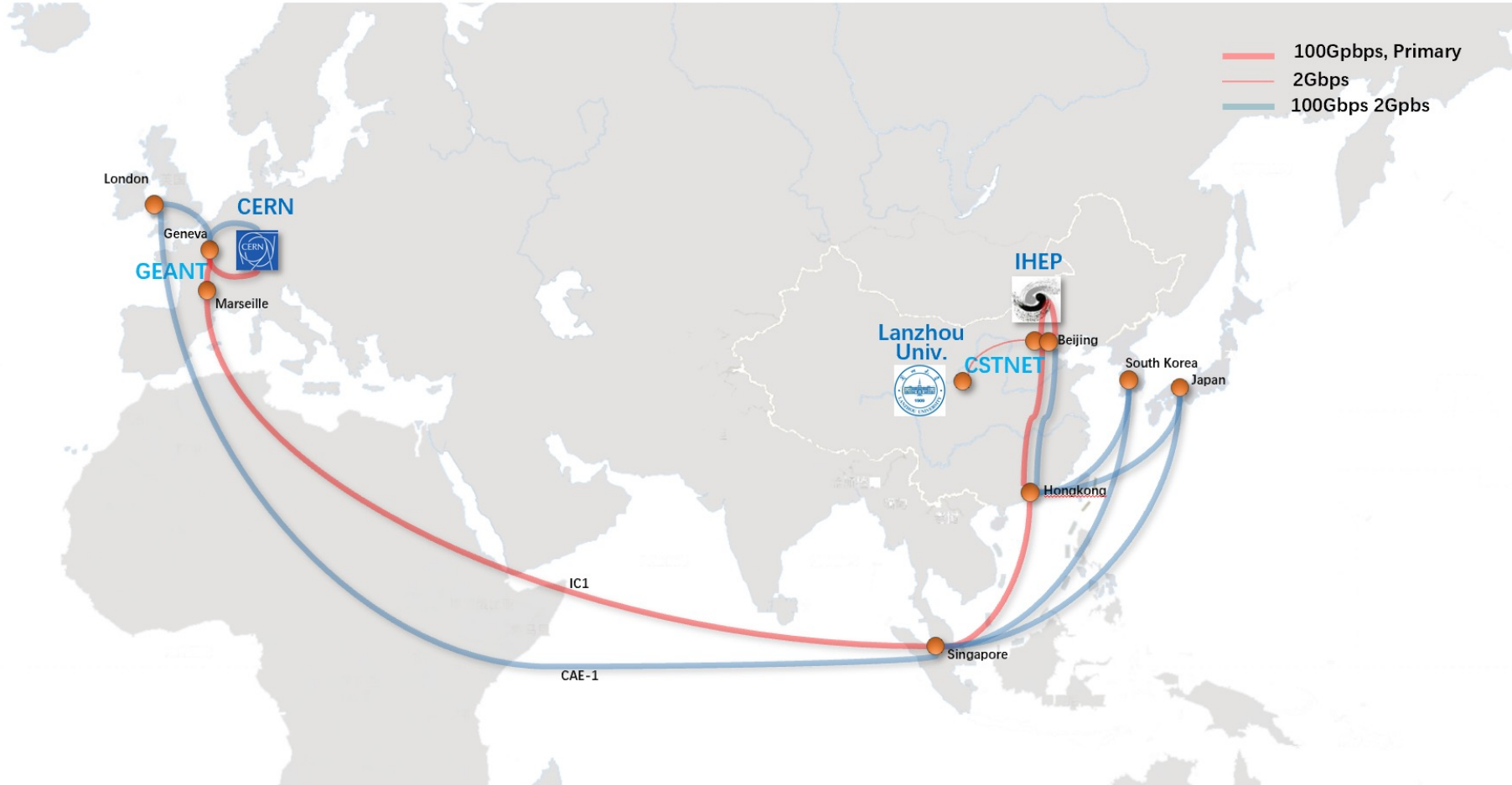
- New 100G link between CSTNET and GEANT was deployed
- An dedicated link of LHCOPN for LHCb T1@IHEP is ready for production
 - Based on the GEANT-CSTNET 100G link
 - Ensure bandwidth $\geq 20\text{Gb/s}$, The bandwidth promised (to lhcb) is 15Gbps

Milestone

- 2023-06 Computing and storage resources was ready for LHCb Tier1 @IHEP
- 2023-06 CSTNET deployed a new 100G link between China and Eur.
- 2023-08 IHEP upgraded the connection to CSTNET from 4X10G to 2X100G
- 2023-12 LHCOPN for LHCb T1@IHEP was online
- 2024-03 Servers and network of LZU-LHCb Tier2 was preliminarily ready
- 2023-04 The results of LHCb data challenge was good



The Current Network Status for LHCb T1@IHEP

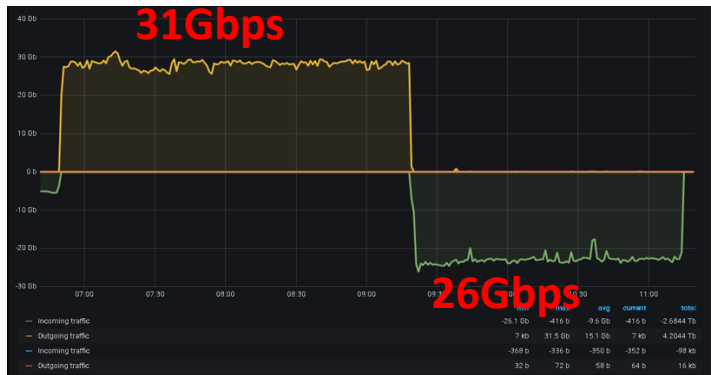


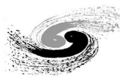


The Status of LHCOPN for LHCb T1@IHEP

Two bandwidth tests has been finished

- Test1 in LHCONE
 - Bandwidth 80G
 - Real data transfer test(based on JUNO data) between IHEP,IN2P3,CNAF,JINR
 - Max = 50.9Gbps
- Test2 in LHCOPN for LHCb T1
 - Bandwidth 20G
 - Iperf3 test between CERN and IHEP
 - Stable more than 20Gbps, Max=31Gbps
- MTU=1500

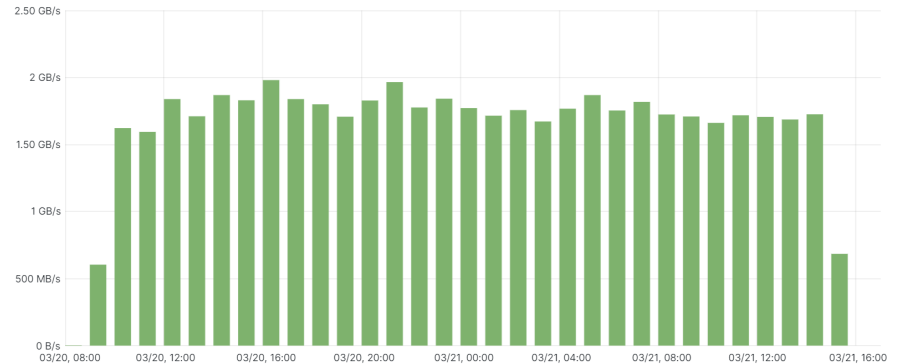
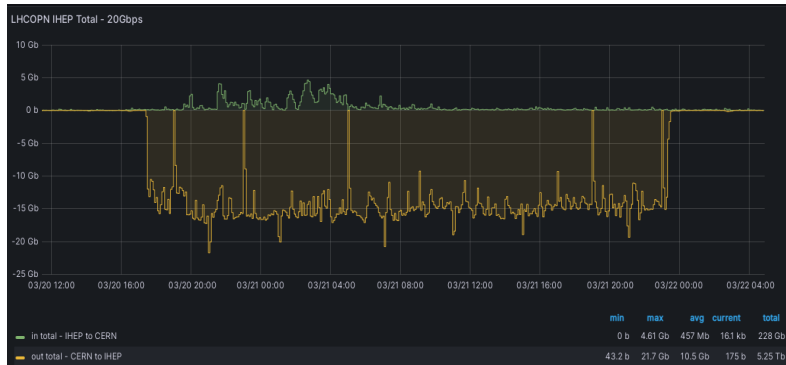




The DC results of LHCOPN for LHCb T1@IHEP

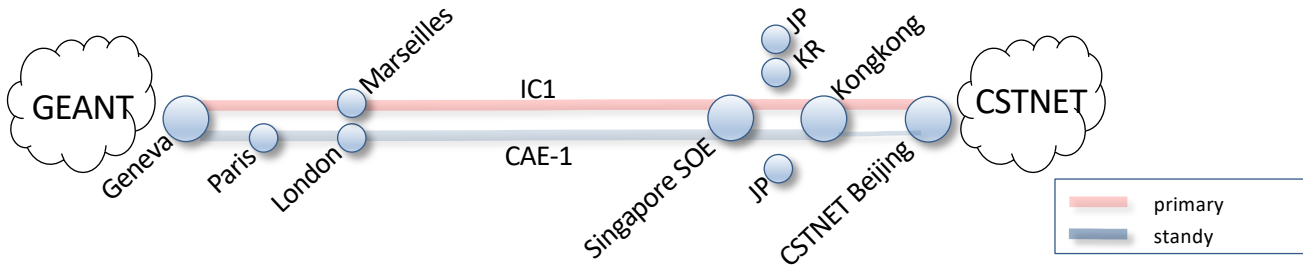
First data challenge has been done

- 189TB data was transferred into IHEP Site in ~2 days
- LHCb system: Average transfer speed is about 1.55GB/s (Max is 1.98GB/s), Transfer efficiency is close to 100%
- Network moni-t: Average transfer speed is about 15Gb/s (Max is 21.7Gb/s)





The bandwidth guarantee policies of LHCOPN for LHCb T1@IHEP



Physics Link between
CSTNET and GEANT

available bandwidth $\geq 60\text{Gb/s}$

Between CSTNET and Singapore
Link bandwidth: 100G
available bandwidth: $\geq 60\text{Gb/s}$

Between Singapore and Marseilles(IC1)
Link bandwidth: 100G
available bandwidth: $\geq 60\text{Gb/s}$

Between Marseilles and Geneva
Link bandwidth: 200G
available bandwidth: $\geq 60\text{Gb/s}$

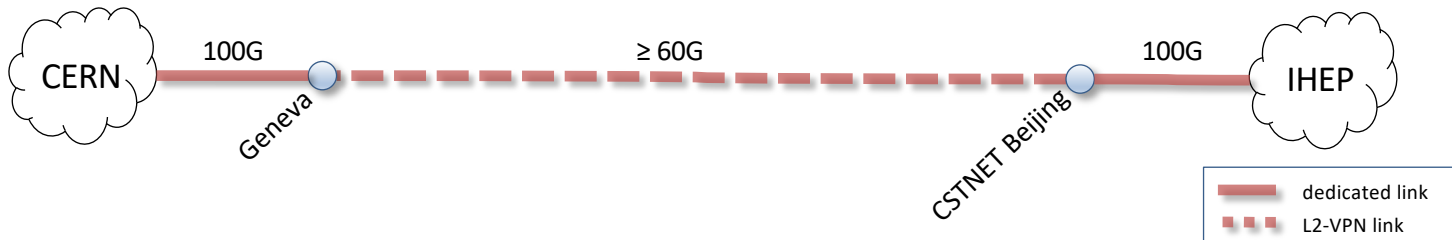
available bandwidth 10Gb/s

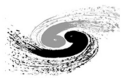
Between CSTNET and Singapore
Link bandwidth: 10G
available bandwidth: $\geq 10\text{Gb/s}$

Between Singapore and London(CAE-1)
Link bandwidth: 100G
available bandwidth: $\geq 60\text{Gb/s}$

Between London and Geneva
Link bandwidth: 400G
available bandwidth: $\geq 130\text{Gb/s}$

Link of
LHCOPN-IHEP





From CSTNET-Beijing to Geneva

- Bandwidth of LHCOPN@IHEP is ensured 20Gbps by traffic policy

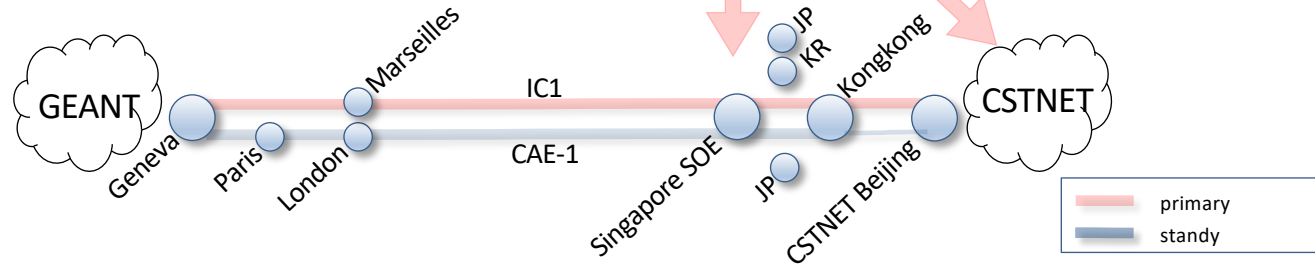
From Geneva to CSTNET-Beijing

- GEANT ensures available bandwidth is enough
- CSTNET ensures available bandwidth is enough

```
traffic policy GuoJi-Singapore
undo share-mode
classifier LHCOPN-ip behavior permit precedence 10
classifier all-ip behavior 80G precedence 100
#
traffic behavior 80G
car cir 80000000 cbs 1250000000 green pass red discard
#
```



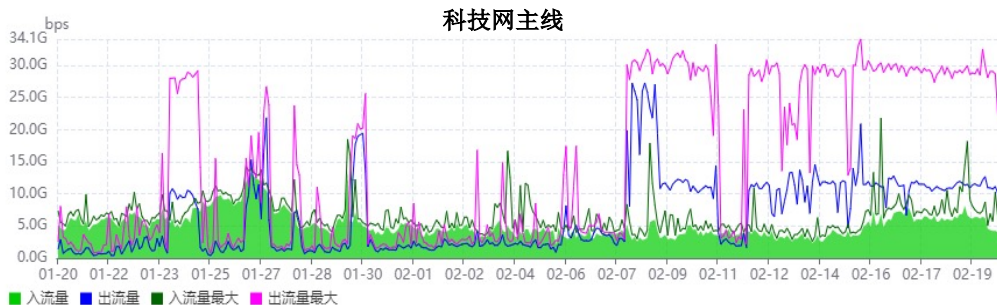
CSTNET
Limit Others <= 80Gbps
Bandwidth Reservation =20Gbps



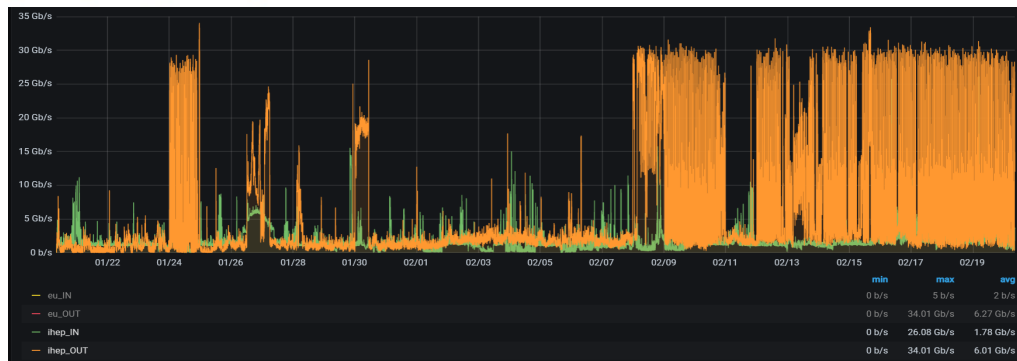


Comparison of traffic charts between CSTNET and IHEP

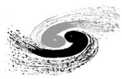
CSTNET 100G link



IHEP 100G link



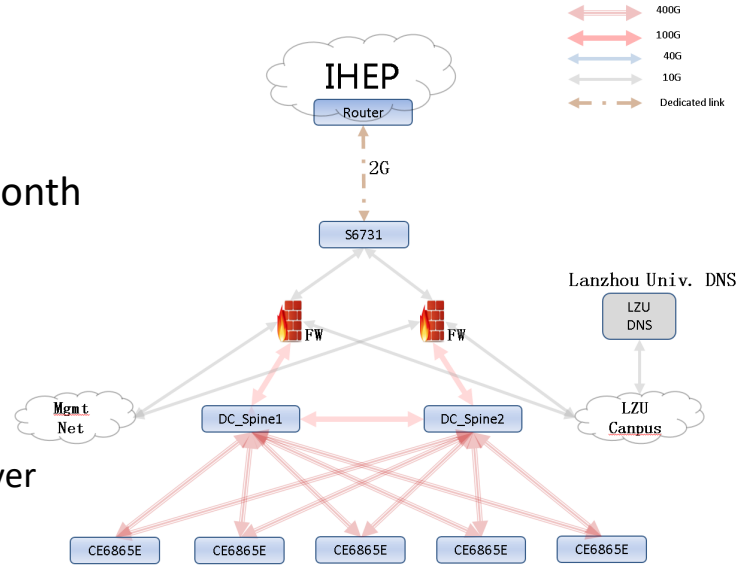
IHEP WLCG traffic is the main traffic of the CSTNET-GEANT 100G link



The Status of LHCb Tier2 in Lanzhou UNIV.

Current Status

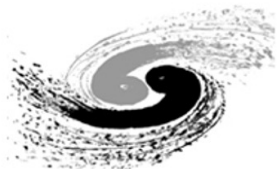
- Network
 - 2G dedicated link to IHEP
 - Data center network was deployed last month
- The storage and computing resources
 - Server is ready
 - The WLCG system is deploying now
- Domain name resolution is provided by LZU's DNS server





Summery

- LHCOPN for LHCb T1@IHEP was online
 - Deliciated network and bandwidth ≥ 20 Gbps was ensured
 - The result of data challenge was good
 - Thank to CSTNET, GEANT and CERN
- LHCb Tier1 is ready for production and Tier2 will be completed soon



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Thank you
questions?

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