T2_BR_SPRACE CMS Tier-2 Cluster

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Worker Nodes

- 29,702 HS06, we pledged 25,200 HS06 to CMS
- 128 worker nodes
  - 1,792 physical cores
  - 2,688 HT cores
  - 768 cores with 4 GB
  - 128 cores with 3 GB
  - 1,280 cores with 3.2 GB
  - 512 cores with 2 GB

Storage Servers

- 2,325 TB
- dCache distributed storage system
  - 1 Storage Element
  - 13 Pools Servers AKA data nodes
    - 10/40 Gbps NIC
    - 852 hard disks (1–6 TB)

Servers

- Headnodes and Auxiliary Servers
  - CE: HTCondor-CE gatekeeper and HTCondor job scheduler
  - Shared Filesystems: NFS
  - Proxy Servers: 2 frontier squids
  - Support services: Grafana, VM servers, DNS server,Prometheus, AlertManager, The Foreman, Ansible

Network Infrastructure

LAN

- Cluster internal connections
  - Worker nodes: 1 Gbps (to TOR switches)
  - 10 Gbps links between TOR and core switch
  - NFS, PerfSonar, Frontier, VM servers, storage servers: 10 Gbps

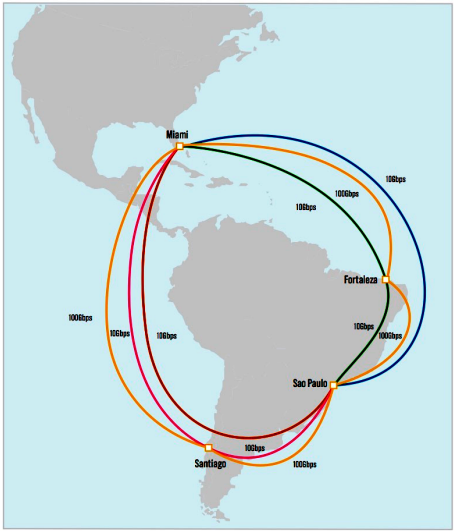
MAN

- SPRACE to ANSP provider
  - 10 Gbps, in production
  - 100 Gbps (2 X 40G + 2 X 10G)
  - Full 100 Gbps channel
  - Links fully dedicated, independent from university commodity network

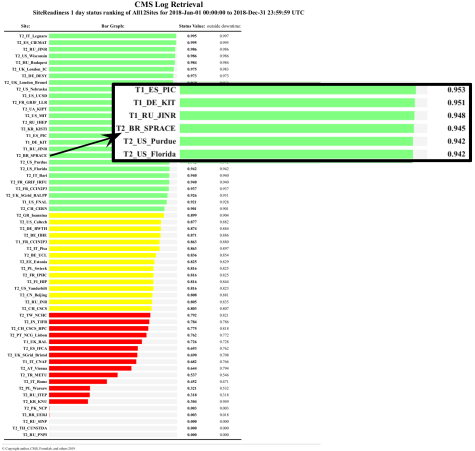
Network Infrastructure

WAN

- Best academic international link in Brazil
- AmLight Connection to Miami
  - 4 X 10 Gbps (2 Pacific & 2 Atlantic)
  - 2 X 100 Gbps (1 Pacific & 1 Atlantic)

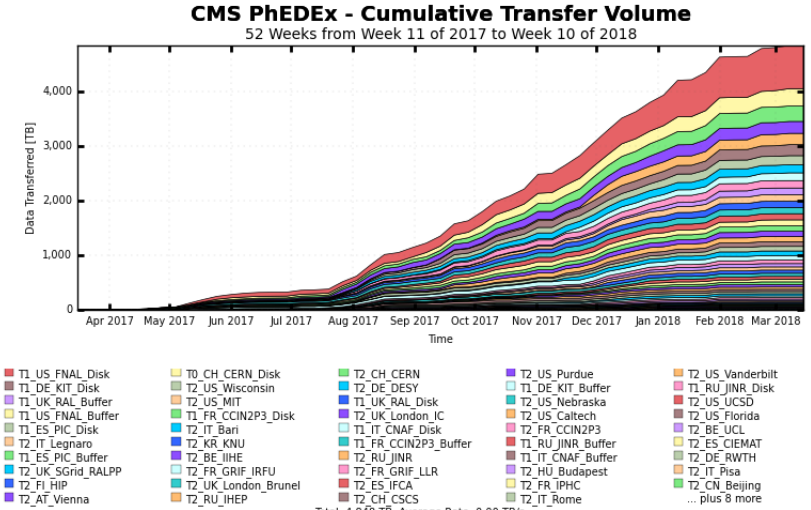


Site Readiness

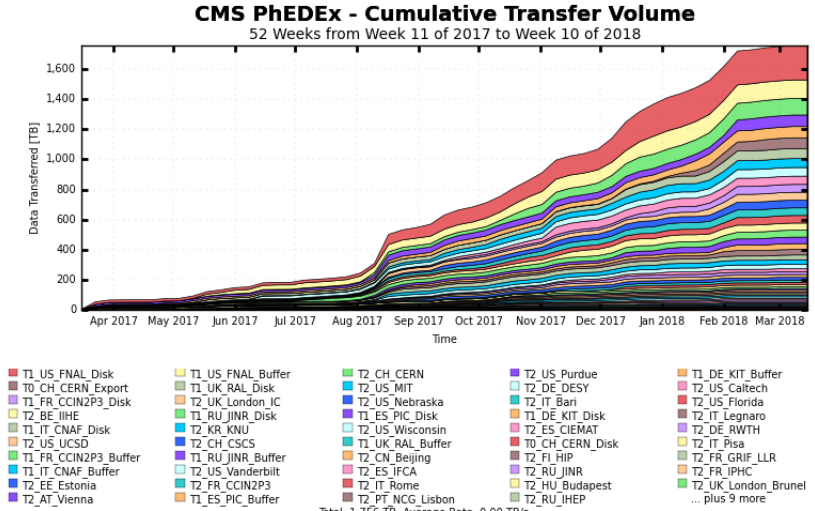


- Good results in availability and reliability
  - 94,5% in the last year of RUN II(2018)
  - Site admin hard work
  - Datacenter stability (network, power, cooling)

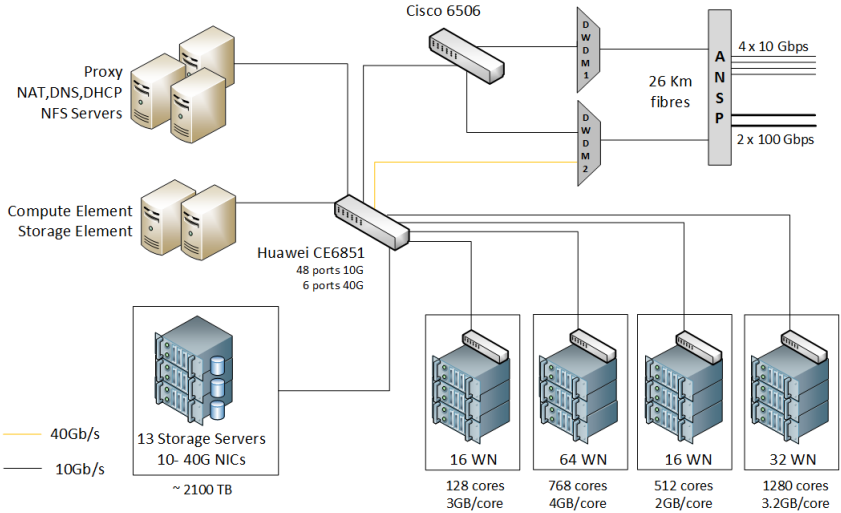
PhEDEx Transfers to SPRACE



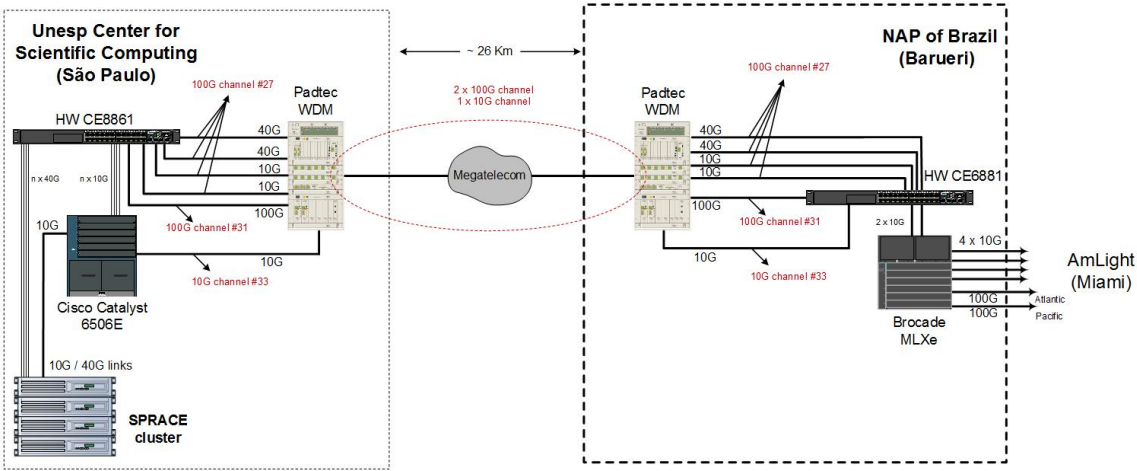
PhEDEx Transfers from SPRACE



SPRACE Cluster



SPRACE External Connections



What to expect to RUN 3

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Processing

- Increase of processing power
  - add more WN
  - decomission of older machines
  - increase our CPU pledge to 30 kHS06 in 2022
  - Another increase on the CPU pledge to 45 kHS06 in 2024
  - improve the LAN to 10 Gb on the WN and to 40 Gb on the TOR switches
- evaluate the use of GPUs in the near future

Storage

- Increase the space to 3 PB in 2022
- Add more 500 TB in 2024

Questions?