Future Computing needs: neutrinos

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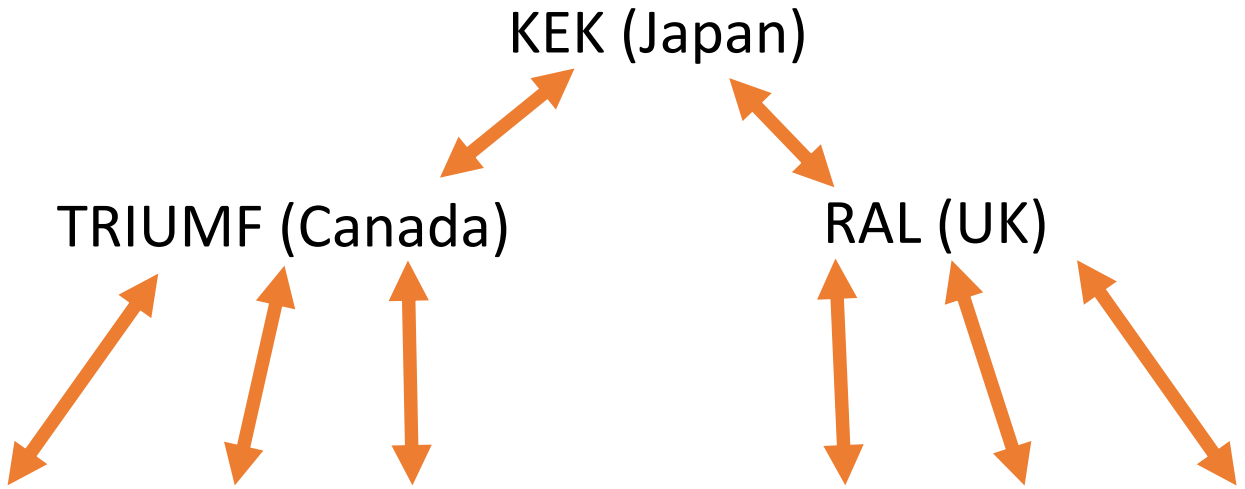
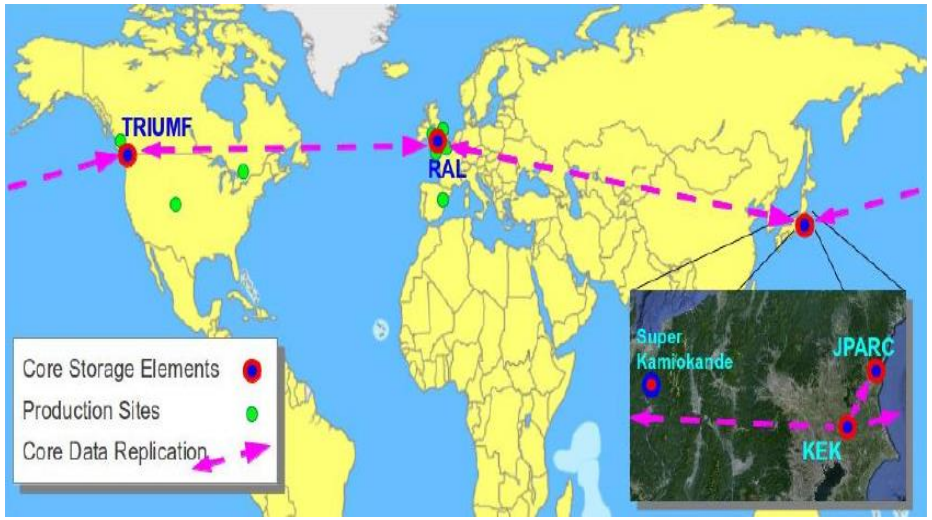
First investigation → no specific requests to coordinate at the moment

what should we expect in future?

Experience from running experiments (T2K, MicroBooNE, SBND) in view of future long baseline experiments

T2K uses distributed computing model using elements from other large HEP experiments, in particular the WLCG





North America:

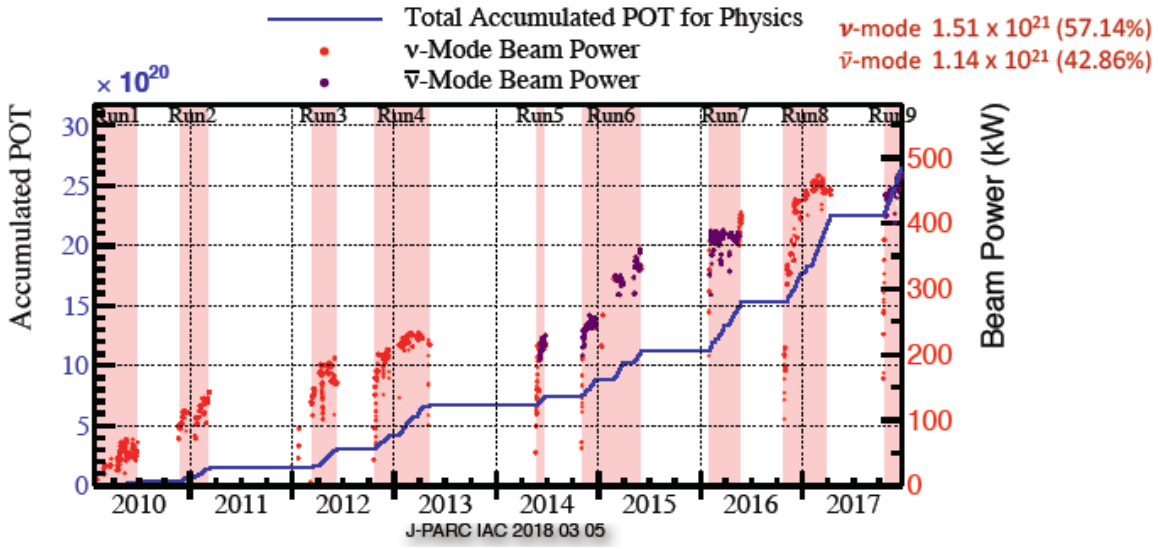
3 sites for MC production (Vancouver, Toronto, Colorado), storage at TRIUMF (Tier1, 700 TB).
Canada provides substantial part of T2K computing efforts (600 core-years)

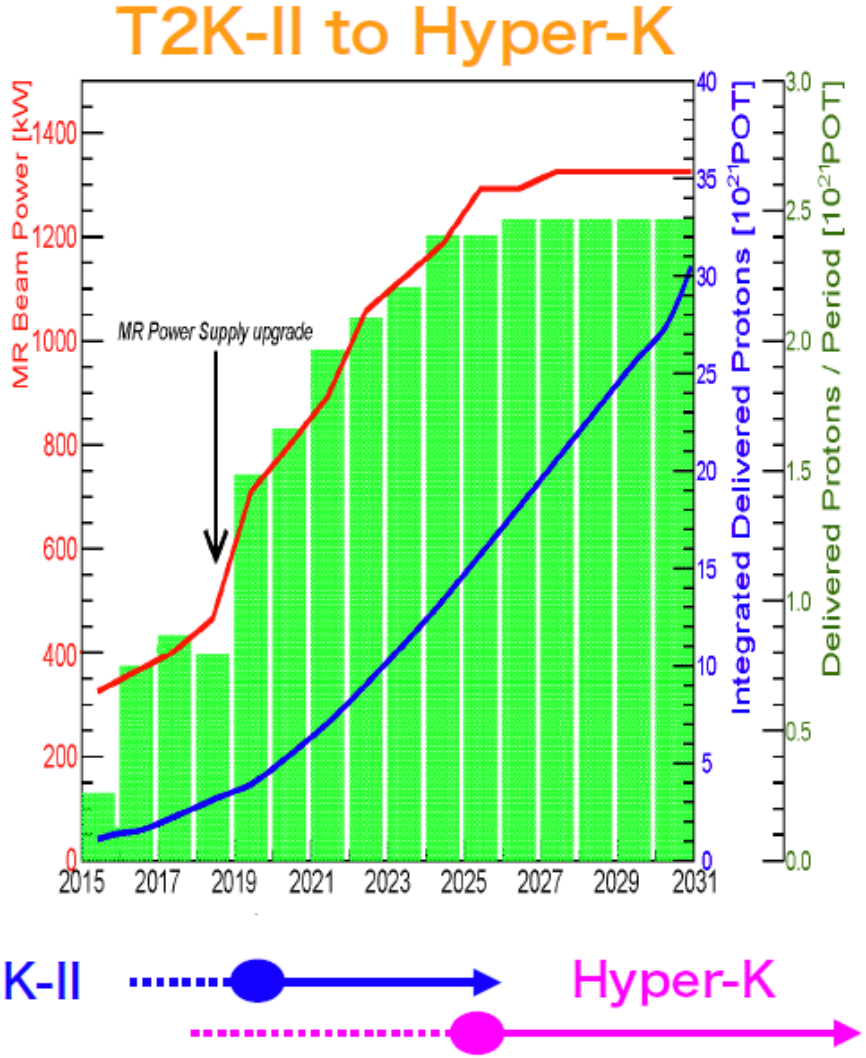
Europe:

Resources provided through LHC Computing Grid. 7 computing sites through the UK. Geneva was contributing with its Tier3 for a period.
Storage at RAL-LCG2 (Tier1, 700 TB)

currently 1.5 PB ND280 MC dataset

Near to far future: toward T2K phase II and Hyper-K





Beam power increase from 500 kW to 1.3 MW
integrated POT x 10
ND upgraded scheme
Super-K → Hyper-K

→ a x2 / x3 increase of computing needs expected

MicroBooNE

Presently the only O(200)ton LArTPC operating for a few years
Raw data size ~40 MB/event
Simulated and reconstructed data can be even larger O(100-150 MB/event)

Total data storage: 11 PB in 2 years of operations

simulation time 200 sec/event.
reconstruction time (data or mc) 100 sec/event

MicroBooNE used 11.2 M cpu-hours in the last 12 months (> 1000 core at 100% efficiency)

I/O bottlenecks are the most important constraints on MicroBooNE ability to process data currently

Similar needs expected for SBND

DUNE

1.3 MW neutrino beam fired from Fermilab
Far detector: 40 kt Lar (MicroBooNE x 200), but much lower rate
Near detector: final design being finalized, O(10^8) collected neutrino interactions
Pixels deliver more data, but better options for zero suppression expected

Reconstrution algorithms in LArTPC not yet finalized
$\rightarrow$ difficult to make precise extrapolations

Ongoing discussion about computing. No formal request at present time. There could be in future, once the overall picture will be more clear.

$\rightarrow$ Further investigations / interactions needed

A statement from DUNE computing coordinators: «maybe something like 10% of an LHC experiment»