

# NORDUnet's views on cloud and cloud providers

## LHCOPN/ONE meeting

Taipei, March 2016



## CMS

- “For example CMS is working with Amazon Web Services (AWS), via a research grant awarded to CMS earlier in 2015, as well as continuing to work on a remarkable number of projects that aim at *enabling CMS to burst into extra (commercial or not) resources on demand.*”
- “After the commissioning period, we were able to stably running at >50k cores continuously for days. AWS resources contributed to several official Monte Carlo production requests, corresponding to ~500M events to be used for Moriond 2016. In this period, *AWS contributed to more than 20% of the global CMS concurrent capacity.*”

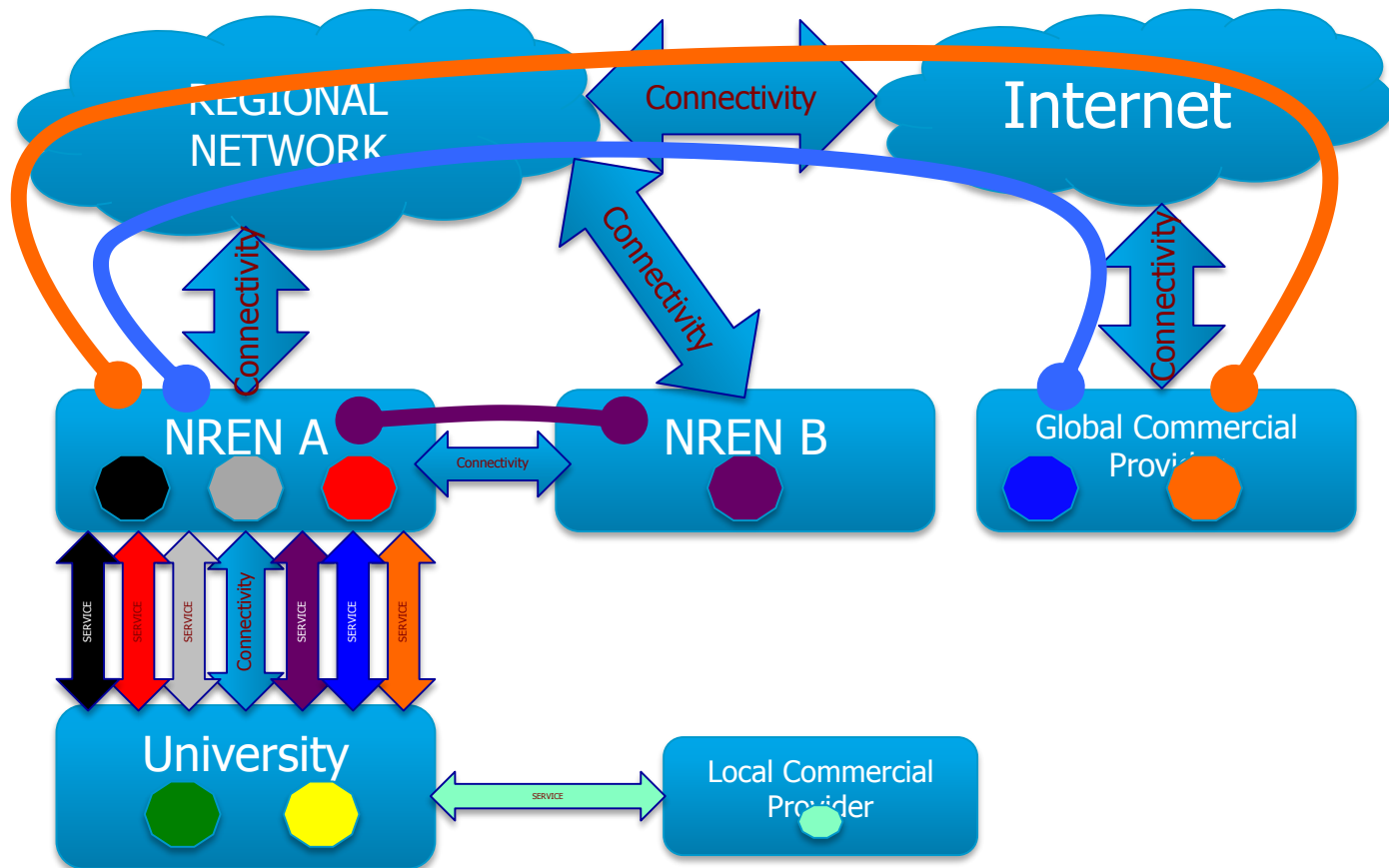
## ATLAS

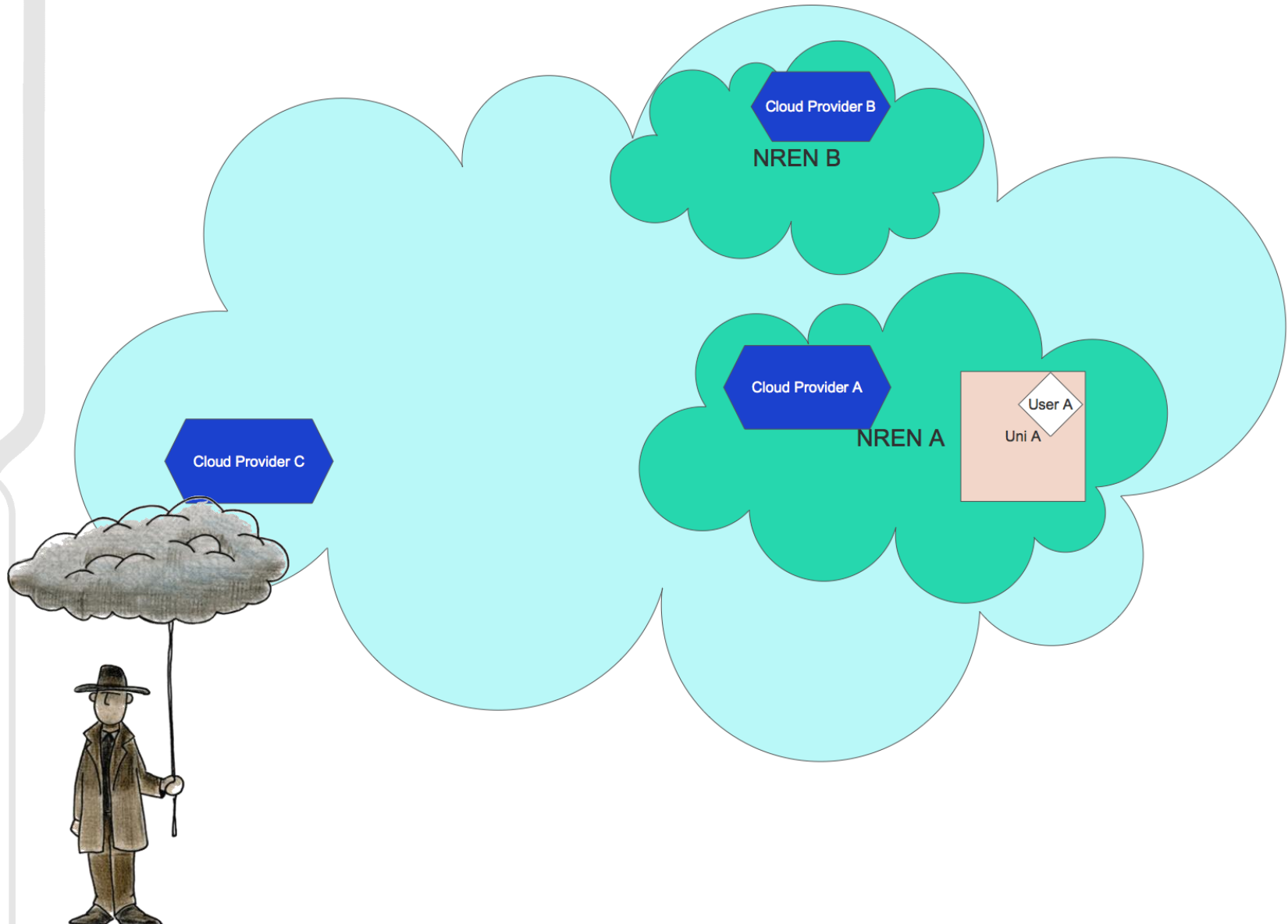
- “ATLAS continues to engage proactively with possible sources of beyond-pledge CPU power. *ATLAS has already run production on donated and commercial cloud resources or volunteer computing.*”



- Big Players (GAFA = Google, Apple, Facebook and Amazon)
- Local commercial players, selling point often that they are in line with local legislation
- NREN working on cloud services (filling niches)
  - Can NRENs compete with the market for generic cloud services?

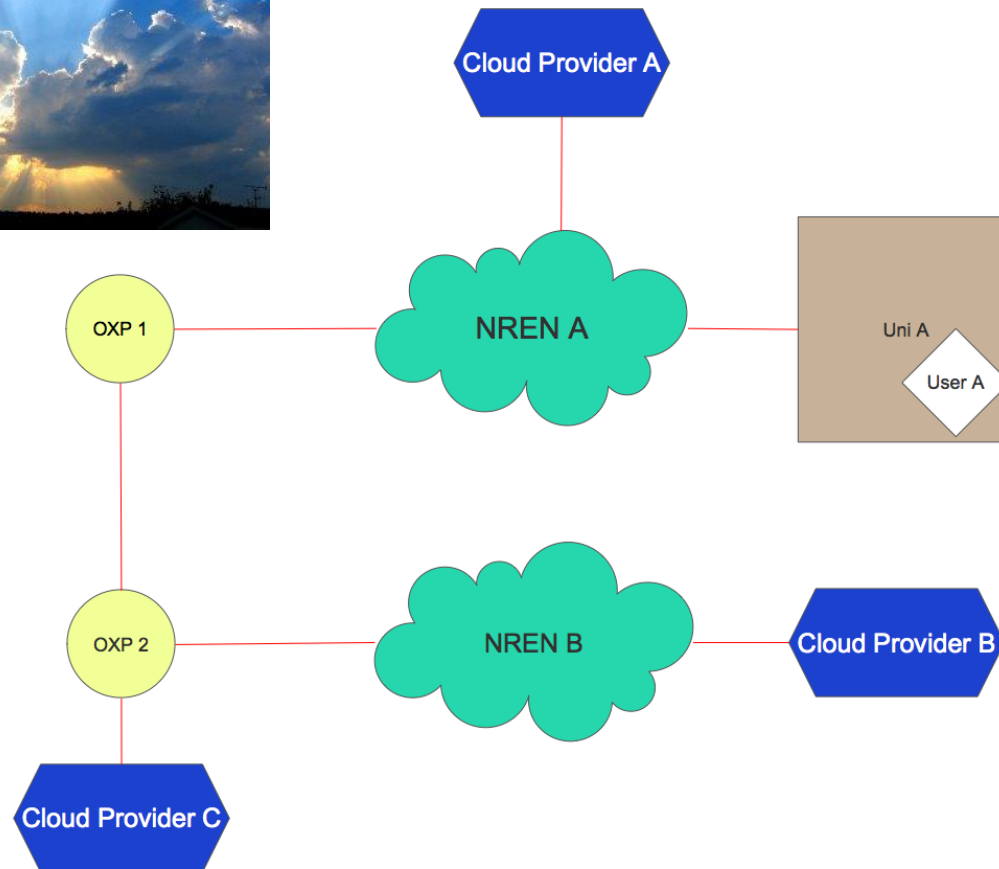
- NREN working on cloud services
  - Our view is that a NREN should aggregate demand from constituency, act as system integrator.
  - Add value, for instance integrate with identity federations.

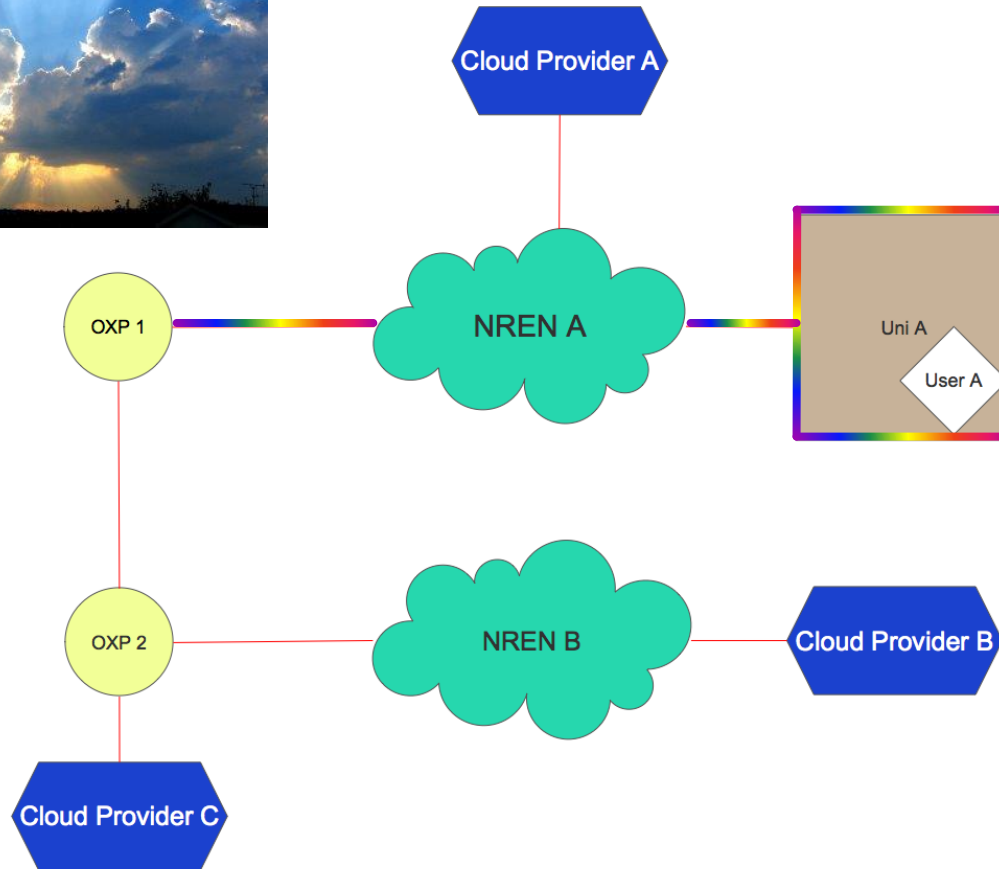




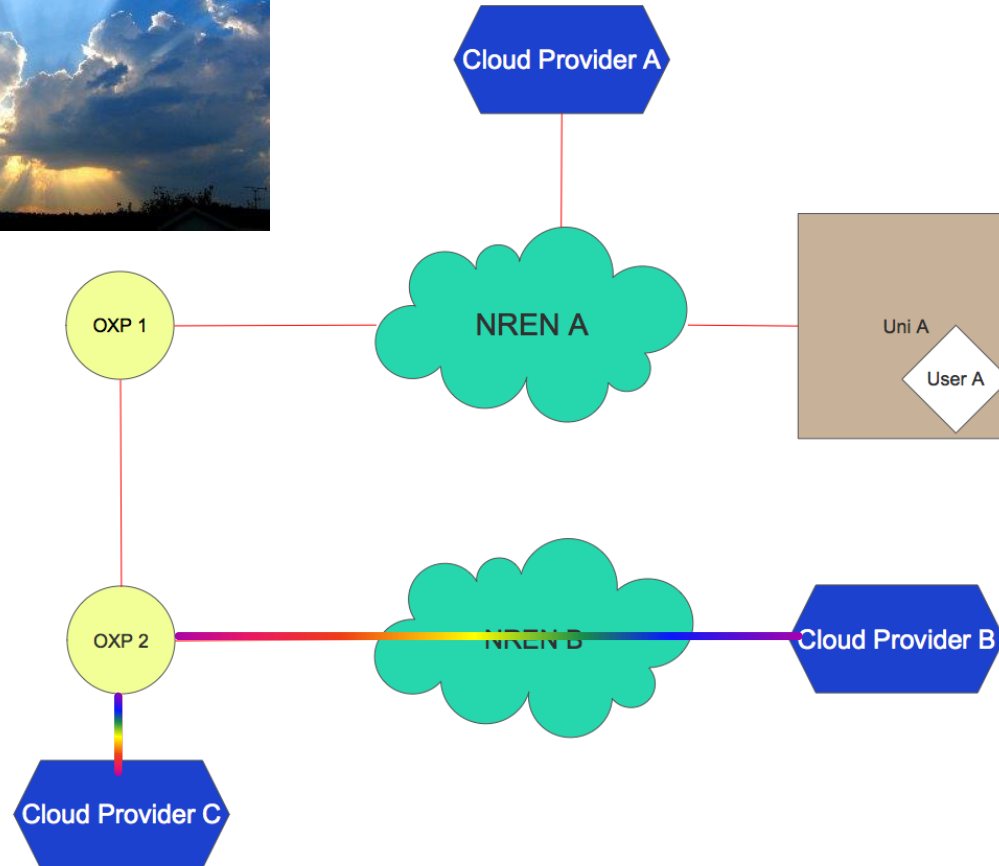
We can break the problem into smaller pieces using open exchange points

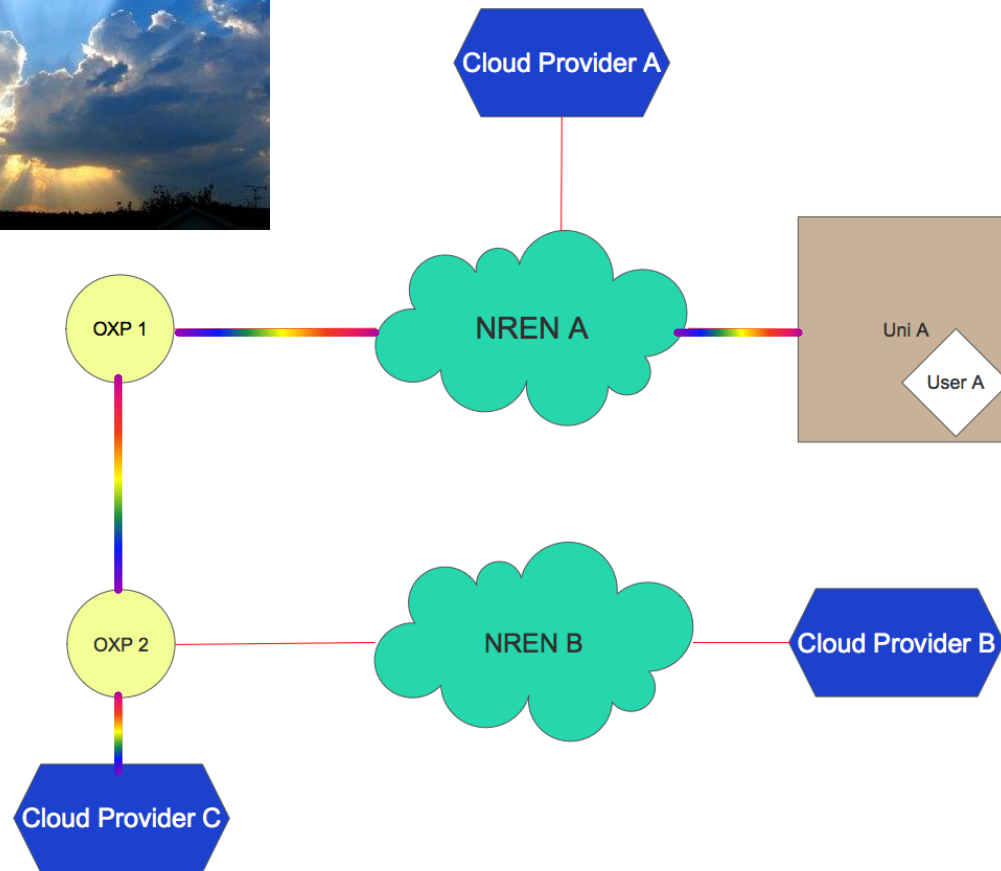
- NREN ensures connectivity for user institutions (as usual)
- NREN connects to one or more OPXs (and each-other)
- Cloud provider has NREN connectivity through:
  - Direct connections to NREN
  - Connections to one or more OXPs

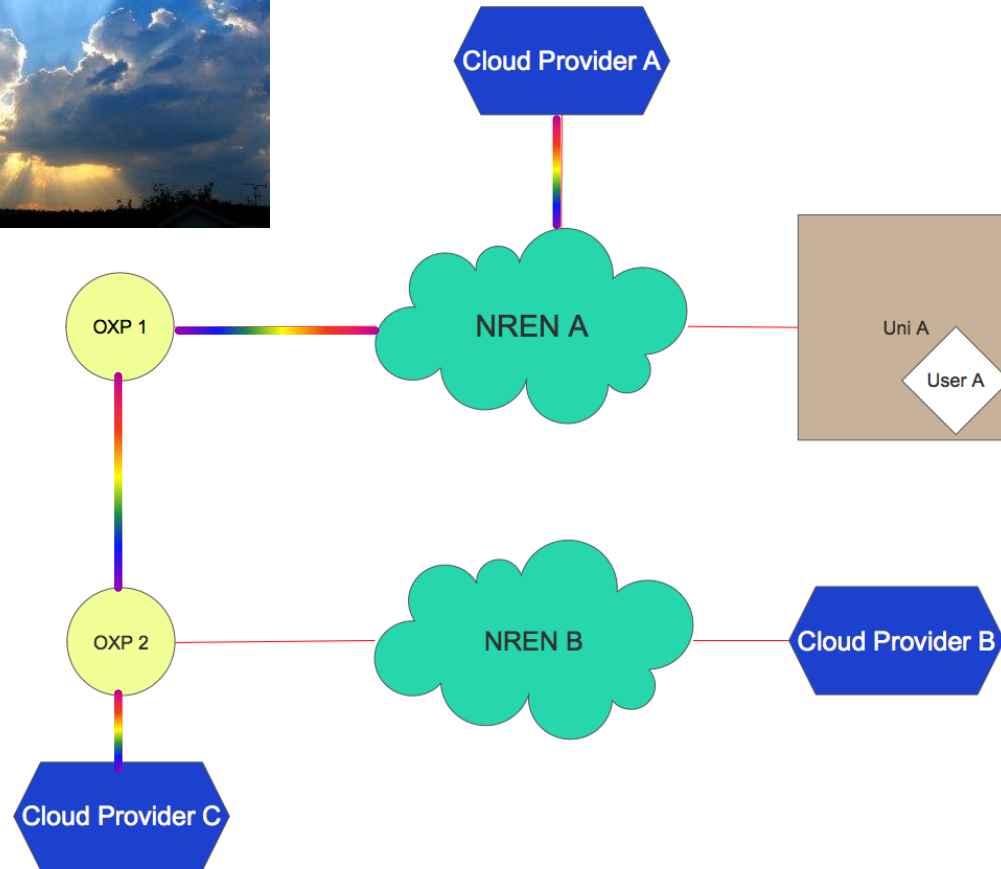


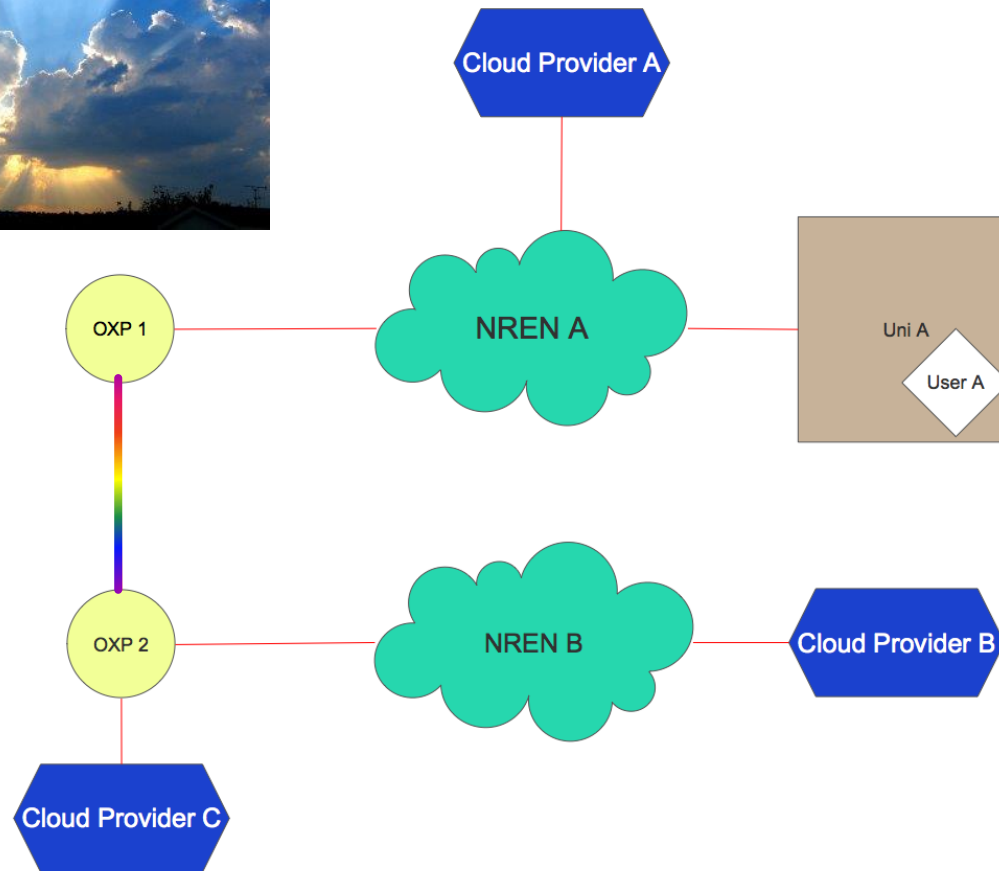












- All links and networks used must allow for Cloud-Researcher traffic, without AUP restrictions.
- Open Exchanges and any links used to connect commercial cloud providers must also allow for Cloud-Cloud on behalf of a researcher.
  - Note that due to the way OXPs are used, no such requirement exist for the networks used to connect user institutions.
- We must resolve any cost sharing required for connecting providers to exchanges (or require providers to carry that cost), and we must resolve cost sharing for inter-exchange traffic in cases where this is not a service offered by aggregation networks.

- Clouds are already here and being used.
- NRENs can support the scientists in using clouds.
- The approach suggested here fits nicely with the way NORDUnet things of Global networking.