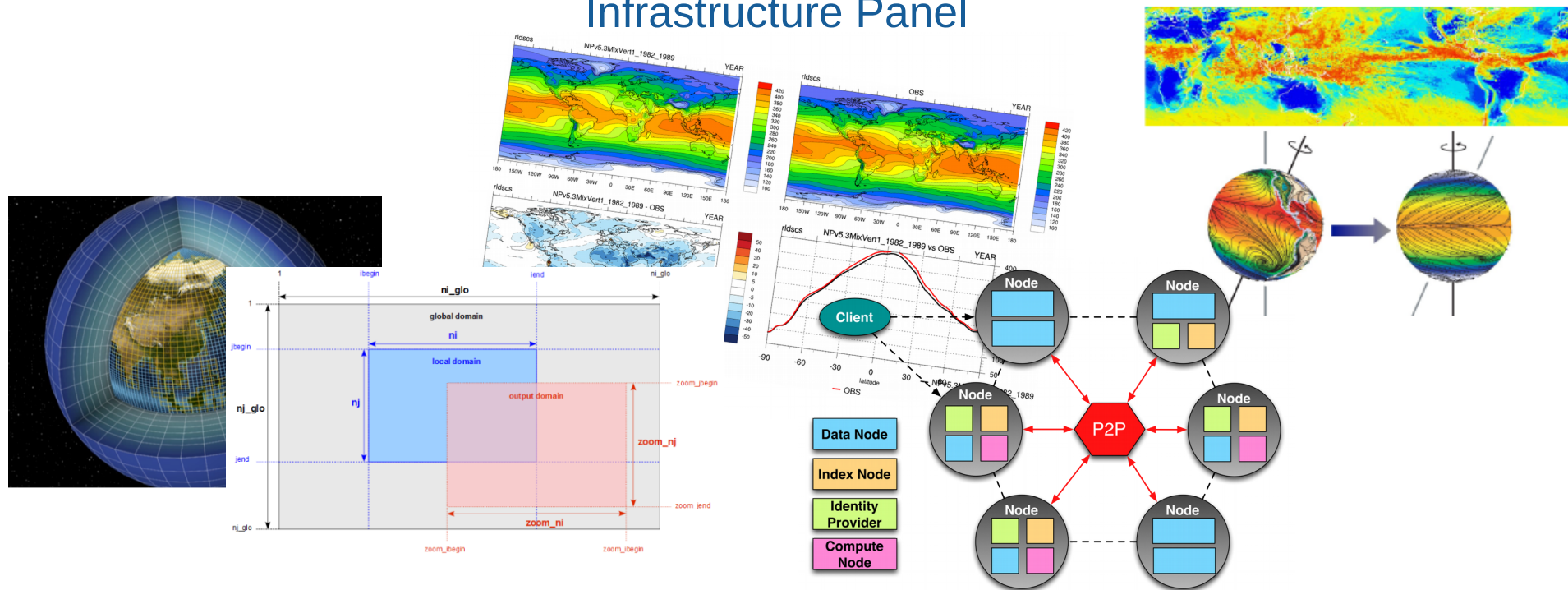


CMIP6 ESGF Tier 1 and Tier 2 Nodes

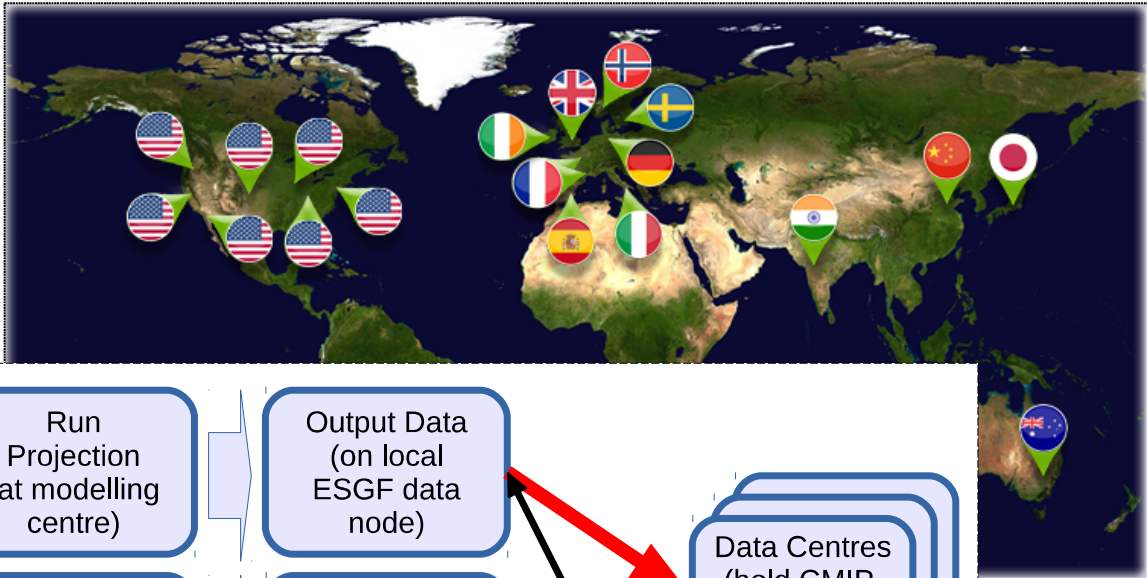
Sébastien Denvil (IPSL), Michael Lautenschlager (DKRZ).
 With contributions from ESGF Executive Committee and WGCM Infrastructure Panel



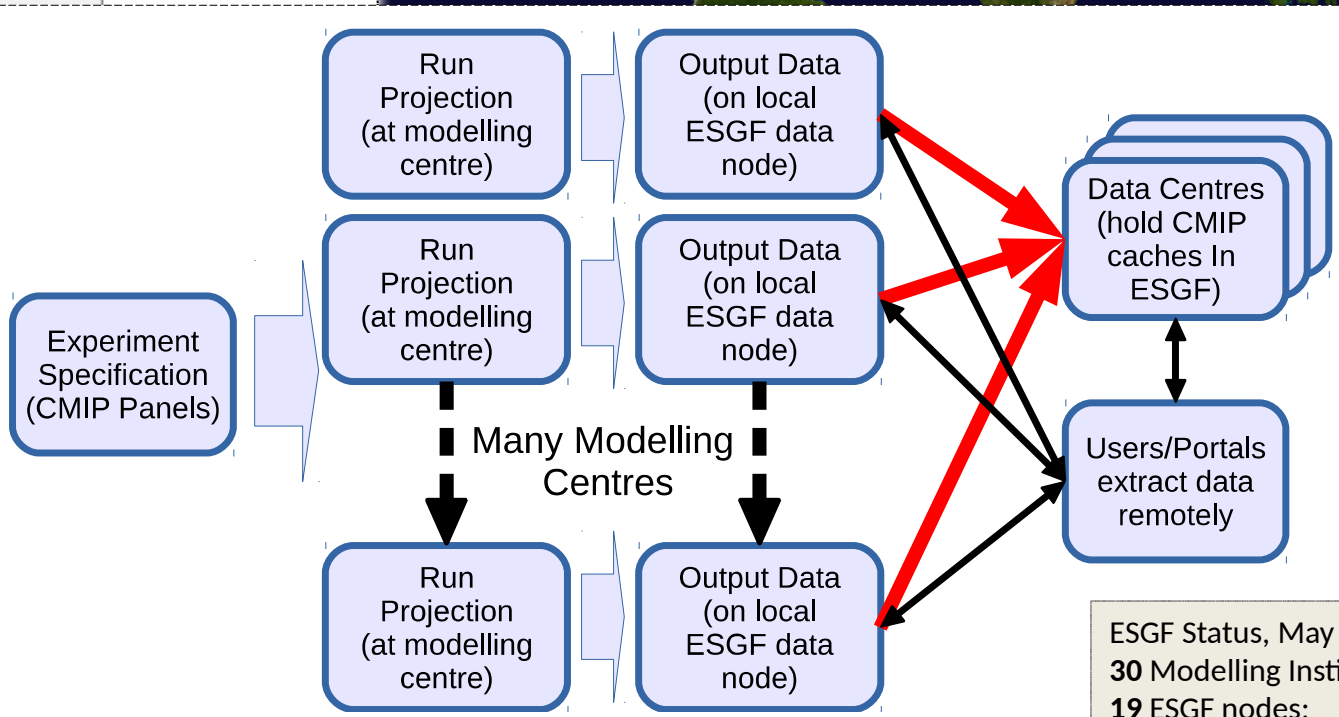
Tiers 1 & Tiers 2 requirements for CMIP6. State of play and what are your views and questions on this.

- The ESGF Executive Committee tasked Michael Lautenschlager and Sébastien Denvil to draw the Tiers 1 / Tiers 2 requirement for ESGF.
- After discussions and iterations within the ENES Data Task Force we came up with the basis I show today.
- We try now to collect feedbacks from group like the CDNOT and you.
- Ag mentioned we should also have an inventory of the amount of cores a Tier 1 candidate will make available for the community.

ESGF Data Infrastructure



- Institute**
- BCC (6891)
 - BNU (512)
 - CCCMA (21879)
 - CMCC (1189)
 - CNRM-CERFACS (5422)
 - COLA-CFS (884)
 - CSIRO-BOM (625)
 - CSIRO-QCCCE (3120)
 - FIO (230)
 - ICHEC (2966)
 - INM (486)
 - INPE (24)
 - IPSL (10637)
 - LASG-CESS (2568)
 - LASG-IAP (418)
 - MIROC (11509)
 - MOHC (23452)
 - MPI-M (11654)
 - MRI (4804)
 - NASA-GISS (4781)
 - NASA-GMAO (1620)
 - NCAR (4922)
 - NCC (1014)
 - NCEP (870)
 - NICAM (15)
 - NIMR-KMA (63)
 - NOAA-GFDL (14932)
 - NSF-DOE-NCAR (949)
 - SMHI (1840)
 - UNSW (26)



ESGF Status, May 2015:
30 Modelling Institutes;
19 ESGF nodes;
6 index nodes.
140,032 datasets of which
58,174 European (42%)

Data provider information (22 PB)

- IPSL** provisioned 2 PB. CMIP6 simulation starts January 2017
- GFDL** provisioned 1.5 PB CMIP6 simulation starts January 2017
- NCAR** 2 to 4 PB. CMIP6 simulation starts January 2017
- CNRM** 2 PB. simulation starts (probably end of 2016)
- ANU** 2 PB. simulation starts January 2017
- UR** 2 PB. simulation starts January 2017
- BCC** 1 PB. simulation starts January 2017
- CMCC** 1 PB. expected end of 2016/begin of January 2017.
- CEDA**. 1-2 PB. CMIP6 simulations expected end of 2016.
- DKRZ** 2-3 PB. simulations start 2017
- BNU** 1PB. CMIP6 simulation starts January 2017.
- FGOALS** 1-2 PB. CMIP6 simulation starts January 2017.
- DIAS** 1-2 PB. and possible extension to 2-4PB. CMIP6 protocol starting january 2017

PCMDI 5 years plan. Up to 20 PB by late 2020

DKRZ 5 PB online (disk), up to 50 PB offline (HPSS)

CEDA Hope to contribute up to 2 PB, > 2 PB offline

ANU Hope to contribute up to 10 PB

IPSL Hope to contribute up to 3 PB

BNU Hope to contribute up to 3PB

FGOALS Hope to contribute up to 3PB

TOTAL : 45 PB spinning and 42 PB on Tape

Tier 1/2 requirements for ESGF infrastructure
and on a per project basis.

- o Level of service:
 - + uptime more than 90% / 95%,
 - + installation of most recent version of SW (Tier 2 as well, time limit for installation to be defined),
 - + installation of complete SW stack,
 - + contribution to development and maintenance
- o Support for Tier 2 data nodes
- o Support for data providers

o Spinning disks

- + Tier 1 for initial data publication and data replication (CMIP6: around 4-5 PB)
- + Tier 2 for initial data publication (CMIP6: about 2 PB)

o Compute resources (Tier 1)

Hard to specify, no experience yet

o Network connection

+ Tier 1: optimisation of nominal bandwidth of 10 GBit/s will result in 30 - 50 % for real bandwidth for replication. This together with the specification of the core data set defines the CMIP6 replication strategy.

+ Tier 2: 1 - 2 GBit/s for data provision. CMIP5 experience showed that each data node provides 10 times the data it hosts over a period of 4 years and the average available network bandwidth should cover this.

o Tapes

- + Single Tier 1: about 20 PB plus for long-term archiving of reference data from the CMIP6 data (volume not clear yet)
- + Tier 1: tapes to fill the storage gap in case of insufficient disc space for initial data publication and data replication

- NAGIOS (<https://www.nagios.org>) is the Industry Standard In IT Infrastructure Monitoring
- NAGIOS have many plug-ins that we can use to monitor our infrastructure
- The proposal is to use NAGIOS to monitor CMIP6 nodes and to guard against
 - Expired certificates (host & globus certificates)
 - http/https endpoints unavailable
 - Gridftp endpoints unavailable
 - Etc

- Tiers 1 node could take the responsibility to monitor data node publishing to them
- Tiers 1 node could also monitor themselves
- There is an ongoing proposition to enable ESGF to exclude a data node that does not satisfy all the CMIP6 requirements or a data node that will degrade the federation usability. The implementation of this is currently under discussion.
- NAGIOS like monitoring is necessary to ease our lives providing a high level of service for CMIP6.



Thank you for your attention

