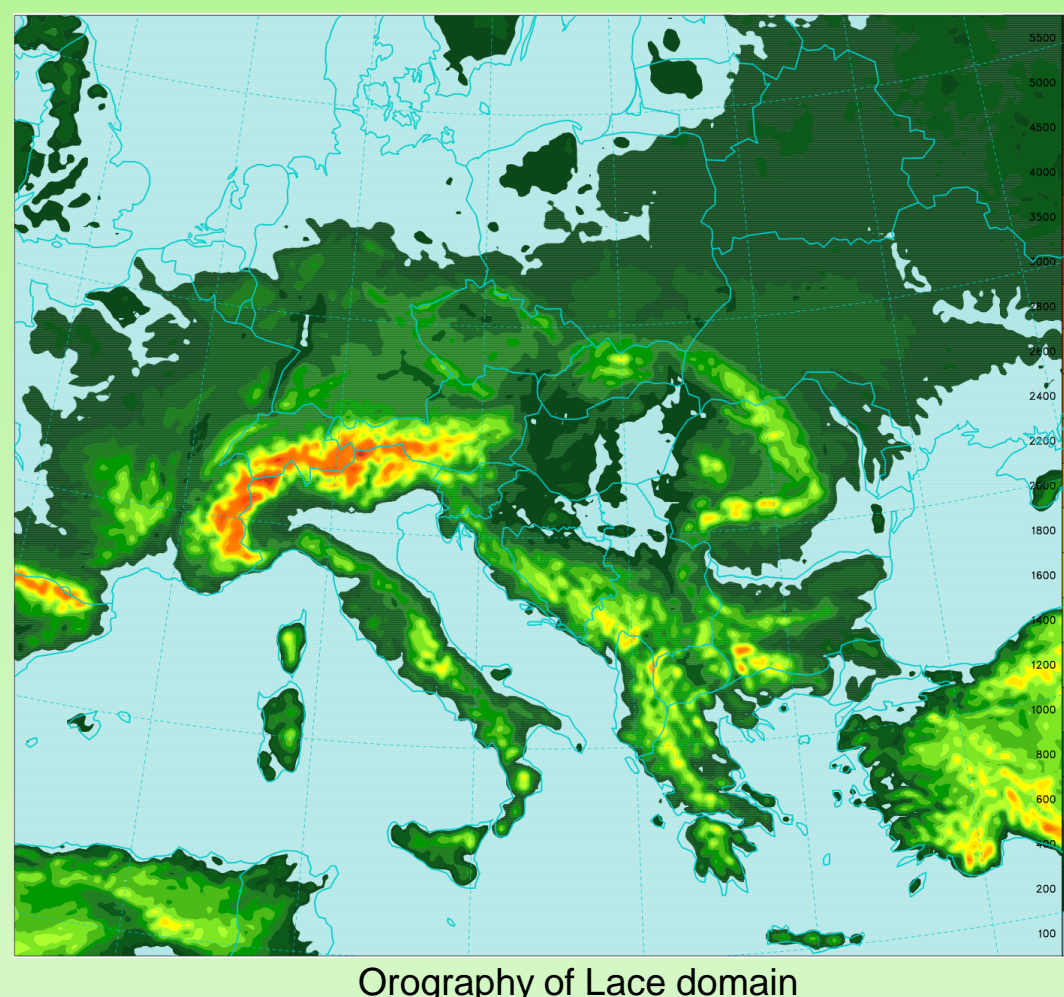


## ALADIN@CHMI

### Model set-up

- LACE domain (309x277 grid points, linear truncation E159x143,  $\Delta x \sim 9\text{km}$ )
- 43 vertical levels, mean orography
- time step 360 s



Orography of LACE domain

- OI surface analysis based on SYNOP (T2m, RH2m)
- digital filter spectral blending of the upper air fields, long cut-off cycle (6h cycle, filtering at truncation E61x55, no DFI in the next +6h guess integration)
- digital filter blending + incremental DFI initialization of short cut-off production analysis of the upper air fields
- 3h coupling interval
- ALADIN cycle 35t1\_lentch (ALARO-0 with 3MT)
- OpenMP parallel execution
- 00, 06, 12 and 18 UTC forecast to +54h
- hourly off-line fullpos
- post-processing using obs-operators of OI

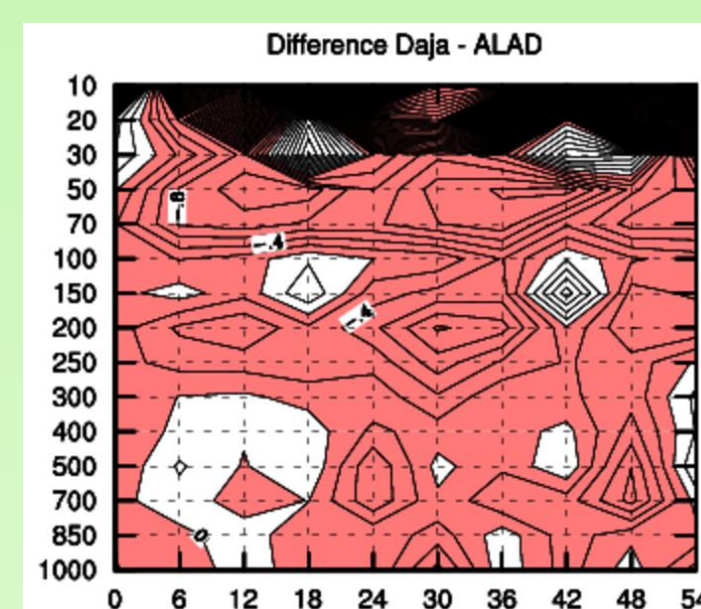
- hourly DIAGPACK analysis (SYNOPS)
- verifpack on CY32T1
- monitoring of SYNOP and TEMP observation based on OI quality control

### Major operational changes (October 2009 – October 2010)

- 6 Oct 2009** New mixing length for the pTKE turbulence scheme, Bougeault-Lacarrere (M.W.R. 1989) type, due to problems with T2m in stable conditions not yet been accepted
- 5 May 2010** New HPC system implementation

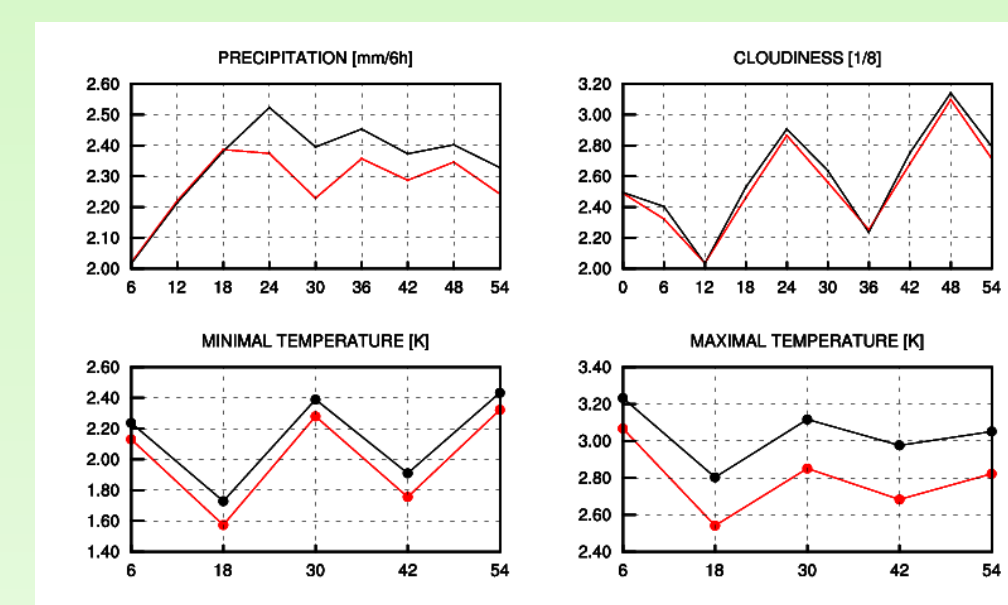
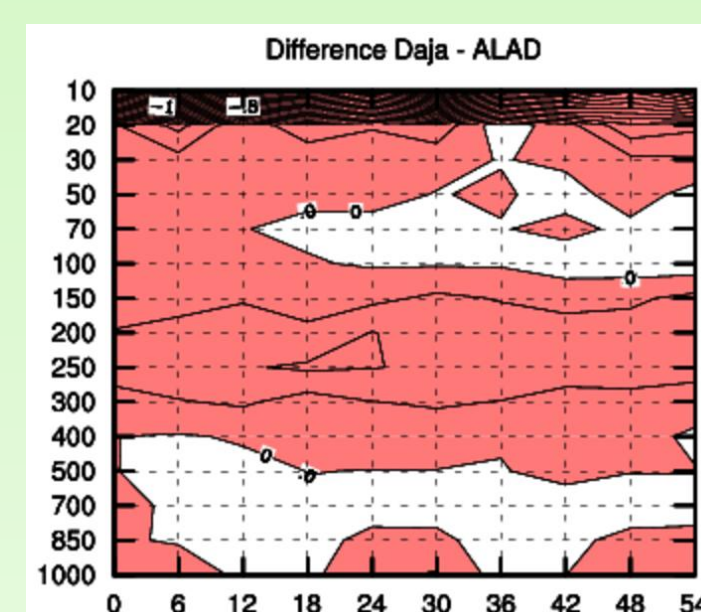
### Content of the e-suite

- Increase of the spatial resolution: 4.7km and 87 vertical levels
  - the centre of the computational domain is moved to NW while keeping the same projection plane of Lambert map
  - 529x421 grid points
  - linear grid truncations E269x215
  - dynamics is using HPE set with the 2TL SI-SL scheme
  - time step 180s
- Tuning of DFI blending due to resolution change
- Corrections in convective computations (namely downdraft) and retuning
- Use of new aerosols in radiation scheme
- Retuning of cloudiness
- Retuning of supportive horizontal diffusion

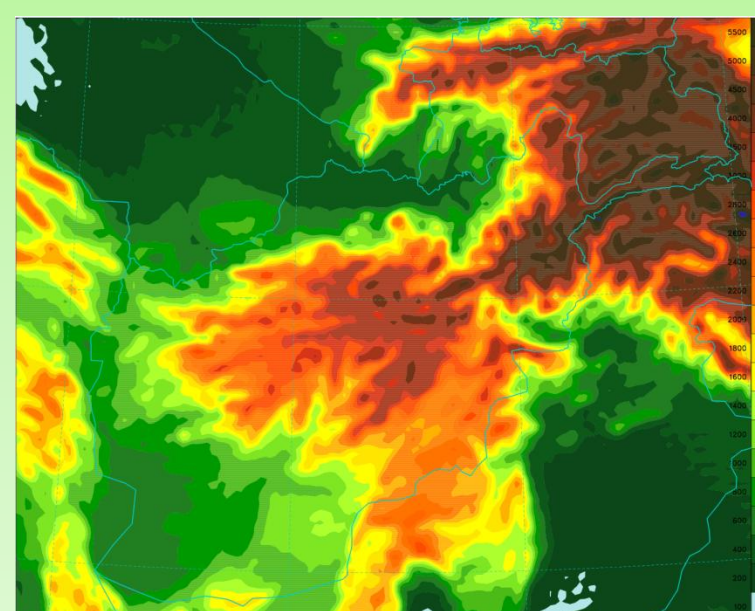


RMSE differences of geopotential (left) and temperature (bottom-left) compared against present operational suite. Red areas show improvement of the forecast in the e-suite

RMSE of some surface parameters show an improvement in precipitation, cloudiness and min/max temperatures



### ALADIN/Afghanistan



Orography of Afghanistan domain

- domain (162x135 grid points, linear truncation E80x67,  $\Delta x = 10\text{km}$ )
- 43 vertical levels
- time step 360 s
- digital filter spectral blending of the upper air fields (6h assimilation cycle, filtering at truncation E18x15)
- short cut-off production + incremental DFI initialization
- 3h coupling interval, ARPEGE driven
- ALADIN cycle 32t1 (ALARO-0 with 3MT)
- OpenMP parallel execution
- 00 and 12 UTC forecast up to +48h
- used mainly for weather service at Kabul airport

### HPC system used in operations

#### NEC SX-9:

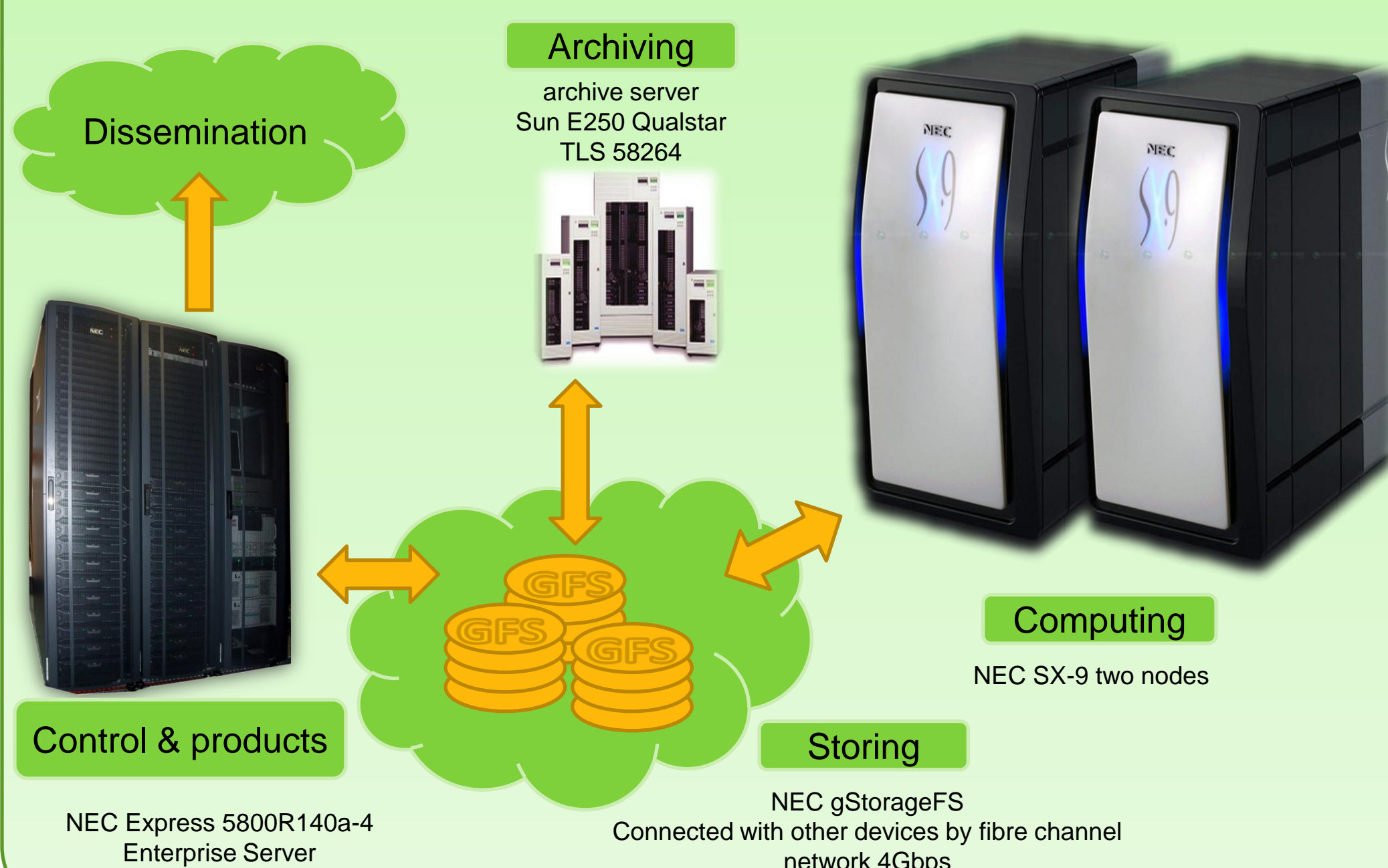
- two nodes
- 1.6 teraflops per node
- 1 TB RAM per node
- NQSII scheduler

#### Front-End servers:

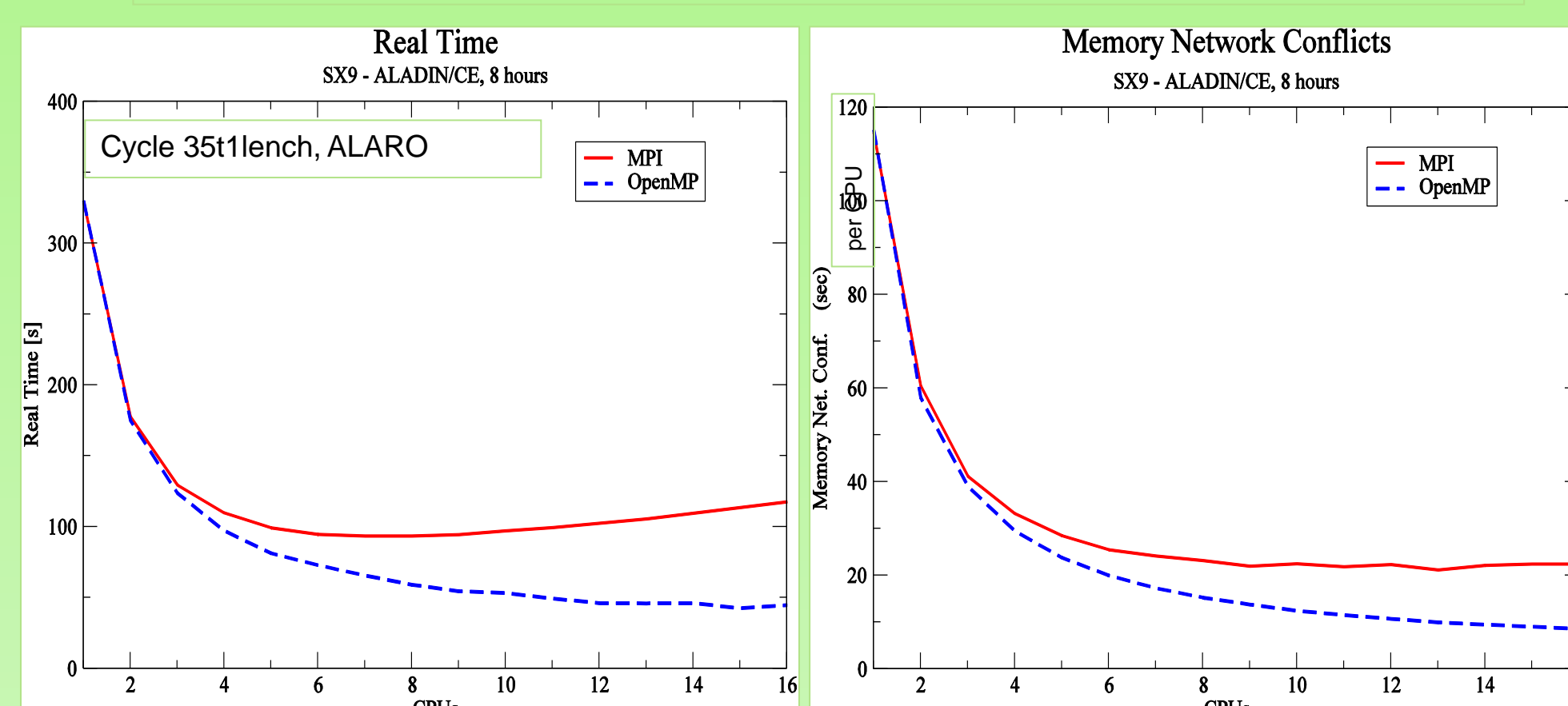
- two NEC Express 5800R140a-4 Enterprise Servers
  - 4 CPU Intel Quad Core Xeon X7350 each
  - 32 GB RAM each
- control suite, create products and disseminate

#### Shared disk file system:

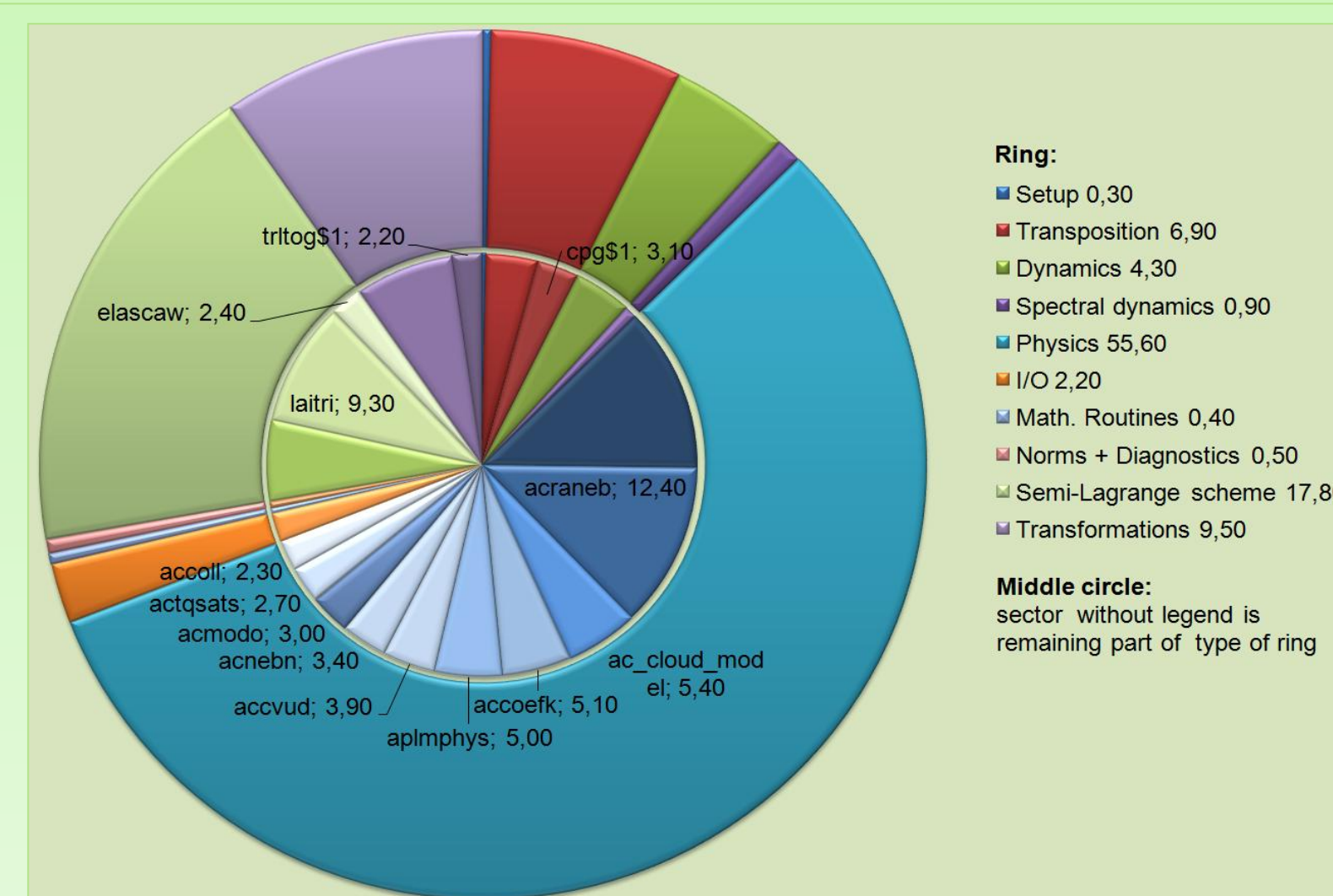
- NEC gStorageFS - global file system (GFS)
- 118 TB usable space



### Scalability of Aladin on SX9



Scalability of OpenMP parallelization is faster than MPI on single node. This is caused by memory conflicts. OpenMP keep constant total memory conflicts but MPI conflicts are function of number of CPUs.



Routine cost profile for cycle 36t1 (ALARO) of 48 hours forecast