Scientific and technical aspects

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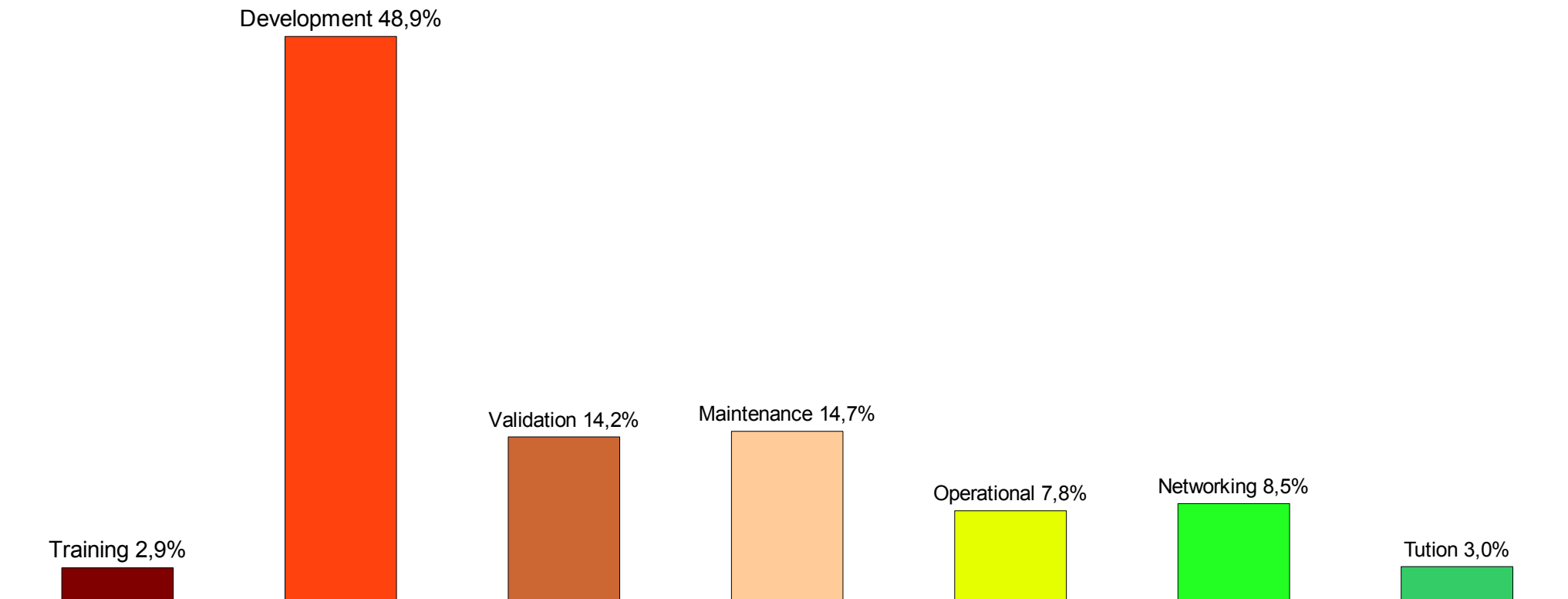- *Migration to new HPC at MF*
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(1) Cycles and code evolution

· At least two R&D cycles planned in 2014 (CY40T1, CY41) => details given at LTM meeting (Antalya, 01/10/13)
· Support from the partners for phasing in Toulouse: good level of technical knowledge in the phasers' teams (*local technical knowledge transfer works in several teams*)

Maintenance seen overall the consortium
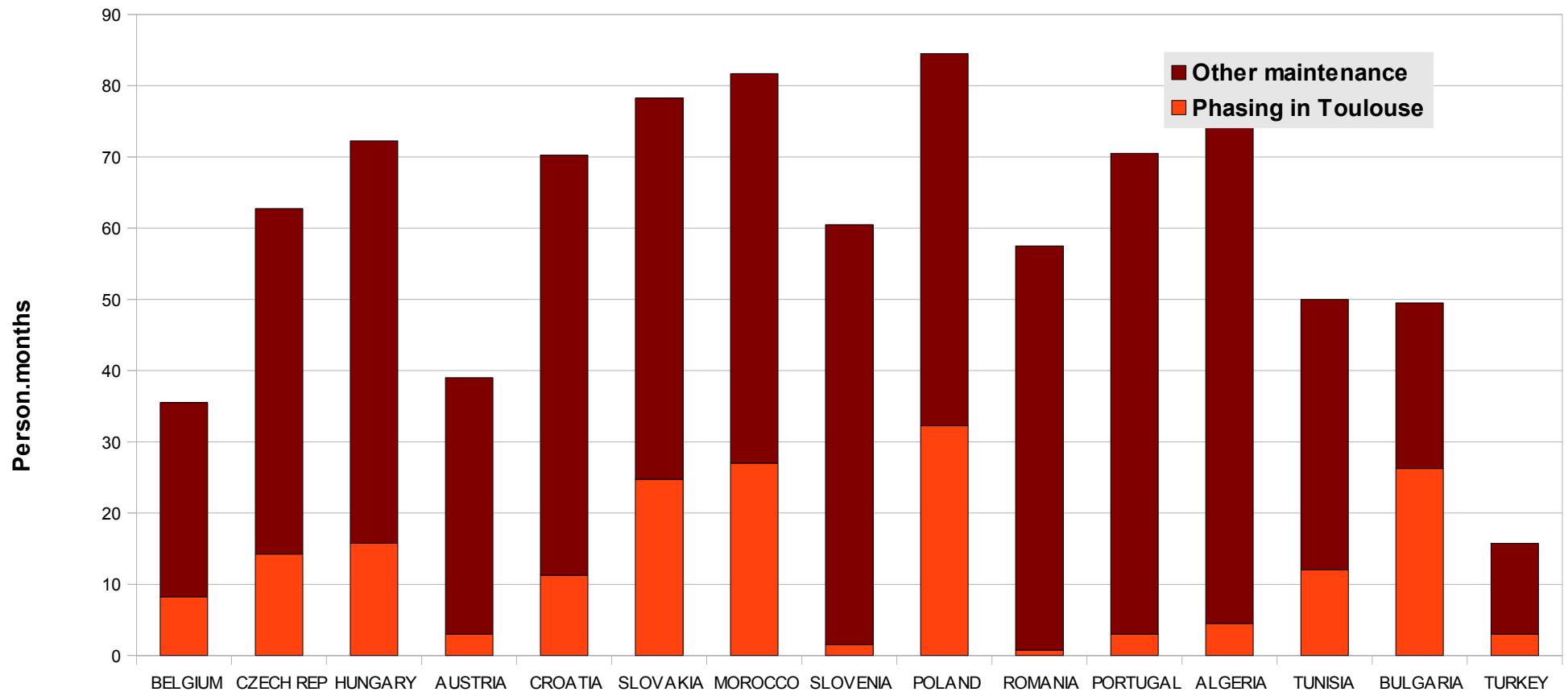
Breakdown of the ALADIN work by type

since July 2001

Development 48,9%

Validation 14,2%

Maintenance 14,7%

Operational 7,8%

Networking 8,5%

Training 2,9%

Tution 3,0%

Phasing in Toulouse: involvement of partners

Breakdown of the phasing effort by country

Breakthrough of maintenance efforts at home / in Toulouse

Maintenance effort by country since July 2001

Code evolution

- There certainly is now an acceleration of the modernization of the codes:
  - More modular coding in FORTRAN 90
  - Features of FORTRAN 2003
  - C++ for COPE and OOPS
- OOPS (Object Oriented Prediction System): steady progress even if some delays have occurred. OOPS concepts become increasingly efficient for designing the (main) FORTRAN code in IFS
- COPE: new observation pre-processing code for IFS => exchange of documentation about obs pre-processing at EC, MF and LAM (Hirlam); coding of new elements already started at EC
- OOPS and COPE are scheduled for IFS Operations in 2015

(2) SURFEX
PREP: CPU time

• Using PREP to interpolate from operational Turkish domain (709 x 439) to domains of different dimensions

- Oper@4.5km
- 250@4km
- 500@1.5km
- 1000@0.5km
- 1500@0.5km
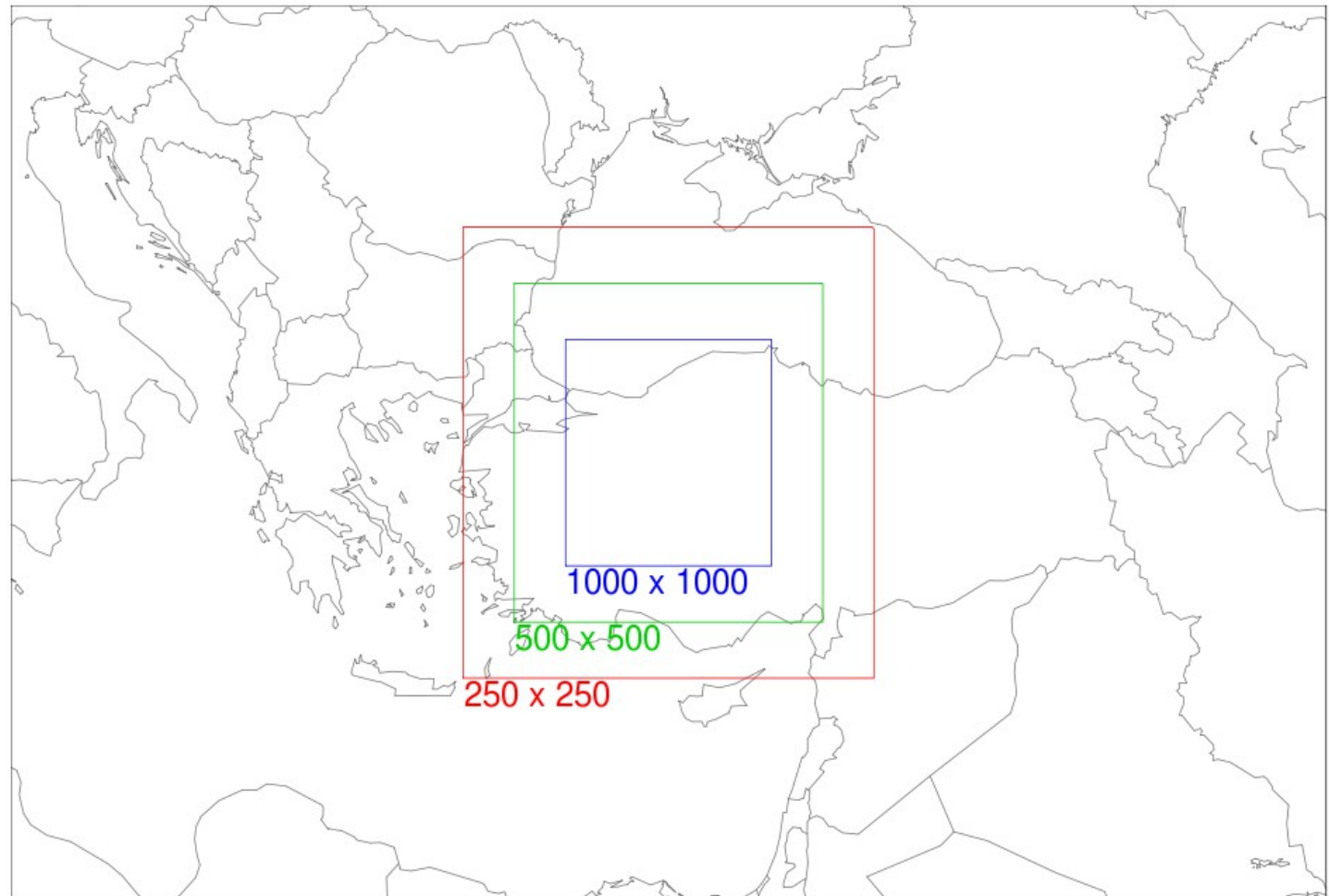
*** 1500 domain coincides with 500 domain

PREP: CPU time

- Tayfun Dalkılıç, Daan Degrauwe, Trygve Aspelien, Ryad El Khatib
- Analysis of performance: 3 routines take about 95% of CPU time!
- Work performed:
    (a) have added selective averaging (only over surface covers that actually are present in the LAM domain)
    (b) specific do-loops were reorganized
    (c) have added Open-MP directives

Optimized PREP
from CPU point of view

- Results: CPU time (s)

Target Geometry	ORIG	OPT	OPT + OpenMP
250 x 250	98	47	25
500 x 500	219	64	32
1000 x 1000	909	148	56
1500 x 1500	1790	323	106

ORIG : Original PREP
OPT : Source code optimization
Open-MP : optimal number of threads between 1 and 32

PREP: memory consumption; implementation of optimization in common codes

• Using the size of shared memory for a single node of ECMWF/c2a as reference (50 GB), it was concluded that memory consumption in PREP was not immediately a blocking point for partners' applications

• Suggested code changes for optimization of PREP have been discussed and agreed with the SURFEX team at CNRM/GMME; work was presented at SURFEX Steering Committee.

• This work will enter the common codes with SURFEX release V7.3 and NWP cycle CY40T1.

(3) Migration of MF's NWP applications to new HPC (Bull)

• Important step towards higher resolution Arpège (7.5km) and Arome (1.3km)

• Porting of codes done in summer 2013

• Migration of NWP implies some harmonization of input files => impact on production of LBC coupling data for Aladin partners

• Changes in LBC production have been presented to LTMs in June; tests of new files and data were asked to LTMs; feedback at LTM meeting in Antalya (Oct 1); further coordinated actions required until migration of MF's operations becomes official (Note: this switch will require a simultaneous switch in all Aladin countries)

• Preparation and coordination of these actions is done between French LTM, MF Operations and ACNA for Aladin

(4) Increased activity and role of <u>ACNA</u>

- Networking and coordination activities
- preparation and coordination of the LTM meetings (that provide input for next steps for PM, CSSI, ST, ACNA):
  - Reykjavik
  - Antalya
- Technical, about the System: compiler issues, some aspects of the link with ECMWF
- assistance on specific issues like the Ankara System working week (item 8 of the Agenda)
- operational-type: new telecom climate files for Partners: test datasets, feedback, coordination of forthcoming simultaneous switch
- Regular web conferences with PM and ST: 30/5; 17/6; 11/7; 13/9; 16 & 28/10 (incl. preparation of LTM meeting), 25/11 planned (wrap up and planning of the outcomes of GA)