Porting RegCM 4 on the EUIndia GRID

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Presentation outline

- RegCM computational requirements
- Pros and Cons of RegCM on the GRID
- Porting RegCM on the GRID
  - Standard way - MPI start
  - Tweak - Relocatable package
- Future developements

Running RegCM

- Medium memory requirements
- CPU intensive code
- Massive data requirements
- 10Gb data for one month on a 160x192 grid

- Requires SMP or cluster-type resources
- Storage speed is a key feature for performance

Storage requirements

Data needs to be local...

- ...for preprocessing input and output
- ...for main input and output

Why RegCM on the GRID?

- Great amount of resources available
- "Cheap resources"
- Ideal when no HPC resources available
- Suitable for testing
- Serial/SMP jobs

Why not RegCM on the GRID?

- Storage requirements
- Data management limits throughput
- Weak support for MPI
- Unsuitable for production runs
- Unsuitable for massive parallel jobs

The gLite GRID infrastructure

It can offer...

- CPU time on best effort basis
- Job submission mechanism (metascheduler)
- Storage and data management tools
- Several **V**irtual **O**rganizations (e.g. EUIndia)

The gLite GRID infrastructure

What can you find?

- CPUs are generally loosely coupled
- Multi-core machines available
- MPI support still a "work in progress"
- New! Provides transparent MPI support

RegCM data management on gLite

- Data needs to be moved to and from a **S**torage **E**lement
- Preprocessing done separately
- Input data located on "near" SE
- Enough space on local storage necessary

MPI-start How-To

- MPI support handled by scripts
- User submits specific jobs
- Request multiple nodes directly

MPI-start example

```
...
JobType = "Normal";
WholeNodes = "true";
HostNumber = 2;
SMPgranularity = 4;
Requirements = "regcm";
...
```

MPI-start Advantages

- Run on multi-node clusters
- Almost transparent to the user
- Can be used for production runs

MPI-start Disadvantages

- Relies upon local MPI resources
- Application needs to be present on site
- t.i. direct support from sysadmin required

Relocatable MPI How-To

- Precompiled MPI + RegCM binary
- Everything sent to CE with the job
- User submits standard (non-MPI) jobs

Relocatable MPI Advantages

- Works in any "functional" environment
- Can take advantage of SMP resources
- "All-you-need" package provided
- No need to know what resources you get

Relocatable MPI Disadvantages

- Works only on SMP resources
- No support for high-speed network
- User needs to handle code deployment

Conclusions

Objective met! RegCM runs on the GRID!

...examples available for users who want to run RegCM on the European GRID

Future developements

What we would like to do...

- Automatic resources evaluation at run-time
- Remote file access through NetCDF+OpenDAP
- Integration of RegCM with a web portal