Dynamo
An ‘Atomic’ Use Case Example

Motivation

Dynamo serves as an example for a class of Grid applications, so called ‘atomic’ use cases. A simple program is uploaded to a compute resource and produces results according to an input parameter set. The input parameters are modified for each run, but the runs are otherwise independent from each other.
AstroGrid-D’s solution is based on templates to allow an easy adaptation for other scientific use cases.

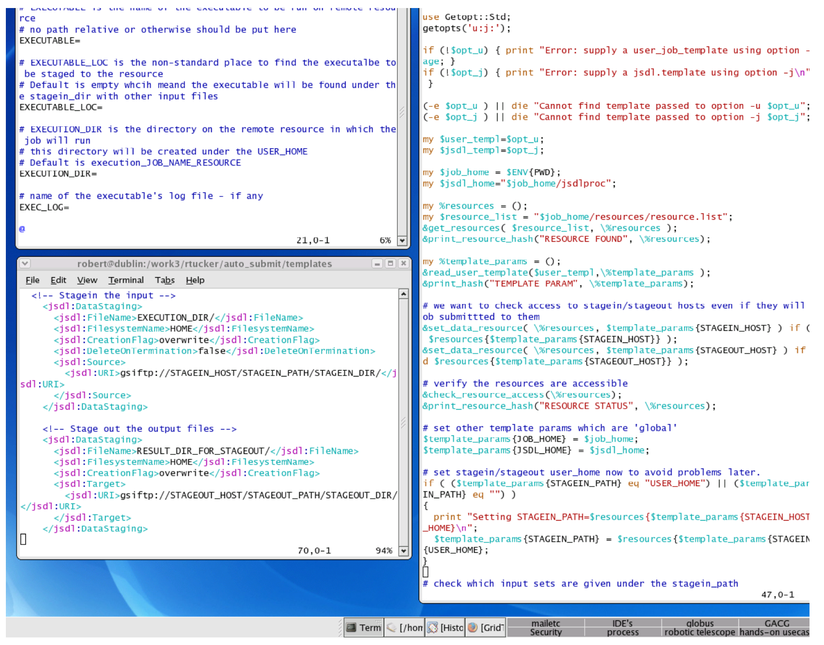
Scientific Background

The Dynamo Use Case is derived from the domain of Magneto-Hydro-Dynamics (MHD). Rotation and turbulence in stars, accretion disks and galaxies cause a ‘dynamo’ effect, inducing magnetic fields. In the case shown the numerical simulation solves the induction equation with a turbulent electromotive force (alpha tensor). The general parameter dependence as well as the time development of a given set are studied.

Job Submission

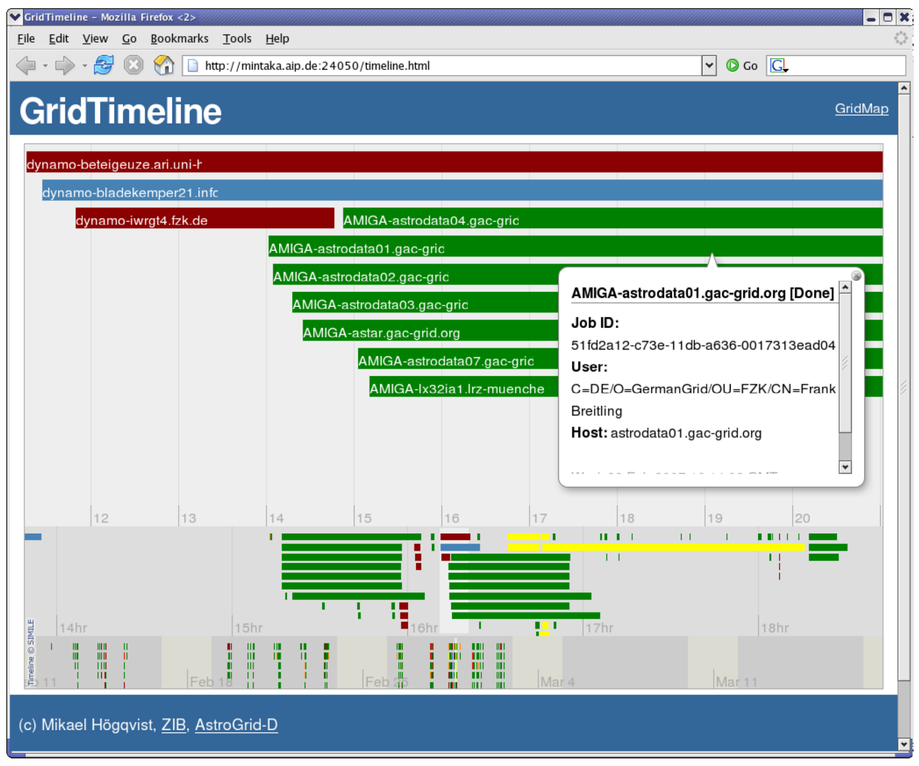
- We use a simple shell script to submit jobs to a arbitrary list of resources or a scheduler.
- Only the input data location and the executable have to be specified by the user
- Multiple input sets are allowed and produce independent jobs running on the different resources
- The job submission is based on a JSDL template (the XML based Job Submission Description Language) and GT4 (globusrun-ws)
- The JSDL template is parsed and transformed to RSL (due to the current lack of JSDL support in GT4)
- During the stage out the results are moved to a specified output location

Templates and Submit Script



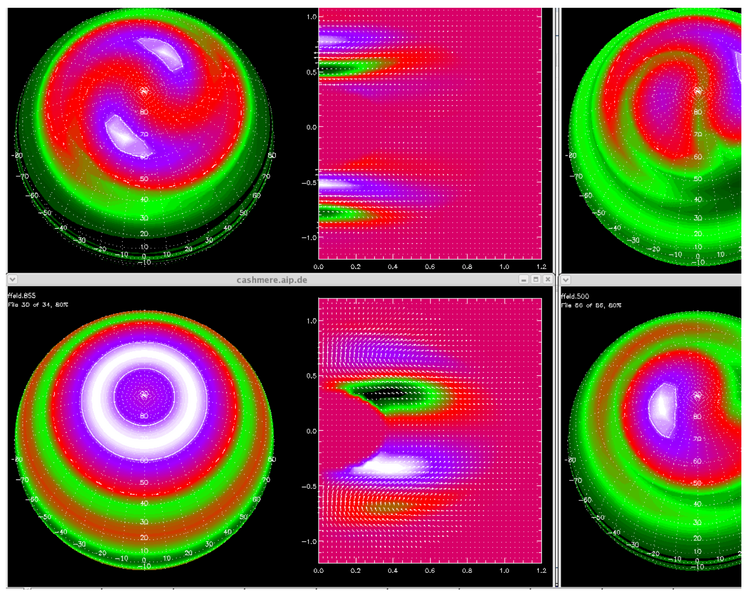
Job Monitoring

With AstroGrid-D’s monitoring system based on the GT4 audit module, the details of the active jobs are automatically transferred to to Stellaris, AstroGrid-D’s information service. **Stellaris** offers different forms of monitoring.



Real-time Visualisation

Visualisation is realised using a customised IDL program (Interactive Data Language) that can retrieve and display intermediate results from the different compute resources. The number of available GT4 commands simplifies information flow between a local software and a remote job.



http://www.gac-grid.org/project-products/Applications/DynamoIntro.html

AstroGrid-D partners: AEI, AIP, ZIB, MPA, MPE, TUM, ZAH, MPIA, MPIfR, USM, UPI, RZG, LRZ, FZK

GEFÖRDERT VOM
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