
MODIS Image Based Computation of Vegetation Indices in MedioGRID Architecture

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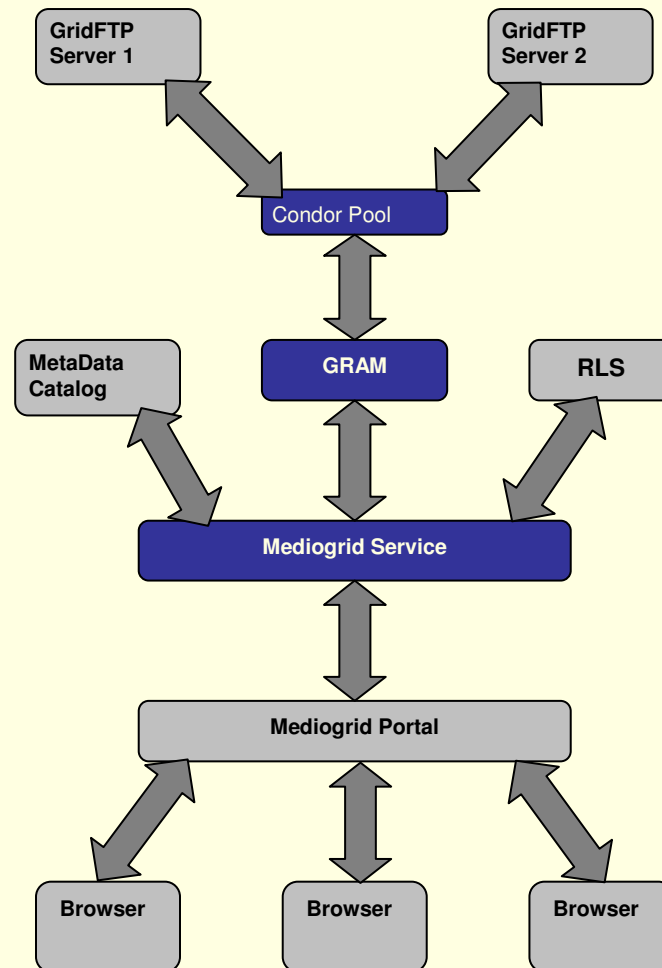
Objectives

- Satellite image processing system over GRID
 - environment for extracting relevant environmental and meteorological parameters
 - Greenland application concerning with the computation of vegetation indices
- User interactivity through a web portal

Data processing architecture in Medio-GRID

- MedioGRIDService
- MedioGRIDPortal
- MedioGRIDMyProxy
- MetadataCatalog and Replica Location Service

MedioGRID components



MedioGRIDService

- Creates and schedules jobs
- Job execution through Condor job manager and GlobusGatekeeper service
- Creates a unique resource for each client
- Stateful service

MedioGRIDPortal

- Client interface
- Control and interaction to MedioGRIDService
- Selection and visualization of the satellite images
- Notifications on the job state

MedioGRID Portal

The image displays four sequential screenshots of the MedioGRID Portal interface, illustrating the workflow for processing satellite imagery.

Screenshot 1: Configuration Form
 This screen shows the 'MedioGRID Portal' tab with a 'Fereastra de timp' (Time Window) section containing input fields for 'Timp initial' (12/31/5/2006) and 'Timp final' (12/3/6/2006). Below this is the 'Selectare zona' (Select Area) section with fields for 'Latitudine 1' (37.35), 'Latitudine 2' (59.20), 'Longitudine 1' (149.27), and 'Longitudine 2' (172.18). A 'Tip de procesare' (Processing Type) dropdown is set to 'Detectie zone inundate'. A 'Next' button is at the bottom.

Screenshot 2: Image Selection
 This screen shows the 'Selectie imagini pentru prelucrare' (Select images for processing) section. It contains a table with columns 'IMAGINE', 'RELEVANTA', and 'THUMBNAIL'. Five rows of satellite image files are listed, each with a checkbox for selection.

IMAGINE	RELEVANTA	THUMBNAIL
<input type="checkbox"/> Browse_A2006151.0000.001.2006151112630.1.jpg	relevanta <%=i%>	
<input type="checkbox"/> Browse_A2006151.0005.001.2006151112630.1.jpg	relevanta <%=i%>	
<input type="checkbox"/> Browse_A2006151.0010.001.2006151112640.1.jpg	relevanta <%=i%>	
<input type="checkbox"/> Browse_A2006151.0015.001.2006151112146.1.jpg	relevanta <%=i%>	
<input type="checkbox"/> Browse_A2006151.0020.001.2006151112520.1.jpg	relevanta <%=i%>	

Screenshot 3: Job Monitoring
 This screen shows the 'Selectie imagini pentru prelucrare' section with a table displaying the status of the processing jobs. The table has columns for 'JOB NR.', 'IMAGINE', 'STARE', 'TIMP START', and 'TIMP FINAL'. Six rows of job data are shown.

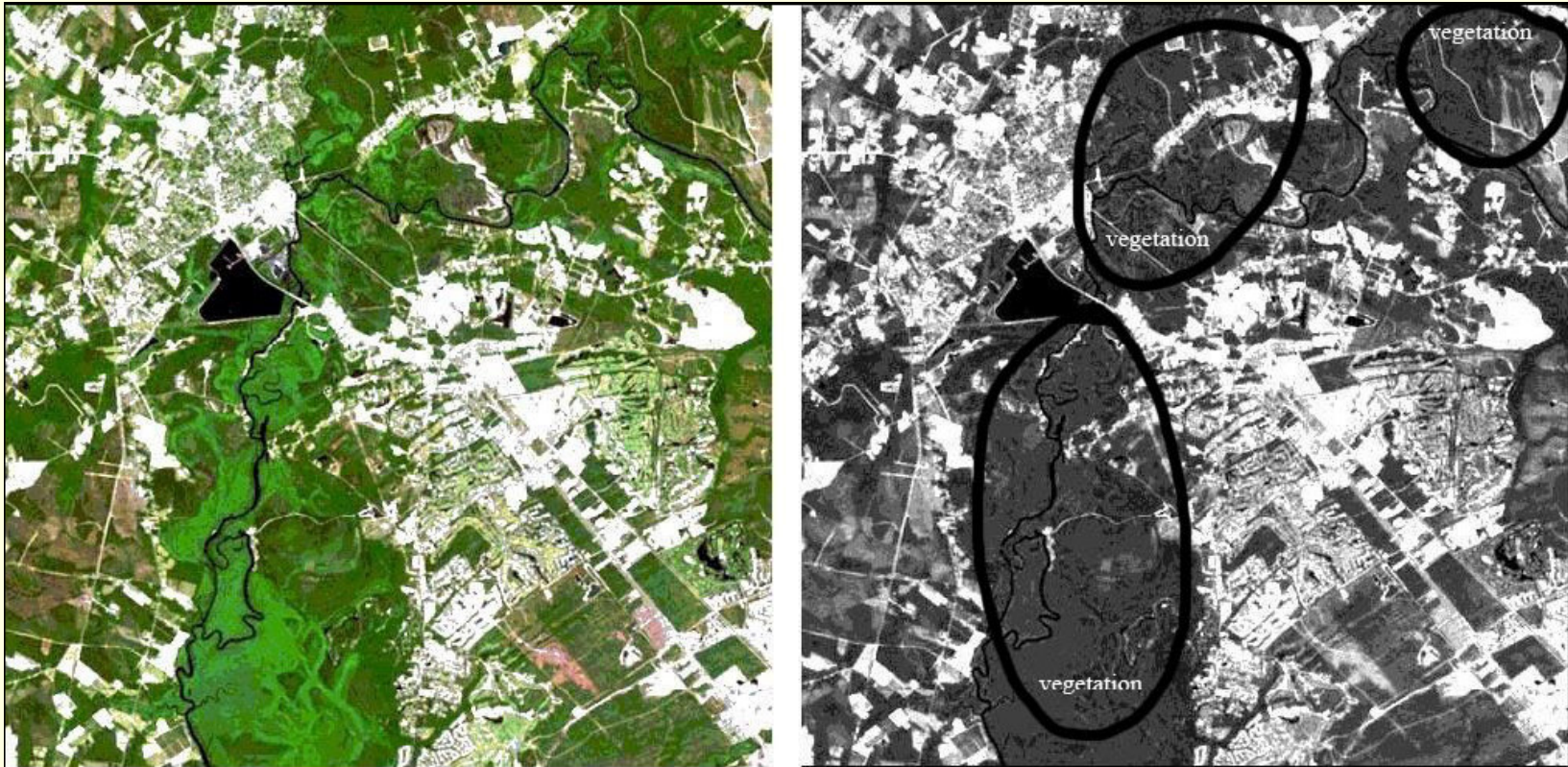
JOB NR.	IMAGINE	STARE	TIMP START	TIMP FINAL
1	Browse_A2006151.0000.001.2006151112630.1.jpg	Pending	Mon Jun 12 19:33:21 EEST 2006	
2	Browse_A2006151.0005.001.2006151112630.1.jpg	Done	Mon Jun 12 19:33:21 EEST 2006	Mon Jun 12 19:34:59 EEST 2006
3	Browse_A2006151.0020.001.2006151112520.1.jpg	Active	Mon Jun 12 19:33:22 EEST 2006	
4	Browse_A2006151.0025.001.2006151112510.1.jpg	StageOut	Mon Jun 12 19:33:22 EEST 2006	
5	Browse_A2006151.0045.001.2006151111553.1.jpg	Done	Mon Jun 12 19:33:22 EEST 2006	Mon Jun 12 19:34:46 EEST 2006
6	Browse_A2006151.0050.001.2006151121543.1.jpg	CleanUp	Mon Jun 12 19:33:22 EEST 2006	Mon Jun 12 19:35:11 EEST 2006

Screenshot 4: Image Viewing
 This screen shows the 'Picture selected is:' section with a large satellite image of the Earth. A red grid is overlaid on the image, indicating the selected area. A small globe icon is visible in the top left corner.

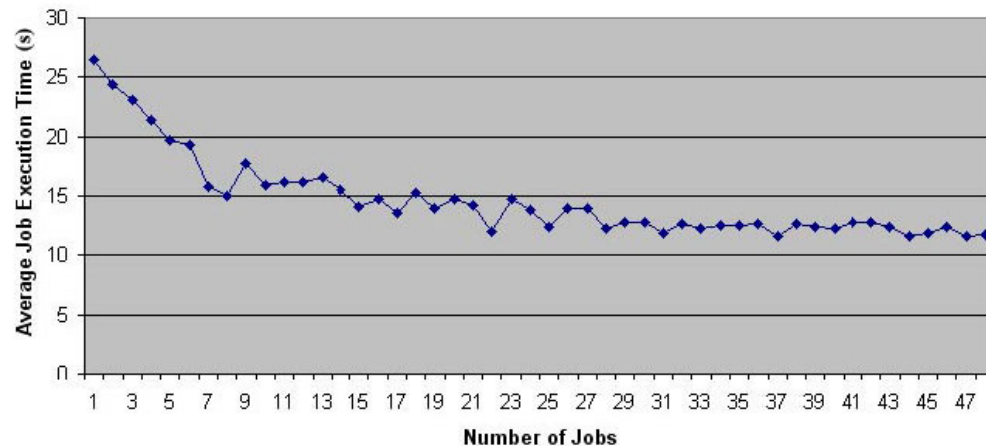
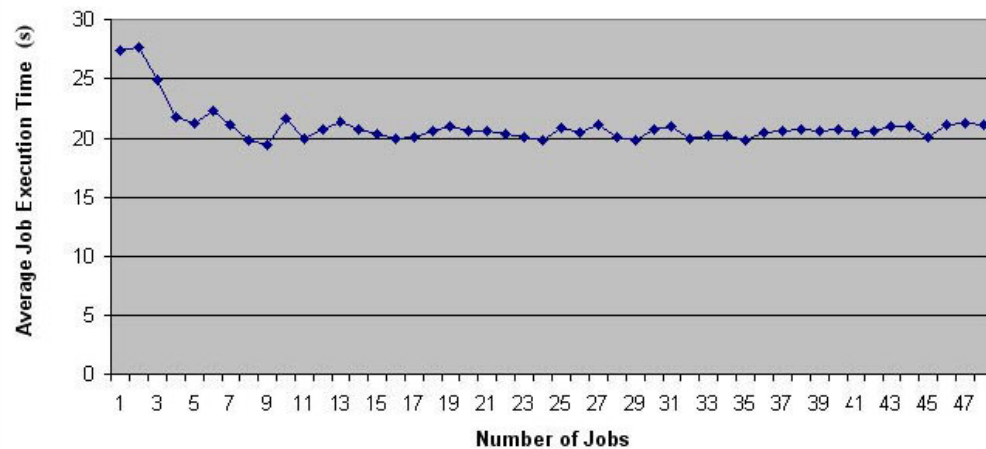
MedioGRIDMyProxy

- Each client and worker process needs a certificate in order to authorize to the service and to the GridFTP, RLS servers
- Provides a certificate for the authorization process

Greenland application



Testing performance



- Job execution time depends on:
 - the number of workstations
 - the number of jobs that are running
- Depends indirectly on the data transfer rate
- For a number of jobs greater than the number of workstations the average job execution time tends to remain constant

Conclusions

- Architectural specifications of the MedioGRID software system
- Interaction among MedioGRID components
- Experiments on the basic functionality, performance evaluation, and GUI usability

Future work

- GIS tools supporting the evaluation of flood and fire evolution

Thanks

Questions?