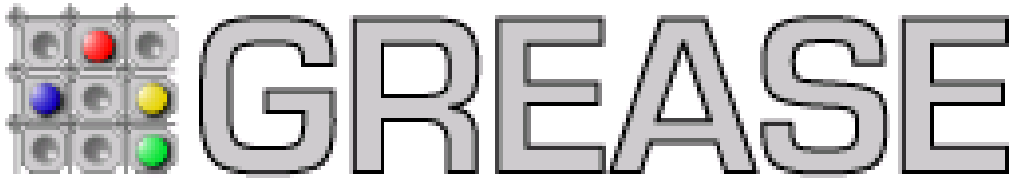


Grid Aware End-to-end Analysis and Simulation Environment

Dutch Space

Mark ter Linden
25 October 2002

Project

Dutch Space

GREASE

- Started July 2002, ends June 2003
  - URD ready
  - SSD, SVVP in progress
  - Prototyping in progress
  - Setup of external Grid cluster in progress
- Funded by ESA and Dutch Space
- Project co-ordination by ESA EOP/A (P.G. Marchetti)
- Successor of the OASE and EASE projects
- Web site: http://tphon.dutchspace.nl/grease

Aim

Dutch Space

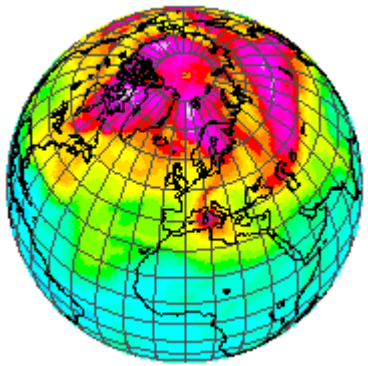
GREASE

- Aim of GREASE is to make it easier for scientists to use their existing applications in a Grid environment but hide the underlying technology.
- Focus will be on the simulation, validation and calibration of data processing applications for remote sensing instruments.
- High Level Requirements:
  - No or minimal re-coding of existing applications
  - Use existing Grid environments (based on Globus)
  - Easy to use interfaces

OMI Validation (1)

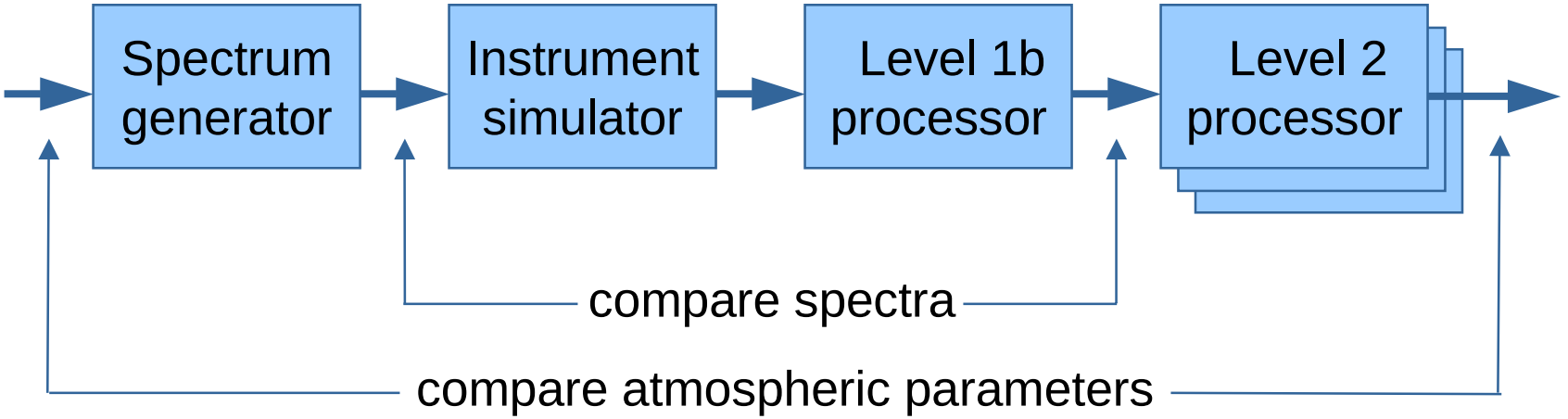
Dutch Space GREASE

- OMI (Ozone Monitoring Instrument) is a remote sensing instrument build in the Netherlands and Finland to be part of NASA's EOS-AURA mission (launch in 2004). (http://eos-aura.gsfc.nasa.gov/)
- Provides each day a global coverage of the Earth with a ground resolution of 13 x 13 km.
- Data products:
  - Ozone profiles and columns
  - NO_2, SO_2, BrO, OCIO, aerosols concentrations



OMI Validation (2)

Dutch Space GREASE

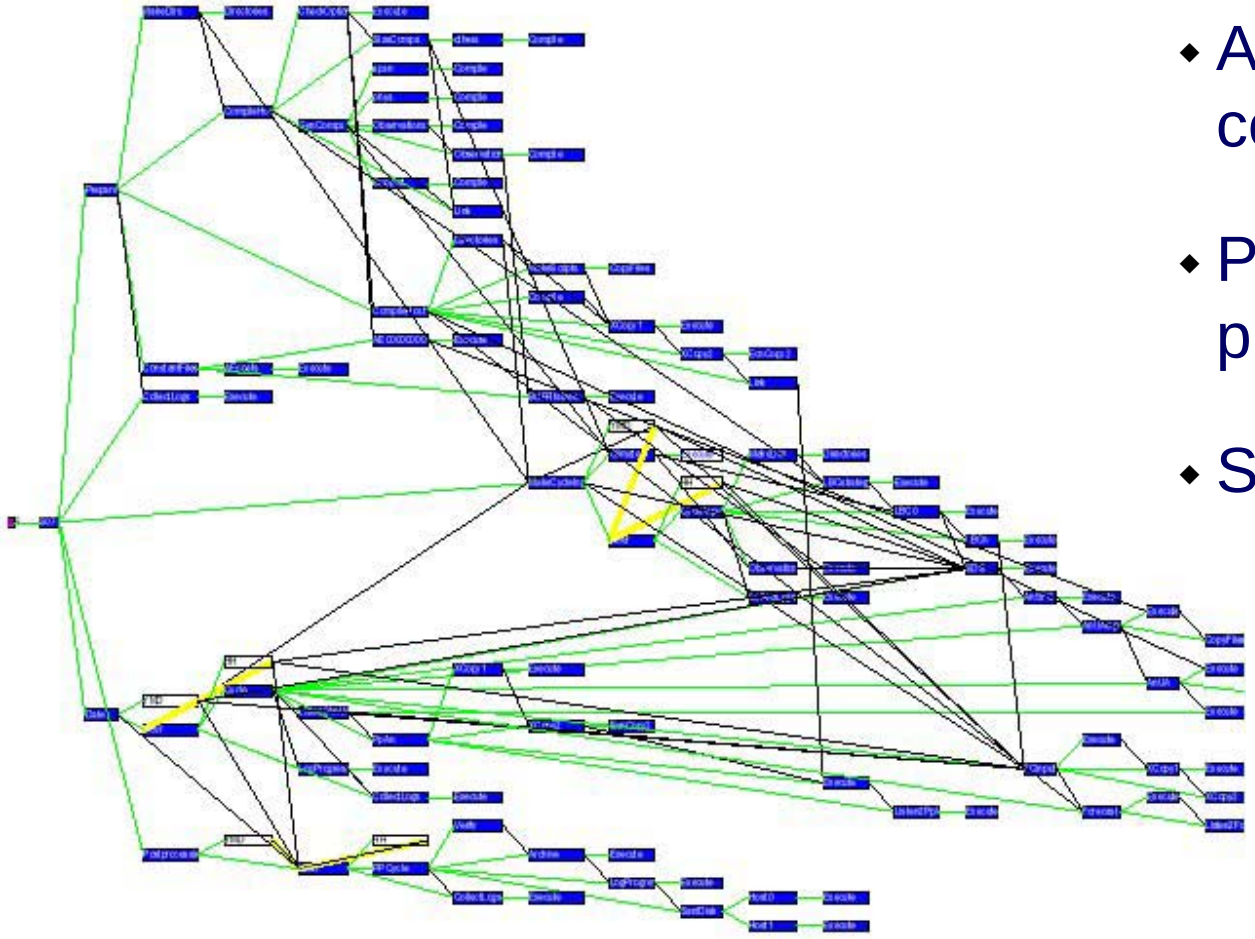


- Simulator and Level 1b Processor are being developed by Dutch Space (the Netherlands). Level 2 Processors are being developed at KNMI (the Netherlands), FMI (Finland) and NASA (United States).
- Simulation + Level 1b Processing takes about 15 minutes on a Pentium III for a single ground pixel.

Future possible use

Dutch Space GREASE

HIRLAM - a numerical weather prediction system



- Approx. 100 components
- Preferred platforms
- Security

Current Situation

Dutch Space

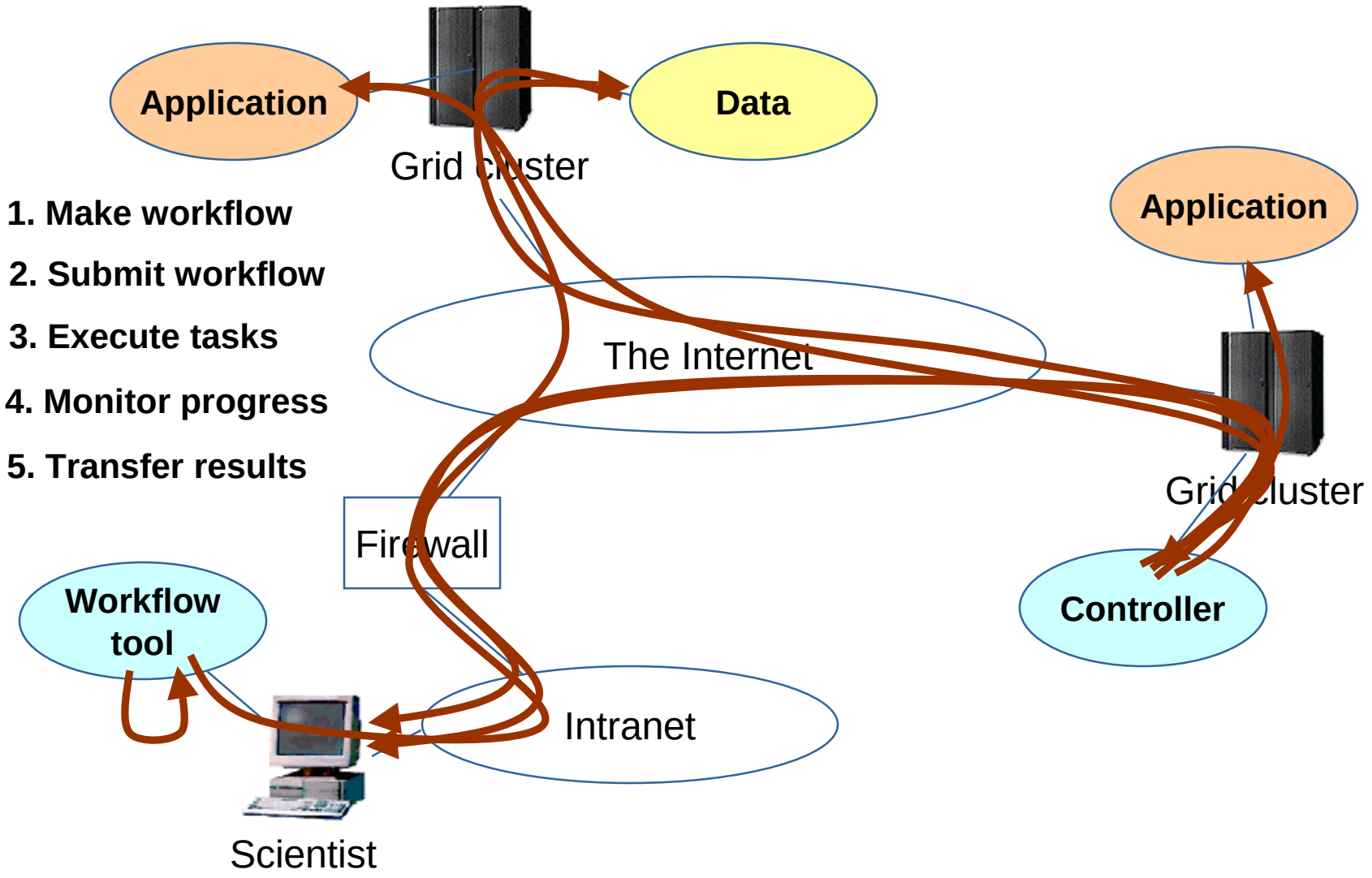
GREASE

- Globus has command-line tools to submit jobs
- For a simple job the user has to:
  - Obtain a proxy certificate
  - Find a suitable grid node
  - Transfer all required input to the node
  - Submit the job
  - Transfer all output back
- For complex jobs this has to be done many times
- When the user is behind a firewall he has a problem

Concept

Dutch Space

GREASE



Architecture

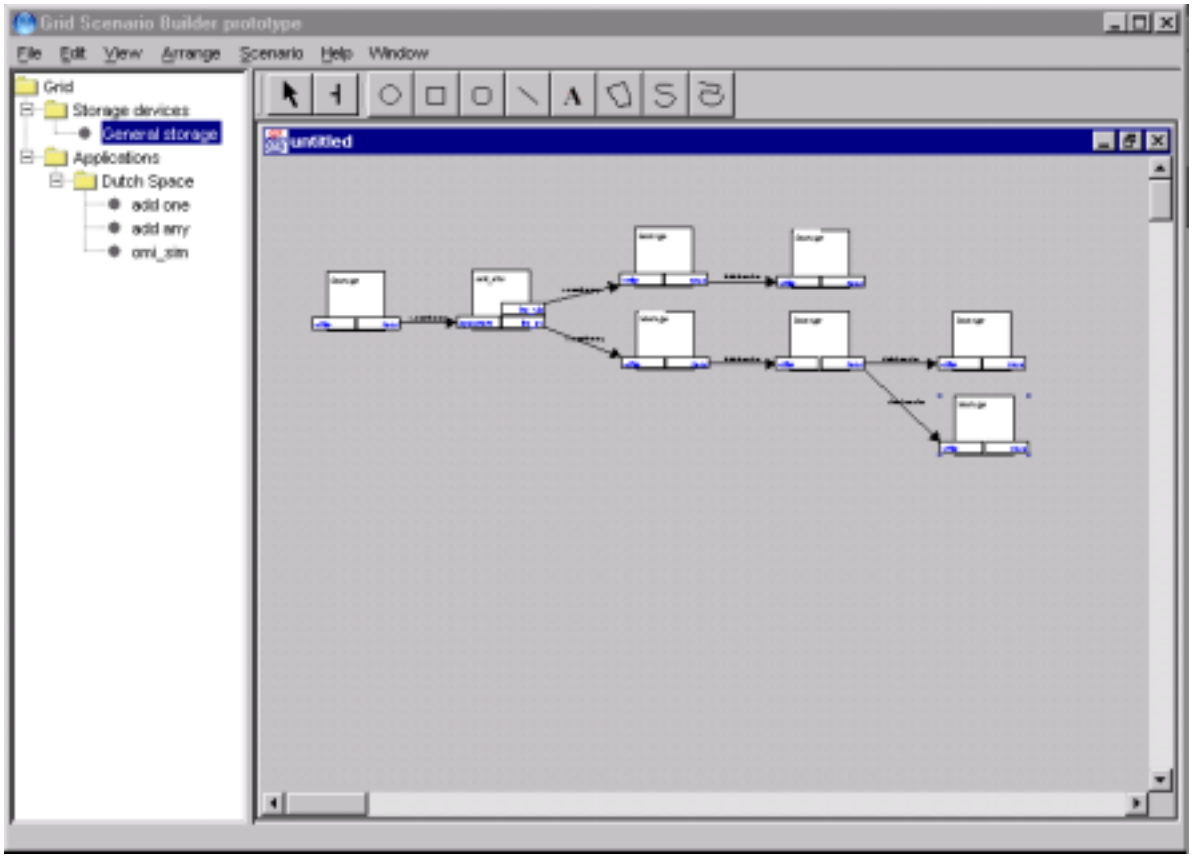
Dutch Space GREASE

- Three major elements in GREASE:
  - Workflow Tool
  - Controller
  - Monitoring and Control Tool
- Interfaces between workflow tool and other elements based on existing protocols (HTTP, SMTP) to prevent firewall problems

GREASE Workflow Tool

Dutch Space GREASE

- Knows about the data processing applications
- Provides drag-and-drop user interface
- Portable JAVA application



GREASE Controller

Dutch Space GREASE

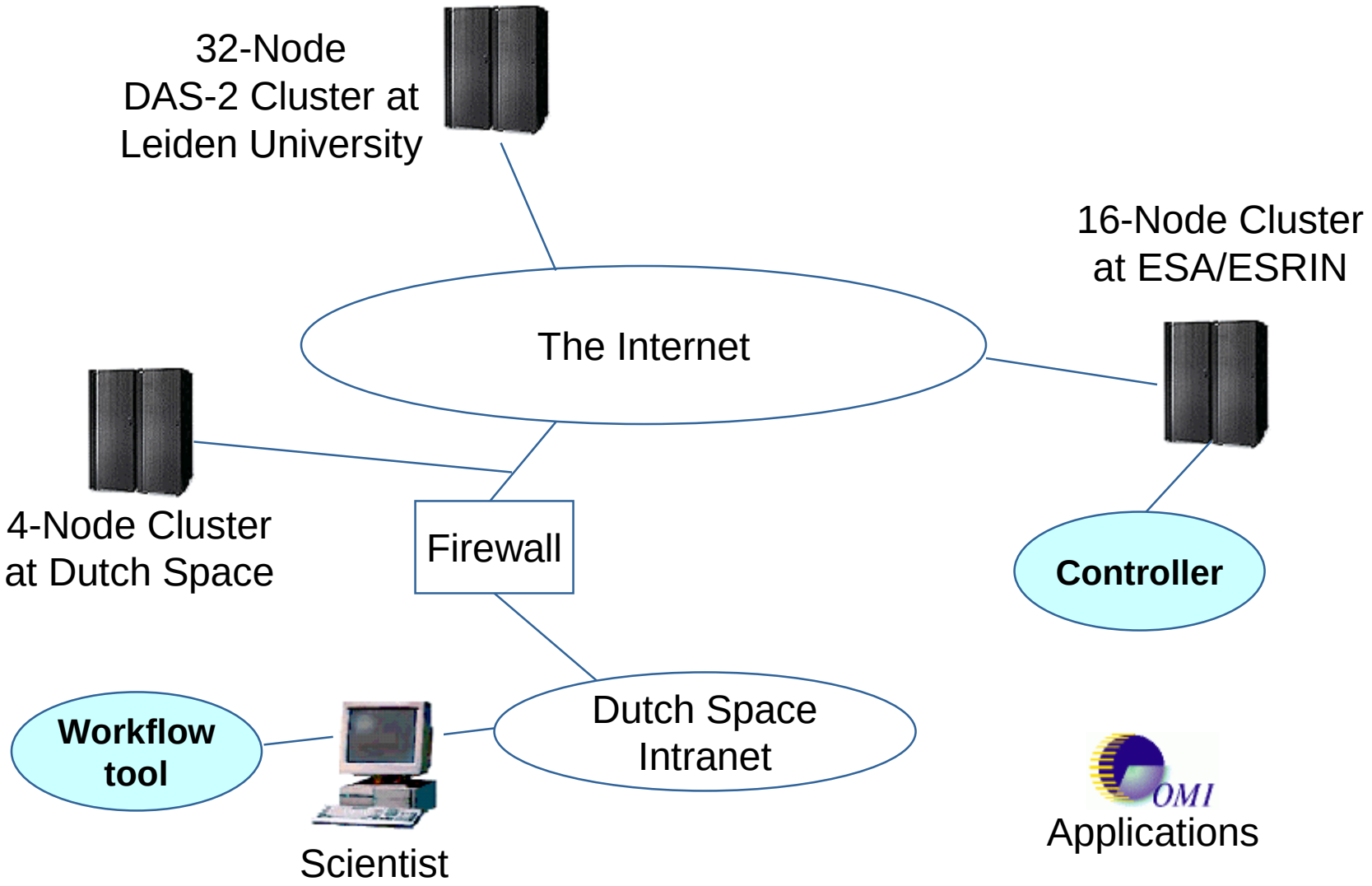
- Tasks:
  - Parses the incoming workflow
  - Searches for suitable resources
  - Selects most suitable computing node
  - Transfers if required the application to the node
  - Transfers the input files to the node
  - Executes the application (using the local job manager)
  - Transfers the output files from the node
- Implementation possibly as Web Service (and in OGSA as Grid Service)
- Interoperability with DataGrid is under investigation

GREASE Monitoring & Control Tool

- Shows progress of his submitted jobs
- Allows the user to stop one of his jobs
- Is accessible via a portal on a web server

Demonstration environment

Dutch Space GREASE



This is all...

Dutch Space GREASE

- Open issues:
  - Specification of work flow (XML, WSFL, BPEL4WS, ...)
  - Storage of application meta data (MDS, WSDL/UDDI, ...)
  - Implementation of Controller as Web Service
  - Final data transfer to end user (FTP, GridFTP, …)
  - Interoperability with DataGrid

- More information:
  - http://tphon.dutchspace.nl/grease
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  - Mark ter Linden, Dutch Space, m.ter.linden@dutchspace.nl