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VLAM-G: A virtual Laboratory for Applied Experimental Science

Computer Architecture and Parallel Systems Group
Department of Computer Science
Universiteit van Amsterdam

Outline

- Introduction
- VLAM-G methodology
- VLAM-G case studies
- Conclusions

VLAM-G
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A collaborative analysis environment for applied experimental science

Grid and VLAM is about sharing resources:

- ✓physical equipment (remote experimentation)
- ✓Data & Information repositories

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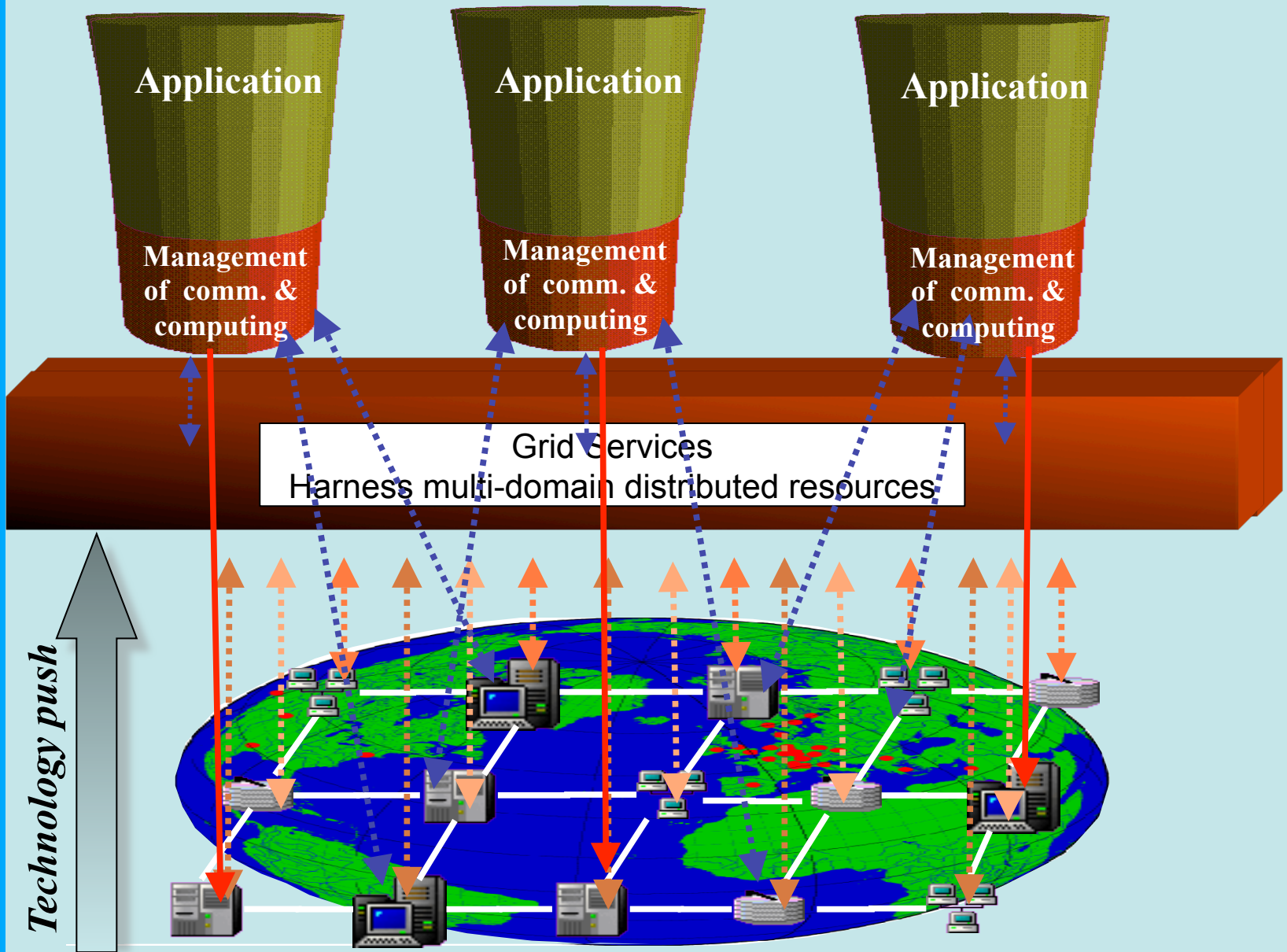

VLAM-G objective

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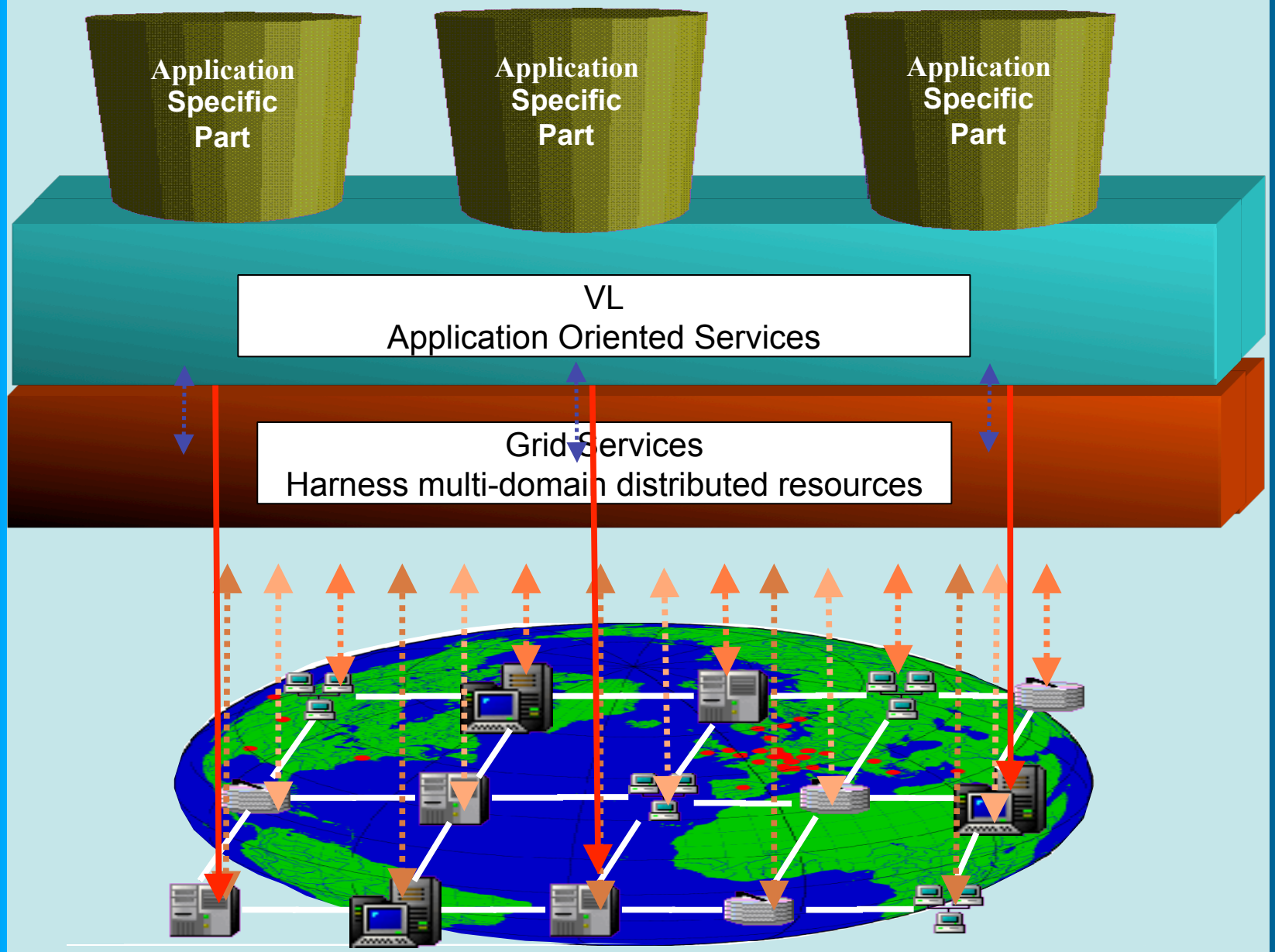
Other Grid-based projects

- AVO combines astronomical databases and processing capabilities in a virtual observatory;
- DAMIEN develops essential software supporting the GRID infrastructure;
- DATATAG develops techniques to support reliable and high-speed collaboration across widely distributed networks.
- CROSSGRID develops techniques for large-scale grid-enabled real-time simulations and visualisations
- DATAGRID develops techniques supporting the processing and data-storage requirements of next generation scientific research
- EGSO lays the foundations of a virtual solar observatory;
- EUROGRID develops core GRID software components;
- GRIA devises business models and processes that make it feasible and cost-effective to offer and use computational services securely in an open GRID marketplace.
- GRIDLAB develops software able fully to exploit dynamic resources;
- GRIP realises the interoperability of Globus and UNICORE, two leading software packages central to the operation of the GRID.

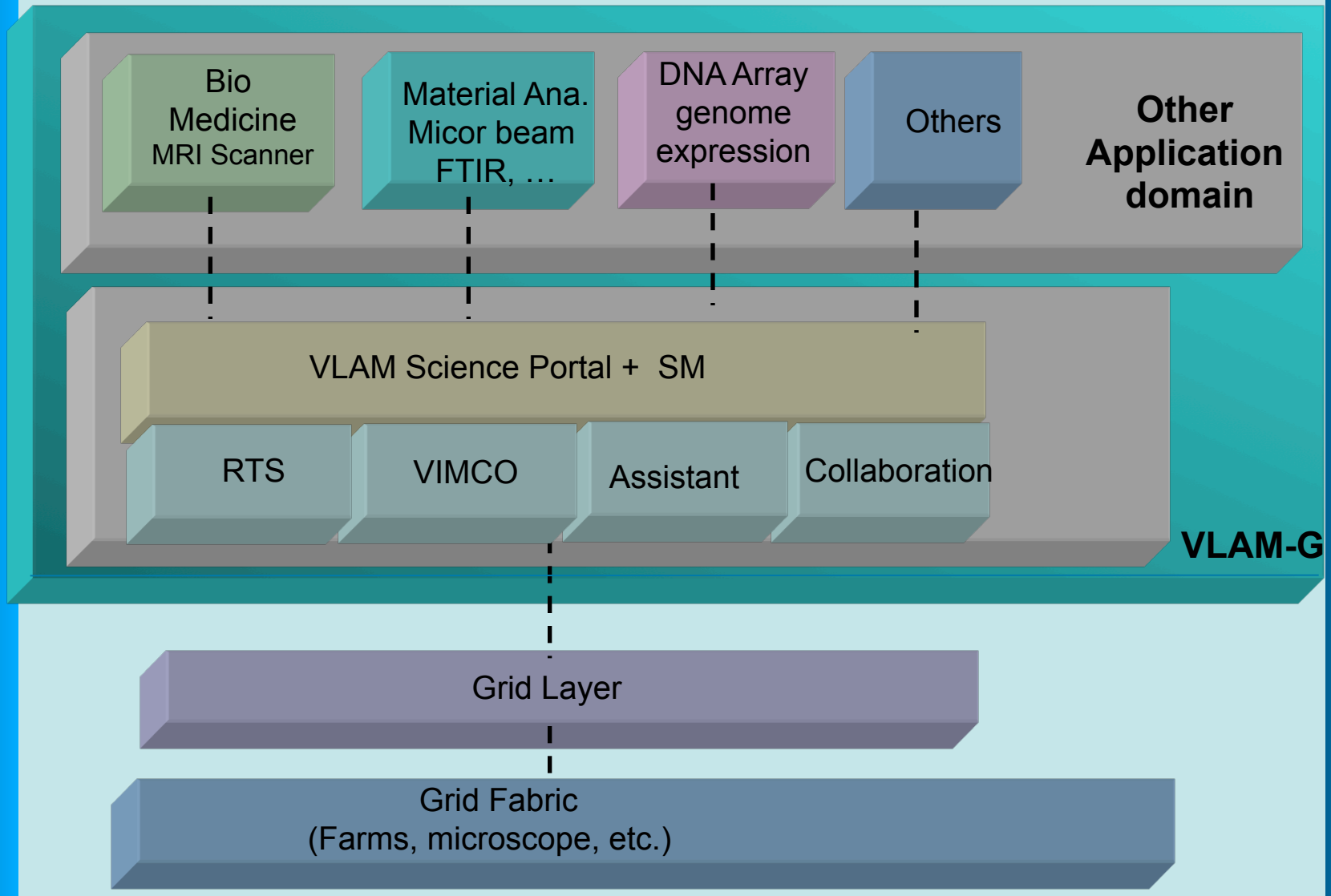
http://www-fp.mcs.anl/gov/~foster/grid-projects

Specific features of VLAM-G

- Development of Application Specific PSEs (medical apps, physics apps, …)
- Improve reusability/sharing across application domains (generic features of applications are integrated in the VL toolkit.)
- VLAM-G is an evolving working environment


Application Specific Part
Application Specific Part
Application Specific Part
VL
Application Oriented Services
Grid Services
Harness multi-domain distributed resources

VLAM-G research topics



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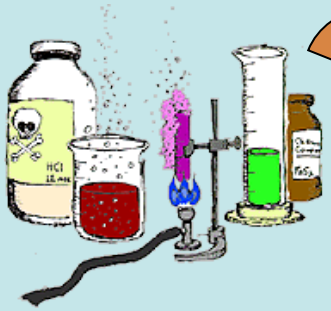
Experiment Steps

designing the experiment

Knowledge and Expertise!

Experiment Archiving!



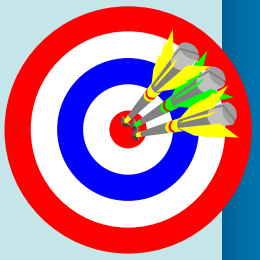
performing the experiment

Information Organization!

Logging Information/Data!

analyzing the experiment results

Approach to Data Analysis and Tools!



Success

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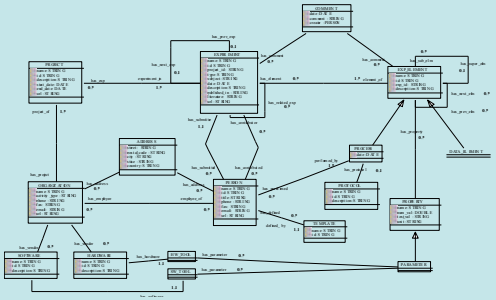
VLAM-G Experimentation Environment Data Model

DNA micro-array experiment

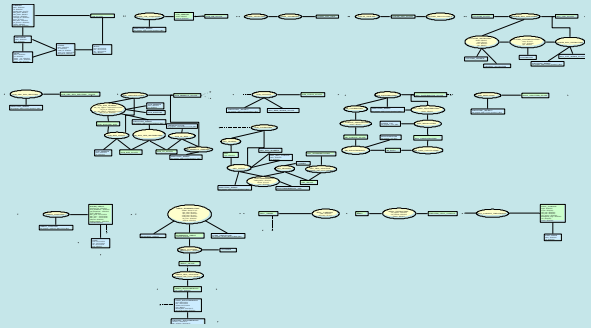
Micro-beam experiment

Common aspects of an experiment



Experimentation Environment Data Model

Process and data flow in an experiment



Process Flow Template

Annotations on an experiment

Application databases

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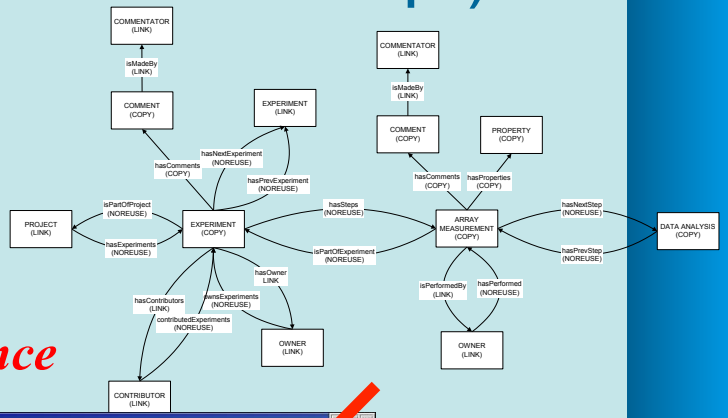
Process Flow Template

- Used as a blueprint for a specific type of experiments
- PFT is the main interface used by the end users to perform a specific experimentation in the VLAM-G environment.

PFT

(a high level of abstraction of the VL exp.)



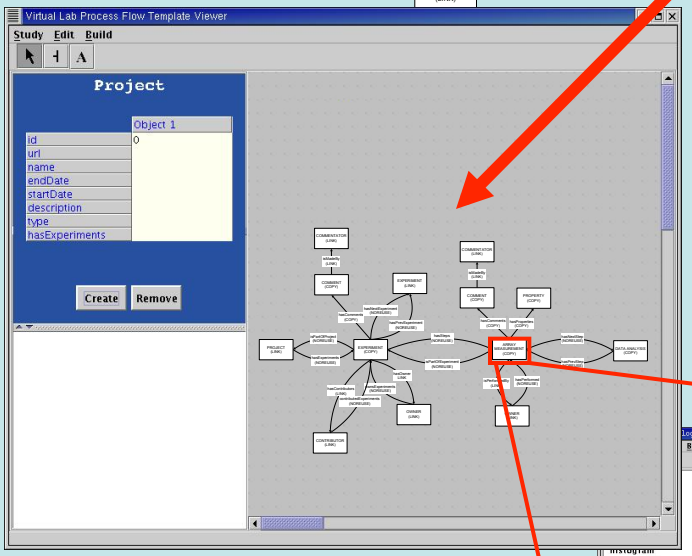
Process-Flow Template

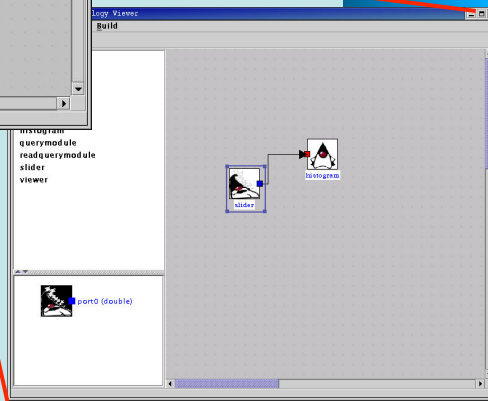
– Graphical representation of data elements and processing steps in an experimental procedure

– Information to support ***context-sensitive assistance***

Study

– Descriptions of experimental steps represented as an instance of a PFT with references to experiment topologies





Experiment Topology

– Graphical representation of self-contained data processing modules attached to each other in a workflow

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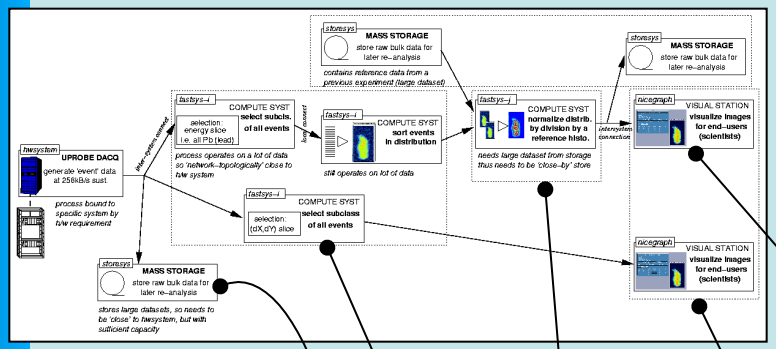
The Experiment Editor
(high abstraction level of the grid layer)



Experiment Editor allows the user to attach a set of software modules to define the execution workflow.

RTS executes the modules in the workflow on the Grid in a distributed manner using the Globus toolkit

VLAM-G Run Time System

Grid / Globus Services

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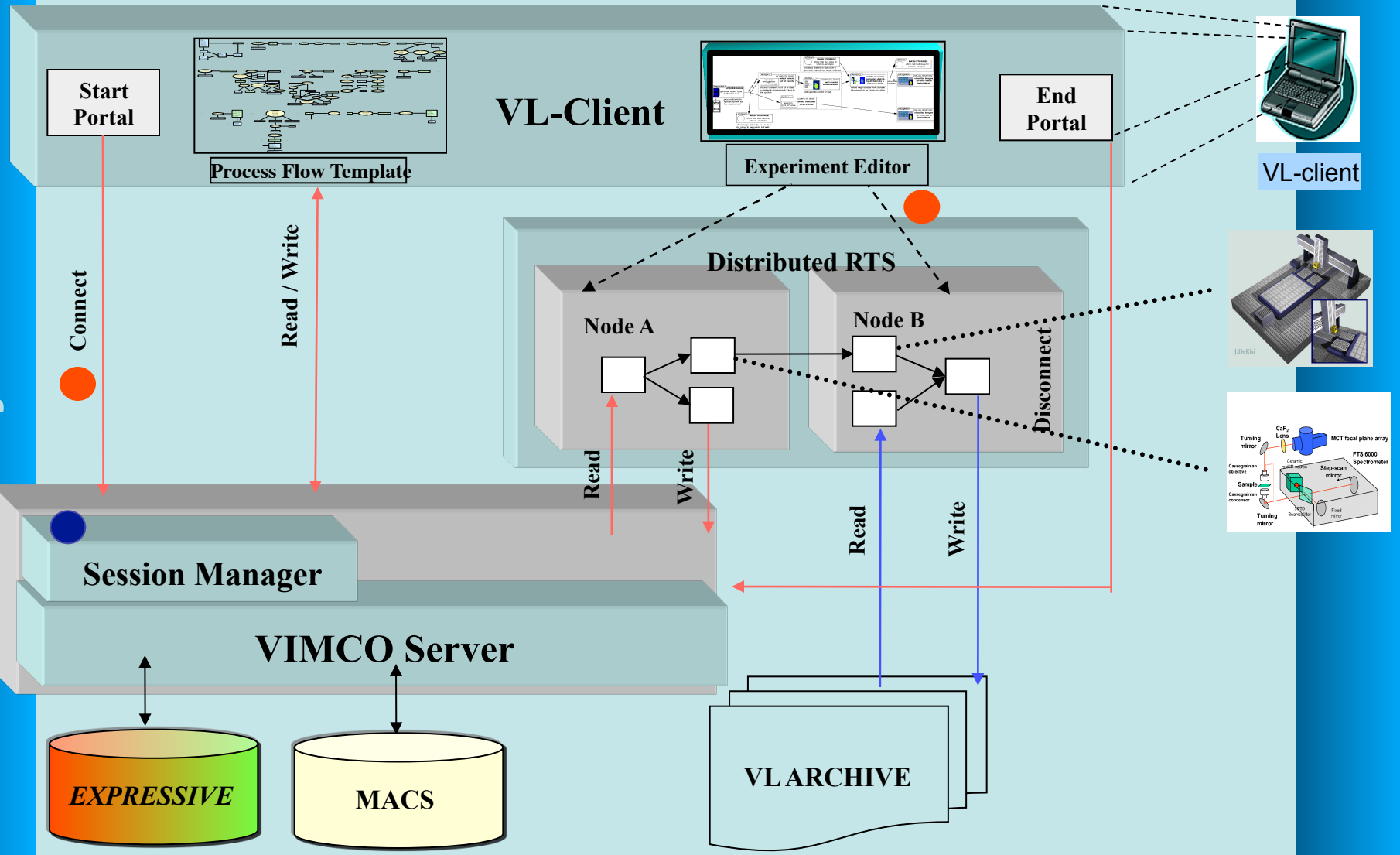
Experimentation in VLAM-G



Simulated Vascular Reconstruction

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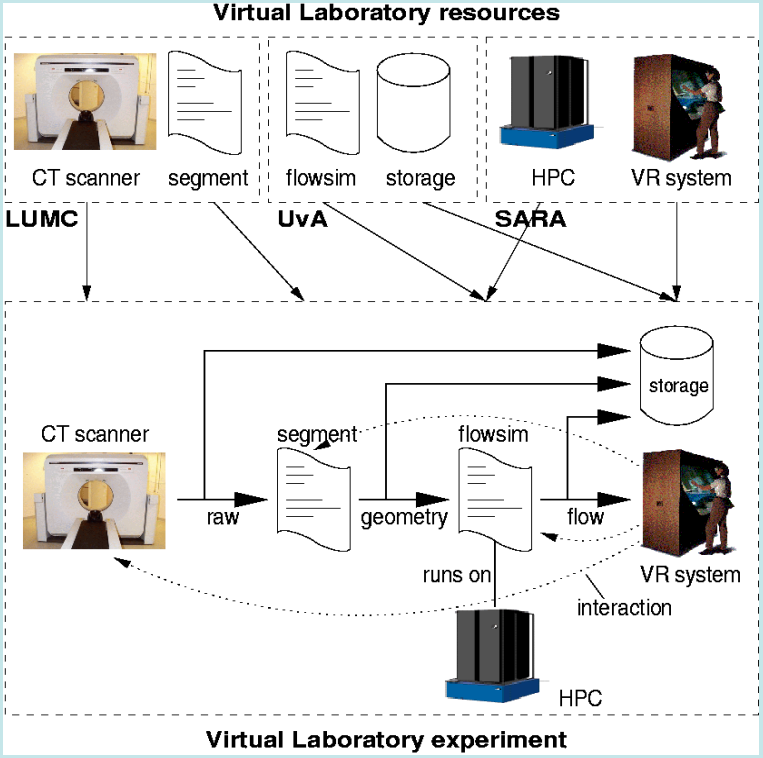
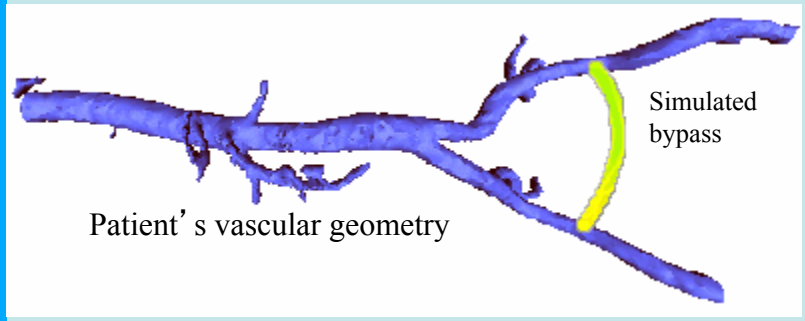
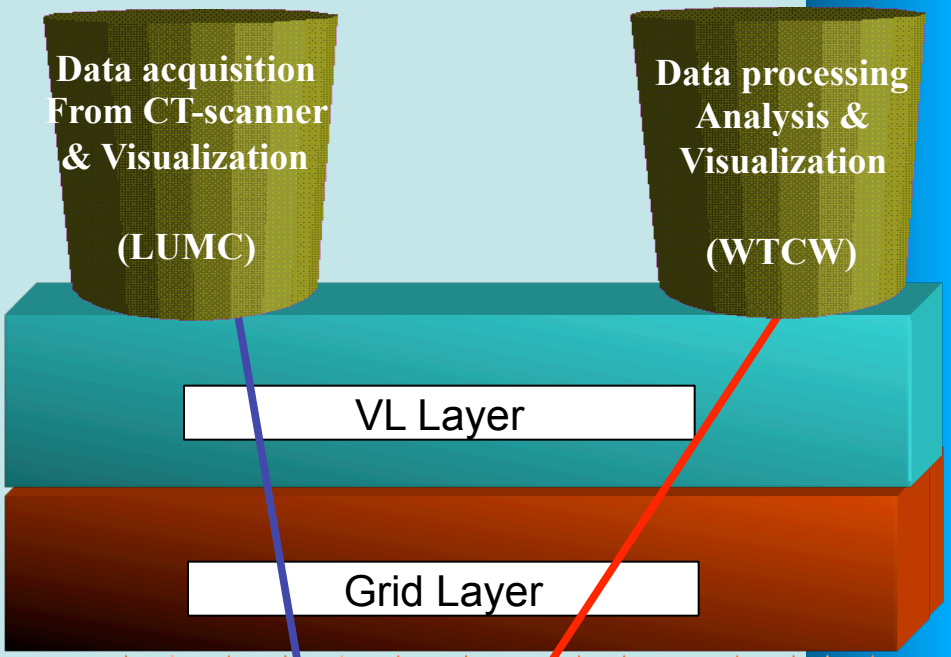
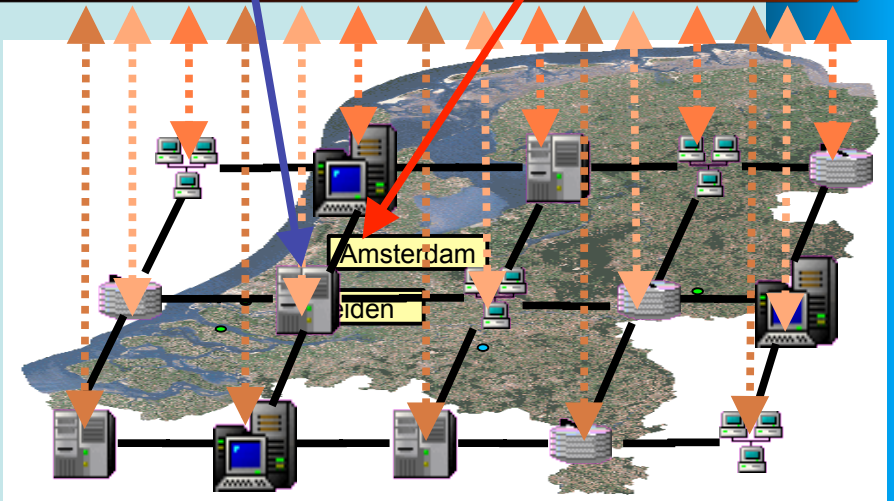
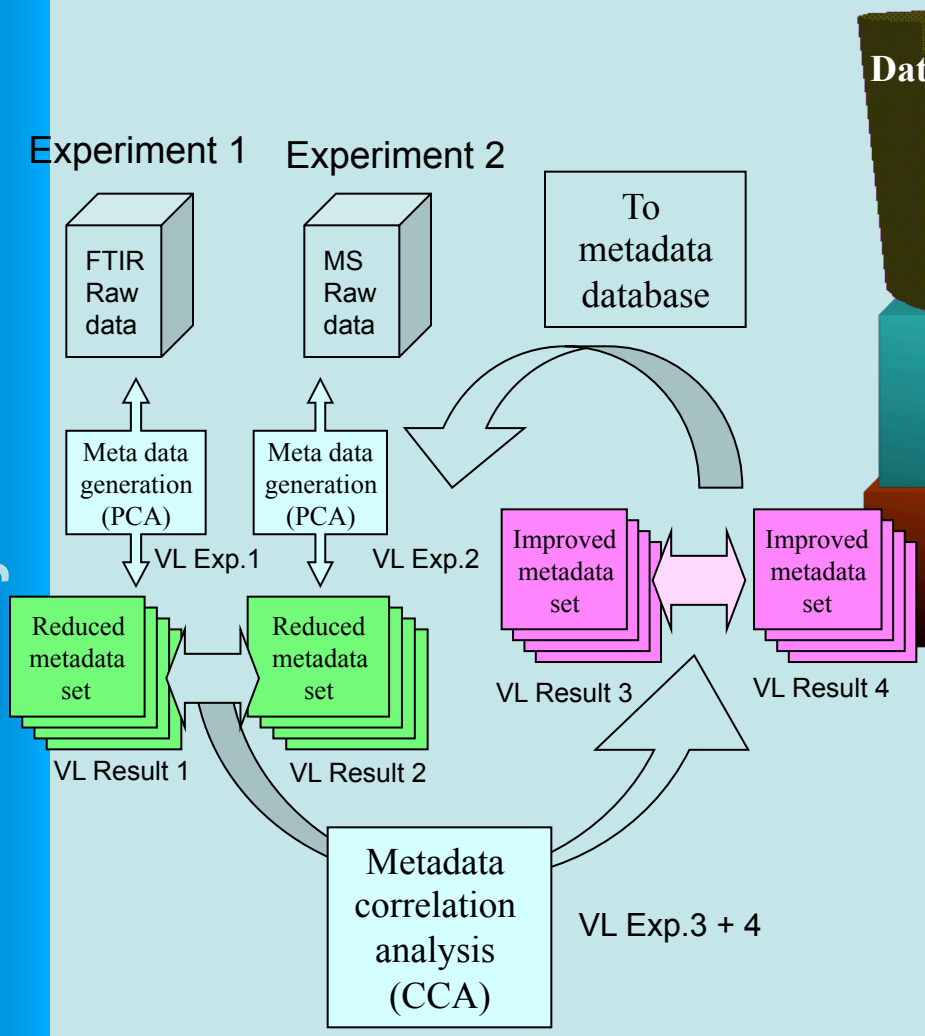


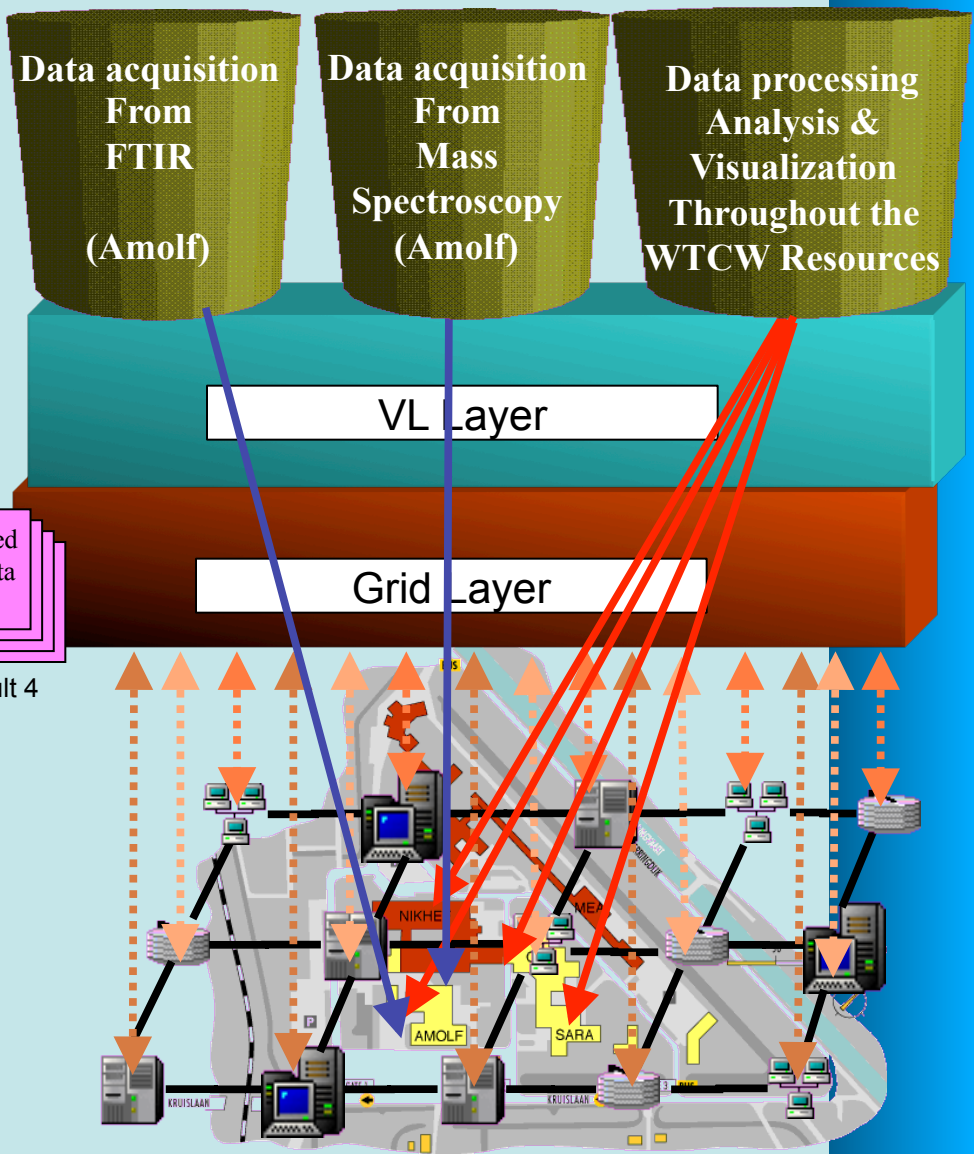






MACS: Material Analysis of Complex Surface





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Conclusions

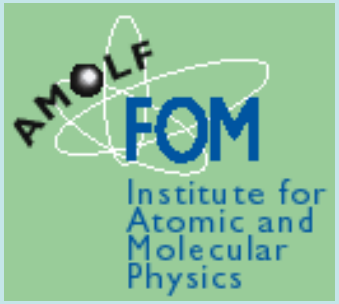
- VLAM-G: a science portal for exp. Analysis
  - ✓ Workflow support for Bio-informatics, Materials Science and Biomedical Simulation & Visualisation
  - ✓ Seamless access to distributed resources cross different institutions
  - ✓ Resource Management: based on Globus
- VLAM-G complete the functionality missing at the Grid layer (Content Management)

Find more information on the VLAM-G projects

VLAM-G home page

- http://www.dutchgrid.nl/VLAM-G
- http://www.vl-e.nl (in the near future)

Participants



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