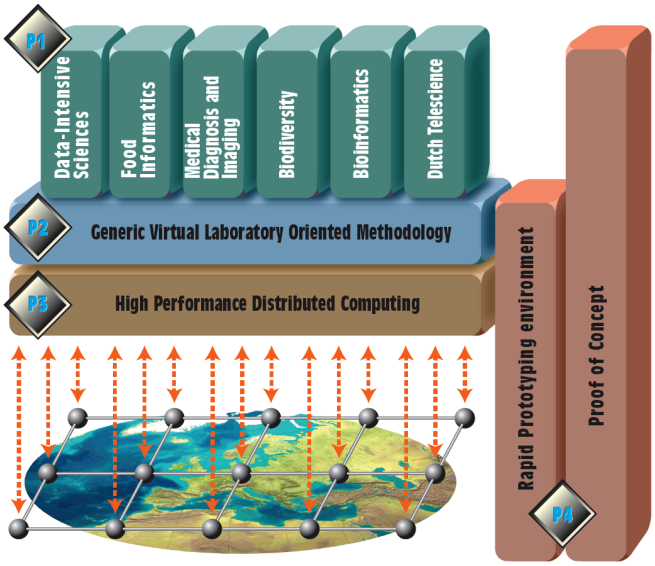
vl·e virtual laboratory for e·science

information

VL-e enables new approaches to traditional sciences

Information has become the fuel of our knowledge society, and our ability to digest, understand and share it will determine our scientific, economic and social progress.

The exceptional increase in computing power, storage capacity and network bandwidth over the past decades forms the basis of a digital revolution which has only just started. Also the changing scale and scope of experimental sciences require a new research paradigm: (digitally) enhanced science or e-Science. The aim of the 'Virtual Laboratory for e-Science' (VL-e) project is to bridge the gap between the technology push of the high performance networking plus the Grid and the application pull of a wide range of scientific experimental application domains. A typical example of this is the life sciences, where VL-e offers solutions for combining laboratory research with computational experiments and simulations, making use of the knowledge and experience gained from dealing with large data sets in high energy physics. At the same time, however, it is recognised that data sets in the life sciences are far more complex than in high energy physics.



More specifically, VL-e is developing a Proof-of-Concept (PoC) infrastructure (both hard- and software) to enhance location-independent access to scientific information and stimulate global and multidisciplinary collaboration, thereby enabling new approaches to traditional sciences. The VL-e software (both for rapid prototyping and in the PoC) provides generic functionalities that support a wide range of e-Science applications. This PoC infrastructure will boost the knowledge economy of the Netherlands.

Currently, six application domains are involved: Data-Intensive Sciences, Food Informatics, Medical Diagnosis & Imaging, Biodiversity, Bioinformatics and Telescience. Several Dutch universities, academic hospitals and industries in the life sciences and ICT domain participate in this project. There is also strong collaboration with NBIC (Netherlands Bioinformatics Centre). The recently started Dutch BIG GRID project will build a nationwide production grid, making use of methodology still being developed within VL-e.

Virtual Laboratory and System Integration – WS-VLAM www.science.uva.nl/~gvlam/wsvlam

WS-VLAM: The aim of the system is to provide and support coordinated execution of distributed Grid-enabled software components combined in a workflow. This system combines the ability to take advantage of the underlying Grid infrastructure and a flexible high-level rapid prototyping environment.

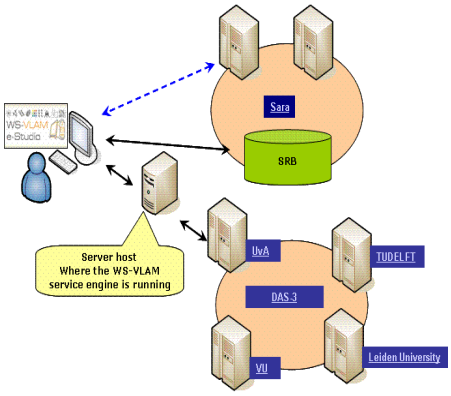
The WS-VLAM workflow management system is developed following the OGSA/WSRF standards.

The workflow engine of WS-VLAM is implemented as a WSRF compliant Web service making it one of the first workflow engines following the Execution Management Services proposed by OGF.

Core features:

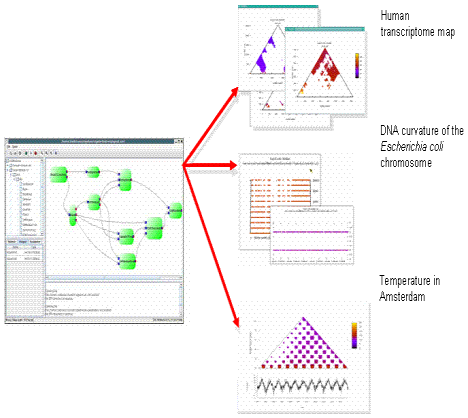
- Interface to develop and port existing applications in C/C++, JAVA, and python.
- Provide streaming facilities between applications executed on geographically distributed resources.
- Support the composition and execution of hierarchical workflows.
- Support for legacy applications.
- Support for remote graphical output.
- Provides a tool to convert Web services into workflow components.
- Provides tools to define, annotate, search for workflow components.
- Provides the detach/attach capability for long running workflows.
- Provides monitoring facilities based on WS-notification.

Deployment: WS-VLAM is currently deployed on the rapid prototyping environment (DAS-3 clusters). However, the WS-VLAM system can be deployed on any Grid (Globus) enabled system.



WS-VLAM deployment on DAS-3

Usage: A number of applications were developed using WS-VLAM (see **www.science.uva.nl/~gvlam/wsvlam/Applications**)



Workflow for discovering enriched windows of genomic features (developed using WS-VLAM)

Workflow Bus: We are exploring a novel architecture, in order to obtain workflow integration and interoperability among different workflow management systems.

In this approach a meta-workflow engine will orchestrate the execution of a number of workflow engines and allow seamless integration.

The workflow bus provides services for the data integration and runtime coordination between sub-workflows.

vl-e facts

budget 40 M, period 2004-2008
more than 20 consortium partners from industry and academia
director: prof. dr. L.O. Hertzberger
website: http://www.vl-e.nl

consortiumpartners

A&F Wageningen, AMC, CWI, DSM, Friesland Foods, FEI, FOM AMOLF, NBIC, Nikhef, IBM, LogicaCMG, Philips Research, Philips Medical, SARA, Top Institute Food and Nutrition, TNO Kwaliteit van Leven, TU Delft, Unilever, UvA-IBED, UvA-IvI, UvA-SILS, VU, VUmc, WTCW

VL-e Program line: Generic Virtual Laboratory methodology

Subprogram: SP2.5 Virtual Laboratory and System Integration

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