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.
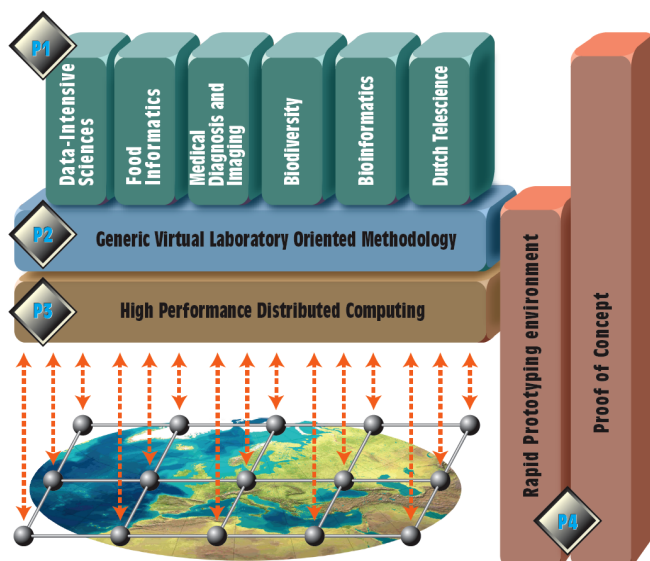
Biodiversity:

from data to relevant information, to understanding our ecosystem

Vast amounts of data on species occurrence are collected in the Netherlands and in Europe. In the VL-e subprogram Biodiversity we address the challenge of making this data accessible, providing relevant analyses, and supporting researchers, policy-makers and local authorities with easy access, visualization and tools.

Our approach is to integrate observation- and contextual data sources in a VL-e science problem solving environment (PSE). We aim at making this environment accessible, for example through webservices. We are succesfully using this approach in several real life applications.

EcoGRID is currently being applied in supporting the functioning of the growing Dutch Flora and Fauna Database (NDFF), containing 20 million records. This project is executed in cooperation with the ministry of agriculture (LNV) and numerous data collecting organizations. Its core technology used, is PostgresQL, PostGIS and a Web service architecture. http://www.ecogrid.nl

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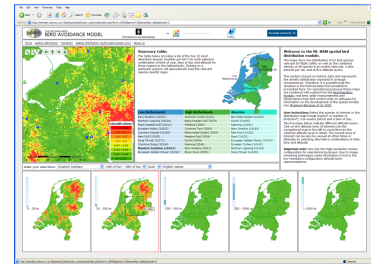
BAMBAS is a completed project that aimed at predicting spatial and temporal bird densitites under changing environmental conditions. It combined existing radar observations, visual observations and modelling expertise. The end-goal of this project was to develop a Bird Avoidance Model for the Netherlands (NL-BAM), which is operational since autumn 2006, and used as a decision support tool by the Royal Netherlands Air Force to reduce the risk of bird-aircraft collisions. http://www.bambas.ecogrid.nl

ESA-Flysafe is a project precurser to the Avian Alert initiative, a potential integrated application promotion programme (IAP) of the European Space Agency. Flysafe aims at demonstrating the added value of integrating different systems across national borders to improve military flight safety by reducing the risk of bird-aircraft collisions. One of the technological partners is the SARA institute, that provides high performance GRID computing. Data collection includes long range military radars and short range local radar systems, meteorological Doppler radars, and tracking of individual birds. All of these sources will be integrated into a Vl-e PSE for modelling bird migration. In this PSE different aspects of bird migration will be modeled in order to provide predictions and forecasts of migration at different scales in space and time. http://www.avianalert.eu
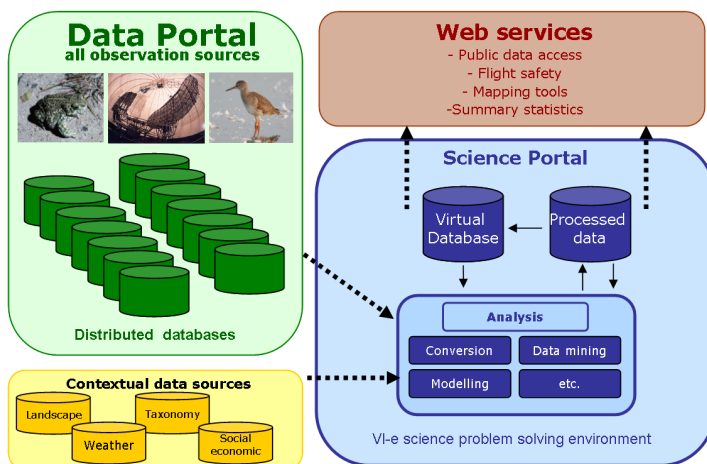
A generic overview of components used for the Vl-e science PSE

VL-e Program line:	e-Science in applications
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