



@neuBrowser – Interactive information system browsing

Christian Ebeling¹, Jordi Huguet², Antonio Arbona³, and Christoph M. Friedrich¹

¹ Fraunhofer Institute for Algorithms and Scientific Computing (SCAI), Department of Bioinformatics, 53754 Sankt Augustin, Germany

² Hospital Clínic i Provincial de Barcelona, Spain

³ Grid Systems S.A., ParcBIT - Edificio I7 07121, Mallorca, Spain

Introduction

The @neurIST Project (Integrated Biomedical Informatics for the Management of Cerebral Aneurysms) is a European initiative, focused on intracranial aneurysms and intends to provide an integrated decision support system to assess the risk of aneurysm rupture in patients and to optimize their treatments. This project integrates a large amount of data and information from clinical centres available by a Grid infrastructure. In the project 6 workflows have been developed, which fulfil various subtasks. Here we present Workflow 0, which aims at using the distributed infrastructure to select subsets of patients with dynamically selected properties and provide this information to subsequent workflows.

Getting a concise overview on availability and completeness of clinical data is of utmost importance during pre-processing for clinical data mining. @neuBrowser provides this dynamic functionality to get an overview of existing information and browse or analyze the data from all clinical centres using basic statistical functions. In order to inspect data, construct hypotheses and check assumptions it is helpful for researchers and clinicians to have access to a web based platform with a graphical user interface.

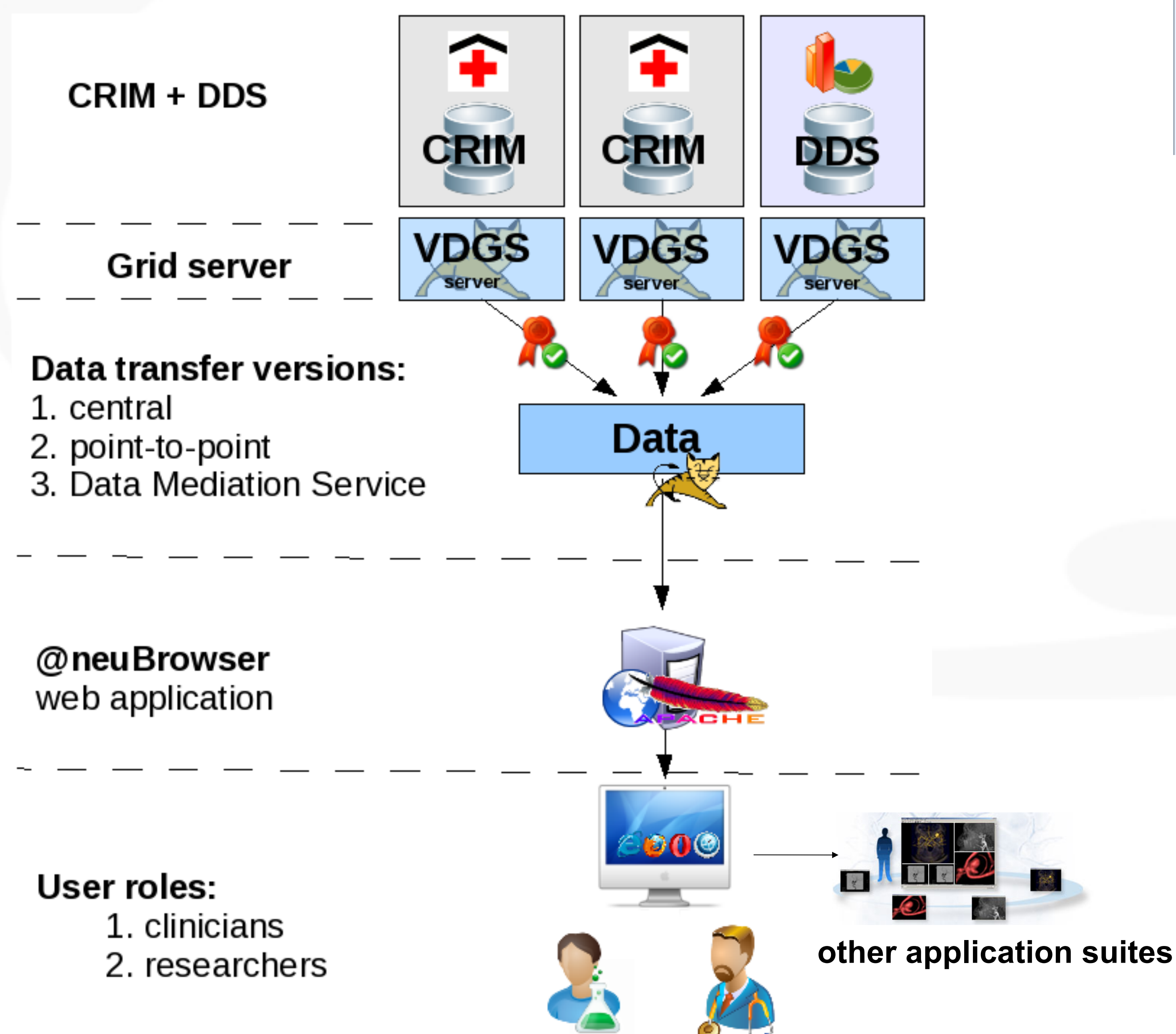


Figure 1. General schema of @neuBrowser architecture. The GRID service (VDGS server/GRID client) is used to transfer data from CRIM (Clinical Reference Information Model) or DDS (Derived Data Store) to the web application server. An interactive web application provides an easy to use interface to the CRIM or DDS data with basic statistical functions.

Features of @neuBrowser

We have developed @neuBrowser - a web based client suite that provides a simple interface for users to explore the pseudonymized patient data in the CRIM-based databases from the @neurIST system side. It is aimed to create customized views of the data available in the BioIS (Biomedical Data Infrastructure) implementations. These views help to evaluate data quantity through basic statistical parameters, and it can be propagated to the other suites for further inspecting certain patient subsets with particular properties. @neuBrowser use the appropriate data access services to obtain information from the clinical centres, and it is integrated into the @neurIST security system. The application allow flexible and secure queries on the CRIM databases which include data from all clinical centres. To protect the privacy of patients data, drill down identification is disallowed, when the result sets are too small.

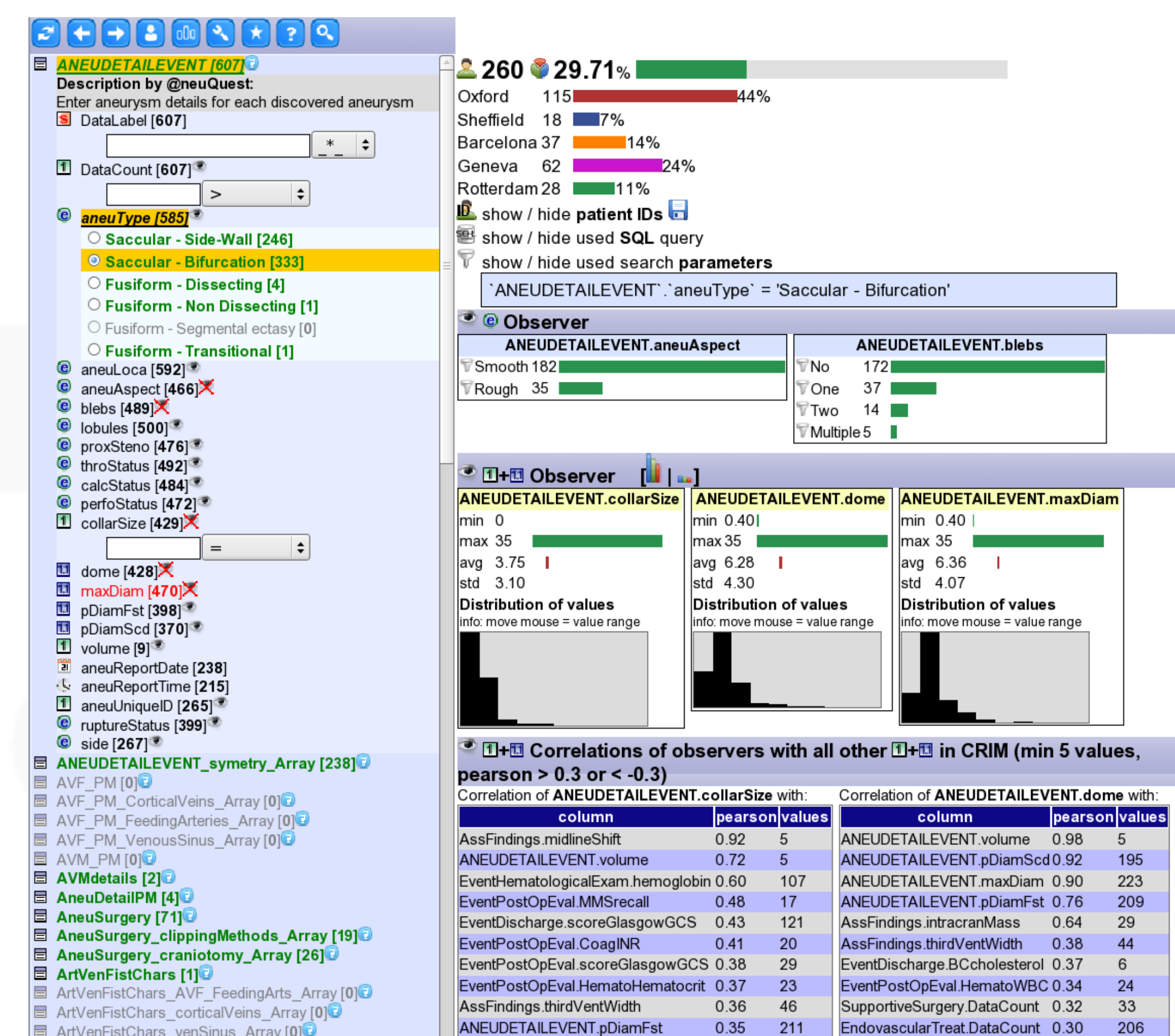


Figure 2. Screenshot of @neuBrowser: The tree structured navigation allows to browse all tables of the CRIM database and easily creates queries. Observers of numeric values and enumerations shows standard deviation, minimum, maximum, mean value, correlation coefficients with all others and histograms

Functionalities of @neuBrowser

Following functionalities are integrated:

- browsing the CRIM (Clinical Reference Information Model)
- create dynamic queries against the clinical data
- On the fly calculation of standard deviation, minimum, maximum, mean value and distribution for numeric values
- observation of linked relationships to enumerations and numeric values
- calculation of correlation coefficients (numeric observers against all other numeric fields in the model)
- calculation of total patient number depending on the query and clinical centre
- export of pseudonymized patient identifier for the use in other @neurIST application suites like @neuFuse

Conclusion and Outlook

In order to allow other applications using the results of advanced queries against the clinical data of the CRIM (Clinical Reference Information Model) we provide a machine-based service (web service). Predefined queries, user configured personalized views and more statistical functions will extend the feature list.

REFERENCES

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Contact:

Dr. Christoph M. Friedrich
friedrich@scai.fraunhofer.de