

MRALD: Secure Data Delivery, Sharing, and Analysis

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Problem

- **Data consumers have complex data needs but not the ability to extract the data.**
- **Lack of time, resources, or expertise to build a secure, intuitive, and easily accessible interface to the data**
- **Contradictory need to balance data sharing and delivery with concerns about security**
- **Need for intuitive analysis tools that interface seamlessly with database**
- **Fixed data delivery system that inhibits enhancements and customizations**

Background

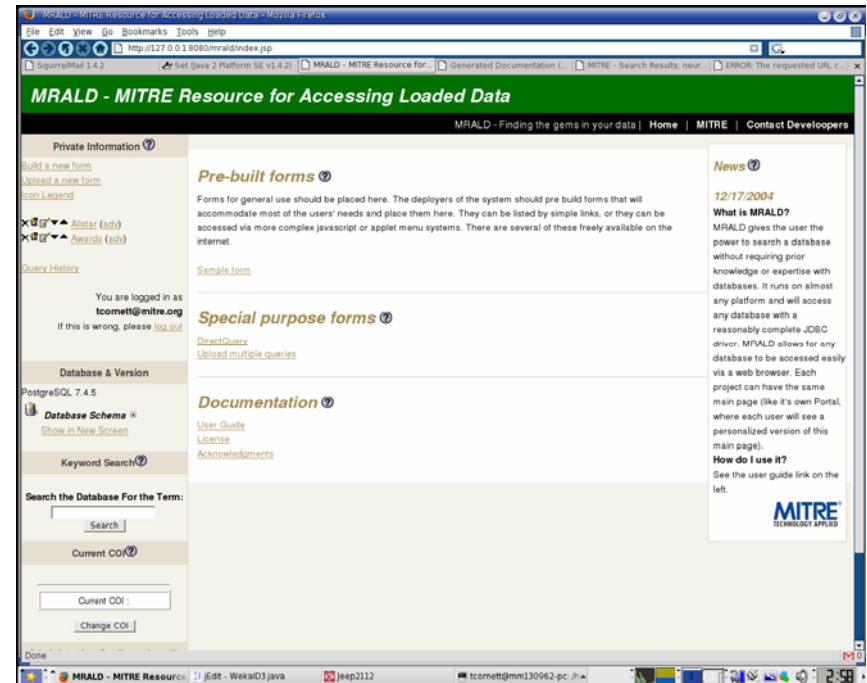
- **MRALD** grew out of the need to solve a frequently recurring problem using a generic yet flexible solution that could be applied in any environment.
- **CAASD**: Need to consolidate data sources and provide an easily accessible data delivery mechanism
 - Result: CRS, CAASD's popular resource for aviation data
- **Neuroinformatics**: Need to store, explore, retrieve, and share neuroimagery
 - Result: NeuroServ, currently in use at several neuroscience research laboratories
- **Both systems use MRALD as the core infrastructure.**

Objective

- **Provide a way to efficiently and securely disseminate data from a relational database to sophisticated data consumers who may or may not have database experience**
- **Provide a secure, intuitive data sharing model to balance data security concerns with data sharing needs**
- **Provide a flexible system to easily allow for schema changes, requirement changes, data analysis, and other application-specific extensions and functionality**

Activities

- Designed and implemented a DBMS and platform-independent data delivery system
- Designed, implemented, and integrated a form-building subsystem
- Created a reference implementation for the Structured Sharing Communities sharing model
- Implemented and integrated proof-of-concept infrastructure to add data mining capability

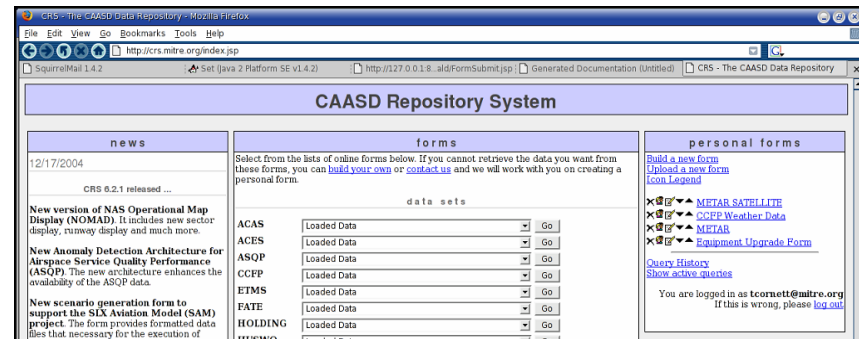


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Highlight

- Platform independent
- Database independent
- Support for all user levels
- Interest
 - Many downloads within MITRE
 - Sponsor demonstrations and installations
 - CRS



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Demonstration

- **CRS - <http://crs.mitre.org>**
- **4 NeuroServ installations**
 - **Johns Hopkins University**
 - **University of Texas, San Antonio (pending)**
 - **Massachusetts General Hospital (pending)**
 - **Here - <http://neuroinformatics.mitre.org/neuro>**
- **Internal demonstration**
 - **<http://powersim.mitre.org:8080/mrald>**

Impacts

- **Successfully used in two very different work programs with very different domains – national aviation and neuroscience**
- **Current interested customers include FAA and airlines, DHS, CDC, MTP, and CIIS**
- **Papers**
 - **M. Brian Blake, Gail Hamilton, Jeffrey Hoyt: Using Component-Based Development and Web Technologies to Support a Distributed Data Management System. *Ann. Software Eng.* 13 (1–4): 13–34 (2002)**
 - **Kenneth Smith, Sushil Jajodia, Vipin Swarup, Jeffrey Hoyt, Gail Hamilton, Donald Faatz, and Todd Cornett: Enabling the sharing of neuroimaging data through well-defined intermediate levels of visibility. *NeuroImage* 22 (4): 1646–1656 (August 2004)**

Future Plans

- **Multiple data sources**
 - One at a time
 - Many at once
- **Data set evaluation**
- **Mature data mining and analysis tools**
- **Additional reporting and charting capability**
- **Increased security**
- **Distributed architecture using grid services**
- **Improved documentation and training**
- **Formal O&M**