One Stop Shopping: The ARM Data Ordering Integration Project

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What is "ARM"?

▶ Atmospheric Radiation Measurement Program is the largest global change research program supported by the U.S. Department of Energy

▶ Sites around the world collect atmospheric data

▶ Web presence for 10+ years

▶ Provide data to the scientific community, free of charge

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The Problem

▶ Data stored in the ARM Data Archive

▶ Archive's website was completely separated from the ARM website, had a different look/feel

▶ Interfaces were complicated for novice users

▶ Information on the main ARM website was not always consistent with the information on the Archive's website

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The Challenge

▶ Integrate the main ARM website with the Data Archive website to create a seamless, more user-friendly, data-ordering experience

- Use the Archive's database as a shared back-end
  - Edit the Archive database so the content is "web ready"
- Redesign the Archive website so that it looks and feels like the ARM website
- Implement a way for users to "shop" for and order data from the main ARM website
- Create a team comprised of developers from 3 labs
- **Do it all in one FY!**

Rising to the Challenge

▶ Create a diverse technical team

▶ Communicate regularly

▶ Conduct regular user testing

Back-End Integration

▶ Had already redesigned the ARM website in 2004 with a database back-end, using PHP to display relational information, "smart navigation"

▶ Needed to integrate the Data Archive database

- Sybase
- 10+ years old
- Millions of records

▶ Set up proxy tables at BNL to use for development

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Front-End Redesign

► Needed a new interface for data ordering

► Wanted to be able to "Order Data" from many different places

► Needed to have a set number of variables defined before we could place an order

- Site
- Facility
- Measurements
- Instruments
- Datastream
- Data range

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Front-End Redesign (Cont.)

▶ Problems with a linear ordering process
- Lots of forms; hard to go back and make changes to previous selections
- Not dramatically different from what the Archive currently had

▶ Solution: Developed a different kind of ordering interface
- Used AJAX (Asynchronous JavaScript And XML) approach and J2EE (Java 2 Platform, Enterprise Edition) technologies
- Created a "less linear", faster, easier to use interface
- Demonstration

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Challenges of a Multi-Lab Team

► Communication
- Not face to face
- Face time is expensive, time consuming
- Hard to discuss highly-technical concepts

► Solution: Compromise
- Bi-weekly teleconferences
- One team meeting at PNNL in February; follow up in March at Science Team Meeting
- Project management tools; ARM Engineering Change Request (ECR) and Engineering Work Order (EWO) software
- Lots of emails!!!

Challenges of Development

▶ Legacy Data
- Creating a data model to account for 10+ years of instruments, datastreams, naming conventions, etc.

▶ Servers across the country

▶ Primary developers spread across the country

▶ Simultaneous development activities

▶ User testing sections of website nearly complete

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Meeting our Goals and Deadlines

► On September 27, 2005 (3-days early)

- Published fully-functional shopping cart on www.arm.gov
- Pulling information about sites, instruments, measurements, and datastreams from "shared" database
- Integrated field campaign data and external data into shopping cart
- Completed 3 rounds of user testing

► User feedback positive! Customer happy.

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The Stats

Since October 2005:

▶ Total number of files ordered: **55,039**

▶ Total volume of order: **384.03 GB**

▶ Number of distinct users ordered through the shopping cart: **32**

▶ Number of orders made: **66**

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Are We Done Yet?

- ▶ Continuing to refine our ordering system, integrate with our IOP information

- ▶ Exploring ways to make our data model more robust

- ▶ Documenting processes for adding new datastream information to the database

- ▶ Continuing to perform user testing to improve our users' experience; attended a website usability workshop

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