

Big Data Systems at the ARM Archive I: Interactive Visualization Opportunities

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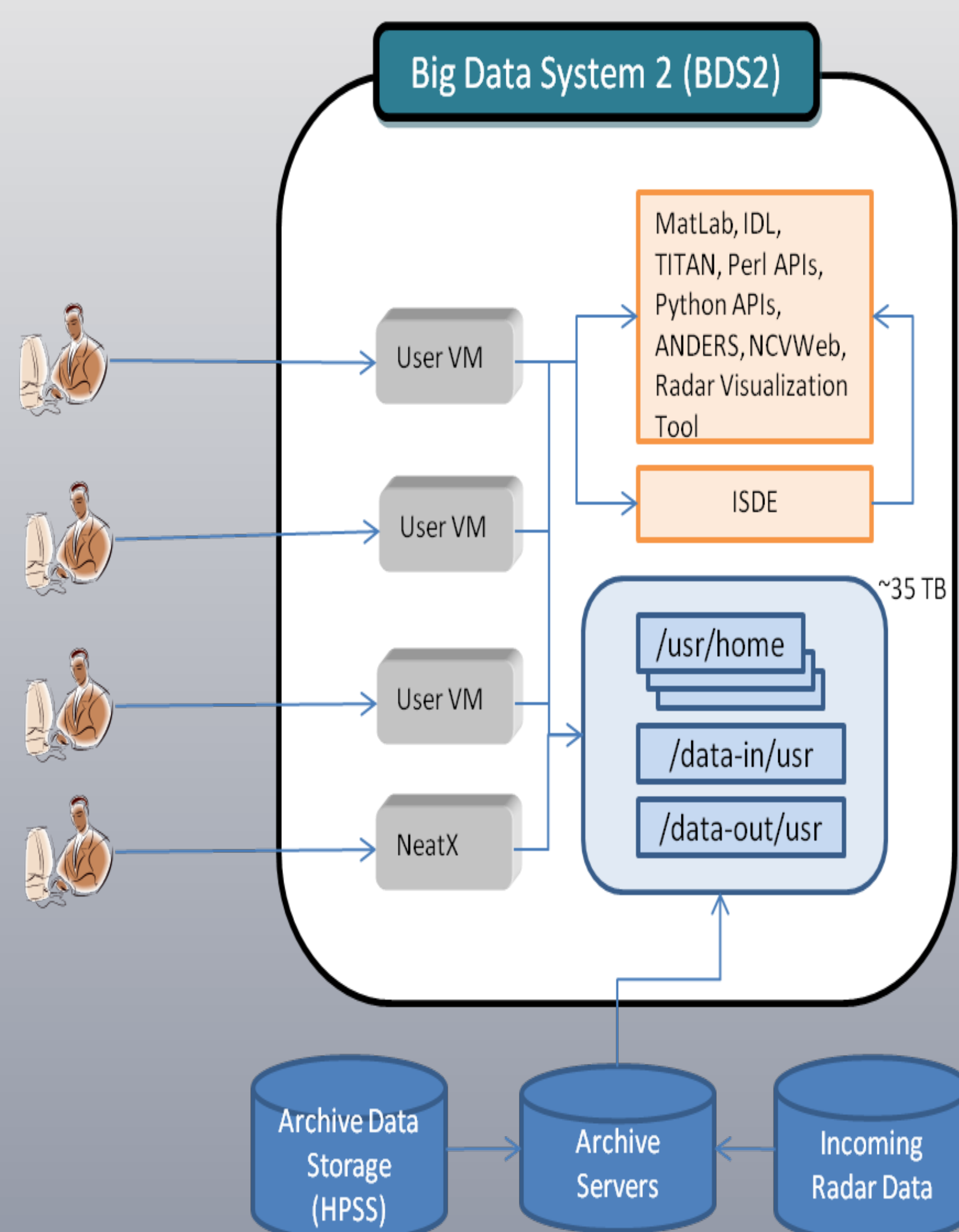
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Introduction

As part of the “Big Data System” (BDS2) design, the ARM Archive is currently setting up a system with various interactive visualization tools (BDS2). The registered archive users will be able to request access to this system and perform various visualization and small-scale data extraction tasks. This system will have radar software and data processing and visualization. In addition to the interactive visualization capabilities, this system will also be used to produce a very large number of pre-computed plots for large volumes of radar data. These plots will be used in various ARM web pages and Archive user interfaces as part of the data discovery and data ordering processes. The ARM Integrated Software Development Environment (ISDE) will be installed as part of the script development feature.

BDS2 Workflow



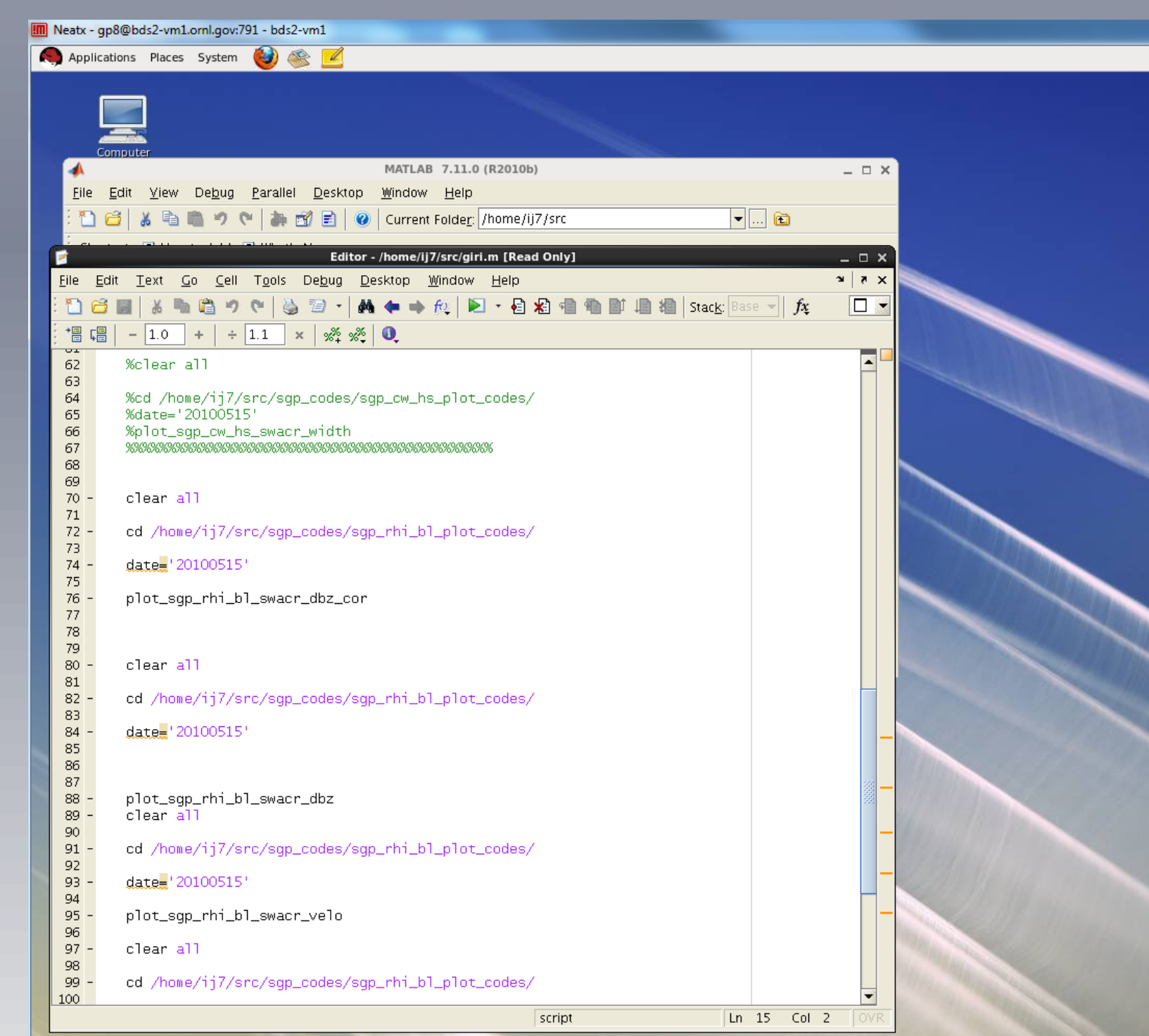
- Interactive visualization
 - Users request access to the BDS2 server
 - Almost instance access to the Archive users
 - Users get access to various data processing and visualization tools and APIs
 - User-saved “views” and data extractions can be made available via web services
- Software Development
 - Access to local copy of Integrated Software Development Environment (ISDE)
 - Users develop scripts using ISDE, test it with locally available data.

ARM SACR Processing Example

Purpose: Generate 3D radar plots for SACR (Scanning ARM Cloud Radar) measurements and make it available in the Archive Plot browser

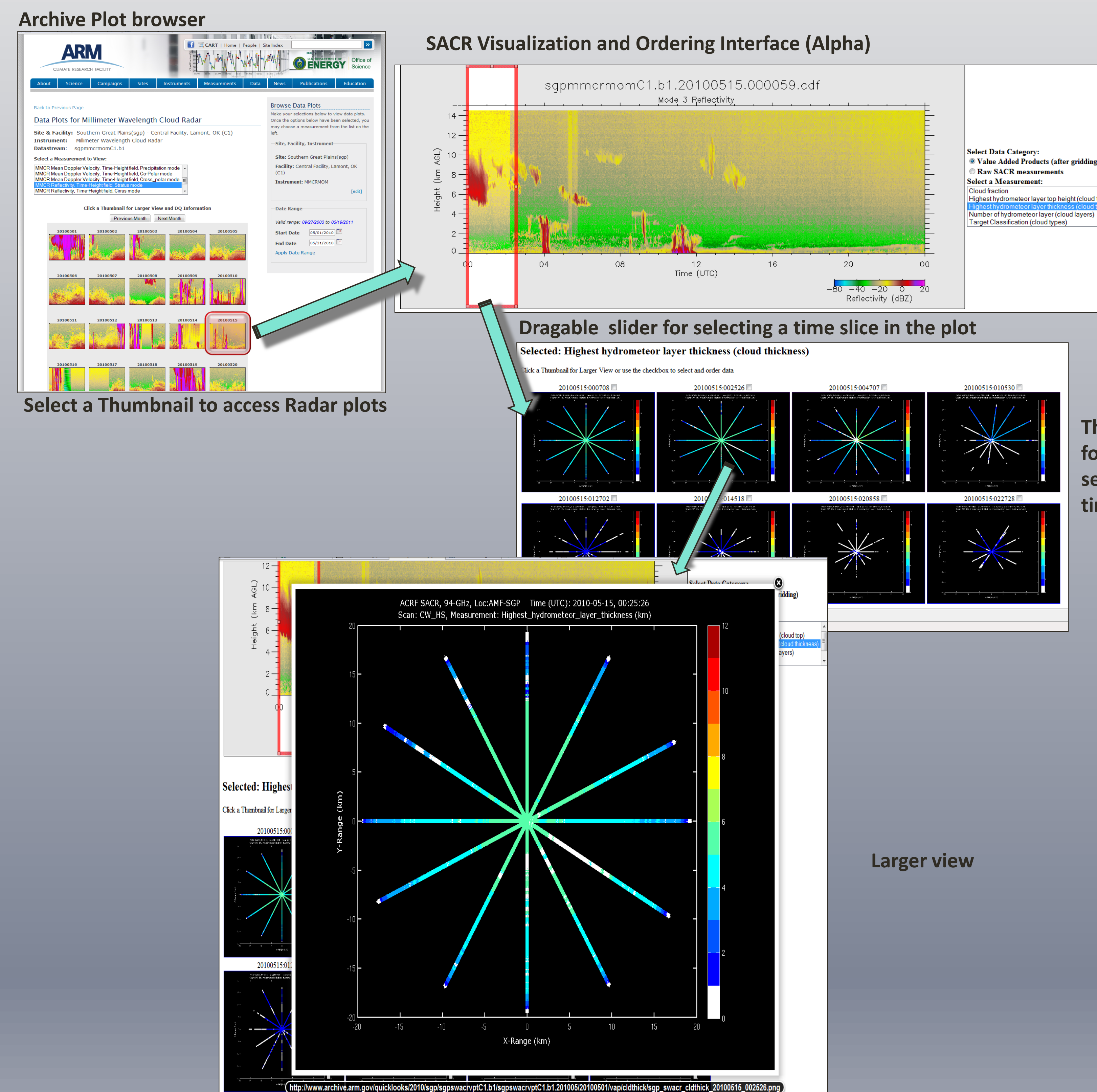
Step 1: Running Visualization scripts in BDS2

- Prototype scripts developed by the Clouds group at McGill University (www.clouds.mcgill.ca). The scripts/code will be reviewed and refined by the BNL radar group for official data production
- Scripts are migrated to BDS2 to run against large collection of SACR data
- Script can be remotely run using Neatx Viewer or via SSH

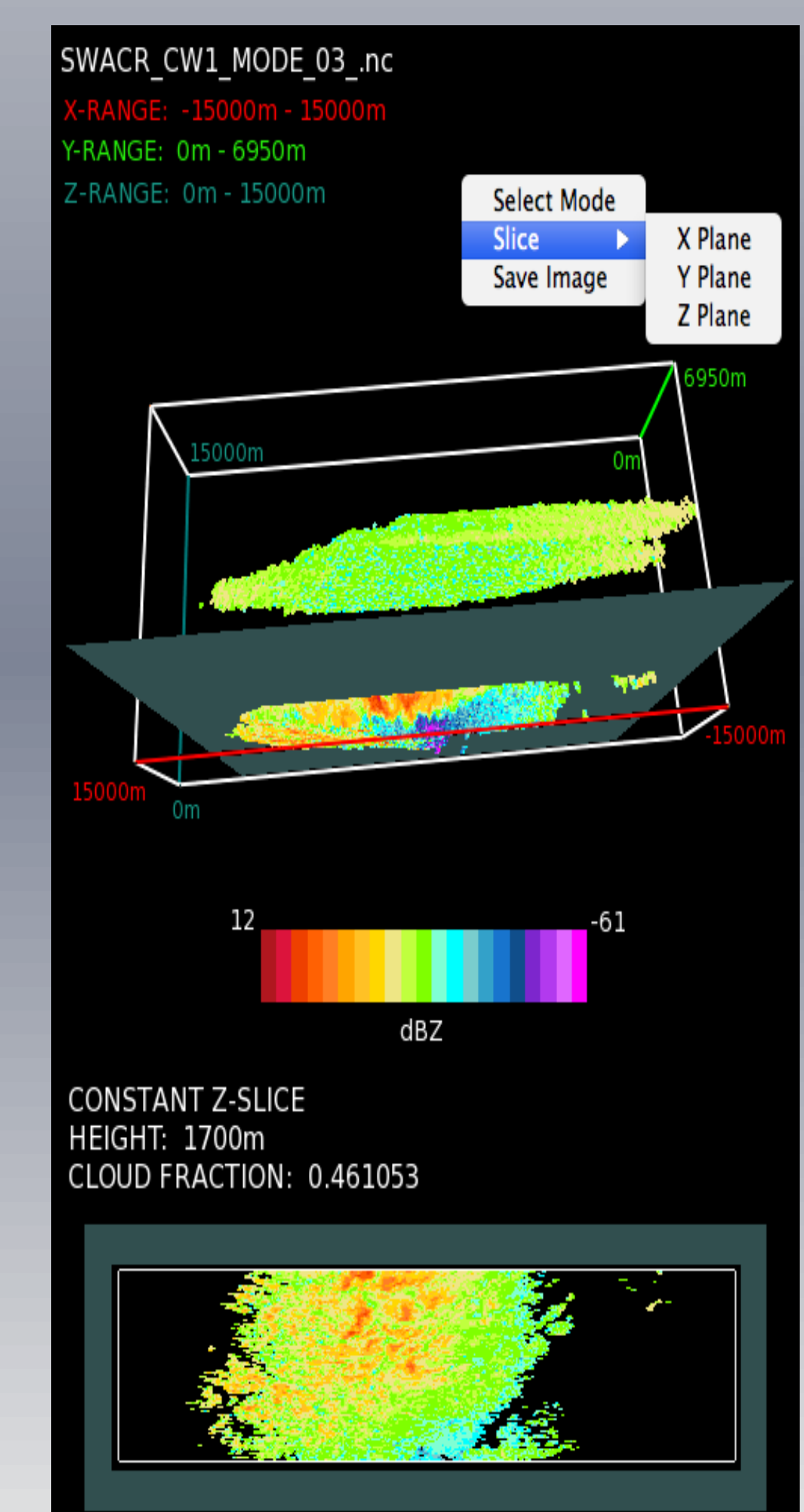


Browse Plots and order Data Using Archive Plot Browser

Generated plots are made available via Archive Plots Browser



3D Radar Visualization Tool

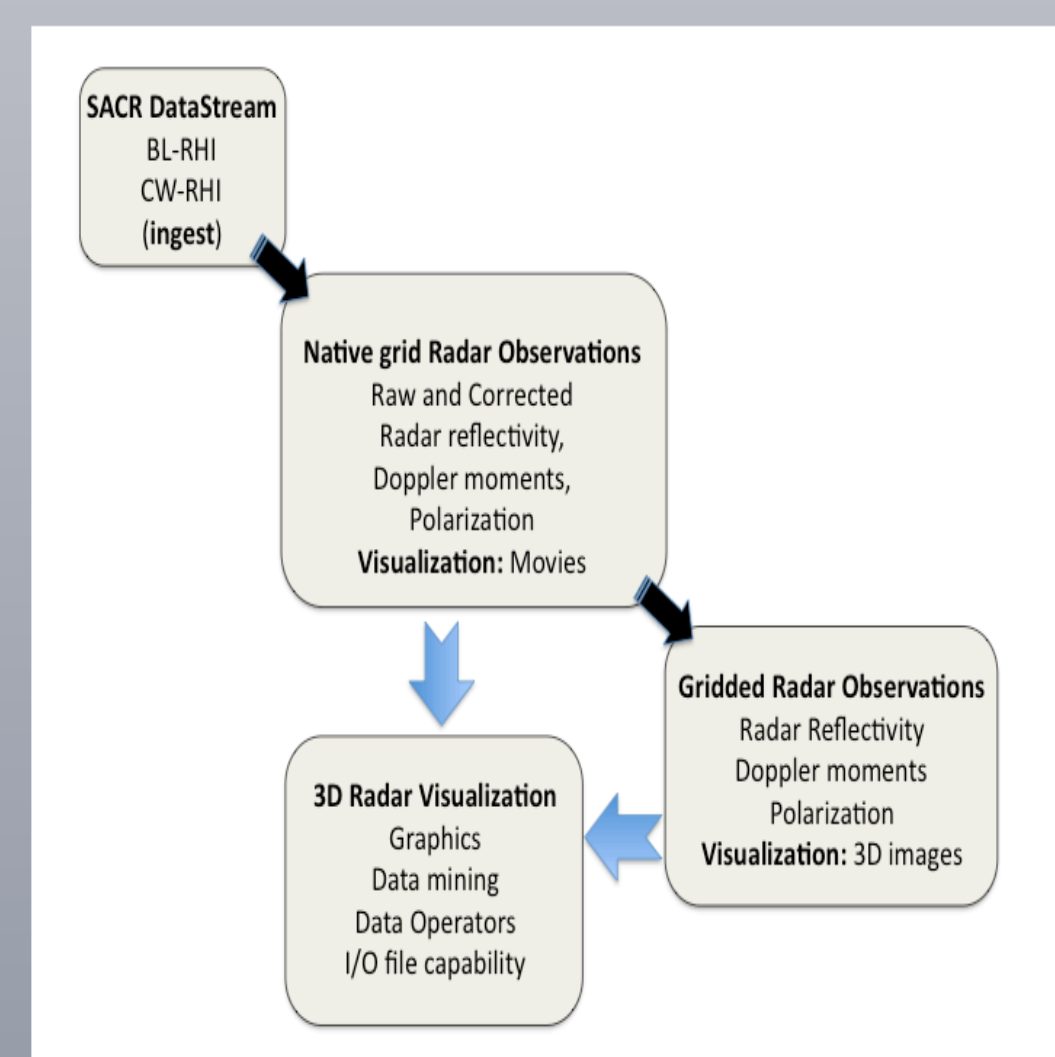


- 3D Radar Visualization Tool:
 - Desktop tool for researchers to view/dissect/analyze 3D radar data
 - Based on OpenGL API developed at BNL
 - User-saved “views” and data extractions can be made available via web services
 - Allow Users to:
 - Easy to load large volume of data
 - interactively rotate data, zoom in/out on specific areas
 - see inside clouds and see dynamically changing slices of clouds
 - Save dynamically created images and their data
 - Apply operators (algorithms) specifically developed for the analysis of 3D cloud fields

What is Next?

SACR Visualization and Ordering Interface :

- expand to accommodate data and images/movies for the proposed BL-RHI and CW-RHI modes
- Integrate Archive data ordering capabilities



BDS2 Milestones:

- Install and test Radar software and other visualization tools (April 2011)
- Complete ISDE deployment (April 2011)
- BDS2 Initial release to the broader Archive user community (June 2011)
- Performance Evaluation (starting August 2011)