

DR POWER

Data Repository for Power system Open models With Evolving Resources

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Team

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 - Craig Miller
 - Chief Scientist

Mission of DR POWER

Collaboratively evolving high-fidelity power system models

- ▶ Design, develop, and host a data repository and web portal to:
 - Provide open-access power grid datasets and the capability to uniquely review, annotate, and verify submitted datasets
 - Ensure sustainable model and dataset dissemination and evolution through user-defined dataset creation and validation
 - Integrate and extend NRECA's success with OMF to include transmission modeling

Challenge of DR POWER

- ▶ Models are continually evolving and interesting problems are found in the proprietary models
- ▶ Many different models are used by the industry
 - Today's planning engineers use bus branch models
 - Real time operation uses node breaker models
 - Cutting edge technology is not always defined in the models
- ▶ DR POWER is targeting support for:
 - CIM (node breaker)
 - OMF/GridLAB-D (high-resolution distribution models)
 - PTI and MATPOWER (Planning/Models)

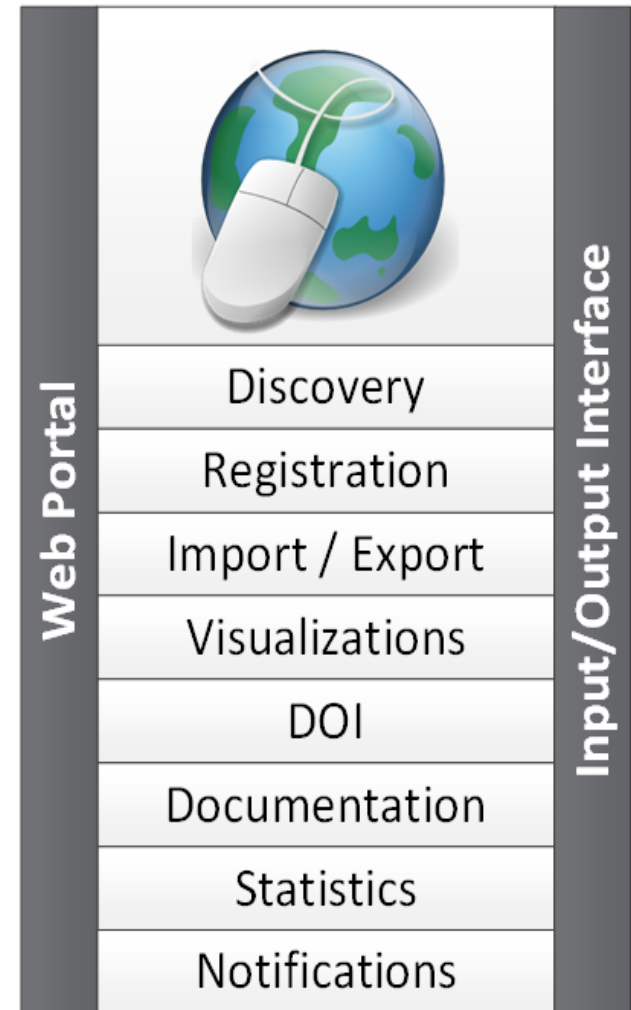
Goals of DR POWER

- ▶ Deliver the ability to collaboratively build, refine, review, and evolve high-fidelity power system models and accelerate grid optimization algorithm development
- ▶ Integrate community development tools, such as SDET

Metric	State of the Art	Project Targets
Open Access	3 stale websites 10's of models Limited scenario sets	1 web portal 1,000s of models/data sets 1,000,000s of scenarios
Flexibility	Models are in limited formats No way to add new model details	Perform data transformations on-the-fly Ability to add new fields as needed and evolve the models, maintaining model history
Scalability	Total models are less than 1 Gigabyte	High-throughput scalable portal technology with petabyte storage
Sustainability	Static websites	PNNL is committed to building a dynamic community resource

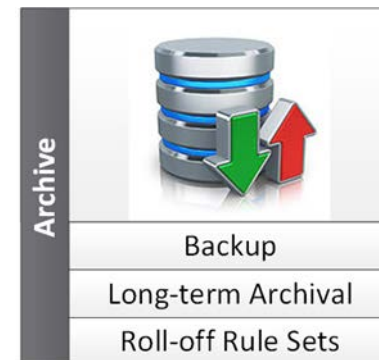
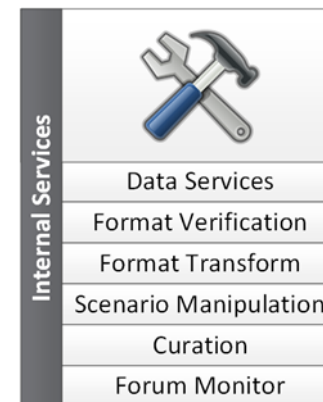
Web Portal

- ▶ Open-access web client for using data repository capabilities
- ▶ Execute tools for dataset generation, modification, citation, etc.
- ▶ Save results from such tools to repository and display the results to user
- ▶ Display various reports such as dataset version details, curation details, etc.
- ▶ Track upload, download, and access statistics

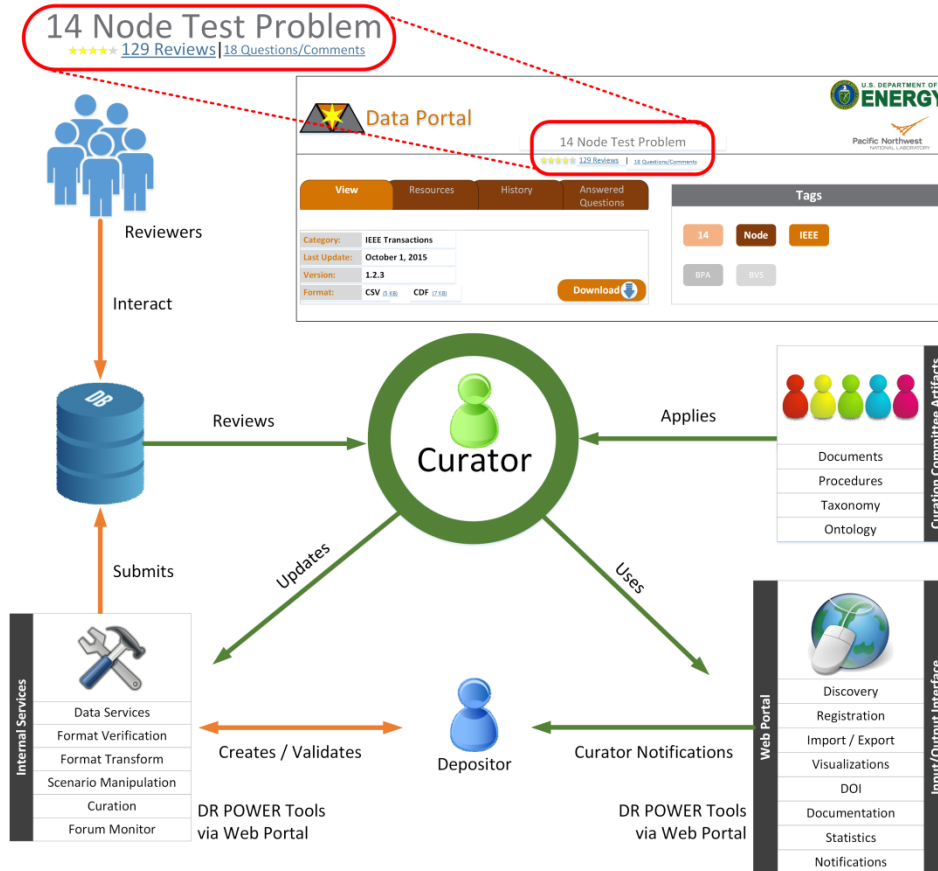


Data Repository (Back-End)

- ▶ Download requested model and scenario data in any available format
- ▶ Upload and store datasets for different power grid models; assign DOI
- ▶ Import models of various formats, including currently available open models
- ▶ Save review of dataset and annotations performed by users
- ▶ Maintain dataset versioning after modification
- ▶ Save additional scenario information for time-series data generated



Active Curation



- ▶ Based on Digital Curation Center Lifecycle Model
- ▶ Curators will review uploaded models
- ▶ Curators will help guide model creation
- ▶ Community participation in reviews, questions, comments, etc.

Short term Goals

- ▶ Q1: Initial requirements and specification document for the overall system architecture and interfaces delivered
- ▶ Q2: Initial version of the web portal and repository deployed
- ▶ Q4: Improved version of web portal

Q2		Q4
<ul style="list-style-type: none"> • Registering a user 	<ul style="list-style-type: none"> • Creating an account 	<ul style="list-style-type: none"> • File transformations
<ul style="list-style-type: none"> • Uploading/ downloading models 	<ul style="list-style-type: none"> • Basic search 	<ul style="list-style-type: none"> • Forums
<ul style="list-style-type: none"> • DOI 	<ul style="list-style-type: none"> • Populated with UW models 	<ul style="list-style-type: none"> • User documentation

Sustainability for Data Repository

- ▶ Ability to cite models is a big carrot to model creators
- ▶ Work with IEEE and other scholarly institutions to use DR POWER as a repository for data used in the articles
- ▶ Work with GRID DATA teams to make sure the repository meets their needs

Conclusions

- ▶ User adoptions is key!
- ▶ Adoption will be achieved by:
 - Ease of use of the repository
 - Ability to cite contributed models
 - Support for multiple model formats
 - Flexibility in adding new fields to the models
 - Early release with continuous updates to the repository