
ARC Database Webinar

Training for ARC Consortium Members

February 25, 2011

10:00 am to 12:00 pm PST

University of Nevada Reno

Session Overview



- Summarize the application
 - Michael V. Ekedahl (ekedahl@unr.edu)
- Application demonstration
 - Dr. Elie Hajj (elieh@unr.edu)
- Discuss new features and demonstration
 - Jeremy Tweet (jhtweet@gmail.com)

Overall Introduction



- ***Work element TT1d and TT1e: Development of materials and research database***
 - Store information related to sources & properties of materials used in various consortium research activities.
 - Includes results update in form of reports, white papers or any other type of documents for each research task...



Overall Introduction

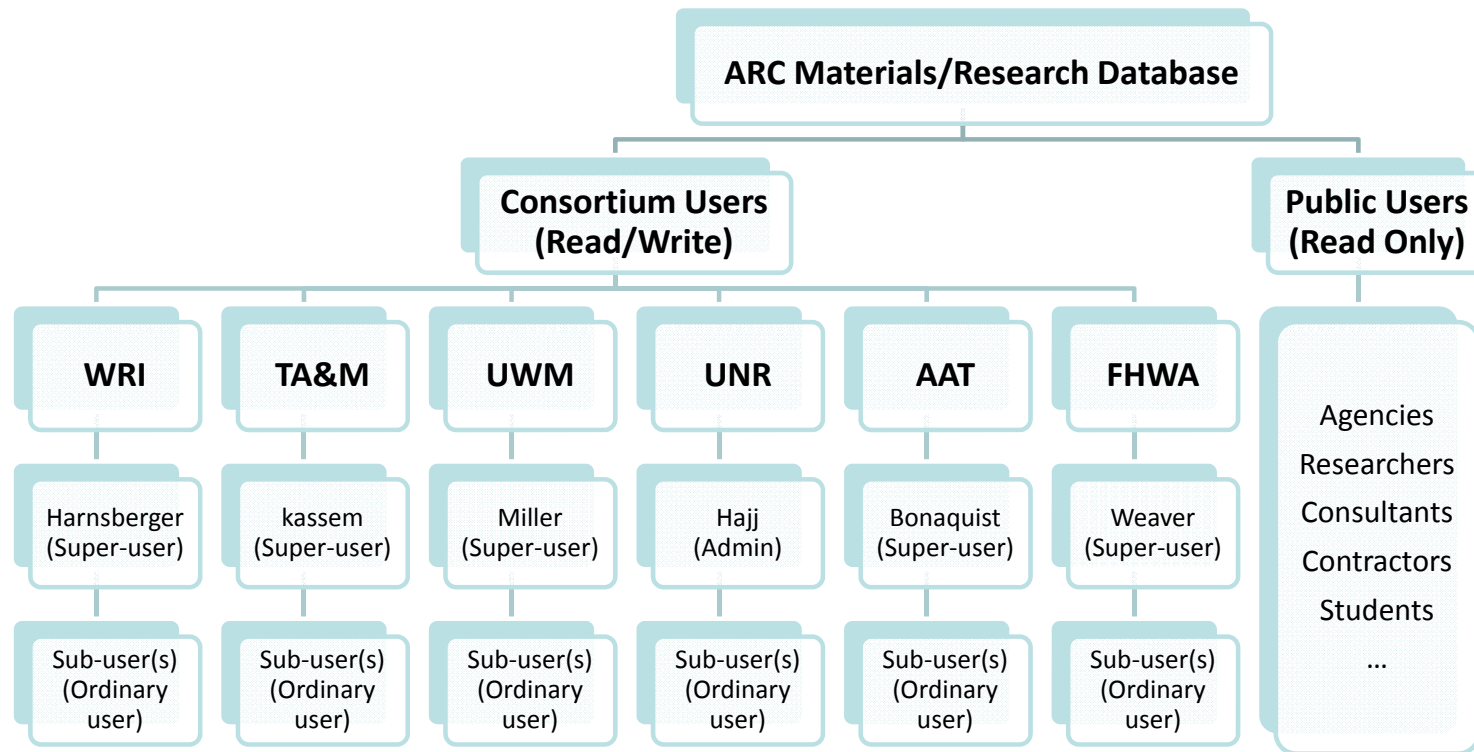


- **Challenges:**

- No software installation
- Flexibility (No hard-coded data)
- central database
- Multiple users
 - Add/Delete/Edit materials information
 - Retrieve information (Public interface)
- Different users' roles
- Common materials use
- Multiple measures for the same material
- Ability to relate material(s) to validation sections
- ...

Overall Introduction

General Users' Diagram



Application Summary



- Technologies used
- Design goals
- Role management infrastructure
- Software model



Getting to the Application



- Using Internet Explorer, visit <http://www.business.unr.edu/arc>
- Click the **Login** button and enter credentials

Technologies Used



- Database backend is SQL Server 2008
- ASP.NET was chosen as the Web development platform
- Hardware and software platforms were chosen based on well-known and supported technologies



Key Design Goals



- Create the *most flexible* system possible eliminating “hard-coded” data types
- Create a *role-based infrastructure* granting privileges to categories of users
- Create an entirely *Web-based* system
 - No software installed on client computers

Role Management Infrastructure



- Users belong to an ARC organization
 - FHWA, UNR, etc...
- Users belong to one or more roles
 - Roles dictate the actions a user can perform
 - New roles can be created as needed
 - Roles are not mutually exclusive

Role Management Infrastructure



- Users are categorized into ***ordinary users*** and ***organizational super users***
 - Ordinary users can only edit data they created
 - Organizational super users can edit data created by an ordinary user in the same organization
- There is a “special” administrative role
 - Administrators can create and edit anything
 - Some forms require administrative access

Software Model (Materials)



- All materials have a type
 - (Aggregate, binder, etc.)
 - Material types belong to a category
- Materials have a supplier
- Materials can be created from other materials (Components)
- Materials may be associated with
 - work tasks
 - validation sections
 - other component materials

Software Model (Properties)



- Materials have properties
 - Properties are categorized into groups
 - Properties can be configured to have a valid range of values
 - Hard and soft limits are supported
 - Properties are categorized as qualitative or quantitative
 - Different units of measure can be applied to a property



Software Model (Properties)



- Edit several properties of a material simultaneously
- Support for “multi-dimensional” properties was added
 - Data are edited via a grid
- It’s possible to copy groups of properties from one material to another to simplify editing



Multi-dimensional Property (Creating)



ARC - Property Entry - Windows Internet Explorer
http://www.business.unr.edu/ARC/PropEntry.aspx?parent

File Edit View Favorites Tools Help

ARC - Property Entry

ML_ESTAR

Copy Selected Copy Group Remove Selected Remove Group Update Group

Create New Property

Add/Edit Dimensions for E_STAR_MOD_OFT

| Dimension 1 | Dimension 2 |
|-----------------------------------------|---------------------------------------------|
| Name: TEMP_F | FREQ_HZ |
| Values: 14 40 70 100 130 | Values: 25 10 5 1 0.5 0.1 |
| Submit | Submit Close |

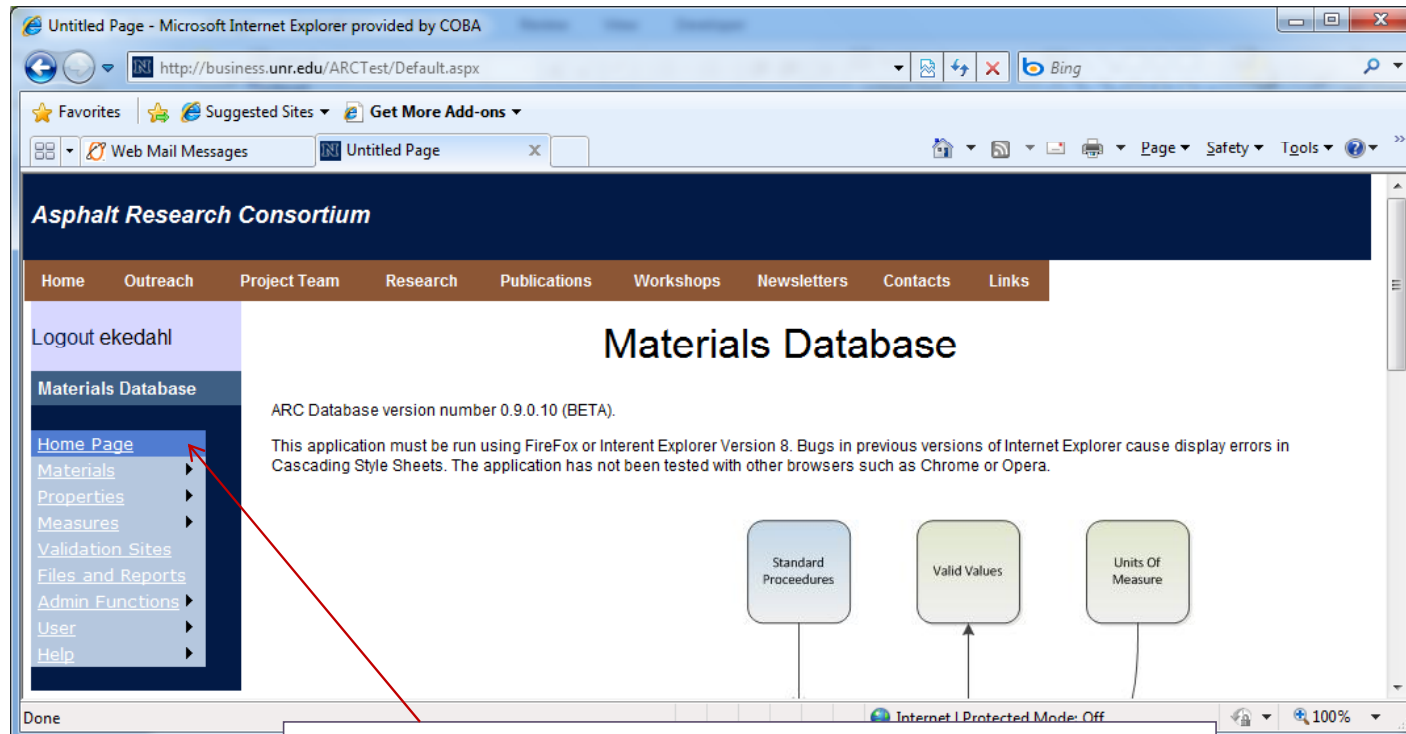


Software Model (Validation Sites)



- Validation sites are used for material field tests
 - Validation sites are divided into validation sections, which are further divided into validation layers
- A contractor is responsible for a validation site
- A validation site has a contact

User Interface (Introduction)



Application menu appears along the left site of Web site



User Interface (Forms)



| Name | Code | Comment | Category |
|------------------|------|---------|-----------|
| Aggregate | AG | | AGGREGATE |
| Binder | BT | | BINDFR |
| Hot Mix Asphalt | HM | | MIX |
| Warm Mix Asphalt | WM | | MIX |
| JHT Test | JT | | MIX |

| Category Name | Description | Comment |
|---------------|-------------|---------|
|---------------|-------------|---------|



Selection and Filtering



- Materials (and other elements) can be selected and filtered by
 - Material type
 - Material category
 - Organization
 - Supplier
 - Work tasks
 - Validation section
 - Component materials

Selection and Filtering



ARC - Materials Editor - Windows Internet Explorer

http://www.business.unr.edu/ARC/Materials.aspx?parent

File Edit View Favorites Tools Help

ARC - Materials Editor

Files and Reports
Admin Functions
User
Help

Select Material To Edit From Tree:

Filters

| Material Type | Material Category | Primary Organization | Supplier |
|---------------|-------------------|----------------------|----------|
| [ALL] | [ALL] | [ALL] | [ALL] |

Work Tasks Validation Sections Component Material

| | |
|----------------------|-----------------------------------------------------------------------------|
| Program Area: | Validation (V) |
| Category: | V1: Field Validation |
| Work Element: | V1b: Construction and Monitoring of Additional Comparative Pavement Valida |
| Subtask: | V1b-1: Construction and Monitoring of Additional Comparative Pavement Valic |

Show Detail

Select Validation Site: PTH8-RAP Project

Select Validation Section: 83R107

Select Layer: 1

Filter By: Site Section Layer

Support Files (Introduction)



- Support files include reports, scanned document, picture, and just about anything related to the ARC project
- The initial implementation was just a flat list of files that could be uploaded and downloaded



Support Files (Revised Implementation)



- Support files are uploaded to a user-defined hierarchical file system
- Users can create folders as needed and upload files
- Support files can be filtered by work items (program area, category, work element, subtask)



Support Files (Implementation)



- A semantic grouping of files is now possible (under construction)
- Any number of semantic groupings can be created
 - Materials, validation sites, etc... can point to one or more of these semantic groupings.

Test Runs



- There might be multiple tests performed on the same material and properties
- Test runs allow for tests to be performed by *different users* at *different times*
- Any number of test runs can be created



Work in Progress



- Update final Help system items to reflect changes
- Continue bug fixes resulting from broad user testing
- Develop read-only user interface for non-consortium users
 - Define public user authentication requirements
- Plan for deployment to other server(s)

Application Demonstration

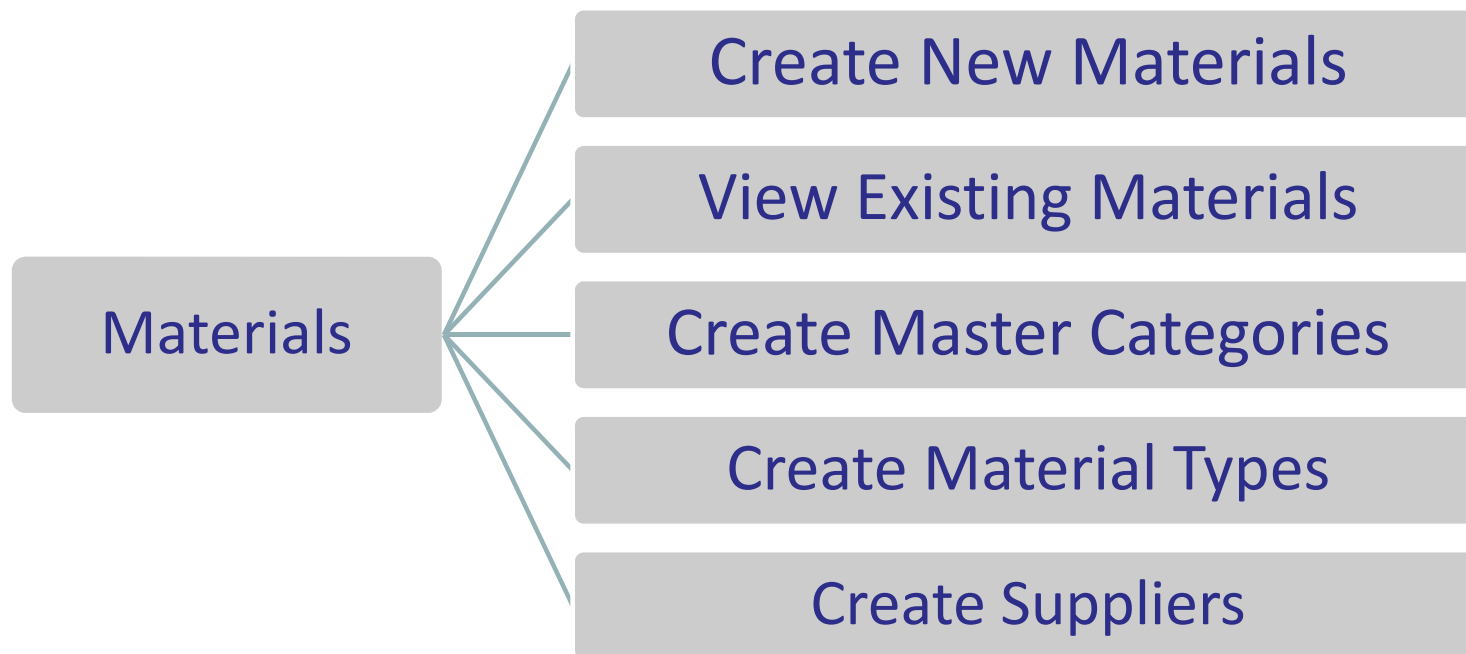


- Materials
- Property
- Validation Sites
- ...



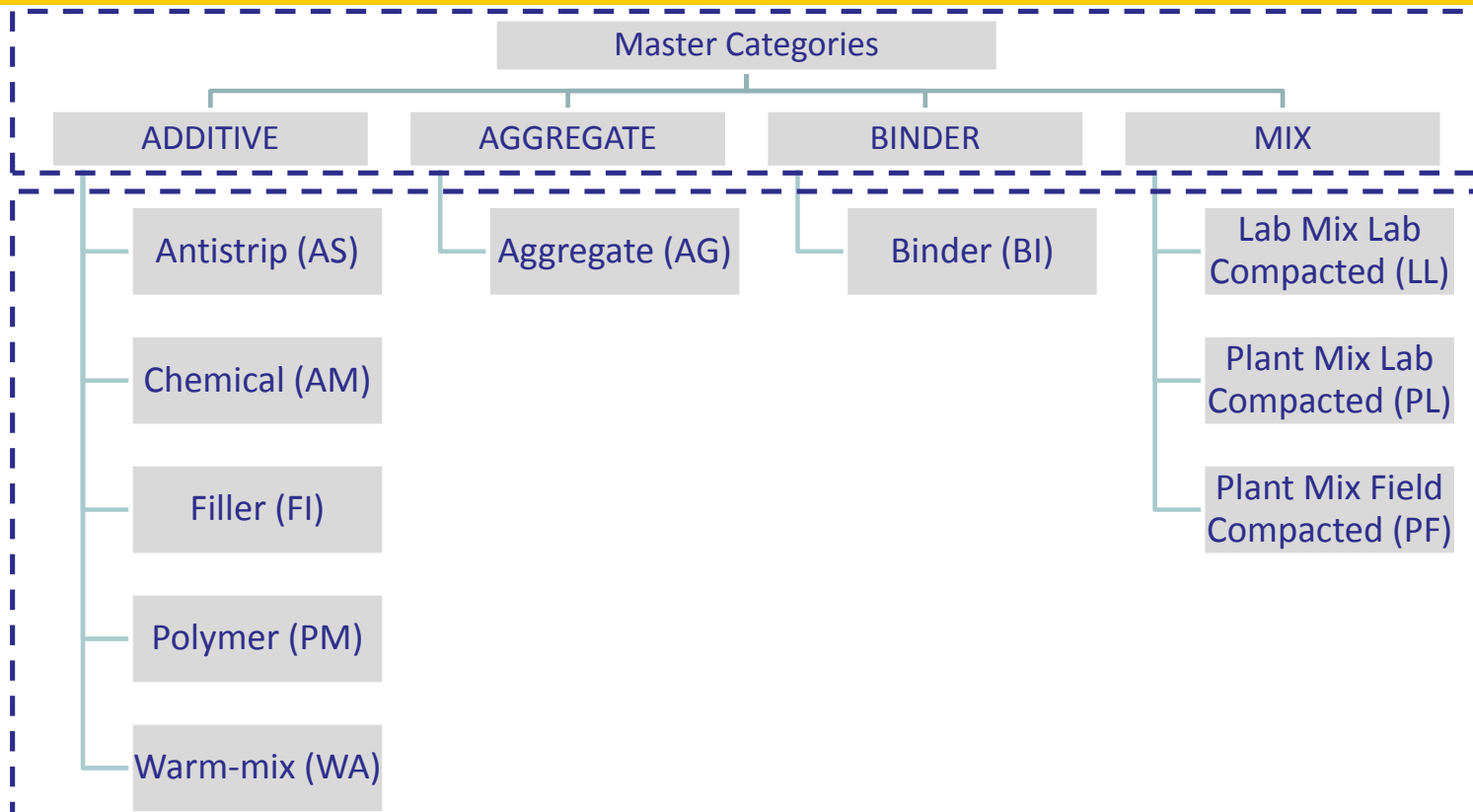
Application Demo

Materials



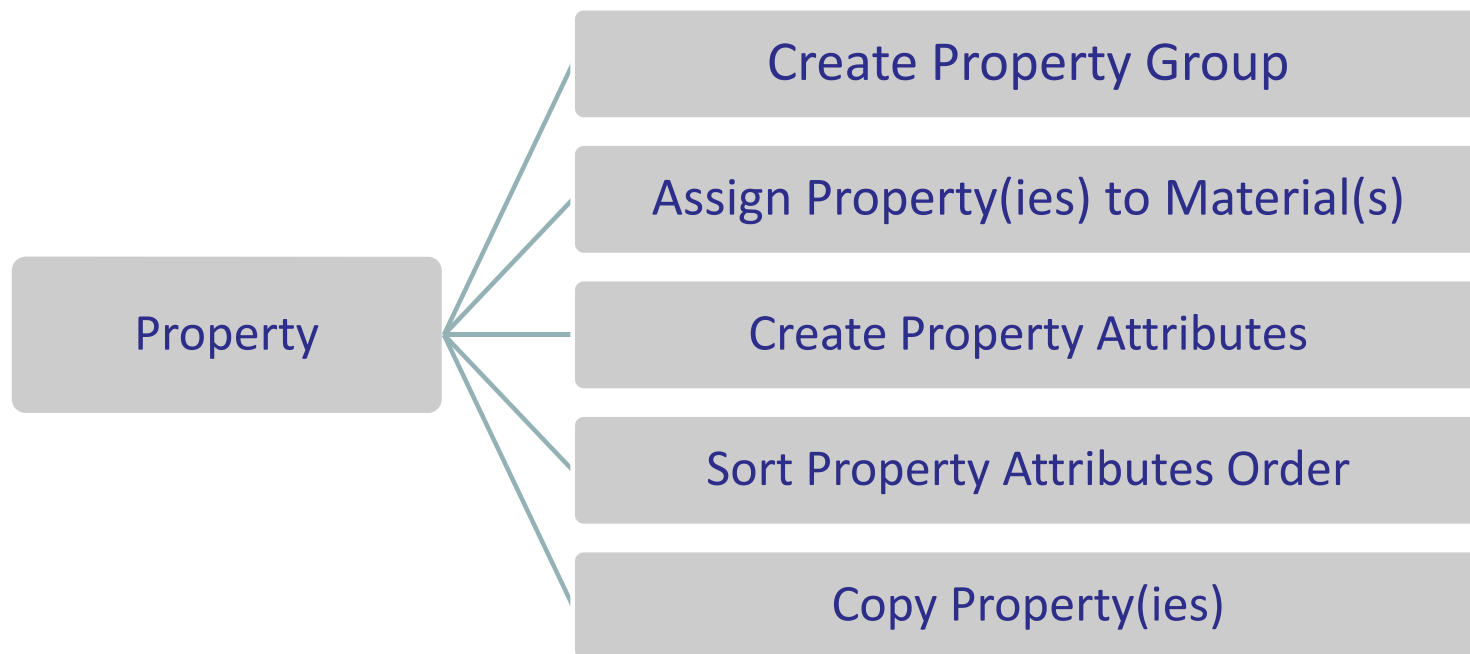
Materials

Material Types



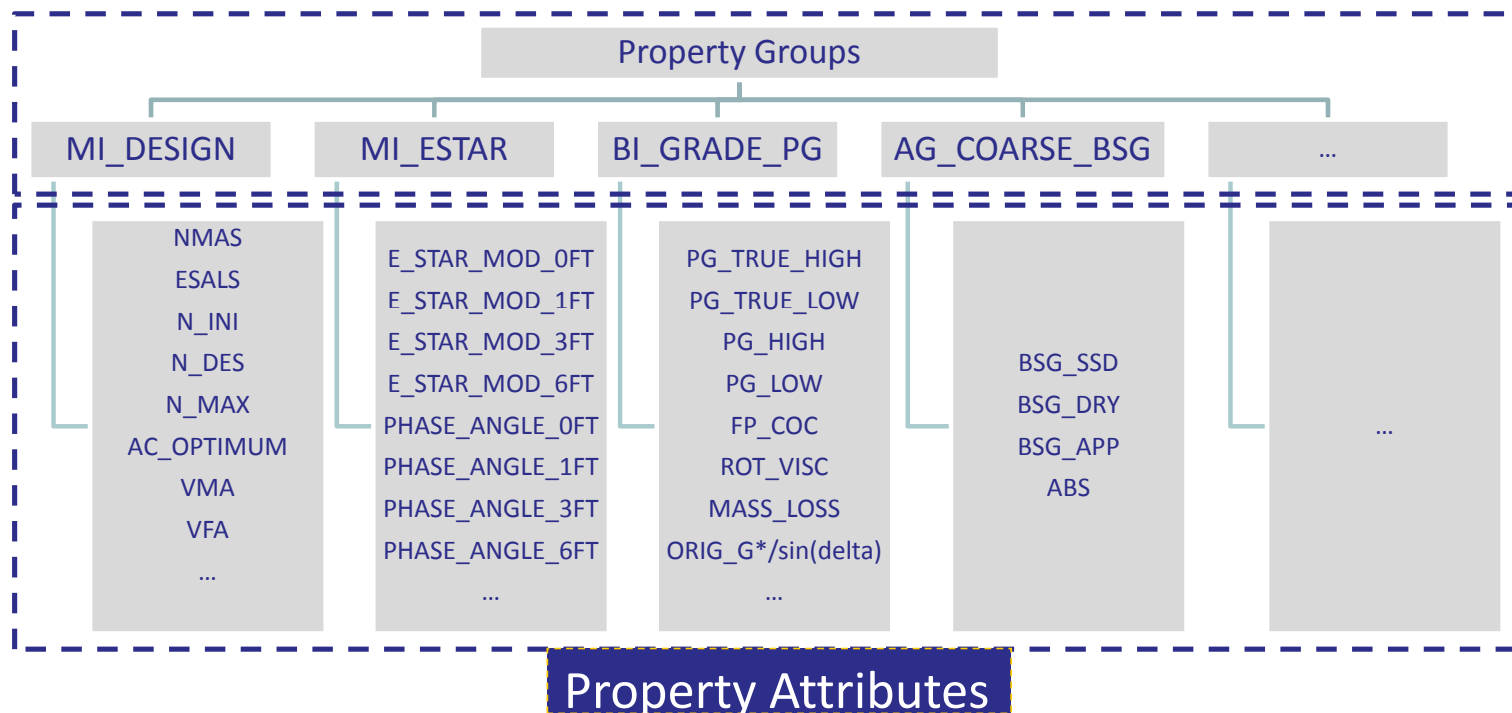
Application Demo

Property



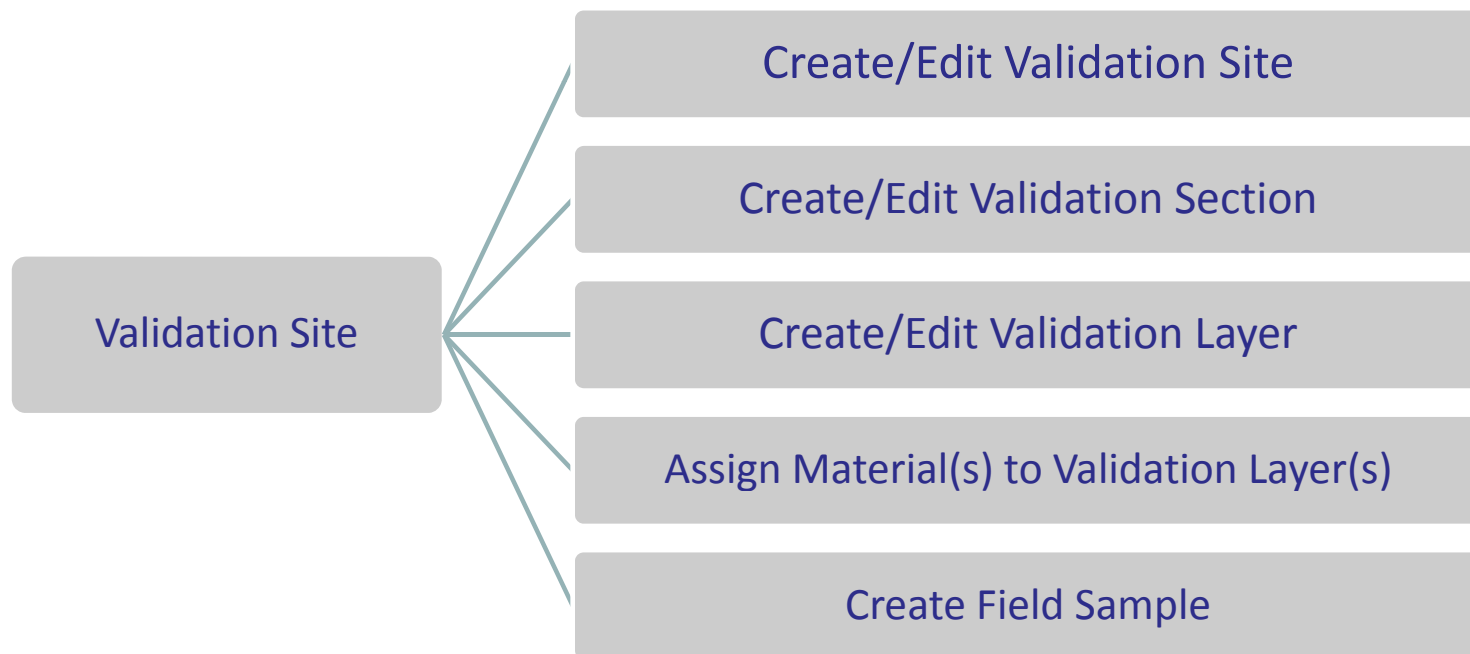
Property

Property Groups and Attributes



Application Demo

Validation Site



Next Step.....



- Start using database and provide feedback
- Provide Materials Details (type, source, description, task, ...) to elieh@unr.edu
- Provide Property Groups and Attributes to elieh@unr.edu
- Validation sections