Title: Comparing Inside-out and Outside-in approaches to CIM-XML Data Management

Today's database technology offers a variety of solutions to support dynamically defined data structures (inside-out) and pre-defined schemas (outside-in). Because CIM UML is technology agnostic it offers many options. The purpose of this presentation is to discuss the results of an alternatives analysis conducted to support managing CIM XML based reference models.

As part of the Department of Energy's Grid Moderation Initiative, the GridAPPS-D project is developing an open-source standards-based distribution system planning and operations application development platform. The GridAPPS-D development platform aims at providing a means for application developers to more cost effectively develop and deploy new tools using a standards-based data bus, message I/O, and data driven approaches to build and simulate power systems operating in real time.   GridAPPS-D uses CIM and other standards-based data structures to manage reference models such as the IEEE 8500-Node Test Feeder in the same universal format. For example, model simulation applications using GridAPPS-D will access the database and translate a CIM-based references model into a simulator native format. To examine simulation results, an application can search and extract CIM-based reference model data structures from the database to convey native simulation results in a CIM universal context.

To determine the best open-source database solution an alternatives analysis was conducted evaluating relational, not only structured query language (NoSQL) graph, and NoSQL triple-store databases. The Open Archival Information System (OAIS) (ISO 14721:12) model was used to help develop a set of unbiased data management criteria that could be used to evaluate database technologies in the context of GridAPPS-D test scenarios. Functionality for each database: administration, query, access, and data management were evaluated in side-by-side tests. This presentation will discuss the rationale for choosing an inside-out data management solution using the NoSQL triple-store and will discuss the merits and shortcomings of each database solution.

Presenter Info:
Eric Stephan
Title: Senior Research Scientist

Background: Eric is a data modeler and supports operational and scientific data management systems including many traditional and leading-edge platforms. He is a standards advocate, works on vocabulary development in the World wide web consortium and recently joined the CIMug in 2017.

Company: Pacific Northwest National Laboratory   Office phone: (509) 375-6977
Address: PO Box 999   email: eric.stephan@pnnl.gov
Richland, Washington 99354