Pacific Northwest
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GridOPTICS™: A Software Framework for Power System Operations and Planning

OBJECTIVE

The primary aim of the GridOPTICS™ framework is to provide a flexible, scalable software architecture for:

» integrating a range of data collection, analysis, simulation and visualization technologies needed to support the operations and planning of the future power grid

» provide a framework for integrating novel new operations and planning technologies with external power grid systems, including energy and distribution management systems that are developed by software vendors

» provide a client software interface to the GridPACK numerical library that is being developed in the Future Power Grid Initiative

APPROACH

This framework enables plug-and-play of various analysis, modeling and visualization software tools for fast and accurate control of the power grid. To bridge the data access for different control purposes, GridOPTICS™ provides a scalable and thin layer of event processing that hides the complexity of data storage and management.

In the first year of this project, we will focus on two areas of investigation. These are:

» Creating a robust, high performance and scalable event processing framework that supports the requirements of high frequency data access from analytical tools running on platforms from Windows workstations to high performance computers;

» Creating a set of abstractions and integration mechanism that exposes the numerical capabilities of the GridPACK library to client applications through remote procedural calls that execute in the Analysis Layer in GridOPTICS™. This enables live data streams to be processed through high performance GridPACK applications.

IMPACT

The realization of this framework as a software infrastructure will:

» Integrate the various FPGI software products/prototypes into powerful demonstrations of novel capabilities for power grid operations and planning

» make it possible to integrate FPGI software products/prototypes into existing power grid software systems, including the GridOPTICS™ PowerNET and EIOC environments

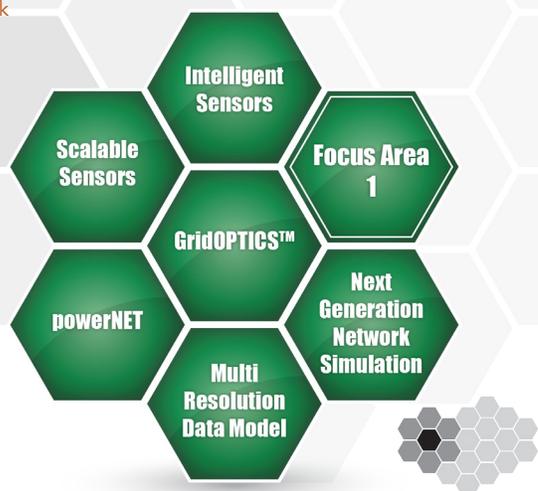**U.S. DEPARTMENT OF ENERGY**
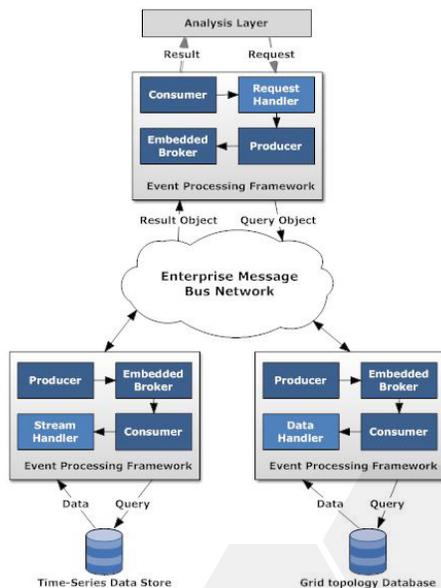
Structure of Event Processing Framework

» create an open-source, lightweight software technology that greatly simplifies the construction of complex operational and planning tools composed of a number of individual software products

FOCUS AREA

Focus Area One addresses data networking and management issues, and enables the digital infrastructure for the future grid. This focus area will address the gaps in networking and real-time data management by developing advanced algorithms and software tools and techniques. **Focus Area Leads:** Bora Akyol (bora@pnnl. gov) and Harold Kirkham (harold. kirkham@pnnl.gov)

ABOUT FPGI

The Future Power Grid Initiative (FPGI) will deliver next-generation concepts and tools for grid operation and planning and ensure a more secure, efficient and reliable future grid. Building on the Electricity Infrastructure Operations Center (EIOC), the Pacific Northwest National Laboratory's (PNNL) national electric grid research facility, the FPGI will advance the science and develop the technologies necessary for meeting the nation's expectations for a highly reliable and efficient electric grid, reducing carbon emissions and our dependence on foreign oil.

ABOUT PNNL

Pacific Northwest National Laboratory is a Department of Energy Office of Science national laboratory where interdisciplinary teams advance science and technology and deliver solutions to America's most intractable problems in energy, the environment and national security. PNNL employs 4,900 staff, has an annual budget of nearly $1.1 billion, and has been managed by Ohio-based Battelle since the lab's inception in 1965.

For more information, please visit the FPGI website or contact:

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