communications, advanced sensors, and distributed computers (including additional intelligence in the electric power transmission and/or electricity distribution). The smart grid may further include additional functionality at a central management facility in order to manage operations, detect and correct faults, manage resources, etc.

[0009] One example of the management system that may manage a smart grid disclosed below is the Intelligent Network Data Enterprise (hereinafter, termed INDE) Reference Architecture. The INDE Reference Architecture enables integration of intelligent or smart grids into the electric power industry (or other types of industries). Further, management of the power grid may be improved using Intelligent Network Data Services (hereinafter, termed INDS). The following discloses a set of processes and assets for assisting utilities with the development of smart grids. This set of assets and methods comprises the INDE solution set. INDE includes: INDE Reference Architecture, which may comprise a template for enterprise wide smart grid data and analytics management and integration; Data acquisition and real time analytics, which may include distributed architectures and analytics implementations for high speed smart grid analytics; Data transport and storage architecture assets, which may include open standards-based data management solution elements; End user transactional analytics applications, which may include implementations of a wide range of analytics covering system performance, power quality, grid asset utilization and grid asset management; and Smart Grid development process, which includes may comprise a methodology to analyze a particular utility's current grid and determine a recommendation for improving the particular utility's current grid with one or more aspects of the smart grid.

[0009a] According to a first aspect of the present invention, there is provided a data management system for a power grid, the power grid comprising a central power grid controller for managing the power grid and a plurality of devices within the power grid, the data management system comprising: local data storage associated with a device positioned in a section of the power grid, the local data storage being proximate to the device, the device configured to sense an electrical parameter in the section of the power grid, the data storage comprising a plurality of memory locations for storing the sensed electrical parameter; and a central data storage associated with the central power grid

controller, wherein the central data storage comprises links to the memory storage locations in the local data storage, and the central power grid controller is configured to access the sensed electrical parameter seamlessly from the plurality of memory storage locations in the local data storage using the links stored in the central data storage.

[0009b] According to a second aspect of the present invention, there is provided a method for data management system for a power grid, the power grid comprising a central power grid controller for managing the power grid and a plurality of devices within the power grid, the method comprising: sensing, using an electrical device positioned in a section of the power grid, an electrical parameter in the section of the power grid; storing the sensed electrical parameter in a memory location of a local data storage device, the local data storage device associated with the electrical device and proximate to the device; and sending to a central data storage associated with the central power grid controller the memory location of the data storage device for storage as a link in the central data storage, the link providing the central power grid controller a pointer to access the memory location in the local data storage device where the sensed electrical parameter is stored.

[0009c] According to a third aspect of the present invention, there is provided a power grid management system for managing a power grid, the power grid comprising a plurality of grid devices, the power grid management system comprising: a first grid device positioned in a first section of the power grid, the first device comprising: a first sensor for sensing an electrical parameter associated with at least one feeder circuit in the first section of the power grid; a first processor configured to analyze the sensed electrical parameter in the first section of the power grid and determine an event has occurred based on the sensed electrical parameter, and a second grid device associated with a substation positioned in a second section of the power grid, the second grid device comprising: a second sensor configured to sense a second electrical parameter in the second section of the power grid; and a second processor configured to: receive the event determined by the first grid device and communicated to the second grid device, analyze the event determined by the first grid device and the second electrical parameter in the second section of the power grid to refine analysis of the event determined by the first grid device, automatically modify operation of at least a part of the second section based on

the event determined by the first grid device and the analysis by the second processor, the modification of operation including automatically change at least one control aspect of the first section of the power grid or the second section of the power grid by controlling operation of the substation and/or adjusting power supplied to the first section of the power grid, and transmit to a central power grid controller information indicative of the modification of the first section and/or the second section of the power grid.

[0009d] According to a fourth aspect of the present invention, there is provided a grid device associated with a substation in a first section of a power grid, the first section comprising: a sensor configured to sense a first electrical parameter associated with at least one feeder circuit in the first section of the power grid, wherein the grid device includes a communication interface configured to communicate with another grid device positioned in a second section of the power grid, and receive indication of an event from the another grid device, the event determined by the another grid devices based on analysis of a sensed electrical parameter in the second section of the power grid; and a processor in communication with the sensor and the communication interface, the processor configured to: combine the event communicated to the grid device from the another grid device and the first electrical parameter communicated from the sensor to further refine the analysis of the event, automatically modify operation of the first section of the power grid and/or the second section of the power grid based on the further refined analysis of the event by control of operation of the substation and/or adjustment of power supplied to the first section of the power grid, and transmit to a central power grid controller information indicative of the modification of the first section of the power grid.

[0010] Various aspects of the INDE Reference Architecture may improve the structure and management of the power grid. For example, the INDE Reference Architecture may include a plurality of network buses for carrying different types of data including: (i) multiple buses may be dedicated to the different types of data, such as operational/non-operational data, event processing data, grid connectivity data, and network location data; and (ii) using the multiple bus structure enabling delivery of the data to multiple destinations. The multiple buses may comprise different