

Using Software Defined Networking (SDN) for Grid Modernization Projects

A grid modernization project refers to the comprehensive effort to upgrade and transform an existing electrical power grid into a more advanced, efficient, reliable, and sustainable infrastructure. The primary goal of grid modernization is to meet the evolving needs of the electricity system, adapt to changing energy landscapes, and address challenges such as increasing demand, renewable energy integration, electrification of transportation, and the need for more resilient power systems.

Software-defined networking (SDN) can play a significant role in better managing grid modernization projects, including battery storage, wind, solar, EV charging, and other distributed energy projects.

Here are some ways SDN can help:

- 1. Network Automation and Management:** SDN allows for centralized control and programmability of the network infrastructure. It enables automated network provisioning, configuration, and management, which simplifies the deployment and operation of grid modernization projects. With SDN, network administrators can define and enforce policies, monitor network performance, and automate repetitive tasks, leading to improved efficiency and reduced human errors.
- 2. Quality of Service (QoS) Optimization:** SDN can prioritize traffic based on specific requirements, ensuring optimal performance and QoS for critical grid modernization applications. For instance, real-time monitoring and control systems for distributed energy projects require low-latency and reliable connectivity. SDN can reduce or eliminate extraneous traffic, ensuring smooth operation and reducing the risk of disruptions.
- 3. Scalability and Flexibility:** Grid modernization projects often involve the deployment of new infrastructure, such as additional charging stations or distributed energy resources. SDN's flexible architecture allows for easy scalability and adaptability to changing project requirements. Network administrators can dynamically reconfigure the network, add new devices, or adjust policies without the need for manual reconfiguration of each network element.

- 4. Network Segmentation, Security and Traffic Isolation:** SDN provides enhanced security features that can protect grid modernization projects from cyber threats. With centralized control and visibility, network administrators can monitor traffic patterns, detect network changes, and enforce security policies at a granular level. SDN can also isolate different types of traffic, ensuring that sensitive data and control signals for distributed energy projects are separated from regular network traffic. For example a network running Modbus will be prevented from running other protocols such as DNP3 as all non-required protocols will be blocked.
- 5. Data Analytics and Insights:** SDN's centralized control and management allow for better data collection and analytics. By gathering and analyzing network data, SDN can provide valuable insights into network performance, and operational efficiency. These insights can help optimize grid modernization projects, identify areas for improvement, and make informed decisions for future expansion or upgrades.
- 6. Zero Trust Capabilities:** SDN can provide a zero trust approach to network access. SDN enforces a deny by default approach to network access by devices, protocols and end users.
- 7. Middleware management layer between utility operators and DER asset owners:** SDN can provide a reliable and secure layer between the DER assets and the power grid. By limiting access to data flows between networks, SDN can enforce policies so that northbound/southbound and east/west traffic flows are properly enforced.

Overall, SDN brings greater flexibility, automation, security, and scalability to network infrastructure, enabling efficient management of grid modernization projects involving battery storage, wind, solar, EV charging, and other distributed energy resources. It helps integrate and coordinate various elements of these projects, leading to improved reliability, cost-effectiveness, and sustainability of the modernized grid.

Find out how the Veracity OT Network Controller can help with your grid modernization project by visiting veracity.io.