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Cisco and SISCO Collaborate on Open Source Synchrophasor Framework

Cisco, Inc. (CSCO) and Systems Integration Specialists Company, Inc. (SISCO) have begun an open source project intended to provide an implementation framework for synchronized phasor measurement communications based on the soon to be published International Electrotechnical Commission (IEC) technical report IEC/TR 61850-90-5 (90-5).

Both companies believe that the open source project will foster innovation and faster adoption of the standards using IP-multicast and a scalable security architecture. 90-5 provides the scalability needed for large wide area measurement systems such as those envisioned by NASPI. With 90-5, synchrophasors can leverage existing, widely-deployed IP multicast technology for reliable and robust communications on large scale wide area networks while also supporting the advanced key management techniques needed for electric grid monitoring.

Time synchronized phasor measurement (i.e. synchrophasors) involves measuring electric system frequencies and phase angles very precisely from 20-120 times every second at various points across the electrical grid over large geographic areas. Synchrophasor measurements are time stamped using very precise time sources such as the Global Positioning Systems (GPS) satellite signals. This provides very detailed and precise time synchronized measurements of the state of the electrical grid.

Analysis of past electricity blackouts has indicated that monitoring synchrophasors in this way has the potential to detect system instability much earlier than current Supervisory Control and Data Acquisition (SCADA) systems. This will prevent large-scale blackouts by giving system operators more time to respond to disruptive events enabling them to take corrective action before system stability is affected. Synchrophasor projects involving the installation of hundreds of Phasor Measurement Units (PMUs) are currently taking place across North America.

For the open source project, Cisco will provide source code for the Group Domain of Interpretation (GDOI) protocol. This protocol provides the type of advanced cyber key management services that are needed to secure communications for power system automation applications, including substation automation and protection, as well as for Smart Grid applications such as metering and demand response. SISCO will provide the source code for the IEC 61850-90-5 communication profile and the integration of that profile with the GDOI code.

IEC/TR 61850-90-5 has as its basis the IEC 61850 standards for communications for power system automation. The IEC 61850 standards offer advanced object oriented semantics for information exchange in power system automation applications SCADA, system protection, substation automation, distribution automation, and beyond. IEC/TR 61850-90-5 extends the capabilities of IEC 61850 to include support for synchrophasor information distribution in a scalable manner over a wide area network (WAN) through utility and national communication networks. The specification is a result of collaboration between several organizations including: IEC, Institute of Electrical and Electronic Engineers (IEEE), the North American SynchroPhasor Initiative (NASPI), and others. The technology specified in IEC/TR 61850-90-5 includes the use of advanced IP multicast and IP subscription to provide a reliable communication infrastructure that minimizes the number of data concentrators required to distribute synchrophasor information over wide area networks.

Cisco and SISCO will begin rolling out the source code over the next month or so. They are seeking other industry participants to help move the technology forward quickly. Others interested in participating should contact Ralph Mackiewicz with SISCO at ralph@sisconet.com or Maik Seewald with Cisco at maseewal@cisco.com.