



Ample[®] Analytics Platform

The Full Benefit of an Intelligent Sensor Network

Ample Analytics is the central software platform for Sentient Energy's grid analytics solutions. Ample's line sensor fleet management, data integration, and grid monitoring capabilities enable utilities to maximize the value of their line sensor deployment.

Sensor Fleet Management

Ample's sensor fleet management commissions, configures, and over-the-air updates 50,000+ Sentient Energy intelligent line sensors from one centralized application. It also contains Auto-Phase ID, capable of correctly phasing the entire deployment of sensors with only a few references.

Data Integration

Ample features a data concentrator for easy integration of thousands of sensors into your SCADA system via standards-based protocols, and a modern web service framework for integration of sensor data into historians or data lakes. Utilities can connect more sensor data, such as sequence of events, load logger, oscillography, and disturbances, to their own applications, and avoid the hassle of managing the security of each sensor connection via use of the Ample embedded Key Management System.

Grid Monitoring

Visualization of distribution system data through a set of intuitive user screens and fault location data reduces fault finding time, and thus outage duration. Load data supports capacity planning and identification of overloaded assets. Oscillography data (waveforms) enhances the understanding of faults and supports preparation of sequence of event reports.



Deployment Versatility

Ample supports a flexible architecture that allows utilities to run some components in the cloud, such as analytics modules, while securely integrating sensor data with on-premises OT systems. This allows Operations teams to have greater system visibility through SCADA/OMS/DMS they may currently use, while enabling analytics teams to work on outage prediction with the benefit of scalable cloud resources.

High Availability

New container-based architecture means Ample's applications and services are self-healing and can be configured to run in parallel on multiple instances for redundancy. Ample also supports Disaster Recovery by configuring the solution to run in an AWS distributed cloud computing network that includes servers in different physical locations. In addition, upgrades to the Ample Sensor Gateway can be applied with zero downtime.

Advanced Security

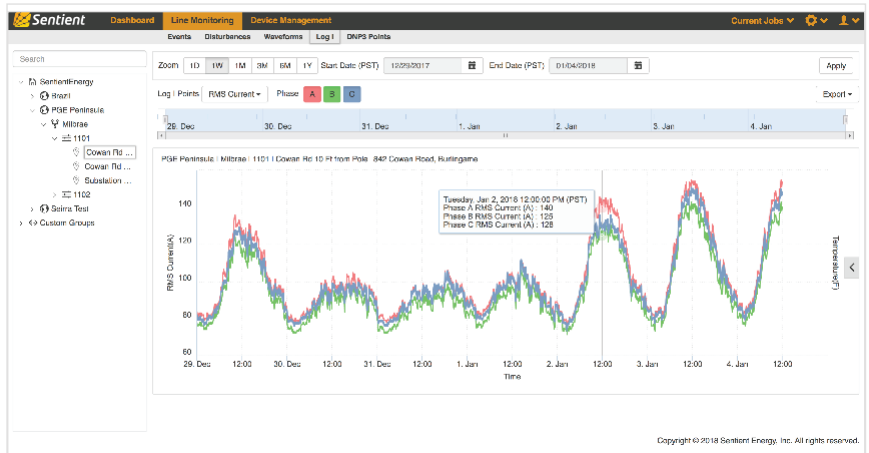
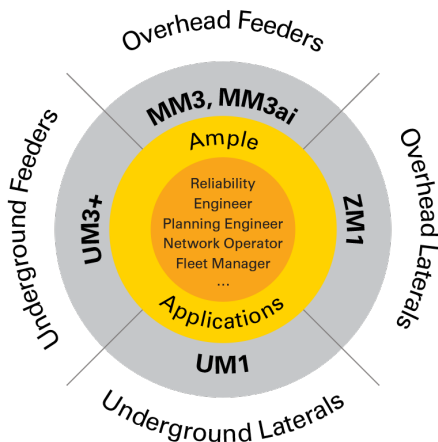
With a zero-trust authorization security framework, data between sensors and Ample is secured with mutually authenticated Transport Layer Security (TLS) supported by a fully managed Public Key Infrastructure (PKI). Ample uses encryption for data at rest and in transit between software services, and all software deployments managed by Sentient Energy are SOC2 compliant.



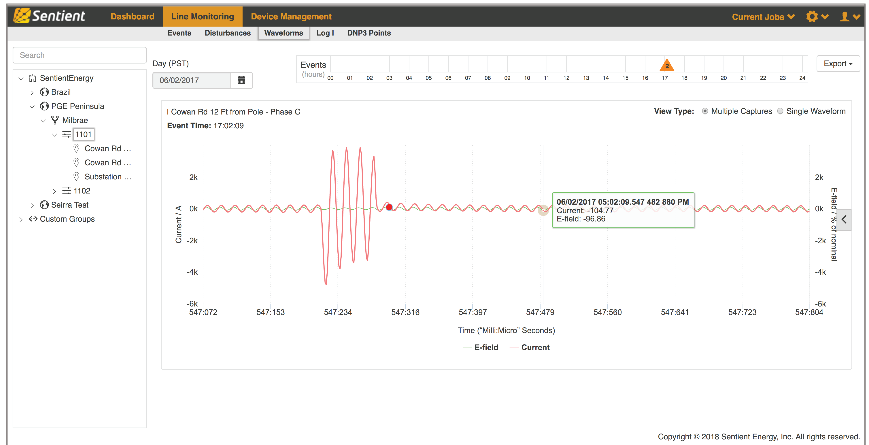
Ample Analytics Dashboards

A Complete Grid Analytics System

Sentient Energy’s Grid Analytics System consists of the MM3, MM3ai, UM3+ and UM1 line sensors, and the Ample Analytics Platform. Each sensor features fault detection and load monitoring capabilities, an LED indicator, GPS, and integrated cellular or mesh communications. The MM3 and MM3ai are used for overhead feeders and the ZM1 monitors overhead laterals as well as low load feeder segments. The UM3+ addresses underground feeders while the UM1 monitors underground residential distribution. All five sensors are designed to maximize the amount of system data gathered while transmitting only the necessary information.



Operations and planning can track load by location, phase, and time; revealing trends, load exceptions and imbalances.



High-resolution amperage and electric field voltage waveforms can be displayed and analyzed for grid event forensics and prediction.

Ample Tiers:

Element Manager – provides sensor fleet management and data integration with SCADA

SAIDI – Element Manager plus user interface for visualizing and trending sensor data

SAIFI – SAIDI plus integration with cloud-based analytics applications (e.g., predicting outages)

User Interface	Microsoft Edge, Google Chrome
Security Implementation	TLS, HTTPs, Federated Identity with SAML 2.0
Licensing	Based on number of endpoints, Ample modules and deployment architecture
Software Deployment Options	Utility data center or private cloud
Client	Microsoft Edge, Google Chrome; direct DNP ¹ to SCADA
Scalability	50,000+ endpoints
Communications Support	Cellular (Public/Private LTE), Itron Mesh
Communications Security	Transport Layer Security (TLS) with managed PKI, DNP3 SA v5
Protocols	DNP3, IPv4, IPv6

¹DNP3/IEC 60870-5-104 through integration gateway

Visibility, Analytics, and Control for a Better Distribution Grid

Sentient Energy®, a Koch Engineered Solutions company, is the premier provider of intelligent sensing, data analytics, optimization, and control technologies for the distribution grid. Sentient Energy’s hardware and software solutions help electric utilities make data-driven decisions to enhance the delivery of safe, reliable, and efficient power. With the industry’s only Grid Analytics System™ that covers the entire distribution network, Sentient Energy leads the global market with the largest network of line sensor deployments in North America, gathering rich data in real time for predictive insights and strategic grid management. Sentient Energy’s Grid Edge Control solutions enable utilities to reduce energy costs at the grid edge through Volt-VAR optimization, conservation voltage reduction, and peak demand reduction. Sentient Energy partners with leading communications network providers. For more information visit www.sentientenergy.com.