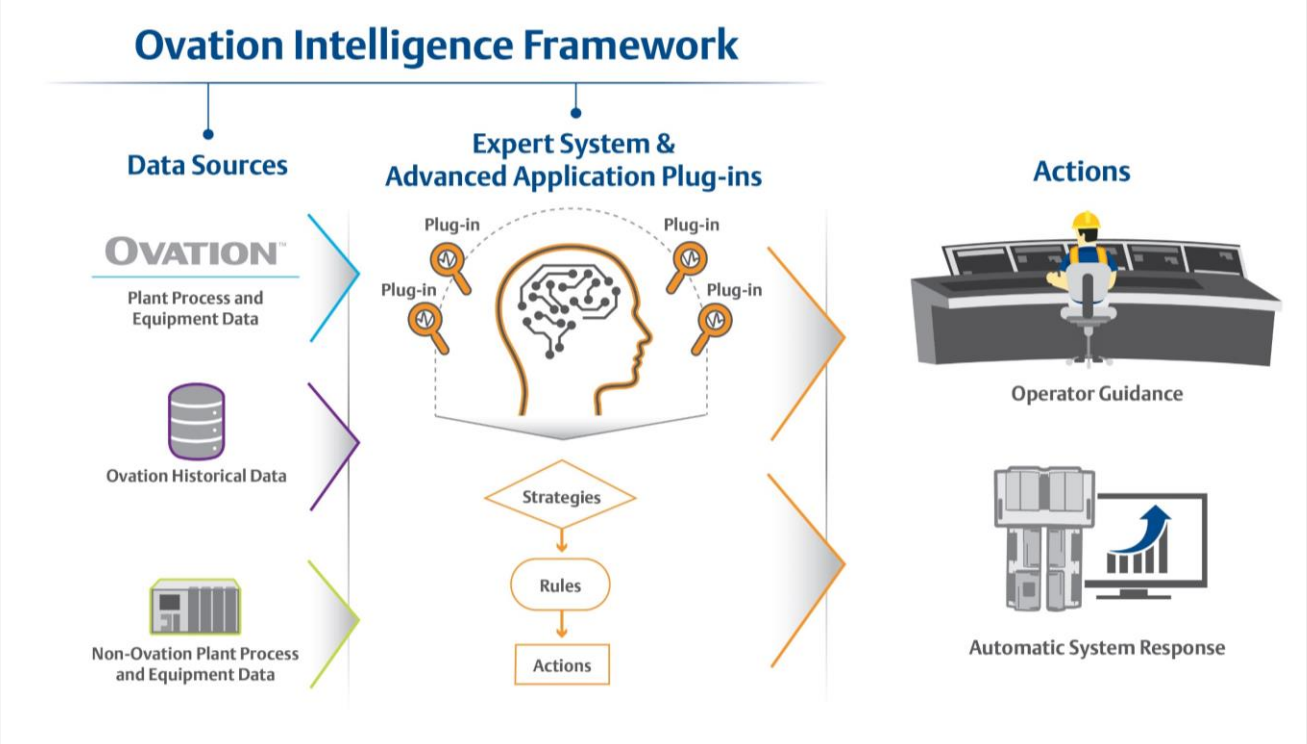
Ovation™ Intelligence Framework

Features

- Enables user-customizable applications that integrate multiple data sources into a single environment
- Provides native access to high-speed, high-resolution data through tight integration with the Ovation control system
- Base functionality can be extended through Ovation™ application-specific plugins and external libraries
- Provides the foundation for:
  - Minimizing the impact of a retiring workforce by embedding human expertise into the control system
  - Empowering informed decision-making
  - Monitoring plant processes and equipment health for the onset of abnormal conditions or operating scenarios
  - Reducing the risk of unplanned outages due to equipment damage or process upsets
  - Augmenting Monitoring and Diagnostic (M&D) center capabilities by focusing on the remediation of short-term, plant-specific issues
  - Supporting multi-network points
  - Reducing required data communications to M&D centers
  - Enabling consistent operations at the plant and/or fleet level



Introduction

The Ovation Intelligence Framework is a high-level software programming environment where multiple, configurable data sources interact with expert system strategies and rules to learn normal versus abnormal process/equipment behavior and take appropriate action if necessary.

A variety of optional Ovation plugin applications extend the base functionality to enable higher-level analysis of plant conditions. Depending on the application, the plugins are developed using a combination of neural networks, model-based control, dynamic prediction, applied intelligence, and other analytic technologies.

Various external libraries from C# and Python are also available for import that allows enhancement of the framework's functionality without having to update the base framework.

In the event of an impending process upset or equipment failure, the framework's expert system, along with any advanced functions provided by Ovation application plugins, alerts and guides operators to take immediate, specific action or interacts directly with the control system to resolve the situation.

While the focus of centralized and remote M&D centers is on analyzing several plant sites using time-lagged data for long-term events and patterns, the Ovation Intelligence Framework can address both short-term events that require immediate response as well as long-term events.

By performing processing functions locally and utilizing native Ovation range-checking and data-quality functions, the framework can significantly reduce communications traffic to get needed data to M&D centers.

Data Sources

Unlike other analytics software packages, the Ovation Intelligence Framework is tightly integrated with the Ovation control system, giving it native access to high-speed, high-resolution data.

The framework takes data from multiple sources available for consumption by the expert system and application plugins. Data sources can include:

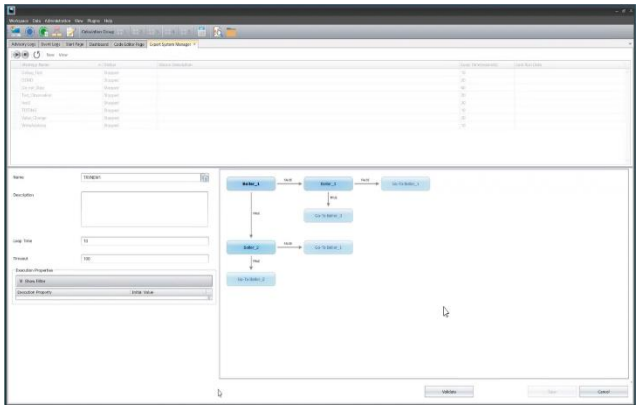
- Real-time Ovation data captured at I/O resolution from Controllers or networks.
- Ovation or non-Ovation historical data.
- Enterprise Data.
- Third-party equipment or system data using standard communication protocols.

Expert System

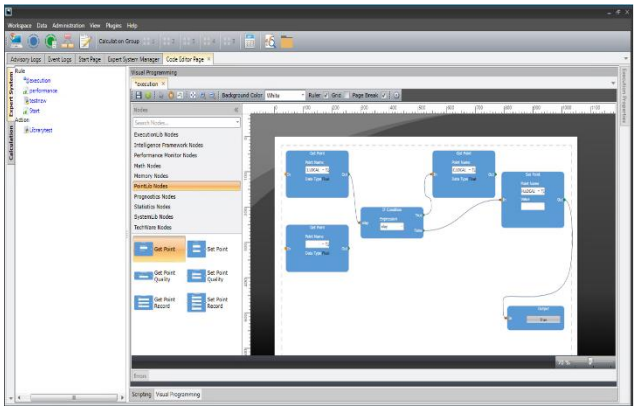
The Expert System within the Ovation Intelligence Framework solves complex problems by combining the data sources with a knowledge base of human expertise codified in strategies, rules, and actions.

The system can be deployed on a single plant running plant-level strategies or on multiple plants and distributed energy resources using either plant or fleet-level strategies. Emerson or the end-user can define the expert system using C# scripting language, Python scripting language, or graphically through the Ovation visual programming environment.

The visual programming language, which is equipped with a library of standard objects, can be extended using scripts (C# or Python) called in an action block for enhanced functionality.



Example of an expert system strategy that is directed by a sequence of rules and actions.



Example of using the visual programming environment to codify the rules and actions used within a strategy.

Plugin options for the Intelligence Framework application

Plugin	Description
Ovation Plant Prognostics Plugin	Interacts with the Ovation Intelligence Framework Expert system to deploy predictive analytics and identify plant operations anomalies to inform plant personnel or take automated action to mitigate deteriorating process conditions.
Ovation Pump Performance Monitor Plugin	Calculates critical performance metrics for centrifugal pumps to ensure operation at optimal efficiency, track operational KPIs over time, and support identification of areas contributing to performance degradation.
Application Extension	**Description**
Ovation Rotor Stress Evaluator Application Extension	Provides real-time calculation of critical steam turbine rotor stress parameters for active management of rotor stress during steam turbine operations along with rotor lifecycle management.

Software Subscription Options

The Ovation Intelligence Framework is a term-licensed offering that requires a valid base Intelligence Framework application license and point count license to operate. The point count license includes the total number of verified points. Point verification is only allowed if the license is valid, and the point count is not exceeded.

Point count licenses are a tier-based offering that comes bundled with two Network licenses. If the user wants to connect with more than two existing networks, more Network licenses can be acquired as needed.

Emerson offers a complete software solution that provides essential tools for unlocking additional intelligence from your Ovation investment.

Software Licenses	Subscription Term Options
Ovation Intelligence Framework Tier 1 Includes a point count license for 10,000 points and a network license for two networks.	1-year, non-cancelable 3-years, non-cancelable 5-years, non-cancelable
Ovation Intelligence Framework Tier 2 Includes a point count license for 50,000 points and a network license for two networks.	
Ovation Intelligence Framework Tier 3 Includes a point count license for 100,0000 points and a network license for two networks.	
*Refer to the applicable plugin data sheet for plugin licensing options.	

Software offered on a subscription basis includes term-based software licenses with integral software maintenance and product support, subject to a license agreement. With an active subscription, product support for the specific software allows access to software updates and various types of software support through the Guardian™ portal.

Subscription-based software maintenance includes updates to the software during the subscription term for enhancements or to fix minor issues. With an active subscription, support provides access to the latest software versions which are available for electronic download. Product-specific software maintenance and support as part of a software subscription may vary and is documented in the relevant product data sheets and is also described on the Guardian™ portal.

Subscription-based software support includes access to basic telephone support where engineers and experts provide telephone support as needed in case of any problems related to software use or functionality. With an active subscription, other forms of software support are available through the Guardian™ portal, including unique support elements for each software product. Licensed software is subject to a software license agreement and corresponding product-specific terms & conditions. Subscription software provides certain software entitlements over the subscription term along with access to support resources. Support for Subscription Software (emerson.com)

Related Products

- **Ovation Analytics Studio -** A Windows desktop application that allows users to visualize, analyze, and identify patterns in data. It also provides a mechanism for building machine learning and other analytic models for deployment in the Ovation Intelligence Framework Prognostics plugin**.**
- **Aspen Mtell® -** AspenTech's predictive analytics software used to optimize industrial operations by monitoring asset health and performance and predicting potential failures using rules, conditions, AI/ML models, and custom codes created by data scientists.

- **Ovation Process Historian (OPH) –** An Ovation drop that collects process values and messages generated by the Ovation control system and stores them in an optimized historical data storage unit. The user can view and filter this information or output it to printers, files, e-mail, or Web pages. Users can use the historian to understand better the typical and abnormal behavior of the plant's processes, identify common trends, explore abnormalities, and diagnose process flaws and failures.
- **Aspen Infoplus.21® (IP.21) –** AspenTech's enterprise process historian that gathers large volumes of data that is further used for analysis and interpretation. It helps drive plant performance and optimize assets through real-time visibility and monitoring.
- **Ovation Data Hub -** A web server that makes Ovation data easily accessible to Ovation applications, customer-created programs, and/or third-party products. The Data Hub provides an extensive list of APIs to access real-time, historical, system health, and configuration data.
- **Ovation Green SCADA -** A portfolio of purpose-built software and automation solutions that work as an aggregator, allowing users to import data from multiple sources, including different Ovation systems, and monitor all their assets in one platform.