

Exaquantum delivers Production Excellence



Bulletin BU GMSCS0102-02E

Production Excellence

Yokogawa's VigilantPlant Solutions enable continuous improvements in production environments to provide Asset Optimization, Production Agility and Flexibility, Quality Optimization together with Safe and Secure Operations.

vigilantplant.®



Functional Solutions

Production Management

- Plant & Enterprise Historians
- Data Visualization Dashboard
- Performance Monitoring
- Production Accounting
- Batch Production Management & Reporting
- Down-Time Analysis
- Yield Accounting
- Environmental Monitoring
- Mass & Energy Balancing
- Data Reconciliation

Data Integration

- Global System Integration
- Business & ERP Integration
- Laboratory & Quality Information Integration
- Maintenance & Asset Management Integration
- Remote Facility Integration
- Standards Based Integration (ISA-95, OPC)
- Legacy System Integration
- Web Services

Alarm Management

- ISA 18.2-2009 & EEMUA 191 based Alarm Reporting, Management & Analysis
- Sequence of Events Recording
- Alarm Master Database

Safety Management

- Sequence of Events Recording
- Trip Analysis
- Safety Function Monitoring
- Valve Monitoring

Energy Management

- Operational Cost & Performance Optimization
- Power & Performance Calculations
- Utility Management Performance Visibility

Operator Effectiveness

- Electronic Logbook
- Production Execution & Instruction
- Performance Monitoring



Industry Solutions

Oil & Gas Production

- Remote Performance Monitoring
- Subsea Valve Performance Monitoring
- Safety Function Monitoring
- Operator Guidance

Oil & Gas Midstream

- Pipeline Monitoring
- Energy Management
- Material Monitoring
- Leak Detection

Refining & Petrochemicals

- Mass/Energy Management & Data Reconciliation
- Utility Management
- Offsite Movement Monitoring
- Operational Cost & Performance Visibility

Chemicals

- Batch Production Management & Reporting
- Down-Time Analysis
- Performance Based Maintenance Scheduling

Power & Energy

- Power Performance Monitoring
- Power Plant Performance & Cost Optimization
- Captive Power Operational Optimization
- Fuel & Utility Management

Production Management



Exaquantum

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Pharmaceuticals, Power and Energy.

Functionality: Standards-based Plant Information Management System incorporating a data historian for real-time and historical data, providing a centralized repository for users throughout the plant, providing KPIs, aggregations, role-based views, graphical interfaces, trending, reports and integration with different systems.

Benefits: Integration and enhancement of process data into timely actionable information available across the enterprise.



Exaquantum/Batch

Industry: Oil and Gas Midstream, Pharmaceuticals, Chemicals.

Functionality: Scalable ISA-88 based Batch Information Management System which collects and stores batch production, equipment and recipe information for tracking and analysis.

Benefits: Improved efficiency and plant utilization; Total visibility of all relevant information for key stakeholders; Key contribution to quality improvement programs; Support for FDA 21 CFR Part 11.



Visa-OM (Movement Monitoring)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals.

Functionality: Live tracking of movements. Stock and movement accounting for continuous processes providing daily book-closing reports using mass balancing with data reconciliation.

Benefits: Effective management and supervision of low or none automated tank farm facilities; Avoid contamination by tracking material and asset usage through early warning.



Exaquantum/mPower (Production Accounting)

Industry: Oil & Gas Production, Oil & Gas Midstream, Refining and Petrochemicals, Chemicals.

Functionality: Key production information for enterprise profitability and planning. A platform for scalable production reporting on material in/out, consumption, product yield, and waste. The plant data model of the actual plant flow network provides calculations for material balances, consumption, emissions and reactions.

Benefits: Optimized stock management; Early detection of missed production targets; Auditable methodology for the automated creation and management of production accounts reports.



Exaquantum/DTA (Down-Time Analysis)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Pharmaceuticals, Power and Energy.

Functionality: Automatically captures plant data to enable Downtime analysis to be carried out by recording times when plant equipment is not running ('Downtimes') and production figures which are less than the Maximum Sustainable Production Rate ('Rate Losses'). Reasons can then be assigned to these events to add context. The statistics including support for Overall Equipment Effectiveness (OEE) are integral to the operational decision making process with a view to minimizing plant loss and maximizing future production.

Benefits: Continuous plant availability improvement through increased awareness of Downtime and Rate Loss within the operating process and equipment dynamics. Prioritized maintenance by identifying the causes and effects of production loss. Inaccuracies removed through automated data collection. maintenance by identifying the causes and effects of production loss.

Alarm Management



Exaquantum/AMD (Alarm Master Database)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Power and Energy.

Functionality: Centralized database for all alarm settings and documentation with alarm metrics providing a comprehensive view of the overall alarm system performance. Comprehensive management of change and auditing to assist in the alarm definition, rationalization and approval processes. Alarm settings can be validated against permissible limits and enforced.

Benefits: Ensures that all changes to alarms are to specification with high integrity and consistency; Enforces the alarm definition, rationalization and approval processes; Provides full auditing for regulatory compliance.



Exaquantum/ARA (Alarm Reporting & Analysis)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Pharmaceuticals, Power and Energy.

Functionality: Comprehensive set of statistical reports and KPIs based upon ISA 18.2-2009 & EEMUA 191. Alarm and Events can be aggregated by hour, day, shift, week, month, quarter and year providing alarm rates, counts, peaks, floods, etc.

Benefits: Reduction in the number of unwanted and distracting alarms allowing operators to react faster to abnormal situations with the proper corrective action, resulting in a safer and more productive plant; Improved plant safety, reduced environmental risk and enhanced maintenance response; Reduction in the amount of equipment damage; Reduced operator stress; Information available to key stakeholders on demand and by emails facilitating efficient and timely decision making.



Exaquantum/SER (Sequence of Events Recorder)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Pharmaceuticals, Power and Energy.

Functionality: Integrated and unified sequence of event information stored in an open and portable database. Trip detection based upon specific plant conditions providing a full log of all relevant process information in the crucial period before and after a plant event.

Benefits: Plant wide integrated view of Alarms & Events; Root cause analysis and problem identification; Assists in the elimination or reduction in the number of unexpected incidents and trips.

Safety Management



Exaquantum/SFM (Safety Function Monitoring)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Power and Energy.

Functionality: Plant-wide Monitoring, analysis and reporting of functional safety performance, across safety systems (SIS) and devices (sensors, actuators). Operational information from system and device activity is mapped against LOPA or HAZOP risk analysis to report the effectiveness of actual safety performance against the design targets. Deviations from safety design expectation are highlighted, and supports maintenance test replacements with successful field safety activations by assisting validation.

Benefits: Improved operational safety; Visibility of safety performance at both system and device level; Identify and reduce spurious trips; Optimization of testing intervals, leading to reduced cost of functional safety improvement; Significant reduction in time and effort to produce regulatory reports; Provides comprehensive information for safety validation and improvement programs.



Exaquantum/SSP (Subsea Portal)

Industry: Oil and Gas Production.

Functionality: Monitoring of the health of subsea wells through the collection and presentation of down hole temperatures and pressures, acoustic sand data and valve profiles. Valve profiles can be compared with ideal and previous profiles, and combined with alarm information will alert operators to issues.

Benefits: Improved operator decision making through integrated and timely information; Early indication of maintenance and potential failures preventing safety, environmental and production incidents.



Exaquantum/OSA (Override Safety Advisor)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Pharmaceuticals, Power and Energy.

Functionality: Provides a view of the safety integrity of the plant. Risk assessments provide the ability to assess the impact on the safety level of the facility when instruments require overriding. Authorization levels allow permission to be granted before an override is implemented.

Benefits: Continuous visibility of safety of the plant; Improves safety risk analysis before the override is implemented; Assists in the enforcement of operational procedures; Provides a full audit trail for accountability, post analysis and safety improvement processes.

Energy Management



Exaquantum/PPC (Power Performance Calculations)

Industry: Oil and Gas Production, Chemicals, Power and Energy.

Functionality: Calculates the efficiencies of primary and auxiliary power plant equipment such as boilers and turbines, and overall plant efficiency. Standard templates containing performance calculation blocks based on ASME PTC are provided which can be defined for specific plant configurations. 'What-if' analysis provides the ability to examine different plant operating scenarios and the impact.

Benefits: Performance KPIs are available in real-time to all relevant users; Bottlenecks and performance deficiencies in key plant assets can be quickly identified; Identification of optimal operating conditions.



Exaquantum/mPower (Energy Balancing)

Industry: Midstream Oil and Gas, Refining and Petrochemicals, Chemicals, Power and Energy.

Functionality: A data model of the plant flow network provides a solution for material and energy accounting, energy flow calculations, fuel consumption, emissions and reaction enthalpies. The thermodynamic calculations provide material and mixture properties, including chemical reaction behaviour in order to close material and energy balances, and estimate unmeasured flows or heat losses within the plant.

Benefits: Energy management, and fuel cost improvement; Environmental and emissions visibility, reporting and improved regulatory compliance; Highlights poor performing equipment, and supports predictive condition based maintenance.

Operator Effectiveness



eLogBook (Electronic Logbook)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Power and Energy.

Functionality: Advanced computer-based replacement for traditional control room paper-based log books enabling the capture of observed and non-automated information and tracking.

Benefits: Consolidation of key automated and non-automated information that requires tracking until completion; Improved shift handovers through clear status and task assignment, and management reporting.



Exaquantum/OTM (Operator Trending Module)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Pharmaceuticals, Power and Energy.

Functionality: Integrated with the Yokogawa DCS, Exaquantum/OTM provides long-term trending of process values combined with Alarm and Events. System wide and user specific trend groups provide quick and easy access to important process information.

Benefits: Optimized plant performance and safety by helping operators to identify changes in plant behavior that require attention.



Exaquantum/GF (Graphical Framework)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Pharmaceuticals, Power and Energy.

Functionality: Enhanced framework for the Exaquantum/Explorer Graphical User Interface providing graphic navigation control, history replay, integration of additional process information, user configurable trend groups and links to frequently used functions.

Benefits: Enables quick access to relevant information; Reduced configuration time for graphics and trend groups; Improved analysis using the history replay facility.



Exaquantum/RM (Report Manager)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Power and Energy.

Functionality: Reports can be created through Microsoft Excel and then scheduled on demand or periodically, for example hourly, weekly, monthly, etc. Reports can be saved as web pages, Excel files, and PDFs.

Benefits: Timely creation and distribution of reports, including reduced manpower in the production of regular reports; Management of reports and auditing.

Data Integration



Exaquantum/MDX

(Manufacturing Data Exchange)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals and Power and Energy.

Functionality: Provides the integration of ERP (Enterprise Resource Planning) systems such as SAP and control systems using the ISA-95 standard. Configurable web services enables the business loop to be closed providing integration of production requests, production status and results, equipment status, KPIs and alerts.

Benefits: Open standards enable lower cost to implement and maintain ERP to Plant (E2P) integration; Enables quicker response to changing business requirements resulting in improved business agility.



Exaquantum/ADX

(Asset Data Exchange)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Pharmaceuticals and Power and Energy.

Functionality: Transfer of key equipment information including running hours and start/stop operations to maintenance packages such as Maximo.

Benefits: Determine maintenance schedules on actual usage reducing down time and production losses; Better prediction of the potential for maintenance issues.



Exaquantum/RDS

(Remote Data Synchronization)

Industry: Oil and Gas Production, Oil and Gas Midstream, Power and Energy.

Functionality: Enables the transfer of process and alarm and event data between one or more Exaquantum servers via satellite, microwave, internet, etc.

Benefits: Secure transfer of process data over unreliable or slow network links; Integration of information over a wide geographical area; Facilitates the centralization of key information for easy access to subject matter experts.



Exaquantum/LDX

(LIMS Data Exchange)

Industry: Oil and Gas Production, Oil and Gas Midstream, Refining and Petrochemicals, Chemicals, Pharmaceuticals and Power and Energy.

Functionality: Integrates production and quality information by collecting laboratory sample data from LIMS packages.

Benefits: Identify optional process conditions for ensuring quality products; Traceability of process conditions leading to "off-spec" products and auditing.

Specialist Connectivity Applications



Exaquantum/AEE

(Alarm & Events Export)
Export Alarm and Events to a CSV file for a specified period of time.

Exaquantum/BRU

(Batch Recipe Update)
Works in conjunction with Exaquantum/Batch and provides the capability to retrieve all or selected recipe parameters for a specified batch on demand then updating the Exaquantum/Batch database with the retrieved recipe values.

Exaquantum/EES

(Event Email Service)
Dispatch emails upon a Tag change, result of a calculation, Alarm and Event message received, or at the end of an aggregation period.

Exaquantum/FDM

(File Data Manager)
Read Tag, Quality and Timestamp data from a CSV file into Exaquantum. Files are placed in a specific folder and processed upon arrival. Adapters can be provided for specific CSV formats.

Exaquantum/EFI

(Event File Interface)
CSV file interface for importing Honeywell DCS Alarm and Events into Exaquantum.

Exaquantum/HDE

(Historical Data Export)
Export Historical Tag values to a CSV file for a specified period of time.

Exaquantum/HDM

(Historical Data Manager)
Read Tag, Quality and Timestamp data from an OPC HDA Server(s) into Exaquantum.



Exaquantum/HEM

(Historical Event Manager)
Read valve signature data from FMC Technologies systems and store for selection and display within Exaquantum/SSP.

Exaquantum/ORM

(OPC Redundancy Manager)
Allow one or more redundant pairs of OPC DA/HDA servers to be connected to a single Exaquantum server, for Exaopc where there are more than four redundant pairs and/or third party OPC Servers.

Exaquantum/RDM

(Relational Data Manager)
Read data from a Relational Database and store into Exaquantum to provide time series storage and trending.

Exaquantum/SDM

(Synchronous OPC DA Manager)
Synchronous read of OPC DA data to provide control of the loading for OPC servers and their underlying sub-system.

Exaquantum/VPN

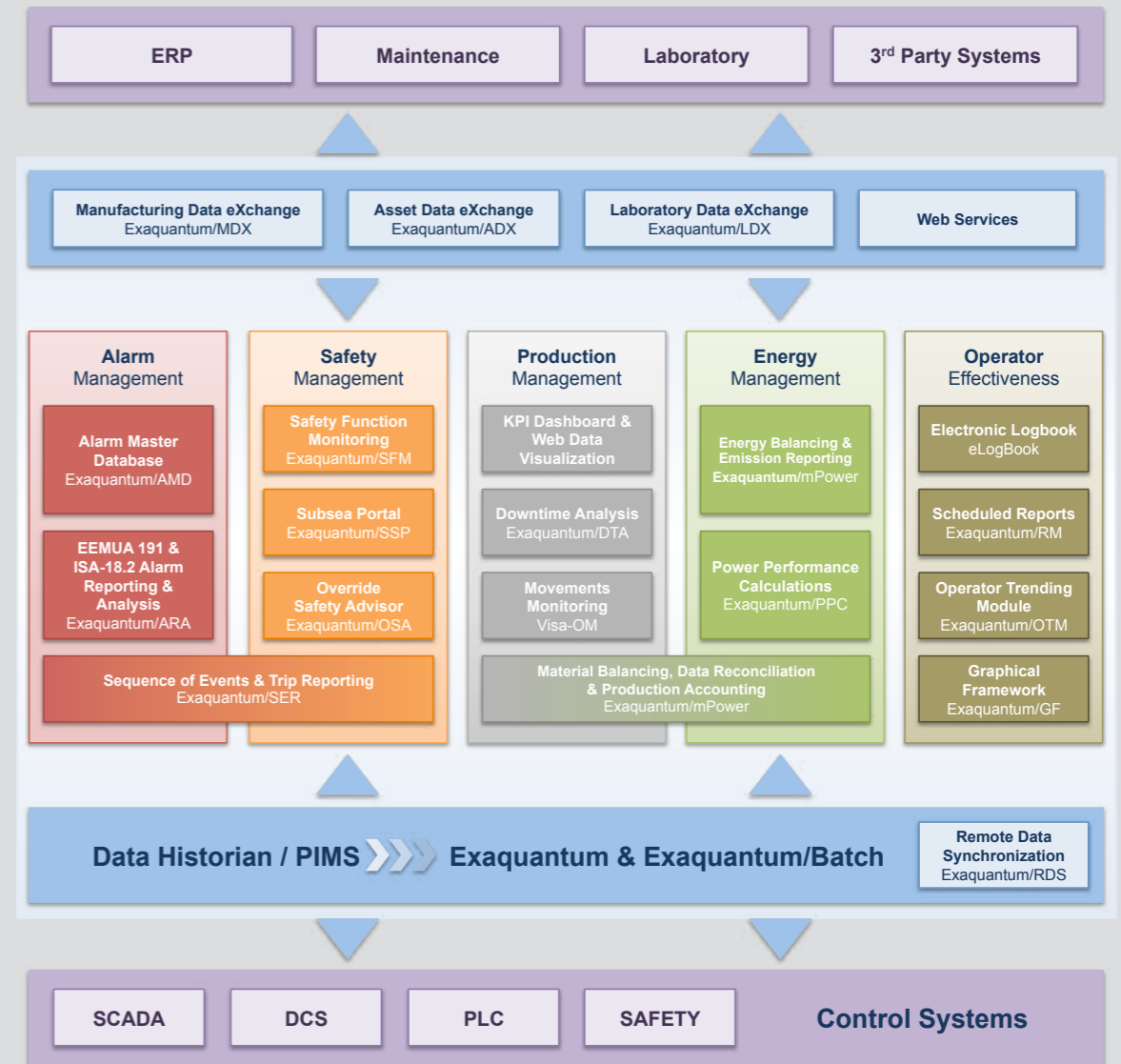
(VPN Manager)
Provide a secure and controlled connection from an OPC server to Exaquantum using VPN.

Exaopc Connectors

Exaopc Cassettes can be used to connect with different sub-systems to take advantage of Exaopc's OPC HAE (Historical Alarms and Events) interface with Exaquantum when the cassette's OPC client is connected to either a Triconex Alarms and Events OPC server or Hathaway SER Alarm & Events OPC server. In addition, an AEC (Alarms and Events Concentrator) cassette to collect Alarms & Events from multiple sub-systems, and a cassette to convert OPC DA to OPC A&E, are also available. Additional cassettes can be developed upon request.

The Exaquantum Family

Exaquantum is Yokogawa's platform application for delivering operational value from the wealth of process information available within process automation solutions. It is seamlessly integrated and aligned with Yokogawa DCSs, Safety Systems, PCI and Analyzers. Complimenting and enhancing the value of Exaquantum are three inter-related product suites – Connect, nHance and mPower. These integrate into other Yokogawa higher-level solutions to provide complete manufacturing intelligence.



Exaquantum

Exaquantum collects and stores large volumes of process data such as temperatures, pressures, flows and Alarms and Events providing actionable information that can be viewed and analyzed by key personnel using process graphics, trends, reports, and integrated with desktop applications such as Microsoft Excel.

Connect

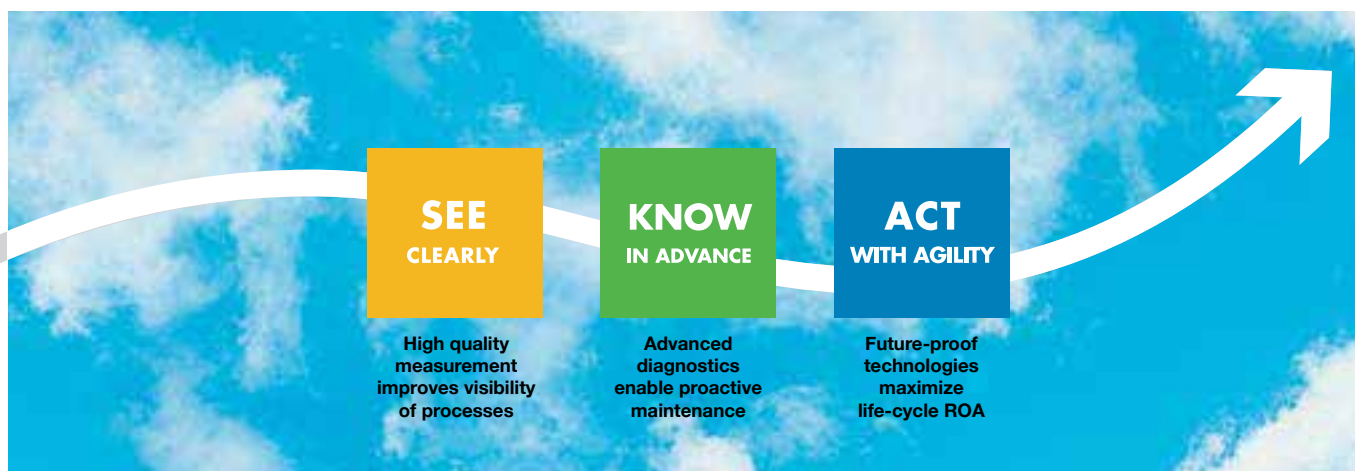
The Connect application suite provides the integration of Exaquantum to other systems including ERP (Enterprise Resource Planning) Systems, Maintenance Systems, Laboratory Systems, Asset Management Systems, Control Systems and other Historians.

nHance

The nHance application suite provides value-added packaged solutions. Packages such as Exaquantum/DTA (Down-Time Analysis), Exaquantum/SER (Sequence of Events and Trip Recorder), etc. provide solutions to specific requirements and leverage the investment made in existing Exaquantum systems.

mPower

The mPower suite extends Exaquantum to integrate business and process data within a production model that provides users with validated information required to optimize and maximize valuable production resources. Key functions include Mass Balancing, Data Reconciliation, Energy Balancing, Production Accounting and Movement Monitoring.



VigilantPlant excels at bringing out the best in your plant and your people — keeping them fully aware, well informed, and ready to face the next challenge.

vigilantplant.[®]

The clear path to operational excellence

VigilantPlant is Yokogawa's automation concept for safe, reliable and profitable plant operations. VigilantPlant aims to enable an ongoing state of Operational Excellence where plant personnel are watchful and attentive, well-informed, and ready to take actions that optimize plant and business performance.

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