

The next step in evolution
CENTUM VP



CENTUM[®] VP

*The core platform for Yokogawa VigilantPlant[®] Solutions.
Designed to empower all members in the production value chain
to See Clearly, Know in Advance, and Act with Agility*

Bulletin 33K01A01-50E

yokogawa.com/centumvp

vigilantplant[®]
The clear path to operational excellence

YOKOGAWA 

VigilantPlant: smart ideas for a sustainable future



Redefining VigilantPlant

For years, Yokogawa has used the word "VigilantPlant" as our vision for operational excellence. What this meant was bringing out the best in your plant and people through visibility of information, predictability of process, and agility of business.

We now believe VigilantPlant means much more than just what goes on in your plant.

Yokogawa is committed to sustaining your business, the environment, and the society that we all are a part of. We are doing this by developing more energy-efficient technology, helping operations produce a smaller carbon footprint, and building rock solid products that protect our environment from contaminants. Sustainability is not just a job for Yokogawa but for all industry.

Will you join in embracing a new VigilantPlant?

vigilantplant.[®]
The clear path to operational excellence

The CENTUM VP advantages

CENTUM VP ushers in an operating environment that keeps everyone fully aware, well informed, and ready to face the next challenge.

Information visibility

SEE
CLEARLY

CENTUM VP makes critical plant information visible in a meaningful and actionable manner.

CENTUM VP captures plant-wide data without delay and delivers the right information to the right people at the right time. Reducing blind spots while preventing information overload, CENTUM VP keeps people's attention firmly focused on operational targets and business goals.

Performance foresight

KNOW
IN ADVANCE

CENTUM VP delivers the knowledge necessary to anticipate changes and to make fast, informed decisions.

CENTUM VP enables quick synthesis of analytic insights from the historical, real-time, and future-predictive perspectives. Allowing people to make fast intelligent decisions every day, CENTUM VP helps your business avoid costly surprises.

Operational agility

ACT
WITH AGILITY

CENTUM VP helps to implement decisions throughout the value chain without delay.

CENTUM VP speeds up task coordination and navigation, enhancing the flexibility of production and adaptability of business. Constantly systemizing and automating operational best practices, CENTUM VP prevents delays and preempts bottlenecks.



Operations

Safe and unified plant operations

Universal interface for control, safety, and asset intelligence
Embedded mechanisms to prevent information overload

Non-stop improvement

Continuous systemization of operational best practices and context specific operational advisories



Production Management

Faster Plan, Do, Check, and Act cycle for agile adaptation

MES and enterprise system integration using S95 and B2MML standards

Secure and standard-based information integration

Built-in control network security certified by experts



Maintenance

Continuous evolution without compromising asset availability

Evergreen evolution with online upgrades and modifications
Most reliable platform with no single point of failure

Long-term investment protection

Step-by-step phased migration paths incorporated before any new release. We have over 35 years of backward compatibility.



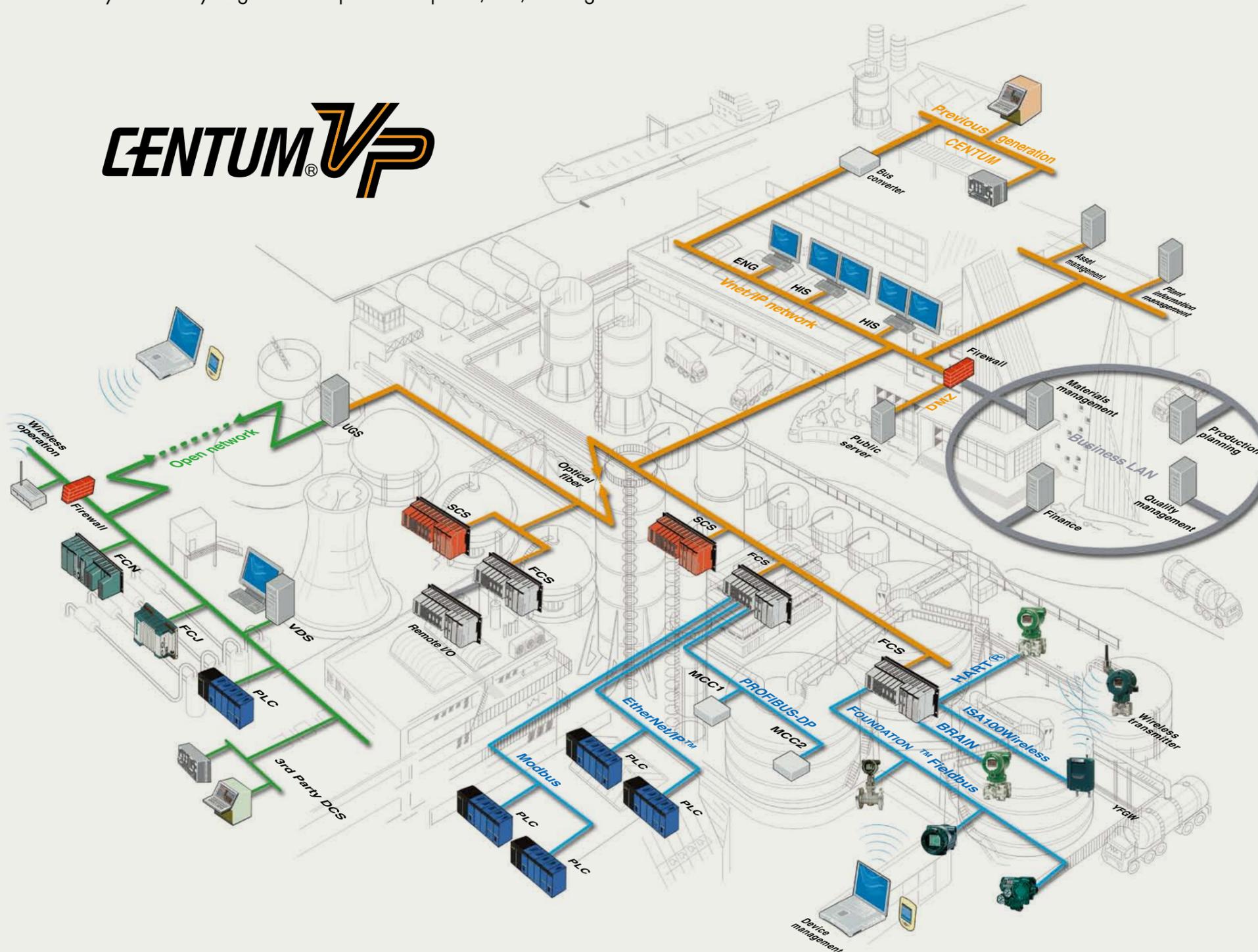
Project

Faster project execution with fewer integration risks

Single-source integrated solutions for control system (DCS), safety instrumented system (SIS), embedded plant information management system (PIMS), intelligent RTU & SCADA, and turbine controller

A simple & common architecture covers a variety of plant sizes & industries

CENTUM VP has a simple & common architecture consisting of human machine interfaces, field control stations, and a control network. These three basic components support facilities from the tiny to the very large and complex with up to 1,000,000 tags.



Human Interface Station (HIS)

Windows based operating system, commercial-off-the-shelf PC hardware, and optional specialized operator keyboard for a large variety of operator consoles

Engineering Station (ENG)

With the same PC features mentioned above, this includes a comprehensive engineering package for all the CENTUM VP components and applications.

Field Control Station (FCS)

100% Yokogawa manufactured. This is the core of CENTUM VP's high availability/reliability, continuing the CENTUM heritage.

UGS/GSGW

Unified Gateway Station (UGS) serves as a gateway to interface CENTUM VP with STARDOM or the third-party subsystems. Generic Subsystem Gateway (GSGW) is a controller for operating and monitoring subsystems connected to CENTUM VP.

Bus Converter (BCV)

Interface hardware that connects multiple control network domains. It also connects previous CENTUM series systems to CENTUM VP.

Control Network (Vnet/IP)

Vnet/IP, an IEEE802.3 Ethernet compliant redundant network operating at 1 Gbps, incorporates Yokogawa's technology, achieving deterministic, reliable, and secure communications.

Digital Fieldnetworks

CENTUM VP supports FOUNDATION™ fieldbus, HART, PROFIBUS-DP, DeviceNet, Modbus, Modbus/TCP, and EtherNet/IP.

Safety Control Station (SCS) - ProSafe-RS

This is Yokogawa's TÜV SIL3 certified premier safety instrumented system. It incorporates Yokogawa's own Pair & Spare and Vnet/IP technologies and offers unprecedented synergy with CENTUM VP.

Network-based Control System - STARDOM

Yokogawa's intelligent-hybrid remote telecommunication controllers are ideal for the oil and gas upstream market. They can be seamlessly integrated, via the UGS, to CENTUM VP.

Operational Excellence Software Suite

A software suite for the Windows platform that supports plant operations and maintenance improvement, such as plant safety, plant asset management, production management, and optimization



Intuitive human machine interface for plant operation

CENTUM VP has a new HMI (human machine interface) that makes information access quicker and more intuitive.



True Integration of Safety Excellence, Asset Excellence, and Production Excellence

CENTUM VP achieves the operational excellence that is the focus of Yokogawa's Safety Excellence, Asset Excellence, and Production Excellence initiatives. It offers integrated viewing and data handling functions. For example, alarms from the ProSafe-RS Safety Instrumented System and Plant Resource Manager, Yokogawa's Asset Management product, can be seen and handled seamlessly in the HIS. All plant process data, device data, and others documents are handled by CENTUM VP.

No Single Point of Failure

The HIS runs on Windows and offers customers the convenience of using commercial-off-the-shelf hardware. Although the reliability of a PC is relatively low, it does not affect the total reliability of the process operator function. Within CENTUM VP the HIS is not server-client dependent. Therefore multiple HISs can support each other and there is no single point of failure. The CENTUM VP supports multiple operator console configurations: desktop, open-bay console, hardened enclosed-bay console, and custom consoles.

Various Display Types

CENTUM VP supports both wide (16:10) and standard (4:3) size monitors. Multiple operation windows can be displayed on a single monitor. And, multiple monitors can be configured to display operation windows. With a click of a mouse, those operation windows can be moved from one to another monitor.

EEMUA Guidelines for Alarm System Design

Based on the latest edition of the EEMUA* #191 guidelines, Yokogawa has developed a Consolidated Alarm Management Software for the process operator in the HIS.

* Engineering Equipment & Materials Users' Association

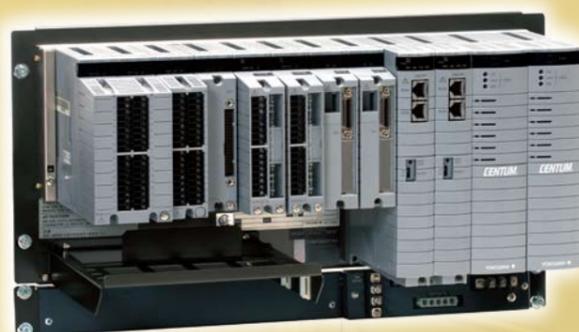


Safety and reliability are the core fundamentals of all production activities

All field control stations (FCSs) in the CENTUM series, including software and hardware, have been developed by Yokogawa. We know every single bit of software and hardware to maintain a 99.99999% availability service record.

The state-of-the-art Field Control Station (FCS)

For over 35 years, Yokogawa has been delivering stable, high quality CENTUM systems. The CENTUM VP controller features outstanding processing performance and a large application storage capacity, yet inherits the same quality and stability that are the hallmark of the CENTUM series. It has been optimized to take full advantage of advances in field digital technology that will help plants operate with increased efficiency and stability.



Guaranteeing the Highest Availability and Reliability

CENTUM VP contributes to the long-term stability of plant operations and reduces total cost of ownership.

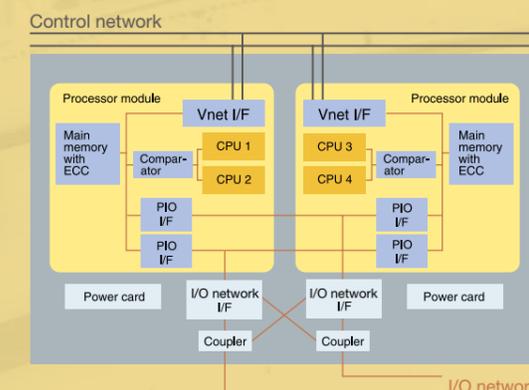
Designed for High Availability

Yokogawa's CENTUM series achieves high availability thanks to a dual-redundant design, online maintenance capability, and other advanced features. The FCS processor module, power supply, I/O modules, and I/O networks are all dual redundant. Active and stand-by processor modules work in synchronization: even if a failure occurs, control switches over seamlessly to the stand-by module and the FCS continues running. Failed modules can be replaced online, ensuring that not even a hardware failure will interfere with the process control.

CENTUM : the DCS solution with an incredibly high 99.99999% availability!

Designed for Stable Process Control and Increased Plant Productivity

The CENTUM series employs a pair & spare architecture that improves the stability of process control. Each processor module has redundant CPUs that execute the same computations simultaneously. Their outputs are constantly compared and a bump-less switchover to the stand-by processor module is initiated if any anomalies caused by electronic noise or other phenomena are detected. This minimizes the likelihood that errors will have any impact on process control.



All of these technologies help to make CENTUM VP the most reliable solution for enhanced safety in plant operations.

Open Structure and High Reliability

Yokogawa is committed to reducing costs for our customers by enabling the use of commercial off-the-shelf technology where appropriate. Third-party cables and other network communication devices can be used with Yokogawa's Ethernet based Vnet/IP. Plant reliability is in no way compromised as the communication response is guaranteed (deterministic as opposed to probabilistic) thanks to Yokogawa's renowned reliability, dedicated protocol, and redundant configuration.

Subsystem Integration and Digital Fieldnetworks Support

To meet the growing need for communication with manufacturing equipment including variable speed drives, PLCs, and "smart" motor protection relays for operation and monitoring, as well as with analyzers, weighing machines, smart instruments, and other instruments used for product inspection, CENTUM VP supports a wide variety of communication interfaces and digital fieldnetworks such as FOUNDATION™ fieldbus, PROFIBUS-DP, Modbus RTU, Modbus TCP/IP, and DeviceNet.

Compact Design

Compact components reduce the overall "footprint" of the control system, allowing savings from smaller equipment rooms. For convenience, both the FCS and its I/O node units can be placed in remote classified locations (IEC Zone2/Class I Div. 2), providing installation savings.

Function Blocks

The CENTUM VP provides function blocks for monitoring, control, manipulations, calculations, logic functions, and sequence control. Not only regulatory control but also advanced control, complicated sequence control, and batch control are all executed in a redundant, secure, and reliable controller environment. Plant systems can be flexibly designed, ranging from small- to large-scale, through the combination of these control blocks.

Online Maintenance

FCS applications can be modified without interrupting process control from the engineering station.

Unit Supervision

The multiple devices of a process facility which would previously have been handled individually can now be defined, operated, and monitored as a single unit, simplifying operation. Unit supervision can be applied to batch processes and continuous control processes that require complex management, expediting overall plant operation.

How does CENTUM VP employ “openness” in a control system?

The technological innovation achieves the world fastest, open, reliable, and real-time communication.
Customer centric mindset maintains the true interoperability.

1Gbit, World's Fastest Open Control Network

The real openness of a control network does not just come from using TCP/IP technology. Yokogawa's Vnet/IP provides open, reliable, and real-time broadband communications. Both CENTUM and non-CENTUM components can be connected to the network. The open communication does not affect process control data communications nor does it impact the performance and security aspects of the control communications. The Yokogawa system guarantees data updates every second in the HIS, even with a large-scale project. Vnet/IP offers five millisecond time synchronization among all stations on Vnet/IP. A third-party organization has certified the security robustness of Vnet/IP and communications to the CENTUM VP FCS.

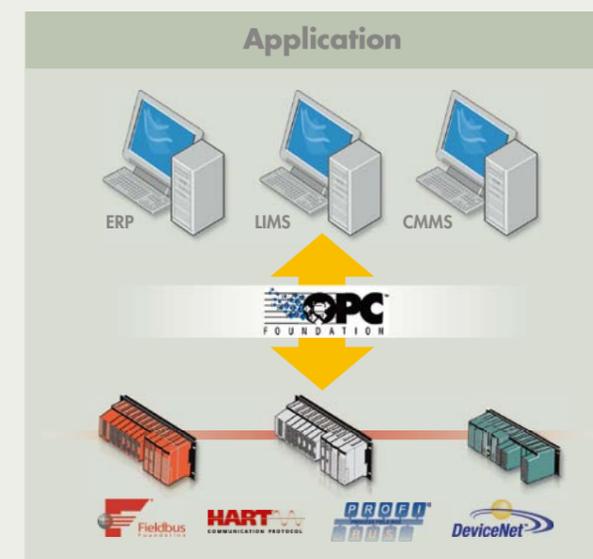


True Interoperability

Interoperability of Yokogawa CENTUM systems with the “outside world” begins with OPC. CENTUM VP utilizes an OPC server that meets the demands of information flow, advanced control, and alarm/event management. Our customers enjoy solid performance and wide flexibility of our OPC server for their integration projects. Yokogawa maintains interoperability with all intelligent instrumentation and deployed fieldbuses.

Global Host Interoperability Support Test (HIST) Network

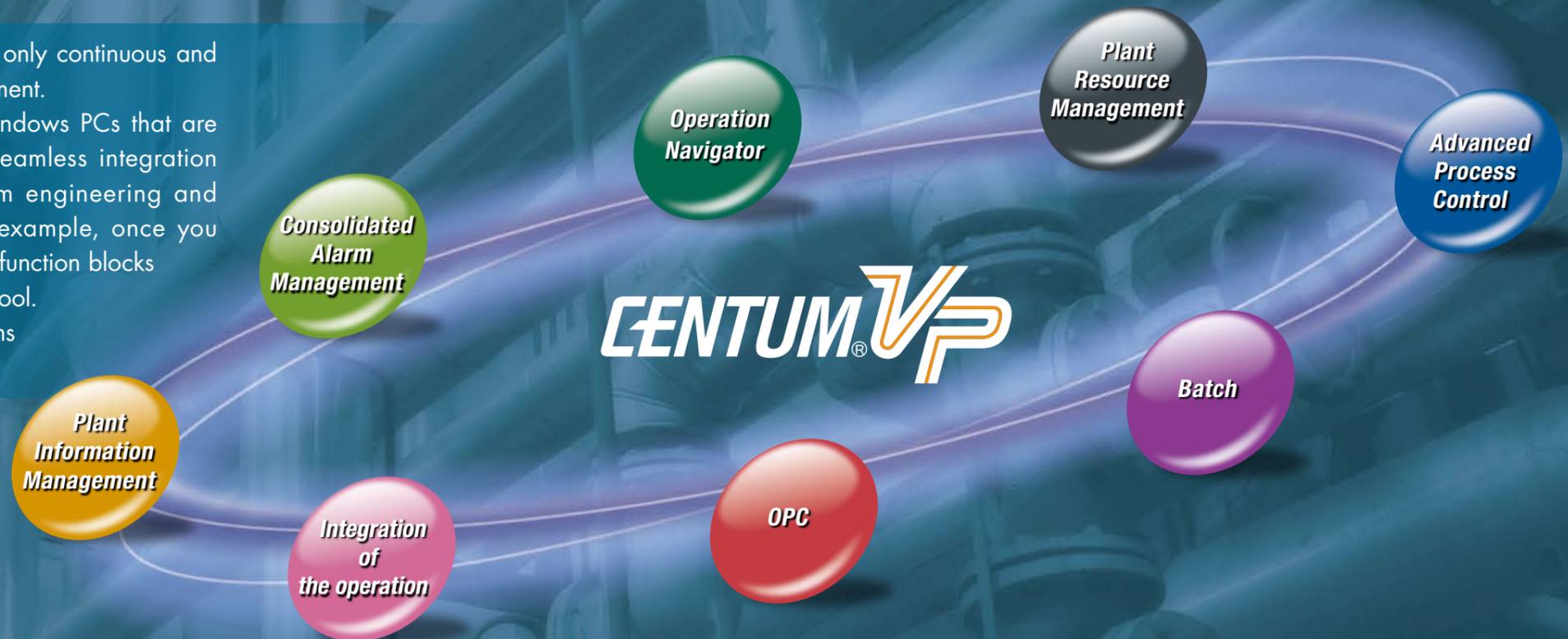
In the arena of FOUNDATION™ fieldbus, manufacturers are bringing new devices to market all the time, in addition to upgrading older instrumentation. Therefore, interoperability has always been a key issue with Yokogawa. To facilitate project management on a global basis, Yokogawa has formed a global HIST network. Test sites in Japan, the Netherlands, Houston (USA), and Singapore make sure the interoperability between Yokogawa systems and non-Yokogawa devices is acceptable. All test results are reported to Japan. This information is disclosed at <http://www.yokogawa.com/fbs/Interoperability/fbs-hist-en.htm>



Operational Excellence Software Suite



The CENTUM VP simple and common architecture covers not only continuous and batch applications but also manufacturing operations management. The Operational Excellence Software Suite operates on Windows PCs that are directly connected to the Vnet/IP network. Single-source seamless integration eliminates redundant engineering between control system engineering and Operational Excellence Software Suite engineering. For example, once you configure the function blocks in the FCS, the information of the function blocks is available in the plant information management engineering tool. This software suite integrates with third-party information systems through OPC interfaces.



■ Plant Information Management

All plant information such as process and batch data, alarms and events, and plant resource and diagnosis data are handled by plant information management. This gathers data directly from the system. Thanks to Vnet/IP functionalities, data availability and gathering is dramatically improved compared to an OPC interface. Plant information management supports the OPC interface for third-party control system integration.

■ Advanced Process Control

CENTUM VP has a variety of advanced process control solutions. The Multivariable Model Predictive Control Package uses a model-based multivariable predictive control algorithm that takes various conditions among process variables into account, such as constraints and economic efficiency, in order to perform stable, economically optimal operation. The Robust Quality Estimator predicts the qualities of intermediate and final products in real time using associated process measurements such as temperature, pressure, and flow.

■ Consolidated Alarm Management

Consolidated alarm management supports Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) for your alarm management based on the latest EEMUA #191 alarm management guideline. It provides additional useful tools such as graphical historical data analysis and automatic alarm reduction. Sequence of event management functions are also included.

■ Batch

CENTUM VP has a batch plant information management system that is compatible with the ISA-88 (IEC 61512) batch control standard and 21 CFR Part 11 regulations. The Web-based trend, report, and analysis functions allow batch process data to be evaluated in terms of productivity, equipment, and recipes.

■ Operation Navigator

Operation Navigator is an operation support tool that assists quick and accurate decision-making and operation. Operation Navigator automates standard operating procedures (SOPs) and provides early detection of process and device abnormalities. Operation Navigator also provides easy to use tools that allow operators to create and automate their own operating procedures.

■ OPC

True interoperability is the policy of CENTUM VP's OPC development. This is compliant with the OPC standard and enables upper-level applications to access data from the production control system. Incorporating data access (DA), alarm and event (AE), and historical data access (HDA) services, OPC provides for high throughput access to OPC clients.

■ Plant Resource Management

With plant resource management and intelligent field devices, operators and maintenance personnel can monitor the condition of plant assets remotely. Plant resource management's diagnostic functions detect early signs of performance deterioration such as valve sticking and impulse line blocking. By helping curtail excessive preventive maintenance and enabling higher level predictive and proactive maintenance, plant resource management opens the way to asset predictability.

■ Integration of the operation

CENTUM VP integrates operation data and alarms from other process control systems (PCS) and displays them in a unified way. It enables operators to operate and monitor other PCSs from CENTUM VP operator stations, saving the misoperations and educational costs.

CENTUM VP stands by its automation users over the entire plant lifecycle



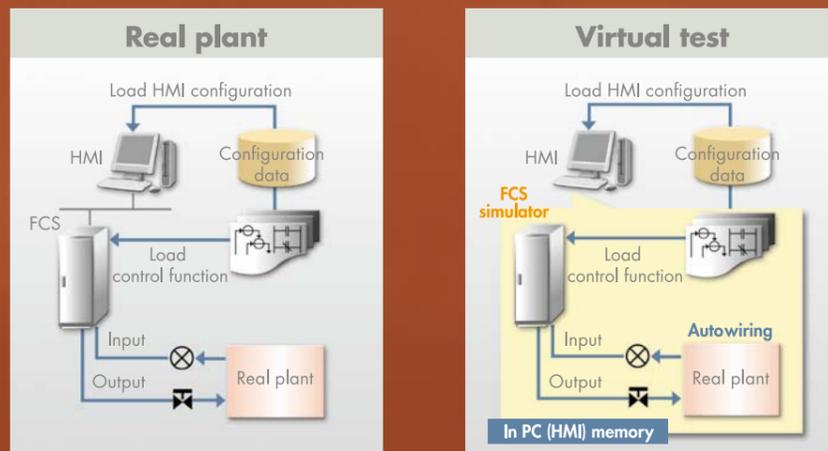
CENTUM VP brings your cost down over the lifecycle of your plant. Maintenance is less frequent, software upgrade is easy, expansion is smooth, and even revamp is speedy.

Precise Project Cost Estimation

In CENTUM VP, the FCS application load can be quickly calculated in the design stage and easily monitored when on-line. During engineering design, the precise number of FCSs required is known. As the project progresses, with engineering changes, cost changes are minimized due to the simple licensing structure incorporated into CENTUM VP. This covers both the addition of stations and tags. To provide the most economical system, CENTUM VP has only two tag license boundaries: the 8,000 tags for entry level and small system architectures, and the 100,000 tags for medium to large scale plant systems. When linking multiple plants together, then we have a one-time 1,000,000 tags.

Virtual Test Function

A virtual FCS and HIS environment is available where both the control and operator functions of the CENTUM database can be tested without FCS hardware. Application testing and engineering time are dramatically reduced, accelerating project progress and reducing engineering cost. For system expansion and modification, applications can be tested and verified without any impact on the actual plant operation. Where ProSafe-RS is also a part of the system, then virtual testing is also available together with CENTUM VP. Our virtual test function is also a key component in building an operator training system (OTS).



Software Upgrading

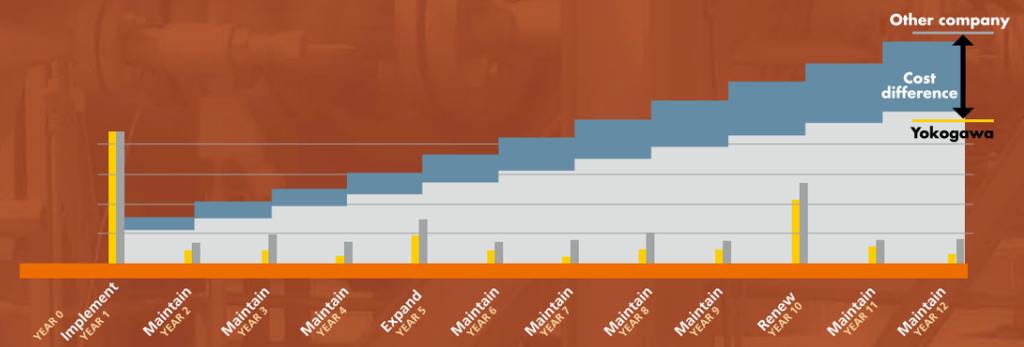
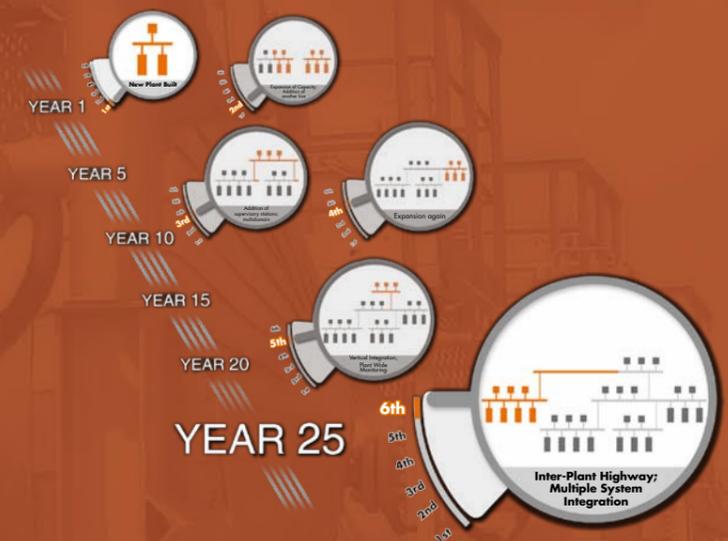
As part of lifecycle cost management, Yokogawa has paid particular attention to upgrading all CENTUM systems. It is simple, quick, and direct. All CENTUM VP stations that are PC-based can be upgraded with one mouse click. For the FCS, if you are not using any new functions, then upgrading is not needed. Where the latest functions are desired, it takes just one mouse click to execute an FCS upgrade.

Migration

Yokogawa provides various tools and engineering methodologies for migration to CENTUM VP. Depending on the project type, you can retain field cables, I/O modules, controllers, and the control network in order to minimize your investment. A step-by-step migration starting with the HMI is easy to carry out. Software conversion tools are available for legacy Yokogawa and third-party DCSs.

Multiple System Connection

Customers are demanding different sites to be linked together so that bi-directional operation can be made more efficient. Yokogawa provides a multiple system connection function to connect several CENTUM VP sites together and link older CENTUM sites.



For sustainable future of customers

With vast experience in maintenance technology and an extensive support structure, Yokogawa maintains the reliability and availability of the control system throughout a plant's lifecycle. Yokogawa also provides operational solutions and optimization of the maintenance plan as well as overall cost through our three introductory steps that include Opportunity Identification Services, Solution Implementation Services and Lifecycle Effectiveness Services.

vigilantplant services.[®]
Building Your Future to Last

Three Introductory Steps

Step 1 | Opportunity Identification Services[®]

Yokogawa evaluates the effectiveness of a customer's system with periodical inspection, environmental diagnosis, deterioration diagnosis and maintenance histories and identifies issues that require improvement to avoid risks. Based on objective data, Yokogawa proposes optimum lifecycle maintenance plans and conducts measures based on the plan. Also, we analyze system utilizations such as controllability, alarm, HMI etc. quantitatively and identify new opportunities for improvement.

Step 2 | Solution Implementation Services[®]

Yokogawa provides maintenance operations based on the plant lifecycle plan for the purpose of sustaining the system's functions and overall effectiveness.

Preventive Maintenance to sustain high availability

Provide periodical inspections and parts replacement, improve system reliability and availability. (MTBF Improvement)

Prompt Recovery in case of emergency

Yokogawa Global Response Center and our worldwide network provides prompt recovery 24/7 with the effective utilization of remote maintenance technology. (MTTR Reduction)

Integrity / Security sustainment

Yokogawa prevents data corruption and inconsistency by providing software backup services. Also, our security service protects the customer system from virus infection and data tampering.

Operation Optimization

Yokogawa provides alarm rationalization services or controllability improvement services to realize safe operations and operational improvements.

Step 3 | Lifecycle Effectiveness Services[®]

Yokogawa periodically reviews the customer lifecycle plan and verifies the effectiveness of maintenance and improvements.



Vigilant engineers making history with CENTUM

CENTUM[®]VP

CENTUM has grown with our customers over the past 35 years and is the clearest sign of our unwavering focus on maintaining continuity in solutions and services. Look to CENTUM for another 35 years of consistency and continuous improvement. With Yokogawa, commitment means building the future to last.



We have developed CENTUM VP in Singapore.



We have developed CENTUM CS 3000 and CENTUM VP.



We have developed CENTUM CS, CENTUM CS 3000, and CENTUM VP.

We have developed CENTUM V, CENTUM-XL, CENTUM CS, CENTUM CS 3000, and CENTUM VP.



CENTUM VP enables VigilantPlant Operational Excellence Model

Excellence in production, asset, and safety sustained over the life cycle of your plant.

- **Production Excellence** for operational agility and adaptability
- **Asset Excellence** for asset availability and utilization
- **Safety Excellence** for health, safety, and environmental (HSE) protection

The VigilantPlant Operational Excellence Model aims to sustain your profitable business growth by enabling excellence in three key aspects of plant operations over the life cycle of your plant.



vigilantplant.[®]

The clear path to operational excellence

SEE
CLEARLY

KNOW
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ACT
WITH AGILITY

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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