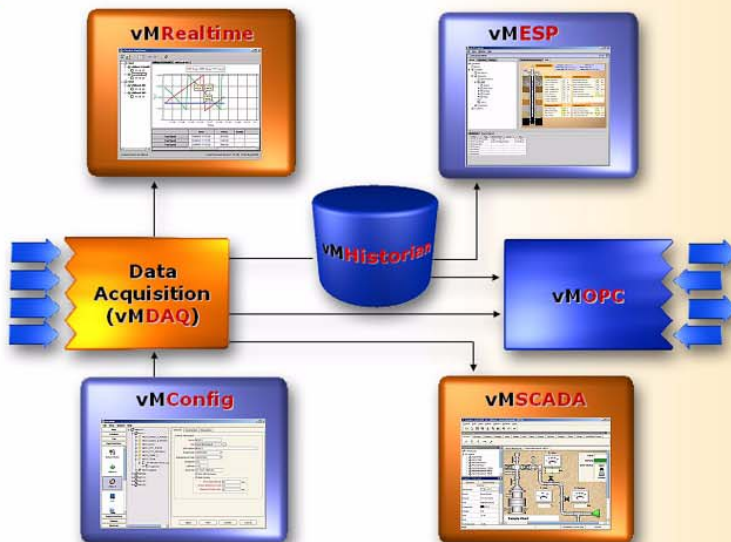


TOTALACCESS

Software Technology Overview



REAL-TIME DATA ACQUISITION
DATA HISTORIAN
REMOTE ASSET MONITORING
SIMPLE CONFIGURATION UTILITY

Web-based user interface that provides real-time data access, anywhere in the world, for the monitoring of remote assets.

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Overview

vMonitor's **TOTALACCESS** provides advanced remote operations solutions by linking people with remote assets at significant cost savings compared to conventional technology. vMonitor's hardware and software are ideal for monitoring assets, such as wellheads, pipelines, ESPs, well test equipment and other systems.

TOTALACCESS uses the latest technology to monitor remote assets. The Data Acquisition Engine (**vMDAQ**) captures real-time data transmitted by various data sources in the field, including our **vMBus** family of products and other third-party hardware.

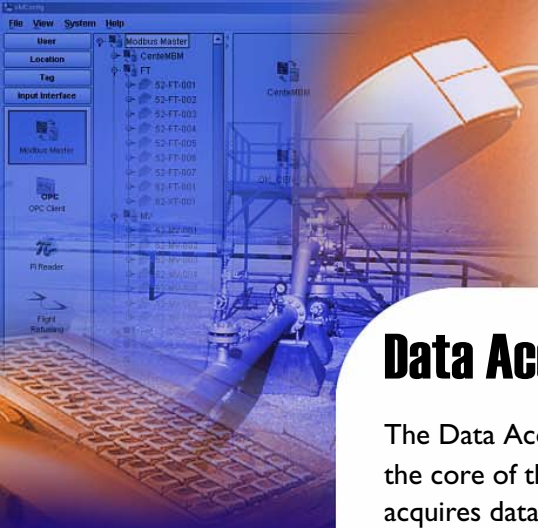
Our data presentation tools, like **vMRealtime**, **vMSCADA** and **vMESP** enable monitoring of real-time data as it flows into the system. Custom alarms can be created, based on pre-defined conditions, to send notifications of any potential problems within the system.

Key Software Components

TOTALACCESS consists of the following components:

- **vMRealtime**. Displays real-time data instantly as it flows into the system.
- **VMHistorian**. Stores data in a secure repository for later viewing & trending.
- **vMESP**. Captures remote ESP data for monitoring and report generation.
- **vMSCADA**. Acts as a custom graphical interface Builder and Viewer. Enables tracking of incoming data and alarm conveyance and handling.
- **vMConfig**. Provides easy-to-use point-and-click configuration for quick setup, maintenance and management.
- **vMOPC**. Converts and broadcasts internal data in the OPC protocol.

These components are designed to work together to deliver total access to all remote data sources that comprise an installation.



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Data Acquisition Engine

The Data Acquisition Engine (**vMDAQ**) is the core of the **TOTALACCESS** system. **vMDAQ** acquires data from hardware and software devices spread across the entire organization and distributes it to other systems. **vMDAQ** is a dynamically configurable multi-threaded system. It consists of a collection of services that shares information using a built-in messaging protocol.

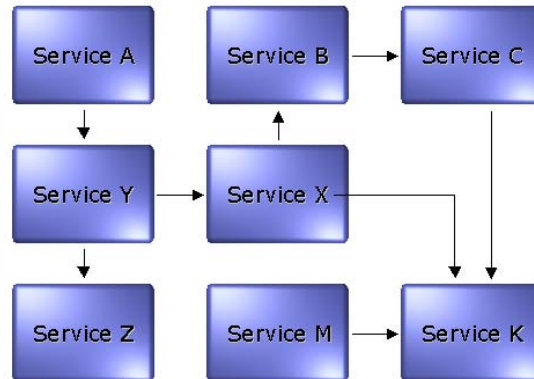
Configurability & Modularity

The complexity of the system is determined by the combination of services chosen. A very simple system is created by combining one or a few modular services (Figure 1). Additional services are added to develop a more complex system (Figure 2). The communication between services can be controlled by configuring the messaging protocol, which allows for maximum system configurability and robustness.

Figure 1 Simple System Configuration



Figure 2 Complex System Configuration



Extensibility of Existing Services

Existing services can be extended or replaced to achieve additional functionality. For example, the Email Notification service could be configured not only to send information about the current triggered alarm, but also to attach an image of the data trend.

Plug-In Support for New Services

New services can be developed and integrated into the **TOTALACCESS** system as plug-ins without having to wait for a new software release. For example, an optimization algorithm that is triggered every time new data is read from a device may be developed using a plug-in loaded through **vmConfig**. The services can be loaded as part of the system, which is then assigned to receive messages from the Scale Conversion Service. The data from the plug-in also can be shared with other existing system services.

Third-Party Software Integration

The **TOTALACCESS** system can send and receive messages from any third-party application that supports a standard protocol such as OPC, DDE, or JMS. If the third-party application does not support such a standard protocol, **vMonitor** can develop a custom service to act as a bridge.

Distributed Architecture

Any service can be run in distributed mode, which allows for the distribution of various services across multiple computers in a network. This distributed architecture is transparent to the service. With the appropriate permissions, the services can exchange data across the network. For example, the Alarming and Database Archiving Service could be run on one server while the Notification service is run on another.





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System Services

TOTALACCESS uses a collection of system services to perform its basic functions. The most prominent services, including a brief description of their functionality, are listed in this section.

System Scheduler Service

Allows users to schedule regular system tasks (internal tasks or external programs). These tasks include system maintenance, such as deleting temporary files or shrinking the database, monitoring the health of other system services, and more.

Device Scheduler Service

Polls device data on a predefined schedule. Devices that share the same communication resource (such as a COM Port) are synchronized to prevent polling errors. Users can also assign the execution priority level to push more important devices to the top of the scheduler list. Using the plug-in capability, new devices that are not part of the basic system can be supported.

Report Scheduler Service

Executes and generates reports at predefined intervals. This service sends the report to users via email or FTP. The plug-in capability also can be used to develop custom reports.

Expression Computation Service

Allows complex mathematical expressions to be run and executed in real-time against polled data. The Expression Builder allows users to create expressions that contain tags from different devices, including tag history data.

Alarm Service

Triggers alarms based on the result of logical expressions. This service is an extension of the Expression Computation Service. The Alarm service allows users to create complex alarm logic beyond simple minimum/maximum or percentage change alarms.

Data Compression Service

Compresses and reduces the amount of data stored in the **vmHistorian** to optimize database usage. The compression algorithm is based on the percentage of change (amount of shift in the data) between two consecutive readings. This process significantly reduces the amount of data stored in **vmHistorian** without compromising the sensitivity or character of the curve.

Historian Service

Stores real-time data in **vmHistorian**. Using the plug-in capability, this service can be easily extended to store data in a separate, third party historian.

Other Services

- HTTP Service
- DDE service
- Email Service
- FTP Service
- SMS Service
- MODBUS Slave Service
- Scale Conversion
- Units Conversion
- OSI-PI Archiving Service
- more...





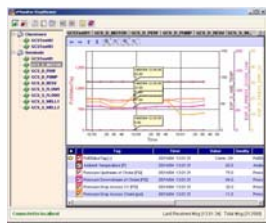
TOTALACCESS

Software Technology Overview

Software Components

TOTALACCESS consists of the following software components with their respective features:

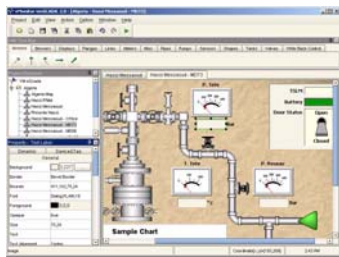
VMRealtime



View real-time data instantly as it flows into the system. Data is organized by Site and Device for quick and easy reference. Users have complete control over the graph and can zoom in on either axis.

- Secure Login
- On-demand Read
- Device Writeback
- Dynamic Data Viewing
- Real-time Alarm Notification

VMSCADA



Build graphical representations of the assets in an organization. Using simple point-and-click operations,

quickly identify alarms and drill down to investigate the problem.

- Level, Flow and Valve Status
- Multi-layer HMI support (Linked Views)
- Monitor and Acknowledge Alarms at any Level
- Allows Quick Response Time
- Models Real Life Systems

vmESP



View real-time data from ESP wells and key production diagnostic parameters for downhole and surface information. Receive alarm notifications of irregular system conditions.

notifications of irregular system conditions.

- Real-time and Historical Data Trending
- Writeback Control
- Report exporting to databases, text files or Microsoft Excel spreadsheets

vmOPC



Broadcast real-time data, historical data, and alarms via the OPC protocol.

Additionally, third party OPC data can be integrated into the system (OPC gateway). **vmOPC** offers full support for the following OPC services:

- **DA.** Data Access 3.0
- **DX.** Server to Server Support
- **HDA.** Historical Data Access
- **A&E.** Alarm & Events

VMHistorian



Store data in a secure repository for later viewing and trending. **VMHistorian** supports Microsoft SQL Server and Oracle.

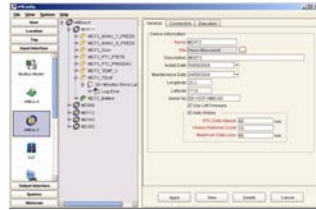




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vMConfig



Configure setups through an easy-to-use, point-and-click remote configuration utility.

- Device and Tag Setup
- Alarm and Action Setup
- Data Conversion/Reverse Conversion
- Start/Stop Services
- Look-and-Feel Control
- Secure Login

Current Development

- Integrated Reporting functionality (reports and HMI sharing)
- PDA support for vMBusX Hardware Configuration
- Full support for HMI Scripting
- Integrated Third Party Databases
- Complete Remote Health Monitoring
- SNMP Support
- HMI Controls
- Importing of HMIs from Third Party Systems

