system 302

Open Digital Ecosystem

Connectivity

Secure Industrial Communications

Flexibility to Overcome Any Data Connectivity Challenge.

Ready for Industry 4.0

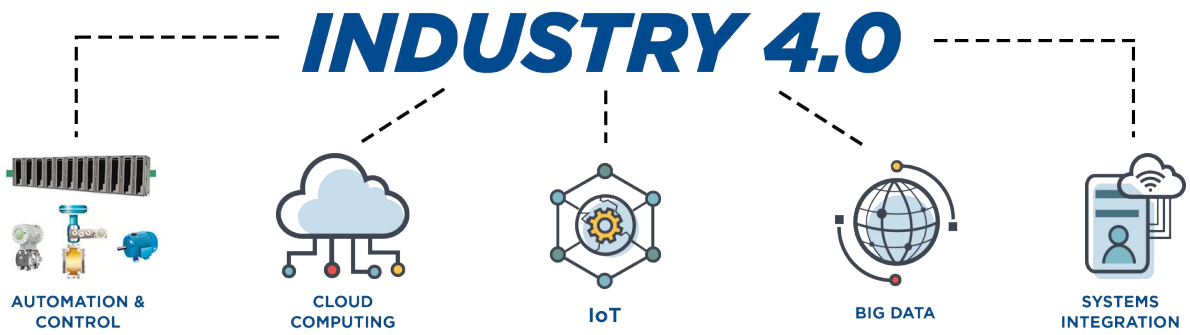
Connectivity Solutions

A flexible and secure connectivity solutions suite including automation standards, protocols drivers, databases and IT standards.

smar

Technology Company

Following its principle of using open industry standards, best practices and maximum flexibility for users, SMAR offers powerful connectivity features. Due to this and many other reasons, System302 is ready for the challenges of Industry 4.0.



Additionally to the possibility of using several industrial buses and their standardized and non-proprietary communication protocols, such as HSE - High Speed Ethernet, Foundation fieldbus, HART, AS-Interface (AS-i), DeviceNet, PROFIBUS-DP and PROFIBUS- PA, System302 also offers a wide range of resources for connecting and exchanging data, including:

OPC Connectivity - Servers e Clients:

- OPC Unified Architecture (UA)
- OPC Data Access (DA)
- OPC Historical Data Access (HDA)
- OPC Alarms and Events (AE)
-

Connectivity via Protocol Drivers

- Modbus,
- DNP3,
- IEC 61580,
- IEC 60870,
- SNMP,
- Drivers para dispositivos de terceiros como, Allen-Bradley, Siemens, Omron, Schneider, Mitsubishi, GE, etc.

Cloud Connectivity a Nuvem via IT standards

- Message Queuing Telemetry Transport (MQTT)
- Advanced Message Queuing Protocol (AMQP)
- Representational State Transfer (REST)
- Websockets

OPC Connectivity

SMAR is a corporate member of the OPC Foundation and has helped over the years to create OPC standards and has participated in interoperability tests to ensure the robustness and Standards compliance of their solutions.

The OPC Foundation is a global organization in which users, suppliers and consortia collaborate to create data transfer standards for multi-vendor, cross-platform, secure and reliable interoperability in industrial automation. The OPC standard consists of a series of specifications that define the interface between clients and servers, as well as servers and servers, including access to real-time data, monitoring of alarms and events, access to historical data and other applications.

OPC is today an open standard of great relevance to the industrial automation sector, providing secure, reliable communications, independent of manufacturers and platforms.

Completely adhering to this technology, SMAR offers a set of Classic and UA (Unified Architecture) OPC servers and clients. The so-called OPC Classic includes OPC DA (Data Access), OPC AE (Alarms and Events) and OPC HDA (Historical Data Access).

OPC servers are available for the entire range of SMAR controllers.

Therefore, data servers are included for all processors on the DFI302 process control and automation platform, including **DFI OPC Server** for controllers using the SE (Smar Ethernet) protocol and **HSE OPC Server** for those using the HSE protocol (High Speed Ethernet). Both follow the OPC DA standard, thus providing access to all data available in the implemented system.

Besides, an **SNMP OPC Server** is also available that uses the Simple Network Management Protocol to provide diagnostic information for the DFI302 platform controllers.

Complementing the Classic OPC servers offering, System302 also offers **SMAR OPC AE Servers** for alarms and events, and **SMAR OPC HDA** for standardized access to historical data.

What is OPC ?

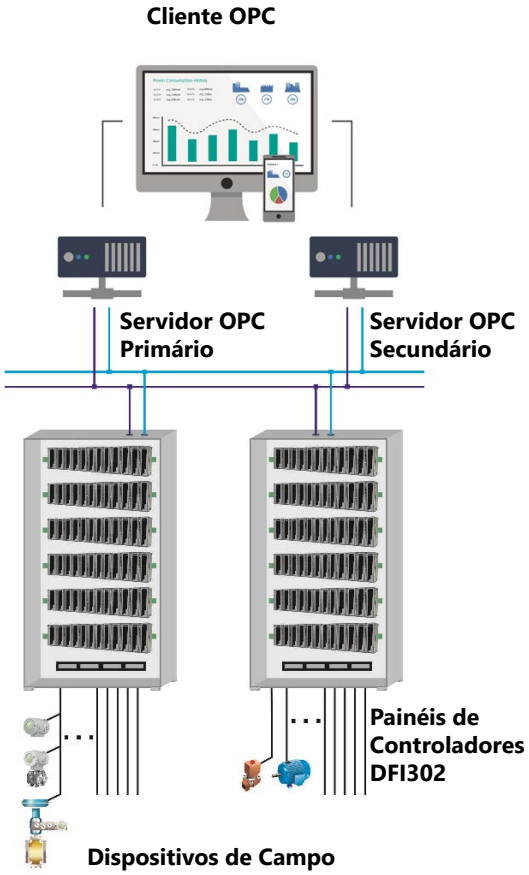
The OPC technology was launched in 1996 with the purpose of being a standardized interface for the exchange of information between controllers and supervisory software (HMI/SCADA) in automation systems, and it has since been widely adopted by the entire industry.

Initially restricted to the Windows operating system, the technology has evolved a lot since then to accommodate new technologies such as service-oriented architectures and new challenges in security and data modeling. Thus, the OPC Foundation developed the OPC UA specifications to meet these needs and, at the same time, to provide an open platform architecture with feature-rich, scalable, extensible technology, and ready to face future challenges.

Today, the acronym OPC stands for **Open Platform Communications** and is considered the interoperability standard for the secure and reliable exchange of data in the industrial automation space and in other sectors. For more information, visit the website http://www.opcfoundation.org/

Redundancy

SMAR guarantees the availability of any critical data, offering high availability redundancy for best communications reliability. Redundant OPC servers serve as a backup in case of failure. With automatic fault detection and storage-and-forwarding technology, users are assured that mission-critical, real-time data, historical data and alarm information are always available.



Arquitetura de Comunicação OPC Redundante

OPC UA

Additionally to OPC Classic, SMAR also offers a full range of OPC UA solutions.

The OPC Unified Architecture (UA) is a service oriented architecture, platform independent, which integrates all the functionalities of the individual specifications of the OPC Classic in an extensible structure.

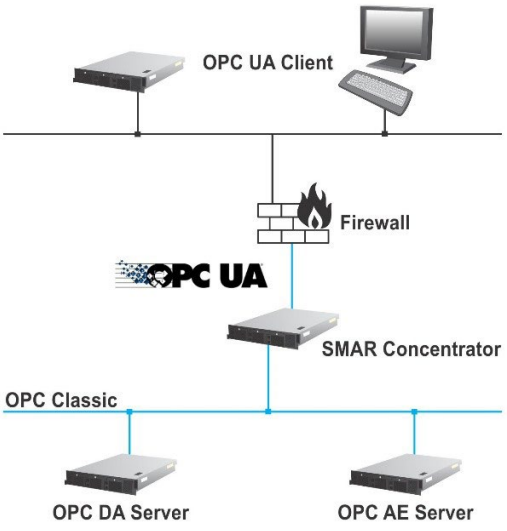
Its multilayered approach meets the objectives of the original specification.

In addition to mapping all OPC Classic specifications (thus providing functional equivalence), the new architecture also offers:

- **Platform independence:** allows applications from an embedded microcontroller to a cloud-based infrastructure;
- **Security:** encryption, authentication and auditing;
- **Extensibility:** ability to add new features without affecting existing applications;
- **Comprehensive information modeling:** for the use of complex information.

SMAR Concentrator

System302 also offers a solution to facilitate the technological transition between OPC Classic and OPC UA, called **SMAR OPC Concentrator.** It allows Classic OPC servers (DA and AE) to communicate securely with OPC UA clients. The great benefits of this solution are that it allows users to maintain their existing installed base with Classic OPC Servers, it adds flexibility for the integration of systems which eventually only have Classic OPC available, and, at the same time, leverages the benefits of OPC UA technology, specially their increased security.



Exemplo de Aplicação com o SMAR Concentrator

OPC and ProcessView64

ProcessView64 is a powerful suíte of 64-bit operations software solutions which allow operators, executives and IT professionals to integrate information in real time in a secure and unified viewing environment, fully Web enabled and ready for Industry 4.0.

ProcessView64 includes a complete set of OPC clients and servers, and can therefore collect and provide data from/to other systems.

ProcessView64 offers numerous user interface options

The current version of ProcessView64 is based on the OPC UA standard, which incorporates new communication standards, maintaining compatibility with previous versions. The original OPC communication model first used COM (Common Object Model) or DCOM (Distributed COM) as its communication protocol, and applications based on Microsoft's ActiveX technology. COM / DCOM were a Windows-only standard that had configuration and security issues and could be difficult to implement. OPC UA moves OPC communications to Service Oriented Architecture (SOA) based on the Windows .NET Framework.

O OPC UA adds better cross-platform support for C, Java and .NET applications, better support for multi-threading and multi-processor, and an enhanced security model. The Base Services which are part of the OPC UA definition define an optimized TCP protocol that makes it possible to record high-speed HistoryView data from ProcessView64. Another OPC UA protocol is a web-based service that is used by the WebHMI application to make different ProcessView64 components available in a browser. In OPC UA, data nodes respond to command events using a Full Mesh Network model to return process data, such as AE, DA, etc., as well as additional metadata; all of this is supported by the namespace or addressing scheme used by OPC UA.

It is important to note that the OPC UA has the following integrated features:

- Data buffer, where data is transmitted and recognized, so its delivery is guaranteed.
- Data redundancy which provides alternate data paths, data failover to mirrors and other technologies.
- Heartbeat signals that provide a timing function which establishes the state of a connection and additional actions.
- A security model that defines the mechanism for accessing OPC data based on authentication and authorization, and that uses encryption and certificate and signature model access.
- An address space model that allows data sources and their values to be mapped.
- DA, AE and HDA standard access, which provides backward compatibility to the standards described above.
- Services and service mappings which allow data sources to be managed by a network or operational

service model on the Internet. Communication is done through a communication stack defined using a set of OPC UA APIs (.NET, Java, etc.) that allow applications to access these services.

In short, the OPC UA standard makes a number of important changes in the way that ProcessView64 can be executed, greatly simplifying how data can be accessed and displayed.

OPC UA offers interoperability for IIoT and Industry 4.0

The OPC UA standard is also very well positioned to play a key role in facilitating today's complex data and information exchange needs and helping to shape the future of data interoperability.

OPC UA is the data exchange standard for secure, reliable and manufacturer-independent and platform-independent industrial communications. It allows data exchange between products from different manufacturers and operating systems. The technology therefore meets the needs for standardized data connectivity and interoperability for horizontal and vertical data communications for the Industrial Internet of Things (IIoT). An example of horizontal communication is data connectivity between equipment or factory floor systems. An example of vertical communication is the data transfer from a device to the cloud. In both cases, OPC UA provides a safe and reliable basis.

The OPC UA also addresses the evolving requirements of **Industry 4.0** as it makes it possible for meaningful information to be shared openly and securely at all levels, while providing independence from operating systems and programming languages; provides scalability including sensors, controllers, computers, servers and cloud applications; provides transfer and authentication security at user and application levels; provides transport via established standards such as TCP/IP for real-time and historical data exchange, commands and events; and it also provides the ability to map information content of any level of complexity.

As such, OPC UA, in addition to ensuring secure, robust and flexible data exchange for industrial automation and control systems, also serves as a common standard for data connectivity and collaboration for access to local and remote devices in **IIoT** and **Industry 4.0** applications.

Connectivity via Communication Drivers

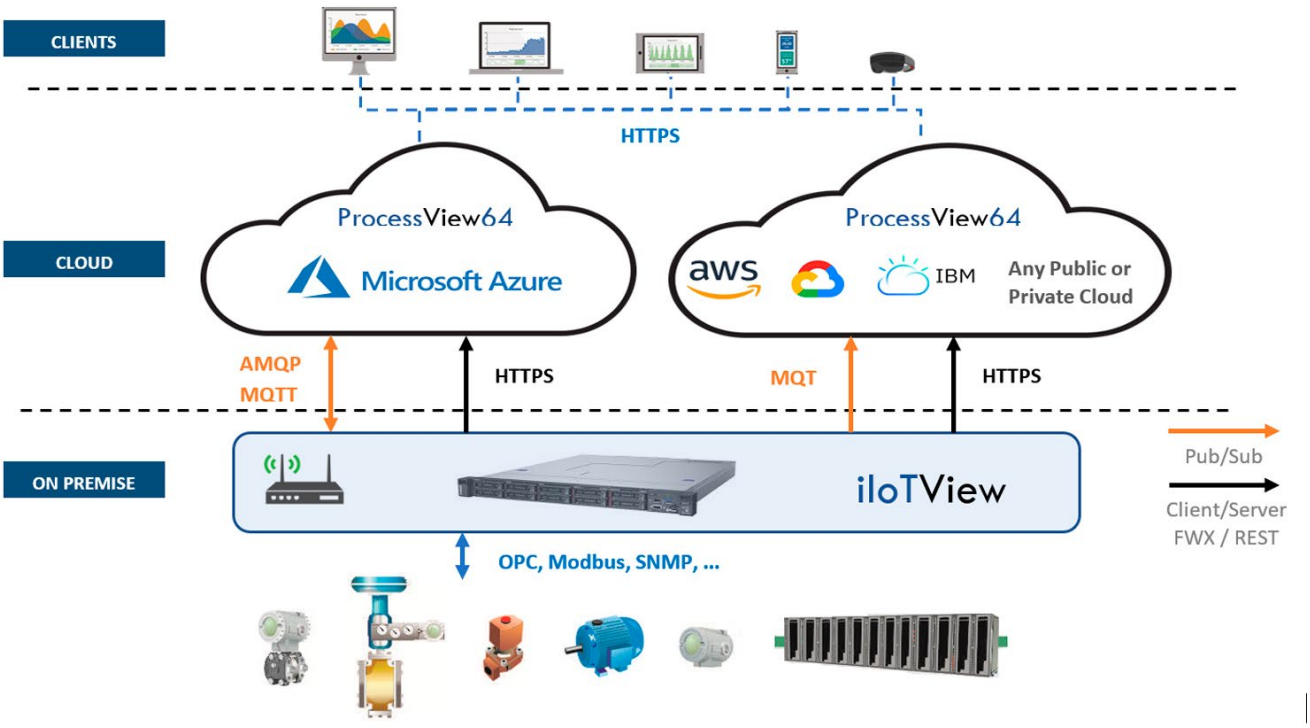
SMAR offers a series of communication drivers which can be optionally added to provide proven communications to third party systems and devices through their specific communication protocols.
This provides System302 users with a connectivity extension to an ever-growing list of devices and applications, in a scalable and secure architecture.
This list includes the protocols Modbus, DNP3, IEC 61850, IEC 60870, among several other specific protocols used by devices from many relevant manufacturers such as Allen Bradley, GE, Siemens, Honeywell, Mitsubish and Yokogawa. For details on specific protocols, consult our sales representative in your region.

Database Connectivity

As communications among systems are often established through databases, SMAR also provides its users with a connection-ready structure for accessing Microsoft SQL Server, Oracle, Microsoft Access, SAP databases, and virtually any source of real-time or archived data from business and production systems.
It is important to note that such functionality does not require programming, i.e., the solution does not require coding for extracting data from the source, for optionally manipulating data before recording it on the target system. This way, the need for in-depth knowledge of the source and destination systems is eliminated.
It is possible thanks to the Workflow and BridgeWorX tools present in the System302 ProcessView64 and OrchestrationView solutions. For more details, please consult our specific catalogs for these solutions or consult one of our sales representatives in your region.

Cloud Connectivity via IT Standards

System302 also offers a flexible platform to create Industrial Internet of Things applications, using standard protocols related to Information Technology.
This way, SMAR makes use of its rich connectivity with industrial equipment or “things” (via OPC, OPC UA, Modbus, SNMP, among other standards and numerous specific drivers) to make industrial data available to cloud applications.



It is possible with the use of the System302's iIoTView software solution which, through simple installation and configuration, users can easily create remote monitoring and analysis solutions which meet their innovative business requirements for collaboration and shared view of dispersed assets. The iIoTView solution makes use of Azure cloud, or any other public or private cloud, for providing global visibility, scalability and reliability.

The connection to popular cloud platforms, such as Microsoft Azure and Amazon Web Services, is made through secure TLS encryption, allowing data access from anywhere.

This way, Sytem302 offers a secure and efficient connection to the cloud through the bidirectional AMQP protocol for Microsoft Azure, as well as MQTT, REST and WebSockets for third-party cloud providers.

The other System302 software modules, such as ProcessView64, HistoryView, AnalyticsView, etc., can also be optionally connected.

This solution also allows System302 users to optionally use cloud services such as the Power BI and Machine Learning tools from Microsoft Azure platform.

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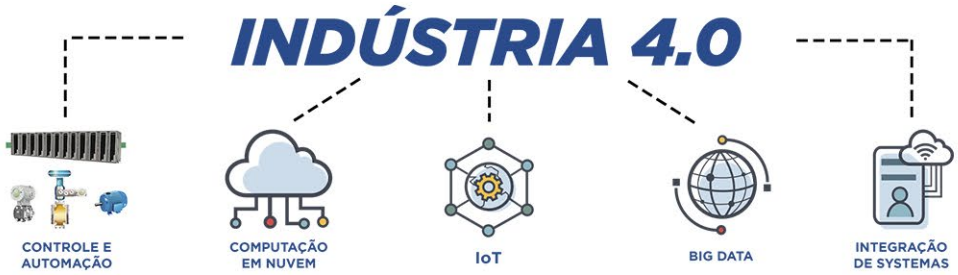

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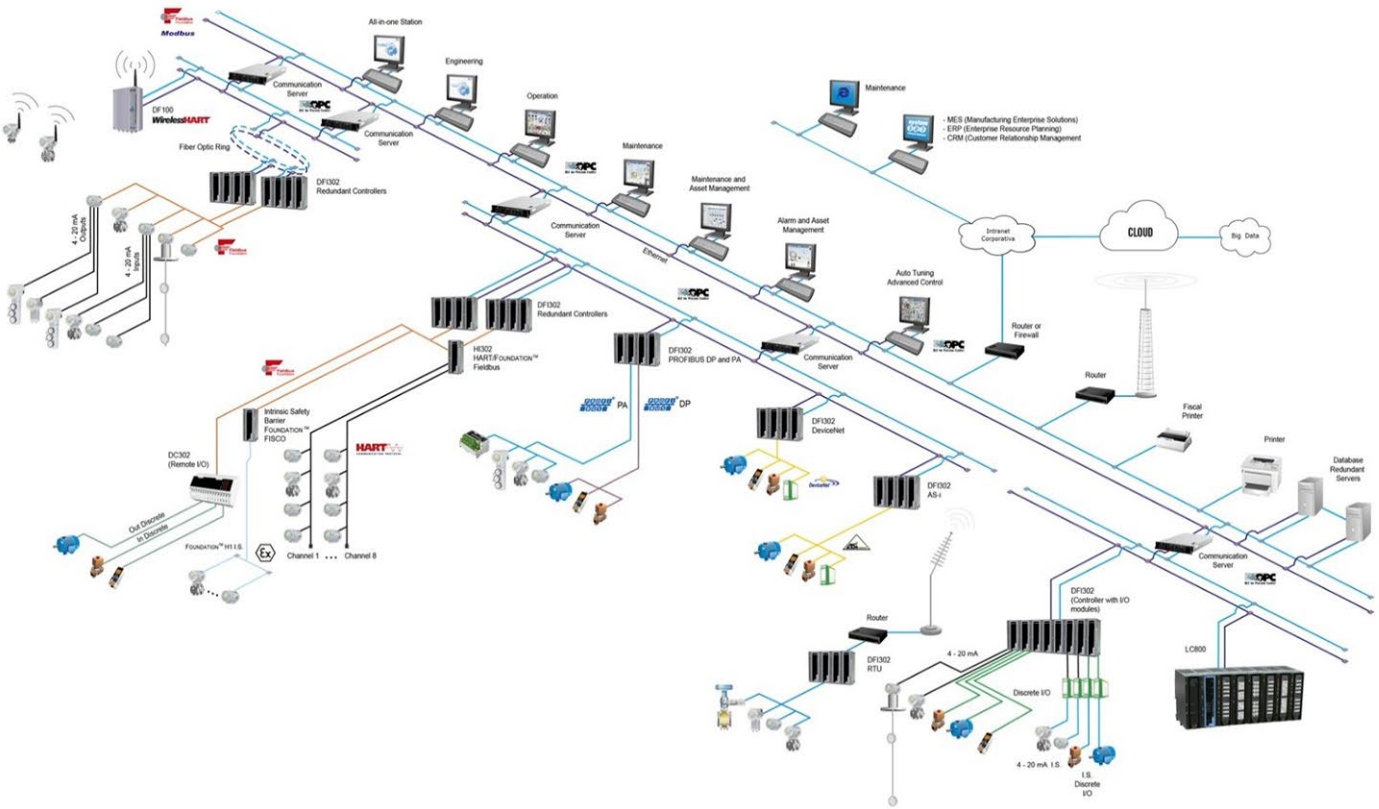

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