



Pharma



BioTech



Chemicals



Agri-food

Automation & Connectivity: Our analyzers speak OPC-UA



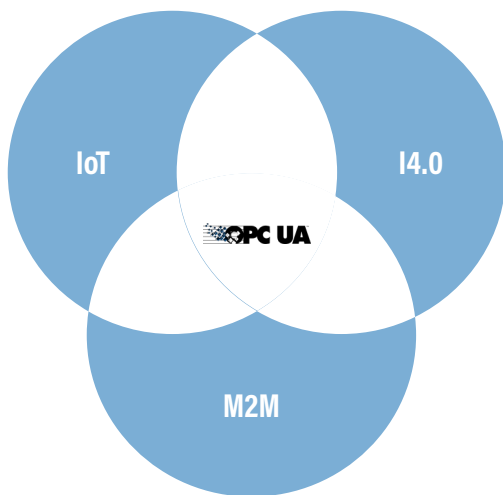
▪ Introduction

OPC-UA (Open Platform Communications Unified Architecture) is a communication standard for exchanging data between different devices and systems. Perfectly suited to modern manufacturing environments and Industry 4.0, this protocol offers a robust solution for exchanging large amounts of data, thus boosting the interoperability, security and upgradability of the systems involved. OPC-UA can run on a wide variety of platforms and operating systems. It is an independent standard that allows secure data communication, alongside multiple services which are useful for supervising industrial installations.



Measure up





In the context of the digital transformation, many industrial companies are seeking to increase their production quality and productivity by boosting process connectivity and data integration.

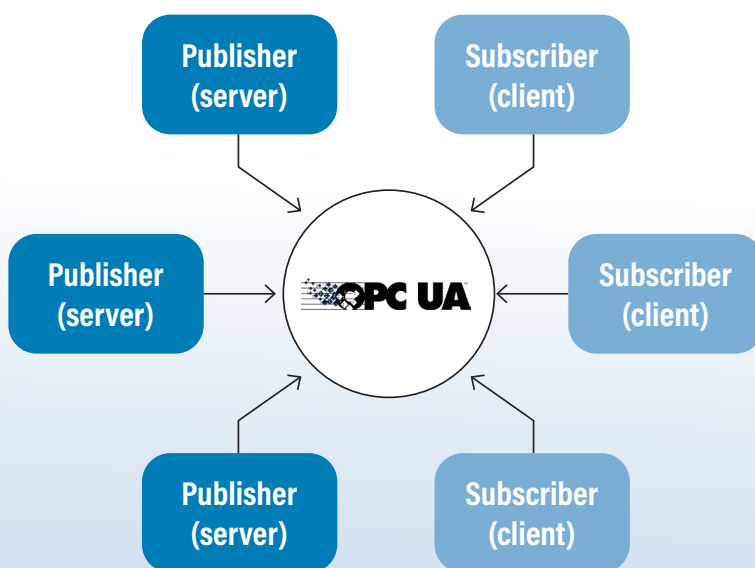
Particularly in the pharmaceutical and biopharma sectors, where the FDA (U.S. Food and Drug Administration) encourages the implementation of PAT (Process Analytical Technology), the digitization of industry is starting to be felt and the interconnection between the various machines constituting the industrial information is growing significantly.

One of the main challenges for Industry 4.0 and the IIoT (Industrial Internet of Things) is exchanging data and information in a secure, standardized way between the various devices, machines and services. OPC-UA is the data interchange standard for secure, reliable communication which is independent of the manufacturer and the platform. This is how Indatech's READY software products, for our Viserion Raman spectrometer or our Asuryan UV-Visible solution, for example, can exchange data in real time with PLCs (such as SIPAT (Siemens) or SynTQ (Optimal Industrial Technologies - Bruker)) via this communication protocol.

The major advantage of OPC-UA over traditional supervision protocols (such as Modbus TCP, etc.) is that communication takes place through open sessions between clients and servers, secured by the popular SSL protocol. The client (e.g. SIPAT or SynTQ) sends queries to the server (READY software) to obtain information on the current process and/or give instructions to modify this process.

OPC-UA supports several communication models, including the PUB-SUB (Publisher-Subscriber) model, which is particularly suitable for environments requiring real-time data transmission and efficient event management.

The PUB-SUB model is based on a decentralized architecture, in which a publisher publishes information to a broker, and several subscribers subscribe to this information. This model is more efficient than the traditional client-server model in situations where numerous data sources must be distributed to a large number of consumers without overloading the servers.



▪ Advantages of the PUB-SUB model

▪ Reduced communication costs:

The publisher only sends data when changes occur, reducing the bandwidth required compared with a continuous communication model.

▪ Real-time updates:

Subscribers receive new data instantly as soon as it is published by the publisher, enabling real-time monitoring without latency.

▪ Scalability:

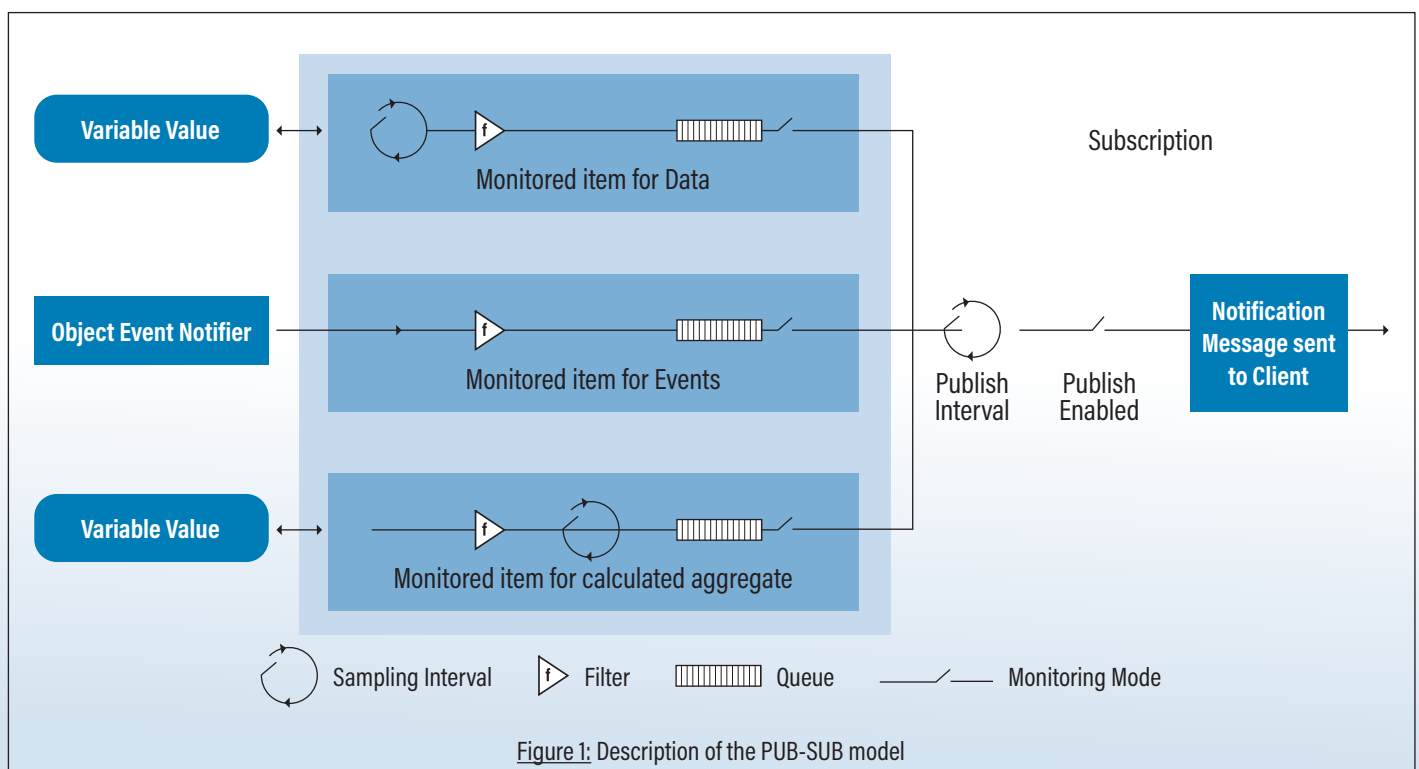
This model is particularly suitable for large-scale systems, where many clients need to receive the same information at the same time.

▪ Flexibility:

Customers can subscribe to specific information groups (for example, measurement data from a specific sensor or PLC), allowing data streams to be customized as needed.

▪ Integration of the model in Indatech Ready

In Indatech's software, such as Viserion, MxViserion, Asuryan and SRS Ready, the PUB-SUB model is used so that users can connect to this server to configure and perform measurements without the need for an operator using the supervision software. The server updates information such as data collection and then makes it available to clients for reading. This allows one machine with clients to connect to multiple servers and eliminates the need to use multiple software products to collect a chain of measurements from interested parts of a process. It also allows synchronized data collection from various parts of the process.



▪ Securing exchanges with certificates

One of the strengths of OPC-UA is the management of secure exchanges through the use of digital certificates. This functionality is essential to guarantee the confidentiality, integrity and authenticity of the data exchanged between OPC-UA servers and clients.

Security certificates are used for server and client authentication to ensure that only authorized entities can access data or control equipment. The certificates are issued by a Certification Authority (CA) and are used to establish a secure connection based on protocols such as TLS/SSL (Transport Layer Security / Secure Sockets Layer).

Advantages of the security certificates in OPC-UA

- **Authentication of the parties :**

Each client and server can present a certificate to prove their identity, thus guaranteeing that the exchanges cannot be intercepted or manipulated by unauthorized parties.

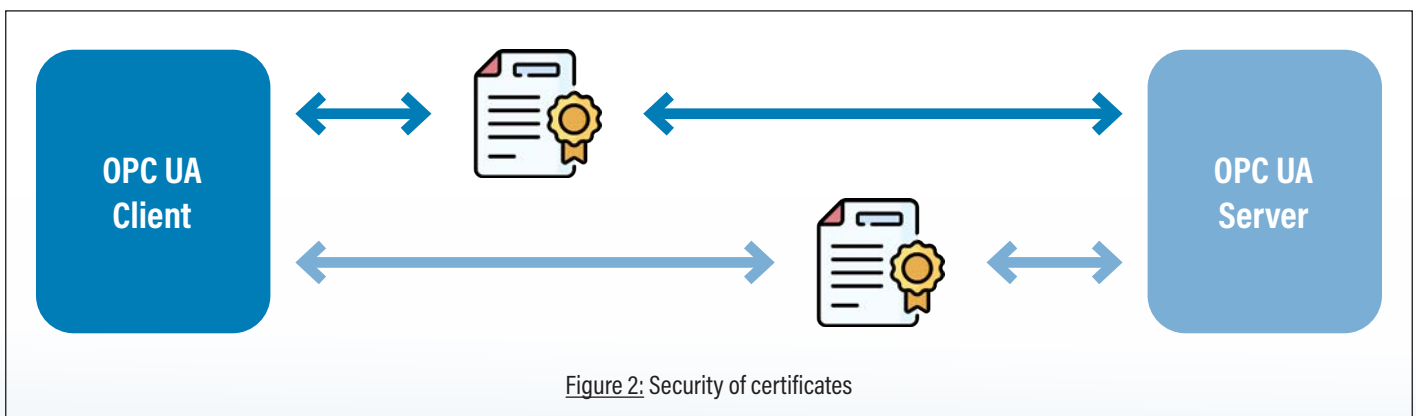
- **Encryption of communications :**

The certificates enable data encryption, which protects the confidentiality of the information exchanged between the systems.

- **Integrity checking:**

The certificate validation process ensures that the data have not been altered during transmission.

In Indatech's solutions, we use these certificates to secure OPC-UA connections, in order to guarantee that the data flows between the instruments and the supervision systems are protected against any risk of cyberattack.



For more information, please see our comprehensive User's Manual, which can be obtained from your Indatech sales representative.

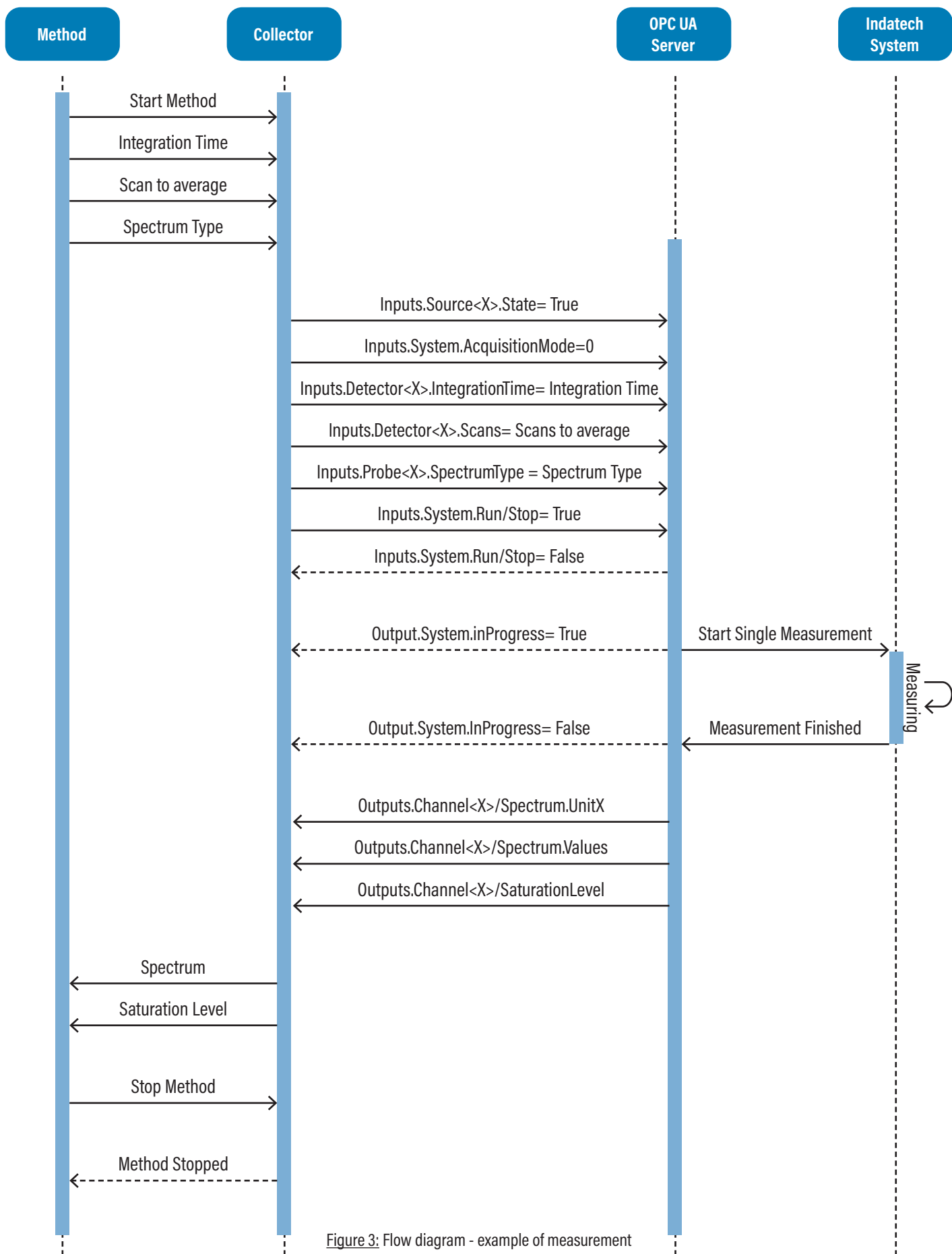


Figure 3: Flow diagram - example of measurement