Microsoft: 5 Clicks to Digital Factory

MichaelPanoramix June 8, 2016 Editorial

Connect your Machines easily with Industrie-4.0-Standard OPC UA to the Cloud

Microsoft took the initiative to port the existing OPC UA C# Stack to the Windows 10 Universal Core. Microsoft then donated the technology to the OPC Foundation and distribution will be via open source (GitHub). Because of the Microsoft Windows architecture, this provides a complete solution for all Windows 10 devices, including the smallest Windows 10 IoT Core that is capable of running on a Raspberry Pi, on any smart devices (smart phones), and even on the exciting Microsoft HoloLens! Microsoft has also developed and provided an OPC UA gateway (as open source) supporting OPC UA Publish / Subscribe via AMQP.

A special thanks goes out to Microsoft for their excellent contributions and evangelism of the OPC UA technology. They are truly pushing OPC UA as the enabling infrastructure for Industrie 4.0 and the Industrial Internet of Things.

Additionally, Microsoft and the OPC Foundation have worked closely together over the last number of months to deeply integrate OPC UA into the Azure IoT Suite.

The architecture of the implementation is shown in the following diagram:
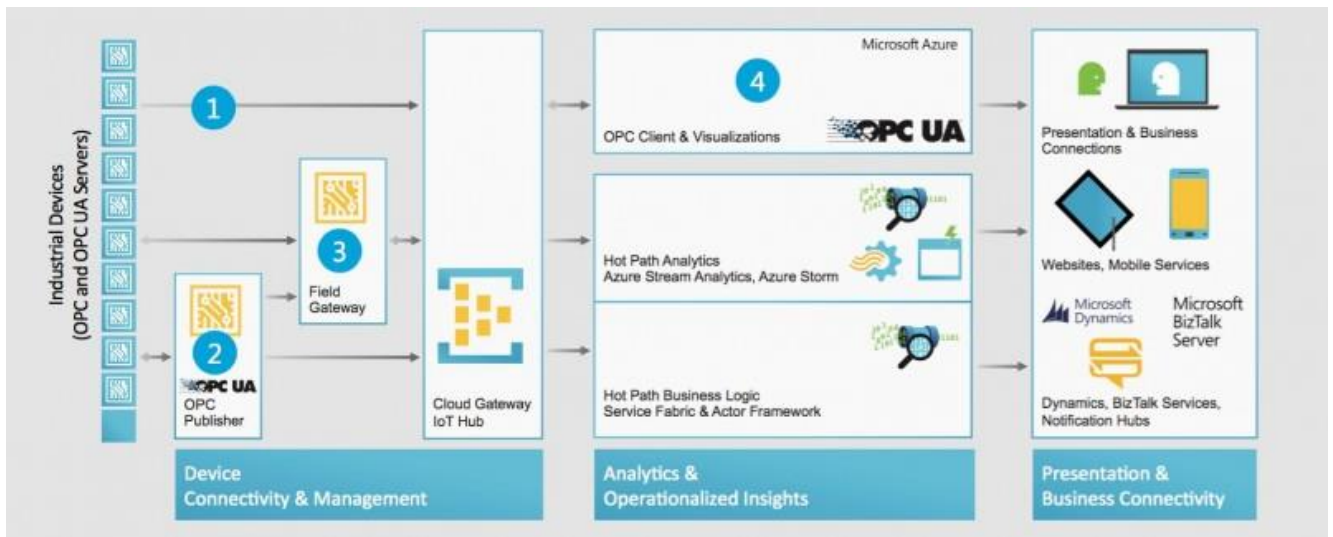
1. **Direct telemetry channel: Pub/Sub**

   New OPC UA Servers supporting the upcoming Publisher/Subscriber specification extension have the ability to publish OPC node data to the Azure IoT Hub for telemetry data via JSON/AMQP messages directly.

2. **Telemetry channel via OPC Publisher**

   Existing OPC Servers (both OPC and OPC UA) will always support the UA-Binary protocol. The OPC Publisher connects to these servers and subscribes to OPC nodes available on the servers and publishes them to Azure IoT Hub for telemetry data via JSON/AMQP messages.

3. **Field Gateway/Relay**

   If edge intelligence (e.g. analytics) or store and forward for lossy connections to the cloud are required, a Field Gateway is needed. It can also act as a Relay for UA-Binary-encoded command and control messages and responses. Note that the OPC Publisher and Field Gateway can also be integrated into a single device, if required. Note that Azure IoT device management agents (per device) will run in parallel, to manage device rm- ware updates and settings.

4. **Cloud Services**

   Customers can program Industry 4.0 Services, e.g. ERP services, process optimization services, manufacturing on demand services, etc. against an OPC Graph Database and API, or they can simply run OPC Clients for visualization in the cloud. A reference im- plementation for both will be provided by us open-source.

OPC UA is an essential component of the connected products that manufacturing customers need today, and it is increasingly seen as an important part of enterprise IoT scenarios and business models. In keeping with our commitment to openness and collaboration, Microsoft is fully committed to supporting OPC UA and its evolution.

— Matt Vasey, Director of IoT Business Development, Microsoft
OPC Foundation Board Member

OPC UA is an essential foundation for the convergence of OT and IT, providing a standardized communication, security and metadata/semantics abstraction for almost all industrial equipment. From an IT perspective, OPC UA is the programming interface of the "connected factory" and any other industrial facility and a critical enabler for Industrial Internet of Things (IIoT) as well as the Reference Architecture Model for Industry 4.0 (RAMI4.0) adoption.

The road to industrial cloud analytics leads through OPC UA.

— Clemens Vasters, Principal Program Manager, Microsoft Azure
OPC Technical Advisory Council Member

OPC UA also serves as a critical gateway technology to cloud-enabled industrial equipment, enabling data and device management, insights, and machine learning capabilities for equipment that was not designed to have these capabilities built-in. The cloud enables globally-available, industry-specific Software as a Service (SaaS) solutions that are otherwise cost-prohibitive to stand up for each industrial facility on its own. As customers and partners collaborate to modernize their plants and facilities, OPC UA is delivering digital transformation simply and easily. Microsoft's support of OPC UA offerings will reduce barriers to IoT adoption and help deliver immediate value.