Has OPC DA finally reached end-of-life?

How to migrate to OPC DA in a heightened security landscape

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Agenda

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Shift in Architectures
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About Skkynet

Critical Infrastructure for over 25 years

- 27,000+ installations in 86 countries
- Used by the 10 top automation providers worldwide
- OEM relationships with hardware and software providers
- Certified AVEVA Technology Partner
- Covering energy, discreet manufacturing, water/wastewater, building automation, oil & gas, and minerals & mining to name just a few
OPC DA

Understanding OPC DA

• Introduced by the OPC Foundation in August 1996
  • Underlying technology is based on Microsoft Distributed Component Object Model (DCOM)
• Today over 80% of Industrial systems still use OPC DA

• Challenges
  • Difficult to configure
  • Difficult to secure
  • Hard to maintain

• Microsoft has been hardening DCOM from its inception, as they are aware of the security risks with DCOM.
  • They discovered a vulnerability in that a potential attacker may bypass server security to attack an organization's networked device. DCOM authentication hardening - Microsoft security patch KB5004442 tries to address this.
OPC UA

Better security

• Introduced in July 2006
• Advantages
  • Multi-platform
  • Better security
  • No reliance on DCOM
• Adoption has been slow, yet today most systems today now support OPC UA.
• Disadvantages
  • Although security has improved, the underlying architecture still does not make it easy to secure data across the OT – IT plane
Renewed focus on Cyber Security

Question is not if, but when you will be compromised

- According to IBM, the average cost of a breach is $4.45M
- It is estimated that 39% of businesses have experienced either a security breach or a cyber attack.
  - Over the last 12 months we have seen Utilities, Oil and Gas, manufacturing facilities, Department of National Security, and even Health Care providers shut down
- Governments have weighed in

In a rare joint release, both NSA and CISA recommend immediate actions to reduce exposure across operational technologies and control systems.

Revised Directive on Security of Network and Information Systems (NIS2)

**Key Guideline:** One or more DMZs are needed for the most secure, manageable, and scalable segregation of control and corporate networks.
Renewed focus on Cyber Security

Where it all starts

- Virtually all security breaches start in IT
- Industrial protocols were never designed for IIoT
- Networking OPC (DA or UA) requires the client to connect to the server
Renewed focus on Cyber Security

Goal: Eliminate the attack surface on the data source

- Securing the OT network is not difficult, as long as you play by the rules.
  - It is important that data source firewalls not be open to any incoming connections
  - No open ports = no attack surface from the Internet or any adversary
- Data source must only make outbound connection
  - Attacking outbound connections is difficult
  - SSL and strict certificate checking addresses DNS poisoning, man-in-the-middle, and packet sniffing
  - User/password/IP address authentication provides added protection
  - Authentication requires correct answers to both “Who am I?”, and “Where am I?”
- Yet, OPC DA and OPC UA require the client to open inbound firewall ports.
Renewed focus on cyber security

When a new solution architecture is required – Does OPC DA fit?

• Market Drivers
  • Analytics / AI are best implemented in the cloud
    • Cloud offers limitless storage and compute power
  • SCADA is evolving
    • First generation: Monolithic
    • Second generation: Distributed
    • Third generation: Networked
    • Fourth generation: Web-based
  • Cloud providers - AWS and Azure
Shifting the data sharing model

ISA 95 verses message broker architecture (sometimes referred to as UNS)
Shifting the architecture

Challenges of ISA 95

• Integration complexity
  • Point to Point data integration
• Inflexible data flow
• Requires the configuration of the same data multiple times
• Hard to combine data from multiple levels
• Moving data from multiple levels is hard to secure
Shifting the architecture

Advantages of the Message broker

• Access to all data from all the systems
• Simplified integration
• Allows for easy application decoupling
• Simple replacement of data producers and data consumers
Shifting the architecture

Challenges in Architecture - Security

- Networking the source data can pose a challenge
  - Some data is inside your control networks
  - Some data is in your DMZ / IT network
  - Some data is going to or coming from the cloud
- Is MQTT the right choice?
  - MQTT does not guarantee message order
  - Lacks intelligent message handling
  - Daisy-chaining is fragile
  - Requires protocol translation to MQTT or the use of Gateways
Shifting the architecture

A better solution for a Message broker

• Message broker should be protocol independent
  • Relying on one protocol means all connections must match that protocol – adds cost and complexity
• Daisy-chaining message brokers should be easy to configure, should eliminate attack surfaces, and maintain message order.
• Message Broker should support redundant communications
Real-world example with multi-protocol support

Paper industry

• Message broker supports multiple protocols
  • OPC DA, MQTT, Modbus TCP
  • As opposed to converting OPC DA, the client chose to Tunnel/Mirror the data – eliminating inbound firewall ports
    • Network isolation between the OT and IT networks
• Message broker resolves redundancy across the production data
  • Two redundant data paths are resolved
• Historian is connected to the message broker
• All systems have access to all data
Real-world example with multi-protocol support

Pharma

• Message broker supports multiple protocols
  • OPC UA, MQTT, ODBC
  • Here the client converted OPC DA to OPC UA.
    • They still have open inbound firewall ports, but they chose to manage that risk with layered security
• Historian is connected to the message broker
• All systems have access to all data
Real-world example DA Tunnel / Mirror

Pharmaceutical Device Manufacturing

- Implemented Microsoft DCOM hardening, but experienced connection failures
- Here the client used Tunnel / Mirror to connect DA Systems
- Keeping production running yields huge cost savings
- Did not have to upgrade their existing software to support OPC UA
In Summary

OPC DA is not end of life

• With over 80% of existing systems supporting OPC DA and the average industrial system life span of 15 years, DA will continue to be present.

• The choice depends on your architecture and your goals
  • Implementing a message broker
    • Choose one that is protocol independent
    • Supports redundant sources
    • Designed with daisy-chaining built-in
  • Dealing with security or Microsoft hardening of DCOM
    • Conversion from OPC DA to OPC UA
      • Choose a tool that maintains the namespace instead of flattening the namespace
    • Tunnel / mirror OPC DA for added security
  • Bridging OT to IT
    • Cogent DataHub Tunnel / Mirror never opens inbound firewall ports
    • Conversion for OPC DA to MQTT
“We tested several products, and found the DataHub product simple, intuitive, and easy to use. When we had a challenge, it was the reaction of the people at Skkynet that impressed me. It was essentially ‘This is our problem; how do we resolve it?’ And that is something that we haven't seen before.”

Jason Burton
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