Waste Water Treatment in Cloud: Case Veolia Krüger A/S

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The Industrial Internet / IoT

Prosys OPC UA software products offer multiplatform capabilities, making them ideal building blocks of any networked system

• OPC UA connectivity
• Sensor data
• Smart devices
• Big data
• Analytics
• Optimization
• Automation
Prosys OPC UA Multiplatform Products

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Unified Automation Products

Developer tools

- OPC UA C/C++ SDKs
- OPC UA .NET SDK
- OPC UA Modeler

Applications

- OPC UA Gateway
Professional Services

QuickStart
Training & Workshops
System Integration
Design & Development
Product Certification
Consulting
OPC UA Workshop

• One, two or three days of training
• Covers the basics of OPC UA for experts and software developers
Waste Water Treatment

• Entire waste water facility needs to be optimized and monitored
  • Pumps, gates, chemical dosing etc.
• Multitude of processes
• Krüger provides STAR online control system
Waste Water Treatment Simplified

• From the data point of view
  • Get measurements from the processes for analysis
  • Set control values back to the processes
  • 5 … 1000 variables, control cycles around 30 s

• Just move the data around?
  • Measurements to analysis?
  • Control values to processes?
Waste Water Treatment Deployed

• Starting situation:
  • 100+ facility installations
  • Each facility deployed with full analysis and control
  • Each facility has its own maintaining and troubleshooting work

• Is there an easier and more cost efficient way?
Waste Water Treatment in Cloud 1/3

- Local OPC UA Client in the facility
  - Write measurements to the cloud
  - Read control set points from the cloud
  - Write control set points back to processes

- Access only through Demilitarized Zone Network
Waste Water Treatment in Cloud 2/3

• Cloud OPC UA Server
  • Relay measurements to the analysis engine
  • Publish analysis results in the OPC UA Address Space
  • OPC UA Servers behind Amazon Web Services Elastic Load Balancer
    • Automated scaling of OPC UA Docker server containers
    • Scaling based on the load of the system
Waste Water Treatment in Cloud

Facility Network
- FACILITY
- Process
  - IO
- OPC UA Client
  - Read
  - Write
  - OPC UA TCP

DMZ Network
- OPC UA BAncer
  - Write
  - Read
  - OPC UA TCP

Amazon Web Services
- CONTAINER
  - OPC UA Server
  - Write
  - Read
  - OPC UA TCP

Analysis Engine
Security in OPC UA

1. All applications (OPC UA servers and clients) are authenticated with X.509 public key certificates
2. All traffic is secured with OPC UA built-in encryption
Security in OPC UA

• Certificates ensure that only trusted applications can access the critical data in the OPC UA servers
• Certificates are generated and handled by Krüger A/S
• Certificates are managed within an internal web dashboard developed by Prosys OPC for Krüger A/S
  • Easy security and access control through modern web interface
Conclusions

• Before:
  • Full deployments per facility
  • Maintenance and troubleshooting work for each facility

• After:
  • 24/7 online system hosted in the Amazon cloud
  • Connections are secured by certificates and encrypted
  • Automated scaling
    • Costs are directly proportional to the number of customers
  • Simplified maintenance of a large number of customer facilities
Questions?

Facility Network

DMZ Network

Elastic Load Balancer

Amazon Web Services

OPC UA Client

OPC UA Server

CONTAINER

Analysis Engine

OPC UA TCP

OPC UA TCP

OPC UA TCP

OPC UA TCP