



# Securing Water Operations with ArrowLinux

ArrowLinux 5000 Series • powered by ST Engineering data diode technology

## AT A GLANCE

### SECTOR

Water and wastewater utilities: treatment, pumping and distribution

### NEED

Live process data for analytics, security monitoring and regulatory reporting, with no inbound path to the control network

### SOLUTION

ArrowLinux 5000 Series, powered by ST Engineering data diode technology

### MODELS

5280, 5282 and 5283

### ASSURANCE

Common Criteria EAL 4+ certified by CSA Singapore (models 5282 and 5283)

### RESULT

Operational insight for the utility while treatment and pumping controls stay isolated

## OVERVIEW

Water utilities depend on operational technology (OT) networks to treat, pump and distribute water. These include SCADA systems and the PLCs and RTUs at treatment plants, pumping stations and reservoirs. Utilities also need the data from those networks for monitoring, analytics, regulatory reporting and asset planning, which live on IT networks and increasingly in the cloud.

Connecting the two with a conventional firewall creates a two-way path. If that path is compromised, an attacker on the IT side can reach systems that control treatment and pumping processes. ArrowLinux is added to that path with a hardware-enforced one-way link, so operational data flows out and nothing can flow back in.

## THE CHALLENGE

- **Growing attack surface.** Remote monitoring, connected sensors and IT/OT convergence expose control systems that were designed to be isolated.
- **Consequences of compromise.** A successful attack on control systems can disrupt treatment and supply and create safety and public health risks, as well as regulatory and reputational fallout.
- **Data still has to move.** Control room operators, engineers, analysts and regulators all need timely operational data, so a fully air-gapped network isn't practical.
- **Long-lived, mixed equipment.** Water sites run a mix of industrial protocols and equipment from different eras, so the solution has to work with what is already deployed.

## THE SOLUTION

ArrowLinux sits between the control network and the corporate or monitoring network. The one-way direction is enforced in hardware, so software misconfiguration or a network-borne attack cannot reverse it.

Built on ST Engineering's patented SFP+ technology, the diode transfers data at up to 10 Gbps. It also includes real-time file loss detection, which matters when operational records must arrive complete.

## HOW THE DATA FLOWS



× No path back into the control network

Data moves from the control network out to the IT side only. Nothing can flow back.

## HOW IT WORKS IN A WATER ENVIRONMENT

| Data flow                               | Source (secure OT side)                               | Destination (IT / monitoring side)                   | Relevant protocols                      |
|-----------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------|
| <b>Process telemetry and SCADA data</b> | PLCs, RTUs, SCADA servers at plants and pump stations | Historian, analytics platform, enterprise dashboards | OPC UA, MODBUS (RS232/TCP)              |
| <b>Sensor and IoT streams</b>           | Flow, pressure, level and water-quality sensors       | Monitoring platforms and cloud analytics             | MQTT, Kafka                             |
| <b>Logs and alarms</b>                  | Control system and network devices                    | Security operations centre (SOC) / SIEM              | SYSLOG, SNMP traps                      |
| <b>Reports and records</b>              | Treatment plant and laboratory systems                | Regulatory reporting, asset management               | SFTP, FTP, folder mirroring (SMB/SAMBA) |
| <b>Video surveillance</b>               | Plant, reservoir and pump station cameras             | Remote security operations                           | RTSP                                    |

## A TYPICAL DEPLOYMENT IN THREE STEPS

### 1 Collect

Protocol agents on the secure side collect data from control systems and pass it to the diode.

### 2 Transfer

The diode transfers it one way, with file loss detection confirming that records arrive intact.

### 3 Republish

The receiving side republishes the data to historians, dashboards, SIEM tools or cloud analytics, with no return path into the control network.

## KEY BENEFITS FOR UTILITIES

### Zero data leakage in the reverse direction

Malware, remote commands and ransomware cannot travel back into the control network through the diode.

### Real-time visibility without added risk

Operators and analysts get live operational data while the control network stays isolated.

### Reliable data delivery

The maximum file loss rate is 1 in 5 million files, and the diode handles more than 200 small files per second.

### Independently certified

Models 5282 and 5283 are Common Criteria EAL 4+ certified by the Cyber Security Agency of Singapore (CSA), giving security teams and auditors an assurance benchmark.

### Built for critical infrastructure

Redundant power supplies and a 0 to 40°C operating range suit climate-controlled control rooms and equipment rooms. Health alerts go out via SYSLOG, email, SNMP traps and file export.

### Simple to run

An integrated management portal covers configuration, monitoring and maintenance.

### Supports compliance efforts

One-way segmentation between OT and IT helps utilities enforce the zone-and-conduit separation. This is necessary for industrial security frameworks such as IEC 62443.

## MODEL SELECTION

### Model 5280

500 Mbps file transfer

#### Suited for

Smaller sites or single-flow deployments, such as a single treatment plant or pumping station, where 500 Mbps file transfer throughput is enough.

### Model 5282

1 Gbps file transfer • CC EAL 4+

#### Suited for

Regional control centres and larger treatment works needing 1 Gbps file transfer throughput and CC EAL 4+ certification.

### Model 5283

1 + 1 Gbps file transfer • CC EAL 4+

#### Suited for

Central control centres and critical hubs consolidating flows from many plants and sites, with 1 + 1 Gbps file transfer throughput over 10 + 10 Gbps media links, the highest capacity in the series.

## SPECIFICATIONS AT A GLANCE

| Model                              | 5280                           | 5282                           | 5283                           |
|------------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Unidirectional media transfer rate | 10 Gbps                        | 10 Gbps                        | 10 + 10 Gbps                   |
| File transfer throughput           | 500 Mbps                       | 1 Gbps                         | 1 + 1 Gbps                     |
| Memory                             | 2 x 8GB RAM                    | 2 x 8GB RAM                    | 4 x 8GB RAM                    |
| Hard disk                          | 2 x 880GB                      | 2 x 1.8TB                      | 4 x 1.8TB                      |
| Power                              | Up to 2 x 300W (redundant PSU) | Up to 2 x 300W (redundant PSU) | Up to 2 x 300W (redundant PSU) |
| Operating environment              | 0 to 40°C, 10 to 95% RH        | 0 to 40°C, 10 to 95% RH        | 0 to 40°C, 10 to 95% RH        |
| CC EAL 4+ (CSA Singapore)          | —                              | Certified                      | Certified                      |

**Talk to ArrowLinx**

[www.arrowlinx.com](http://www.arrowlinx.com)

[sales@arrowlinx.com](mailto:sales@arrowlinx.com)