Adapter performance, failover, and best practices

PI GEEK TRACK

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Hello AVEVA World!

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Objectives

- Hardware and best practices
- Adapter performance expectations
- Failover and redundancy
Supported hardware

• Broadened platform compatibility with edge devices in mind
  o Linux (Debian/Ubuntu)
  o ARM processors
  o Docker containers

• Windows

• Intel/AMD processors
Hardware configurations

Small devices

• 1 core CPU
• 512MB RAM
• Example: Raspberry Pi 1

Performance expectations

• 1,000 events / sec
• 1,000 total streams
Hardware configurations

Large devices

• 2 core CPU
• 8GB RAM
• Virtual machines or dedicated servers

Performance expectations

• 20,000 events / sec
• 20,000 total streams

Expect enhancements to adapter performance in the future!
Isolating software performance

Extremely large device
• 24 core CPU
• 24GB RAM

Performance test
• Custom OPC UA server
• 100,000 nodes - random float values every 1s
• Data source and PI Web API run locally

OPC UA adapter results
• 50,000+ events/sec
• 100,000 total streams
General recommendations

• Sufficient resources to handle desired stream count and throughput

• Solid state drives

• Stable network
Performance issues

Factors that can negatively impact performance

- Insufficient hardware sizing
- Network instability
- Programs hogging resources
- Excessive stream count/subscriptions

Symptoms

- Errors and timeouts
- Data lag
- Missing data
Mitigating performance issues

Adjust client parameters

- Timeouts
- Operation limits
- Block sizes

Increase buffer capacity

- Default is 1024MB
- Increase in case of long egress outages

Configure data filters

- Set dead bands to reduce network traffic
Data source performance

Many support cases for interfaces, connectors and adapters turn out to be caused by problems at the data source!

• Data source devices need sufficient hardware and network stability as well

• Symptoms can appear similar to adapter performance issues

• Correct source server settings (operation limits, timeouts, etc.)
Failover and redundancy
Client failover service

- External service that controls adapter failover states
  - Installation not required if using AVEVA™ Data Hub
- Adapter with best health score is chosen as active primary
- Currently supported by OPC UA and MQTT adapters
Adapter failover behavior

Hot failover: Normal operation

Data source

Failover group

AVEVA™ PI Server

Client failover service
Adapter failover behavior

Hot failover: A data source disconnection
Adapter failover behavior

Hot failover: Normal operation

Failover group

Data source

AVEVA PI Server

Client failover service
Adapter failover behavior

Hot failover: B Egress destination disconnection
Adapter failover behavior

Cold failover: Normal operation

Failover group

Data source

Client failover service

AVEVA PI Server
Adapter failover behavior

Cold failover: A data source disconnection

Failover group

Data source

AVEVA PI Server

Client failover service
Adapter failover behavior

Cold failover: A data source disconnection

Failover group

Data source

Client failover service

AVEVA PI Server
Adapter failover behavior

Warm failover: Normal operation

Failover group

Data source

Client failover service

AVEVA PI Server
Adapter failover behavior

Warm failover: A data source disconnection
Adapter failover behavior

Warm failover: A data source disconnection
Source server failover

- Some adapters such as OPC UA and MQTT support source server redundancy
- Adapters will fail over to backup server(s) if primary source server goes down
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