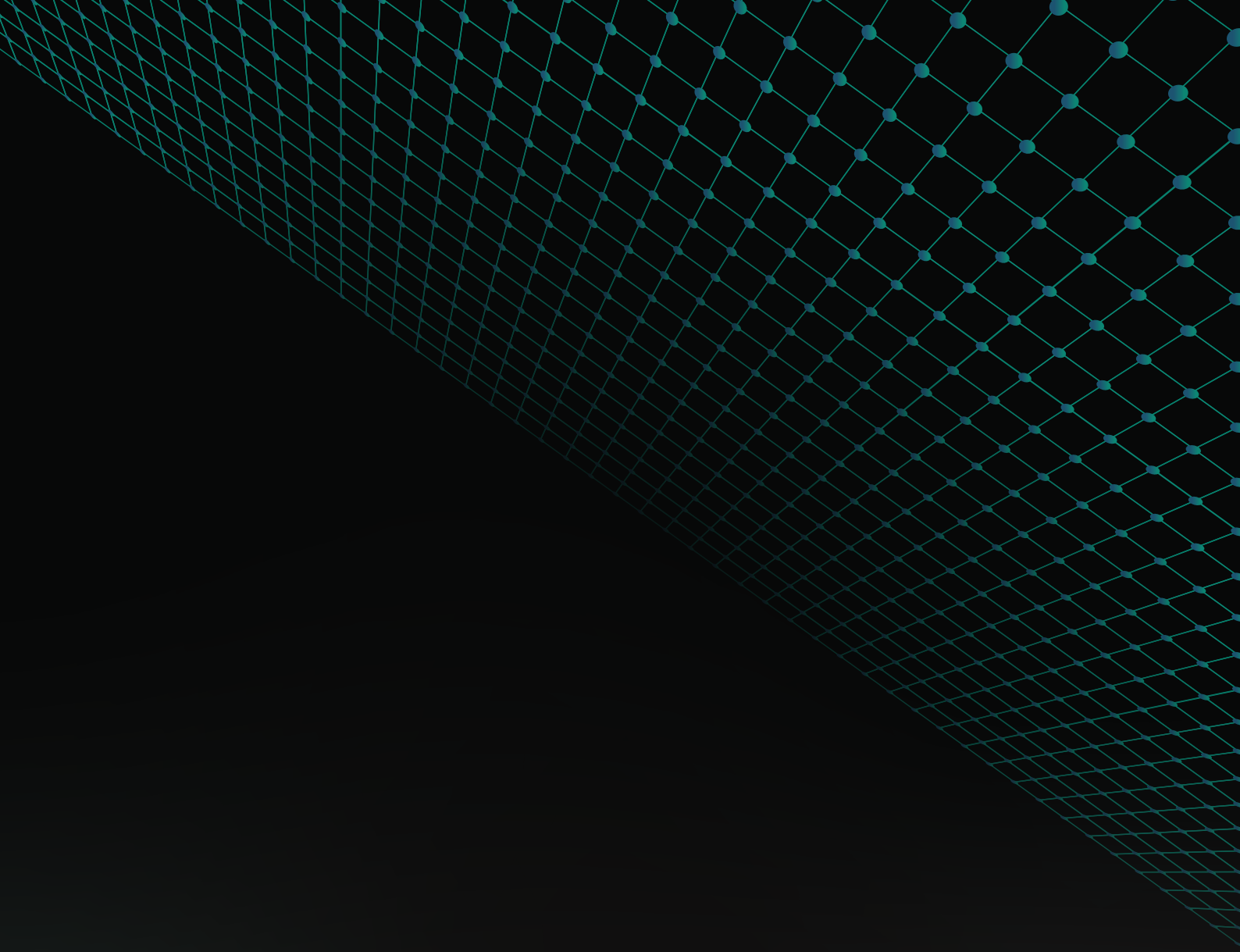


vNode

Use Cases

The Communication Platform for Industrial IoT
From the Edge to the Cloud

SECURE, RELIABLE AND SCALABLE.

vNode

Contents

Introduction

The most suitable projects to deploy **vNode** are those that require **secure, reliable, and flexible industrial data exchange**, especially across segmented networks and heterogeneous systems. vNode delivers the highest value in scenarios such as:

- **Cross-network / multi-plant integration,** where the data source and the destination are located in different networks or facilities.
- **Improved communication security,** including tighter control of data flows and reduced exposure between OT and IT.
- **Multi-technology environments** that go beyond OPC, Modbus, or Siemens—e.g., **REST, MQTT, Web Services, SQL/NoSQL databases, IEC 60870-5-104 (IEC104), BACnet, and SNMP.**
- **Intermittent connectivity use cases,** where data collection must continue despite disconnections (wind and solar farms, pumping stations, vessels, trains, remote sites, etc.).
- **Strict firewall and segmentation requirements,** where IT aims to minimize or close firewall openings while still enabling required data exchange.
- **Multi-stakeholder architectures,** where the data source belongs to the customer but the destination application is owned or operated by a third party.
- **Multi-source consolidation,** requiring ingestion from multiple (often heterogeneous) data sources and the creation of a common, standardized data structure.
- **Cloud integration,** where industrial data must be forwarded to cloud platforms securely and in a controlled manner.
- **Lossless, configurable database writing,** including flexible storage structures and behaviour—beyond predefined/default table schemes typical of some traditional solutions.
- **High-availability requirements,** where redundant data collectors are needed to ensure continuous data movement.
- **SAP connectivity,** where SAP is either the data source or the destination.
- **Event-driven data movement,** where data transfer is triggered by specific conditions rather than only periodic polling.
- **Pre-processing needs,** including aggregation (average/min/max) and advanced transformations, logic, or complex calculations before delivery to the target system.

These are among the most common use cases; additional scenarios may also benefit from **vNode** depending on the customer's architecture and integration requirements.

Basic Architectures

Standalone vNode

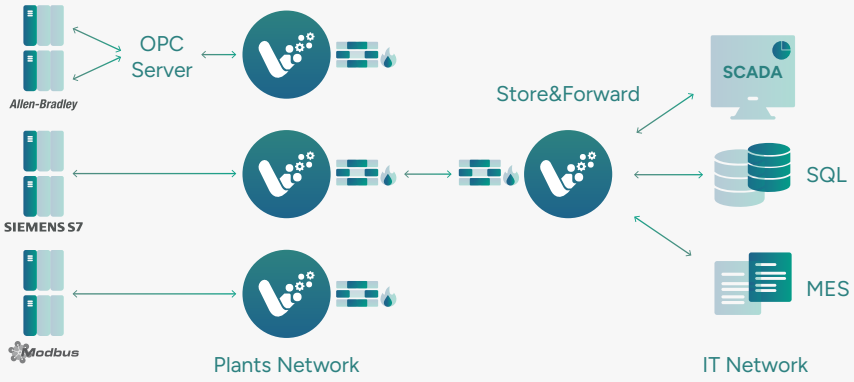
vNode Reading data from OT protocols

Standalone vNode collecting data from the local network and serving data to applications in the **local network.** vNode works as a **data concentrator.**

Distributed vNode

Linked vNodes between different networks

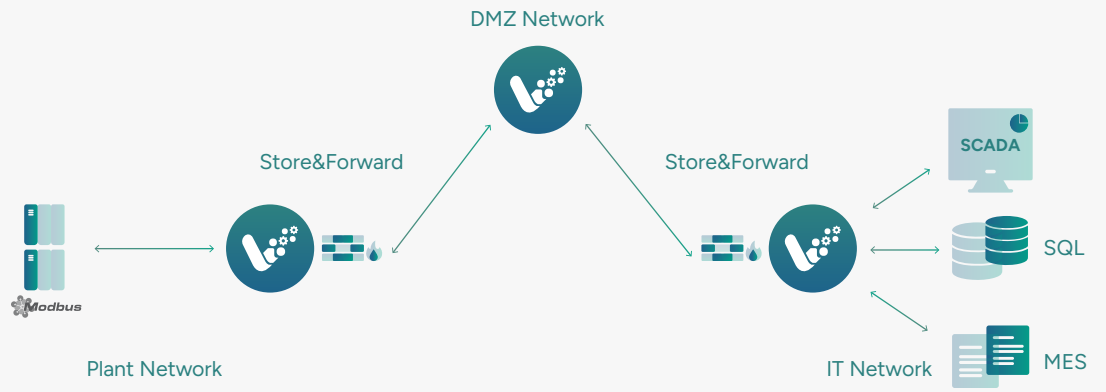
vNode can be configured to open the connection from the distributed Plant vNodes to the central IT vNode. Therefore, there are **no open ports at the Plant Firewalls.**



DMZ vNode

Linked vNodes between different networks through a secure DMZ

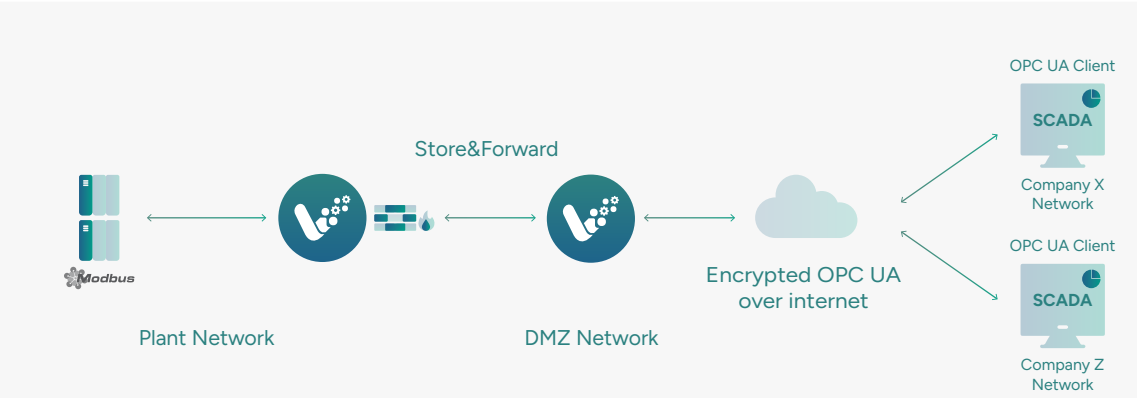
vNode can be configured to open the connection from the distributed Plant vNodes and from the central IT vNode to the DMZ vNode. Therefore, there are **no open ports in any Firewall.**



3rd Party Data Sharing

Sharing realtime data between companies through a secure DMZ

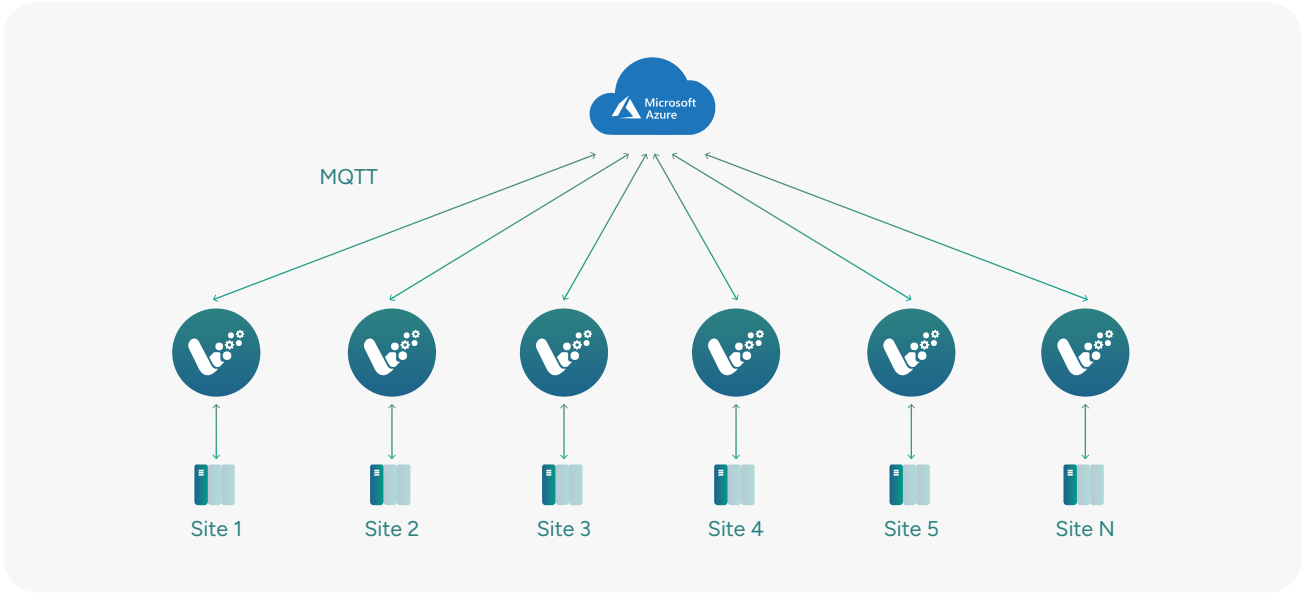
vNode can be configured to open the connection from the distributed Plant vNodes and from the central IT vNode to the DMZ vNode. Therefore, there are **no open ports in any Firewall.**



vNode Use Cases

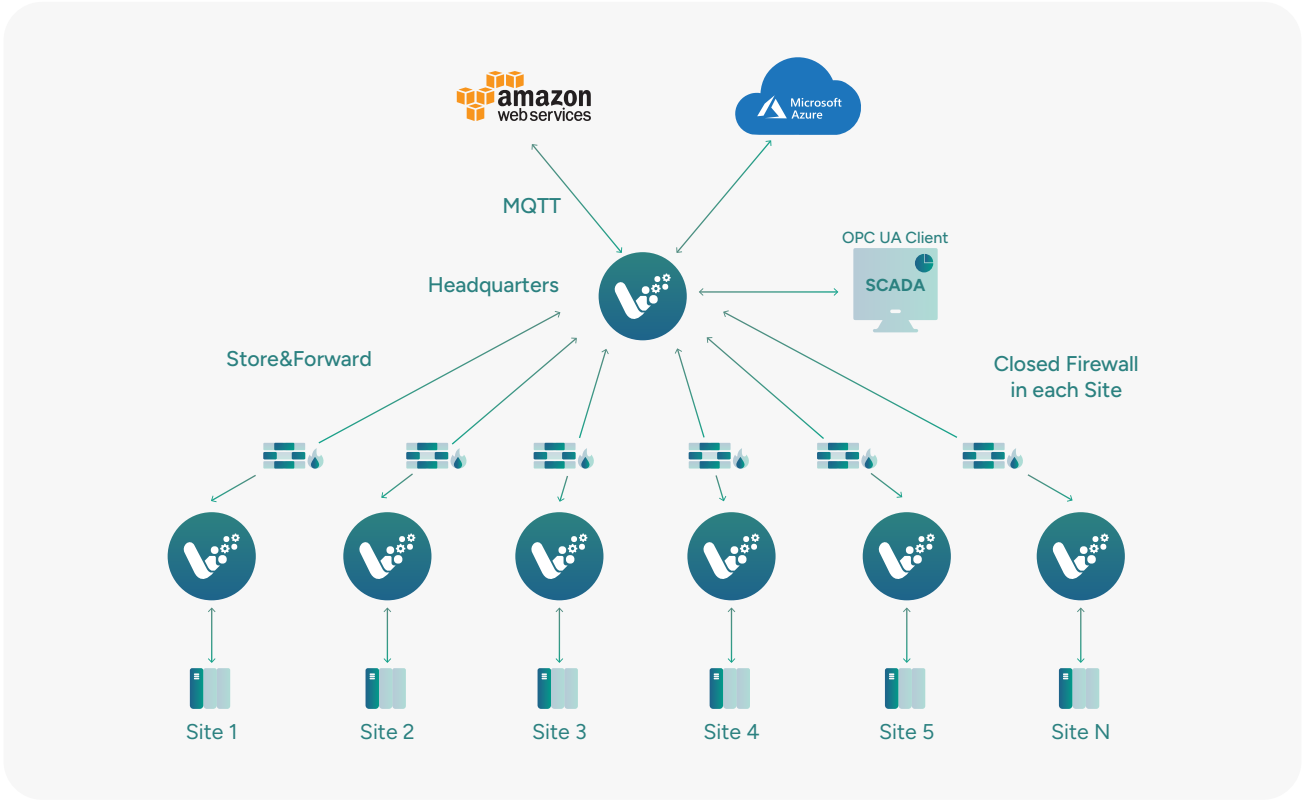
Standalone vNode sending data to cloud providers

Remote vNode's operate in isolated environments. Each vNode collects process data locally and transmits it directly to the cloud using a secure communication protocol.



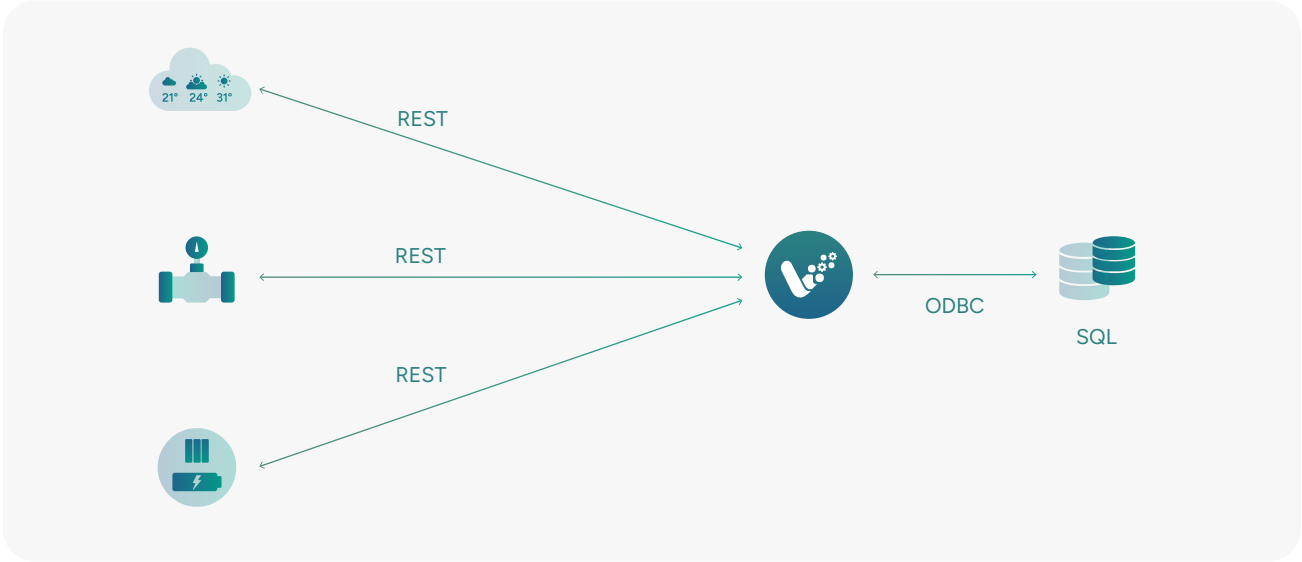
Centralized vNode sending data to cloud service providers

Remote vNode's running in isolated locations. Each vNode is collecting local data and sending it to a Control Center where data is grouped, analysed and validated. Then only a data collection is uploaded the cloud.



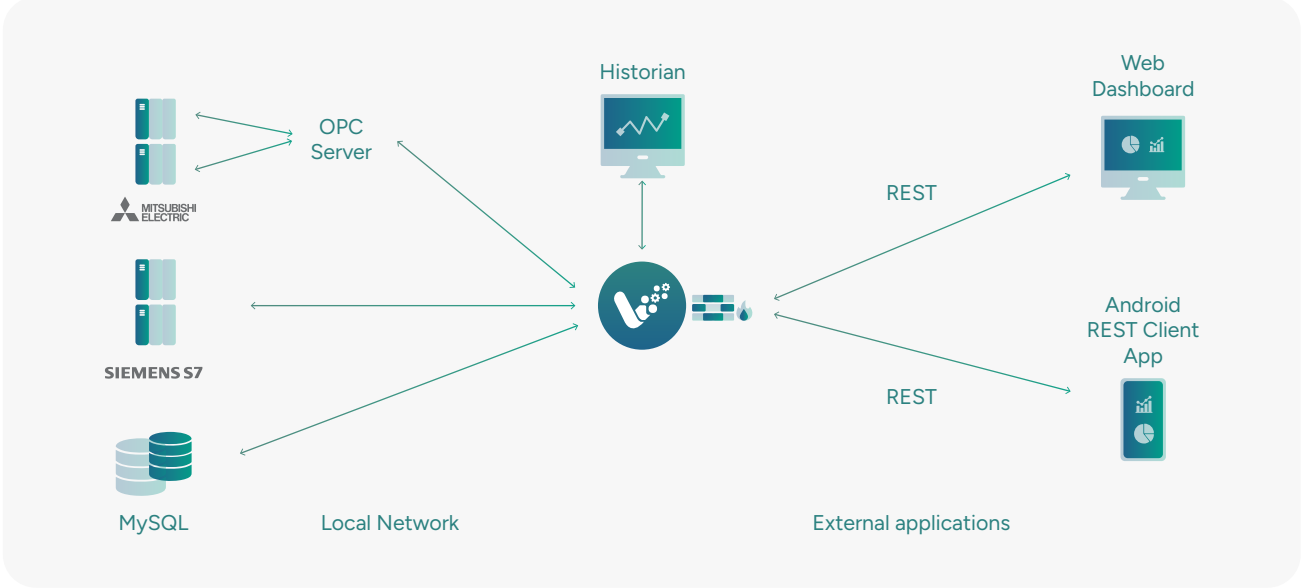
Standalone vNode reading data using REST

Standalone vNode collecting realtime data from remote data sources such as a weather forecast Website, Power Meters, or Sensors supporting REST. vNode collects all the data and stores in a Database.



Standalone vNode historizing data

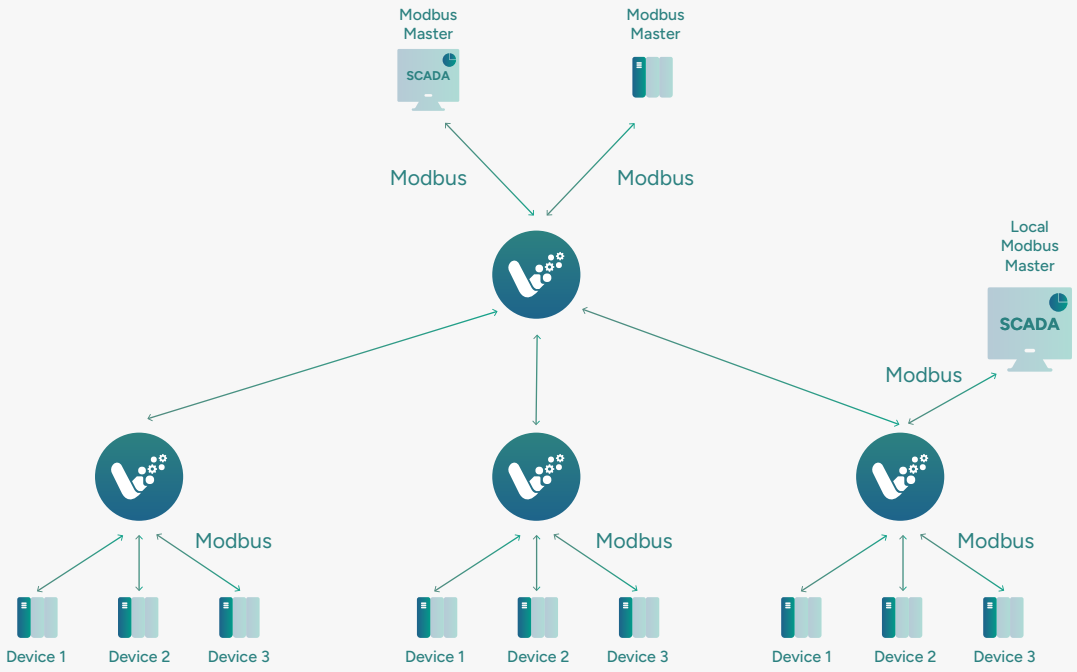
Standalone vNode collecting realtime data from local and remote data sources. Data gets stored in a local MongoDB. vNode acts as a RESTful Server sending realtime and historical data to REST API Clients.



Distributed vNode to increase security in Modbus architectures

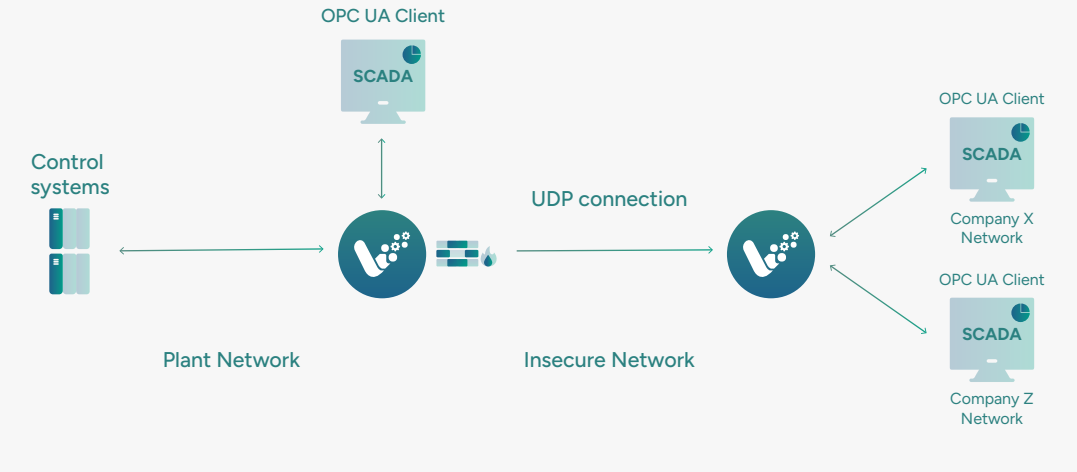
vNode architecture working as a Modbus concentrator

vNode works as a Modbus Master collecting realtime data from the devices, and a Modbus Slave sending all collected data to multiple centralized Modbus Masters.



Data Diode vNode

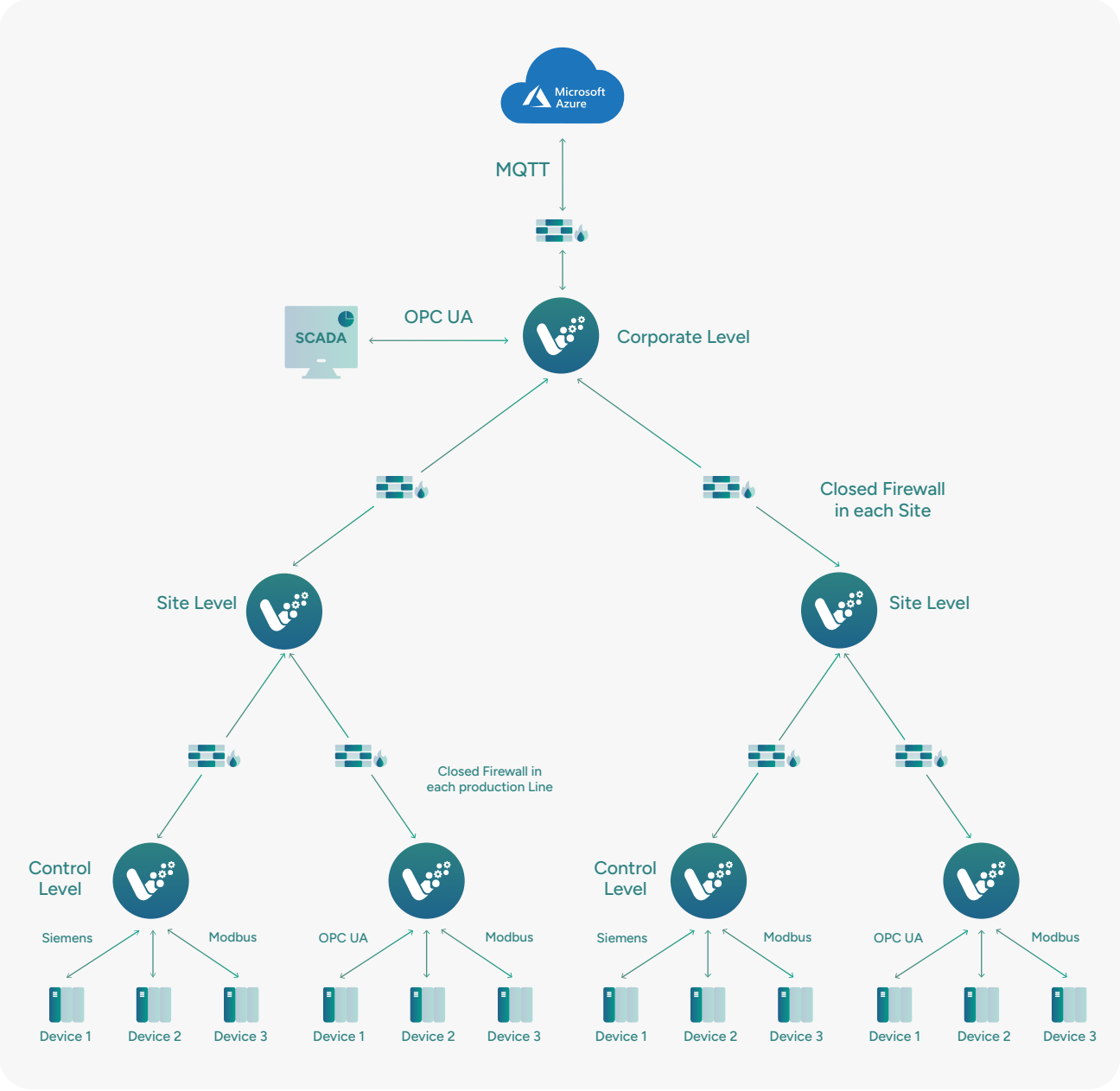
The use of a Data Diode creates a connection 100% secure from the Plant network to an outside network. In this case the communication is unidirectional and there's no possibility from the outside applications to write back to the Control network



vNode for Corporate Architectures

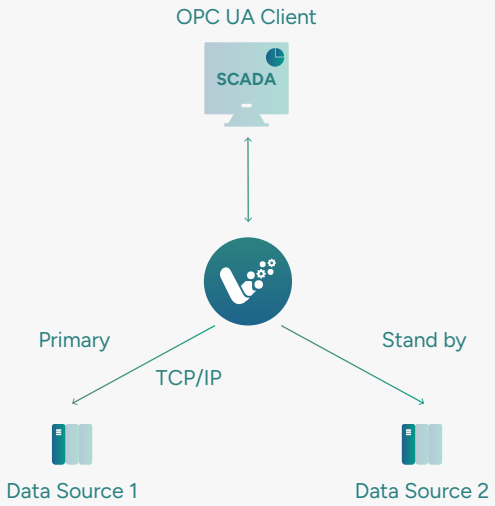
vNode will connect at the Control Level with the controllers. Through an outgoing connection will pass the Control Firewall and send data to the Site Level vNode.

Site Level vNode will concentrate data from all the production lines and make edge calculations before sending data to the Corporate Level vNode.



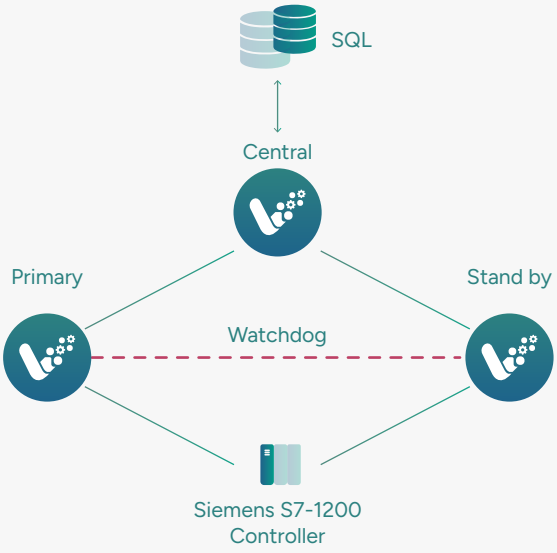
vNode for Data Sources Redundancy

vNode can manage redundant input data sources over TCP/IP channels allowing to perform a backup link in case of device failure.



vNode in High Availability mode

vNode's redundancy core technology, provides a fully synchronized environment between 2 vNode's, guaranteeing a high availability in critical systems.



vNode

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