



# vNode Use Cases

## Use cases

The following architectures are some use cases scenarios where vNode is used in real projects:

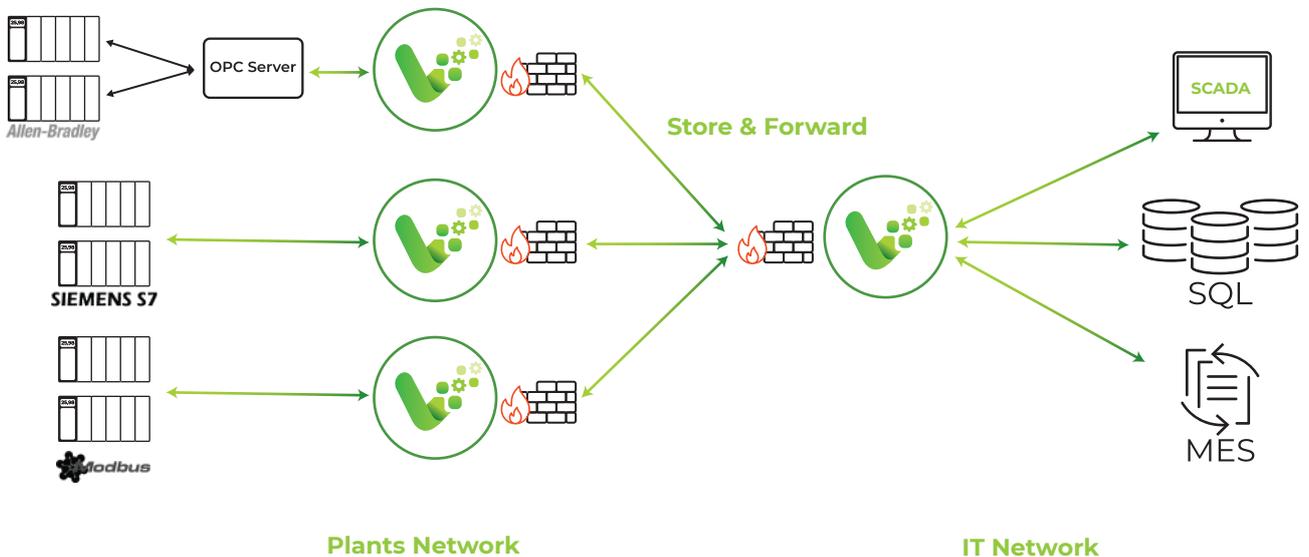
### Architectures

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



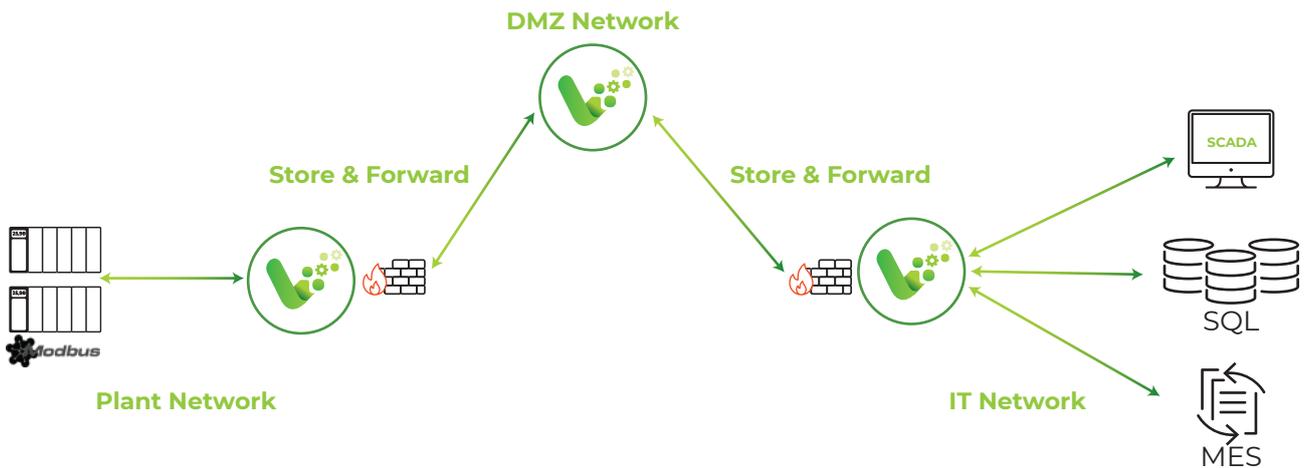
2) Linked Nodes between different networks.

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.

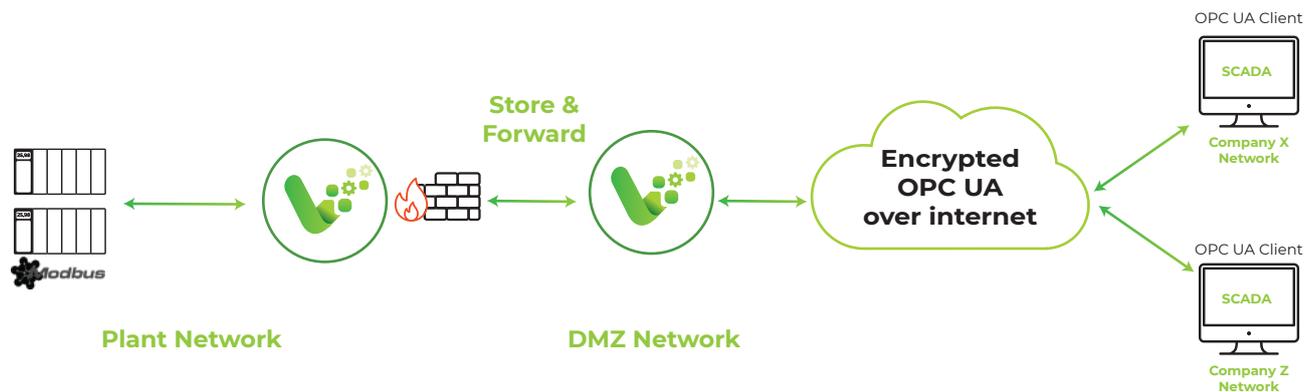


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3) Linked Nodes between different networks, through a secure DMZ. vNode can be configured to open the connection from the distributed Plant vNodes and from the central IT vNode to the DMZ vNode. Therefore there are no open ports in any Firewall.

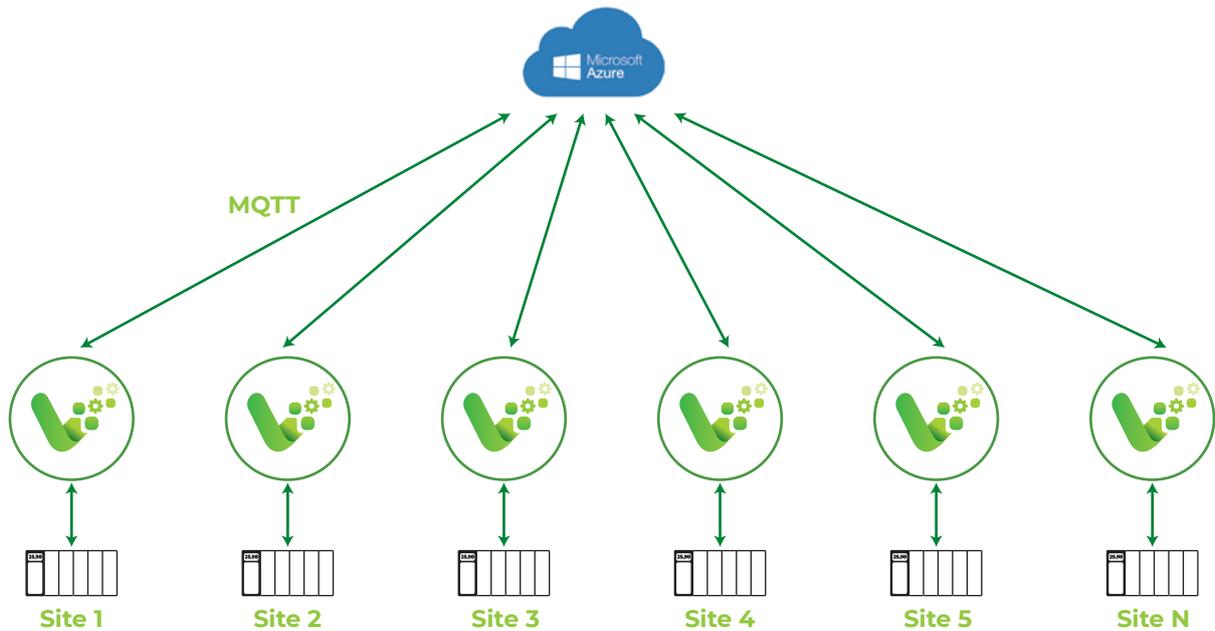


4) Sharing realtime data between companies through a secure DMZ. The SCADA software from a 3rd company gets realtime data from our control system. Using vNode in a DMZ with an outbound connection creates a connection 100% secure.

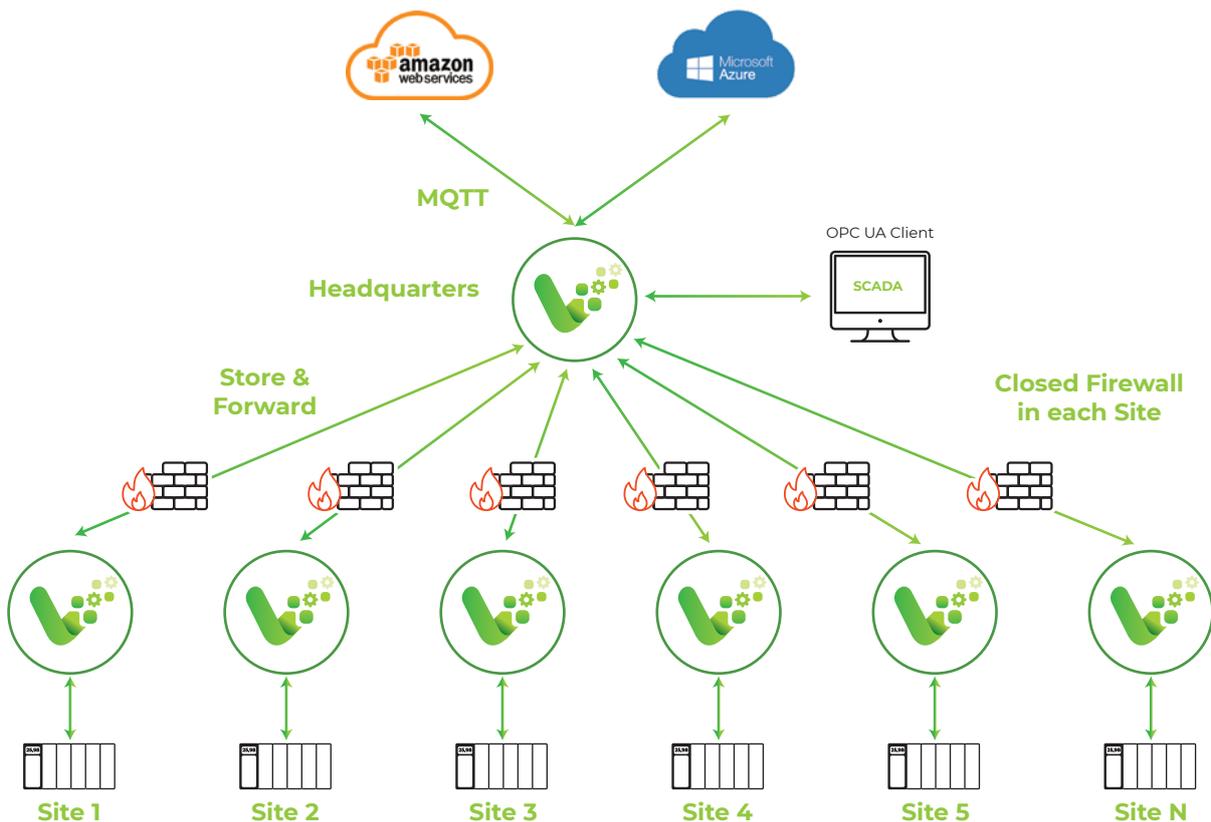


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5) Remote vNodes running in isolated locations. Each vNode is collecting local data and sending it straight to the Cloud.

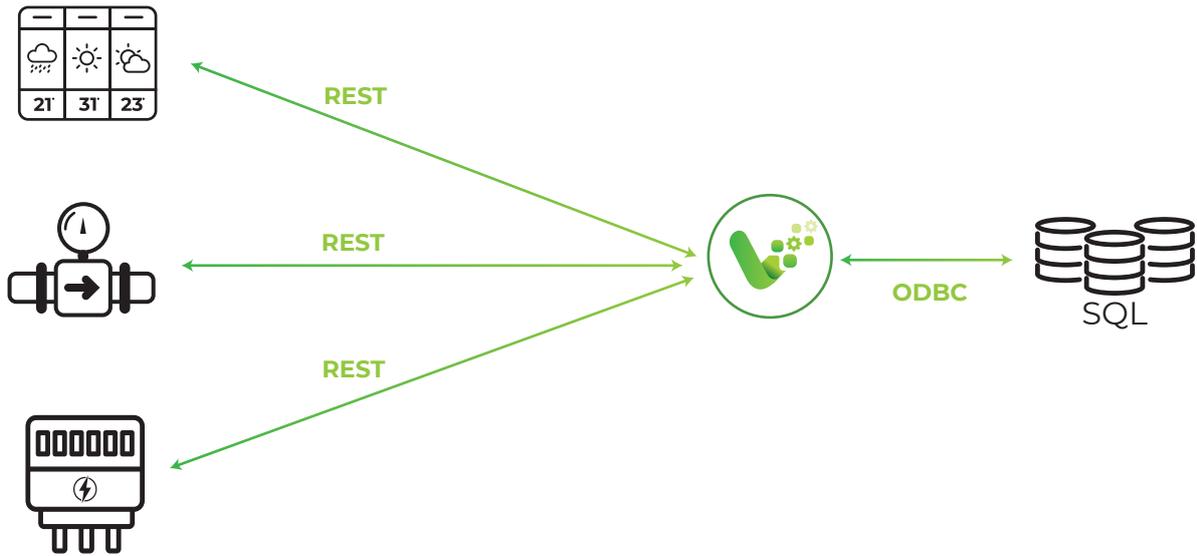


6) Remote vNodes running in isolated locations. Each vNode is collecting local data and sending it to a Control Center where data is grouped, analyzed and validated. Then only a data collection is uploaded the Cloud.

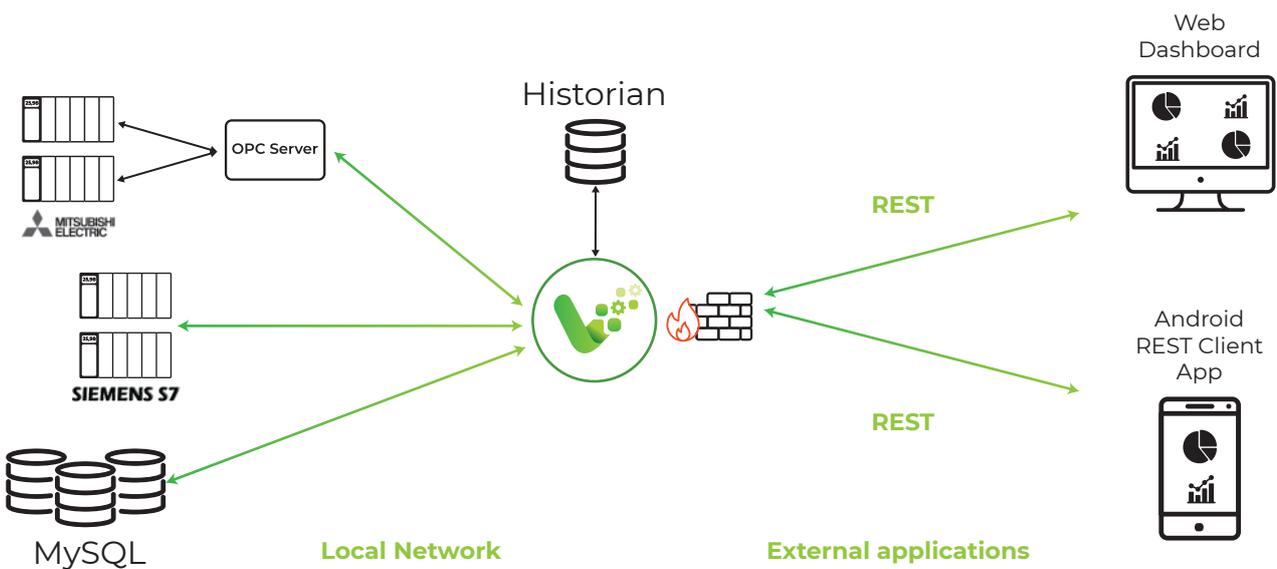


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7) Standalone vNode collecting realtime data from remote data sources such as a weather forecast Website, Power Meters, or Sensors supporting REST. vNode collects all the data and stores in a Database.



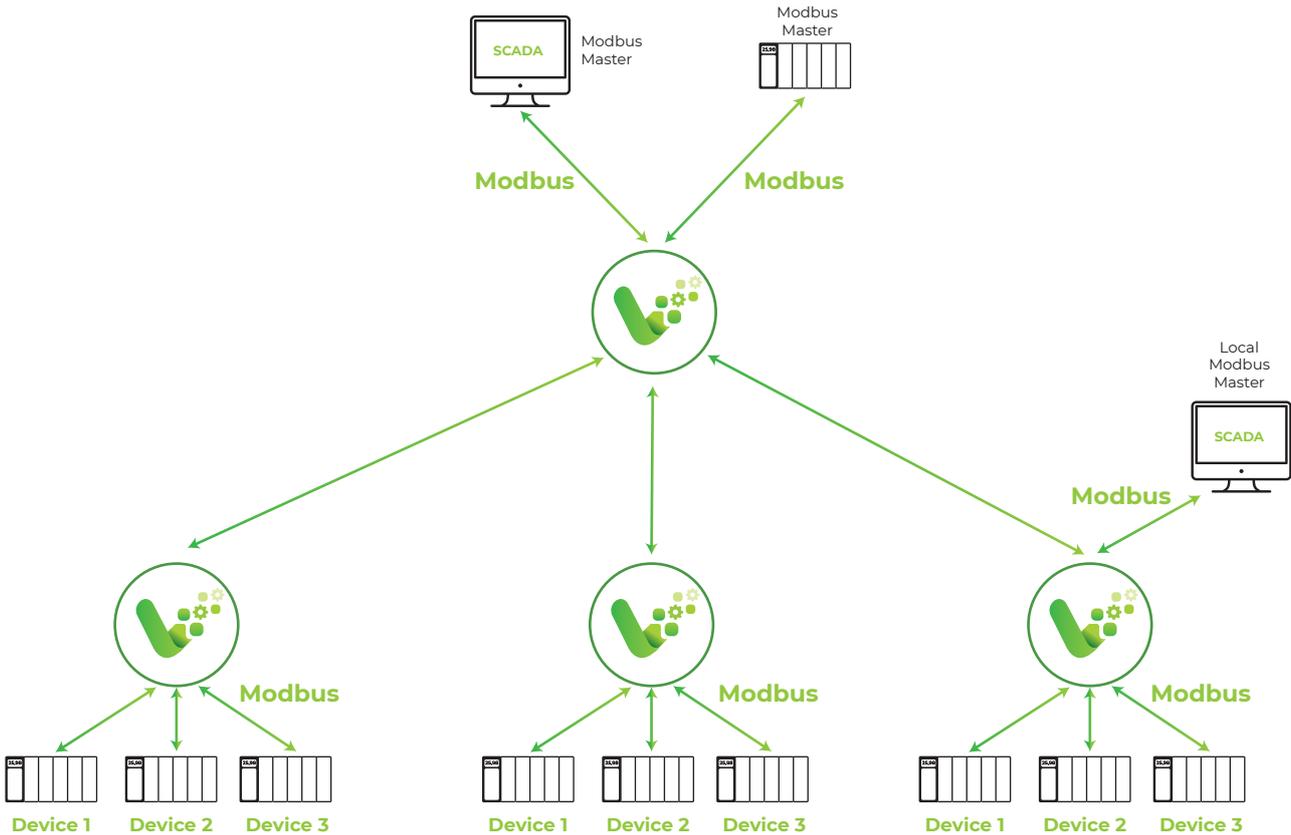
8) Standalone vNode collecting realtime data from local and remote data sources. Data gets stored in a local MongoDB. vNode acts as a RESTful Server sending realtime and historical data to REST API Clients.



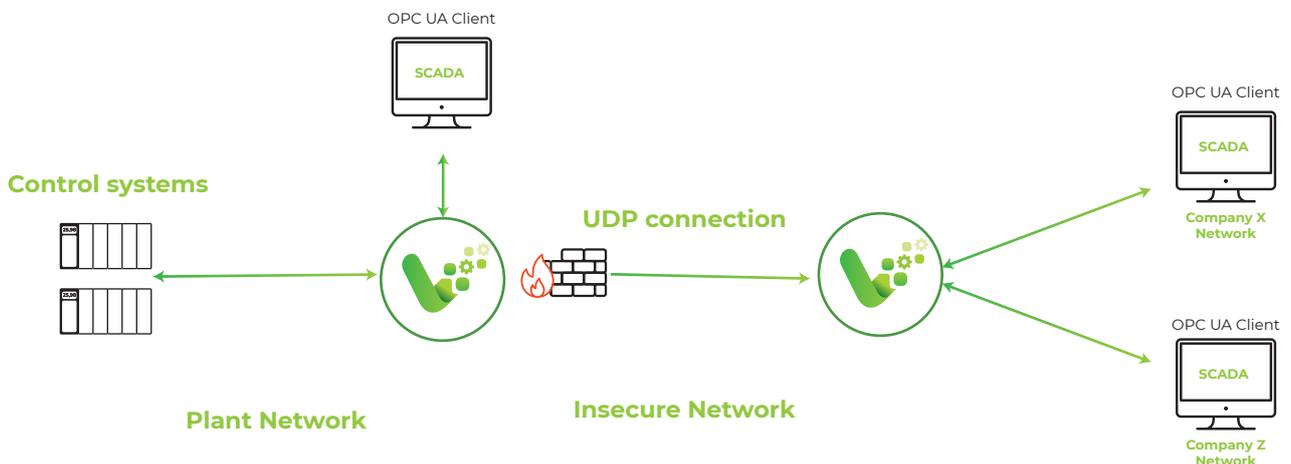
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9) vNode architecture working as a Modbus concentrator.

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



10) 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.



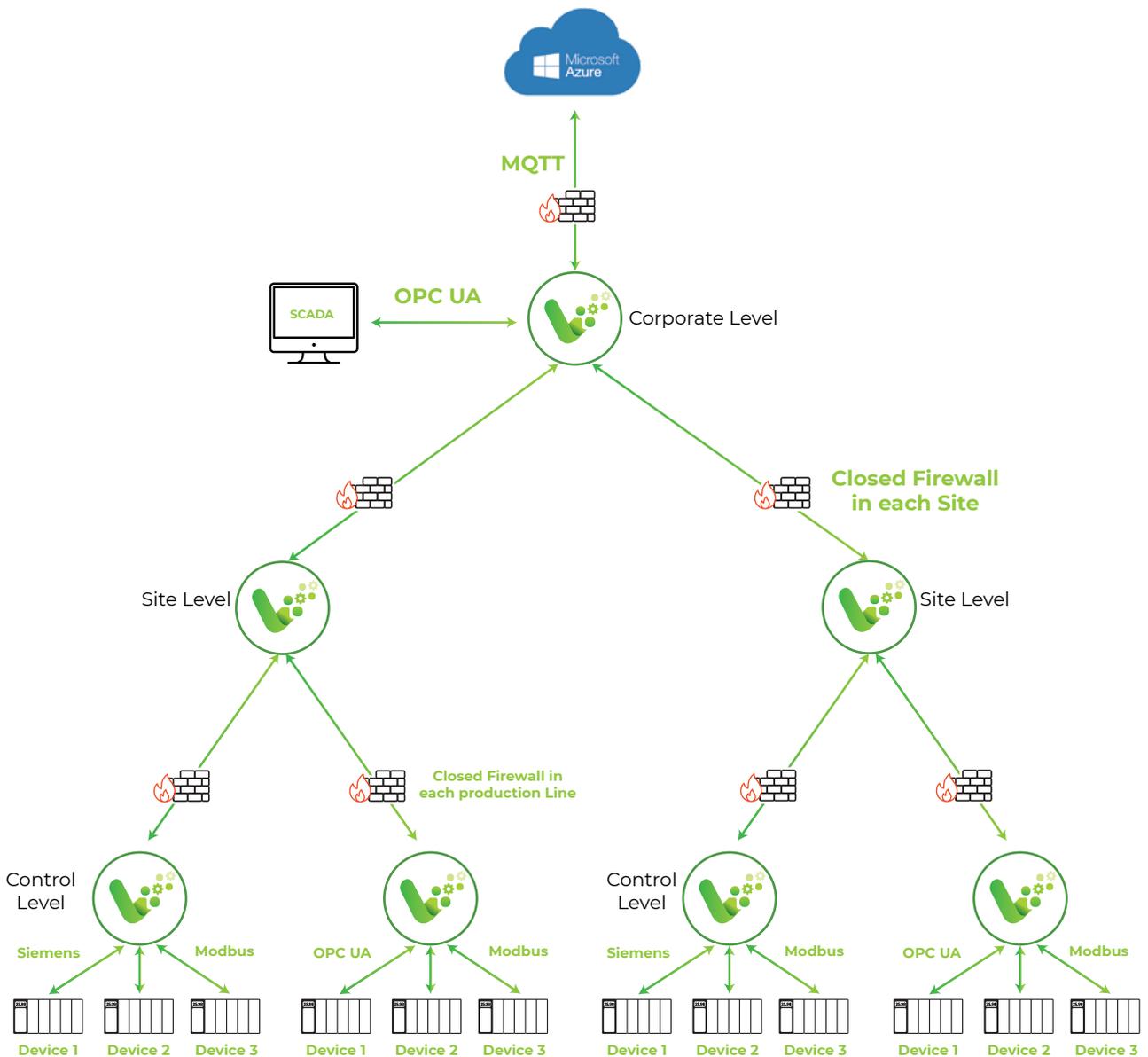


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11) vNode classic Corporate architecture.

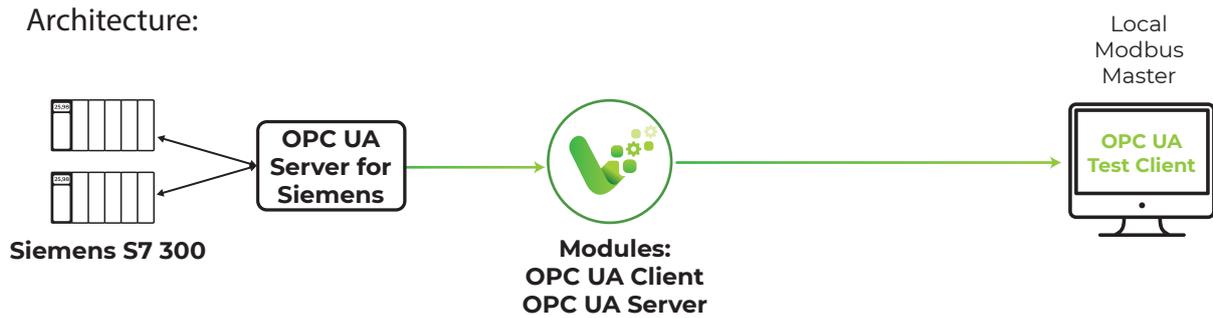
vNode will connect at the Control Level with the controllers. Through an outgoing connection will pass the Control Firewall and send data to the Site Level vNode.

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



## Stress Test

In order to have a better understanding about the needed hardware running vNode in a certain project, we have done several stress tests:



### Hardware:

- NPE X500 fanless embedded PC
- RAM: 1GB
- CPU: ARmv7 Processor rev 4 - Speed: 1200 MHz
- Cores: 4

### Performance vNode in NPE X500 hardware





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