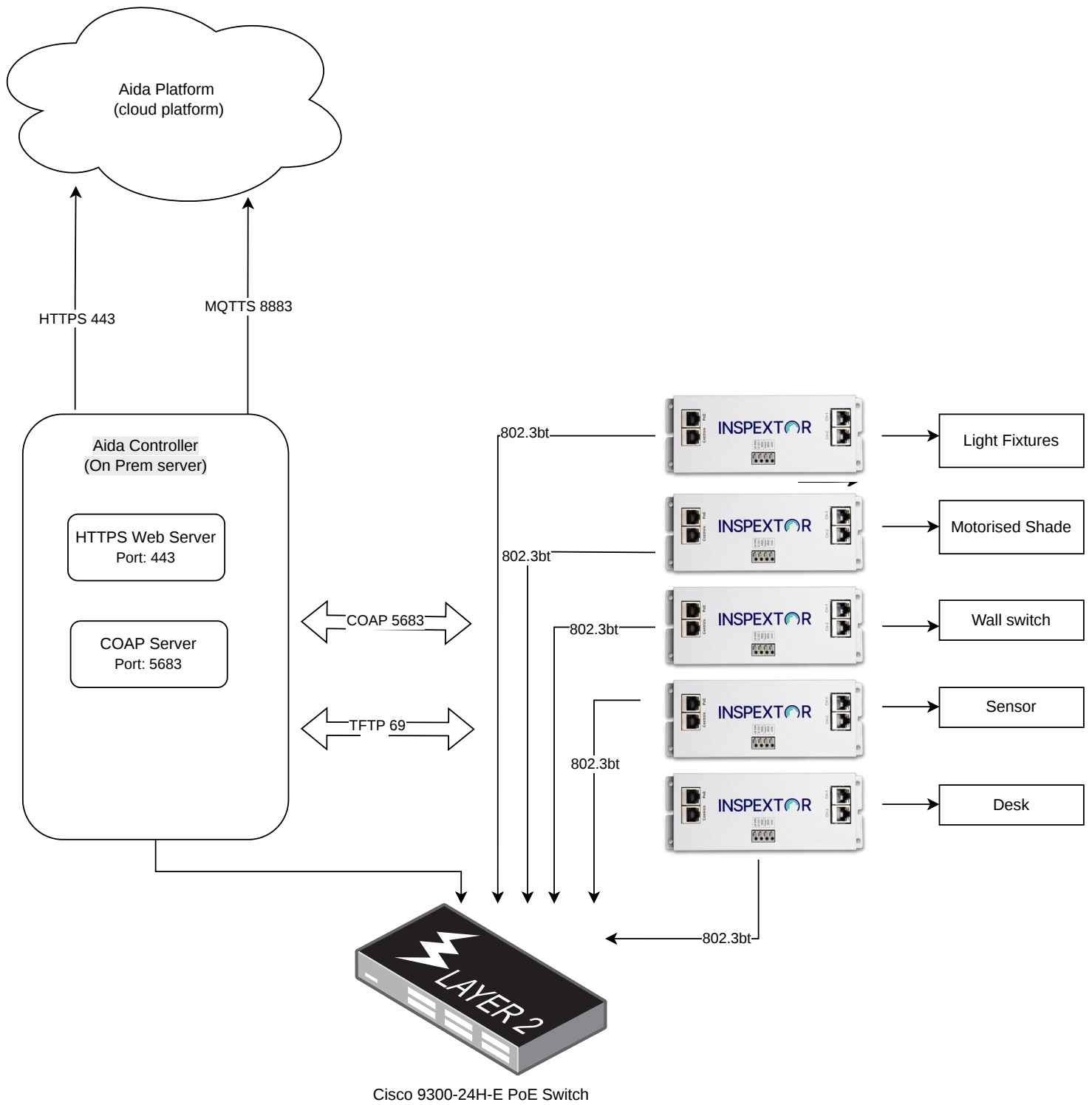




Node90 Communication Flow

Overview

The **Aida Controller** is the on-premises lighting control server that manages all **Node90** devices. The controller is connected to the Cisco Catalyst 9300 PoE switch, and all Node90 devices communicate with the controller over the local network.

Each **Node90** provides both power and control for connected field devices, including:

- Light Fixtures
- Motorized Shades
- Wall Switches
- Occupancy/Environmental Sensors
- Desk Controllers

The Aida Controller is responsible for device discovery, configuration, monitoring, scheduling, and firmware management.

Communication Flow

1. User Access to Aida Controller

Users access the Aida Controller through a web browser using HTTPS.

Source	Destination	Port	Purpose
User PC	Aida Controller	TCP 443 (HTTPS)	Secure access to the Aida Controller Web Interface

Example:

`https://<Aida_Controller_IP>`

2. Aida Controller ↔ Node90 Communication

The Aida Controller communicates with all Node90 devices using the **CoAP protocol**.

Protocol	Port	Purpose
CoAP	UDP 5683	Device discovery, configuration, monitoring, scheduling, status updates, and control commands

This is the primary communication channel between the controller and Node90 devices.

3. Firmware Upgrades

When firmware updates are required, Node90 devices download firmware from the Aida Controller using TFTP.

Protocol	Port	Purpose
TFTP	UDP 69	Firmware transfer from the Aida Controller to Node90 devices

This port is only required during firmware upgrade operations.

4. Aida Controller → Aida Platform (Cloud)

The Aida Controller establishes **outbound-only** secure connections to the Aida Platform cloud service.

No inbound firewall rules or port forwarding are required.

Protocol	Port	Purpose
HTTPS	TCP 443	Secure communication with the Aida Platform
MQTT over TLS (MQTTS)	TCP 8883	Real-time messaging between the Aida Controller and the Aida Platform

These outbound connections allow the controller to securely communicate with the cloud platform.

5. IP Address Assignment (DHCP)

All Node90 devices require a valid IP address to communicate with the Aida Controller.

Node90 devices obtain their IP addresses automatically from the customer's DHCP server. Once a valid IP address has been assigned, the device can communicate with the Aida Controller over the local network.

Requirements

- A DHCP server must be available on the Node90 network.
 - Each Node90 must receive a unique IP address.
 - The Aida Controller and all Node90 devices must be able to communicate over the same network or through properly routed VLANs.
 - Required firewall rules must allow communication over the necessary ports.
-

6. Broadcast-Based Device Control

After obtaining an IP address from the DHCP server, each Node90 participates in the lighting control network by listening for CoAP broadcast messages (UDP port 5683).

When a connected wall switch or sensor is activated, the associated Node90 immediately transmits a CoAP broadcast message across the local network. All Node90 devices receive the message, but each device compares the embedded group (cluster) identifier against its configured group membership.

Only Node90 devices assigned to the matching group execute the requested control action, while all others ignore the message. This distributed communication model enables fast, reliable control without requiring every event to pass through the Aida Controller, resulting in low-latency operation even if the controller is temporarily unavailable.

7. Network Switch Requirements (IEEE 802.3bt PoE)

Each Node90 must be connected to an IEEE 802.3bt (PoE++) capable switch port.

Unlike a typical PoE-powered device, the Node90 uses the power received from the switch to operate both the Node90 itself and the connected field devices. It distributes power and control to:

- Light Fixtures
- Motorized Shades

- Wall Switches
- Sensors
- Desk Controllers

Because of this, every Node90 requires an 802.3bt (PoE++) switch port capable of supplying sufficient power.

Requirements

- Switch ports must support IEEE 802.3bt (PoE++).
- PoE must be enabled on all switch ports connected to Node90 devices.
- The network switch must have an adequate PoE power budget to support all deployed Node90 devices.
- A Cisco Catalyst 9300-24H is an example of a compatible switch that supports IEEE 802.3bt.

Aida Platform Functions

Once the outbound connections are established, the Aida Platform provides:

- Webex integration
- Remote system management (when enabled)
- Software updates on on prem aida controller
- Cloud-based monitoring
- Secure communication with the on-premises Aida Controller

Required Firewall Ports

Direction	Protocol	Port	Required For
User PC → Aida Controller	TCP	443	Web UI access
Aida Controller ↔ Node90	UDP	5683	CoAP device communication
Aida Controller → Node90	UDP	69	Firmware upgrades (TFTP)
Node90 ↔ Node90	CoAP Broadcast	UDP 5683	Local distributed control communication (CoAP Mode only)
Aida Controller → Aida Platform	TCP	443	Secure cloud communication
Aida Controller → Aida Platform	TCP	8883	MQTT over TLS (MQTTS)

Note: The Aida Controller initiates all cloud communication. Only outbound connections on TCP ports **443** and **8883** are required to reach the Aida Platform. No inbound ports from the Internet to the on-premises server are required. This simplifies firewall configuration while maintaining secure communication.