

Network Communication Overview

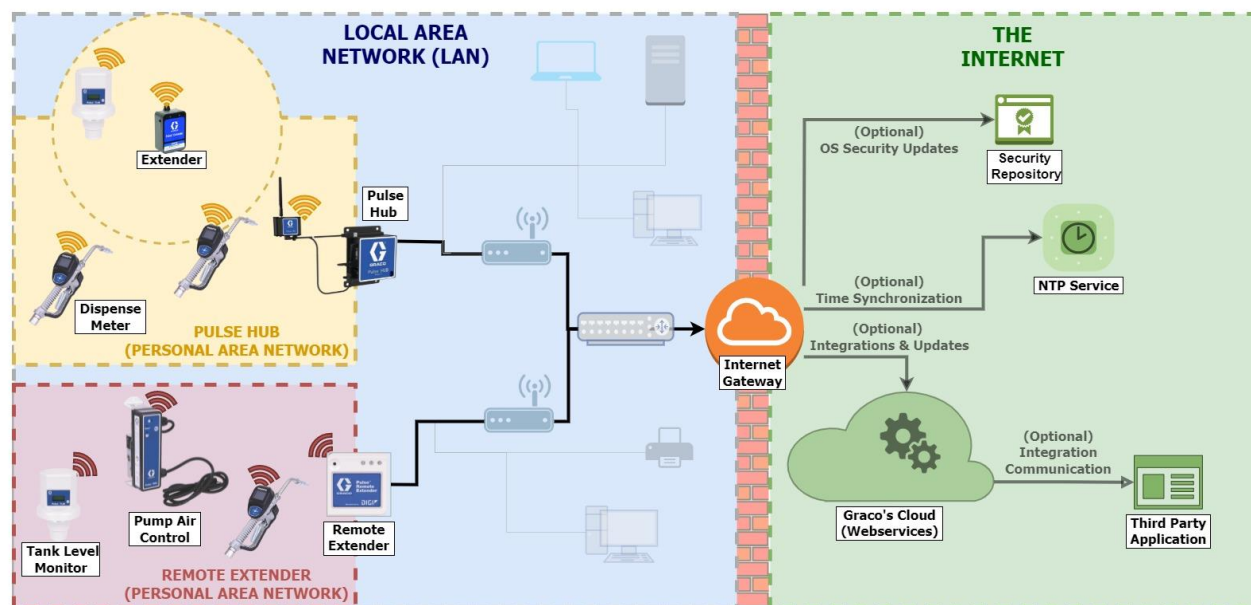


Figure 1: Example Networking Diagram

Local (Internal) Communication

- **Pulse Hub – Connection to Local Area Network (LAN):**
 - Option 1 – Ethernet Connection: IEEE 802.3 (RJ45) [highly recommended]
 - Option 2 – WiFi Connection: IEEE 802.11-a/b/g/n (WPA-PSK, WPA2-personal, WPA/WPA2 enterprise)
 - Device requires a reserved DHCP IP or an assigned static IP
 - Device hosts a WiFi hotspot during startup (if not connected to Ethernet) for system configuration.
 - Active Ports: 80, 443, 3603, 5001, 5002, 5003, 5004, and 8080
- **Pulse Hub – Hosted Personal Area Network (for Connection to Pulse Devices):**
 - Wireless (2.4GHz), low-power, encrypted network: IEEE 802.15.4 (Zigbee)
 - Supports up to 20 Pulse devices (each Extender adds 20 additional capacity)
- **Remote Extender – Connection to Local Area Network (LAN):**
 - Requires Ethernet connection: IEEE 802.3 (RJ45)
 - Recommend using reserved DHCP or an assigned static IP (static IP must be setup using the [Pulse Utility](#))
 - Active Ports: 80, 443, 3609, 5000, and 5001
- **Remote Extender – Hosted Personal Area Network (for Connection to Pulse Devices):**
 - Wireless (2.4GHz), low-power, encrypted network: IEEE 802.15.4 (Zigbee)
 - Creates a separate network from the Pulse Hub PAN. Pulse devices cannot travel between separate PANs.
 - Supports up to 20 Pulse devices (each Extender adds 20 additional capacity)

External (Internet) Communication

Internet connection is not required for basic system usage. Advanced features such as automated software update checks, and/or third party integrations do however require external network access.

➤ **Time Synchronization (NTP Service)**

- Used to keep system time accurate
 - Request Origin – Pulse Hub
 - Request Target (DEFAULT) – pool.ntp.org (UDP:123)

➤ **Integrations & Updates (Graco's Cloud Webservices)**

- Used to check for, and download, Pulse firmware/software updates
 - Request Origin – Pulse Hub
 - Request Target (1) – <https://ivosyqi689.execute-api.us-east-2.amazonaws.com> (TCP:443)
 - Request Target (2) – <https://fcizyexp9c.execute-api.us-east-2.amazonaws.com> (TCP:443)
- Used to check product registration, report statistics, and send integration content for processing
 - Request Origin – Pulse Hub
 - Request Target – <https://integrations.gracopulse.com> (TCP:443)
- Used to Communicate with Pulse Level system (send tank level data)
 - Request Origin – Pulse Hub
 - Request Target – <https://nq0dpp9r4m.execute-api.us-east-2.amazonaws.com> (TCP:443)

➤ **OS Security Updates**

- Used to fetch distribution updates
 - Request Origin – Pulse Hub
 - Request Target – <http://us.archive.ubuntu.com/ubuntu/>
 - Request Target – <http://security.ubuntu.com/ubuntu>

➤ **Integration Communication (Third Party Applications)**

- When integrations are enabled, Graco's Cloud Webservice sends integration content to user designated third party applications.
 - Origin 1 (Graco Cloud NAT Gateway) – 3.210.161.27
 - Origin 2 (Graco Cloud NAT Gateway) – 3.210.161.181
 - Endpoint – Integration specific [determined by end-user or DMS] (TCP)