

# 5. Network & Connectivity

SMHUB provides robust and flexible networking options to ensure reliable operation in both **enterprise environments** and **home setups**. It can connect via **Ethernet, Wi-Fi (2.4/5 GHz), Bluetooth**, and optionally via **VPN tunnels and DDNS services** for secure remote access.

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## 5.1 Ethernet

- **Primary interface** for stable operation.
  - Supports **100Mb Ethernet** via onboard RJ-45 port.
  - Recommended for enterprise and multi-device deployments.
  - Provides lowest latency and highest reliability compared to wireless options.
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## 5.2 Wi-Fi

SMHUB includes **dual-band Wi-Fi** with both **2.4 GHz** and **5 GHz** support.

- **2.4 GHz**
  - Longer range, higher wall penetration.
  - Ideal for IoT-heavy environments with many legacy devices.
- **5 GHz**
  - Higher throughput.
  - Less interference in crowded environments.
  - Suitable for high-speed data transfers and local automations.

### Operating Modes:

- **Client Mode**
    - SMHUB connects to an existing Wi-Fi network.
    - Configurable via CLI (`nmccli`) or SSH.
    - Web UI configuration will be available in upcoming updates.
  - **Access Point Mode (in development)**
    - SMHUB creates its own Wi-Fi network.
    - Default SSID: `SMHUB-XXXX` (last 4 MAC digits).
    - Default password: `smhub1234`.
    - Useful for first-time setup or when no LAN is available.
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## 5.3 Bluetooth

- **Bluetooth 5.0** with **BLE (Bluetooth Low Energy)** support.
  - Future updates will expand Bluetooth integration into the web interface.
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## 5.4 VPN (WireGuard)

SMHUB includes **WireGuard VPN** for secure tunneling.

- Provides encrypted remote access to SMHUB and connected devices.
  - Suitable for enterprise remote deployments or secure home use.
  - Configuration available via CLI or SSH.
  - Can be combined with DDNS for access without a static IP.
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## 5.5 USB Networking

When connected via **USB-C upstream**, SMHUB can act as a **network device** to the host PC:

- Appears as an Ethernet-over-USB adapter.
  - Provides direct access without needing an external router or switch.
  - Useful for initial setup, debugging, or portable use cases.
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