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.

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.

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 (`nmcli`) 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.

5.3 Bluetooth

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

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.

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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