# Home Networking Infrastructure

Physical and logical network infrastructure documentation covering cabling, switching, wireless, and device connectivity across the home.

# Physical Infrastructure

Physical layer documentation — structured cabling, patch panel, rack, switching hardware, wireless mesh, and server network interfaces.

Physical Infrastructure

# Network Closet & Structured Cabling

## Overview

The network closet is located in the **Basement Electrical Panel room**, which serves as the central termination point for all Ethernet and Coax runs in the house. This is not yet a finished closet — it is an open area with a floor-standing rack in place. Full rack buildout (patch panel punch-down, cable labelling, power management) is planned for **Summer 2026**.

> **Status:** Work in progress. All Ethernet runs are currently raw ends. Patch panel is not yet installed.

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## Rack

| Property | Detail |
|---|---|
| Type | Floor-standing |
| Size | 6U |
| Status | In place, not fully secured or built out |

> **Note:** 6U is tight at full population. Current planned rack residents: 24-port patch panel (1U), GigaPlus switch (1U), 5-port PoE switch (1U), PDU (1U) — leaves 2U spare. Consider upsizing before finalizing rack procurement.

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# Patch Panel

| Property | Detail |
|---|---|
| Type | 24-port Cat6 keystone |
| Status | Not yet installed — pending cable labelling |
| Blocker | All 18 runs require labelling at both ends before punch-down |

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# Ethernet Runs — Full Inventory

18 total runs. All Cat6 runs were self-installed post-purchase. Cat5a runs are builder-installed dual-purpose cable.

| # | Room / Zone | Count | Type | Notes |
|---|---|---|---|---|
| 1 | Basement Gym | 1 | Cat6 | Single wall plate (unfinished). Feeds Deco AP, TV, PoE injector → Front Yard Camera |
| 2 | Living Room | 1 | Cat6 | Self-run through wall. Feeds unmanaged switch → TV + AppleTV |
| 3 | Front Yard | 2 | Cat6 | Run 1: from Network Closet → Reolink camera (active). Run 2: from Gym PoE injector → future gas meter camera (Fall 2026) |
| 4 | Back Yard | 2 | Cat6 | Run 1: PoE → outdoor Deco X50-Outdoor AP. Run 2: unconnected — reserved for future WAN failover (Starlink or UniFi SIM) |
| 5 | Garage | 1 | Cat6 | ~50–70ft via conduit. Feeds Deco X50-Outdoor AP (PoE-powered from Closet) |

| # | Room / Zone | Count | Type | Notes |
|---|---|---|---|---|
| 6 | Kitchen | 2 | Cat6 | Run 1: Deco BE11000 AP (primary node). Run 2: spare / unconnected |
| 7 | Kitchen | 1 | Cat5a | Builder run — awkward termination position, unconnected |
| 8 | Media Room | 1 | Cat5a | Single wall drop — daisy-chained switches downstream |
| 9 | Guest Bedroom | 1 | Cat5a | Not directly in use for Ethernet — MoCA adapter at desk end |
| 10 | Office | 1 | Cat5a | Feeds Deco XE75 Pro AP + MokerLink switch → homelab + work desk |
| 11 | Master Bedroom | 1 | Cat5a | PoE — feeds Deco X50-PoE on-wall AP |
| 12 | MoCA Network Feed | 1 | Cat6 | Dedicated run from Network Closet to Coax splitter for MoCA/OTA distribution |

> **Labelling status:** Starting from zero. Previous labels have fallen off. Full re-labelling required at both ends of all 18 runs before patch panel work begins.

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# Coax Infrastructure

A coax network runs in parallel to Ethernet throughout the house, fed from the Network Closet via a coax splitter.

**Signal sources at splitter:**

- OTA antenna (attic-mounted, amplified)
- MoCA Ethernet bridge (1x adapter at Network Closet end)

**Coax-capable rooms:**

| Room | Active Use |
|---|---|
| Living Room | Coax present — current use TBD |
| Media Room | Connected to TV (OTA) |
| Guest Bedroom | MoCA adapter → desk Ethernet |
| Master Bedroom | Coax present — not actively in use for MoCA |

**MoCA Adapters:**

| Location | Role |
|---|---|
| Network Closet | Coax → Ethernet bridge (network side) |
| Guest Bedroom | Coax → Ethernet bridge (endpoint) |

> MoCA expansion is possible but unlikely. The Guest Bedroom use case is a unique placement issue where Coax terminated at the right desk location but no Ethernet run was present.

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# Outstanding Action Items

- ☐ Label all 18 Ethernet runs at both ends (Network Closet + room end)
- ☐ Install 24-port Cat6 keystone patch panel in rack
- ☐ Secure and complete rack buildout
- ☐ Verify IoT network isolation method (see Wireless page)
- ☐ Install gas meter camera on Front Yard Run 2 (Fall 2026)
- ☐ Determine WAN failover solution for Back Yard Run 2 (Starlink vs UniFi SIM)

# Last Updated

2026-06-18

Physical Infrastructure

# Switching & Core Network Hardware

## Overview

The core network is built around a **UniFi Cloud Gateway Fiber (Whistler)** as the sole router and firewall. All switching downstream is unmanaged. The Bell Home Hub 3000 remains inline as the Fiber ONT termination point but serves no routing or WiFi function.

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## WAN & Core Routing

| Device | Hostname | Role | Location |
|---|---|---|---|
| Bell Home Hub 3000 | — | Fiber ONT + PPPoE upstream passthrough | Basement Electrical Panel |
| UniFi Cloud Gateway Fiber | Whistler | Sole router, firewall, DHCP, DNS upstream | Basement Electrical Panel / Network Closet |

**WAN topology:**

```
Bell Fiber (ONT) → HH3000 (PPPoE passthrough, no NAT, WiFi disabled) → UCG Fiber WAN (10GbE) → LAN
```

> The HH3000 remains inline rather than bypassed to support troubleshooting and recovery during frequent Bell ISP deprovisioning events. PPPoE credentials are configured directly on the UCG — there is **no double NAT**.

**UCG LAN Port Assignments:**

| Port | Connected To | Speed |
|---|---|---|

| | | |
|---|---|---|
| WAN | Bell HH3000 | 10GbE |
| LAN 1 | GigaPlus Switch (SFP+) | 10GbE |
| LAN 2 | Emporia Vue (Electrical Panel) | 1GbE |

# Switch Inventory

| Switch | Model | Location | Ports | Uplink | Notes |
|---|---|---|---|---|---|
| GigaPlus | GigaPlus (unbranded) | Network Closet | 2x SFP+ 10GbE, 8x 2.5GbE | UCG LAN1 (SFP+) | Core distribution switch |
| 5-port PoE | Unbranded | Network Closet | 5x 1GbE PoE | GigaPlus (2.5GbE) | Powers cameras and PoE Deco APs |
| MokerLink | MokerLink | Office | 8x 2.5GbE | GigaPlus (SFP+) | Homelab + work desk uplink |
| Media Room #1 | Netgear (older) | Media Room | Unknown | Single Cat5a wall drop | Daisy-chains to Media Room #2 |
| Media Room #2 | Unbranded | Media Room | Unknown | Media Room #1 | AV + gaming devices |
| Garage | Unbranded | Garage | 5x 1GbE | Deco X50-Outdoor LAN port | Non-PoE — uses downstream injector |

> **All switches are unmanaged.** No VLANs or managed switching features are in use at the switch level. IoT and Guest network segmentation is handled at the Deco/UCG layer.

> **Media Room note:** Both switches are daisy-chained off a single Cat5a wall drop — a known bottleneck. All Media Room bandwidth is constrained to 1GbE on a single shared uplink.

# PoE Infrastructure

| Injector / Source | Location | Powered Device |
|---|---|---|

| | | |
|---|---|---|
| 5-port PoE Switch (port) | Network Closet | Back Yard Deco X50-Outdoor |
| 5-port PoE Switch (port) | Network Closet | Garage Deco X50-Outdoor (via conduit Cat6) |
| 5-port PoE Switch (port) | Network Closet | Master Bedroom Deco X50-PoE |
| 5-port PoE Switch (port) | Network Closet | Front Yard Run 1 → Reolink Camera |
| PoE Injector (passive) | Basement Gym | Front Yard Run 2 → future gas meter camera |
| PoE Injector (passive) | Garage | Reolink Driveway Camera |

# Network Topology Diagram (Text)

```
Bell Fiber
  └── HH3000 (ONT / PPPoE passthrough)
        └── UCG Fiber "Whistler" (Router / Firewall)
              ├── LAN1 (10GbE SFP+) → GigaPlus Switch
              │     ├── SFP+ → MokerLink (Office, 2.5GbE)
              │     │     ├── Centerpoint (2.5GbE)
              │     │     ├── Lusankya (2.5GbE)
              │     │     └── Work Desk
              │     ├── 2.5GbE → 5-port PoE Switch (Network Closet)
              │     │     ├── Back Yard Deco X50-Outdoor (PoE)
              │     │     ├── Garage Deco X50-Outdoor (PoE, via conduit)
              │     │     │     └── LAN → Garage 5-port switch
              │     │     │           └── PoE Injector → Reolink Driveway Cam
              │     │     ├── Master Bedroom Deco X50-PoE (PoE)
              │     │     └── Front Yard Reolink Camera (PoE, via Cat6)
              │     ├── 2.5GbE → Kitchen Deco BE11000 (Primary AP Node)
              │     │     └── Backhaul mesh to all other Deco nodes
              │     ├── 2.5GbE → Basement Gym Deco BE11000
              │     │     └── LAN → PoE Injector → Front Yard future camera
              │     ├── 2.5GbE → Living Room switch → TV + AppleTV
              │     └── 2.5GbE → Media Room Switch #1
              │           └── Media Room Switch #2
              │                 ├── TV
              │                 ├── Xbox
              │                 ├── PS4
              │                 ├── Halcyon (Gaming PC)
```

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|                 └── CorSec + Smart Hubs
└── LAN2 (1GbE) → Emporia Vue (Electrical Panel)
```

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# Outstanding Action Items

- [ ] Identify and document Media Room switch models and port counts
- [ ] Confirm GigaPlus full model number
- [ ] Confirm exact UCG LAN1 port type (copper 2.5GbE vs SFP+)
- [ ] Evaluate managed switch replacement for Media Room (single uplink bottleneck)

# Last Updated

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Physical Infrastructure

# Wireless — Deco Mesh

## Overview

Wireless coverage is provided by a **TP-Link Deco mesh network** operating in **AP mode** — all routing and DHCP is handled upstream by Whistler (UCG Fiber). All nodes use **wired Ethernet backhaul**; no wireless backhaul is in use.

The network supports WiFi 7 (BE) on capable nodes with Multi-Link Operation (MLO).

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## Node Inventory

| Node | Model | Location | Mount | Power Source | Backhaul Uplink |
|---|---|---|---|---|---|
| Primary | Deco BE11000 | Kitchen | Freestanding | Passive (powered via Cat6) | GigaPlus switch (Cat6) |
| Secondary | Deco BE11000 | Basement Gym | Freestanding | Passive (powered via Cat6) | GigaPlus switch (Cat6) |
| Office | Deco XE75 Pro | Office | Freestanding | Passive | MokerLink switch (Cat5a) |
| Master Bedroom | Deco X50-PoE | Master Bedroom | On-wall | PoE (5-port PoE switch via Cat5a) | 5-port PoE switch |
| Back Yard | Deco X50-Outdoor | Back Yard | Outdoor mount | PoE (5-port PoE switch via Cat6) | 5-port PoE switch |
| Garage | Deco X50-Outdoor | Garage | Outdoor mount | PoE (5-port PoE switch via conduit Cat6) | 5-port PoE switch |

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## SSID Configuration

| SSID | Bands | Purpose | Client Isolation |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Main (MLO) | 2.4 / 5 / 6 GHz | Primary devices | No |
| IoT | 2.4 GHz only | Smart home devices | Intended — method unverified |
| Guest | 2.4 / 5 GHz | Guest access | Yes — no local network access |

> **IoT isolation caveat:** Deco abstracts network isolation implementation details. It is the intent that IoT devices cannot communicate with main LAN devices, but the specific mechanism (VLAN, client isolation, UCG firewall rule) has not been verified. **Do not treat IoT as confirmed isolated until this is investigated.**

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# Known Limitations & Notes

- IoT device migration to the IoT SSID is **in progress** — not all smart home devices have been moved over yet
- The Back Yard Run 2 (non-PoE Cat6) is reserved for future WAN failover — not a Deco uplink
- No wireless backhaul in use — all nodes require a wired Ethernet connection

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# Outstanding Action Items

☐ Verify IoT network isolation mechanism — check UCG firewall rules and Deco app network settings

☐ Complete migration of all smart home devices to IoT SSID

☐ Document final device-to-SSID mapping once migration is complete

# Last Updated

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# End Devices — Network Interfaces

## Overview

Key server and endpoint devices and their physical network interface configuration. All servers are assigned **static IPs configured at the UCG Fiber**. All other devices use DHCP (with or without reservations — to be documented separately).

> Full static IP and DHCP reservation mapping is out of scope for this page — see **Network → Logical Configuration → IP Address Management** (future page).

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## Server & Key Endpoint Interfaces

| Device | Hostname | Location | NIC Speed | Switch | IP Assignment |
|---|---|---|---|---|---|
| MiniPC Intel Core Ultra 9 | Centerpoint | Office | 2.5GbE onboard | MokerLink | Static (UCG) |
| QNAP TS-873 (UnRAID) | Lusankya | Office | 2.5GbE NIC | MokerLink | Static (UCG) |
| N100 Server (Home Assistant OS) | Corsec | Media Room | 1GbE onboard | Media Room Switch #2 | Static (UCG) |
| Gaming PC (RTX 3060) | Halcyon | Media Room | 1GbE onboard | Media Room Switch #2 (daisy-chained) | Static (UCG) |
| UniFi Cloud Gateway Fiber | Whistler | Network Closet | 10GbE WAN + multi-port LAN | Core (is the switch root) | Static (self) |

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# Notable Interface Constraints

- **Halcyon** is currently wired in the Media Room via daisy-chained 1GbE unmanaged switches off a single Cat5a wall drop — bandwidth is shared with all other Media Room devices including CorSec, Smart Hubs, TV, Xbox, and PS4
- **Lusankya** has a 2.5GbE NIC but the QNAP TS-873 onboard NICs are 1GbE — confirm which NIC is active for primary traffic
- **Centerpoint** 2.5GbE is the bottleneck on the MokerLink → GigaPlus SFP+ uplink for inter-server traffic; Lusankya is on the same segment

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# Outstanding Action Items

- [ ] Document full static IP table and DHCP reservation list (separate page)
- [ ] Confirm Lusankya active NIC (onboard 1GbE vs add-in 2.5GbE)
- [ ] Evaluate moving Halcyon to Office switch when rack buildout is complete (dedicated Cat6 run consideration)

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