

Conversation: a digital twin of Snowdon Towers, with Claude Code, no MCP

The conversation behind the video, condensed: 3 requests and the assistant's answers.
The BMS readings are demo data. From [VCAD + AI · Digital twin kit](#).

USER

This folder has the VCAD Power BI project of Snowdon Towers and last week's export from the building management system (data/): temperature, CO₂ and occupancy, room by room, hour by hour. Build me a digital twin.

CLAUDE

I read the export and the model's data first.

The export

- `bms_sensors.csv` : 117 sensors, three per room (temperature, CO₂, occupancy), with room number, name and level.
- `bms_readings.csv` : 19,656 readings, one per sensor and hour, Monday 5 to Sunday 11 October 2026.

The model: 54 Revit rooms in the New Construction view, each with a **Number** (101, 303, P02...), a name, a level and a use: offices, live/work units, studios, a café, shops, corridors, plant rooms. The export uses the same numbers: **all 39 rooms in the export match a room of the model**. Stairs, lifts and outdoor spaces have no sensors.

Four things stand out in the week

1. **Live/Work Unit 303 (L3)**, Tuesday night: under 18 °C from midnight to 8:00. Heating off?
2. **Office Unit 401 (L4)**, Wednesday from 13:00: up to 29 °C, and CO₂ over 1,000 ppm until the evening. Ventilation fault? Back to normal on Thursday morning.
3. **Café 101 (L1)**, Friday lunch: CO₂ over 1,000 ppm.
4. **Machine RM P02 (Parking)**, Saturday and Sunday: over 30 °C.

For the 3D, the VCAD viewer can draw a heatmap of the sensors on the floors: I was reading how it maps the sensors to the rooms.

USER

Don't get tangled up in the heatmap: use colours, markers, the rest.

CLAUDE

The **Digital Twin** page is built, first in the project.

Model

- **TWIN_Readings** : the two CSV files joined and pivoted, one row per room and hour (6,552 rows), with Day, Hour and a **Severity**: 0 OK, 1 warning, 2 alarm.
 - Temperature: OK from 19 to 25 °C, warning up to 18 or 27 °C, alarm beyond.
 - CO₂: warning over 800 ppm, alarm over 1,000 ppm.
- **TWIN_Rooms** : the Revit rooms and their Number, read from the VCAD data, related one to one to the model's objects. The readings join it on the room Number.
- Measures: temperature, CO₂, people, status and its colour, a temperature colour scale, rooms in alarm and in warning.

Page

- KPIs: the moment selected, rooms in alarm, rooms in warning, temperature, maximum CO₂, people in the building.
- **3D**: the rooms coloured by status, or by temperature from the colour menu. The Level filter cuts the 3D to that floor.
- **Day, Hour** and **Level** as lists, so every choice is one click.
- A chart of the rooms in warning or alarm, hour by hour: the four incidents stand out as four peaks.
- The rooms, worst first. Click one and the 3D isolates it, the rest in X-ray, and zooms in.

Verified: the model loads in TOM, and the readings query runs in Power Query and returns 6,552 rows.

USER

Put some nice icons on the markers instead of the dots.

CLAUDE

Done. I read how the VCAD viewer draws markers: it takes a list of styles, each with its own image, and a field that picks the style row by row.

- I drew **seven SVG icons**, a white glyph on a coloured disc with a white ring: a green check (OK), a thermometer (warm in orange, hot in red), a snowflake (cool in light blue, cold in blue) and "CO₂" (stale air in orange, alarm in red). Selected, the ring turns yellow.
- A measure, **Marker Style**, picks the icon of each room: the worst problem at the moment selected.
- The icons are stored in the viewer's settings inside the project: no external files.

One thing to know: the viewer draws a marker for every row of data, so every monitored room has one. The healthy rooms show a green check, and the problems stand out.