

SMART HOME REPORT

Presented by Aaron Davies

CORE PLATFORM	PROTOCOL SUITE	TOTAL ENDPOINT CAPACITY	ELECTRICAL SERVICE
Tuya Smart/Alexa	Zigbee 3.0, Wi-Fi, Matter, Matter over Thread	105 Active / 210 Max	63A Single Phase w/ 6Kw Solar

1. INFRASTRUCTURE & PLATFORM ARCHITECTURE

The residential automation infrastructure is built upon the Tuya platform. By leveraging an ecosystem supporting over 310,000 products across 2,000 categories, the deployment ensures vendor-agnostic hardware compatibility and native support for emerging smart home standards including Matter and Matter over Thread.

NETWORK TOPOGRAPHY • Primary LAN: 3-Node Wi-Fi Mesh Network. • Low-Power Mesh: 3-Node Zigbee Mesh Network. • Local Autonomy: Core automation routines retain full execution capabilities during Internet disconnection.	CONTROL SURFACES & INTEGRATION • Touch Interfaces: 3× Dedicated Touchscreen Smart Panels. • Voice Layer: Integrated Amazon Alexa on touch panels. • Physical Layer: Standard mechanical switches. • App Interface: Tuya Smart App (4.6★ rating across 550k+ reviews).
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2. SUBSYSTEM HARDWARE MATRIX

Domain	Hardware Endpoints Installed	Control & Automation Logic
Lighting & Shading	Dimmable lighting (100% house coverage), Motorized curtains, Motorized blinds, Smart scene keypads.	Automated sunrise/sunset schedules, departure/return scenes, manual wall keypads.
Security & Access	Biometric smart door lock, Video doorbell, Multi-camera exterior suite, Door contact & motion sensors (int/ext).	Biometric authentication, event-driven video recording, intrusion sensing & local alarms.
Climate & HVAC	Central Heat Pump/HVAC system, 3× Zone temperature sensors, Ambient humidity sensor, Heated towel rail.	Continuous thermal band regulation for optimal COP performance; occupancy independent.
Life Safety	Smart smoke alarms, SOS/Medical alarm button, Bath overflow sensor.	Automated emergency broadcast contacting designated contacts via voice/SMS.
Appliance & AV	Smart oven, Dishwasher, Clothes dryer, Roborock robotic vacuum/mop, 3-zone audio matrix, Smart TVs.	Centralized AV matrix control, scheduled cleaning runs, appliance power monitoring.
Irrigation	5-Zone smart water irrigation system, Soil moisture sensors.	Weather-dependent dynamic irrigation scheduling based on local atmospheric data.

3. ENERGY MANAGEMENT & LOAD SHEDDING

To operate within a strict 63A single-phase supply limit while maximizing rooftop solar utilization, four dedicated metering circuits continuously monitor electrical flow (Main AC Supply, Rooftop Solar Generation, HVAC Load, Hot Water Cylinder Load).

- **Automated Peak Load Shedding:** High-draw loads are automatically throttled during peak consumption. For example, if multiple induction cooktop elements exceed the 63A budget, the system temporarily pauses EV charging until cooktop power drops.
- **Rooftop Solar Divert:** Excess solar generation automatically triggers high-capacity thermal and mechanical loads, including the Hot Water Cylinder, Smart EV Charger, Dishwasher, and Clothes Dryer.
- **HVAC Efficiency Optimization:** Maintains steady-state temperatures across 3 climate zones to maximize the Heat Pump's Coefficient of Performance (COP), preventing inefficient ramping cycles.
- **Holiday Setback Logic:** Automatically reduces Hot Water Cylinder baseline temperatures, places HVAC into low-power air circulation mode, and simulates occupancy via solar-tracked window treatments.

4. MAINTENANCE, HANDOVER & QUALITY ASSURANCE

All hardware endpoints completed pre-deployment stress testing across multiple vendor samples to establish component reliability. Comprehensive documentation, device manuals, and configuration maps are archived for system maintenance. The architecture supports complete digital ownership transfer via the Tuya enterprise platform, allowing intact migration of all automations, paired nodes, and routines to a new user account.