WHAT IS IT?

At Wavecom, we see the **Connected Rail** as an integrated system supported on 5G, providing: Wi-Fi connectivity for passengers, Real-Time Fleet Information, Advanced Passenger Counting, Origin & Destination Matrixes and managed connectivity for other onboard sub-systems (confort and air quality monitoring, CCTV, seat occupancy...)
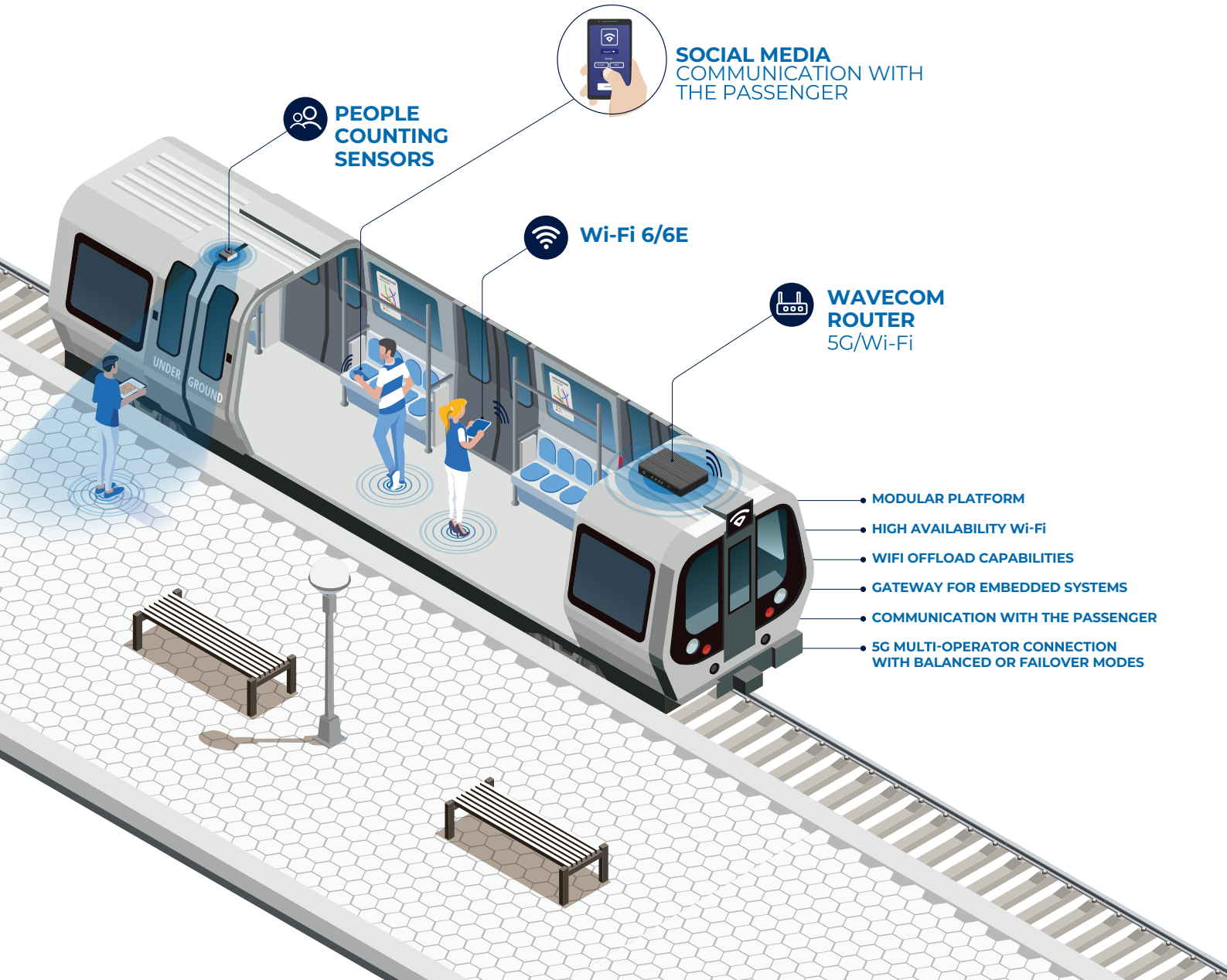
WHAT DOES IT CONSIST OF?

Wavecom's Railway certified Gateways provide the interfaces and high performance required for trains and trams communications, providing multiple 5G modems for redundant internet connectivity, Wi-Fi 6/6E service to passengers and managed connectivity through Ethernet and Serial for onboard systems.
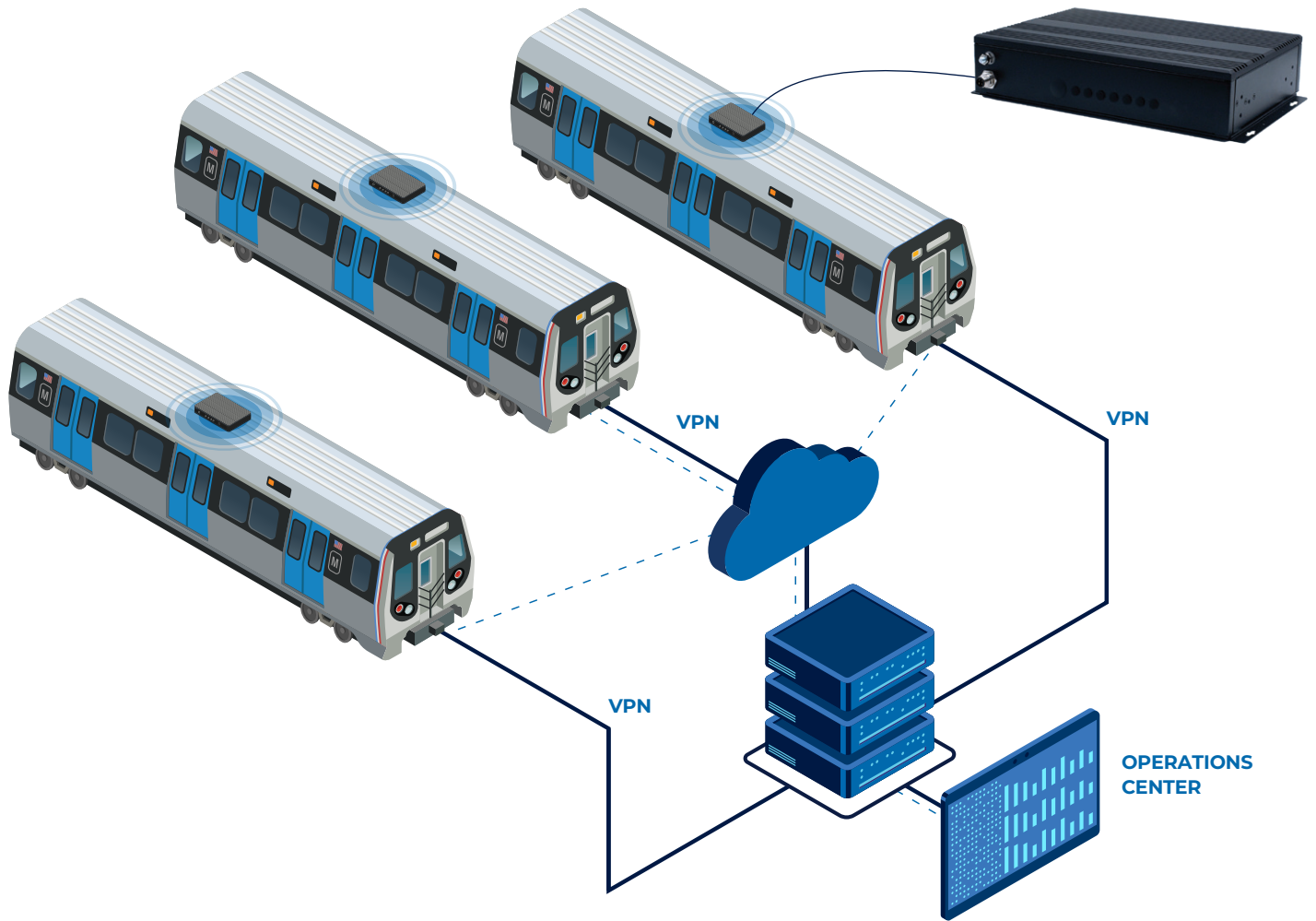
Wavecom's IoT manager is a multi-tenant platform supporting all deployment sizes, from a few vehicles to hundreds, following a top/down organization, as required for fleet management.

It centrally manages the Gateways and orchestrates the applications running on the fleet: Wi-Fi Service for passengers, Passenger profiling statistics via Wi-Fi, Passenger counting, Origin & Destination matrix, Sensors data visualization, Connectivity for onboard systems, APIs, Monitoring, Service and support.

CONNECTED RAIL

PEOPLE COUNTING SENSORS

SOCIAL MEDIA COMMUNICATION WITH THE PASSENGER

Wi-Fi 6/6E

WAVECOM ROUTER 5G/Wi-Fi

- MODULAR PLATFORM
- HIGH AVAILABILITY Wi-Fi
- WIFI OFFLOAD CAPABILITIES
- GATEWAY FOR EMBEDDED SYSTEMS
- COMMUNICATION WITH THE PASSENGER
- 5G MULTI-OPERATOR CONNECTION WITH BALANCED OR FAILOVER MODES

UNDER GROUND

VPN

VPN

VPN

**OPERATIONS
CENTER**

COMMUNICATIONS
SYSTEM

WAVECOM
GATEWAY

MANAGEMENT

- **Local:** RS232 serial (DB9), SSH and Web GUI
- **Remote:** SSH and Web (HTTP and HTTPs), TFTP, SNMPv1, SNMPv2, SNMPv3
- **Centralized:** Via Wavecom IoT Manager

NETWORK

- **Gateway Features:** DHCP Server & relay, NAT, PPPoE, Link Aggregation (IEEE 802.1ad)
- **IP Stack:** IPv4 and IPv6 simultaneously
- **VLAN:** 802.1Q (until 256): Management VLAN. Access and Trunk Modes,
- **Other:** QoS support (WMM/802.1e) for real-time data, video and voice VPN client for secure connections (OpenVPN, IPSec, DWVPN) – Encryption AES128/256, Hashing MD5, PKI certificates

SECURITY

- **Encryption:** 64-bit and 128-bit WEP encryption, WPA/WPA2 Personal and Enterprise
- **Authentication:** TKIP, AES and IEEE 802.1x/RADIUS based authentication
- **Other:** SSID broadcast control MAC address control list Firewall for MAC, IP, protocol and port filtering

WAVECOM
GATEWAY

- **CPU: Intel Atom® x6425E, quad core @ 1,8 GHz**
- **RAM: 8GB DDR4**
- **Storage: 64GB industrial grade eMMC flash**
- **Cellular: Up to 2x 5G Modem (R15 NSA/SA up to 2.4Gbps)**
- **Wi-Fi: Up to 2x IEEE802.11ac (dual-band 2.4/5GHz)**
- **GNSS: GPS, GLONASS, Galileo and BeiDou**
- **Ethernet: 3x 10/100/1000 Mbps Gigabit Ethernet ports, M12 8pin X-coded**
- **2x Serial RS232/422/485 (upon request)**
- **Digital IOs (upon request)**
- **Input Voltage: 24/48VDC and 72/110VDC**
- **RTC with 6-day retention time (upon request)**
- **PoE+ capability on 2x GbE ports for PSE (upon request)**
- **IP40 Fanless box**
- **Operating temp: -40 °C to +70 °C,**
- **Storage temp: -40 °C to +85 °C**

Certifications: EN50155: 2017 including EN45545-2 Fire & Smoke, EN50121-3-2 EMI/EMC, EN61373 Shock & Vibrations (Body Mount Class B), EN60068-2 Climatic. CE(EN62368-1 for safety), FCC part 15

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NP 4457: 2021, ISO 9001, ISO 14001, ISO 45001: 2018, ISO 27001