

Introduction to Organic Response

Organic Response lighting control is based entirely on distributed intelligence. A luminaire is fitted with an Organic Response node, this allows it to respond to its environment and/or receive information from its neighbouring luminaire, so that the optimal amount of light is delivered when and where needed. Each sensor node is fitted with a motion sensor, ambient light sensor, infrared transmitter and infrared receiver. Plus RF 2.4Ghz transmitter/receiver, these allow wireless communication with their closest neighbours. Plus the option of cloud based communication. Passive nodes are only fitted with the RF 2.4Ghz transmitter/receiver.

How Organic Response works; a sensor node sees occupancy and communicates that occupancy and light level to its neighbours via infrared signal "level 1 signal". Its neighbours respond by outputting predetermined light levels and simultaneously transmit a "level 2 signal" to further neighbouring sensor nodes. This propagates rapidly across the floor. The relationship between a sensor node and its neighbours we call a Personality.

Features & Benefits

- Occupancy control, daylight control, scene control and manual control
- Corridor linking, individual luminaire control and grouped luminaire control
- Out of the box operability
- Tunable white control

Cloud based:

- BACnet integration, real time status of current utilisation and performance, detailed historical performance data for trend analysis, time control, status reporting at luminaire, automatic emergency light testing and reporting with fault and failure notifications (see Platform 2 cloud based)
- Automatic over the air updates
- Open API integration between third party systems
- New features may come available, these can be purchased if required, please contact Whitecroft controls technical team.

Organic Response can be a simple field based system (Tiers 1 to 3) or advanced cloud based (Tier 4)

Field Based (Tiers 1 to 3)

Node to node only:

Instant out of the box, default factory settings deliver proximity limited communication. No need for expert commissioning services.

Organic Response can be optimised via the Organic Response app; adjusting light levels, dwell times, change lighting "Personalities" and activate daylight dimming. Further customization by introducing additional devices, create independent and dependent zones, create customised scenes eg: meeting rooms and for presentations, create switch integration; pairing wireless switches.

Cloud Based (Tier 4)

Node to node plus IoT Gateway for cloud connectivity:

Centralised view of building wide assets. Real time visibility of current utilisation and performance. Detail historical data of utilisation and performance for trend analysis. Real time system status with fault monitoring with email fault notifications. Detailed historical fault data. Cloud portal time based scheduling for control of building lighting. BMS integration via BACnet. Automatic over the air updates. To enable the cloud based platform, it will require our gateways to be connected to the Internet. This will need the intervention of the customer's IT department, for DHCP or static IP configurations, both will require inbound and outbound rules activating (port forwarding) see below table of ports.

Required Hosts:

https://portal.organicresponse.com	TCP/HTTPS (Port 443) TCP/MQTT (Port 8883) UDP (Port 123)
a34occh7iu2muo-ats.iot.ap-southeast-2.amazonaws.com	TCP/HTTPS (Port 443) TCP/MQTT (Port 8883) UDP (Port 123)

In order to implement static IP configuration, the following information must be obtained:

- A list of IP addresses
- Default gateway address (the address of the IP network gateway)
- Subnet mask and DNS (specify even if default)

It is important that all gateway ID's and serial numbers which are displayed on the box and on the back of all gateways are associated to the correct IP addresses.

Data

It is the principal of Organic Response that the customer owns the data. Organic Response is GDPR General Data Protection Regulation compliant. All data is stored in the AWS cloud, which complies with the relevant regulations and is used in finance, healthcare and government applications.

Communication

The Sensor Nodes communicate to each other in two ways:

- Infrared (IR) communication (38kHz carrier frequency)
- RF mesh 2.4Ghz, each sensor node communicates pier to pier over a low energy RF mesh backbone and also to the optional IoT gateways.

Each Gateways default configuration is to allow Internet connection to the Organic Response web based portal API as a DHCP device. Gateways must be installed within 5 Metres line of sight to a cluster of Organic Response nodes, this will give a stable mesh. Maximum 130 sensor nodes per IoT gateway, we would typically design in 15% spare capacity of nodes per gateway. We recommend each gateway to be positioned central to the group of 130 nodes it communicates with via the WirePAS RF 2.4Ghz, this is to allow for stable mesh networks to be established.

Please note: The building's construction materials can vary transmission distances.

Infrared communication is not able to travel across physical barriers (walls, doors, stair cores etc). However from our sensor node 3 (SN3) version onwards, occupancy, light levels or configuration messages can be communicated via RF 2.4Ghz.

Passive Mini Nodes communicate via RF mesh 2.4Ghz, node communicates pier to pier over a low energy RF mesh backbone and also to the optional IoT gateways.

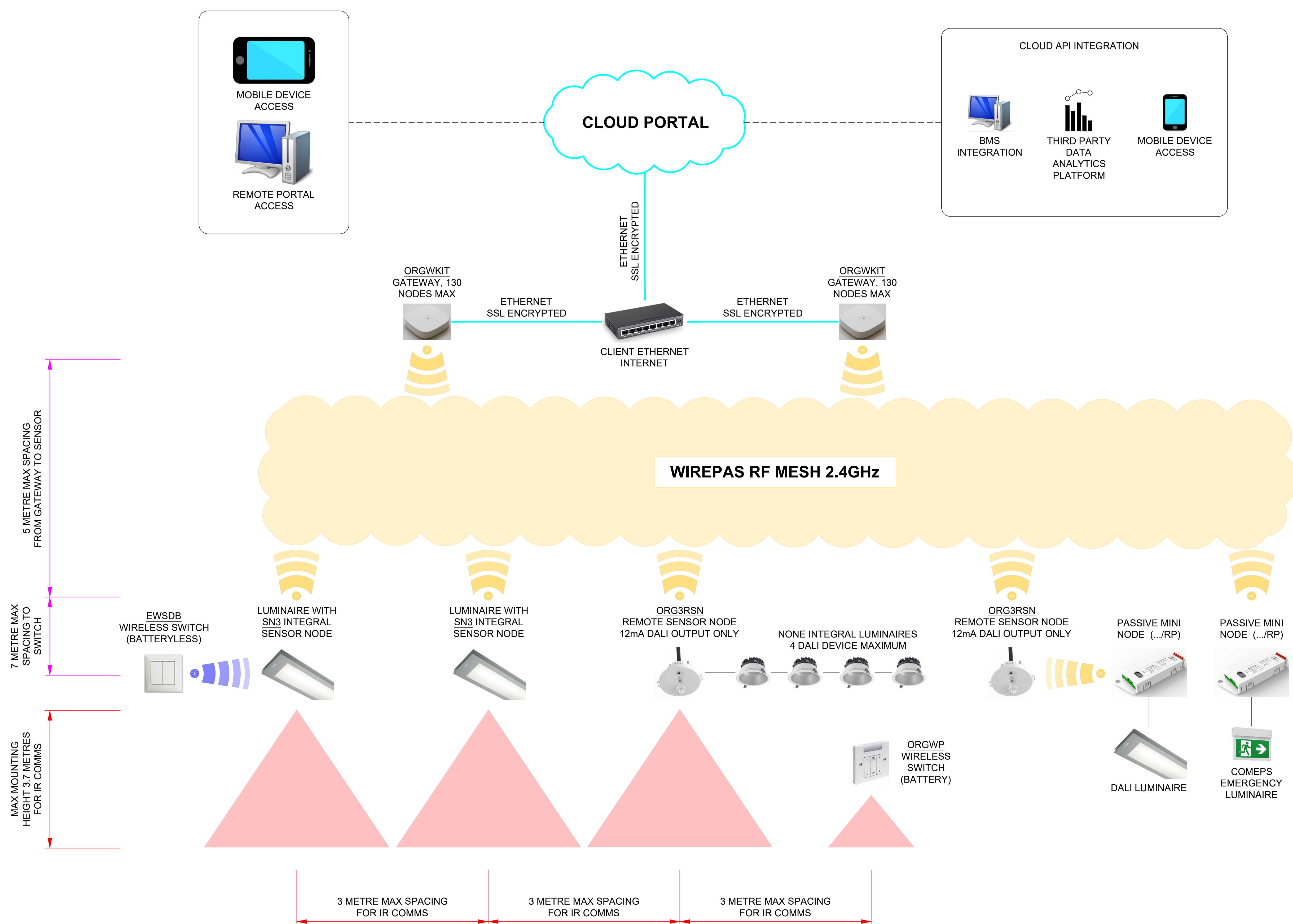
Encryption

The RF Mesh delivers Enterprise level security built on industry standards to guarantee message integrity and authenticity. Every message is encrypted with AES-128 counter mode. A device without the correct encryption and authentication key pair cannot join the network.

Gateways send and receive data to and from Amazon Web Services' (AWS) IoT service. Each gateway ships with a unique certificate that is used to establish an AES-128 encrypted SSL connection with the cloud.

Technical Specification

- Infrared carrier frequency: 38kHz
- Distance between sensor nodes: IR comms 3 Metres max
- Maximum sensor mounting height: 3.7 Metres
- Sensor node ambient temperature: 0°C to 50°C
- Luminaire compatibility: Dali (subject to Organic Response® list of approved drivers)
- Passive Mini Node: 1 Dali device max
- SN3 Integral Sensor Node driver load: 1 Dali device max
- ORG3RSN Remote Sensor Node driver load: 4 Dali device max
- Remote Sensor Node Dali Cable: 2 Core 1.5mm² radial. Maximum length = 300m
DALI pair is polarity conscious. When DALI and mains cable share containment, DALI cable to be rated at same potential voltage as mains (although the DALI cable operates at ELV potential it is not classified as SELV). All wiring and connections are the responsibility of the customer
- IOT gateway communication: WirePAS, Ethernet TCP/IP (RJ45 cat5)
- Gateway node capacity: Max 130 sensor nodes per gateway
- Gateway max distance from node: 5 Metres max
- Gateway security: 128bit AES, TLS, storage Amazon AWS IoT)
- Wireless battery less wall switch protocol: EnOcean (2.4Ghz low power)
- BMS Integration: BACnet protocol
- WIREPAS transmission spacings: Luminaire node to luminaire node = 10M
Gateway to luminaire node = 5M



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Note :- All information detailed in this document is **not** project specific, and is provided as a typical example only. Whitecroft Lighting reserve the right to make changes to Equipment and Specification as required. It is the customers responsibility to verify the required specification on a project by project basis.

Whitecroft Lighting Ltd
Burlington Street
Ashton - under - Lyne
Lancashire
OL7 0AX
United Kingdom

Telephone: +44 (0) 330 6811

email@whitecroflight.com
www.whitecroflighting.com

Whitecroft
lighting