Why Intelligent Environments Ltd?

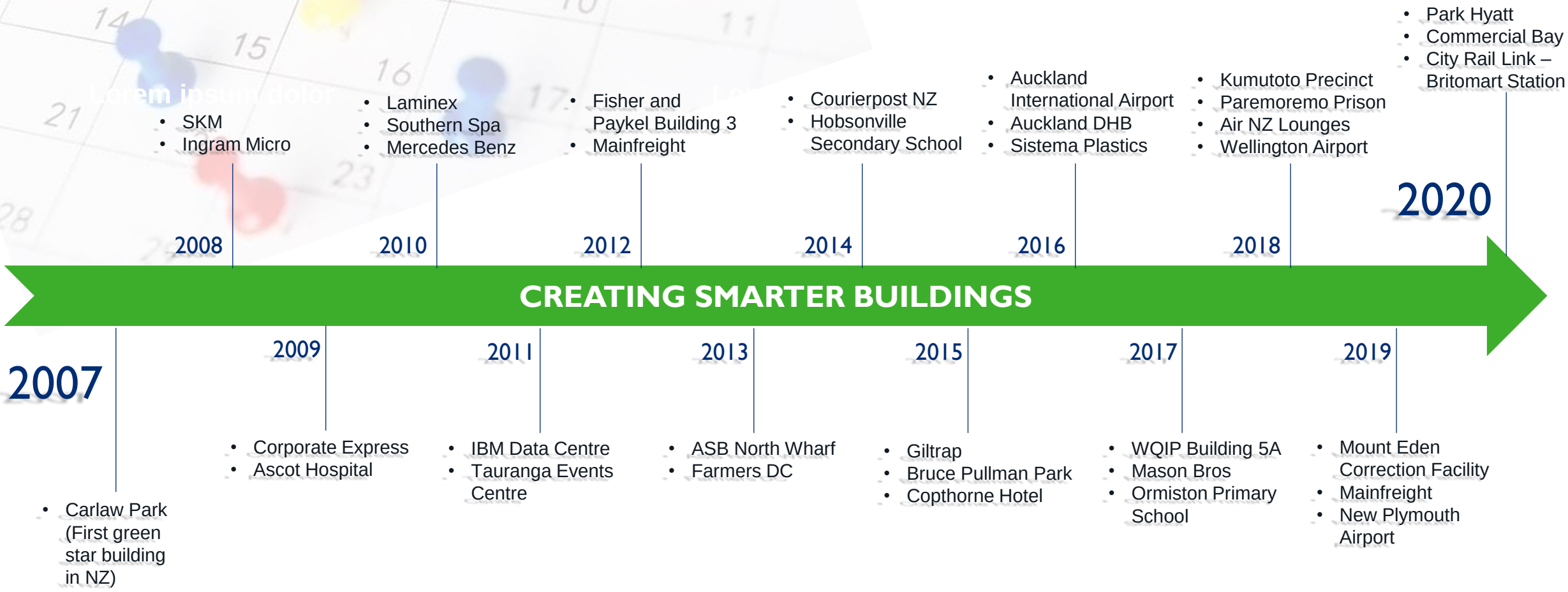
SITEWISE GREEN 2020/21

Experience	Solutions	Reach	Relationships	Professionalism
Established in 2007, IEL leads the way in building technology.	*Our solutions are designed using proven products. 'It works'- everytime.*	*Based in Auckland and Wellington – We deliver projects nationwide.*	*We value relationships with consultants, electrical contractors and end-users.*	*Our processes are driven by our values. All our projects are managed and delivered professionally.*

CREATING SMARTER BUILDINGS

Past Projects

A timeline of a few of our projects…



DALI 2.0 – What is it?

- Digital Addressable Lighting Interface, named DALI, is a communication language.
- DALI facilitates the communication and therefore control of multiple devices such as ballast, transformers and other lighting equipment.
- Devices which speak the same language can exchange information, in much the same way people can exchange information when they communicate using the same language.

DALI – Why choose it?

In addition to being a cost-effective, future proof solution, using DALI has the following benefits:

Simple

DALI devices can work straight out of the box for the simplest systems.

Flexible

DALI devices can be reconfigured without having to touch the wiring.

Scalable

DALI can function on small and large systems, with subnets in a large building.

Robust

DALI works best with other DALI devices but can also be translated.

Recognised standard

DALI is a recognised, widely used standard and is therefore compatible with a large range of ballasts.

Control method options:

The choices of control methods for lighting devices are quite limited.

- Non dimmable ballast

(referred to as fixed output/switched devices)

- Phase cut dimming

(this cannot be used reliability for fluorescent lighting or HID lighting)

- 1-10V analogue system

(International lighting control standard)

- DSI digital system

(used only by Tridonic)

- DALI

(latest control standard)

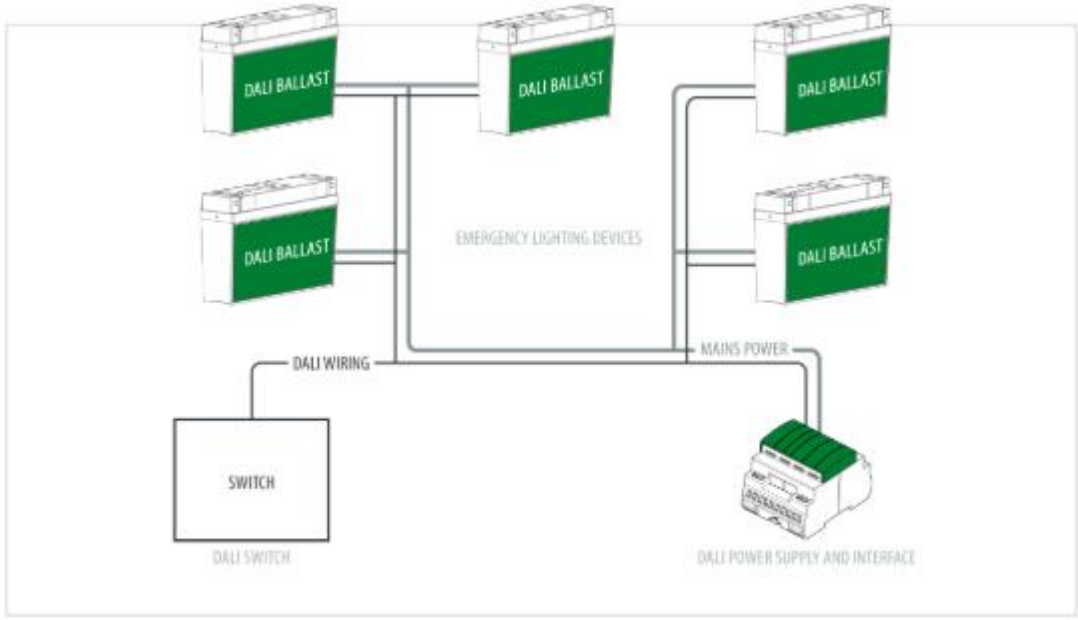
The benefits of DALI

- Simple 5-core wiring, no special control cable, no polarity, no termination and no segregation
- Removes the special wiring needed for 24 hour power
- Removes the special wiring needed for emergency generator use
- Removes the special wiring required for monitored emergency lighting
- Easy base-building commissioning
- Easy commissioning for tenancies
- Integration of standard and emergency lighting
- No need to switch the mains voltage (handled internally by the ballasts)

Dali Features & Information

Simple DALI line

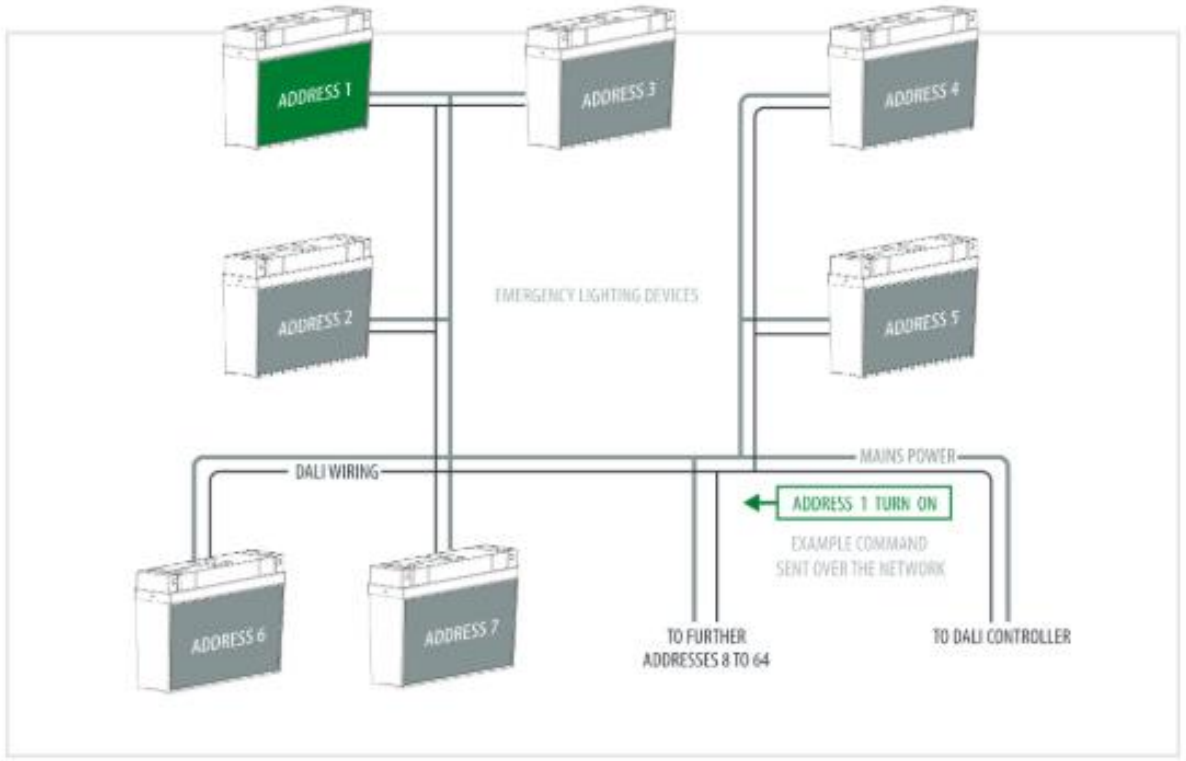
- Here you can see DALI devices, these can be ballasts, transformers, LED controllers or emergency devices compatible with DALI.
- Up to 64 DALI devices can be connected to a line.
- Sensors, switches, groups or scene controllers can be connected anywhere on the DALI line. These are optional devices.
- A DALI power supply is required for every DALI loop and a DALI controller allows control of a DALI line.
- The DALI protocol allows for multiple controllers per DALI loop. Also these devices are optional.



Dali Features & Information

Individual control

- Each DALI device has its own address which enables individual communication and control over a single DALI line.
- This means that you can wire up to 64 DALI devices together and control them separately, whereas traditionally you would need to wire each device separately.
- Individual control provides the means to gain the maximum power savings and comfort.



Dali addressing is between 00 and 63.

New devices, do not have an address until programmed

HINT: Think of a command as a letter sent via the post. Only the person it is addressed to will open and read the letter.

Dali Features & Information

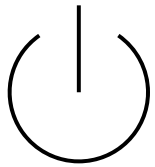
Groups

- Groups allow multiple DALI Devices on the same line to be grouped together which allows the devices to perform an action together.
- Each DALI device can be assigned membership to a group or multiple groups.
- This grouping allows commands to be sent out in groups with all members of the group reacting to one individual group command.
- If a device is not part of the group it will be ignored.

HINT: You can group devices together into rooms or areas to perform functions easier

Dali Installation Requirements

Mandatory requirement for DALI communication



DALI LINE POWER SUPPLY

This device is current limited and enables DALI devices to communicate on the line without having to use their own power

Typically 230mA.

This is the device that you want to control

DALI DEVICES

DALI devices are available to control almost every light source or even blind controllers or relays.

An installer or designer can install as many as 64 DALI devices connected to a single DALI line.
Control devices can be, but not limited to

- Fluorescent Ballast
- HID ballast
- LED converter
- Halogen converter
- Incandescent converter
- Relay

Not more than 2mA per device

This allows you to control the DALI device

DALI CONTROLLER

A controller can be as simple as a DALI group controller, DALI scene controller, DALI sensor or even a lighting control system that can communicate to the DALI device.
Control devices can be one or more of the following

- DALI Gateway
- DALI Front end controller
- DALI Switch
- DALI sensor
- DALI IR transmitter
- DALI 4-20ma receiver etc

Dali Wiring / Installation

DALI cables can be wired next to normal mains carrying wires reducing the need to segregate the control wires. Thanks to a high signal to noise ratio and wide ranges for the digital signal, it is virtually impossible for the DALI data signal to be affected by interference.

The DALI line

- The DALI line can be run up to **300m** using **1.5mm** twin active cable.
- The DALI specification allows for maximum 2V drop in the communication signal.
- The DALI line does not require termination of the line and supports all wiring typologies except rings and closed loops (star, trees, branches and chains are all acceptable).
- The DALI line is a 4 or 5 wire system (requiring active, neutral and two control wires). An earth wire is required in single insulated devices.
- A DALI line can be connected to a maximum of **64 DALI type devices**.

Dali Wiring / Installation

NOTE: A maximum of 64 DALI devices can be connected to a single line. The number of circuit breakers required may change based on the wattage of each DALI device

The DALI power supply

A DALI power supply can be wired at any position along the line wire and is used to facilitate communication between the DALI devices and the control system. The DALI power supply will continue output between 9.5 and 22.5 volts on to the control wires while there is no communication. DALI devices will respond to the control system by shorting the two control wires together.

Emergency lighting

Because all DALI fittings are supplied with a switched active supply, there is no added need for any extra circuit breakers or wiring. The same setup can be used for DALI lighting.

DALI emergency lighting or mixture of DALI and DALI emergency lighting: Due to the fact that the DALI wires are NOT SELV, normal wiring rules apply and this allows the DALI cables to be wired with the normal mains rated cable.

Backup generator

A backup generator can be wired directly to all supplies without consideration of the load. During commissioning, the load and fittings required to be powered by the emergency generator are selected and then programmed.

A control system can even be programmed to control the load and turn on more fittings as the generator stabilises.

24 Hour fittings

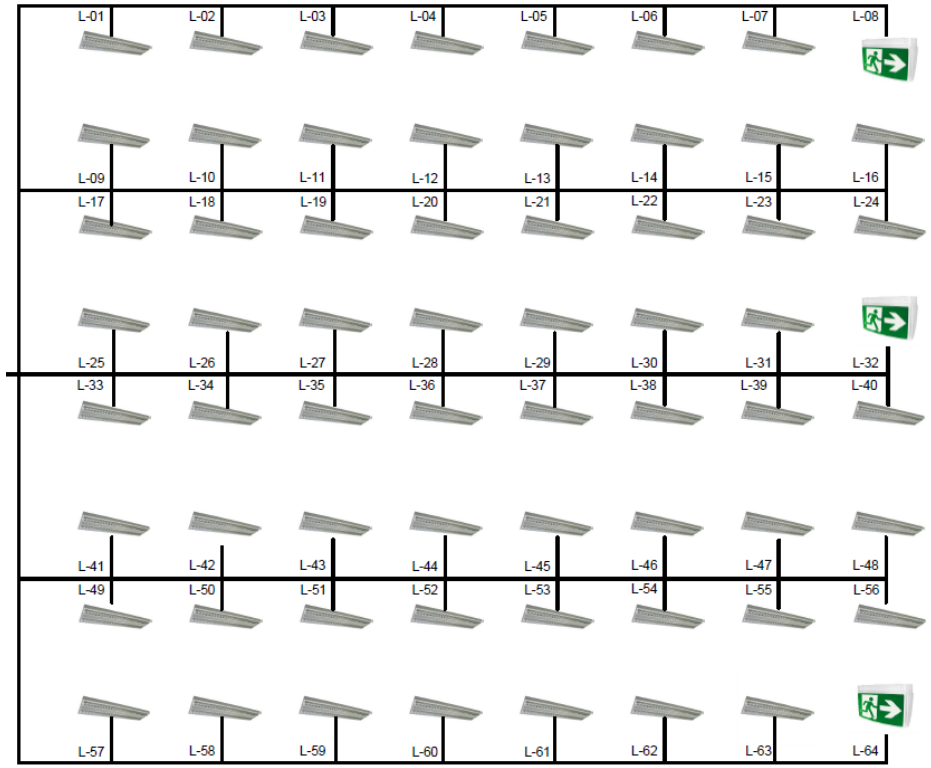
There is no need to separate fittings that need to operate 24 hours a day onto a separate supply. Fittings that are required to operate 24 hours a day can be programmed when the site is commissioned.

Design & Layout of a building

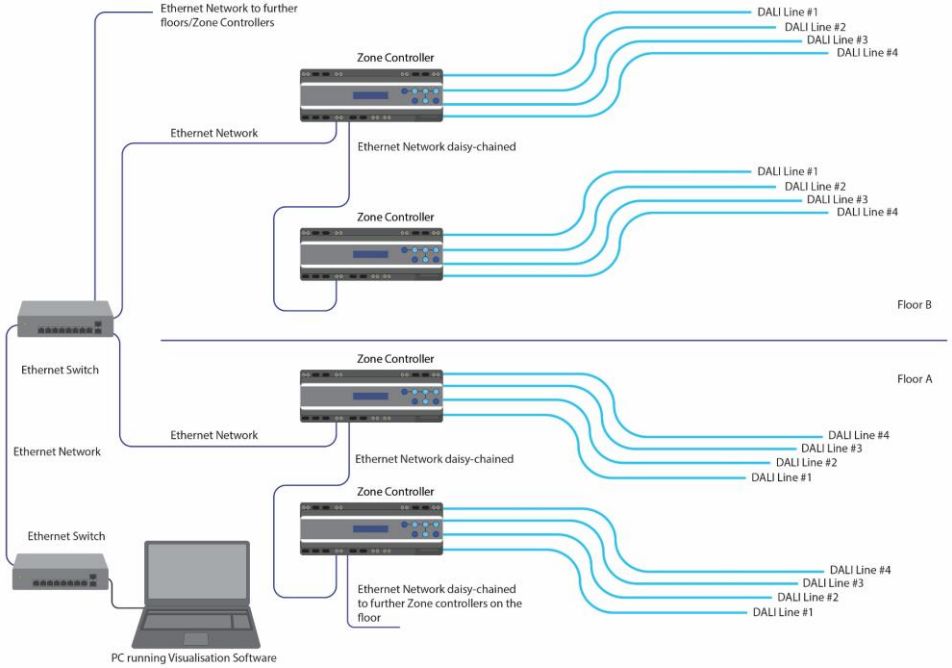
As each DALI line is limited to a maximum of 64 devices, it is common that more than one DALI line will be required on each floor. Commonly, floors are broken into a number of different sections containing up to 64 DALI devices. Each section is then wired back to the communications room located on the same floor.

As a DALI device is galvanically isolated, each DALI device can be supplied from a different electrical supply circuit or even a different phase. This means that wiring a DALI line does not have to take into account the layout of internal subdivisions.

Typically the DALI control system will have a connection box located on each floor to reduce the required wiring. A connection box will have two separate communication zones, one dedicated to the DALI protocol to talk to all DALI devices on the connected line(s), and the second to use the manufacturer chosen protocol(s) to connect the connection box and the control system together.



Design & Layout of a building



HINT: Try to group physical rooms onto the same DALI line to reduce the complexity of the installation and to allow easier control

HINT: For true DALI compatibility try to choose a control system which allows for other DALI controllers to be placed on the DALI line. This will allow for the greatest capability and can lower the future costs when change occurs, this is referred to as a multi-master DALI system.

NOTE: TCP/IP or Ethernet is the preferred choice for connecting multiple DALI lines together, as it is fast, efficient and can even use a shared communication backbone. Preference is given to Ethernet, as the combination of DALI & Ethernet can provide almost every option or control available on other systems.

Also other systems (like KNX or BACnet) tend to require both DALI and Ethernet to perform the same tasks. Using Ethernet & DALI properly removes the need to wedge a third protocol in between two perfectly suitable and capable systems, and thus reduces complexity and overall cost of the system.

Functionality & Flexibility

Because of the localised intelligence within each DALI device, it becomes possible to turn the DALI device on or off directly from the DALI control system rather than using a mains switch. This brings greater functionality and allows for flexibility and change after installation.

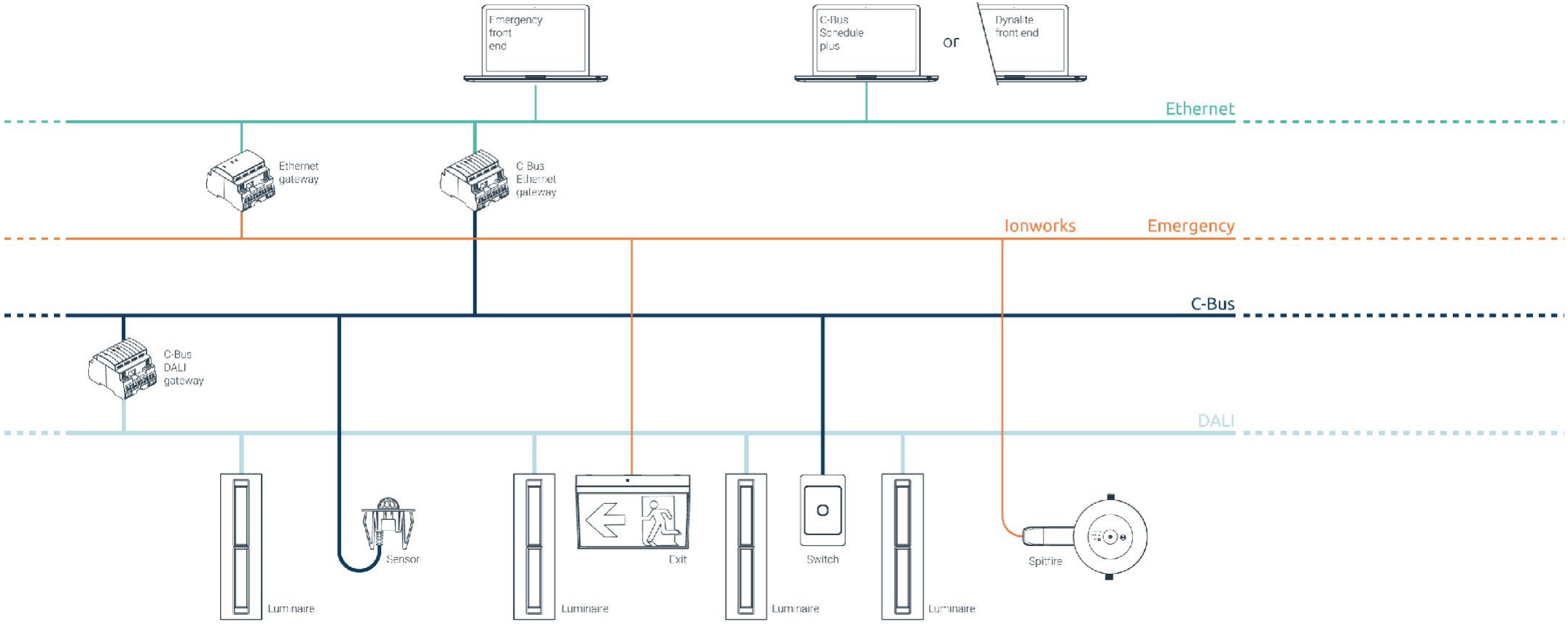
Moreover, changes can be made to scenes and functions through simple programming without the addition of any new hardware

Adjustable features

DALI devices have a number of features which can be changed to adjust the operation of the device.

- **Power on Level:** 1-100%
- **System Fail Level:** 0-100%
- **Minimum Level:** Physical Min Level -100%
- **Maximum Level:** Min Level – 100%
- **Fade Rate:** 1-15
- **Fade Time:** 1-15

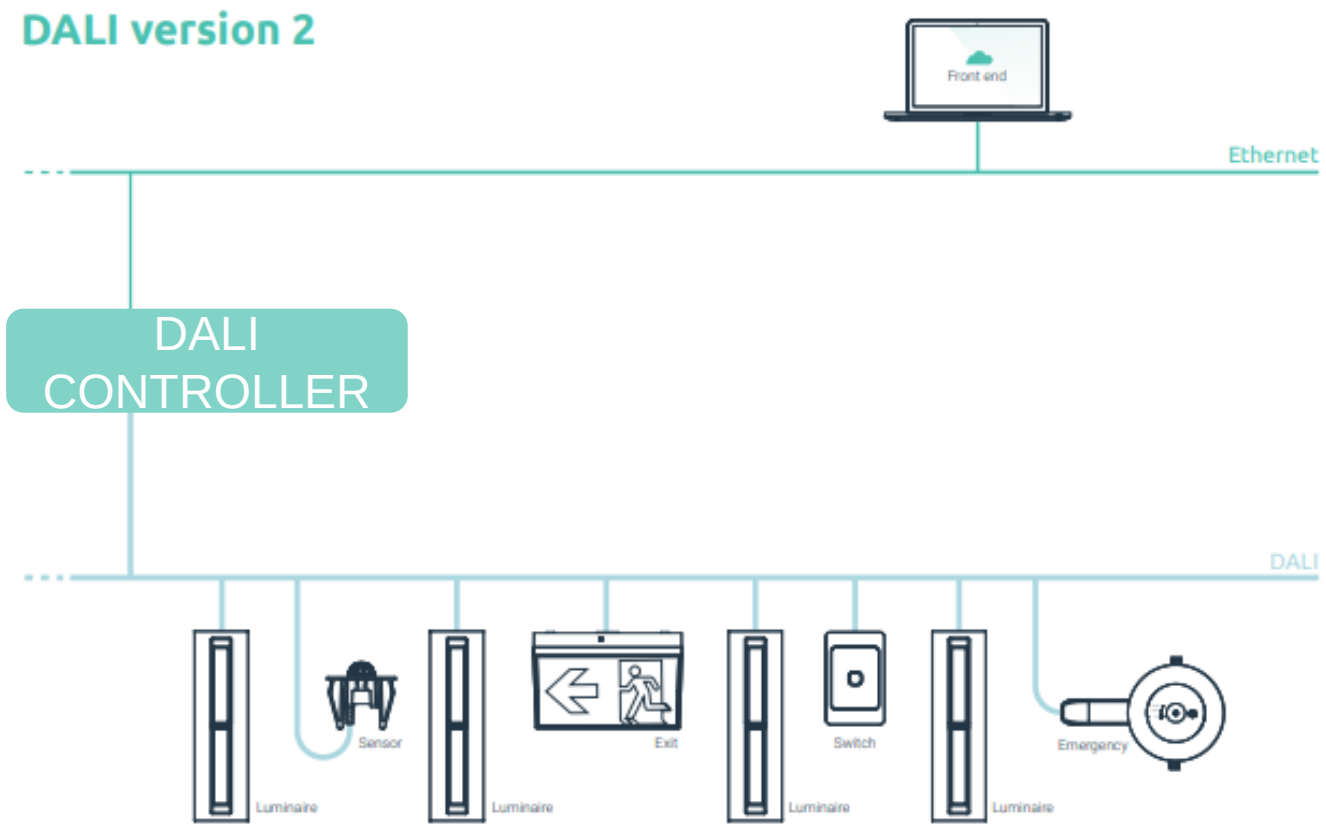
Multi Layered Legacy Systems Example



Complex to design, specify, install, commission, maintain

Dali Lighting Example

NOTE: All devices, including Emergency, sensors, switches etc co-exist on the same DALI line



Native speakers do it better

Protocols that use DALI gateways are normally slower and add extra complexity to DALI as they need to translate all their sent commands from their native language (for example KNX, CBUS, DYNALITE, BACnet etc) into the DALI language, whereas a native DALI device can speak directly to the DALI devices (ballast, leds etc) without translating the language.

Questions?

intelligent environments
CREATING SMARTER BUILDINGS

Thank you!