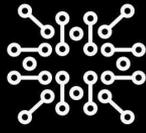


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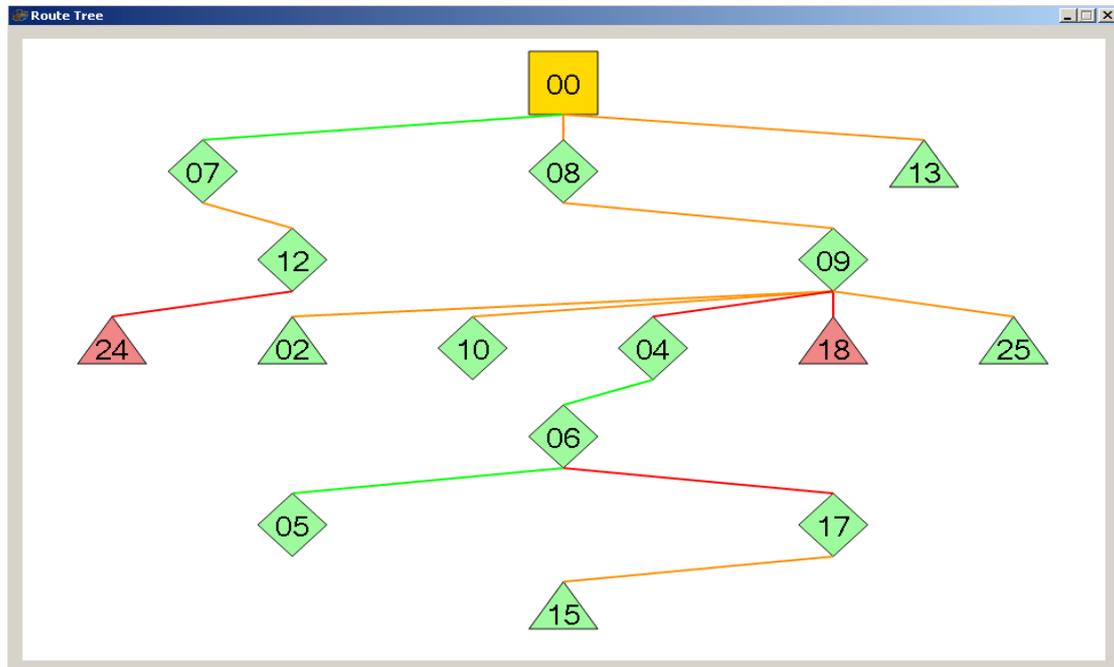
Introduction and set-up

(connectivity via gateway on USB slot)

2017

1. General info

1. All modules are **wireless, 802.15.4, 868 MHz protocol**; they can be located on any convenient place, as long as it is suitable for the measurements that it carries out. 1x and 3x energy meter enclosures are designed for placement in electric cabinets; however, they can also be used for plug monitoring
2. Modules may work on 3V/ 9V **battery or mains power**, via a low voltage adaptor. In some cases the module will, for operational reasons, require strictly mains power (e.g. CO2 metering). Energy meters are obviously directly sourced from the mains and will never run on batteries
3. **All nodes sample and report their data to the gateway with a sampling rate that can be defined in the admin panel.** The gateway is a USB stick that plugs into any USB slot on Internet connected PCs, notebooks, etc, and sends the data to the cloud.
4. **DATA ROUTING!** The nodes **do not connect necessarily directly to the gateway**; they may form a meshed network that optimizes routing and allows to compromise large distances. For example, a node that is 50m away from the gateway will not be able to reach directly the gateway. It will search for parents in between and if it finds some, it will select the best (in terms of signal power). This will then receive its data and forward them to the gateway; the figure below illustrates how the network dynamically emerges. You can see there that node 15 (located far away from the gateway) sends its data to node 17, this to node 06 (together with its native data) and so on till it reaches the gateway.



5. **NOTE: Only mains powered nodes can assume a parent role!** A parent must be always awake waiting for data! This is not possible for battery powered nodes; these sleep most of the time and can not stay awake as their battery will be fast exhausted
6. If a node is located far away from the gateway and there is no mains powered node in

between to attach to it as a child, one will need to place **relay nodes** in between; these carry no sensors and are used only for bridging the remote node to allow it to join the network

7. **Battery lifetime** will depend on sampling rate and will generally be between 6 and 12 months
8. **Communication distances** will vary along many parameters and materials in between. In open areas they can extend up to 100- 200m in closed spaces they are much reduced and may greatly vary between 10- 30 m.

2. Setup

- A **MS WINDOWS** (any version) device will be required with **internet connectivity** and a **USB slot**. The device must remain always on and connected.
- You will receive the agreed SITE_NAME and the user credentials. You will then need to
 - **Connect the USB gateway to a USB port**. Windows should find and install the appropriate drivers automatically; if not try to download from <https://wsn.wirelessthings.biz/dl/CDM.zip>
 - **If the .NET framework is needed, you can download it from** https://wsn.wirelessthings.biz/dl/dotNetFx40_Full_setup.exe
 - **Download the BRIDGE software** and save it at a convenient location (e.g. C:\WSN folder)
https://wsn.wirelessthings.biz/SITE_NAME/dl/WTbridge.exe
 - **Double click the BRIDGE icon to launch it**. This software coordinates the data collection and forwarding to the cloud.
- The **dashboard** will be available at https://wsn.wirelessthings.biz/SITE_NAME Various notifications may be set from the Reports panel (following user authorization)
- The **site administration** is web based and is accessible at https://wsn.wirelessthings.biz/admin/SITE_NAME

3. Installation issues

Module boxes are 11 x 6 x 3 cm in gray, black or transparent blue colors. ENERGYBOARDS come in cabinet ready enclosures. Modules are:

1. **directly and loosely placed on a convenient surface** (ENVSENSE, IRSENSE, CO2SENSE, OCCUSENSE)
2. **installed in a electric cabinet**; the enclosure fits directly on the rails (ENERGYBOARDS)
3. **glued via special tape on a vertical or overhead frame** (OCCUSENSE)
4. **fixed on a rotating device** (similar to those used to place a GPS on the car window screen) (IRSENSE); this will work only on very smooth, window like surfaces.
5. The waterproof series have small de-humidifying opening at the bottom; **keep this clear so that excess humidity may escape from the enclosure** (ENVSENSE WATERPROOF)