

Wireless Logger Networks

Wireless logger networks are composed of nodes, gateways, and GeoCloud web services.

Nodes are wireless devices that read sensors, digitize the readings, and transmit them to an internet gateway. The gateway receives readings sent from the nodes, reformats them for the internet, and forwards them to the internet.

GeoCloud web services receive and process the readings, check for alarms, and update dedicated project websites to show current project site status, graphs, and reports.

Node Functions

Sensor Compatibility: Unlike general-purpose data loggers that read many types of sensors, nodes are designed to read specific types of sensors. For example, a vibrating wire node is required for vibrating wire sensors. Analog nodes are available for current or voltage-based sensors. Digital nodes are available for bus-based sensors, such as shape arrays. Some nodes have built-in tiltmeters or laser distance meters.

Logger Nodes: Logger nodes read sensors at specified intervals, store the readings in memory, and transmit the readings to an internet gateway. Storing readings in memory provides a valuable backup if transmission paths are temporarily blocked. Logger nodes use 900 Mhz radio bands, which provide improved penetrating power and range. Most logger nodes include built-in barometers and temperature sensors.

Interface Nodes: Interface nodes are similar to logger nodes, but are designed for read-and-send operations and store only a few readings temporarily. Interface nodes use 2.4 Ghz radio bands, which tend to provide shorter range. However, battery life is very good for most interface nodes and some tiltmeter nodes are extremely compact.

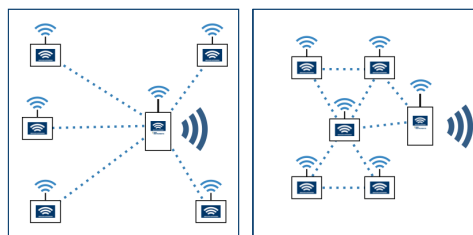


Single-sensor and multi-sensor nodes with internet gateway. Self-powered and wireless, nodes can be placed anywhere, including locations that would be impractical with traditional data acquisition systems.

Network Topography

Star Networks: Each node transmits measurements directly to the gateway, using industry standard LoRa-based wireless transmissions. Advantages include reliable long range transmissions, good signal penetration due to the radio band, and an unlimited number of nodes per gateway.

Mesh Networks: Each node transmits to a neighboring node. Measurements hop from node to node until they are received at the gateway. Advantages include the ability to relay transmissions when the gateway is not within line of sight and also to reroute transmissions if a pathway is blocked.



Star Network

Mesh Network

Logger Network Advantages

Nodes are compact and self-powered. They can be placed anywhere, including locations that would be impractical with traditional data acquisition systems.

Nodes transmit data wirelessly, eliminating the expense of installing and protecting long runs of cable.

Nodes have fixed capacities and are matched to sensor types. This greatly simplifies wiring and programming, and eliminates the need for add-on multiplexers or signal conditioners.

Nodes filter and digitize sensor readings locally, eliminating the sources of cable-related data degradation, such as voltage drops and EMI.

Wireless logger networks are designed to provide automatic and secure wire communications. This built-in function eliminates the need for add-on wireless modules and complex programming.