



IIoT Solutions  
for the Natural  
Resources Industry:

Lynkz Technology

MARKETING

v3.0

# IloT: Introduction

Having full control on processes and assets is a never ending mission for industrial companies. Whether it is about health and safety or about efficiency and yield, having control on each and every aspect of the game is a major advantage.

The Industrial Internet of Things (IloT) is becoming widely used throughout the industry in order to monitor key activities in a simple, efficient and inexpensive way. All of that, in real time.

This presentation targets the introduction of a cutting edge IloT technology to natural resources industrials, especially to mining and forestry industries.

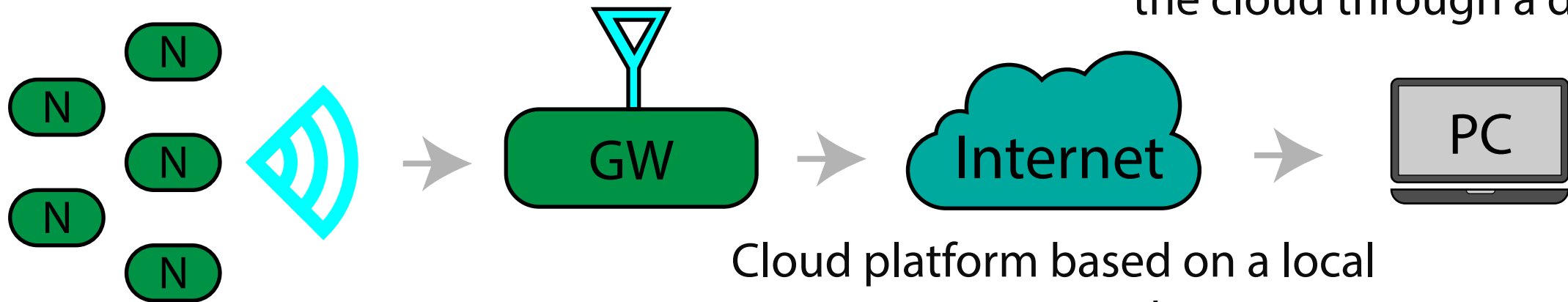
# Industrial Internet of Things

High Level Description of the Technology:

“Wireless devices connected to the Internet.”

Gateway linking the nodes to Internet, generally through an Ethernet network

User interface device from which the user can access and analyze the data compiled on the cloud through a dashboard

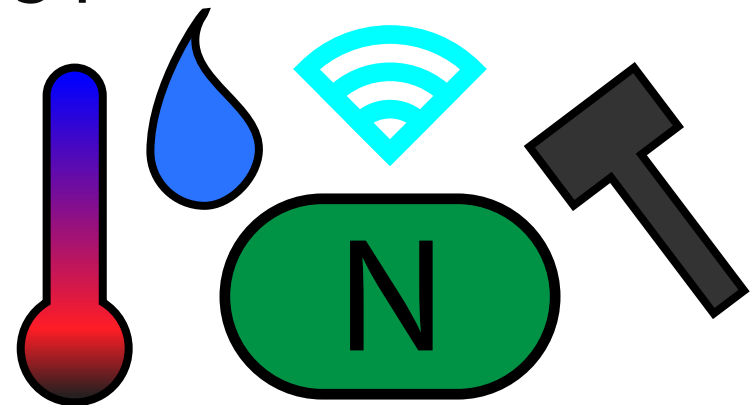


Nodes connected through a wireless technology (Ex.: Bluetooth, WiFi, etc...)

Cloud platform based on a local or remote server on the internet. Processes and manages the nodes' data

# Nodes Characteristics

- Battery powered. Can last 5+ years depending on configuration
- Emerging wireless technology enabling for a 15km radius range
- Can be equipped with almost all possible types of sensors
- Programmable transmission cycle: seconds, hours, minutes, days, etc...
- Rugged enclosures that can sustain any kind of ingress hazards
- Operating temperature ranging from  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$
- Over The Air (OTA) firmware upgrades
- Active remote configuration of the sensing parameters
- Bidirectional wireless communication
- Wireless battery charging
- Combining sensors and GPS position

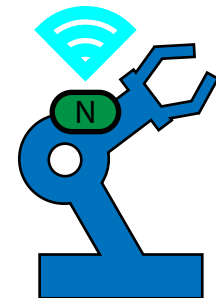
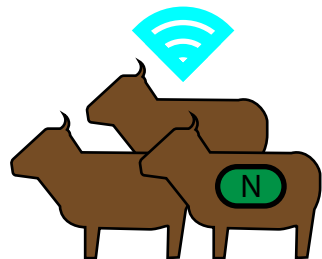
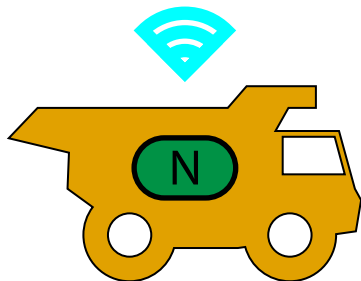


# The Node's Role

The main role of the nodes is to measure physical phenomena, events, quantities, etc... using integrated high performance digital sensors and to broadcast the data through radio waves.

## Measurement/Sensor Examples:

- Environment: Temperature, Humidity, Pressure
- Movement/Space: Acceleration/Shocks, Rotation, Position, Speed
- Electrical System Monitoring: Current, High Voltages, EMI
- Danger Potential: Gas detection, Fire Hazard (Infrared), Air Quality
- GPS Positioning, Remote Asset Monitoring, Intrusion Detection Alarm

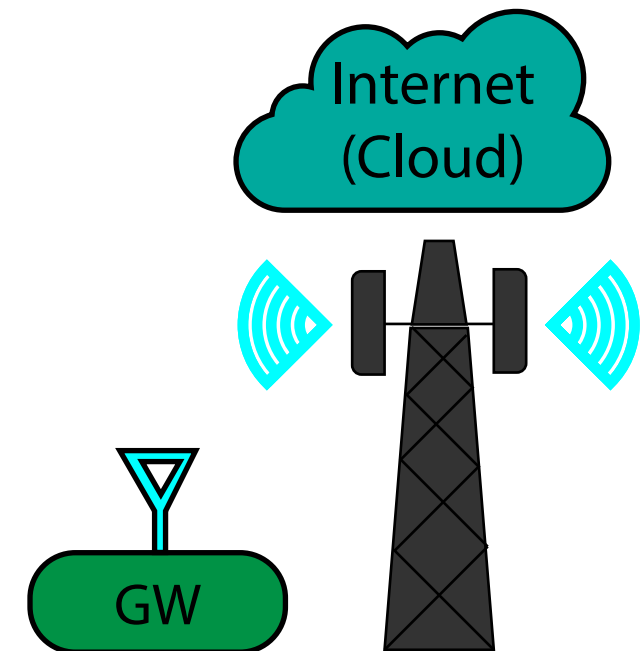


# The Gateway's Role

The gateway acts as a router between the nodes and the Internet. It processes the received data packets and redirects towards the right address (IP). It also tags the packets with useful information such as received signal strength and a timestamp. The gateway must be connected to internet or to a local data server.

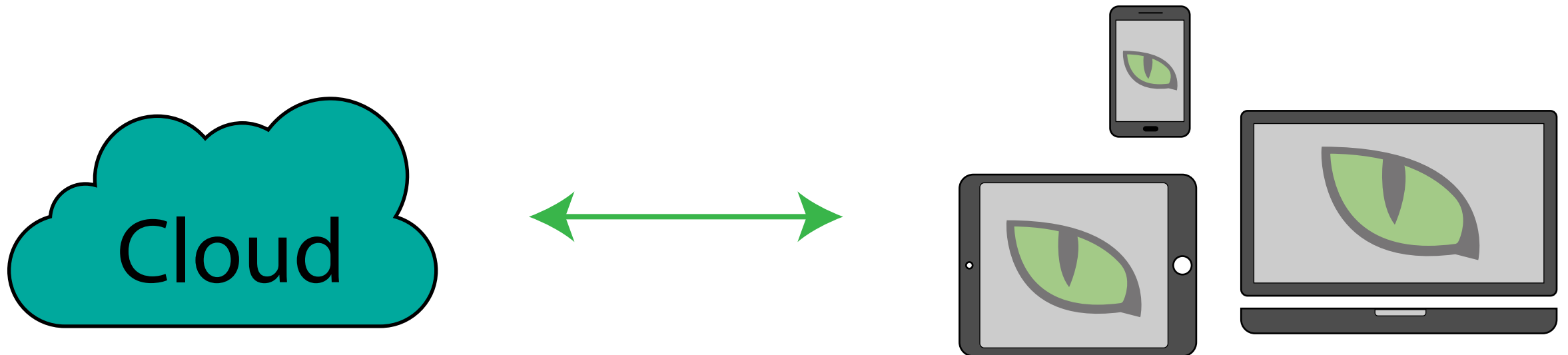
The Gateways can be installed:

- Inside a building, layed on a desk (Femto Gateways)
- Outside, on a building's wall (Pico Gateways)
- On a telecom tower (Micro Gateways)



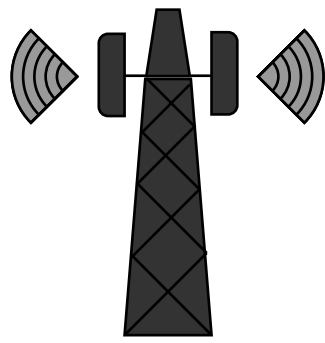
# Cloud and User Interface

A server in the cloud (or local) processes the data sent by the gateway and stores it on a virtual drive. The user can then access the processed data using the device of his choice. The data is compatible with any installed software (PI, Oracle, Canary, SQL, Excel, etc...) used to manage the data. Lynkz technology can easily be made compatible with any software already in place.

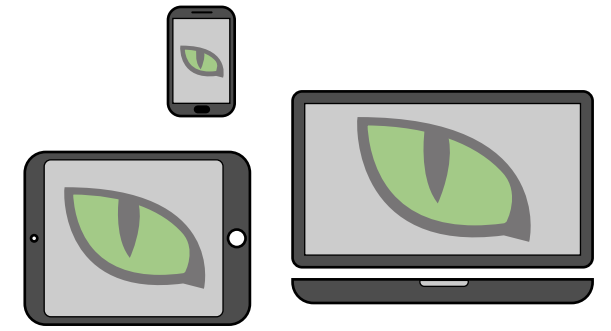


# IIoT

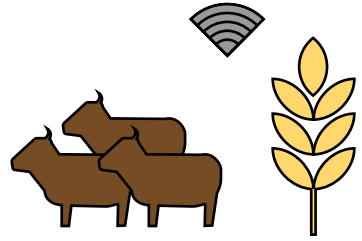
## Fields of Application



Coverage



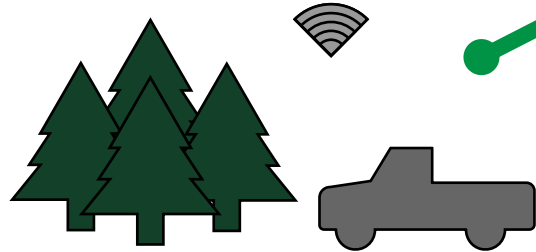
Dashboard



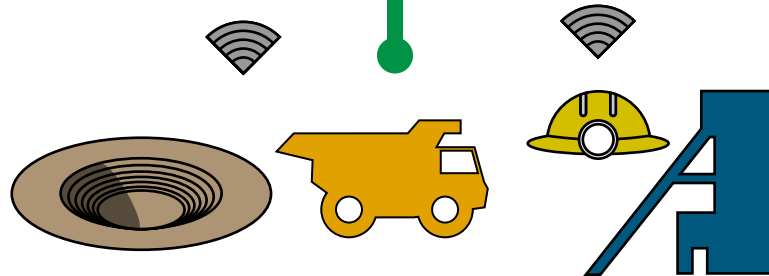
Agriculture



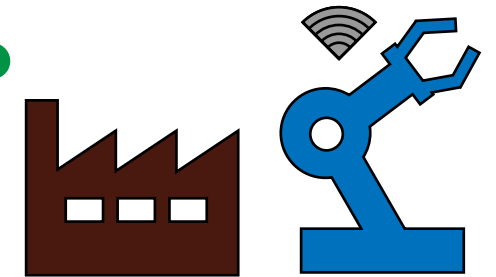
Residential/  
Commercial



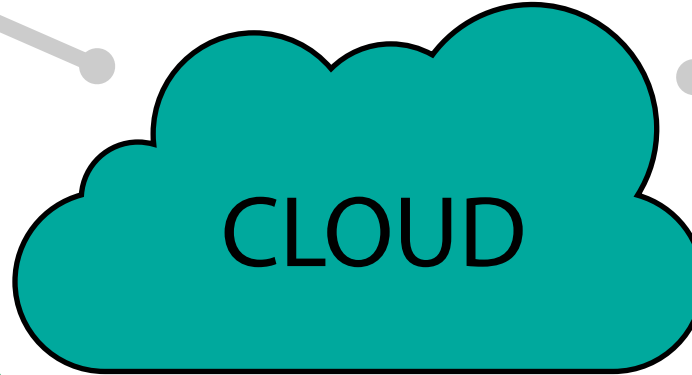
Prospection



Mining



Industrial



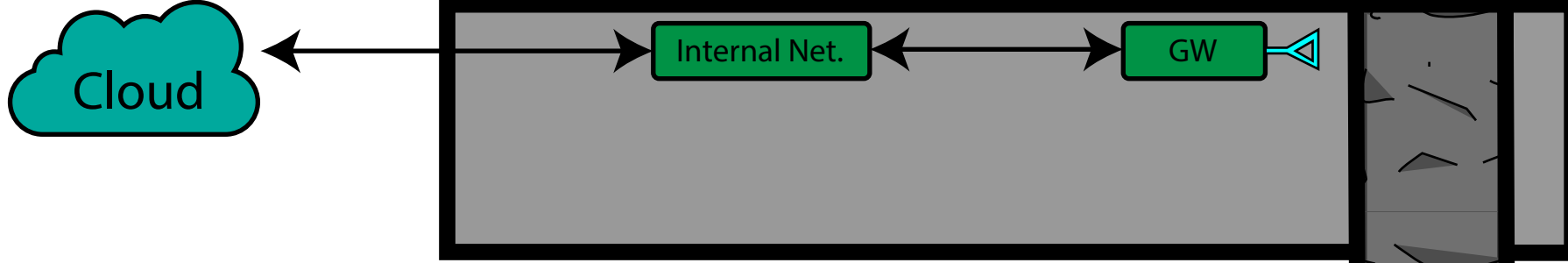
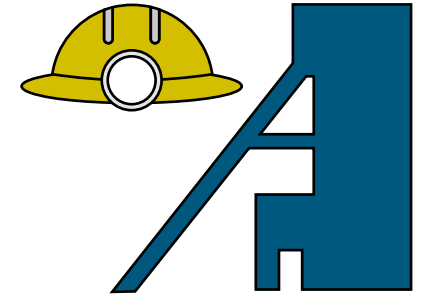
CLOUD



# Application Examples

**Important Note:** Possibilities are much more diverse than those presented below. Lynkz' idea is based on making the industry needs show up by themselves. The goal here is not to create more needs, but to replace and fill in for obsolete and expensive solutions with more intelligent and efficient ones.

# Mining: Underground



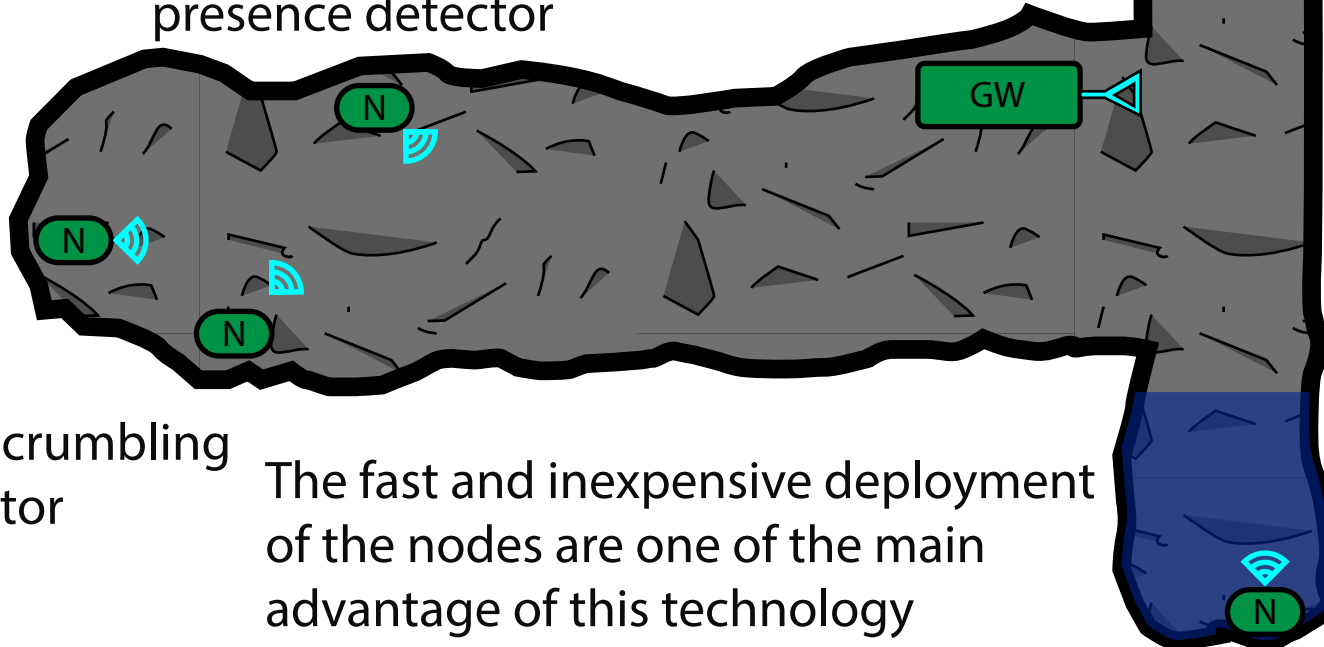
Packets coming from underground are simply redirected on the local network which sends them to the right server based in the cloud.

The RF link between the gateways makes transmission in the shaft possible.

Node2: Infrared presence detector

New runs of cable in the shaft are then not necessary.

Node1: Dangerous gas sensor



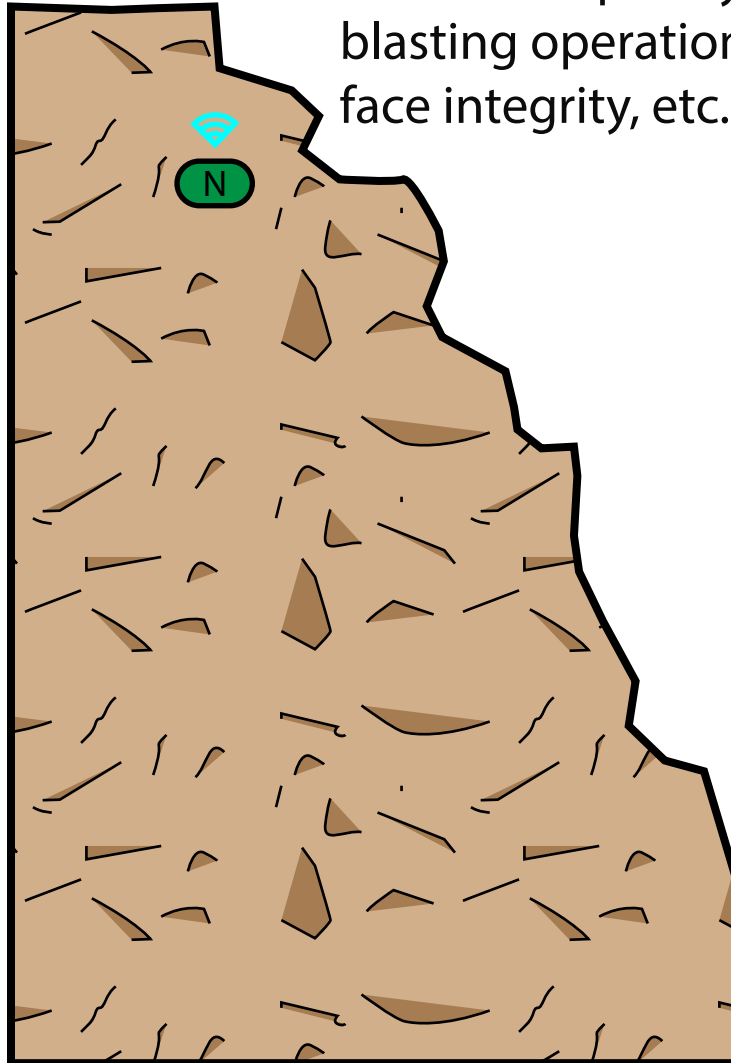
Node3: Movement, crumbling and vibration detector

The fast and inexpensive deployment of the nodes are one of the main advantage of this technology

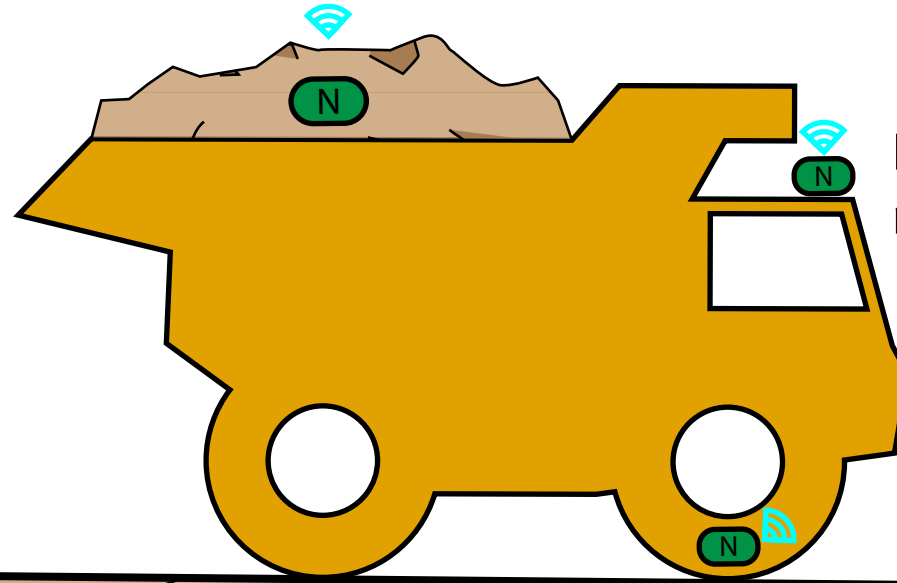
Node4: Pressure sensor giving water level in the well.

# Mining: Open Pit

Node1: Frequency analysis of blasting operations, vibrations, face integrity, etc...



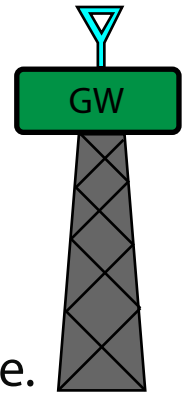
Node4: Ore tracking.  
Disposable node.



Node2: Periodic status of motorized equipment.

Node3: Real-Time status/pressure of the tires.

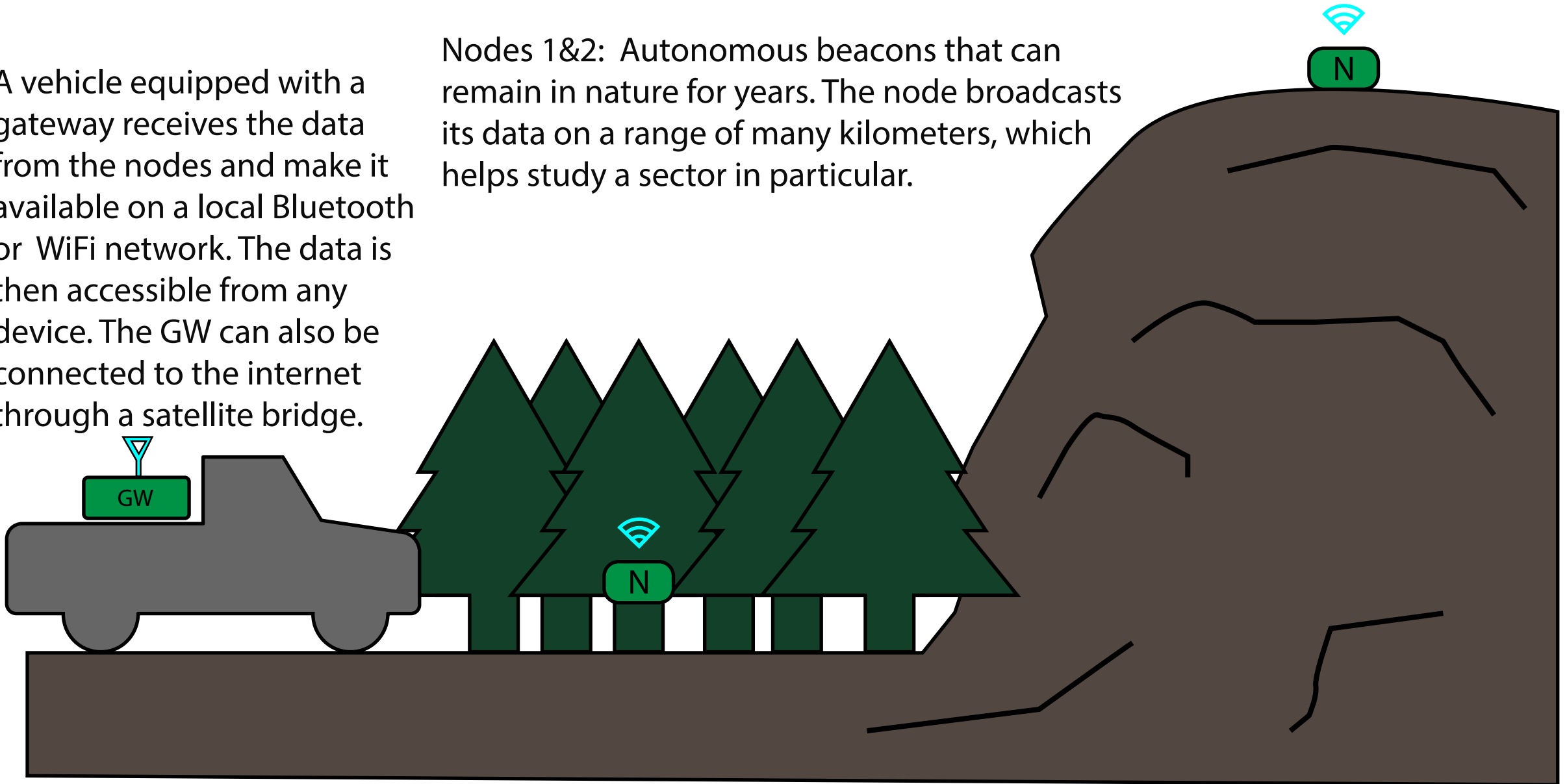
A gateway installed on a dedicated tower easily provides the wireless network for the whole site.



# Mining/Forestry: Prospection

A vehicle equipped with a gateway receives the data from the nodes and make it available on a local Bluetooth or WiFi network. The data is then accessible from any device. The GW can also be connected to the internet through a satellite bridge.

Nodes 1&2: Autonomous beacons that can remain in nature for years. The node broadcasts its data on a range of many kilometers, which helps study a sector in particular.



# Advantages Summary

- Long range wireless technology that can get through obstacles
- High autonomy battery powered technology; Autonomy of many years
- Very fast and inexpensive installation anywhere (Ex.: Newly blasted drift)
- Very inexpensive systems regarding hardware, installation and operation
- Can be installed in constrained and hostile environments
- Data is accessible from almost anywhere, anytime
- No cables / Very compact and tailored devices / High Autonomy
- Secure connection through encrypted data and meta-data

It's an easy, fast, inexpensive and safe way towards industry automation.

# How is that possible?

Manufacturing costs are going down exponentially and information technologies are developing at an exponential pace. Here are some fundamental factors that make IIoT product development profitable:



**Send your application ideas to:**

The logo for Lynkz features the word "LYNKZ" in a large, grey, sans-serif font. To the right of the text is a stylized graphic of a green leaf or petal shape with a grey outline. The email address "applications@lynkz.ca" is overlaid in black text across the middle of the logo.

**applications@lynkz.ca**

**Inexpensive monitoring, everywhere.**

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