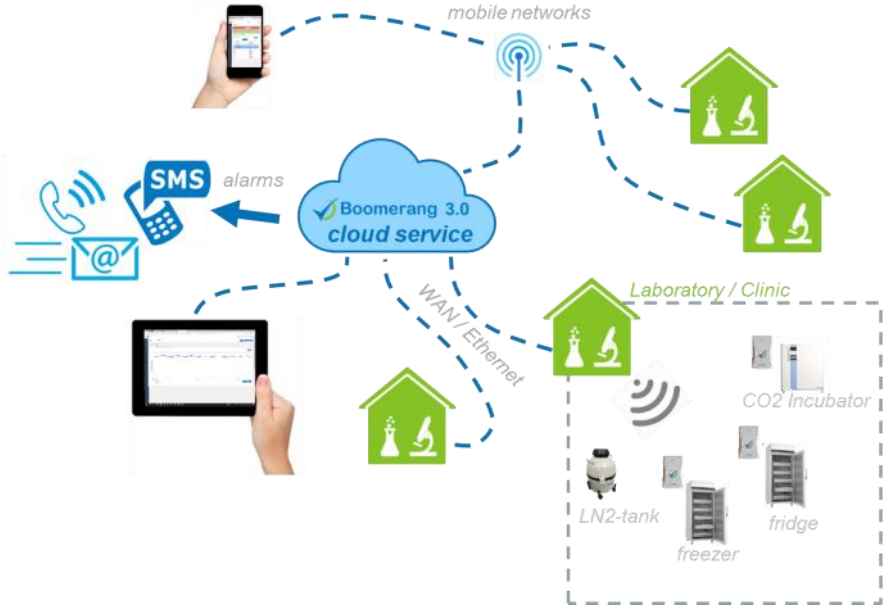
Infrastructure

Map application with Node concepts

January 2022

Boomerang 3.0 - principal block schematic

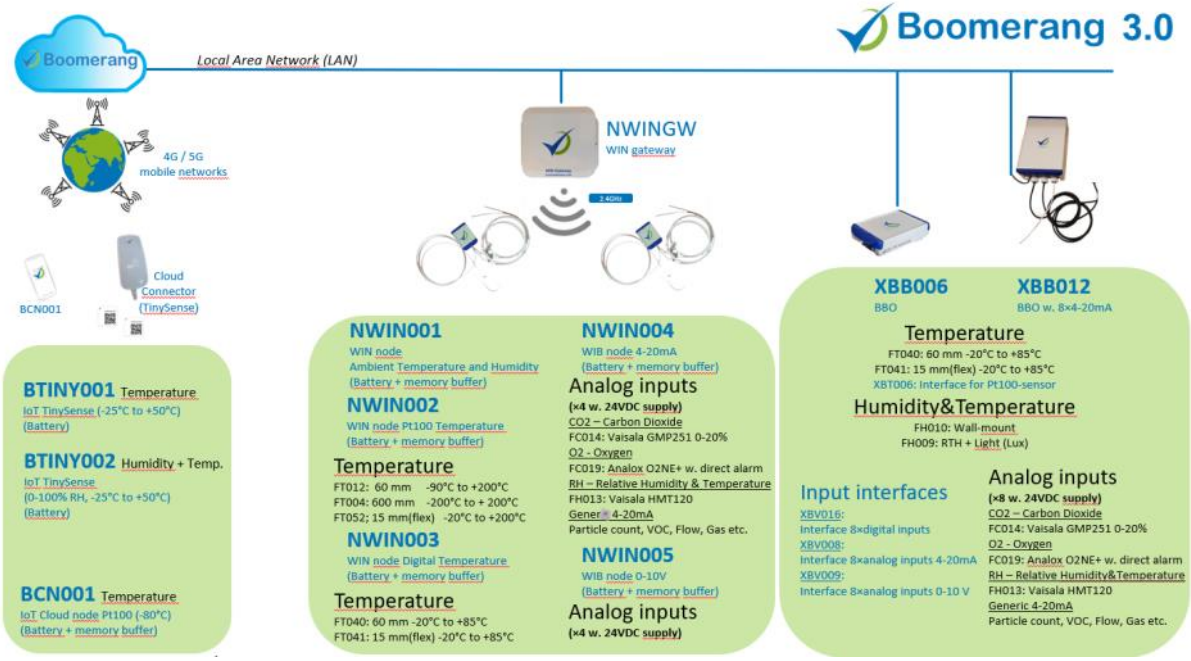


Boomerang-in-the-cloud

Boomerang 3.0 is a cloud service for continuous monitoring and log in laboratory environments.
Numerous possibilities for connecting the log of your equipment to Internet, provides great flexibility to integrate monitoring and log all over the world.

Measuring Points

Various configurations on each measuring point are possible depending on data measured or logged, e.g. temperature, humidity or values from other sensors. Please see some of the most common combinations below.



Typical Boomerang users

Laboratories:

- Clinical labs in hospitals
  Microbiology / Virology / Chemistry
  Immunology / Pathology / Blood bank
  Human tissue / etc.
- Lifescience
  Medical / Pharma / Biotech / etc.
- Test labs
  Bioanalytical / Forensic /
  Water analysis / Food / etc.
- Clinics
  IVF– Infertility / Eye
- University labs
- Veterinary labs

… and more

Cold Storage:

- Pharmacies
- Cold chain logistics
- Transports
- Medicine storage in hospitals
- Biobanks
- Retail

… and more

Boomerang provides a wide variety of log-equipment, in order to cover as many monitoring and logging challenges as possible.

- Data communication can be Ethernet/LAN based or Wireless
- Internet connection available via mobile networks 4G/5G, to avoid interfering with local IT or if local IT is not present/available.
- Battery operated log equipment is available for flexibility and/or extra secure monitoring.
- Boomerang Log equipment is compatible with a wide selection of sensors and probes; temperatures from –200°C to +200°C, humidity, CO2, O2, Pressure, alarm contacts, proximity and many more sensors and instruments using analog outputs like 4-20mA or 0-10V.

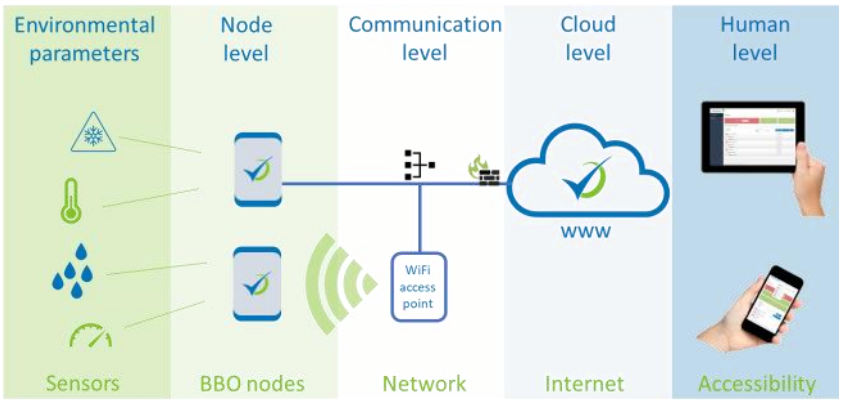
The following pages will guide you to find your optimal log equipment.

- Log equipment capable of connecting multiple sensors for efficiency
- Mobile and Wireless Log equipment for flexibility

… or combinations of the above to meet all requirements in large labs.

Boomerang Log equipment

Depending on your monitoring requirements, we can propose the most suitable and efficient Boomerang log equipment.

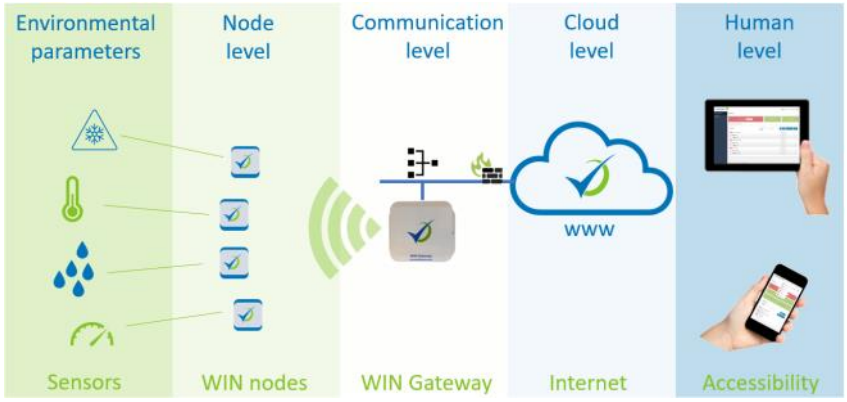


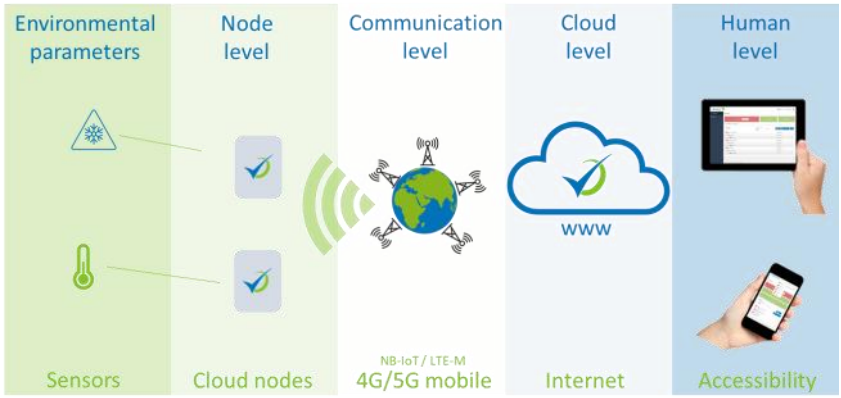
BBO
BoomBridge concept

- Ethernet/LAN based (or WiFi)
- Multiple sensors on each BBO (up to 19)
- Temperatures, Humidity and analog signals

WIN-nodes concept

- Wireless (2.4GHz)
- Memory buffer
- Battery backup (or battery operated)
- Temperatures, Humidity and analog signals



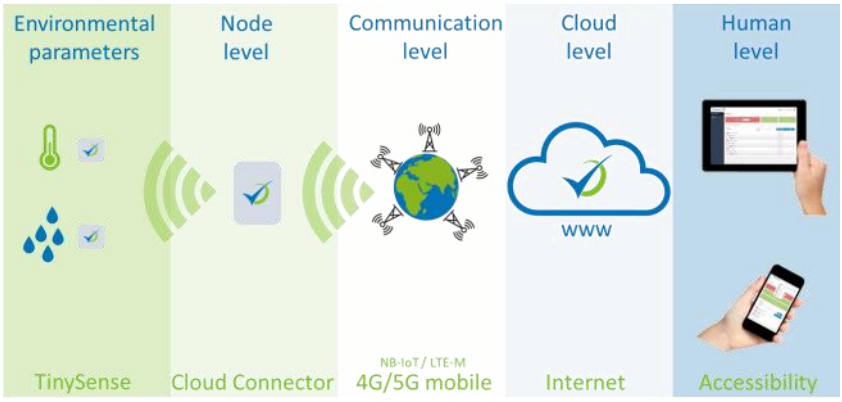


IoT
Cloud-node concept

- 4G/5G mobile broad-band connection
- Memory buffer
- Battery backup (or battery operated)
- Temperature only

IoT
TinySense concept

- 4G/5G mobile broad-band connection
- True wireless, no probe
- Battery operated
- Tiny size 19x19x2.5mm, 2.0g
- Temperature and Humidity



Mapping different types of monitoring and log applications

Depending on your monitoring requirements, we can propose the most suitable and efficient Boomerang log equipment. Below you can find our general guidelines.

Large systems for monitoring and log

- University hospitals with several labs and cleanrooms
- Regions with several hospitals
- Large Institutes for veterinary, forensic, food stuffs etc.

Typical requirements: hundreds or thousands of users, many measuring points (hundreds or thousands), many different types of sensors and probes, geographically spread sites etc.

Suggested Boomerang implementation for large systems

The combination of all Boomerang monitoring and log equipment.

- WIN-node concept for flexibility and wide variety of sensors and probes.
- BBO concept for secure Ethernet connection and for cost efficiency in banks of refrigerators/freezers. And for a wide variety of sensors and probes.
- IoT and TinySense for remotely located measuring points.

Clinics and labs

- IVF / Infertility, Eye
- Cold chain warehouse
- Dairy, food labs etc.

Typical requirements:
Ten to twenty users,
10-150 measuring points,
many different types of sensors and probes (temperature, humidity, CO2 etc.), perhaps chains of clinics in different cities/countries etc..

Suggested Boomerang implementation for labs and clinics

- WIN-node concept for flexibility and a wide variety of sensors and probes.
- IoT and TinySense for remotely located measuring points.

Cold storage

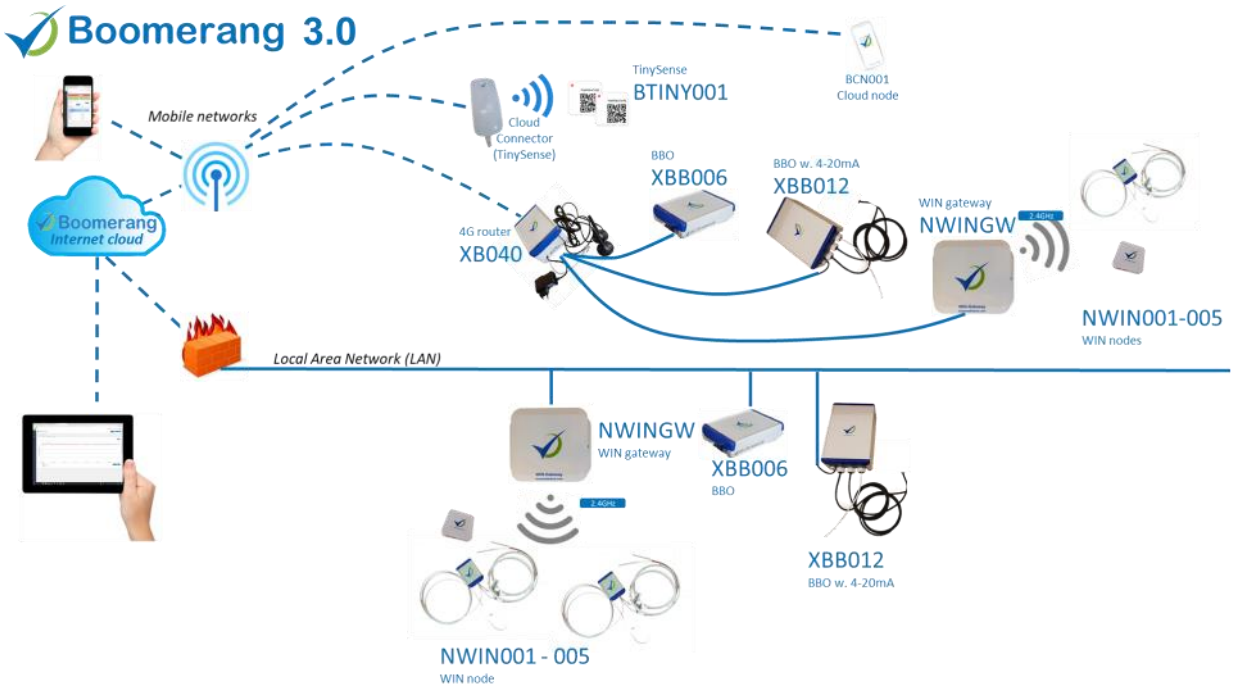
- Pharmacy shops
- Health care centers
- Vaccination centers, etc.

Typical requirements: few (1-3) refrigerators or freezers on each location, several geographically spread sites (chains). In general, few measuring points on each site but several sites in a chain of e.g. pharmacy shops. Typically it is only temperatures (+4°C and/or –20°C), perhaps also ambient parameters like temperature and humidity in the room.

Suggested implementation for Cold storage

- IoT and TinySense for cost efficient and convenient monitoring of remotely located measuring points.

Measuring points - principal block schematic and connection



Measuring points - Sensor selection and alternatives

Boomerang measuring points can use different types of sensors/probes, depending on certain characteristics of the equipment where the sensor will be installed, or depending on the range to be measured, or depending on which unit of measurement you are looking for.