Go-IoT

Reference Cases

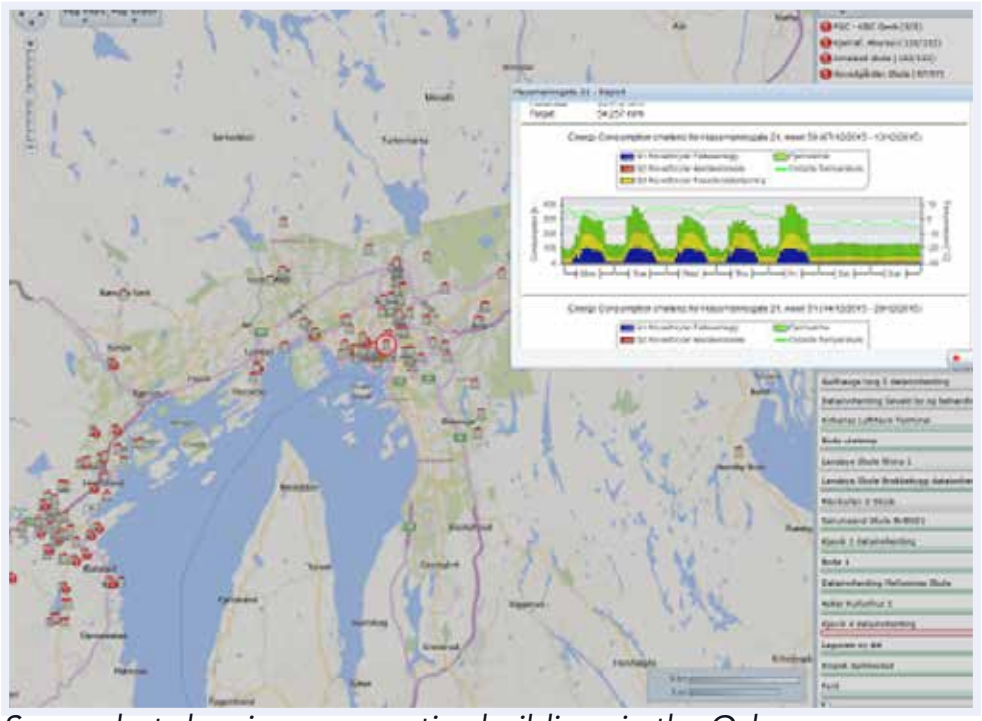
Modular hardware and software solutions for
the next generation of Building Automation

250+ Installations and Counting

Dingo Reference Case 1

Go-IoT (formerly Rational Network) has over 13 years of industry experience, particularly at relaying data to cloud servers from those meters which are commonly found in buildings; electricity, gas, oil, heat, water, solar-production, manual, file etc.

The system is currently used in Norway, Iceland, Benelux and the United Kingdom in more than 300 buildings. Both public and private, they include small kindergartens, shopping malls, schools, hotels, industrial buildings, offices and apartment blocks. With as few as 1 or 2 meters being managed in the smaller installations, increasing to 220 in one of the large tower blocks at Canary Wharf in the business district of London.



Screenshot showing some active buildings in the Oslo area.

In Norway and Benelux, the solution is heavily reliant on power-line communication (the predecessor of the current Go-IoT PINGO technology). There are two reasons for this:

1. Many of the installations were in old buildings, with the meters in deep stone basements where wireless communication was impossible. The only wiring available was the pre-existing electrical cables where 'wiring up' would cause disruption to

the building and be costly.

2. Simply installing a single Narrow Band Power-line Communication (NPLC) master created an infrastructure for the entire building, reaching as far as the street. Wherever the electricity wires might be reached (basically the entire building), device-data communication was now possible.

There were times when using other types of proprietary data loggers or file-formats was unavoidable. It was usually costly and often complex to implement. This was essentially the spur which drove us to create the Go-IoT DINGO sensor-to-cloud solution. We saw the need for a solution based on open well accepted standards, yet which would keep open access to legacy protocols, but in a sort of 'black-box'.

Originally, the solution collected all the data and relayed it to the IBM Informix database in the cloud, using the extreme performance of its time-series engine. Then, Analytics Systems, Accounting Systems, Energy Management Systems, etc. access the data to create valuable information resulting in energy savings, automatic tenant billing, etc.

The robust nature of this remote meter 'meter-data retrieval' solution means that Go-IoT customers are very loyal. Most of our original customers from 2004 are still using this system in their buildings for meter-data retrieval.

Recently we began offering our customers the new DINGO hardware and software for new installations. Its flexibility means that more buildings can now be accessed, making it a lot more cost effective to reach more meters in each building.

This BACnet based solution has been very well received and accepted by our existing Norwegian clients.

New clients in the United States are now coming in with large buildings of thousands of points to trend-log in each building.

Next Generation Trend Logging

Dingo Reference Case 2

Until the summer of 2017, the Heggedal School in Norway was not equipped with an Energy Management System (EMS), despite being BACnet enabled for Building Automation.

Since one of the essential elements in an EMS system is Trend Logging from electricity, heat, oil, gas and water meters, a single DINGO Backbone was installed on the BACnet/IP network and was configured to log data from each of the 25 meters in the building.

Configuration was quickly done using the new Trend Log Maker (TLM) which enables the automatic configuration of BACnet Trend Log objects, saving hours of work and reducing installation costs.

”Save hours of work and reduce installation costs”

Finally, the Trend Log data was to be pushed regularly to a third-party Energy Management System in the cloud using a small DINGO app called the ‘Trend Log Pusher’. This app performs regular searches for all TL objects on the BACnet Network, then creates an XML- or JSON file with the data changes from the last file sent before pushing THAT file to the EMS in the cloud via old-style ftp.

This is just one example of the many methods available to feed the cloud system from DINGO BACnet TLs.

A small software module at the TLM end digests the files received from the DINGO, automatically creating missing meter-objects in the EMS database and writes the data to its Time-Series database ready for EMS analysis.

The DINGO configuration is maintained remotely using DINGO Manager; A web based system for managing multiple DINGO installations. The DINGO Manager communicates with each DINGO using BACnet/WS (Web Services) via the encrypted https protocol and using OAuth 2.0. Giving the maximum security available in such systems today.

Heat Pumps: From Old to New

Dingo Reference Case 3

Heat-pumps (a reverse refrigerator) are becoming quite popular in Norway for saving energy by drawing heat from whatever temperature differences can be found. For example, a deep hole can be drilled into the ground and the temperature difference at the top and bottom of the hole can be used by a heat pump to 'suck' energy from that temperature difference.

Heat pumps exist in sizes intended for normal homes, right up to huge commercial buildings. When installed in larger buildings, it is vital to bring in the data from those heat pumps to the Energy Management System of the building. Recently Åsenbygg borettslag has started installing DINGO Backbones for trend-logging the different parameters from their installed heat pumps in Norway.

> "Sensor to the cloud in ONE solution"

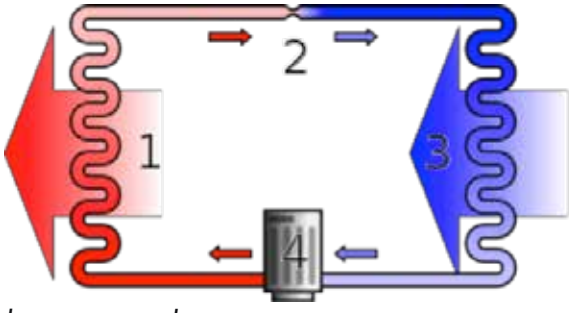
Most of the heat pumps use the old-style Modbus interface. This has not proved to be a problem however, since the DINGO-stack software is fully capable of transforming Modbus to BACnet/IP, the heat-pump parameters can be easily represented as virtual BACnet objects in the DINGO. For example, the Modbus register for generated energy can be represented as BACnet Analog input. From that point on it is straightforward to set up a BACnet Trend Log Object to log from the Analog Input object. As in Reference case 1, the TL-data must be pushed from the DINGO to the EMS in the cloud, however; here a different approach is used, since access to an 'In Building' Internet Connection is not available. To solve that problem, the DINGO is equipped with a PG-GSM-3G DINGO plug-in to enable Internet connection over the mobile network of Telenor, protected by VPN.

Later, some external electricity meters had to be logged from inside the building. A few were Modbus enabled, but others had only legacy S0 pulse output (to count pulses where each pulse is a fixed amount of kWh). Fortunately, the DINGO-Backbone is equipped with 8 Binary inputs, enabling the legacy meters to be easily hooked up to the DINGO and trend-logging enabled.

The next problem was that the old pulse-meters were in an old, deep, stone basement at the far side of a parking lot almost 200 meters (650 feet) away. There were no bus-wires in that stone basement. Wireless was not possible because of the underground location and thick stone walls. Even mobile coverage was non-existent. The only possible media available to transport the data was the existing power-lines in the building, but that was all that we needed: A second DINGO was hooked up to the pulse-meters in the basement, but this time, the DINGO was equipped with a PINGO slave plug-in providing robust Narrowband Powerline Communication (NPLC). At the previously installed DINGO, a PINGO master plug-in was added and the slave-DINGO was configured as a virtual BACnet-device. This enabled TL data to be polled from the slave, via the power-lines to the master. Problem solved gracefully!

Just a few minutes after those additional meters were connected to the DINGOs, they pop up in the EMS system in the cloud with their first data. To configure the DINGO Backbone for different types of heat-pumps, a product definition is added using the Peripheral Manager part of DINGO-manager, a web-based application for managing multiple DINGOs remotely. After having defined each heat-pump as a product in DINGO-manager, that definition can be reused for further installations using the same type of heat-pumps.

Currently, heat-pumps from the world leaders NIBE and GEBWELL have been defined in the DINGO database.



heat pump loop

Kindergarten Goes Smartgrid

Dingo Reference Case 4

Because the DINGO solution is so cost effective, it makes it feasible for small installations, such as this kindergarten school at Kistefossen in Oslo, Norway. The kindergarten is equipped with multiple solar-panels for energy production; not for the kindergarten itself, but to sell unused energy on the grid.

The solar cell energy meters were accessible via M-Bus, the widely accepted European meter-bus standard. The DINGO Hardware family provides two types of M-Bus plug-ins; one for up to 5 meters connected, and a second one for up to 80 meters installed. The original plan was to access only 4 meters in this building, so the smaller one was fitted. When that solution proved to be a success, the customer wanted to add more energy meters and two water meters. Fortunately, because the DINGO has a modular design, the only requirement was to replace the small M-Bus 5 plug-in with the more powerful M-Bus 80 plug-in, which was incredibly simple!

As with any other non-BACnet device-communication standard, the DINGO-stack takes care of transforming the M-Bus meters to virtual BACnet objects and making trend-logging easy. Once again, trend-logging was vital for the EMS.

As in the previous reference cases, the DINGO Manager was used to configure the entire thing remotely from Go-IoTs office in East-Iceland, including the Trend Log Pusher responsible for pushing the trend-log data to the third-party EMS system in the cloud. Immediately the configuration was activated, the meters with data popped up in the EMS system and able to be accessed from any browser, anywhere in the world.

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