



Challenge description

A major beverage distributor in **Costa Rica** loans refrigerators to their resellers—a major resource investment. The distributor’s entire business model is based on selling cold drinks in a hot climate, so if a reseller has a broken refrigerator—or no refrigerator at all—this is the loss of an entire point-of-sale.

The distributor has placed 42,000 refrigerators in shops, restaurants, and bars around the country. The operating environment is often harsh and refrigerators have to work 24 hours a day, 365 days a year. In the past, regularly-scheduled, rolling maintenance inspections were the norm as there was no way to know whether any individual refrigerator required repairs. This meant that a lot of fully-functional refrigerators were inspected needlessly, wasting time and money.

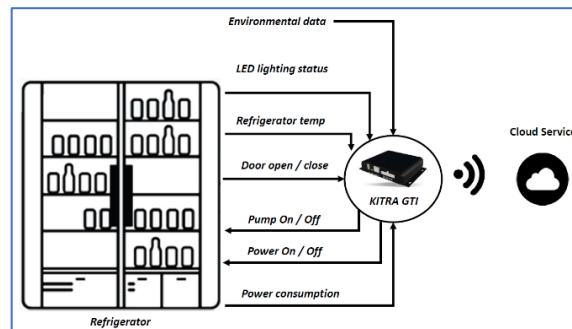
Solution

Each refrigerator is outfitted with a range of sensors and a Kitra GTI industrial gateway. The KITRA GTI acts as an IoT gateway, sensor hub and controller to provide local control and measurement, connectivity and remote device management. This allows the distributor to track and analyse the state of their entire refrigerator fleet. By leveraging the two-way cloud connection, settings adjustments and other updates can be sent to individual refrigerators in the field to fine-tune performance.

Technical breakdown

Each refrigerator collects the following data:

- **Internal temperature:** The distributor knows whether beverages are being stored at the right temperature.
- **Outside temperature and humidity:** The distributor can adjust refrigerators’ internal temperatures remotely for the most efficient cooling. For example, during a heat wave, refrigerator temperatures can be lowered much more during the night, reducing the need for cooling during the hottest hours of the day.
- **Compressor:** The refrigerator pump is managed by an IoT solution that uses all the data collected to drive more efficient compressor use.
- **Door sensor:** A reseller can be notified to close an open refrigerator door, saving compressor wear and tear as well as collecting data about the use of the fridge for marketing and sales purposes.
- **Current energy consumption:** This is an important indicator of a refrigerator’s mechanical health.
- **Motion sensor:** Vibrations are another key indicator of mechanical health and can be an indicator of future problems.
- **Audio sensor:** Compressor noises can further help predict and diagnose problems.
- **GPS and battery:** The distributor can check that each refrigerator is still in its original location. Stolen refrigerators can be tracked and recovered.
- **Main power:** The distributor can monitor and disable power consumption entirely if a refrigerator is being used in violation of contractual agreements.



Conclusions and advantages

- **Reduced downtime:** Failures can be predicted and repairs scheduled in real-time. This increases asset availability and reduces operating costs.
- **Improved visibility and streamlined operations:** IoT-enabled asset tracking allows thousands of assets anywhere in the world to be managed from just one location.
- **Increased asset efficiency and predictive maintenance:** Understanding how a device is used and for how long allows for performance optimization and enhances profitability. When a monitored asset has a problem, technicians can get a full diagnosis prior to being dispatched. Technicians bring only required spare parts, increasing their onsite efficiency and helping reduce overall spare parts inventory.
- **Asset location:** Lost or stolen assets can be located indoors or outdoors thanks to installed GPS sensors.
- **Advanced data reporting:** Depending on how assets are outfitted, an IoT management solution could allow companies to tell how often customers use certain device features. This can help identify customers who may need additional training on how to use assets effectively and give insight into future features and services that could be added.