Case Study:

Monitoring the Refrigerators at Merici with ITWatchDogs’ Environment Monitors

Provided generously by Mathieu Beaudoin, Technician, IT Service at Merici

Work Environment:

Merici College is a private institution providing a variety of pre-university and professional programs. One of our programs is Restaurant Management, and we are equipped with a pedagogical kitchen and dining room open to the public. Merici College offers students a program combining both production and management skills to enable them to make a career as a chef or restaurateur. In addition to the specialized cooking skills developed in our training kitchen, students acquire the planning, supervisory and organizational competencies that today's restaurant business demands.

The issue:

The irregularities of the College's refrigerated appliance alarms combined with irregular school schedules, with long holiday periods for students (three summer months and one winter month of off-time), created significant waste. Therefore, I decided to install alarms on refrigerated appliances.

Since we use ITWatchDogs monitors in our server rooms, I decided to test them in the food refrigeration sector to put an end to waste issues caused by refrigeration unit failures.

Adaptation:

However, one problem remained, I observed that normal defrost cycles triggered false alarms. One feature existed to offset the triggering of an alarm for 5 minutes. With the possibility of configuring a longer value, I would be able to suppress false alarms. I therefore submitted a feature request to ITWatchDogs to allow me to specify a longer sampling period before an alarm was triggered. ITWatchDogs was quick to implement. Here is a diagram showing my appliances' normal cycles.
We can see that some appliances are configured to start a defrost cycle from time to time by letting themselves get warmer, but that is a normal situation within a short period. Moreover, in a kitchen the coming and going is so constant that frequent and temporary variations of temperature would have triggered a significant amount of false alarms.

**Our alarm configuration:**

Here is an explanation of alarm configuration for the cold chamber:

If the cold chamber temperature remains higher than -16°C for more than one hour, an email is sent to the appliance manager, together with a text message on his cellphone. This alarm will repeat every 60 minutes as long as the problem persists.

If the situation worsens and temperature reaches -10°C for more than 30 minutes, an email and a text message are sent to the material resources supervisor. This alarm is considered critical and is also sent by email to the CRM system for the occurrence to be registered and documented.

If the situation hasn't been corrected and the temperature reaches -5°C, an email and a text message are sent every 30 minutes. The instructions are then to move the food supplies to another appliance to avoid waste.
Failures

Besides classic refrigeration unit failures, now detected instantly, new issues have been found thanks to the WatchDog 15 from ITWatchDogs.

Refrigeration chamber is too cold

Our freezing chamber is reachable only through the refrigeration chamber. The upside is that warm air from the kitchen doesn't get in directly. However, if someone forgets to close the partition door between the freezing chamber (-22°C) and the refrigeration chamber (4°C), all the food in the refrigeration chamber will freeze. Last year, 3 occurrences of door left open triggered an alarm which allowed us to save the content of the refrigeration chamber.

Failures undetectable before .... The slow failure!

What normally constituted a person can know if a freezing chamber is at -22°C or -18°C? Some appliances lost refrigeration capacity, but so slowly that it was very hard to notice the difference from one visit to the other. However, with the data graph provided on the WatchDog user interface, spotting a negative trend in refrigeration capacity / increase in temperature over time becomes easy.

In this specific case, boxes were stored too close to the freezing chamber's fans. This air flow limitation had allowed ice to develop on the refrigeration unit and its performance was decreasing by the day. The refrigeration unit compressor would have ended up failing and would have remained out of service for a long time, and would have probably caused a significant waste. With the WatchDog 15, once the freezing chamber rose to the limit of -16°C for a long period of time, alarms were triggered and upon observing the diagram, we saw that it was not a false alarm and that we had to investigate further. Before, a security guard would have passed once in a while, and the issue would probably not have been detected.
The cellar is running warm

Our cellar helps us to serve the wine at the right temperature, but also to maintain wine in good operating conditions. During 2011 summer holidays and in the absence of the restaurant-school employees, the cellar's refrigeration unit failed and we registered temperatures of 33°C in the following hours. Very far from the optimal conservation temperature! We replaced quickly the defective unit and saved our 200 wine bottles. Since the cellar is locked, nobody would have known the inside temperature before the sommelier’s return 3 months later.

Quality control and food inspection agency

A few days after implementing our WatchDog 15, the cooking teachers received the surprise visit of the Ministry of Agriculture, Fisheries, and Food of Quebec (MAPAQ). In Quebec, this is the agency responsible for hygiene and food safety in the food and restaurant institutions. When the inspector, who had come to verify the temperature of our refrigeration equipments, asked them where their thermometers were, the cooks answered that they no longer had any since the system had just recently been computerized. A little panicked, the chef looked for me (I'm the network administrator!) so as to give a demonstration to the inspector.

I connected using my iPhone, in which I had prepared special quick access links for my users and security agents. When he asked me "What's the temperature in the freezing chamber?", I answered him mockingly "When exactly?" I then showed him the graphed data that let me know the temperature of my appliances for any day of the previous month, and he was very impressed. When I explained to him the escalated alarm system that I had set up, he was stunned! He left confident that we were a responsible institution in terms of hygiene and food safety. After checking with the kitchen employees, this was the end of surprise inspections, and I imagine that inspectors focus on less-equipped facilities.

APPENDIX 1: List of supervised equipment

Excluding the probe inside the equipment, I monitor the temperature of the following appliances

1. Appliance 1
   a. Classroom-Restaurant
      i. Bar refrigeration
      ii. Cellar
   b. Classroom-Kitchen
      i. Service refrigeration
ii. Pastry refrigeration
iii. Refrigeration chamber
iv. Freezing chamber

2. Appliance 2
   a. Processed food store
      i. Glass display
      ii. Freezer
      iii. Fridge

APPENDIX 2: Pictures showing the implementation

Example of implementation on a wall above the suspended ceiling.

The area didn’t have a proper cabinet located at a reasonable distance from all the equipments, that’s why we hid it in the section above the suspended ceiling. Since summer 2011, I never had to reboot it. My equipment has a fixed IP address, which is checked every 5 minutes by my monitoring server.
Refrigeration chamber

We implemented the probe in the higher part of the appliances, where the temperature is likely to be the highest.

Partition door leading to the freezing chamber.
Freezing chamber

Processed food display

Probe and identification
Processed food display

Vertical freezer and fridge for the sale of processed food.
Vertical freezer:
External implementation

Vertical freezer:
Internal implementation of the probe.

Cellar and beer fridge
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<th>Pastry refrigeration</th>
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| **Pastry refrigeration:**  
| **External implementation** |
Pastry refrigeration: Internal implementation of the probe
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