

Xompass Inc.

XOMPASS IOT DATA CENTER SOLUTION

White Paper

Xompass Solution Benefits

- ✓ Improve data visibility of UPS systems
- ✓ Lower implementation costs
- ✓ Up to 40% reduction in battery related costs
- ✓ Up to 10 x ROI

Executive Summary

Uninterruptible power supply (UPS) failure continues to be the No. 1 cause of unplanned data center outages*. When running a datacenter business, there are costs related to energy for both power and cooling and also for equipment upgrades, which not only involve server related equipment but also backup systems continuous maintenance and replacement.

In this document we show you how to reduce costs of battery bank system replacements by operating your assets in proper conditions by using Xompass's Cloud solutions for monitoring and enabling predictive maintenance to maximize your battery lifecycle, keeping your 100% SLAs and reducing operational and failure costs.

Date: August 2016

*Ref: <https://gcn.com/Articles/2016/02/09/data-center-outages.aspx>

Introduction

When operating a datacenter involves a lot more than only installing servers and connecting them to the network. It requires cooling systems, hyper fast network infrastructure, top speed hardware and also energy backup energy system both online (UPS and Uninterrupted Power Supply) and offline (Generators).

If the servers running on a data center lose energy for a single instant, petabytes of data can be lost in the running cloud, which can be translated in millions of dollars due to SLA not being accomplished. This is why UPS or Uninterrupted Power Supply systems are used, an UPS system consists of a battery bank for storing energy and an AC power input from the grid to provide energy from the grid to the load is always on at the same time that energy is flowing from the main energy supply (grid connection), this allows to be able to be disconnected from the grid for a short period of time before activating the backup generator system to continue the operation. Since battery backup systems only will last for a few hours at most, they are used for keeping the servers running while the connection to the backups is made.

Why monitor the batteries?

The cores of the UPS systems are the batteries, which can be found from tens to hundreds of batteries depending on the size of the UPS. So when talking about a medium sized data center with centralized UPS systems the number of batteries required can go from a few thousands to tens of thousands, which are very often stored in rooms without any kind of benefits like the server's rooms, this means no Temperature control, no dust free, no monitoring. In the best case the UPS will report some general information about the battery bank and single point temperature but nothing comes for free, this translates in many cases to have no information at all about the battery vital sings.

These thousands of batteries are acquired with a certain lifetime only achievable under optimal conditions (i.e environmental and electrical).

What happens when battery is not operated in optimal conditions?

If the battery is not operated under optimal conditions its lifetime can be reduced up to 40% even after proper preventive maintenance schedules and operations are properly made. This means you have to replace your batteries a few years before they complete their life cycle.

So how does this blind operation translate to money?

This reduction in lifetime due to unideal operation conditions can translate to an invisible cost of \$200,000 per every 1,000 batteries every year.

Xompass Solution Overview

In this section an overview of the Solution overview is shown, and how it helps to improve the operations and reduce costs.

The architecture of the solution is shown in figure 1.

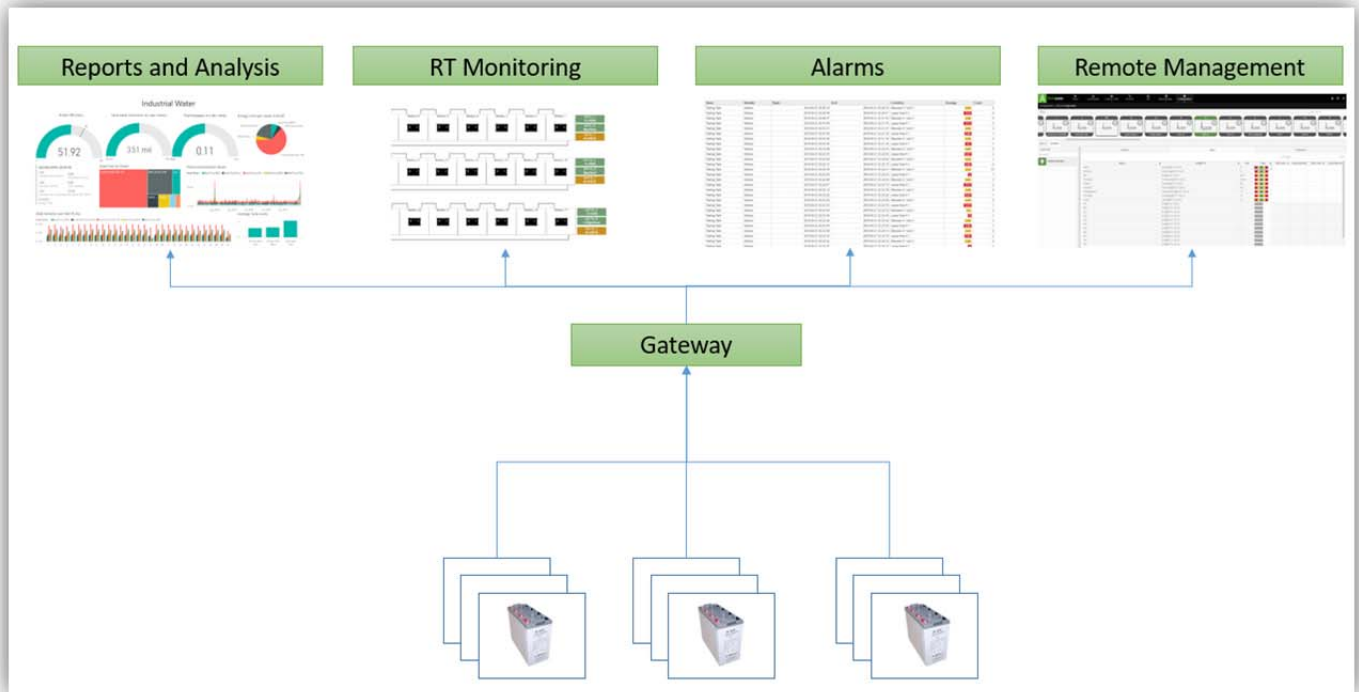


FIGURE 1 SOLUTION ARCHITECTURE

Data acquisition

The sensors are installed in batteries, where they will get automatic readings of environmental and electrical parameters of the batteries and will be transmitted through a Gateway device to the cloud Platform.

Functions

- ✓ Automatic Sensor readings
- ✓ Remotely Managed from Cloud Software
- ✓ Visual indicator for faster field maintenance
- ✓ Low costs and capability of being reused after batteries are changed

In figure 2 the sensors are shown installed on battery banks, and in the figure 2 the gateway device is shown.



FIGURE 2 BATTERIES WITH SENSORS IN BATTERY BANKS

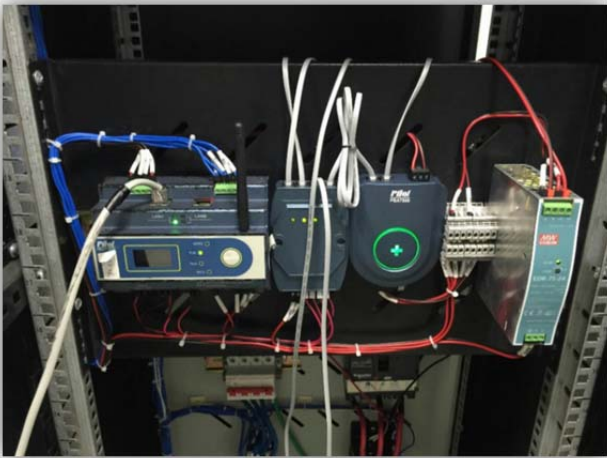


FIGURE 3 GATEWAY, STRING SENSOR AND POWER SUPPLY.

Picture of setup and data flow

Cloud Platform

The main functions of the Cloud Platform is to use the data for providing useful insights about the batteries and also remote management of the equipment to avoid field visits and ease of access from anywhere.

- ✓ Identify the failure type and possible cause
- ✓ Keep track of State of Charge and State of Health of Batteries
- ✓ Use historical data of batteries to improve the preventive maintenance programs
- ✓ Use Machine Learning tools to provide preventive maintenance
- ✓ Display information of batteries in real time such as temperature, voltage, SOC and SOH
- ✓ Alert the users when anomalous conditions have been detected
- ✓ Generate automated reports for users to improve decision making

Xompass Solution Results

By knowing the real status of the batteries and their behavior, the system not only allows you to detect the root causes that might be affecting the life of your batteries, but also allows you to know the right time to make the batteries maintenance or replacement and ensuring your datacenter is always backed up.

A sample battery replacement schedule is shown in figure 4 considering the dates where all existing batteries have been renewed (they are not changed all at once but the ones with SOH under 80% every year). Considering a datacenter with 4,000 batteries, this **life expectancy increase** can be translated into approximately **\$1,600,000** with an estimate of **10x ROI**. The reduction in costs due to better **preventive maintenances** provides a significant **payback to protect the investment (\$1.4M invested for 30 banks)**.

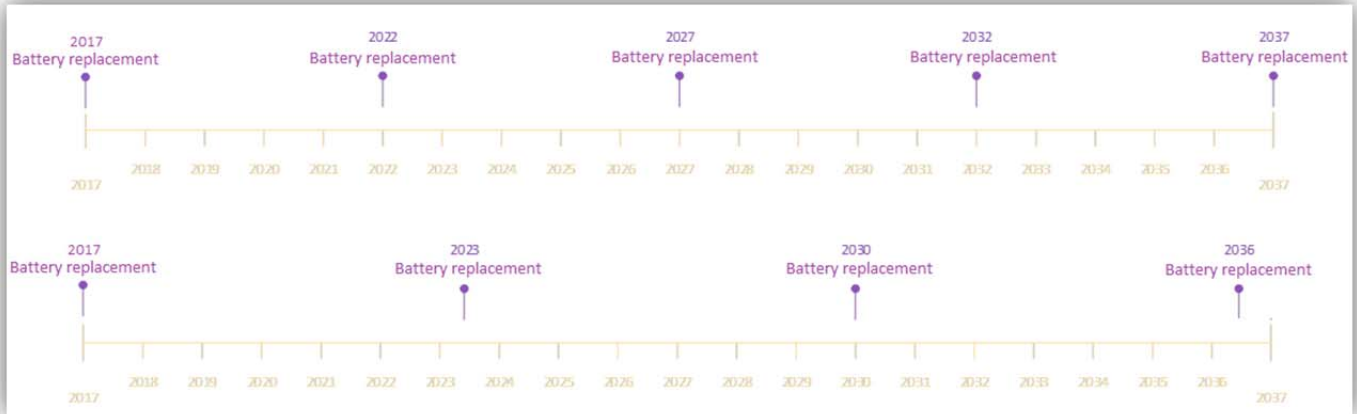


FIGURE 4 BATTERY REPLACEMENT SCHEDULE, TOP LINE IS BEFORE XOPASS SOLUTION AND BOTTOM ONE IS AFTER XOPASS SOLUTION IS OPERATIONAL.

The Xompass solution provides great value to prevent unplanned outages in datacenters to save \$750,000 to \$2.4M per datacenter by monitoring the UPS batteries that account for at least 25% of these unplanned outages.

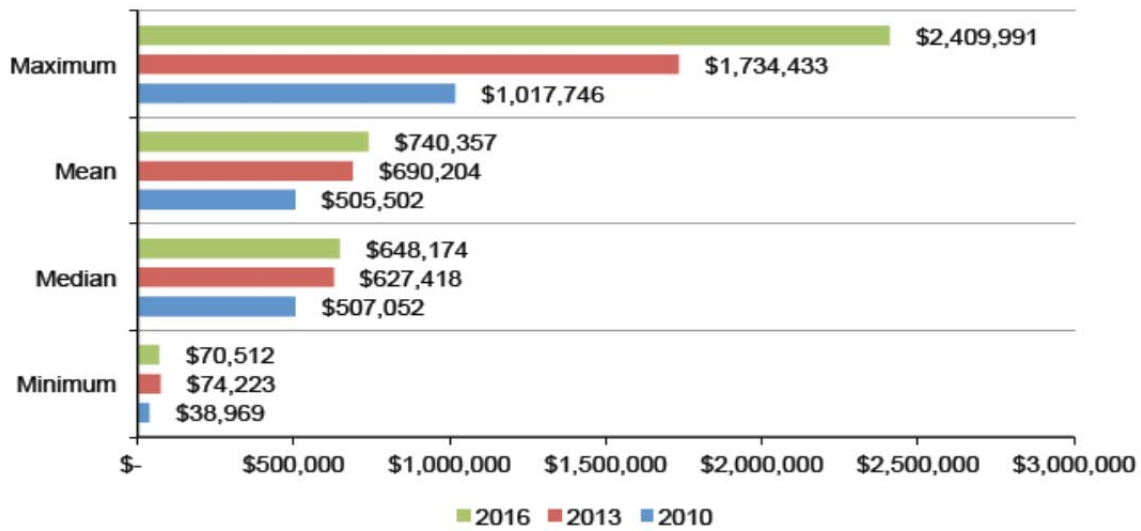


FIGURE 5 KEY STATISTICS ON DATA CENTER OUTAGES. COMPARISON OF 2010, 2013 AND 2016 RESULTS (REF: PONEMON INSTITUTE® RESEARCH REPORT, 2016)



FIGURE 6 REAL-TIME MONITORING WITH XOPASS

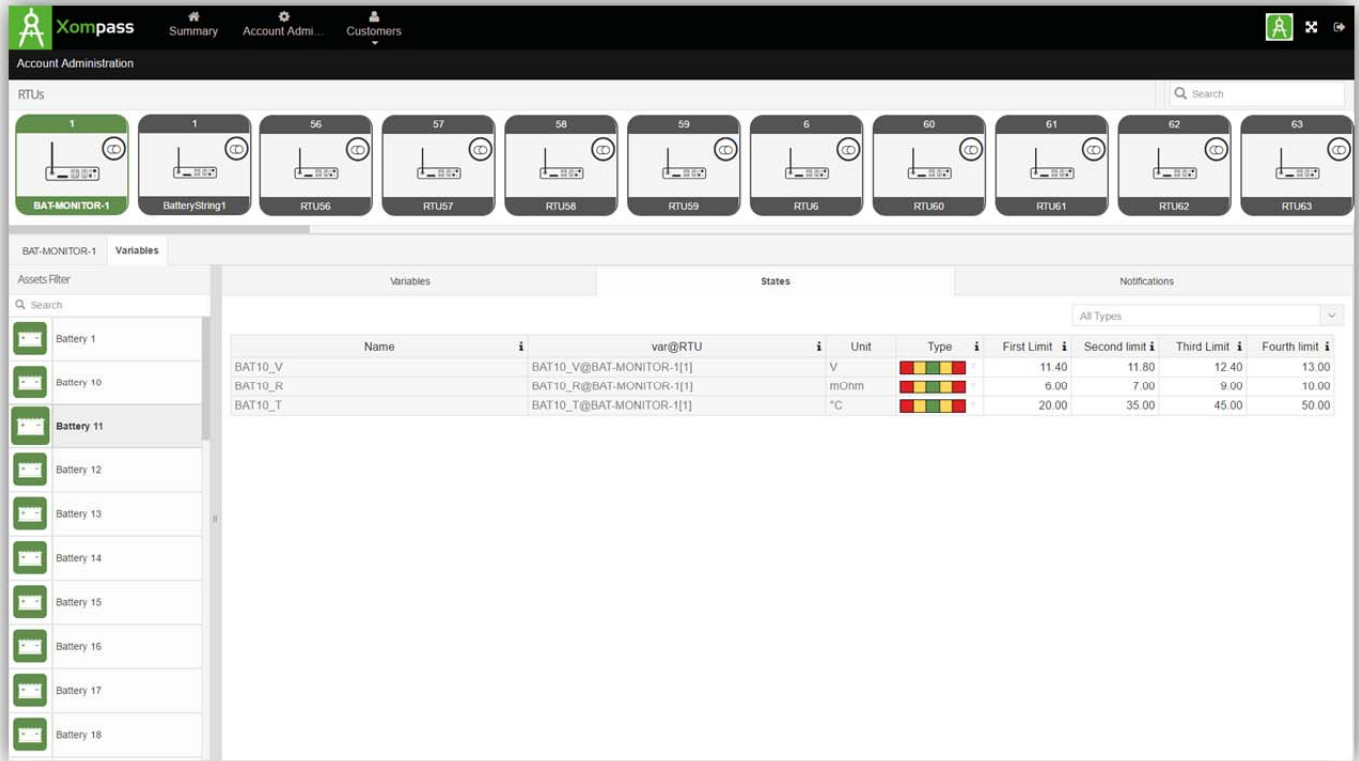


FIGURE 7 REMOTE CONFIGURATION WITH XOPASS