



Network Management Efficiency, Reliability and Cost-Savings are Driven by Active Battery Management™

In an age in which the Internet is increasingly integrated into our residential and business lives, telecommunications companies must ensure network reliability. As more devices connect to the Internet – not just cellphones and PCs but cars, residential and industrial appliances, and other personal devices – downtime is more impactful. Keeping the network up and running at all times is critical.

Gila River Telecommunications, an ISP located in Chandler, AZ, was faced with many battery management challenges in the Arizona desert. These challenges - costly maintenance, environmental abuse of equipment, and the need to grow their organization - are faced by nearly every ISP, telephone company, and utility in the country. The solution for Gila River was an investment in Servato's Active Battery Management™.

Gila River Telecommunications, Company Profile:

- Headquartered in Chandler, AZ
- 65 employees
- Total of 3,350 lines
- Residential DSL Service
- Rolling out Fiber-To-The-Home

Maintenance Challenges:

- Improve equipment reliability in harsh environment
- Reduce maintenance costs and truck rolls to remote sites
- Extend battery life
- Real-time monitoring of site health and issues

Solution:

- Servato Active Battery Management™
- Servato SPS-48 + Embedded Software
- ActiView® Software
- Hands-on Servato Training & Full-Time Support

Outcome:

- Servato met Gila River's goals to overcome their battery maintenance challenges and provided surprising additional data that would improve the reliability of their backup power.
- Many of Gila River's sites experienced brief power outages, sometimes multiple times per day.
- The SPS™ detected these unnoticed outages, but the problem was not the batteries. Gila River had several faulty rectifiers.
- Once replaced, the outages ceased. Since Servato's appliances are able to gather better data than other monitoring-only products, Gila River was able to identify and correct an equipment issue that may have unintentionally ended up harming their backup batteries.

Results:

- Gila River had been worried about not getting the most from their batteries and replacing them too often. The company now benefits from Servato's adaptive charging, which extends battery life.
- Hiring more technicians was not a scalable or appealing solution for Gila River, and they have reduced overall maintenance costs with predictive analytics and remote monitoring for less frequent truck rolls to remote locations. This is aided by advanced predictive analytics.
- In a climate unforgiving to equipment and batteries, the Gila River staff is more confident in their network's reliability.

Battery Maintenance Challenges

Power outages are unpredictable so telecom companies deploy batteries for backup power at nearly every site. Unfortunately, batteries that are improperly (or not at all) maintained provide little reassurance during an outage. Environmental factors often accelerate battery degradation and so batteries fall short of their expected capacity or fail entirely after just a few years in the field. Worse still, traditional maintenance and monitoring routines fall short of guaranteeing protection during outages.

Technicians often manually check and monitor the valve-regulated lead acid (VRLA) batteries deployed at their sites. This means periodically driving out (often to remote locations) to check batteries without prior information about their state of health. This is time-consuming and inefficient, and the costs associated with such truck rolls are often seen as a necessary evil.

If a battery failure occurs between periodic readings, sites can be without adequate backup assets for months. Hand-held manual testing devices do not provide the ability to track a battery’s health through trend analysis.

Prior to partnering with Servato to utilize their Active Battery Management™ solution, Gila River Telecommunications in Chandler, AZ exhibited this common pattern. Gila River was seeking a solution that would eliminate concerns about the reliability of their backup batteries and limit the time and cost of maintenance trips to remote desert locations of their wireline cabinets. Most importantly, Gila River’s staff knew that the harsh climate in the Southwest was harming their batteries, and this meant more money spent on frequent replacement cycles.

Shawn Manning, Network Operations Manager at Gila River, was well aware of these issues – accelerated battery replacement, inadequacy of manual testing, and an overall concern about reliability and insight – when he was presented with the Servato Active Battery Management™ solution. Coupled with the ability to reduce capital and operating expenditures by lengthening replacement cycles and lowering maintenance needs, Servato had a way to help Gila River worry less about backup power and network reliability.

The First Truly Data-Driven Battery Management System

Servato offers the most advanced battery management solution on the market with an unprecedented ability to achieve battery life extension for 12V VRLA batteries in backup settings. Servato’s management team brings extensive experience from the telecom sector in strategy, operations, hardware and software and a deep understanding of the issues Gila River faced.

To date, Manning has installed the Sentinel SPS-48™ at over a dozen sites. Upon installation the SPS-48™ found a variety of issues at remote sites big and small. Gila River began registering small, brief power outages (Figure 2).

Outage Date/Time (CDT)	Outage Duration	Charge Duration
05/19/2015 08:00 AM	00:01:46	00:00:31
05/29/2015 08:01 PM	00:01:15	00:00:45
06/07/2015 08:00 PM	00:01:15	00:00:45
06/19/2015 04:00 AM	00:01:58	00:00:30
06/22/2015 04:00 PM	00:01:37	00:02:29
06/24/2015 08:01 AM	00:01:01	00:02:44
06/24/2015 08:00 PM	00:02:00	00:00:30

Figure 2: ActiView Displaying “Mini” Outages



Figure 1: Servato’s Smart Power System (SPS™) (pictured above at right) is capable of measuring battery state of health with unprecedented accuracy *in situ*. This proprietary function, combined with unmatched data collection and analysis, enables the Servato to extend battery life, predict battery failure, and provide real-time battery information, while also detecting equipment issues like bad rectifiers. The SPS™, along with Servato’s cloud-based software ActiView®, are the basis of Servato’s Active Battery Management.™

This was a confusing and unexpected result of the SPS-48™ installation. Based on the data collected, ActiView showed healthy batteries and so ruled out faults or issues within the batteries.

As the SPS-48™ kicked on to charge the batteries the load drawn by the batteries would drop the rectifier voltage down far below normal for the rectifier.

The SPS-48™ was able to detect a voltage drop in the rectifier, which signaled a faulty rectifier (Figure 3). Without Servato's unique charging regimen, this issue would not have been exposed. The faulty rectifiers would need to be replaced to protect the batteries.

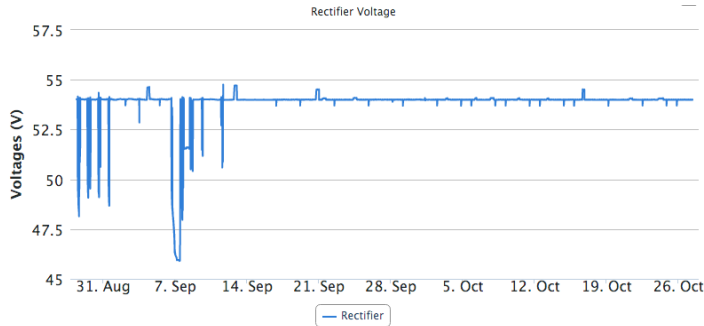


Figure 3: Rectifier Outages Disappear After the Rectifiers are Replaced

Working with Servato support to understand the issues presented in this instance, Gila River was able to hone in on the bad rectifiers. When Gila River examined the rectifier logs they found indications of bad blades. As they began replacing the rectifiers at sites experiencing these brief outages the results were clear - the "mini" outages had been caused by faulty rectifiers. Had they not been replaced the batteries would have gone bad sooner. Manning now knows that he has a more reliable network.

Discovering these issues proved to Shawn what he had suspected – lack of insight into DC power assets had left Gila River exposed to reliability issues. These issues went beyond accelerated battery degradation in the Arizona heat. Proactively correcting equipment issues now promises to deliver long-term CapEx and OpEx reductions.

Signature Analysis and Predictive Analytics for Efficiency

ActiView® does more than just register alerts and changes in battery health. Using proprietary analytics, ActiView® can actually predict battery failure weeks in advance by

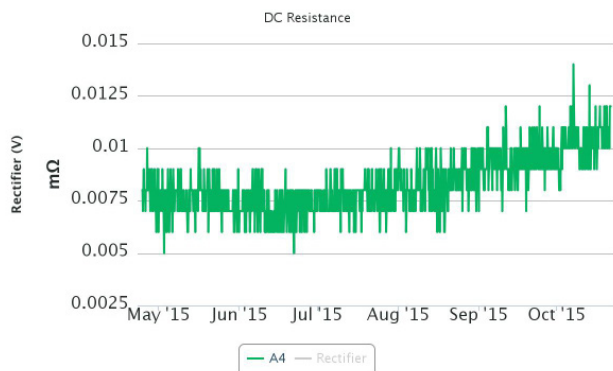


Figure 4: A Rise in DCR Predicts Battery Failure

looking for unique signatures in the battery data. In Figure 4, increasing DC Resistance is indicative of a failing battery, and the Servato solution can automatically detect and alert Gila River to this information. There is no need for a technician to sift through readings and process the data. Servato has automated this process to save time and energy.

Servato Saves Time and Money and Improves Reliability

"Servato has changed the way we manage our backup power assets. Batteries are no longer something we have to test manually and hope for the best – with Servato we can now actively manage our DC power assets. Confidence in our network is built on proactively planning for issues, now with Servato providing active battery management, monitoring and more importantly, the potential for extended battery life, we have more confidence in our network during power outages."

-Shawn Manning

As is common with most carriers and with other Servato clients like CenturyLink, Shentel, Fairpoint, and others, Gila River's manual maintenance left them in the dark most of the time about the status of backup DC power in their cabinets. Now, using Servato's hosted platform, ActiView®, Manning and his team receive daily and real-time updates about any issues at their sites. The power of the software allows team members to view all of Gila River's sites in table or map views for a high-level picture and to drill down to groups of sites, individual sites, individual strings, and even individual batteries for health readings. ActiView® has improved efficiency by delivering flexibility and managerial control.

Behind the scenes, ActiView® is constantly improving the charging algorithms through the battery data it captures. Further, advanced predictive analytics seek out trends and signatures that indicate battery failure in advance of the event.

Gila River has changed their beliefs and their behaviors around battery management and has become a more efficient organization. The issues that Gila River faced – lack of confidence in current battery management routines, lack of true clarity into equipment reliability, frustration with battery replacement cycles – have been eliminated with Servato's Active Battery Management™.

