



Use Case

Centralisation des données avec des
solutions RTU avancées

1. Introduction – Déclaration du problème

Il est essentiel pour les fournisseurs de services de télécommunications de maintenir une visibilité à distance des actifs critiques présents sur leurs sites afin d'assurer la fiabilité et la résilience de leurs réseaux. Pour surveiller l'état de santé et les statuts des équipements, de nombreuses entreprises de télécommunications installent et déploient des Unités de Télémétrie À Distance (RTU) sur leurs différents sites. Ces RTU collectent des informations critiques provenant de divers actifs d'alimentation et de refroidissement, tels que :

- Systèmes de chauffage, ventilation et climatisation (CVC);
- Baies de fusibles de distribution de batteries (BDFB);
- Centrales d'alimentation CC;
- Redresseurs;
- Systèmes d'alimentation sans coupure (UPS);
- Générateurs;
- Systèmes de carburant.

Les RTU peuvent également surveiller les conditions environnementales sur les sites et générer des alarmes en cas d'intrusion.

Étant donné que les opérateurs télécom possèdent typiquement des centaines de RTU déployées sur le terrain, la centralisation des données peut présenter des défis considérables. Les techniciens et ingénieurs doivent souvent se connecter à de nombreuses unités RTU et dispositifs intelligents via des adresses IP individuelles pour accéder aux informations, rendant la planification fastidieuse. Ce document explore comment le logiciel Atlas peut aider à centraliser les données collectées par les RTU et dispositifs intelligents pour faciliter la gestion des équipements de site.

2. Utilisation des Unités de Télémétrie À Distance

Les RTU sont largement utilisées dans les réseaux de télécommunications pour surveiller à distance différents types d'équipements d'alimentation et de refroidissement. Voici quelques méthodes de surveillance des données par les RTU :

- **Mesures analogiques** : Les RTU disposent d'entrées analogiques permettant de mesurer tensions et courants. Elles peuvent ainsi surveiller en continu l'alimentation CA d'entrée principale, l'alimentation CC des centrales, et les conditions environnementales du site.

- **Entrées binaires (contacts secs)** : Utilisées pour générer des alarmes en cas d'intrusion, incendie, perte de courant commercial, décharge de batterie ou panne d'équipement. Par exemple, le dispositif ACD-01 de Multitel peut être connecté au iO Supervisor pour signaler une panne de courant. De même, le BOD de Multitel peut indiquer une batterie en décharge.



Figure 1: Multitel's ACD-01 for low AC voltage detection

- **Protocoles de communication série** : Les systèmes CVC, UPS et générateurs utilisent souvent Modbus RTU. Certains RTU peuvent lire les registres Modbus de ces équipements pour en extraire les données.
- **Modbus TCP/IP et SNMP** : Certains RTU peuvent interroger des équipements intelligents utilisant des protocoles IP.
- **Autres protocoles** : Certains RTU supportent aussi BACnet, MQTT, etc.



Figure 2: The iO Supervisor, Multitel's Newest RTU

Une fois les données recueillies, les RTU utilisent généralement SNMP v3 pour transmettre les informations à un système de gestion de réseau, tel que le logiciel Atlas de Multitel, qui consolide les données de tous les sites via une interface unique.

3. Solution: Data Centralization via the Atlas Software

Atlas is a network monitoring and asset data analytics platform that enables the data monitored throughout the network to be available in a single location. A key feature of the Atlas software is its ability to poll Remote Telemetry Units and smart devices in the field using the SNMP communication protocol. Hence, all site and equipment monitored by the RTUs or directly connected to the network can be accessed through a map view as illustrated in the figure below.

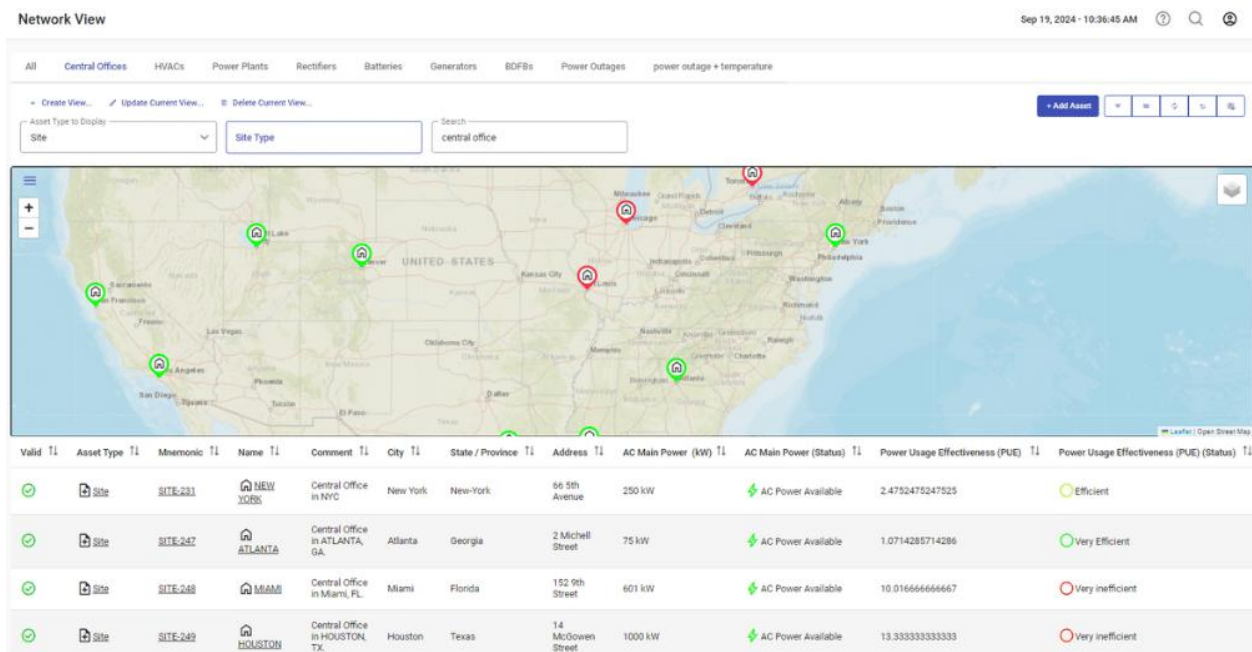


Figure 3: Example of a Network View Available in Atlas

Through this network view, users can access the entirety of the data points monitored at both the RTU and equipment levels. Additionally, users can click on individual sites within the network view to obtain a detailed visual of all the equipment and data monitored at a specific site.

4. Data Management Available in Atlas

In addition to centralizing the data collected across the network, **Atlas** also features robust data management and analytics capabilities. Below are some examples of how Atlas can be used to organize and transform data collected throughout the network.

4.1 Network View

It is possible to configure custom views in **Atlas** to access only the most critical information relevant for each user. For instance, the custom view shown below was created to view only the generators within a network.

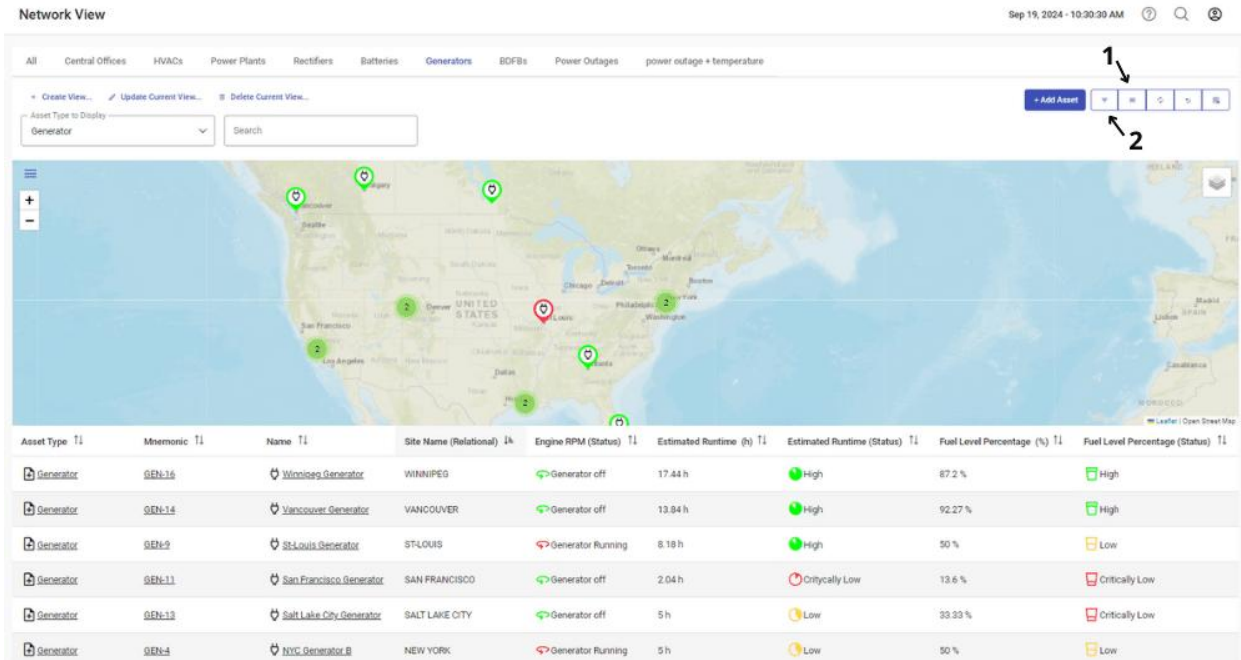


Figure 4: Custom View for Visibility on Generators

In the custom view above, users can click on the different columns of the dynamic table to sort the assets. For example, clicking on the “Fuel Level Percentage” column will arrange the generators from lowest to highest fuel levels, and vice versa. Users can also click on the icon on the top-right corner (see #1 in above image) to add and remove information from the dynamic table. Filters can also be applied to the view by clicking on the first icon in the top-right corner (see #2 in above image).

Such data organization directly in **Atlas**’ map view allows the users to have visibility on the fuel levels and remaining runtimes of their generators throughout their network. It also allows users to quickly determine which generators in the network are running. Of course, such custom views could be added for every type of cooling and power equipment in the network: HVACs, power plants, BDFBs, etc.

4.2 Configurable Statuses

Customized statuses can be added to every data point collected from the equipment in the **Atlas** software. For instance, in the figure below, a status has been applied to the temperature measurement reported by an RTU at a specific site.

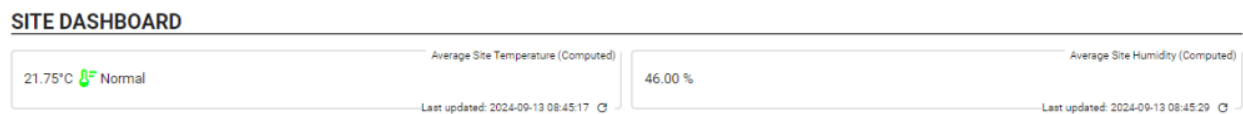


Figure 5: Example of a Status Configured for the Temperature Measured in a Site

In this example, the temperature reported by the RTU is 23.75°C, and the status “Normal” has been assigned to this temperature value. Note that every status associated with numerical measurements in **Atlas** is configured through user-defined business rules. Hence, statuses are fully programmable to meet each user’s reality and requirements.

Statuses can also be applied with binary quantities reported to the RTUs via their dry contact inputs. The figure below illustrates an example of such statuses applied to an HVAC unit.

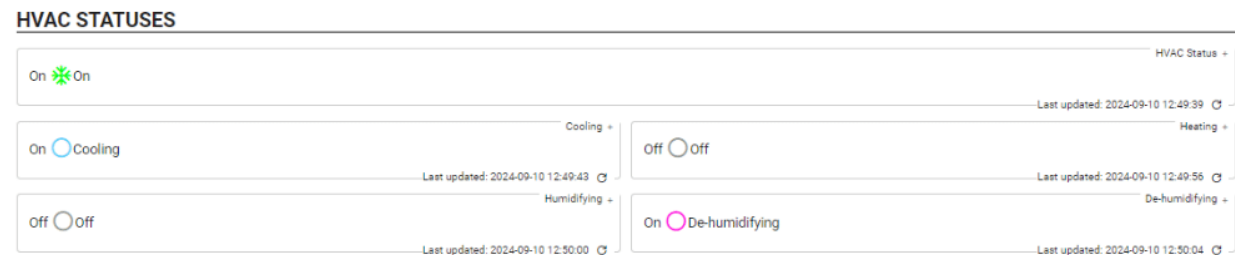


Figure 6: Example of Statuses Configured for an HVAC Unit

When **Atlas** detects failures or abnormal conditions based on the data, it is possible in the RTU or smart equipment’s web interface to obtain more information on the site and to support troubleshooting. Atlas can store the IP addresses for the RTUs and smart devices within the network. It is thus possible to directly log into every IP-capable device present within the network directly from the Atlas platform

IP Address

http://10.10.100.62/

20/50

Figure 7: Example of the IP Address of an RTU stored in Atlas

4.3 Customized Dashboards

Lastly, **Atlas** enables users to create customized dashboards for a comprehensive global view of all the assets within the network. The figure below shows an example of a dashboard created in Atlas, customized for telecom sites with information collected from the RTUs in the network aggregated and transformed in Atlas.



This dashboard provides the following information:

- The number of sites with different statuses of Power Usage Effectiveness (PUE). This data is often critical for telecom providers to ensure they consume the power efficiently.
- The number of sites with different statuses related to the average temperature measured in the site.
- The number of sites where there is an ongoing power outage.

- The site statuses related to the ratio of the heat dissipation provided by the equipment in the site over the heat removal and rejection capacity. These metrics help determine whether the HVAC cooling capacity is sufficient in the sites to support the heat load from the equipment.
- A dynamic table storing the most critical data from each site, including the PUE and AC main power status. This table also displays a “valid” status to ensure that there is no connectivity error with the RTU in the site, thus ensuring that the alarms are communicated to the Network Operating Center (NOC).

Dashboards can be created and customized for every type of asset connected to the RTUs in the network, such as power plants, HVAC systems, UPS units, generators, and more.

5. Outputs and Benefits

As demonstrated, [Atlas](#) is a powerful data centralization platform that offers significant advantages for telecommunications providers with their operations. Specifically, some benefits of using the Atlas software on a day-to-day basis for centralizing data collected by the RTUs in the field include:

- **Increased operational efficiency:** With [Atlas](#)’ network view and dashboards, users can access at a glance their most critical information. The data centralization offered by Atlas provides a means for users to plan maintenance activities more effectively, eliminating the need to log into multiple RTUs and smart devices to prioritize their maintenance tasks.

***Example:** An operator wants to determine which generators in their network have fuel levels below 50% to assess which sites are at risk of a service interruption in case of a power outage. In this scenario, users can use dynamic tables provided in [Atlas](#)’ network view and dashboards to quickly determine the fuel levels from all the generator in the networks. Had the operators not used Atlas for this matter, they would have had to log into every individual RTU in the network to determine the fuel levels from the generators. Hence, Atlas provides a means to significantly accelerate the planning process and allows to manage the network in a proactive manner.*

- **Increased Equipment Uptime:** The user-configurable statuses in [Atlas](#) clearly highlight abnormal conditions at a site. Combined with instant notifications, this functionality helps to reduce unforeseen service interruptions.

***Example:** A major storm causes a power outage in five different sites. Users are quickly notified of this situation by the [Atlas](#) software via email. Using the Atlas interface, users can determine in which of these sites a generator is present for back-up power supply in a matter of seconds. They can also quickly assess the remaining runtime of the generators as well as the battery reserve time in those sites using Atlas’ custom network views. In this manner, Atlas assists users in planning the appropriate corrective measures efficiently, thus minimizing the risk of a service interruption.*

- **Reliable and accurate budgets:** [Atlas](#) is a powerful database and can store information about all equipment present within a network. By tracking the equipment's targeted maintenance and replacement dates, Atlas helps in creating budgets more swiftly and accurately. Budget processes are also facilitated using lifecycle reports which are easily exportable from the Atlas interface.

***Example:** At a given telecommunications company, operators are required to create budgets for battery replacements required in the upcoming year. Luckily, the operators previously stored in [Atlas](#) critical information regarding the batteries in the network such as their manufacturing date, their installation date, their warranty end date and their cost. Thus, users can quickly identify the batteries requiring replacement during the upcoming year and hence provide their management with a more realistic budget.*

- **Reduction of unnecessary truck rolls:** The network view and user-configurable statuses in [Atlas](#) streamline for engineers and technicians their maintenance and truck roll planning for the day. Engineers can also troubleshoot remotely abnormal conditions ongoing in their sites and come better equipped when their presence in a site is required. As a result, truck rolls are better optimized and more unnecessary visits to the sites are avoided.

***Example:** A user is notified by [Atlas](#) that the temperature in three sites is abnormal. Using Atlas' network view, users can easily sort the sites in decreasing order of temperatures to prioritize the necessary truck rolls. Still using Atlas, the user notices some HVAC units in the most critical site are offline and do not respond. A visit to this site is thus necessary. Before the visit to the first site, the operator uses Atlas' dynamic table to determine when a battery maintenance is due at this same site. Hence, the user can bring the necessary material for the battery maintenance, potentially saving an additional truck roll. After the first visit, the user moves to the site with the second highest temperature. However, the user notices in the Atlas interface that some of the HVACs in this site seem to have been set accidentally in "heating" mode. Consequently, the operator uses the IP addresses from these devices stored in Atlas to log into the HVAC units and switch these devices to "cooling" mode. The temperature in the site subsequently decreases slowly, and a potential second truck roll has been saved.*

6. Next Steps

In this first use case of the Atlas, we have examined the advantages of utilizing Atlas for polling Remote Telemetry Units and smart devices within a telecom network. More precisely, we have explored the types of data that can be centralized on the Atlas platform, the ways in which this data can be managed, and some of the benefits of centralizing network data.



As we have seen, Remote Telemetry Units are employed to monitor different types of power and cooling assets at telecom sites, such as DC plants, batteries, HVAC systems and UPS units. In the upcoming series of use cases, we will see how the Atlas interface can be customized to deliver transformed, actionable information for each of these equipment types. The following applications will be addressed in the upcoming use cases:

- Power Capacity Management;
- Cooling Capacity Management;
- Battery Management Optimization;
- Monitoring of Power Usage Effectiveness (PUE) and other eco-metrics; and
- Generator Maintenance Automation.

For more information on Atlas or the iO Supervisor, Multitel's newest RTU device, please [contact us here](#).