

# BERTOLINI SHIPPING COMPANY'S DATA CENTER MORE ACCURATELY, EFFICIENTLY CONTROLED WITH ELIPSE E3

Elipse Software's solution controls access to the facilities; monitors lights, temperature, firefighting centrals, air conditioning, generators, no-breaks, PUE index, and others

Augusto Ribeiro Mendes Filho Elipse Software's Media Relations

## Needs

Headquartered in Manaus, in the heart of the Amazon forest, and with 35 branches throughout the country, Bertolini Shipping Company Ltd. (Transportes Bertolini - TBL) specializes in road and water transportation, logistics, and warehousing. Their ground modal fleet comprises more than 2500 vehicles whose routes cover the whole Brazilian territory. Their water modal convoys have more than 220 tugboats that travel the Amazon Basin carrying oil, grains, and mineral barges, among others.

The TBL group also comprises the following companies: BECONAL (shipyard in Manaus that manufactures equipment for water transportation), BAL (plant in Manaus that manufactures equipment for road transportation, ECOLOGÍSTICA (specialized in full truckload shipping), AIAPUÁ (specialized in transporting dangerous cargo), BAG (warehousing company), and BEAL (agribusiness company).

For their Data Center's automation project, TBL has decided to employ the Elipse E3 technology. Developed by Elipse Software, a Brazilian software developer for process management solutions, the system allows monitoring and controlling the many different variables and devices comprising the DC. The solution was implemented by **Ideal Home**, a company specialized in developing smart, integrated automation projects.





Figure 1. Initial Screen depicting the DC's ground plan

## Data Center

The 80-square-meter building in Bento Gonçalves (in the South of Brazil) was opened in 2013 and comprises all of TBL's computerized systems, further divided into access, telecom rooms, devices, and UPS. A heavily automated, pro-active environment, the Data Center is where the preventive maintenance and periodical simulations of several subsystems take place, which ensures that the operation is always in a state of high readiness and safety. The facility was projected and built according to ANSI / TIA 942 (Telecommunications Infrastructure Standard for Data Centers) standards, which meet the main requirements for highly available solutions.



Figure 2. TBL's Data Center facility

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# Solution

The Elipse E3 application contemplates all environmental routines in the Data Center. A great number of sensors (motion detectors, thermostats, humidistats, flood sensors, automatic doors, power meters), integrated via ModBUS, SNMP, and dry contact, are responsible for monitoring not only the work environment, but also power generators, no-breaks, air conditioning, systems, biometric readers, and fire panels, among others.

Large screens display a real-time, integrated overview of all the data in Elipse E3, and any anomalies in the system will trigger notifications to the NOC (System Management Center) via e-mail, SMS, and voice messages. These occurrences are also shown on the screen's footer, blinking in red, on the verified events' list.

Additionally, the software can generate reports listing all events and alarms recorded from any selected variable and/or device, from any time period. If necessary, these reports can be exported to Excel or PDF.

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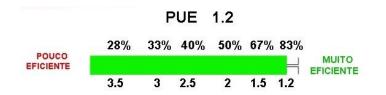
Figure 3. Example of a report generated for a specific time period

#### PUE

Power Usage Effectiveness (PUE) is a measure of how efficiently a data center uses energy, that is, how much energy is used by the computing equipment in contrast to anything other than a computing device in the data center (for example, lighting, cooling, etc.). An ideal PUE is 1.0; its acceptable range goes from 1.0 to 2.0.



The energy meters installed in the electric boards, as well as any reads from other assets, let Elipse E3 monitor the Data Center's PUE and, in case it exceeds the predetermined limit, issue an alarm to the NOC. With this information, TBL can plan their costs with electricity, since it allows identifying periods when consumption is higher in a certain day, week, or month.





#### Environment control system

The Elipse E3 communicates with the systembox (Homesystems' controller) to monitor the Data Center's humidity, temperature, flood scares, motion detection, lighting, access, and phonelink module. Whenever the temperature is over 25° C (77° F), air humidity is under 30% or over 70%, or water and/or smoke is detected on the plant, the software is triggered and an alarm is set to the NOC.

Both the thermostat's and the humidistat's values are visualized on the main screen; this screen is also where lighting can be controlled either individually or altogether.



Figure 5. Lighting control; individual lamps are indicated in yellow



# Air conditioning

The Data Center features a precision air conditioning system, designed to work with large, constant workloads and sensible heat (generated by machines), not latent heat (generated by people). The DC's temperature and humidity are controlled by two precision air conditioning centrals working redundantly.

Each air conditioning device comes with a RS-485 bus for reading the memory map. With an Ethernet gateway, TBL is able to convert Modbus RTU into TCP in order to read the devices' memory maps. Alarms and devices (and their statuses) are monitored on an E3 screen.



Figure 6. Air conditioning monitoring

# Generator and distribution board

The generator's general status (input voltage and current, frequency, battery voltage, diesel fuel levels) is monitored by Elipse E3, in communication with DSE (Deep Sea Electronics) manager, via protocol SNMP. This control also indicates whether it is being power-generated by the DC or the energy supplier.



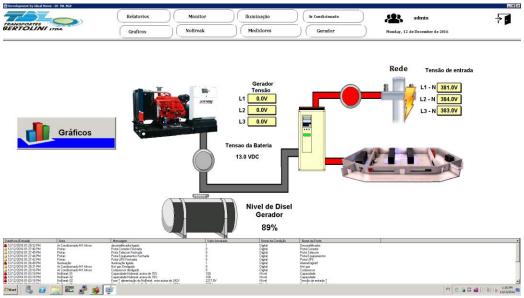


Figure 7. Screen depicting the DC's power feed (in this case, by the energy supplier)

In case there is a fuel shortage or overflow in the generator, in addition to the alarms normally sent to the NOC, a window pops up in the software with all the information about the event. The Elipse E3 also monitors the general distribution board, reporting on voltage, current, and potency provided by the energy supplier.

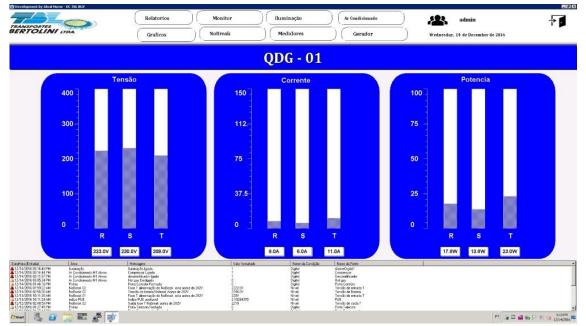


Figure 8. Monitoring the power distribution board



# **No-breaks**

The Data Center has individually modulated, redundant, three-phase no-breaks (N+1 settings), with total capacity of 160 kVA, and each one operating on its own battery bank. With Elipse E3, the no-breaks' voltage, current, and frequency are monitored, as well as their batteries' voltage, potency, and capacity.

Possible fails to the no-breaks are also monitored by E3; UPS equipment memory map reading takes place via Modbus TCP, directly on the devices Ethernet ports.

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#### **Benefits**

TBL's new Data Center has undergone a profound change in its structure: from a purely reactive environment to a highly pro-active one, where sensors, equipment, and systems are now fully integrated. And Elipse E3 was instrumental in this change: the software is the key piece in the DC's architecture, responsible for allowing several different indexes (such as PUE) remotely and in real time.

Among the other benefits brought by Elipse E3 are:

• Easily integrated with devices from different vendors;



- Pro-active environment: any alarm, even in its initial stages, is sent to the IT team very quickly via e-mail, SMS, and voice messages, according to their severity level;
- PUE index monitored in real time and with historic storage, which allows the company to better plan their costs with energy by identifying which periods demand more supply than others;
- Remote control of access and lighting;
- DC's temperature, humidity, air conditioning, no-breaks, generator, and distribution panel are fully monitored;
- Events and alarms are recorded in reports that can be exported to PDF and Excel.

## TECHNICAL INFORMATION

Client: Transportes Bertolini Ltda. Systems integrator: Ideal Home Elipse package used: Elipse E3 Platform: Windows Server 2008 R2 Number of I/O points: 1000 I/O drivers: Modbus TCP and SNMP