



The Top 10 Benefits of Paladin® Power Analytics

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EDSA is frequently asked to provide “The Short List” of the most valuable features and benefits that our Paladin® DesignBase™ and Paladin® Live™ platforms deliver for customers. Paring the list down is a challenge – what’s crucial in a data center differs from what’s crucial in an aircraft carrier – but at the highest level, here is a short list of the ten most universally valuable aspects of Paladin:

1. Truly predictive diagnostics – Paladin is a model-based platform, in which design specifications (Paladin DesignBase) provide the foundation upon which analytics (Paladin Live) are based. In formulating its predictions, Paladin takes into consideration design limits, changing conditions, and their real-time implications... as opposed to other “predictive” technologies, which simply look back at trends, extrapolate a linear value, and call it a “prediction.” Such technologies are based only on historical data, and – like projecting the future value of stocks – have no means to recalibrate for unforeseen events.

Key Benefits:

- Identifies problems in the *theoretical* stage, long before they actually occur
- Identifies current, actual risks, based upon changing system state
- Lays the foundation for reliability-centered maintenance

2. Intelligent Alarm Management – Unlike conventional systems, in which the only indicator of problems is when a threshold has already been breached, Paladin Live begins diagnosing the health of the overall system the instant problems become *theoretically possible*. Because Paladin’s model-based methodology understands the interconnect-edness of all equipment, it takes a “master” view of alarms, focusing on only core problems (e.g. loss of utility power) rather than the hundreds of resulting alarms (e.g. every device reporting its own loss of power) that frequently overwhelm conventional systems and their human users.

Key Benefits:

- Intelligent alarm discernment eliminates cascading and nuisance alarms
- Focuses on the core underlying problems, without being distracted by false alarms
- Maintains a coherent, reasoned dialog with owner/operator in critical situations

3. Situational Awareness – Paladin maintains a real-time, uninterrupted awareness of the health of all components throughout your electrical power infrastructure and supporting equipment, like generators, batteries, and UPSs. This ensures that 1) at a facility-level or a component-level, all systems are functioning within their target specifications, 2) current conditions do not imply the emergence of power anomalies, and 3) in the event of unforeseeable power problems, all backup systems are fully capable of withstanding a catastrophic disruption.

Key Benefits:

- Maintains both broad and deep expert knowledge about infrastructure
- Ensures all systems are operating according to their intended specifications
- Learns and assimilates changes in system states in a contextual manner

4. Global Consolidation and Standardization – Paladin is built with an open systems architecture that recognizes data from any source, including proprietary meters, buses, and control systems. Thus, whatever types of data are being aggregated – and wherever that data is being generated – Paladin ensures that uniform standards are applied and adhered to on a global basis. If a problem is emerging across the facility or across the globe, Paladin applies whatever “tribal knowledge” exists to ensure that issues are effectively and consistently resolved and documented.

Key Benefits:

- Eliminates customization and “hard coded” application integration
- Embedded expertise... deployed consistently, globally, ubiquitously
- Provides institutional insight into all facilities, policies, and processes

5. “Black Box” Data Restoration and Analysis – Like the flight recorder on aircraft, Paladin stores (to 1 millisecond waveform capture) all values from all sources: in the event of electrical power problems, users can retrieve and analyze all historical data from everywhere in the system... not limited to just the values selected at the outset. With conventional control systems, the database stores only the values from selected points predetermined by the plant operator when it was deployed; if power problems occur, only those values can be used to reconstruct the fault and prevent it from recurring.

Key Benefits:

- Event-driven capture, reconstruction, and playback of critical data
- Allows service teams to “autopsy” problems in power infrastructure
- Provides critical insight into how problems arise and how they can be alleviated

6. Energy Management – Energy management is a growing concern for mission-critical facilities, especially data centers, where the cost of powering IT equipment equals 20% of its cost. Because of the ever-increasing density of servers and switches, power requirements for the largest data centers are increasing 20% per year; some data center operators report that their monthly power costs recently skyrocketed from \$10,000 to \$35,000.

Key Benefits:

- Accurately track your energy usage
- Validate utility billings
- Determine the effect of facilities expansion and consolidation

7. Reliability-Centered Maintenance – Electrical power systems are very analogous to human biology: over time, critical components age, become less reliable, and begin to adversely impact surrounding systems. This deterioration can be observed, measured, and extrapolated... allowing Paladin to make highly accurate predictions about overall system health and the “life expectancy” of specific components.

Key Benefits:

- Ensures that maintenance occurs only if and when it is truly necessary
- Eliminates the time, costs and risks associated with “scheduled” maintenance
- Promotes maximum uptime, without jeopardizing system integrity

8. Asset Management – Since your facility was designed, there have been countless changes from the original specification: new equipment may have been added, older systems have been modernized, and other configuration changes. Very, very few facilities have up-to-date documentation on the current state of their operations; such undocumented changes are frequently the “weak links” that lead to power problems.

Key Benefits:

- All components are documented in the context of an overall, system-level model
- Component-level specifications provide the foundations of system-level knowledge
- The operational interconnectedness of components is captured and codified

9. Paladin BlackBoard – While Paladin Live maintains situational awareness of live operations, Paladin BlackBoard is a virtual environment that provides an off-line, mirror image of them. It enables users to make a “freeze frame” of their real-time, current environment in order to conduct detailed “what if” simulations reflecting the present configuration of your electrical infrastructure. Such simulations include testing of real-time configuration, maintenance, repair, and other procedures, before attempting them on live systems.

Key Benefits:

- Perform service actions on virtual electrical facility, prior to doing it live
- Train electrical personnel on the equipment in a safe virtual environment
- Add loads, utility sources, etc., in order to predict future states of operation

10. Capacity and Resources Management – Understanding the capacity of your facilities – e.g. the number of servers in a data center, the amount of equipment on a plant floor, or the peaks-and-valleys of electrical loads – gives management insight into when and how to manage facility planning. Whether consolidating, expanding, or moving facilities, knowing precisely how much power systems overhead you are using – and more importantly, how much remains to be used – is crucial in driving operational, technical, and financial planning.

Key Benefits:

- Know safety margins as loads fluctuate based on usage
- Predict potential overload conditions, suggest opportunities for load balancing
- Save money (instead of running multiple data centers at 20% capacity, safely consolidate into a single data center running at full capacity)