VERTIV WHITE PAPER

Benefits of Adaptive Power Solution in High Density Data Center Applications

Introduction

It is expected that the demand for big data will continue to rise in the years ahead. To address these growing challenges, facility managers adapt and seek innovative solutions to future proof their data center infrastructures. Managing multitude of medium to large-scale IT systems with high density servers to support the high-density computing of the current and coming world, calls for a consolidated, quickly deployable, scalable, and compact solutions. That's why rapid deployment of standardized, factory tested solution is becoming the norm.

Conventionally, the power system infrastructures are distributed and assembled physically away from each other throughout the data center. This is a space consuming topology that results in extensive power cabling, complex scaling, decentralized monitoring, and complex site integration & testing. With the adoption of integrated solutions, such as Liebert® APT solution, power systems are streamlined and combined in just one box, resulting in rapid deployment and uncomplicated installation. Since components are reduced, there is lesser staff requirements, space needs and operational costs. Further, management and monitoring of the power chain can now be seamlessly done in a single console.

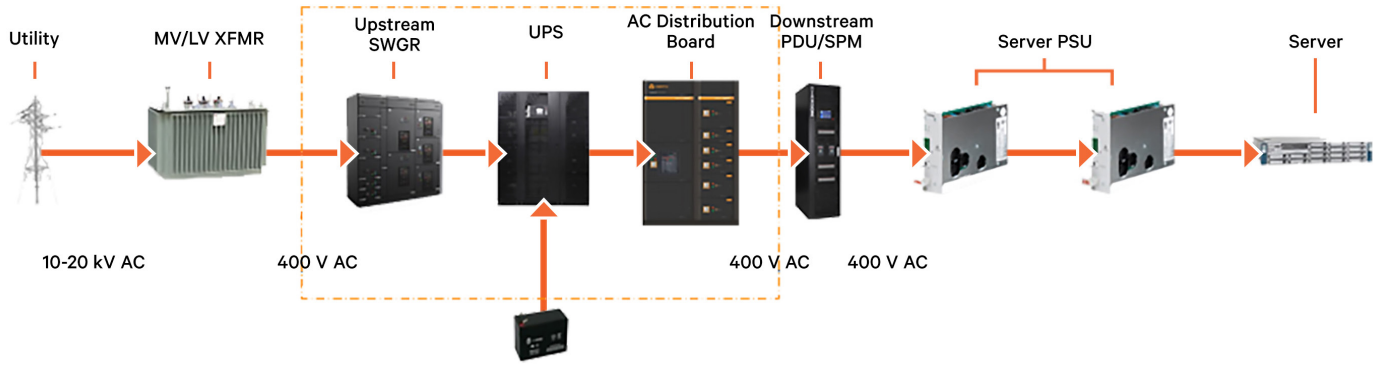
An Adaptive Power Solution for Your Changing Needs

Integrated Approach to Growing Power Demand

The Liebert APT is a unified solution with an innovative architecture that integrates a simplified input/output switchgears, scalable uninterruptible power supply (UPS), and a top-notch monitoring and control system called the Power Train Manager. This all-in-one solution package helps facility managers with the complexities and challenges of deploying, testing, and managing the entire electrical ecosystem in a dynamic business environment. The Liebert APT is standardized, factory fitted, and can be delivered to the site and installed within a minimal timeframe.

Solution Elements

The Liebert APT is an efficient and fully redundant solution, so mission-critical operations can run smoothly and continuously, without a single point of failure. All components of this complete solution are ensured to be in highest degree of quality and safety compliance. Shown below is a typical data center power chain, and enclosed are the components that comprise the Liebert APT.



Design Verified Switchgear

The upstream switchgear is scalable and has a configuration of either a drawing cabinet or a fixed mode cabinet for flexibility. It has high power density supporting up to 36 draw-out units. Its rated short circuit can withstand up to 120kA, and its rated bus bar capacity can reach up to 6300A. It is fully compliant to any relevant standards which are certified and tested by external agencies. The AC Distribution Board or the Downstream Distribution, on the other hand, has user configurable outgoing feeders which can also be fixed or draw out type.

Highly Advanced Vertiv Liebert UPS

Connecting the switchgear to the UPS is the prefabricated copper bar, which simplifies the field cable engineering, and hastens the power supply system deployment. The specific Vertiv UPS used for the Liebert® APT solution can be either Liebert® APM Series or Liebert® EXL S1.

The Liebert® APM Series are scalable and modular online UPS with hot swappable 50kW power modules, and batteries that fit your specifications, resulting to more flexibility. This also reduces the mean time to repair (MTTR) and the mean time between failures (MTBF) – both of which are crucial parameters considered in data center management.

The Liebert® EXL S1 is a transformer-free monolithic Vertiv UPS, available from 300kVA to 1200kVA. It can provide a double conversion efficiency of up to 97% plus intelligent paralleling to optimize efficiency at partial load, thus achieving superior running cost savings as well as reduced TCO and CO2 emissions.

Intelligent Power Management Center

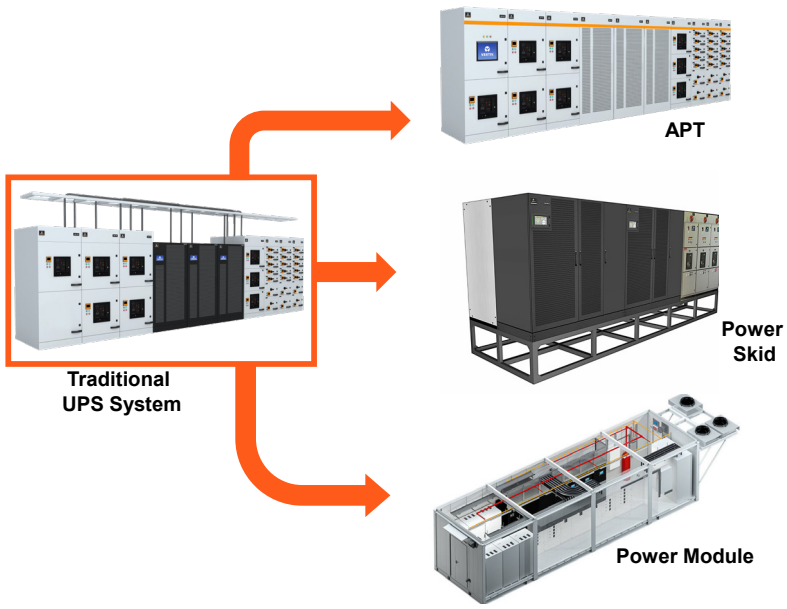
To ensure an energy efficient data center design, extended data center life cycle, and greater power train reliability, the solution comes with a built-in Power Train Manager (PTM). It is a comprehensive power management center with single point of control, monitoring, and communication. This gives the facility manager the power to know and the power to do at a distribution level. Significant information like dynamic single line diagram (SLD), system health diagnosis, and failure localization can be visualized and collected easily.

Key Features & Benefits of a Unified Solution

Simplification Without Compromise

The innovative architecture design of Liebert APT results in simpler installation and commissioning. This solution is shipped per panel to the site. No more massive cabling is needed. Once assembled, it simply needs to be connected from the utility and diesel generator sources, and then to the load that it needs to support.

Additionally, to match customers' unique needs and requirements, Vertiv offers other integrated power solutions. As shown in the diagram, from the traditional UPS system, there are two other options customers can transition to. For customers seeking an integrated power solution delivered as one whole unit to further reduce installation time, there is the Power Skid. It is much like Liebert APT, but all power cabling and ducts are assembled below. Lastly, the most comprehensive one, which includes batteries and cooling units built in a shipping container, is the power module or the Vertiv SmartMod.

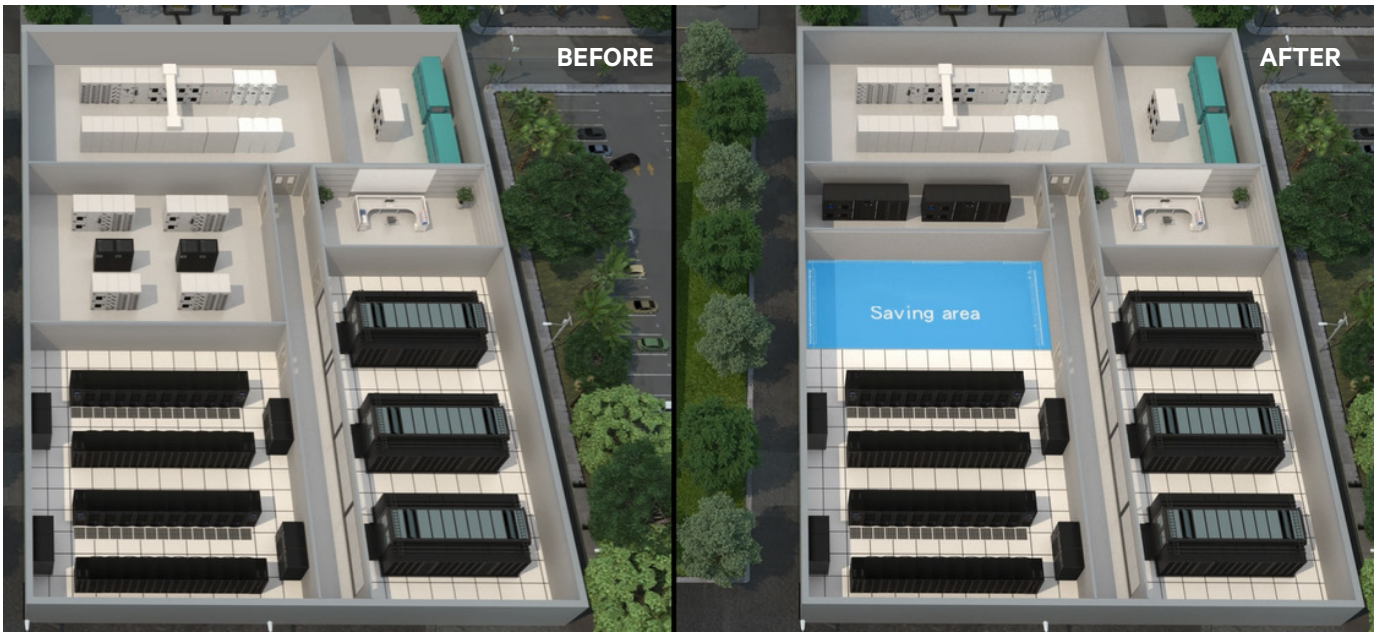


Benefit

- Entire solution is delivered as "Factory fitted & Tested" - Complied to highest degree of quality and safety.
- Standardize design
- Value engineer the system
- Space saving
- Hassle-free, faster installation and commissioning- Offers less cabling and MTTR – Lead to less CAPEX
- A comprehensive centralized control, monitoring and communication solution. (APT)

Scalability & Space Saving Topology

There are limitless ways to architect critical infrastructure by customizing power capacity that fits your specific needs. It is a true pay-as-you-grow, modular, and fully swappable design. It saves about 30% of footprint compared to the distributed approach. To visualize this remarkable benefit, let's look at the sample data center before and after layout below. The blue highlighted floor area indicates the space saved through Liebert APT.



Centralized & Optimized Infrastructure Management

The Liebert APT is equipped with an intelligent management system for centralized monitoring, and real-time data analysis of power equipment and system operations. Through this device, the entire electrical ecosystem can now be easily managed at a single console instead of going to individual feeders to check equipment and operation status. The PTM helps optimize power system, prevent systems failures, and reduce significant operating costs.

Conclusion

The continuity of business-critical operations is one of the challenges that facility managers must guarantee especially with the prominence of data analytics, metaverse and other data intensive technologies of today's era. More and more facilities are expected to be developed to match the accelerating demand for capacity, leading to inflated deployment costs, enormous energy consumption and space requirements.

Several data center equipment providers have started embracing system integration to approach these challenges. Similarly, Vertiv has taken a step forward to streamline larger systems like power infrastructures into a unified solution called the Liebert APT. This comprehensive power solution encompasses the aspects of availability, flexibility, efficiency, and sustainability. With Liebert APT, you can reap the significant benefits summarized below:

Rapid Deployment. By standardizing, testing, and integrating the power components in the factory, and shipping them in compact structure to sites, complexity and guesswork are eliminated while the capital to deploy and support is minimized. This complete solution allows rapid onsite installation and commissioning in as fast as 2-4 days, ideal for on demand business needs.

Space Optimization. Its innovative design requires lesser floor space than traditional architectures, saving you 30% of footprint which you can allot for IT racks and other essential equipment. It also saves you from the costly and extensive cabling or bus duct connection of a distributed power systems.

Scalable. Its wide system level building blocks, modularity feature, and hot swappable components allow real-time addition of power capacity, providing a responsive approach without compromising the continuity of critical business operations. By keeping the capacity in pace with current business demand, greater flexibility and practical investment allocation are attained.

Easy to Manage. The intelligent PTM incorporated in the APT gives facility managers the power to oversee and control the DC and AC power systems both onsite and remote through a single window display. It eradicates the need to check the status of each equipment, overall, improving data center efficiency.

Vertiv understands that there will constantly be uncertain changes and requirements in the data center, so the Liebert APT is designed for optimum flexibility and adaptability.

To empower and help you adapt with the challenges as the world advance, choose the Vertiv's adaptive and insightful power train – Liebert APT.

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