Improve competiveness of IDC and enterprise data centers with DCIM

This paper studies the implementation of modern DCIM systems for data centers to improve operational competitiveness with ATEN's DCIM solutions.

In recent times, Data center infrastructure management (DCIM) has become a hot issue. Instead of managing assets in data centers, DCIM covers the management of power, air conditioning, hot spots and space utilization.
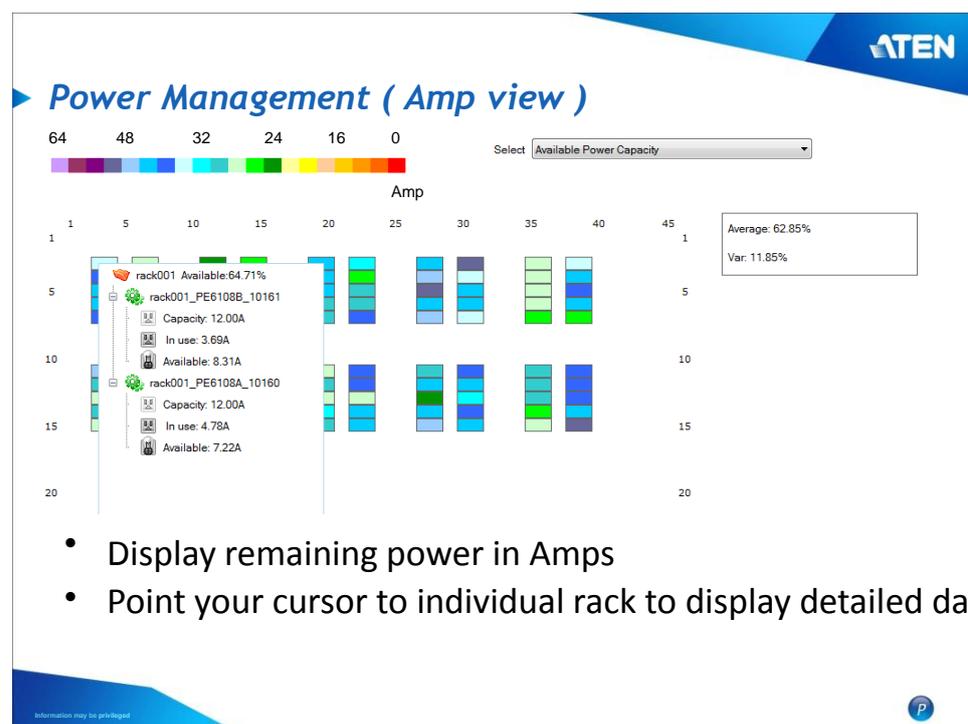
When DCIM has the appropriate tools and functionality their uses can be improved sharply for higher IDC operation, competitiveness or better enterprise management cost control. Also, with the appropriate combination of hardware and software, a reliable and effective DCIM system is remarkably cost efficient.

In its most basic meaning a DCIM system effectively manages the infrastructure of a data center with a systematic management mechanism for better efficiency by monitoring a variety of metrics precisely and in real time. Accurate and abundant reports are also required so that changes sought for increasing efficiency and so on, are only approved under the most stringent of circumstances so that applications for upgrades on the basis of any evaluation are in line with not only data center infrastructure regulation, but also with the actual needs of the data center itself.

Equipment managed by most DCIM software include power supply, air conditioning, computing devices, storage for the normal operation of information, servers, switches, and routers. Professional DCIM systems outperform conventional manual management because of their ability to satisfy current and future equipment needs in a highly effective manner.
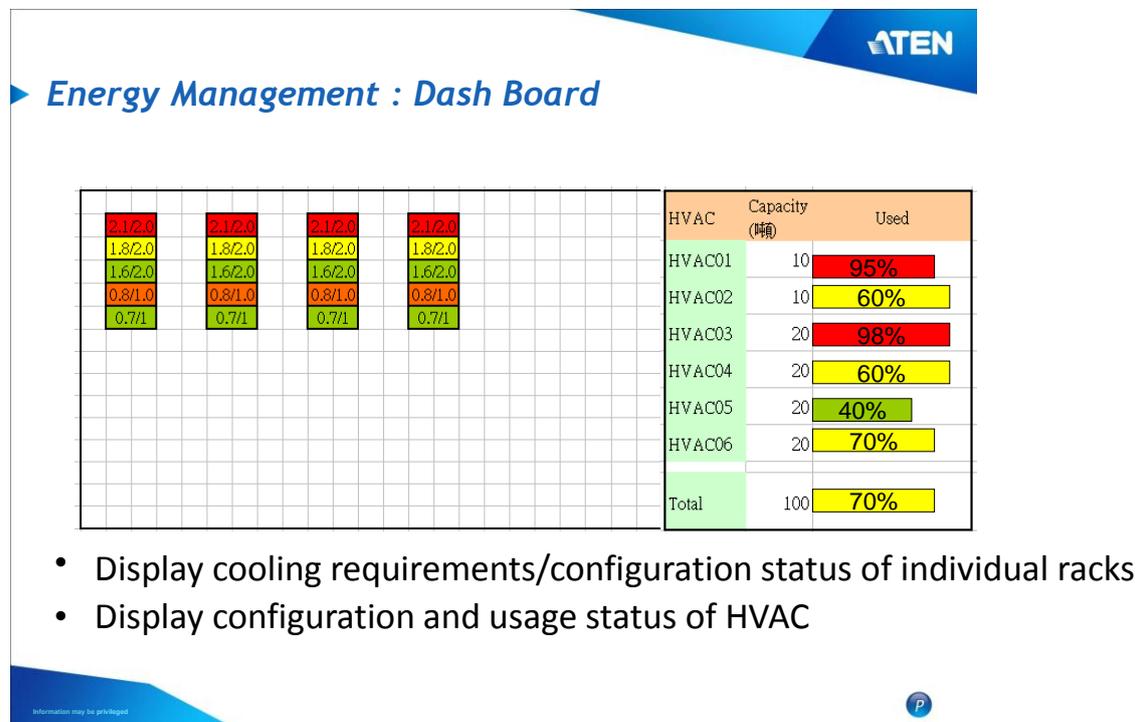
I- Power management:

Power consumption in data centers comes from information and non-information equipment. Increasing utility costs and environmental protection awareness promting improving energy efficiency in data centers has become a hot issue in the data center industry. Power Usage Effectiveness (PUE) is the ratio of power consumed by information equipment VS. total power consumption of the whole data center. The smaller the PUE value the more efficient the data center is as it indicates that most power is consumed by the information equipment contained in the data center. Effective PUE value measurement is the very first step in effective energy management. Overall power consumption in a data center can be measured with CT and PT smart meters installed at the distribution panel, while power usage information of information equipment may come from rack PDUs. The latter features the power measuring and monitoring function for instant power measurement, monitoring, and alarms. ATEN's eco PDU features single port level, circuit level and PDU level instant power measuring and supports HTTP/HTTS and SNMP communication protocols. The latter enables you to remotely retrieve instant information regarding the equipments' power usage data through a web interface and ATEN's data center management software (eco Sensors) or any third party SNMP management software to form a direct and effective tool for PUE calculation, equipments power usage control, and management. Effective electricity management enables data center administrators to understand actual usage which, in turn, ensures power usage safety which helps plan electricity usage in the future.

- Display remaining power in Amps
- Point your cursor to individual rack to display detailed data

II- Air conditioning and hot spot management:

Air conditioning equipment consumes the lion's share of power consumed by non-information equipment in data centers. Most data centers set the air conditioning temperature very low to ensure that the servers contained in it remain at the appropriate temperature to avoid hardware failure caused by over heating. Yet focusing on the supply of air conditioning without equal efforts in air conditioning efficiency improvements may lead to high power consumption and poor PUE value. Further, cold and hot points caused by unbalanced temperature management may lead to local overheating and dew condensation. ATEN's eco PDU and Energy Box may work together with temperature, humidity and differential pressure sensors to monitor ambient information in data centers and provide Rack Cooling Index (RCI), Return Temperature Index (RTI) and cold/hot point data. These indicators can be derived from ATEN's data center management software (eco Sensors) as a guide for air conditioning improvements. The air conditioning capacity and air volume management functions in eco Sensors' DCIM module may have air conditioning equipment settings configured in it to compare the differences between theory and practical values and serve as the evaluation base before verification and after air conditioning improvements.

▶ *Energy Management : Dash Board*

HVAC	Capacity (噸)	Used
HVAC01	10	95%
HVAC02	10	60%
HVAC03	20	98%
HVAC04	20	60%
HVAC05	20	40%
HVAC06	20	70%
Total	100	70%

- Display cooling requirements/configuration status of individual racks
- Display configuration and usage status of HVAC

III- Space and asset management

Many have thought about DCIM in terms of assets management covering servers, networking devices and the like. Indeed, there are scores of information equipment in any large scale data center. Effectively controlling their installation location and usage status are critical to improving administrator efficiency. Yet the space management of the data center is as important if not more so. It is critical for controlling floor and cabinet space utilization and meeting the requirements brought by growth of IDC's colocation businesses. The effective equipment allocation in available space is limited by factors including power, air conditioning, and cold/hot spots. Addressing this issue, ATEN's eco Sensors offers administrators with effective and visual management tools and reports for change and expansion requirements. It enables the macro view of utilization of total floor space and micro view of server changes in every 1U contained in each cabinet.

- Display space, outlet, and power usage status at rack level

IV- Change simulation management

An ideal DCIM system is required to provide not only management information but also practical solutions to the data center administrator. For example, in case a data center with 2000 servers in existence needs to add another 1000 servers to meet growing business requirements. To add these servers the administrators must learn to select among available space or to add more cabinets, power supplies and air conditioning equipment. The eco Sensors' DCIM module enables user to simulate and generate installation solutions and efficiency indicators after installation based on the current usage status of new requirements. Investing in DCIM like ATEN's eco sensors

benefits IDC's with strong evaluation and monitoring tool that assists in addressing new business requirements, guiding necessary investments and thus serving as a tool for decision makers.

Despite being accepted as one of the key issues in the data center industry some issues still linger. One of them is that generally DCIM management costs a lot in hardware and software investments. In reality, appropriate planning along with ATEN's data center management software accompanied by eco Sensors and eco PDUs or Energy Box will improve power, air conditioning, cold/hot spots and space assets management significantly at a relatively low investment level. It not only improves infrastructure management efficiency, data center safety and reliability, but also provides instant information and simulation based on decision recommendations against future demands. ATEN's DCIM solutions are suitable for both large scale IDC and small and medium sized data centers. It is the ideal choice for any data center with DCIM requirements.