

Evolution in premise cabling approach meets monitoring trends for UPS and other critical infrastructure

Abstract

People who rely on Information and Communications Technology (ICT) need systems to be highly available. High integrity UPS deliver clean, continuous power to enable a high level of uptime from the systems they power. It is considered standard practice then that UPS are installed as an integral part of the building electrical infrastructure or deployed as an integral part of ICT infrastructure - or both.

It has long been accepted best-practice that status of centralized or zone UPS be monitored via Building Management Systems (BMS) used by Facilities Managers to oversee mechanical, electrical and other elements of the building physical plant.

It has also been accepted best-practice that distributed UPS deployed in server or communications rooms or remote branch site locations be monitored via Network Management Systems (NMS) used by ICT Infrastructure Managers to oversee network routers, communications switches, server computers, circuit capacity etc.

The communities of people responsible for Facilities and ICT Infrastructure often rely on Vendors of Support and Maintenance Services to help them maintain reliable operation of the various physical assets in their respective infrastructures. These vendors represent a 3rd community of people who rely on monitoring systems to help them oversee their specific areas of responsibility.

In the past, each of these communities would rely on their own discrete monitoring communications infrastructure:

ICT Network Management Systems evolved as part of a broader inter-operability standards initiative that required ICT systems vendors to deliver vendor-neutral solutions for flexibility and ease of integration between systems over time. NMS systems use the ICT infrastructure.

Building Monitoring Systems evolved from Process Control technologies where each process was a unique island of activity typically requiring a highly customized SCADA system. Consequently, BMS systems use a variety of proprietary system protocols (i.e. Modbus (J-bus), BACnet, PROFIBUS etc.) over RS232, RS422, RS485 and other communications media.

Monitoring systems used by Equipment Service Providers used "phone-home" and/or "dial-in" techniques via analogue modem connections through the PSTN to access a diagnostic and configuration terminal console embedded in a device located within their end customer's remote facilities.

There are several trends occurring in various areas of activity that are beginning to drive demand for *multiple monitoring systems* or multi-purpose *converged monitoring systems* that are able to serve the needs of Facilities, ICT and Service Vendor communities simultaneously across the full range of UPS applications. (See **Table 1**)

**Table 1:
Trends Driving Convergence in Monitoring and Cabling**

Industrial Ethernet
Digitized Voice Communications
Network Security
Server Consolidation
Mainframe Migration
Best Practice Initiatives

From high-power UPS deployed in large Data Centre installations to low-power UPS deployed in branch site applications such as petroleum distribution, hospitality, or retail banking, requirements for monitoring are present now and expanding.

UPS specialists and cable plant specialists each need to be aware of these trends, consider the implications and make the necessary investments in solution portfolio, expertise and staff training in order to serve customers using old, new or combined approaches.

Let's review each of these trends briefly - including experience and observations from end customer installations and examples of solutions that Chloride can provide to some of the new challenges these trends present.

Industrial Ethernet

Standardized and inherently lower cost Ethernet and TCP/IP interfaces are displacing RS485 and other communication topologies in a range of industrial and process control applications.

This trend enables installation of generic cabling infrastructure that can be shared by control, data and voice applications.

Chloride has already delivered a solution on a project where the main premise Ethernet infrastructure was truly shared between ICT and BMS monitoring applications. The solution required a dedicated UPS monitoring system able to cover several hundred UPS modules deployed throughout the facility and forward selected summary information to three different high-level monitoring systems.

In another project, Industrial Ethernet network cabling was deployed as the BMS backbone - but was logically and physically separated from the ICT Ethernet infrastructure.

Recognizing that many customers are still in transition on this point, Chloride offers solutions for simplified BMS integration using a standard modbus UPS point-map available through either Ethernet or traditional RS485 media.

Digitized Voice Communications

ISDN (1990s) and more recent VoIP technologies are displacing the need for traditional analogue telephone circuits within newer facilities.

Monitoring systems that use modems for dial-out incident notification, or dial-in diagnostics may need special cable provisioning to bring analogue circuits to specific locations within a facility.

Before mobile phones and PDAs were ubiquitous, UPS monitoring systems were required to provide automated incident notification via pager dial-out.

The now broad-based adoption of email based messaging options allows Chloride to deliver easily readable, short incident messages that include quick http links back to the embedded WEB server hosted on the ManageUPS NET ADAPTER that connects the UPS directly to the customers ICT network infrastructure.

Network Security

In the 1990's, IT network managers relied on modem-based remote access to network switches as "out-of-band" communications paths for analysing and correcting network problems.

More resilient ICT infrastructure coupled with increased concerns for network security are resulting fewer, more controlled remote access points.

At some companies, existing modem-based access points to the ICT network are being disabled and new ones are not allowed.

LIFE.net is Chloride's industry leading monitoring system that enables secure, bi-directional connections between customer UPS and our award-winning UPS service teams. LIFE.net uses proven and trustable modem-based connections to monitor more than 8000 UPS installations around the world.

In some high security installations, Chloride has been asked to certify that the physical LIFE modem connection to the PSTN and the physical connection to the customer's private ICT network via ManageUPS NET ADAPTER does not present a potential security breach. The service and customer communications channels are isolated within the UPS operating system and cross-connect is not technically possible.

This attention to security concerns also prevents unauthorized personnel inadvertently accessing UPS control and configuration parameters through the customer's Ethernet network.

Server Consolidation

Many companies have been consolidating remote and departmental server computers into central server rooms or into the data centre. Consolidation offers several advantages for ICT operators;

- Better physical security from controlled physical environment.
- Simplified management and administration.

- Lower UPS acquisition costs (price per watt) and simplified UPS asset management when servers are clustered onto shared UPS with higher power ratings.

Chloride offers solutions to help manage potential downsides;

- Providing for automated safe shutdown of multiple servers on a shared UPS.
- Higher heat density per sq. meter can challenge air flow design or exceed power and cooling capacity designed for the room.

Chloride's ManageUPS NET ADAPTERS can act as a UPS status server or master shutdown controller for servers running Chloride's UPS monitoring software or Network Shutdown Agent.

ManageUPS monitors UPS load percentage and can be configured to email message when UPS load levels exceed a defined power margin threshold.

ManageUPS adapters can also be fitted with environment sensors to monitor and respond to changes in ambient temperature or humidity.

Mainframe Migration

As new 64bit CPUs and operating systems are fully proven on low cost, high volume server platforms, many companies are looking to move remaining legacy applications off mainframe and UNIX mid-range computers onto lower cost, more scalable server frames running Windows or Linux.

This trend will present some of the same challenges noted previously for Server Consolidation with two subtle differences;

- Central UPS in Data centre applications will typically be powered by multi-module parallel systems.
- UPS will be supported upstream by generators.

Chloride's network-based server shutdown solutions scale up very well to handle high server counts on parallel UPS systems. The environment sensor includes volt-free contact signal inputs so that generator and UPS status can be monitored by a unified system.

Best Practice Initiatives

The Information Technology Infrastructure Library (ITIL®) is a framework of best practice approaches, published by the UK OGC, that are designed to help business achieve both high quality and good ROI from ICT investments.

While this resource first appeared in the early 1980's, wide spread adoption did not develop until the mid 1990s. The ITIL began to receive more publicity in the ICT industry press in the last few years.

ITIL promotes the concepts of operational monitoring and management as essential to quality service delivery.

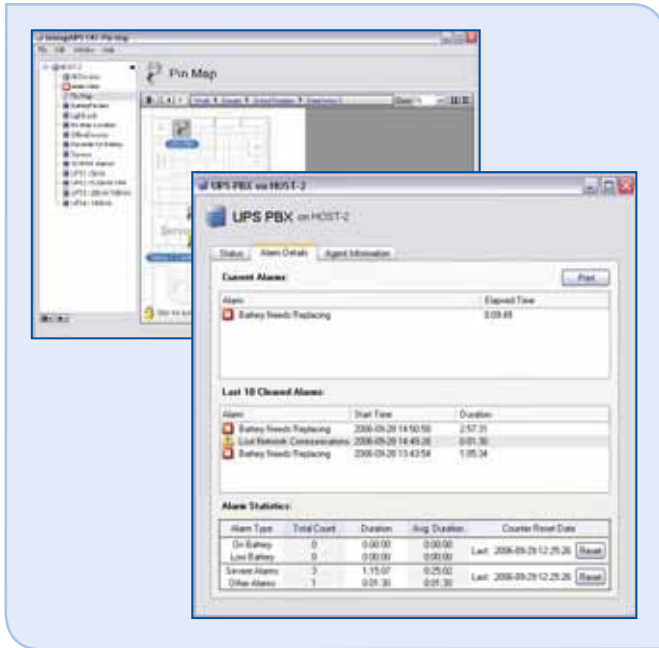
Process models recognize that infrastructure management and service delivery often requires cross-functional teams to efficiently handle asset management and incident/problem resolution.

The high level of recent interest in this approach is helping to fuel demand for converged monitoring system that enable several people from otherwise isolated disciplines to access the results observed, reported and recorded by monitoring systems.

CHLORIDE

Chloride addressed this situation by developing new software to simplify the essential tasks associated with central monitoring of UPS and related critical infrastructure deployed across enterprise facilities.

ManageUPS CIO is simple to use, simple to install and configure. Client-Server architecture allows easy sharing across the network for access by multiple people from both Facilities and ICT backgrounds.



As easy as it is to install and setup ManageUPS CIO monitoring software, many end customers prefer to outsource implementation and maintenance of monitoring systems to vendors with system specialists on staff.

Chloride offers a range of Professional Service options associated with the on site commissioning and operation of the system. Services also include training, system maintenance and on going on site and telephone based support.

Monitoring systems need to enable Facilities and ICT Managers to address changing requirements that may be driven by any or all of the trends impacting ICT and BMS subject areas today.

In house monitoring systems ensure that key personnel are aware of the status and integrity of their power installation and UPS asset pool at any time. Chloride can integrate with multiple 3rd party monitoring systems - or provide a converged turn-key monitoring solution that serves the needs both communities.



LIFE.net is a trustable 24/7 remote monitoring and diagnostic service that allows Facilities or IT managers to outsource responsibility for UPS operation back to Chloride. It allows UPS service teams to deliver excellent service response and preventative maintenance more effectively than they could without remote visibility.

Both monitoring systems are invaluable tools in the armoury of personnel tasked with maintaining maximum power available for critical systems.

About the author

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David Fencl is Director of Chloride Connectivity Solutions.

Holding various strategic marketing roles over 18 years in the power protection industry, David has authored several white papers and articles on key issues at the intersection of IT and power protection interest areas.



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