Technical Article

Aligning Best Practices and APLLM Principles for Efficient Data Centre Lifecycle Management

by Dave Harney, Group Product Manager, Molex

It's Friday, 3:00 pm and an alarm has just notified you that your SharePoint applications server has lost connectivity, you have a cutover scheduled for Saturday morning and you are late in delivering a SAN expansion plan to the CIO. In the midst of your active deliverables list you are only too aware that IT service provisioning in your company is under increasing scrutiny and it seems that this is magnified in the case of your data centre. In an effort to drive costs down and reduce the potential for human error you've attempted to identify opportunities for automation, but let's face it you are faced faced with issues of process and document control, network monitoring and performing triage on the most important urgent events your monitoring identifies. In spite of your best efforts at planning you find that you've still been forced to bolt on additions, implement temporary initiatives that have become permanent and make decisions with incomplete or even untrustworthy data. You've often thought how you would do things if you could start out with a clean slate. But what would that change be and how quickly would you end up in the same place you find yourself in today?

Every element of a Physical Layer One Network infrastructure goes through a lifecycle from planning, design, installation, maintenance and ultimately, retirement. The concept of 'Lifecycle Management' ' is not new to the world of IT but it is a new concept to apply 'Advanced Physcial Layer Lifecycle Management' (APLLM) principals to structured cabling. Cabling infrastructure is all too often considered a necessary evil, a burden on pathways and spaces, a limiting factor in implementing change, and according to some industry experts a not so infrequent source of network outages. Along with power, cooling and weight, cabling infrastructure was also recently classified as one of the four biggest challenges facing data centres today by Ron Hughes of the California Data Center Design Group.

This article covers six factors that impact APLLM and extends APLLM principals to demonstrate the value that can be captured by IT and facilities when APLLM is extended to the planning, building and management of the layer one physical infrastructure. Each component goes through a continuous lifecycle, from deployment and management to integration and replacement. The intent is to address best practices for infrastructure management, with an emphasis on simplifying the infrastructure with an IT lifecycle management solution.

Planning to align corporate, property and facility groups' objectives

ANSI/TIA-942 Telecommunications Infrastructure Standard for Data Centres provides the platform for telecom designers to participate in the early phases of the data centre design, but it is also critical that institutional or corporate, property and facilities groups work to align the overall objectives of the business. The obvious approach here is to make certain that the physical plant and facility's requirements can meet an organisation's financial objectives and that the organisation has adequate support resources. All data centres are built within these constraints and so the

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key is in anticipating future needs and determining how these constraints will limit the centre's effectiveness in the future. The data centre is the prototype for dynamic environments. Recently a company within the electronics manufacturing sector completed construction of their new corporate data centre. As is all too common, they had suffered from power, cooling and space problems for several years. The expansion was completed late in 2006 and was built to a capacity utilisation level of 40%. In fewer than twelve months that facility was over 90% utilisation. As it stands, there is no room for expansion as the data centre is located within part of the building with only one external wall, facing a road. Expansion for this company means making major structural changes to the existing building, major groundworks, moving to a new site, or outsourcing to a co-location facility. While the original build was a major capital expenditure it did not adequately address the company's needs. The business objectives and the IT support requirements were in alignment only over the short term. A strain will be placed on this company's business operations as they face major capital expenditures and a new IT services plan to make the inevitable changes. There may be no substitute for a good plan but an adaptable plan is a best practice essential for success.

Decreased capital costs to deliver new facilities

As an addition to planning for an adaptable centre it is also recommended that systems be designed to support and monitor the plan and its implementation. When designed well, metrics for project scheduling and measuring progress during construction and implementation can be created, including even actionable controls that trigger project releases, approvals and invoicing. Relatively simple things such as coordination between complimentary trades on a project can lead to compressed delivery schedules, improved cash flow for contractors and even a reduction in change orders caused by trade errors. In one high profile project, competition rather than coordination was the operational mode. Electricians, trunking fitters and low voltage installers all needed access to the area above the ceiling grid. Deadlines on the ceiling contractor were in conflict with the need to coordinate with the other trades. The result was the ceiling contractor installed the grid and tiles before the electricians, trunking fitters; low voltage installers were able to complete their work. This resulted in long delays and cost overruns for those trades. It also resulted in damaged ceiling grid and tiles and again more delays and cost overruns. The ceiling contractor concluded their work within contract terms and was the only winner. To enhance project control and decision making, visibility for the stakeholders of the facility, business management and vendors alike should be built into the system up front. Think of this as building in tools for process control and management similar to what would be done in a manufacturing environment. Apply the principles from the example to manufacturing a network switch. Imagine if final case assembly and the setting of anti tamper fasteners was completed prior to the installation of the power supply. In the manufacturing environment this would not happen because process flow must be controlled and managed efficiently in order for the manufacturer to compete and survive. Think of building projects or even network expansions in the same light and build processes, controls, monitoring and management

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tools to support the processes you build. Tools exist today that facilitate automated project support to integrate actions by trade's people with global project status reports allowing for data-based decisions and actions to drive a project.

Increased visibility into the entire portfolio of projects and facilities

We live in a web centric world. Basic tools are available that allow varying degrees of online collaboration and document control for users. Additional tools are available to facilitate project management and report engine tools exist to enable users to track and monitor critical data. Integration of these functions and tools has historically been a challenge especially when applying them strictly to IT functions or at least construction and IT integration projects. Project managers may spend fifty percent or more of their day gathering information, coordinating with trades and suppliers, updating schedules and ultimately preparing reports for their various stakeholders. Trades need tools to track materials, schedule labour and document project status for payment. Project managers need tools to coordinate and manage projects and facilitate reporting. General contractors need tools to monitor and manage project phases and completion to manage compliance with contract terms. IT & facilities need tools to monitor progress to allow effective scheduling of internal staff and to coordinate between building and infrastructure construction and network integration build out. Owners need to tools to monitor compliance, evaluate suppliers, schedule move dates, and trigger action for payment to vendors. Selection of tools should be made based on their ability to be tailored to meet the needs of the different stakeholders. At a minimum, tools should be selected that permit automation of basic workflows, configure data that is useful beyond initial construction, and provision for secure accessible data storage for regulatory compliance and future use alike.

Decreased operating costs to manage existing facilities and assets

Symantec's highly informative annual study on the state of the Data Centre reveals a conflict brewing between resources available and expected performance of the available resources. In a survey of over 1,600 companies worldwide they found that seventy-five percent of the companies surveyed say user expectations were rising gradually or rapidly, whilst fifty percent reported budgets are flat to decreasing, and thirty-seven percent of companies indicated that they were understaffed. Just as there is little doubt that user expectations will continue to rise there is also little doubt that pressure for cost reductions will mount in the face of a global economic downturn. When looking for cost reduction opportunities, IT organisations that focus on initiatives that both save in real expense and risk little opportunity cost to implement will be of greatest benefit, especially for organisations that are already understaffed. From the infrastructure perspective, the solution would be to provide a bridge and visibility to layer one devices and cabling infrastructure to network management systems via advanced physical layer lifecycle management applications.

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Organisations that apply this strategy look to leverage existing network management tools such as IBM's Tivoli™, HP's Open View™ or open source NMS such as Nagios® from Nagios Enterprises to capitalise on opportunity cost management. Real operating cost savings occur when the user is able to mechanically verify open and available cabling channels, physically map devices or even cabling outages, automate auditing of the physical infrastructure, and even work order assignment and verification of completion. Typically each of the tasks mentioned are today done through physical inspection based audit, combined with work order systems. By establishing documentation requirements from installers and integrators to match a PLM system's capabilities rather than simply accepting paper or PDF reports, drawings and network diagrams, the user can capitalise on the productivity offered by the APLLM system with little to no real or opportunity cost.

Automate and enforce best practices for governance and compliance

In over twenty years of meeting with clients, finding a user who did not desire to have proper documentation of their network infrastructure and building has been scarce. By that anecdotal metric it would be assumed that accurate dynamic documentation would be the rule rather than the exception and yet experience indicates that is not the case. At the point of closing a project, pressures for completion and cost containment most often relegate proper documentation to non essential status. The problem begins at the RFP stage. Most often an RFP contains ineffectual language such as the following sample that leaves the method, format and structure of documentation to the installation company's interpretation: (1) contractor provides a copy of the test reports in softcopy format, (2) contractor provides as-built information to owner to accompany all test result information, (3) as-built information shall be in a copy of construction drawings, (4) contractor will indicate location of all TOs, pathways, distribution cable trays, junction boxes, and all additions and deletions pertaining to telecommunications. In recognition of the extent of the problem, CENELEC has addressed record keeping requirements for installation and operational administrative systems in its EN 50174-1:2008 standard. This standard provides a platform for establishing specific documentation requirements from installers and integrators that can be built into the RFP process. The competitive bidding process must be structured to assure the user that requirements are understood and accounted for in the bid response from the contractors and integrators awarded a project. By first specifying and requiring the installation of an APLLM system as suggested earlier, the user can establish an evergreen documentation method. While proper configuration and system initialisation is essential to implementation, the key to long-term use is to automate systems as much as is practical.

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Eliminate multiple point solutions and reduce IT administration costs

Some time ago, an Olympic stadium project, fundamentally in the limelight of the world press, was, in a word, catastrophic. Services were alleged to have been ordered but not installed; installed cabling channels had been damaged by the cleaning staff who, incidentally, shared many of the telecom rooms. The lead Project Manager had an incredible memory and could recite location by phone number or phone number series by location. In effect, he was the Physical Layer lifecycle Management system for the site. Other venues' systems were not so robust. No linkage existed for pulling all venues together and so it was a shuffle of paper coordinated through the telephone, two-way radios and meetings in construction trailers. While extreme, it did not represent the exception. In a best practice environment the construction process will include a global management and monitoring system that facilitates the ongoing management and maintenance of the installed global Physical layer management system, spanning its entire lifecycle. While there are clearly trends towards data centre consolidation it is common for multi-site and global enterprises to have distributed data centres as well. Effective management of small and lights out facilities require tools. These tools must have local management capabilities but must be common tools that can be managed centrally. The cost alone in real expense and lost opportunity expense of dispatching technicians and skilled network managers to remote or small sites to conduct audits and correct problems that could be as insignificant as proper placement of a patch cord justify implementing an advanced physical layer lifecycle management system.

Conclusion

Planning, process management control, automation, full network visibility down to the cabling infrastructure itself, real and opportunity cost management, and leveraging existing tools are all issues that are adaptable to solving one of the four biggest challenges facing data centres today. While there is glamour in cabling infrastructure only in the eyes of cabling manufacturers, there are tangible benefits to expanding the view and scope of the role and constraints that the cabling infrastructure plays in the life of the data centre, or indeed any network infrastructure. True physical layer lifecycle management principles need to be applied to maximise the useful life and financial performance of the data centre.

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