

Pittsburg Core Server Infrastructure and Systems Build Management Project Scope Statement

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Summary

An analysis of LMC's current state of IT infrastructure and systems deployment reveals critical needs in replacing hardware and improving processes.

- LMC's core server systems are out of lifecycle, going from 10 to 14 years in production. Some infrastructure and power management elements are currently in a partial failed state presenting increased risk of outage. The server systems are on aged hardware and are considerably slower against current standards.
- There is no enterprise backup solution for server infrastructure and data of user home and department files. There is no technical base for future enterprise disaster recovery planning.
- Local share file storage produced for LMC staff use is currently maximized and not readily able to be increased. This has been a long term issue with constant complaints that requires a solution.
- Desktop and laptop endpoint systems are not properly updated timely for security upgrades, presenting a larger risk profile to all of our information systems. With the College approaching 1000 various endpoint PC/mobile systems and beyond, this must be addressed for improved service delivery.
- IT Staff use a dated methodology to build and manage endpoint PC systems, requiring inefficient use of labor, slow ability to react to changes, and do not have real time asset management reporting.

Proposed is the following:

- Acquire a new deployment of core server infrastructure for LMC's virtualized VMware servers and data storage provisioning. Current virtual server containers will migrate to this new VMware virtualized environment. This includes all the improvements needed in redundant CPU cluster systems, network storage availability, network connectivity, backup UPS power, and proper rack mounting. An exponential improvement in total server performance will be obtained. This system will position LMC for possible future projects in cloud server hosting, cloud file replication, and virtual desktop infrastructure technology.

Cluster Server and Storage solution platform (HW/consultant engineering): **\$175k**

- An enterprise data backup solution for on-premises retention and restoration. This will enable recovery of servers, user data, and have point-in-time abilities. It will have future setting ability to provide cloud archival storage, and be a foundation to any enterprise disaster recovery plan. Current efficiencies in data de-duplication, and compression will be present in the solution.

Backup solution (HW/SW): **\$60k**

- A server based enterprise automation system will be configured for PC endpoint management, and a new methodology of network based system building and modular software management will be created. This system will optimize IT support with remote tools to configure and deploy systems, and distribute key security updates in a timely manner. Reporting on assets and licensing will be present in the solution.

Systems Management Server and network endpoint systems building (SW/Consultant engineering): **\$65k**

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- There will be modifications to the existing data server racks in CC-125 and the MPOE to home the new core server infrastructure, and the new on-premises portion of the backup solution.

Server Data Room upgrades: **\$25k**

All estimated one-time costs = **\$325k**. This reflects contingencies of around 20%. Actual vendor technology decision and engineering consultants remain to be chosen. There will be in likelihood an increased bump in licensing costs with VMware and to some possibility Microsoft, to be determined.

Estimated Ongoing Annual Costs:

Core Infrastructure vendor support (HW/SW): **\$12k/annual**

Backup solution support (HW/SW) **\$10k/annual** [new cost to organization]

Host and client software support: Existing VMware and Microsoft support contracts in place.

Savings:

Remove existing Dell\EMC SAN server stack hardware support (ABTech): **\$10,764/annual**.

Project Background Description

1.1 Infrastructure Stability Issues

The majority of Los Medanos College [LMC] local LAN server systems are hosted on Dell Poweredge R805 servers in a logical cluster connected to a fiber channel EMC Clariion SAN storage solution. These hardware systems were acquired over 10 years ago, and are all outside of their lifecycles; unsupported by their manufacturers. LMC contracts out hardware support to a third party that specializes in off lifecycle equipment. This core server environment as a whole is production to a critical VMWare virtual server hosting software platform on an unsupported version which contains most of LMC's critical daily operational and core IT services both for Pittsburg and Brentwood campuses.

This system is attached to an APC Smart-UPS system providing limited uninterrupted power services. At around 14 years old this APC UPS system is well outside of intended service life, and a collection of batteries are currently in a failed state.

The rack mounting hardware for these systems are installed incorrectly against best practices. The main server data room resides on the lowest floor of what is the common core original facility of LMC. Water intrusion is a real documented risk for this area. The current racks resides right next to and adjacent an outside facing door, starting directly off the slab floor with high voltage battery systems.

1.2 Data Storage Problems and Lack of Backup Solution

The solutions architecture that drove the design years ago of how storage is produced by this system no longer is serviceable to the needs of the organization now. Negative impact is present and there is no ROI attempting to modify the existing system to expand storage. Many storage shares are at +90% of volume utilization, locked out from dynamic ability to expand. Restrictive quotas were put in place on staff individual work space, and department shares are harshly limited to simply out of space. Complaints on this from faculty and administration are common. These storage limits are too low against common standards in 2019.

LMC lacks a structured backup solution at user file, OS server, and virtual server container levels, and this poses a significant risk to LMC data retention. There is no system in place for previous version level recoveries. The EMC

Clariion SAN system is in a troubled state of physical sector errors of an entire physical array that would require a full rebuild to remedy at some cost.

1.3 High Friction in Desktop/Laptop Support and Security Updating Problems

For software management of endpoint systems such as PCs, LMC currently uses an antiquated support method of building entire disk images via Symantec Ghost per each department and lab instance. Then a technician locally goes to each system and manually rebuilds systems individually, often by USB memory stick. When there are critical OS refreshing or application stack tasks to update or upgrade, LMC commits this whole process of entire system re-imaging each time. Currently, security patch management for administration systems is unchecked and not audited with many core applications going unpatched.

While student lab systems use a software product to “freeze” systems and daily restart them to an original state, those frozen states can go without software updates for over a year. This creates a high security risk profile to all of our network systems. The method has become unmanageable for around 1000 systems in the enterprise, and will not properly scale forward with college expansions and the increasing demands of IT security management.

Justification

2.1 Core Server Modernization and Improved Performance

LMC has identified that this aged infrastructure is a substantial risk against maintaining IT services. The return on investment for the existing systems has been well serviced for LMC, and upgrade and maintenance spending on this has been deferred for years. Moving to a new platform will remove the annual costs paid to ABTech Systems Inc. at \$10,764 annually for hardware support on out of lifecycle systems.

The use of virtualized server hosting environments and the need for network based storage solutions locally is still critical for LMC. It also allows LMC fast turnaround and negligible cost to turn up or down IT server based services as needed. While LMC has with other campuses moved some application demands to off-premises server solutions on SaaS cloud or District office hosted servers, there still is and will be functional and strategic IT need for future foreseeable years with an on-premises server infrastructure. Cloud based virtual server hosting architecture still presents an operational annual cost and risk envelope question that will be further examined for the years to come, but the current need to move to new and supported hardware is a presently overdue time sensitive task. This architecture will allow future possible transitions to existing partnerships with popular VMware enabled cloud CPU and server hosting infrastructures.

2.2 Enterprise Data Integrity, Security, and Network Systems Support Efficiency

An enterprise network backup system is mission critical to IT systems production and business operations. It is cornerstone to any future developed disaster recovery plan. LMC must have a backup system in place, and one that takes advantage of robust network and internet access to produce quick on-premises turnaround with cloud archival ability.

Moving to a systems software architecture for endpoint management will give LMC a current state technology approach. Normalizing PC deployments to an infrastructure structured on a platform of software distribution based not on whole images, but component driven in an automated remote management state will leverage network abilities and increase flexibilities to scale with the enterprise, while optimizing where IT staff labor is directed. LMC will get enterprise asset management capabilities and increased compliance with security protocols, along with better automated administration abilities.

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The entire system proposed is congruent in enabling LMC with leveraging possible future on-premises and cloud based technology considerations like virtual desktop infrastructure (VDI) and virtual application hosting, should that prove viable.

Objectives

- The new core server infrastructure will migrate with continuity LMC's current Microsoft Server Enterprise architecture. LMC will maintain as a solution in VMWare as a virtualization platform, and existing virtual servers in the current environment will transition to this new one. Existing services will move with continuity to the existing client systems that depend on this core server infrastructure, thus there will be low change to re-configure enterprise wide services, with the target of low impact of change to users.
- LMC shared server storage will be modified in this new environment with best practices for dynamic growth. LMC IT will expand its shared file services to accommodate current industry standards in space allotment to the campus. The ability to dynamically replicate these files multi-site and cloud at a domain share level will be present in the solution.
- This on-premises solution will be properly outfitted with an updated and fresh in-lifecycle UPS power system. All of this will be on server racks mounted accordingly to best practices if at a location of risk to water intrusion.
- An on-premises backup storage solution for quick restoration of file, virtual server, and bare-metal VMware host will be installed and placed into an alternate data room on LMC's campus for some physical data assurance. There will be enterprise backup management software in place to host system backups and restorations. This system will be congruent with future migration planning of archiving data to an offsite cloud based resource of future choice.
- A new systems software management server architecture will be installed, and a full methodology and practice will be built and proved, to enable LMC to distribute "package" building and automated remote installations to large groups of endpoint systems. OS and core application security updates can then be applied more often with little impact to staff and students during the course of a semester. LMC will be less vulnerable to security issues due to long delay from applying them. As all colleges in the District review security vulnerabilities as they occur, LMC will be able to react timely to current standards. When larger changes to software versions for curriculum or administration are driven, these can be configured as modular "jobs" for group scaled remote deployments without need of full system rebuilding.

Operationally, IT support staff will also use more remote access tools for faster service desk engagement with users. Reporting on assets and licensing controls will be introduced where possible. Engineers will fully document and knowledge transfer train LMC support staff in this new systems method.

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Key Deliverables

LMC IT will engage with vendors and integrators for solutions hardware and IT engineering services that best matches the current and future demands required. The solution will fulfill for:

- New redundant systems server hardware architecture for VMware hosting of virtualized servers. This will be in a clustered or virtual clustered system optimizing efficiencies.
- New redundant systems network storage solution for enterprise level services. This can integrate with line 1 in a hyper-converged system. Provisioning can be virtualized.
- New UPS system and rack power distribution to properly distribute loads to redundant power supplies.
- New server racks installed in best practice as determined.
- VMware 6.7 environment and VSphere services to produce like-to-like or better systems management.
- On-premises network backup platform in hardware storage and management software for file and VM restoration. Cloud enabled for archive ability.
- Endpoint systems management server architecture for automated modular software building, deployment, and asset management reporting of enterprise.
- Remote support management software across the enterprise for IT support staff.

5.1 Timelines

LMC is in need to initiate this project as soon as reasonably possible, due to the long out of lifecycle systems currently in use and their growing faulting states. LMC is in a suboptimal at risk IT standing with this faulting server infrastructure and lack of proper backup implementation.

6.1 Key team members

LMC Administration leadership, LMC IT Manager, vendor representatives, IT solutions service implementer, LMC IT Specialists, District network IT staff.

7.1 Assumptions

It is assumed that LMC can properly obtain the means, hardware, and service to conventionally migrate to this new technology environment.

8.1 Constraints

Funding is the major constraint of this project. There also may be need for planned outages to be scheduled and staffed for low impact to the college community while migrations or major project step installations occur.

9.1 Exclusions

This project moves our existing out of life-cycle platforms forward to supported states inside the same platforms. We are not moving to a significantly different state of technology or architecture at this time.