

## Fiscal Year 2015-16 Information Technology Request

### Colorado State University — Pueblo

*Modular Data Center*

#### PROGRAM PLAN STATUS and OIT BEST PRACTICES

2016-016

Approved Program Plan?  Date Approved:

The university says that the project design follows best practices set forth by the datacenter equipment manufacturers and hardware vendors.

#### PRIORITY NUMBERS

Prioritized By	Priority	
DeptInst	1 of 1	
CCHE	1 of 2	
OSPB	NP of 10	Not prioritized. Not recommended for funding.

#### PRIOR APPROPRIATION AND REQUEST INFORMATION

Fund Source	Prior Approp.	FY 2015-16	FY 2016-17	Future Requests	Total Cost
GF	\$0	\$1,864,800	\$0	\$0	\$1,864,800
<b>Total</b>	<b>\$0</b>	<b>\$1,864,800</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,864,800</b>

#### ITEMIZED COST INFORMATION

Cost Item	Prior Approp.	FY 2015-16	FY 2016-17	Future Requests	Total Cost
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$60,000	\$0	\$0	\$60,000
Construction	\$0	\$100,000	\$0	\$0	\$100,000
Equipment	\$0	\$1,616,000	\$0	\$0	\$1,616,000
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$88,800	\$0	\$0	\$88,800
Software Acquisition	\$0	\$0	\$0	\$0	\$0
<b>Total</b>	<b>\$0</b>	<b>\$1,864,800</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,864,800</b>

#### PROJECT STATUS

This is a new, never-before requested project.

#### PROJECT DESCRIPTION / SCOPE OF WORK

Colorado State University - Pueblo (CSU-Pueblo) is requesting state funds to upgrade its Information Technology (IT) datacenters and computing infrastructure, including improvements to the datacenter, local area network (LAN), and the wireless LAN (WLAN).

The project procures a "containerized" data center with an engineered modular design that provides a self-contained environment for housing servers and other critical hardware. The containerized data center also includes lighting, fire suppression, security monitoring, power distribution, and critical cooling. The university says the data center is a standalone unit and does not need to be contained within an existing building. The project also procures and installs 130 network edge and distribution switches. The edge switches allow end users to directly connect their device to a LAN. The distribution switches reduce cabling needs by aggregating the edge switches into high-speed links. The project also procures and installs 520 wireless indoor and 20 wireless outdoor access points. The new wireless

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access points will allow network services to a large area of the campus, where only 30 percent of the academic instructional areas are currently covered. The project will allow for the entirety of the campus academic areas to be covered.

#### PROJECT JUSTIFICATION

The university says these IT upgrades are necessary to quickly accommodate the growing technology needs of the university. CSU-Pueblo says the current data center is housed in an administrative building with inadequate cooling and electrical power capabilities, and renovating the administrative building to meet the environmental and power needs of the ever-increasing demands of the current data center is cost prohibitive. The academic requirements of the school have vastly outpaced the technology required to support essential learning needs, says CSU-Pueblo.

According to the university, the current switch technology is too slow to allow for the use of instructional video learning and has reached the end of its useful life cycle. The university also says the current wireless environment is inadequate and poor. The university hired a consultant to assess the current wireless environment. A total deployment of new wireless technology was recommended.

**Project Alternatives.** The university considered replacing the current Administrating Building's HVAC system. According to the university, this alternative would cost \$400,000 to only upgrade the existing cooling system, thereby greatly increasing the project cost. Additional work for the electrical system, raised floor system, and flood mitigation would be required. The new containerized data center was chosen as the selected alternative. The containerized data center allows for the upgrade of all systems while allowing the existing space to be reused.

#### PROGRAM INFORMATION AND IMPLEMENTATION PLAN

According to the university, a data architect and data center design firm will be hired to create the project drawings and scope of work. The data center will be custom built off campus and delivered upon completion. This portion of the project will take six months once the design documents are finalized. The network edge and distribution switches will be procured from the manufacturer and will be installed over a 12-month period. The new wireless access points will be procured and installed over a 12-month period.

#### COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

According the university, the project will decrease network downtime and prolong the life of the equipment. CSU-Pueblo also says that the containerized datacenter will mitigate hazards such as flooding and that the switch and wireless upgrades will increase the speed of the network by a factor of 10.

#### SECURITY AND BACKUP / DISASTER RECOVERY

According to the university, security and backup/disaster recovery will be enhanced by the installation of the new datacenter. The containerized data center will have the power and cooling necessary to deliver optimal performance. The containers will be monitored by closed circuit cameras. Environmental conditions will also be monitored.

#### BUSINESS PROCESS ANALYSIS

According to the university, it evaluated the systems with the greatest impact on IT infrastructure that could potentially cause a prolonged outage. The university then identified IT infrastructure deficiencies using industry best practices. It determined that the new datacenter and installation of the new switches would decrease the possibility of network downtime.

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#### PROJECT SCHEDULE

	Start Date	Completion Date
Contracting	N/A	N/A
Design and Implementation	July 2015	January 2016
Equipment	July 2015	January 2016
Completion		January 2016

#### OPERATING BUDGET

Operating expenses are paid from institutional sources. According to the college, there will be no impact on the operating budget.

#### STAFF QUESTIONS AND ISSUES

1. With the onset of newer technologies that often, require less power and cooling why was moving the datacenter to a containerized/mobile option considered the best solution?

*The current datacenters are not able to meet the cooling demands of the equipment that are in use. The main campus datacenter is located on the first floor of our Administration Building, originally constructed over 30 years ago. Due to space availability at the time, the IT (Information Technology) Department was located in the Administration Building. Originally, the space was designed for office workspace and not for the future high heating and cooling demands that an Information Technology datacenter requires. The building mechanical system is the original infrastructure and does not have dedicated heating/cooling service or dedicated mechanical controls for the datacenter. The building mechanical system is reaching its useful life and providing constant airflow to other areas of the building is proving to be difficult.*

2. What air conditioning alternatives were considered?

*Installing a new building mechanical system and installing a new dedicated system for only the datacenter were both evaluated. The cost to complete either initiative far exceeds the cost of the new compartmentalized datacenter, which provides its own heating and cooling system with redundancy.*

3. What electrical alternatives were considered?

*Currently there are no electrical difficulties with the location of the current datacenter. The new compartmentalized datacenter would include electrical design for the current and future electrical loads of the datacenter. The datacenter would feed to an existing building generator to provide a backup power source if necessary.*

4. What are the annual maintenance costs associated with the containerized data center?

*The annual maintenance costs would be minimal, not to exceed \$20,000. Water and air filters would need replacement and would be completed with existing staff.*

5. How will data be migrated from the old datacenter to the new data center?

*The campus has a secondary datacenter on campus to provide necessary data redundancy. During the migration to the new datacenter, the secondary datacenter would serve as the main datacenter and campus operations would continue as normal.*

6. How old is the current datacenter?

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*The main campus datacenter is located on the first floor of our Administration Building, originally constructed over 30 years ago. The building mechanical system is the original system that struggles to meet the needs for the current building occupants, let alone the high demands of a datacenter.*

7. Are there any plans for future expansion of the containerized datacenter?

*A future, secondary compartmentalized datacenter is being considered. The current secondary datacenter is also located in a building without the proper mechanical systems to handle high loads. This would provide the necessary technological space requirements for current and future needs.*

8. Moving the datacenter outside a physical building increases risks to the data being stored. What risks did you consider when deciding upon a containerized datacenter solution?

*The new datacenter would include a datacenter infrastructure management (DCIM) system. The system would include video surveillance, physical access alerting, temperature and fire monitoring and alerting, and much improved security over the current datacenters. The datacenter would be above grade to minimize the risks of flooding whereas the current datacenter is located directly below a janitorial closet and water damage has occurred in the past. The current datacenter does not have a DCIM in place.*

9. Who quoted the \$400,000 cost for HVAC renovation?

*University staff creating the estimated cost working with a datacenter design specialist working with mechanical and electrical contractors for installation.*

10. Was there any thought given to hosting the datacenter offsite via contract facilities?

*Yes, offsite hosting was considered, but for the foreseeable future, sensitive data is safest when controlled and archived by the campus. Reliability issues with the internet connections have caused downtime and the bandwidth requirements would be costly and require a significant purchase of equipment. In addition, the campus would need additional technological infrastructure to and from campus, which would be costly.*

11. Was there any thought given to housing the datacenter in campus buildings that are being renovated?

*Yes. We have worked closely with campus facilities and in the next five years, there are no renovations appropriate to allow the hosting of a data center in a different building. The current locations proposed for the containerized datacenters allow the use of existing fiber duct ways. Moving the datacenters to other buildings on campus would require a significant amount of utility work to move the fiber optic cables to allow the interconnections between the buildings on campus.*

12. Will you be asking for funding in the future to build a "new" datacenter?

*This is a planned two-phase project. In order to keep campus technological operations functional, installing the new compartmentalized datacenter and migrating from the Administration Building datacenter would occur in phase one. A future request to install a compartmentalized datacenter at the secondary location is being considered for phase two. The movement of life safety systems and campus security systems to internet protocols (IP) are forcing the campus computing systems into operating as 24/7 systems.*