



RFP #820-18 Technology Data Storage

**Addendum 001
Issued October 22, 2018**

1. Section 2.2 Should the 240TB at each location be raw storage or usable storage? ie. After RAID etc, but before deduplication and compression is factored in

✓ **Total capacity is defined as presented storage, as we understand that dedup/compression/raid all factor into the total footprint. If we could assign the storage to a server, and the server would “see” 240TB, then it’s usable, and that meets our definition.**

2. Section 2.13 Could you please define Public Cloud? Does this specifically mean Azure or AWS or mean must be in the cloud off-prem?

✓ **Public Cloud, in this context, would be anything off premises. We are looking for the ability to replicate data to providers off site and outside of our “private, on-prem solution”.**

3. Can you provide a breakdown of the storage utilization for the attached categories.

Data Type	TBs
Virtual Machines	~110TB
Virtual Desktops	~10TB
SQL Server	2TB
SQL Server (encrypted)	N/A
Oracle Database	N/A
Oracle Database (encrypted)	N/A
Microsoft Exchange	~ 12TB
Files	10TB
Files (compressed and/or encrypted)	N/A
SAP	N/A
SAP HANA	

Other/Unknown	
<p>*If a VM is using SQL, Oracle, Exchange, Files or SAP please count that capacity under that row and all others aggregated in the Virtual Machines or Virtual Desktop rows.</p>	

✓ ***** These numbers are rough estimates. We do not utilize encryption today, but would like to in the future. *****

4. Are your hosts or VM's encrypting data at the host/VM level today?

✓ **Today they are not encrypting data at the host/vm level.**

5. Are you replicating over an IPSEC or VPN connection today?

✓ **We are not replicating over an IPSEC vpn.**

6. If the array is highly efficient can the Erasure Coding requirement be waved?

✓ **Yes, please address this directly in your response.**

7. Are there plans to use cloud replication services upon rollout or in the future?

✓ **No firm plans in either direction with this. We'd like the option.**

8. Per section 2.5, "Solution must have single pane / integrated management through VMware's vcenter" – Kelyn would like to know if VASA is a requirement?

✓ **VASA is not required. The requirement is that your solution integrates into vcenter in some way that allows us to have a single management pane for administration.**

9. Per section 2.6, "Proposed solution must be able to suffer the loss of two (2) simultaneous drives as well as the loss of one or more server nodes without impacting performance or availability." – how should this be interpreted. Is it RAID 6 or a 3 way RAID 10 or multiple drive failures within a pool?

✓ **Interpretation: We should be able to lose two drives or nodes without impacting performance or availability. Meaning that if we lose two drives it should not crash our environment. If your solution presents a situation where if we lost two drives, it would impact performance or availability, then it would not meet this requirement. Our goal is to not have the environment go down because of hardware failure.**

10. Per section 2.10, "Proposed solution must include encryption for local data in use, data in flight, and data at reset. 2.10.1 Encryption must be a minimum of FIPS 140-2 Certified." – is the requirement for certification or compliance? What level 1-4 compliance/certification is required?

✓ ***The requirement not for certification, and it for internal compliance only today. We anticipate this requirement in the future. A minimum level of 1 is appropriate for this.***

11. Per section 4.1, "Solution might include integrated backups at a VM Level." - Is integration with Site Recovery Management (SRM) a requirement?

✓ ***It is not a requirement.***

12. Additionally, we understand that 580TBs are needed but would like to know what CMC's current data amounts (TBs) are and the projected growth rate?

✓ ***Projected growth rate was not included in this RFP because it's a number that has been wildly inaccurate, and does not represent a clear depiction of Colorado Mountain College's needs. Today, we have a ~ 160TB of presented capacity in use at CMC.***

13. Appendix A referenced in 3.1 is not included.

✓ ***Added.***

14. 2 – Is it possible to include Enterprise Manager screenshots of the used capacity in the two SC8000s?

✓ ***We will not be including screenshots, because it does not give a complete picture of all of CMC's goals with this storage environment. However, here is the info requested:***

Central Services SC8000: 127TB Total, 86TB Used, Avg Read IOPS of 1521, Avg Write IOPS of 211

Rifle Campus SC8000: 126TB Total, 65TB Used, Avg Read IOPS of 99, Avg Write of 211.

****** The amount of storage requested for this RFP takes into account other storage we will be consolidating, projects forecasted for completion, growth, and other factors. ******

15. Would Colorado Mountain College be opposed to a cloud based solution for the SAN replacement as well as a cloud based compute solution?

✓ ***We would not be opposed to this being a presented solution. Please feel free to present this a solution in this RFP.***

16. The RFP mentions that “Both Compellent SC8000 SAN arrays utilize fiber channel within the data centers.” Can you confirm that currently the environment uses Fiber Channel SAN connectivity to surface storage volumes to VMware ESXi Hosts?

✓ **Connectivity from the SAN begins with a Fiber Channel Card within the SC8000. These connections plumb into the SAN Fabric, which consists of two Nexus 5548's, and some older Cisco MDS switches that are being retired. The ESXi hosts utilize CNA's, using FCoE into the same SAN fabric. These are then presented to ESXi as datastores in most cases. I'm not familiar with the phrase “surface storage volumes”, but we can confirm that we use Fiber Channel in our data center.**

17. Would you please provide us details on the current SAN fabric:

- a. Does the topology use dedicated FC switches (MDS or Brocade)? If so, what are the model and speeds?

✓ **The switches in play are Cisco 5548UP (2 per site), and the Cisco 6248UP Fabric Interconnects (2 per site). These switches have various configurations and speeds depending on the connection. We also have two Cisco MDS 9124 Switches in this fabric, but they are currently being retired.**
- b. If you are not connecting through MDS or Brocade FC switches, are the FC SAN connections from Compellent SC8000 SAN arrays going to the Nexus 5Ks and uplinked to the Fabric Interconnects?

✓ **The FC SAN connections go to the Nexus 5k directly. We have Fiber Channel licensing for the Nexus. The Interconnects are also connected to the Nexus 5k, and not directly to the Compellent.**

18. Are you replacing any SAN Switches in scope with this storage RFP?

✓ **We are not.**

19. The RFP mentions in 1.0 General Requirements: 1.5 All storage network connections are to be 10 Gb Ethernet. Can you confirm our understanding of these requirements: For external block storage solutions, you anticipate sticking with an FC SAN strategy and require 16 Gbps FC SAN connections.

✓ **Clarification: We have existing Fiber Channel, and we are not opposed to using it going forward. However, we currently have 8GB connections, and we believe an Ethernet solution is more cost competitive for this solution. We'd prefer to see some form of Ethernet transport (FCoE, iSCSI, etc.), but we will consider Fiber Channel solutions as well so long as they do not require a forklift of the existing FC Fabric.**

20. Please clarify 2.0 SAN/Storage Requirements: 2.2

- a. How much capacity do you expect to allocate/subscribe to the environment?

- ✓ **We expect to have the ability to allocate 580TB of presented storage total across the two arrays, and 240TB per array.**

b. How much data do you expect to write to the provisioned volumes?

- ✓ **We anticipate the need to write a total of 216TB per array, and have forecasted in 10% of growth into our calculations**

c. What blended yearly growth rate are you planning for?

- ✓ **We anticipate over 10% growth in the next 24 months, and then we will re-assess. These calculations were all taken into consideration, and have been included in the total capacity CMC has requested.**

21. Please provide more detail regarding your requirements for encryption for “data in use” and “data in flight”.

- ✓ **CMC expects that data will be encrypted while the data is at rest on the disk, while the data is being used, and while the data is being replicated (in flight).**

22. Generally speaking, “data at rest” encryption technology does not interfere with data reduction capabilities. Encryption technologies introduced within application layers (that produce encrypted data) will render storage data reduction solutions ineffective. Are “data in use” and “data in flight” requirements for encryption within the application or network transport layers?

- ✓ **These requirements pertain to the storage environment, and the solution you will be presenting. We expect the solutions presented to be able to encrypt data that is resting, or active, on the disks. We expect that if the array is sending data (replication, for example) that it includes the ability to also encrypt data it may send (in flight). For example: If the proposed solution encrypts the data, but has to unencrypt the data before it can send it to its replication partner, it would not meet our requirements. Additionally, if your solution requires external components that are not proposed in the solution (such as our network encrypting the data or our applications encrypting the data), it would not meet our requirements.**

23. Dual parity data protection schemes are designed to raise availability for less reliable drive components. If we can meet availability standards/expectations with other data protection schemes, are you open to choosing a solution with a different data protection scheme than dual parity.

- ✓ **Yes, we are open to these solutions being presented.**

24. Please provide details of your VDI platform. Are you using Citrix or VMware, or both? Are your desktops persistent? What types of use cases are you using VDI for?

- ✓ ***Currently, the VDI environment at Colorado Mountain College is VMware Horizon. We do not utilize Citrix currently. We do have persistent desktops. Our use cases for VDI vary, and we are evaluating these all the time. Some current use cases are our Lab environments, and Admin/Staff compute.***

25. Please provide bandwidth and latency available for connectivity between primary and DR sites.

- ✓ ***Our primary connection between our primary datacenter and our DR data center is 10G, with ~5ms latency end to end. The backup connection between these two sites is a 1G, with ~6ms end to end.***