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QUESTION 1

A customer has purchased a two X-Brick XtremIO array with a physical XtremIO Management Server (XMS). The customer plans to use all Fibre Channel connectivity in the environment.

What are the physical connectivity requirements for the cluster?

- A. 1 Copper Ethernet connection, 4 Fibre Channel Optical connections
- B. 3 Copper Ethernet connections, 8 Fibre Channel Optical connections
- C. 4 Copper Ethernet connections, 16 Fibre Channel Optical connections
- D. 5 Copper Ethernet connections, 8 Fibre Channel Optical connections

Correct Answer: B

EMC XTREMIO 4.0 SYSTEM SPECIFICATIONS

Host Connectivity (Based on number of X-Bricks in the array)	Starter X-Brick	1 X-Brick	2 X-Brick Cluster	4 X-Brick Cluster	6 X-Brick Cluster	8 X-Brick Cluster
Fibre Channel Ports (8Gbps)	4	4	8	16	24	32
iSCSI Ethernet Ports (10Gbps)	4	4	8	16	24	32

Management	Starter X-Brick	1 X-Brick	2 X-Brick Cluster	4 X-Brick Cluster	6 X-Brick Cluster	8 X-Brick Cluster
Ethernet Ports (1Gbps)	2	2	4	8	12	16

References: <http://www.aecf.com/AECWeb/media/Assets/PDF/h12451-xtremio-4-system-specificationsss.pdf>

QUESTION 2

Which multipathing software is supported by XtremIO?

- A. PowerPath/VE and NMP on ESXi hosts
- B. MPIO on non-clustered Microsoft Windows hosts only
- C. PowerPath/VE on Microsoft Windows VMs hosted by ESXi
- D. Native MPIO on IBM AIX clusters

Correct Answer: A

Noting the inefficiencies in VMware's NMP driver, EMC developed a set of drivers specifically designed to overcome these limitations and improve the performance and reliability of the data passing between an array and a server. EMC developed the PowerPath family of products optimized specifically for Linux, Microsoft Windows, and UNIX Operating Systems as well as PowerPath/VE for VMware vSphere and Microsoft Hyper-V hypervisors.

PowerPath is installed on hosts to provide path failover, load balancing and performance optimization VPLEX engines

(or directly to the XtremIO array if VPLEX is not used).

Note: VMware, with the cooperation of its storage partners, developed a Native Multipathing Plug-in (NMP). VMware NMP was designed to distribute the load over all the available paths and provide failover protection in the case of path, port or HBA failure, but it has not been fully optimized to work with the controllers in a storage systems. VMware's NMP Round Robin policy does not have the intelligence that PowerPath has as PowerPath uses testing and diagnostics to continually monitor an environment to determine the optimal path for queuing requests and will adapt to current conditions.

References: <https://www.emc.com/collateral/analyst-reports/emc-taneja-group-powerpath-tb.pdf>

QUESTION 3

A new 500 GB VM disk is created on a database that resides on an XtremIO LUN. The VMware administrator plans to provision the disk using the thick provisioned eager zeroed format.

How much physical XtremIO capacity will be allocated during this process?

- A. 5 GB
- B. 10 GB
- C. 50 GB
- D. None

Correct Answer: D

XtremIO storage is natively thin provisioned, using a small internal block size. This provides fine-grained resolution for the thin provisioned space. All volumes in the system are thin provisioned, meaning that the system consumes capacity only when it is actually needed. XtremIO determines where to place the unique data blocks physically inside the cluster after it calculates their fingerprint IDs. Therefore, it never preallocates or thick-provisions storage space before writing.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 22

QUESTION 4

A Linux administrator is attaching a new RHEL server to their XtremIO storage array. Which configuration setting should be changed?

- A. Enable Logical Volume Manager
- B. Modify the file system block size
- C. Disable HBA Queue Depth
- D. Disable I/O elevators

Correct Answer: B

The block size for both Oracle Cluster Registry (OCR) and Cluster Synchronization Services (CSS) voting files are 512 bytes. I/O operations to these file objects are therefore sized as a multiple of 512 bytes. This is of no consequence since the best practice with XtremIO is to create volumes with 512e formatting.

References: <https://www.emc.com/collateral/white-papers/h13497-oracle-best-practices-xtremio-wp.pdf> , page 22

QUESTION 5

A customer is considering migrating their existing non-EMC storage arrays to an XtremIO array. The current environment consists of 350 servers running VMware ESXi 5.5 with 5000 virtual machines. The customer has various tools in place to monitor performance and collect statistics. On average, their service time is 32 ms and utilization is at 75%. In the past, the customer has had performance issues.

Based on Little's Law, what is the calculated response time on the existing environment?

- A. 128 ms
- B. 192 ms
- C. 256 ms
- D. 332 ms

Correct Answer: A

Disk service time $T(s) = 32$ ms (service time for one I/O).

Response time $T(r)$ is calculated as: $T(s) / (1 - \text{Utilization})$, which here calculates to $32 \text{ ms} / (1 - 0.75) = 128$

ms.

References: <https://community.emc.com/thread/145100?tstart=0>

QUESTION 6

A customer has recently purchased an XtremIO 10 TB single X-Brick cluster for an implementation of Oracle RAC. The customer wants your help with integrating Oracle with their new XtremIO cluster. The customer has three DATA disk groups, two REDO disk groups, and four FRA disk groups.

How many XtremIO LUNs should be assigned to the FRA disk groups?

- A. 2
- B. 4
- C. 6
- D. 8

Correct Answer: D

Best practice is to use four LUNs for the DATA disk group to allow the host to use simultaneous threads. The REDO and FRA disk groups should use two LUNs each.

References: https://community.emc.com/community/connect/everything_oracle/blog/2016/03/31/bestpractises-of-vblock-on-xtremio-with-oracle-databases-part-i

QUESTION 7

A storage administrator has 20 TB of storage provisioned to their ESXi cluster from a 10 TB XtremIO storage array. The administrator is concerned about running out of physical capacity on the XtremIO.

Which recommendation will assist the administrator?

- A. Enable VAAI TPSTUN
- B. Increase the compression ratio on the XtremIO
- C. Disable VAAI XCOPY
- D. Thick provisioned eager zero all VM virtual disks

Correct Answer: A

TPSTUN is a VAAI primitive that enables the array to notify vSphere when a LUN is running out of space due to thin provisioning over-commit. The command causes suspending all virtual machines on that LUN. XtremIO supports this VAAI primitive.

Incorrect Answers:

C: The XtremIO features for VAAI support include:

Clone Blocks/Full Copy/XCOPY

Used for copying or migrating data within the same physical array (VMware term:

HardwareAcceleratedMove).

On XtremIO, this allows VM cloning to take place almost instantaneously, without affecting user I/O on active VMs.

D: The XtremIO features for VAAI support include: Zero Blocks/Write Same

Used for zeroing-out disk regions (VMware term: HardwareAcceleratedInit).

This feature provides accelerated volume formatting.

References: <https://itzikr.wordpress.com/2015/12/16/host-configuration-for-vmware-vsphere-on-emcxtremio/>

QUESTION 8

A customer is considering XtremIO storage for their current Virtual Desktop Infrastructure (VDI) deployment. The customer wants information on the benefits of an XtremIO solution.

What are the benefits of an XtremIO solution for this environment?

- A. Latency is less than 1 ms for all large I/O sizes, deduplication with compression, and scales linearly
- B. Latency is less than 1 ms for large I/O sizes, deduplication and compression, and no reduction in power and cooling costs

- C. Latency is less than 1 ms for small I/O sizes, scales linearly, and slightly higher cost/IOP/GB than hybrid arrays
- D. Latency is less than 1 ms for small I/O sizes, deduplication and compression, and scales linearly

Correct Answer: A

Storage capacity and performance scale linearly, such that two X-Bricks supply twice the IOPS, four X-Bricks supply four times the IOPS, six X-Bricks supply six times the IOPS and eight X-Bricks supply eight times the IOPS of the single X-Brick configuration. However, the latency remains consistently low (less than 1ms) as the system scales out. The sub-millisecond latency is validated by actual test results, and is determined according to the worst-case scenario.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 37

QUESTION 9

A customer has two XtremIO clusters running 3.x software release. The customer just purchased a new XtremIO array that will be installed with the latest 4.x software release.

What is the minimum number of XtremIO Management Server(s) that will be required to manage all clusters?

- A. 1
- B. 2
- C. 3
- D. 4

Correct Answer: C

The system operation is controlled via a stand-alone dedicated Linux-based server, called the XtremIO Management Server (XMS). A single XMS can manage multiple clusters. Multiple cluster management is supported from version 4.0 and up. System version 4.0 supports up to eight clusters managed by an XMS in a given site.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 48

QUESTION 10

When creating XtremIO volumes for a host, which operating systems will benefit by changing the default logical block size for applications consisting of 4 KB I/Os?

- A. Microsoft Windows and RHEL
- B. VMware ESX and Microsoft Windows
- C. RHEL and IBM AIX
- D. Sun Solaris and HP-UX

Correct Answer: B

With VMware ESX 5.5, the VMware hypervisor cannot work with LUNs that use a logical block size of 4K. When using VMware, be sure to specify Normal (512 LBs) from your XtremIO array.

References: <https://gruffdba.wordpress.com/2015/08/02/4k-logical-block-size-size-fails-on-vmware/>

QUESTION 11

A storage administrator wants to add a volume to their XtremIO storage array using the RESTful API. Which RESTful method should be used to complete this task?

- A. HTTP POST
- B. HTTP PATCH
- C. HTTP LINK D. HTTP PUT

Correct Answer: A

An example of a generic wrapper function that queries XtremIO REST API using HTTP/POST to create a new object with specified properties.

```
function ExecutePostRestQuery ($xmsip,$cfgOption,$data,$headers)
{
    $baseUrl = "https://" + $xmsip
    $resUrl = '/api/json/v2/types/'
    $url = $baseUrl + $resUrl + $cfgOption
    Write-Host $url
    Write-Host $data
    $jsonserialInput = New-Object -TypeName System.Web.Script.Serialization.JavaScriptSerializer
    $jsonserialOutput = New-Object -TypeName System.Web.Script.Serialization.JavaScriptSerializer
    $jsonserialInput.MaxJsonLength = [int]::MaxValue
    $jsonserialOutput.MaxJsonLength = [int]::MaxValue
    $result = (Invoke-RestMethod -Method POST -Uri $url -Body $data -Headers $headers)
    return $result
}
```

References: <https://www.emc.com/collateral/white-papers/h14980-wp-accelerate-sql-lifecyclemanagement.pdf>

QUESTION 12

A customer wants to purchase an XtremIO array. After the array is installed, the customer wants to initially disable encryption. What is the result of enabling encryption on an array that is already being used?

- A. Data will remain in place but the XtremIO cluster services will need to be temporarily shutdown.
- B. Data will remain in place and there will be no interruption to the XtremIO cluster services.
- C. Data will be erased but there will be no interruption to the XtremIO cluster services.
- D. Data will be erased and the XtremIO cluster services will be temporarily shutdown.

Correct Answer: A

Disable Encryption and Non-Encrypted Models This version [Ver. 4.0.2-65] allows disabling the Data at Rest Encryption (DARE), if desired. Disabling and Enabling is done when the cluster is stopped.

References: <https://samshouseblog.com/2015/12/29/new-features-and-changes-in-xtremio-ver-4-0-2-65/>

QUESTION 13

Which level of granularity does XtremIO deduplication run?

- A. Variable 8 kB
- B. Variable 32 kB
- C. Fixed 8 kB
- D. Fixed 32 kB

Correct Answer: C

EMC XtremIO(All-Flash) : SAN, inline deduplication, 8K fixed chunk size;

References: <https://www.linkedin.com/pulse/deduplication-fake-reality-mike-uzan>

QUESTION 14

A customer wants to use the Cinder driver to manage XtremIO storage in an OpenStack environment. What is a potential concern?

- A. Compression is not supported
- B. Deduplication is not supported
- C. Snapshots of snapshots are not supported
- D. Volume expansion cannot be reversed

Correct Answer: D

Incorrect Answers:

B: OpenStack Cinder features include:

Clone a volume: With inline deduplication, compression and thin provisioning.

C, D: EMC XtremIO OpenStack Block Storage driver, supported operations: Create, delete, clone, attach, and detach volumes
Create and delete volume snapshots
Create a volume from a snapshot
Copy an image to a volume
Copy a volume to an image
Extend a volume

References: <https://docs.openstack.org/juno/config-reference/content/XtremIO-cinder-driver.html>

<https://www.emc.com/collateral/data-sheet/h13287-ds-xtremio-openstack.pdf>

QUESTION 15

What is a method to establish an XMCLI session?

- A. Use the PuTTY SSH tool configured for the serial port and xmsupload credentials
- B. Use the Telnet SSH tool configured on Port 443 and root credentials
- C. Use the CLI terminal in the Administration tab and root credentials
- D. Use the PuTTY SSH tool configured for Port 22 and xmsadmin credentials

Correct Answer: D

The system's Command Line Interface (CLI) allows administrators and other system users to perform supported management operations. It is preinstalled on the XMS and can be accessed using the standard SSH protocol.

PuTTY is an SSH and telnet client.

The standard TCP port 22 has been assigned for contacting SSH servers.

You can login using the builtin xmsadmin account.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 50

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