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E20-526

XtremIO Solutions and Design Specialist Exam for Technology Architects



Version 1.0

## Exam A

### QUESTION 1

When using the XtremIO PoC Toolkit, what is the purpose of the Age phase?

- A. Continuously write to a specific range of logical block addresses to test Flash durability
- B. Overwrite each LUN multiple times to ensure they contain all unique data
- C. Test the performance of the All-Flash array with non-production static data
- D. Scatter writes across the entire array to simulate ordinary use of the system

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Proceed with filesystem aging by doing random overwrite cycles.

### QUESTION 2

A user attempts to create a quorum disk for a host cluster. Volume parameters are:

- Size = 1000 kB
- Name 1MB\_Vol

However, the volume creation fails. What caused the process to fail?

- A. Quorum disks cannot have an 8kB block size
- B. Volume size is too small
- C. Volume name is invalid
- D. XtremIO volumes cannot be quorum disks

**Correct Answer:** B

**Section:** (none)

**Explanation**

**Explanation/Reference:**

The volume size must be specified in MB, GB, TB, and not in KB.

Incorrect Answers:

D: Quorum disks on XtremIO

The SAN Volume Controller cluster will select disks that are presented by the XtremIO storage system as quorum disks. To maintain availability for the cluster, ideally each quorum disk should reside on a separate disk subsystem.

The quorum device can be any disk device that is shared between two or more nodes. EMC Symmetrix, VNX series, or XtremIO devices are commonly used for this purpose. References:

<https://vcdx133.com/2014/09/14/emc-xtremio-provisioning-a-lun/>

### QUESTION 3

You have been asked to design an XtremIO storage array solution that will be used for two large applications workloads. One workload will generate approximately 150,000 write IOPs with an average 4 kB I/O size. The second write workload will have an average I/O size of 128 kB and will generate approximately 2 GB/s of throughput.

At a minimum, how many X-Bricks are needed in a single cluster to meet this requirement?

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

**Correct Answer:** A

**Section:** (none)

**Explanation**



**Explanation/Reference:**

Second write workload IOPS = 2 GB/s divided by 128 kB = 2 x 1,073,741,824 / (128 x 1,024) = 16384 IOPs. Total IOPS required would be 150,000, from the first workload, plus 16384, totaling 166384.

A 2 X-Brick cluster provides 300K Read/write IOPS so it would be adequate.

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 XBrick configuration.

Note: Choose an EMC XtremIO system and scale out linearly by adding more XtremIO X-Bricks.

System	Raw Capacity	Read/Write IOPS	Read IOPS
Starter X-Brick	5 TB	150K	250K
1 X-Brick	10, 20, or 40 TB	150K	250K
2 X-Brick Cluster	20, 40, or 80 TB	300K	500K
4 X-Brick Cluster	40, 80, or 160 TB	600K	1M
6 X-Brick Cluster	120 or 240 TB	900K	1.5M
8 X-Brick Cluster	160 or 320 TB	1.2M	2M

References: <https://store.emc.com/en-us/Product-Family/EMC-XtremIO-Products/EMC-XtremIO-All-Flash-Scale-Out-Array/p/EMC-XtremIO-Flash-Scale-Out>

**QUESTION 4**

How can REST API commands be run to manage and monitor an XtremIO cluster?

- A. From the REST API CLI built into each X-Brick
- B. From the REST API GUI built into each X-Brick
- C. From a third-party GUI
- D. From the REST API tab in the XMS GUI



**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

The XtremIO's RESTful API allows HTTPS-based interface for automation, orchestration, query and provisioning of the system. With the API, third party applications can be used to control and fully administer the array.

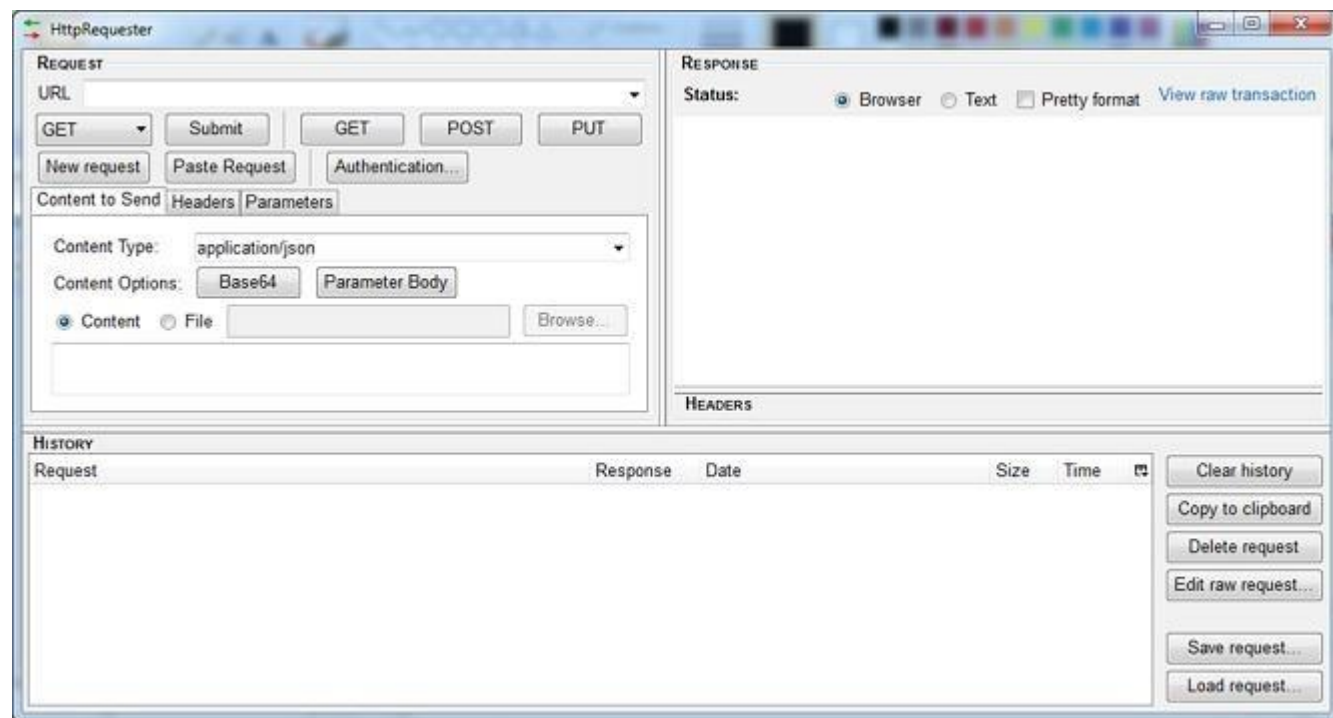
Normally you would access the API using some form of programming/scripting language, such as Python or Perl. However for the purposes of learning or testing concepts there are a number of tools that work better, such as HTTPRequester and curl.

\* Curl is a command-line tool that exists in all Linux distributions, and is available for most other Unix OSes as well as Windows.

To use curl to access XtremIO you'll need to pass it a few options, such as the username/password to access the array (any valid account on the XtremIO XMS will work), the URL of the API, and potentially a few options such as -k to tell curl not to validate the SSL certificate (presuming you don't have a valid certificate installed), and -s (silent) to stop curl displaying it's progress as it downloads the response.

\* HTTPRequester is a browser extension that is available for both Chrome and Firefox.

As with for curl, you'll need to provide a username/password, which is done by clicking on the "Authentication..." box, which adds two boxes below the URL for the username and the password.



References: <https://blog.docbert.org/using-the-xtremio-rest-api-part-1/>

#### QUESTION 5

How should a storage administrator navigate to different XtremIO clusters from the XMS GUI if the administrator has more than one cluster managed by the same XMS?

- A. Click the Cluster Name on the Menu bar near the top of the screen
- B. Click the Inventory List button on the Menu bar
- C. Click the Administration tab and locate the Cluster Name
- D. Click the Cluster Name on the Status bar at the bottom of the screen



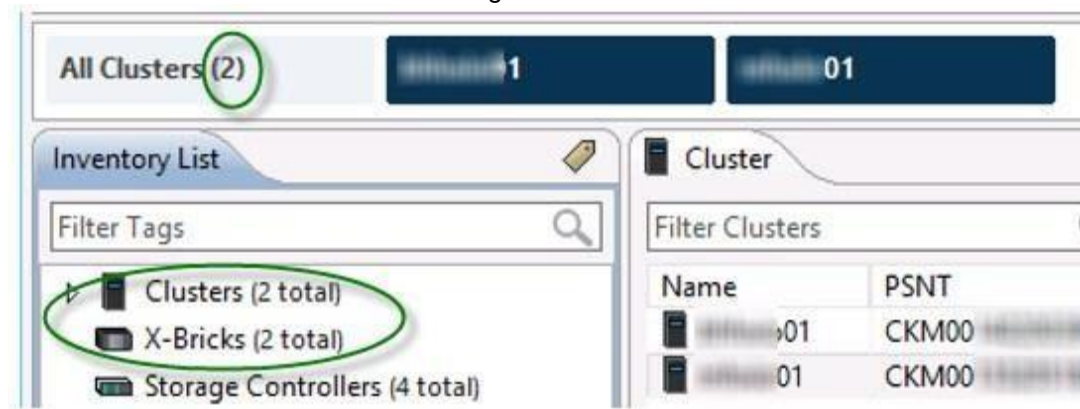
**Correct Answer:** B

**Section:** (none)

**Explanation**

**Explanation/Reference:**

From the menu bar, the Inventory icon is to be clicked to display the Inventory workspace. This workspace takes the place of the Hardware workspace in earlier versions of the XtremIO GUI. With the All Clusters tab selected, we can see a list of all the hardware elements in the managed clusters.



Note: With time, additional clusters can be added to a deployed XMS. In addition, a cluster can be easily moved from one XMS to another. All management interfaces (GUI/CLI/REST) offer inherent multi-cluster management capabilities. Multiple cluster management is supported from version 4.0 and up.

References:

[https://community.emc.com/community/connect/everything\\_oracle/blog/2015/08/27/xtremio-40-multi-array-management](https://community.emc.com/community/connect/everything_oracle/blog/2015/08/27/xtremio-40-multi-array-management)

**QUESTION 6**

A customer has a large ESX server environment they are considering deploying to XtremIO for a VDI implementation. To determine a baseline of the environment, you are proceeding with documenting each server's CPU, NIC, and disk utilization statistics. The customer has provided you with direct CLI access to the servers to conduct this assessment.

Which utility should be used to monitor these performance parameters?

- A. esxtop
- B. resxtop
- C. top
- D. iostat

**Correct Answer:** B

**Section:** (none)

**Explanation**

**Explanation/Reference:** resxtop is a command to retrieve performance statistics. This command is included in vSphere command line interface (CLI) and is part of the vSphere Management Assistant (vMA), which is an equivalent to esxtop that runs only inside an ESX service console.

Incorrect Answers:

A: esxtop runs only inside an ESX service console.

D: Use the iostat command to report statistics about disk input and output, and to produce measures of throughput, utilization, queue lengths, transaction rates, and service time.

References: [www.emc.com/collateral/TechnicalDocument/docu5265.pdf](http://www.emc.com/collateral/TechnicalDocument/docu5265.pdf), page 22

**QUESTION 7**

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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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/best-practises-of-vblock-on-xtremio-with-oracle-databases-part-i](https://community.emc.com/community/connect/everything_oracle/blog/2016/03/31/best-practises-of-vblock-on-xtremio-with-oracle-databases-part-i)

**QUESTION 8** 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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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 9

Based on best practice, what is the maximum number of paths a host should have to an XtremIO volume?

- A. 4
- B. 8
- C. 16
- D. 32

**Correct Answer: C**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

The recommended maximum number of paths to storage ports per host is 16 as per the table below.

2 HBAs	2 X-Bricks		Ports Per Cluster
HBA1	X1_SC1_FC1	X1_SC2_FC1	8
	X2_SC1_FC1	X2_SC2_FC1	
HBA2	X1_SC1_FC2	X1_SC2_FC2	
	X2_SC1_FC2	X2_SC2_FC2	
4 HBAs	2 X-Bricks		Ports per Cluster
HBA1	X1_SC1_FC1	X1_SC2_FC1	16
	X2_SC1_FC1	X2_SC2_FC1	
HBA2	X1_SC1_FC2	X1_SC2_FC2	
	X2_SC1_FC2	X2_SC2_FC2	
HBA3	X1_SC1_FC1	X1_SC2_FC1	
	X2_SC1_FC1	X2_SC2_FC1	
HBA4	X1_SC1_FC2	X1_SC2_FC2	
	X2_SC1_FC2	X2_SC2_FC2	

References: <https://www.emc.com/collateral/white-papers/h14475-wp-xtremio-brocade-best-practices.pdf?isPublic=false> , page 12

#### QUESTION 10

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**



**Section: (none)**

**Explanation**

**Explanation/Reference:**

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 pre-allocates or thick-provisions storage space before writing.

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

#### QUESTION 11

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**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

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 12

An XtremIO administrator is having a problem with performance and is troubleshooting the issue. What is an accurate statement about I/O transfers?

- A. As I/O size increases, IOPs increase, and latency increases
- B. As I/O size increases, IOPs decrease, and bandwidth increases
- C. As I/O size decreases, IOPs increase, and bandwidth increases
- D. As I/O size decreases, IOPs decrease, and latency increases

**Correct Answer: A**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Large block I/O by nature incurs higher latency.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 6

#### QUESTION 13

You are designing an XtremIO solution for a potential customer. If the server and storage information is available, which information should be documented regarding the customer's capacity expectations?

- A. Capacity requirements on a per data center basis
  - Expandability/scalability
  - Performance requirements determined on a server-to-server basis
- B. Capacity requirements on a per volume basis
  - Expandability/scalability
  - Performance requirements determined on a server-to-server basis
- C. Capacity requirements on a per volume basis
  - Compression rates/scalability
  - Performance requirements determined on a server-to-server basis
- D. Capacity requirements on a per data center basis

Expandability/scalability  
Performance requirements determined holistically

**Correct Answer:** B

**Section:** (none)

**Explanation**

**Explanation/Reference:**

#### QUESTION 14

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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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
<b>Fibre Channel Ports</b> (8Gbps)	4	4	8	16	24	32
<b>iSCSI Ethernet Ports</b> (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
<b>Ethernet Ports</b> (1Gbps)	2	2	4	8	12	16

References: <http://www.aecl.com/AECWeb/media/Assets/PDF/h12451-xtremio-4-system-specifications-ss.pdf>

#### QUESTION 15

A storage administrator is configuring SAN switches and zoning to connect an eight X-Brick XtremIO array. A VMware ESXi server is hosted on a blade chassis with 16 HBA ports. In addition, the SAN is composed of two separate SAN switches.

What is the recommended XtremIO best practice for zoning?

- A. Two HBA connections per host connected to a single switch  
Multiple initiators/multiple targets per zone  
Maximum of 4 paths for each LUN per zone
- B. Connect a single storage controller to the first switch  
Connect a second storage controller to the second switch  
Single initiator/multiple targets per zone  
Maximum of 6 paths for each LUN per zone
- C. Connect all N1 storage controllers to the first switch  
Connect N2 storage controllers to the second switch  
Multipath all host ports to single LUNs per zone  
Maximum of 4 paths for each LUN per zone
- D. Multiple HBA connections per host  
Single initiator/single target per zone  
Maximum of 2 paths to each X-Brick for each initiator



Each host connected to each SAN switch

**Correct Answer:** B

**Section:** (none)

**Explanation**

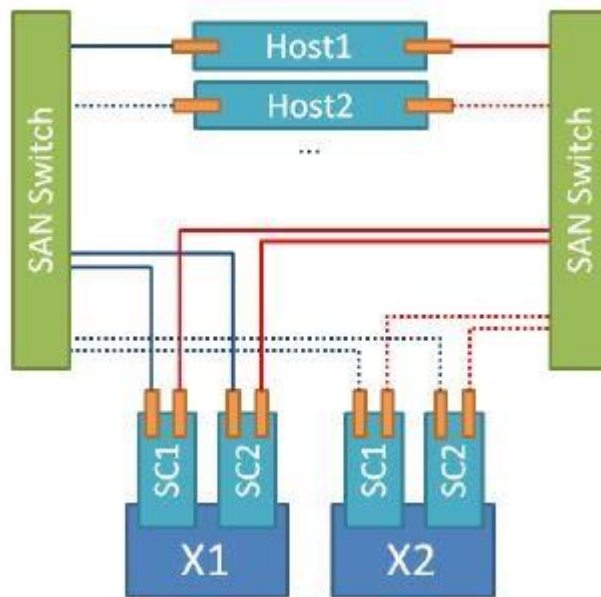
**Explanation/Reference:**

In an environment where a host with two HBAs (VMware Best Practice) is connected to two fabrics and storage array with two Storage Controllers (EMC VNX, for example) the host will have four paths to a LUN: 2 Controllers x 2 HBAs = 4 paths

If you go to the extreme and configure your XtremIO with eight X-Brick, you have 16 controllers. Again, two HBAs per host and the max number of LUNs you can attach to an ESXi host will be 32... I understand, different OS'es may have different limits than VMware and this logic will not be applicable.

If you have hit the limit of 1024 paths per host ( $1024 / 4 \text{ controllers} / 2 \text{ HBAs} = 128 \text{ LUNs}$ ) and need to provision more LUNs, the best way will be to re-zone the host to limit the number of X-Bricks / Controllers the host HBA can connect to.

The following diagram displays the logical connection topology for 4 paths.



Incorrect Answers:

D: Eliminate single-initiator to single-target zones.

References: <http://vstrong.info/2015/11/18/vmware-host-zoning-for-multi-x-brick-emc-xtremio-storage-array/>

**QUESTION 16** Based on XtremIO Data Protection, how many dedicated hot spare disks per X-Brick are required?

- A. 0
- B. 1
- C. 2
- D. 3

**Correct Answer:** A

**Section:** (none)

**Explanation**

**Explanation/Reference:**

XtremIO Data Protection (XDP) doesn't require any configuration, nor does it need hot spare drives. Instead it uses "hot spaces" – free space in the array.

References: <https://www.emc.com/collateral/white-paper/h13036-wp-xtremio-data-protection.pdf> , page 23

**QUESTION 17**

When using XtremIO storage with Solaris (SPARC), what is the EMC recommended I/O size that will deliver sequential I/O more efficiently to XtremIO?

- A. 1 MB
- B. 2 MB
- C. 4 MB
- D. 8 MB

**Correct Answer: C**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

EMC recommended setting for Solaris include that the /etc/system file be modified to include the following parameter:

\* Set maximum IO size set

maxphys = 0x400000

This also requires increase of the maximum I/O size for the disk driver. The corresponding entry and file for this change are different for different Solaris versions, as follows: For Solaris 10 (SPARC):

File: /kernel/drv/ssd.conf

Setting: ssd\_max\_xfer\_size=0x400000;

For Solaris 10 (x86):

File: /kernel/drv/sd.conf

Setting: sd\_max\_xfer\_size=0x400000;

Etc.

References: EMC Host Connectivity Guide for Oracle Solaris, page 167 <https://www.emc.com/collateral/TechnicalDocument/docu5132.pdf>

**QUESTION 18** 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**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

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

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

**QUESTION 19** Which operation is performed when an XtremIO Snapshot is created?

- A. Pointers to the ancestor metadata are created for the snapshot
- B. Space equal to the size of the ancestor is allocated to the snapshot
- C. A reserved space is created for new snapshot data
- D. A deduplication pass is immediately run against the snapshot

**Correct Answer: A**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

When a snap is created, the following steps occur:

- 1) Two empty containers are created in-memory
- 2) Snapshot SCSI personality is pointing to the new snapshot sub-node

3) The SCSI personality which the host is using, is linked to the second node in the internal data tree

References: EMC RECOVERPOINT REPLICATION OF XTREMIO, Understanding the essentials of RecoverPoint Snap-based replication for XtremIO, page 8 <https://www.emc.com/collateral/white-papers/h14296-wp-recoverpoint-replication-of-xtremio.pdf>

#### QUESTION 20

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

**Section:** (none)

**Explanation**

#### Explanation/Reference:

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-lifecycle-management.pdf>

#### QUESTION 21

Block size/IOPS	Single X-Brick – FC Connectivity						
	100%R	80%/20%	70%/30%	50%/50%	30%/70%	20%/80%	100%W
512b	244,950	156,651	135,752	109,434	91,818	86,003	75,820
1K	244,840	156,814	136,096	109,300	92,150	86,103	76,293
2k	244,299	156,843	136,157	109,424	92,813	86,340	76,004
4k	243,655	156,563	135,376	109,205	93,068	86,181	75,857
8k	243,831	181,200	163,430	136,187	116,679	108,606	95,241
16k	154,240	109,849	97,069	77,777	64,731	59,666	51,776
32k	94,169	61,813	53,666	42,433	34,880	32,077	27,627
64k	50,170	32,405	28,365	22,662	18,683	17,116	14,660
128k	25,128	16,153	14,263	11,582	10,120	8,896	7,605
256k	12,116	7,692	6,841	5,695	4,886	4,522	3,885
512k	4,572	3,182	2,886	2,480	2,216	2,102	1,886
1M	2,264	1,582	1,440	1,238	1,104	1,050	944

Refer to the exhibit.

A customer has a VMware Horizon View environment with the following characteristics:

- One X-Brick XtremIO cluster
- 100% read during a boot storm ▪

8K read/writes

What is the maximum recommended number of VDIs the XtremIO cluster can support during a boot storm?

- A. 1625
- B. 1833
- C. 3250
- D. 5094

**Correct Answer:** A

**Section:** (none)

**Explanation**

**Explanation/Reference:**

EMC estimates that 150 IOPS per desktop is required in a boot storm. As per table the recommended number of VDIs then is 243,831/ 150, which equals 1625.

References: <https://www.emc.com/collateral/white-papers/h14279-wp-vmware-horizon-xtremio-design-considerations.pdf>, page 32

#### QUESTION 22

You have worked with a customer to successfully evaluate their existing server environment using the MiTrend data analysis tool. You have collected the resulting reports and aggregated the data set. You determine the customer's application workload generates a 50:50 read/write ratio with an average of 500K IOPs during peak business hours.

Which recommended XtremIO model meets the customer's needs?

- A. Starter X-Brick cluster
- B. Single X-Brick cluster
- C. Two X-Brick cluster
- D. Four X-Brick cluster

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

System	Raw Capacity	Read/Write IOPS	Read IOPS
Starter X-Brick	5 TB	150K	250K
1 X-Brick	10, 20, or 40 TB	150K	250K
2 X-Brick Cluster	20, 40, or 80 TB	300K	500K
4 X-Brick Cluster	40, 80, or 160 TB	600K	1M
6 X-Brick Cluster	120 or 240 TB	900K	1.5M
8 X-Brick Cluster	160 or 320 TB	1.2M	2M

References: <https://store.emc.com/en-us/Product-Family/EMC-XtremIO-Products/EMC-XtremIO-All-Flash-Scale-Out-Array/p/EMC-XtremIO-Flash-Scale-Out>

#### QUESTION 23

A customer has a VMware vSphere environment running Native Multipathing (NMP). Which path selection policy should be set for optimal performance when connected to an XtremIO cluster?

- A. Fixed AP
- B. Most Recently Used
- C. Fixed
- D. Round Robin

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Configuring vSphere Native Multipathing.

For best performance, it is recommended to do the following:

Set the native round robin path selection policy on XtremIO volumes presented to the ESX host.

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

**QUESTION 24** A customer is interested in transitioning their traditional infrastructure to the Cloud by implementing ViPR software-defined storage in an XtremIO environment. Which capabilities will EMC ViPR software-defined storage provide to XtremIO?

- A. Delivers SaaS
  - Centralized management and monitoring
  - Chargeback and billing capabilities
- B. Chargeback reporting capability
  - Centralizes reactive monitoring capability
  - Policy-driven configuration management
- C. Automatically grows storage volumes
  - Slows growth of data
  - Centralized auto-deletes of aging files
- D. Creates virtual storage pools
  - Automates disaster recovery
  - Replaces chargeback capabilities

**Correct Answer:** A

**Section:** (none)

**Explanation**

**Explanation/Reference:**

EMC ViPR Controller is a software-defined storage platform that abstracts, pools and automates a data center's underlying physical storage infrastructure. It provides data center administrators with a single control plane for heterogeneous storage systems.

ViPR enables software-defined data centers by providing features including:

\* Comprehensive and customizable platform reporting capabilities that include capacity metering, chargeback, and performance monitoring through the included ViPR SolutionPack

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 60

**QUESTION 25**

Based on XtremIO best practice, which byte sector size should be used for volumes hosting Oracle database files?

- A. 256
- B. 512
- C. 1024
- D. 4096

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Architecting a database on an All Flash Array (AFA) like EMC's XtremIO is best done by reviewing practices to optimize I/O performance. One consideration is the use of Advanced Format and how it impacts the performance of the database Redo logs. Advanced Format refers to a new physical sector size of 4096 bytes (4KB) replacing original 512 byte standard.

References: [https://community.emc.com/community/connect/everything\\_oracle/blog/2014/07/18/xtremio-best-practices-advanced-format-512e-and-native-modes](https://community.emc.com/community/connect/everything_oracle/blog/2014/07/18/xtremio-best-practices-advanced-format-512e-and-native-modes)

**QUESTION 26** How many management IP addresses are required on a single XtremIO storage controller?



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

**Correct Answer:** A

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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

**QUESTION 27** At which point is data compressed when a host sends data to the XtremIO storage system?

- A. Inline before data is written to the SSD
- B. Once data is written to the storage controller
- C. After data is written to the SSDs
- D. After data is in SSD cache

**Correct Answer:** A

**Section:** (none)

**Explanation**

**Explanation/Reference:**

XtremIO inline data deduplication and inline data compression services are inline, all the time.

References: <https://www.emc.com/collateral/faq/faq-million-dollar-guarantee-rp-2016.pdf>

**QUESTION 28**

A customer has the following requirements for their VDI deployment:

- Greater than 1000 desktops with the ability to grow 10% for the next 3 years
- Low latency boot volumes
- General purpose NAS for home directories
- Remote replication with the ability to snap at every write
- Capable of delivering 100 IOPs per desktop

Which EMC technologies should be recommended?

- A. XtremIO, RecoverPoint CRR, and VPLEX only
- B. VSPEX Blue, RecoverPoint CDP, and VNX
- C. Isilon, VSPEX Blue, VPLEX, and RecoverPoint CDP
- D. XtremIO, RecoverPoint CRR, VPLEX, and Isilon

**Correct Answer:** A

**Section:** (none)

**Explanation**

**Explanation/Reference:**

The EMC RecoverPoint family provides cost-effective, local continuous data protection (CDP), continuous remote replication (CRR), and continuous local and remote replication (CLR) that allows for any-point-in-time data recovery and a new "snap and replicate" mechanism for local and remote replication (XRP).

Splitter-based replication, using VPLEX

RecoverPoint splitter-based replication provides synchronous replication, continuous replication with fine recovery granularity (journal based), and replication for active-active datacenters.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 52

**QUESTION 29**

You need to design a VDI solution for a customer. Which best practices should be used for VDI environments?





- A. Align data on 4 kB boundaries. Put persona and user data on XtremIO LUNs
- B. Align data on 4 kB boundaries. Allocate multiple XtremIO LUNs to each host
- C. Align data on 8 kB boundaries. Put the master VM image on an XtremIO LUN
- D. Align data on 8 kB boundaries. Put all VDI-related data on one large LUN

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

#### QUESTION 30

A customer has a requirement to replicate their VDI to a newly purchased data center located 5 miles away. They require 10-day retention at each site and a continuous replication RPO. However, they want to have the same storage platform at each site. They have a limited budget but need to meet their requirements.

Which solution should be recommended to the customer?

- A. XtremIO and OpenStack
- B. XtremIO with VPLEX and RecoverPoint
- C. XtremIO and RecoverPoint
- D. XtremIO and MirrorView/A replication

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

The EMC RecoverPoint family provides cost-effective, local continuous data protection (CDP), continuous remote replication (CRR), and continuous local and remote replication (CLR) that allows for any-point-in-time data recovery and a new "snap and replicate" mechanism for local and remote replication (XRP).

Native replication support for XtremIO

The native replication support for XtremIO is designed for high-performance and low-latency applications that provides a low Recovery Point Objective of one minute or less and immediate RTO.

The benefits include:

- Block level remote or local replication
- Asynchronous local and remote replication
- Policy-based replication to enable optimizing storage and network resources, while obtaining desired RPO and RTO
- Application-aware integration

Incorrect Answers:

A: OpenStack is the open platform for managing private and public clouds.

B: XtremIO with VPLEX and RecoverPoint is a valid solution, but it would be more costly.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 52

**QUESTION 31** Which SCSI instructions are used to build a bitmap of the changes between the first snapshot and subsequent snapshots when RecoverPoint is used with XtremIO?

- A. SCSI Delta
- B. SCSI Transfer
- C. SCSI DIFF
- D. SCSI Update

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

DIFF protocol - A vendor specific SCSI command which RecoverPoint uses to query XtremIO with in order to obtain a bitmap of changes between two snapshot sets. RecoverPoint uses the output of DIFF command to read the actual data and transfer it to the target side.

References: EMC RECOVERPOINT REPLICATION OF XTREMIO, Understanding the essentials of RecoverPoint Snap-based replication for XtremIO, page 9 <https://www.emc.com/collateral/white-papers/h14296-wp-recoverpoint-replication-of-xtremio.pdf>

**QUESTION 32**

A customer has a workload with the following attributes:

- Generates 250,000 IOPs
  - 100 TB in logical capacity
  - Read/Write ratio of 1:1
  - Random workload with 8 kB I/O size
  - Deduplication ratio of 2:1
- Compression ratio of 2:1

Which XtremIO solution should be recommended to the customer?

- A. 1x40 TB X-Brick
- B. 2x10 TB X-BrickC. 3x20 TB X-Brick
- D. 4x10 TB X-Brick

**Correct Answer: C**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

XtremIO clusters with 60 TB of physical usable flash capacity can now logically support 360 TB or more of capacity at typical 6:1 data reduction (deduplication plus compression) ratios. Here we have a 4:1 reduction ratio, so 25 TB would be enough. The 250,000 IOP requirements indicates that we need at least two Bricks.

System	Raw Capacity	Read/Write IOPS	Read IOPS
Starter X-Brick	5 TB	150K	250K
1 X-Brick	10, 20, or 40 TB	150K	250K
2 X-Brick Cluster	20, 40, or 80 TB	300K	500K
4 X-Brick Cluster	40, 80, or 160 TB	600K	1M
6 X-Brick Cluster	120 or 240 TB	900K	1.5M
8 X-Brick Cluster	160 or 320 TB	1.2M	2M

References: <https://store.emc.com/en-us/Product-Family/EMC-XtremIO-Products/EMC-XtremIO-All-Flash-Scale-Out-Array/p/EMC-XtremIO-Flash-Scale-Out>

**QUESTION 33**

When using a 10 TB single X-Brick, what is the minimum amount of data that should be written during the Fill phase of the PoC Toolkit?

- A. 10 TB B.
- 15 TB
- C. 20 TB D.
- 30 TB

**Correct Answer: C**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Per IDC's best practices the toolkit fills the array 2x.

References: <https://community.emc.com/docs/DOC-35014>

**QUESTION 34**

A customer is considering a six brick dispersed cluster using 3x40U racks. The customer wants advice on racking the InfiniBand switches. ▪

Rack 1 (left) contains X-Bricks 1 and 2

▪ Rack 2 (middle) contains X-Bricks 3 and 4 ▪

Rack 3 (right) contains X-Bricks 5 and 6

Which recommendation should be provided?

- A. Install the InfiniBand switches in Rack 1 with a 1U placeholder between the switches.
- B. Install an InfiniBand switch in Racks 1 and 3 with a 1U placeholder between the X-Bricks.
- C. Install the InfiniBand switches in Rack 2 with a 1U placeholder between the switches.
- D. Install the InfiniBand switches in Rack 3 with a 2U placeholder between the switches

**Correct Answer: B**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

**QUESTION 35**

An administrator receives an error on an XtremIO array while performing snapshot refreshes to a production volume. What is a potential cause for this issue?

- A. Refresh of the production volume is not supported
- B. Volume was not unmapped on the XtremIO cluster
- C. Only snapshot-to-snapshot refresh is supported
- D. Volume was not unmounted on the host



**Correct Answer: D**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

The workflow for refreshing XtremIO Snapshots, containing Oracle Database files, consists of the following five simple steps:

1. Shut down the database instances with files in the target Snapshot Set.
2. Dismount the ASM disk group (or file systems) involved.
3. Refresh the Snapshot via XtremIO GUI (or CLI or RESTful API).
4. Mount the ASM disk groups (or file system) involved.
5. Start the database instances.

This entire workflow is measured in seconds (not minutes).

Incorrect Answers:

A: The refresh command is a powerful tool for test and development environments and for the offline processing use case. With a single command, a snapshot of the production volume or CG is taken and the SCSI face of the volume, which was mapped to the test and development application, is moved to it. This allows the test and development application to work on current data without the need to copy data or to rescan.

References: <https://www.emc.com/collateral/white-papers/h14485-xtremio-snapshot-refresh-oracle-databases.pdf>, page 8

**QUESTION 36**

What is considered typical performance for an XtremIO single X-Brick cluster?

- A. Small block writes: 200k-250k IOPs. Large block reads: up to 2.5 GB/s
- B. Small block writes: 200k-250k IOPs. Large block writes: up to 2.5 GB/s
- C. Small block reads: 200k-250k IOPs. Large block writes: up to 2.5 GB/s
- D. Small block reads: 200k-250k IOPs. Large block reads: up to 2.5 GB/s

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Choose an EMC XtremIO system and scale out linearly by adding more XtremIO X-Bricks.

System	Raw Capacity	Read/Write IOPS	Read IOPS
Starter X-Brick	5 TB	150K	250K
1 X-Brick	10, 20, or 40 TB	150K	250K
2 X-Brick Cluster	20, 40, or 80 TB	300K	500K
4 X-Brick Cluster	40, 80, or 160 TB	600K	1M
6 X-Brick Cluster	120 or 240 TB	900K	1.5M
8 X-Brick Cluster	160 or 320 TB	1.2M	2M

References: <https://store.emc.com/en-us/Product-Family/EMC-XtremIO-Products/EMC-XtremIO-All-Flash-Scale-Out-Array/p/EMC-XtremIO-Flash-Scale-Out>

#### QUESTION 37

A storage administrator is adding both an XtremIO and third-party storage arrays to their existing infrastructure. The administrator is using ViPR SRM to monitor the environment.

Which requirement is needed to implement this solution?

- A. A single third-party Solution Pack is required to manage both storage arrays
- B. Each storage needs its own Solution Pack
- C. Each storage array requires two Solution Packs; one for monitoring and one for performance
- D. A single XtremIO Solution Pack is required to manage both storage arrays



**Correct Answer:** B

**Section:** (none)

**Explanation**

**Explanation/Reference:**

References: [https://www.emc.com/techpubs/vipr/understanding\\_solutionpacks-3.htm](https://www.emc.com/techpubs/vipr/understanding_solutionpacks-3.htm)

**QUESTION 38** Which actions are initiated when a snapshot is created on an XtremIO array?

- A. Parent object becomes read only and two auxiliary volumes are created
- B. Parent object remains writeable and one auxiliary volume is created
- C. Parent object remains writeable and two auxiliary volumes are created
- D. Parent object becomes read only and one auxiliary volume is created

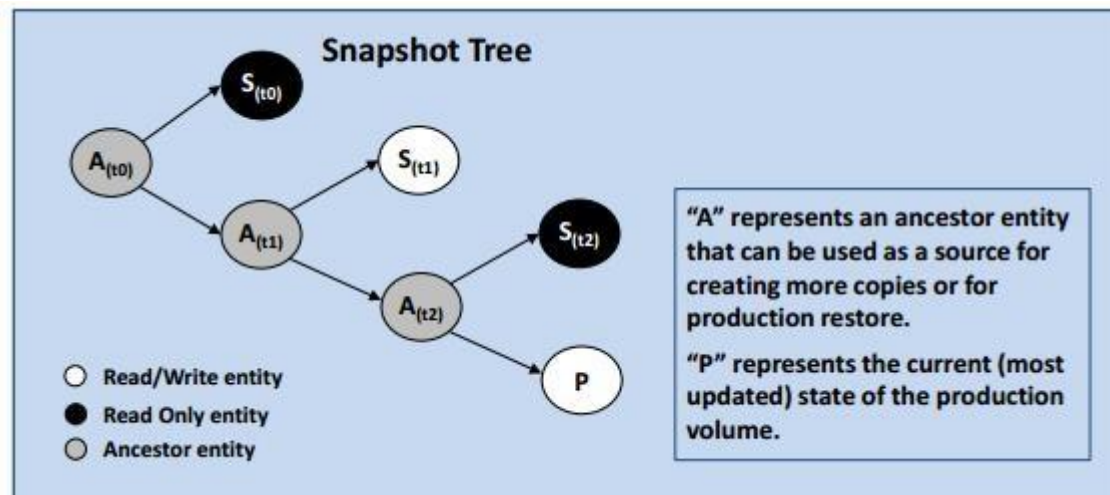
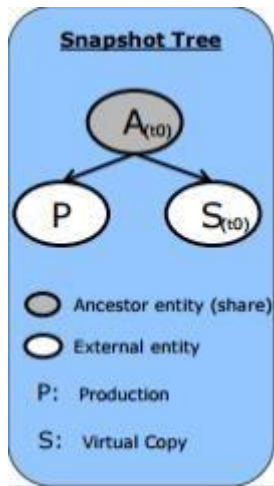
**Correct Answer:** A

**Section:** (none)

**Explanation**

**Explanation/Reference:**

When a copy is created, the volume's existing metadata becomes an "ancestor" entity (parent object) that is shared between the production volume and the copy. New empty containers are created for subsequent changes to both the production volume and the virtual copy volume. Therefore, the act of creating a copy is instantaneous and involves no data or metadata copies.



References: <https://www.emc.com/collateral/white-paper/h13035-wp-introduction-to-xtremio-snapshots.pdf>, pages 18

**QUESTION 39** What is a characteristic of the XtremIO Snapshot feature?

- A. Snapshots may be deleted in any order
- B. Snapshots can only be deleted in reverse creation order
- C. Only one snapshot may be created or deleted at a time
- D. Snapshots can be restored

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Any copy in the hierarchy tree can be deleted without effecting the parents or children.

Incorrect Answers:

B: Deleting a snapshot in the middle of the tree triggers an asynchronous process. This process merges the metadata of the deleted entity's children with that of their grandparents. This ensures that the tree structure is not fragmented.

C: It is possible to create copies of the production volumes in order to protect against logical data corruption. Multiple copies can be created over a short interval in order to provide a fine RecoverPoint Objective (RPO) in a cyclic manner (a superior RPO to a backup).

References: <https://www.emc.com/collateral/white-paper/h13035-wp-introduction-to-xtremio-snapshots.pdf>, page 14

**QUESTION 40**

A customer's storage administration team wants to receive e-mail notifications when the XtremIO cluster detects an issue of major severity. The customer has successfully configured and tested the e-mail server in the XtremIO GUI. However, the e-mail server is not receiving the expected notifications when major severity issues appear.

What is the cause of this issue?

- A. Alert definitions have not been defined
- B. Event handlers have not been defined
- C. Public reports have not been defined
- D. Private reports have not been defined

**Correct Answer:** A

**Section:** (none)

**Explanation**

**Explanation/Reference:**

**QUESTION 41** Who developed the framework for testing All-Flash arrays that is used in the XtremIO PoC?

- A. EMC
- B. Seagate
- C. Micron
- D. IDC

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

IDC outlines a criteria some criteria for selecting a testing tool:

- \* Generate workloads
- \* Capture results for analysis:
  - Throughput
  - IOPS
  - Latency Etc.

References: [http://info.xtremio.com/rs/xtremio/images/IDC\\_Flash\\_Array\\_Test\\_Guide.pdf](http://info.xtremio.com/rs/xtremio/images/IDC_Flash_Array_Test_Guide.pdf)

**QUESTION 42** 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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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-emc-xtremio/> **QUESTION**

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Table 1. Sustained remote replication throughput per RPA (MB/s)			
Configuration	IP		Over FC
	Without compression	With compression	
Between XtremIO arrays	80	240	300
XtremIO to non-XtremIO	80	90	90
Continuous replication from non-XtremIO to XtremIO	110	300	300
Snap-based replication from VNX to XtremIO	110	150	150

Refer to the Exhibit.

A customer has the following XtremIO environment:

- Read/write ratio is 3:1
- I/O size is 8K
- Write pattern is random
- Data is compressible



If an application generates 100,000 IOPS of traffic, how many RPAs are needed to replicate the traffic from one XtremIO array to another XtremIO array over IP?

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

**Correct Answer: C**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Required bandwidth= 100,000 \* 8 \* 1024 bytes

Provided bandwidth between XtremIO arrays with compression over Fiber Channel: 300 \* 1024 \* 1024 bytes

Required number of RPAs:  $100,000 * 8 * 1024 / (300 * 1024 * 1024) = 800,000 / (300 * 1024) = 2.6$ . Three RPAs would be enough.

**QUESTION 44**

A customer has an existing Oracle environment they are considering moving over to XtremIO from VMAX for improved performance. The customer wants to know the expected deduplication and compression savings they can achieve with XtremIO.

Which tool is appropriate for conducting this assessment?

- A. EMC Backup Tool

- B. EMC Storage Tool
- C. XtremIO Sizing Tool
- D. EMC MiTrend Tool

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

MiTrend has been available for EMC Employees and Partners for years, but it's a valuable tool that Customers can take advantage of also. And the price is awesome. It's FREE !

Use it for VNX, Clariion, VMAX, and many more.

References: <http://www.pragmaticio.com/2014/11/mitrend-self-service-performance-analysis-for-emc-vnx/>

**QUESTION 45** Which values are required to enter a generic workload into the XtremIO Sizing Tool?

- A. Capacity, IOPs, R/W ratio
- B. IOPs, I/O size, bandwidth
- C. IOPs, bandwidth, latency
- D. Bandwidth, I/O size, latency

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

IDC outlines a criteria some criteria for selecting a testing tool:

\* Generate workloads

\* Capture results for analysis:

Throughput

IOPS

Latency



References: <http://emc.co/collateral/technical-documentation/h15280-euc-xendesktop-vsphere-xtremio-sg.pdf>, page 87

[http://info.xtremio.com/rs/xtremio/images/IDC\\_Flash\\_Array\\_Test\\_Guide.pdf](http://info.xtremio.com/rs/xtremio/images/IDC_Flash_Array_Test_Guide.pdf), page 7

**QUESTION 46**

A customer currently uses XtremIO native remote replication with four RPAs and a 1 GB WAN link to asynchronously protect all production data. Management has decided that all data stored on the XtremIO must now be protected at the disaster recovery site by synchronous replication.

How can this be achieved?

- A. Set the Link Policy to Synchronous, Dynamic by throughput
- B. Purchase four additional RPAs.
- C. Set the Link Policy to Synchronous, Dynamic by latency
- D. Use a VPLEX splitter

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

XtremIO with VPLEX provides for both synchronous and asynchronous replication.

Note: The engine of RecoverPoint is the RecoverPoint Appliance (RPA).

Incorrect Answers:

A, B, C: XtremIO with Physical RPA - No Synchronous option available, only asynchronous replication as this uses snapshot shipping.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 55

**QUESTION 47** Which part of the XtremIO architecture do host ports use to access an XtremIO volume?

- A. FA
- B. Initiator
- C. Target
- D. Zone

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

All XtremIO's enterprise features (including Inline Data Reduction, snapshots, XDP, HA, etc.) have been developed as part of the scale-out architecture. All data and metadata are evenly distributed across the entire cluster. I/Os are admitted to the array via all the host ports, utilizing SAN zones and multi-pathing.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 39

**QUESTION 48** 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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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

**QUESTION 49**

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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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 50

A customer is interested in purchasing XtremIO for their mission critical database applications that require the lowest possible response times. They have two data centers in which they want to introduce All-Flash arrays. However, they need a way to maintain true active/active access to all databases and application LUNs across both sites.

What is the recommended solution to address the requirements?

- A. ViPR Controller with XtremIO
- B. RecoverPoint with XtremIO
- C. VPLEX Metro with XtremIO
- D. ViPR SRM with XtremIO

**Correct Answer: C**

**Section: (none)**

**Explanation**

#### Explanation/Reference:

The EMC VPLEX family is the next-generation solution for data mobility and access within, across and between data centers.

VPLEX supports two configurations, local and metro. In the case of VPLEX Metro with the optional VPLEX Witness and Cross-Connected configuration, applications continue to operate in the surviving site with no interruption or downtime. Storage resources virtualized by VPLEX cooperate through the stack, with the ability to dynamically move applications and data across geographies and service providers.

Incorrect Answers:

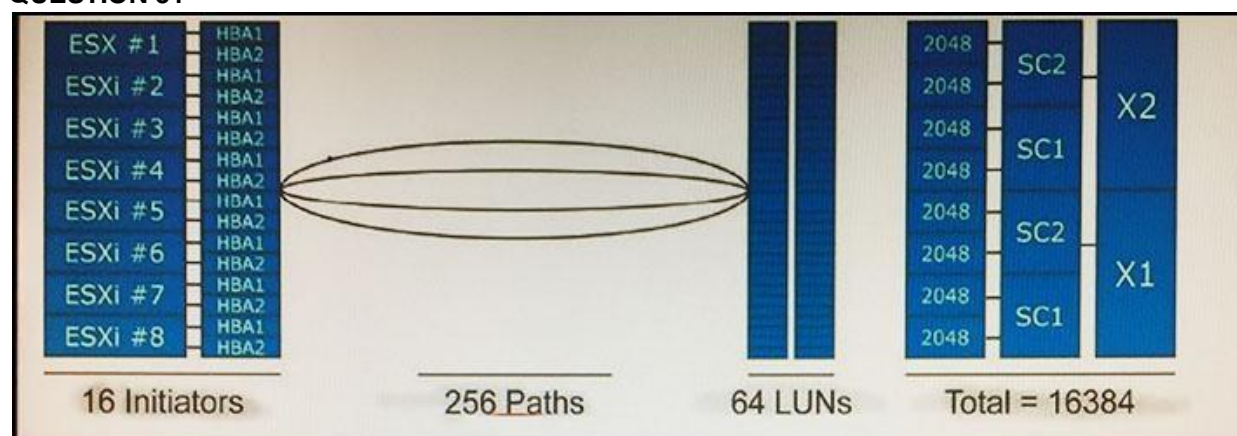
A: EMC ViPR Controller is a software-defined storage platform that abstracts, pools and automates a data center's underlying physical storage infrastructure. It provides data center administrators with a single control plane for heterogeneous storage systems.

B: The EMC RecoverPoint family provides cost-effective, local continuous data protection (CDP), continuous remote replication (CRR), and continuous local and remote replication (CLR) that allows for any-point-in-time data recovery and a new "snap and replicate" mechanism for local and remote replication (XRP). This enables replication for high-performance, low-latency applications.

D: EMC ViPR SRM provides comprehensive monitoring, reporting and analysis for heterogeneous block, file and virtualized storage environments. It enables the users to visualize applications to storage dependencies, monitor and analyze configurations and capacity growth, and optimize their environment to improve return on investment.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015) , page 63

#### QUESTION 51



As shown in the exhibit, a customer's environment is configured as follows:

- Dual X-Brick cluster
- 8 ESXi hosts with 2 HBAs
- Each ESXi hosts has 8 LUNs
- Each LUN is visible through 4 paths

What should be the host queue depth setting per path?

- A. 64
- B. 128

- C. 256
- D. 1024

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

The queue depth is per LUN, and not per initiator. Here there are 64 LUNs, each visible through 4 paths, which would indicate that 256 is a good choice for the queue depth setting.

Note: As a general advice, for optimal operation with XtremIO storage, consider the following: Set the queue depth to 256.

References: <https://www.emc.com/collateral/white-paper/h14583-wp-best-practice-sql-server-xtremio.pdf>

**QUESTION 52** What is the maximum speed of the Fibre Channel ports on an XtremIO storage controller?

- A. 2 Gb/s B. 4 Gb/s
- C. 8 Gb/s
- D. 16 Gb/s

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Each Storage Controller includes two 8Gb/s Fibre Channel (FC) ports.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 8



**QUESTION 53**

A customer has recently deployed an XtremIO 20 TB two X-Brick cluster to run an existing instance of Oracle RAC previously leveraging VNX for back-end storage. The application environment uses a block size of 1 MB. Multiple tables are in use with the PARALLEL\_DEGREE\_POLICY variable set to AUTO.

The customer wants your help with tuning the DB\_FILE\_MULTIBLOCK\_READ\_COUNT parameter for best performance with XtremIO. Which values should be recommended for tuning the DB\_FILE\_MULTIBLOCK\_READ\_COUNT parameter in the Oracle RAC environment?

- A. 8 or 16
- B. 24 or 32
- C. 64 or 128
- D. 256 or 512

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Oracle Database performs I/O on data files in multiples of the database block size (db\_block\_size), which is 8KB by default. The default Oracle Database block size is optimal on XtremIO. XtremIO supports larger block sizes as well. In the case of multiblock I/O (e.g., table/index scans with access method full), one should tune the Oracle Database initialization parameter db\_file\_multiblock\_read\_count to limit the requests to 128KB. Therefore, the formula for db\_file\_multiblock\_read\_count is:  $\text{db\_file\_multiblock\_read\_count} = 128\text{KB} / \text{db\_block\_size}$

In our case the block size is 1 MB, so the formula  $\text{db\_file\_multiblock\_read\_count}$  is  $1\text{ MB} / 8\text{KB} = 1024/8 = 128$

References: <https://www.emc.com/collateral/white-papers/h13497-oracle-best-practices-xtremio-wp.pdf>, page 21

**QUESTION 54**

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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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 55

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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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 XBrick 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 56

A physical XtremIO Management Server (XMS) has failed and requires replacement. Which two software packages are required for recovery?

- A. XMS image and OVA image
- B. Xtremapp and OVA image
- C. XMS image and Xtremapp
- D. Xtremapp and MPIO

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

The first step is to re-install the XMS image, in the event it is a physical XMS then you may install an image via a USB flash drive or for a virtual XMS simply deploy the provided VMware OVA image.

The following step is to upload the XMS software to the images directory of the XMS and login with install mode .....

Once logged into the XMS console with xinstall then perform the following sequence of steps:

1. Configuration
  5. Perform XMS installation only 11.
- Run XMS Recovery



```

Install menu
1. Configuration
2. Check configuration
3. Display configuration
4. Display installed Xtremapp version
5. Perform XMS installation only
6. Perform "fresh" installation(XMS + storage controllers)
7. Set IP Client Configuration
8. Start IP Client Installation
9. Set Policy Manager configuration
10. Start Policy Manager Installation
11. Run XMS Recovery
12. Reboot
99. Exit

```

Options to choose when running the "XMS Recovery":

```

> > 11
Enter IP Address or Host Name of the System Manager Storage Controller (usually the first) (previous value: ''):
> 172. .40
Input received: '172. .40'
Enter selection for Keeping the GUID of the old XMS (Y/N) (previous value: 'N'):
> N
Input received: 'N'
Enter selection for restoring the original DB in case of failure (Y/N) (previous value: 'Y'):
> Y
Input received: 'Y'
Running: /xtremapp/bin/xms-recovery 172. .40

```

References: <https://davidring.ie/2015/02/20/emc-xtremio-redeploying-xms-xtremio-management-server/>



#### QUESTION 57

You need to design an Oracle solution for a customer. Which XtremIO best practices should be used in Oracle environments?

- A. Use a 512 byte LUN sector size for databases. Use Eager Zeroed Thick formatting for ESXi
- B. Use a 4 kB LUN sector size for databases. Use Lazy Zeroed Thick formatting for ESXi
- C. Align data on 4 kB boundaries. Use Thin formatting on ESXi
- D. Align data on 4 kB boundaries. Use Lazy Zeroed Thick formatting on ESXi

**Correct Answer: A**

**Section: (none)**

**Explanation**

#### Explanation/Reference:

The default setting for XtremIO volumes is 512e. It is recommended not to alter this in order to use 4K Advanced Format for Oracle Database deployments. There are no performance ramifications when using 512e volumes in conjunction with an Oracle database. On the contrary, 4K Advanced Format is rejected by many elements of the Oracle and Linux operating system stack.

References: <https://www.emc.com/collateral/white-papers/h13497-oracle-best-practices-xtremio-wp.pdf>, page 20

#### QUESTION 58

You have conducted a meeting with a company's Chief Technology Officer (CTO). The CTO wants an XtremIO solution to meet their business needs. The CTO wants you to review the proposed solution with their desktop administrator to identify any additional requirements.

What are two key considerations to discuss with the desktop administrator?

- A. Rapid desktop deployment and operational ease of use
- B. Application response time and rapid boot times
- C. Sufficient capacity and performance
- D. Ease of management and ability to customize end-user desktops

**Correct Answer:** BC

**Section:** (none)

**Explanation**

**Explanation/Reference:**

**QUESTION 59** Where is the XtremIO VSS hardware provider package installed?

- A. On all X-Bricks in the cluster
- B. On the XMS
- C. Factory-installed on the array
- D. On the backup server

**Correct Answer:** D

**Section:** (none)

**Explanation**

**Explanation/Reference:**

In order to use the XtremIO VSS provider it must be installed on the server where we want to do an application consistent snapshot. References:

<http://muegge.com/blog/tag/xtremio/>

**QUESTION 60**

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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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 61**

What are common storage array mechanisms?

- A. Log structuring and RAID
- B. Post-processing and metadata logging
- C. RAID and metadata log structuring
- D. Metadata logging and RAID

**Correct Answer:** B

**Section:** (none)

**Explanation**

**Explanation/Reference:**

XtremIO's snapshot technology is implemented by leveraging the content-aware capabilities of the system (Inline Data Reduction), optimized for SSD media, with a unique metadata tree structure.

XtremIO leverages a proprietary flash-optimized data protection algorithm (XtremIO Data Protection or XDP), which provides performance that is superior to any existing RAID algorithm.

References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 33

#### QUESTION 62

A storage administrator wants to re-use some of their XtremIO thin provisioned disks attached to a Microsoft Windows 2012 host. However, the administrator notices that "Quick Format" of the drives is taking a long time to complete. This has an impact on the overall performance.

What should be recommended to minimize the performance impact?

- A. Disable the I/O elevator feature on the Windows host while formatting
- B. Temporarily disable the UNMAP feature on the Windows host during formatting
- C. Adjust the execution throttle value on the Windows host
- D. Change the disk format to thick provisioned

**Correct Answer:** B

**Section:** (none)

**Explanation**

**Explanation/Reference:**

It is related to TRIM/UNMAP, which is enabled per default in Server 2012(R2).

References: <https://serverfault.com/questions/679211/quick-format-of-lun-in-server-2012r2-hosted-on-a-thin-provisioned-san-vol-take>

#### QUESTION 63

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

**Section:** (none)

**Explanation**

**Explanation/Reference:**

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 64

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

**Section: (none)**

**Explanation**

**Explanation/Reference:**

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 65** A customer has a group of applications that need storage which can provide low response times. The total I/O requirements are 75,000 IOPs with a 4 kB block size. They will have 500 LUNs and need to keep 30 daily snapshots of each LUN.

What is the smallest XtremIO configuration that will meet their needs?

- A. 1 cluster with 2 X-Bricks
- B. 1 cluster with 4 X-Bricks
- C. 2 clusters with 1 X-Brick each
- D. 2 clusters with 2 X-Bricks each

**Correct Answer: A**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

**QUESTION 66**

When installing a physical XtremIO Management Server (XMS) station, which requirement must be met?

- A. XMS must be able to access one of the management ports on one X-Brick storage controller in the cluster
- B. XMS must be able to access only the management ports on the first X-Brick's storage controllers
- C. XMS must be able to access all management ports on the X-Brick storage controllers
- D. XMS must be able to access all management ports on at least two X-Brick storage controllers in the cluster

**Correct Answer: C**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

The XMS must access all management ports on the X-Brick Storage Controllers, and must be accessible by any GUI/CLI client host machine. References: Introduction to the EMC XtremIO STORAGE ARRAY (April 2015), page 48

**QUESTION 67**

A customer has decided to use VMware Horizon View as their desktop virtualization technology. Their VDI environment will consist of XtremIO storage and ESXi hosts. They are looking for increased speed and low latencies while performing file copy operations.

What should the setting for VAAI XCOPY I/O size be set to in order to achieve this requirement?

- A. 8 kB
- B. 63 kB
- C. 256 kB
- D. 4 MB

**Correct Answer: C**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

The VAAI XCOPY I/O size of 256 kB gives the best performance. 4 MB is the default value.

References: <https://www.emc.com/collateral/white-papers/h14279-wp-vmware-horizon-xtremio-design-considerations.pdf>, page 57

