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By Nutanix X-Ray

Test Infrastructure Lifecycle

Content

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About X-Ray

Test Infrastructure Life Cycle

Enterprise clouds leverage hyper-converged infrastructure technologies, mixing compute and storage resources into systems which are then shared by multiple application workloads. When architecting these infrastructures, it is important to test different real-world datacenter scenarios to understand how controlled and uncontrolled situations affect consistent application performance.

X-Ray models and tests typical datacenter scenarios that mirror the infrastructure lifecycle requirements including: pure infrastructure and application performance, performance while using infrastructure data protection features, performance scaling capabilities, and implications of failure scenarios. As shown below, tests have been categorized into typical phases of the infrastructure lifecycle.

Infrastructure Life Cycle Phase	Related Tests
Infrastructure Performance Measure raw infrastructure performance.	Four Corner Microbenchmark Throughput Scalability
Application Performance Model application-specific workloads and measure performance.	VDI Scalability OLTP Simulator
Data Protection Measure effects of data protection features on application workload performance.	Snapshot Impact VM Clone Impact
Infrastructure Resiliency Measure effects of unplanned infrastructure failure events on running applications.	Sequential Node Failure Rolling Upgrade Extended Node Failure
Infrastructure Scalability Measure effects of introducing new application workloads on infrastructure running existing workloads.	Database Colocation HCI Workflow

Testing Summary

Test Scenarios	Test Result Name	Systems Tested
HCIBenchmark	HCIBenchmark on Nutanix - AWS-i3.metal-3Node	AWS-i3.metal-3Node (3-Node Nutanix 6.0.2.4 on AHV)

Target System Details

AWS-i3.metal-3Node

Cluster Version	Nodes	Usable Capacity
6.0.2.4	3	18.15 TiB

Node ID	Hypervisor Version	CPU	RAM	Attached Storage
10.210.2.22	Nutanix 20201105.30007	2 x Intel(R) Xeon(R) CPU E5-2686 v4 @ 2.30GHz Cores - 36	503.52 GiB	3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD 3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD 1 x Amazon EC2 NVMe Instance Storage 1.49 TiB SSD 1 x Amazon EC2 NVMe Instance Storage 1.54 TiB SSD
10.210.2.7	Nutanix 20201105.30007	2 x Intel(R) Xeon(R) CPU E5-2686 v4 @ 2.30GHz Cores - 36	503.52 GiB	1 x Amazon EC2 NVMe Instance Storage 1.54 TiB SSD 3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD 3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD 1 x Amazon EC2 NVMe Instance Storage 1.49 TiB SSD
10.210.2.38	Nutanix 20201105.30007	2 x Intel(R) Xeon(R) CPU E5-2686 v4 @ 2.30GHz Cores - 36	503.52 GiB	1 x Amazon EC2 NVMe Instance Storage 1.53 TiB SSD 3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD 3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD 1 x Amazon EC2 NVMe Instance Storage 1.49 TiB SSD

HCIBenchmark

Test Description - (HCIBenchmark)

This test allows you to run customized storage workloads on one or more VMs. You can adjust common storage microbenchmark parameters, including the working set size, block size, and the target I/O rate. Workloads are evenly distributed across every disk on every VM. Setting the target I/O rate to 0 performs a max throughput test. Higher IOPS and lower latency indicate better performance.

How X-Ray runs the test

Setup
Deploy the desired number of workload VMs per host.
Fill virtual disks with the desired amount of random data.
Measurement
Run the desired workload configuration for the requested amount of time across each VM.

HCIBenchmark on Nutanix- Test Result Details

Target : AWS-i3.metal-3Node (3 node Nutanix 6.0.2.4 on AHV)

Preset: custom

Type	Value
Number of VMs deployed across the cluster	9
Number of disks attached to each VM	6
VM working set size (MB)	2048
Workload read percent	50
Workload random percent	50
Number of I/O operations left outstanding per disk	6
Workload block size in kilobytes	8
Target IOPS rate per VM (0 for unlimited)	0
Runtime in seconds	600

Start Time	RunTime	Result
6/30/2022, 6:41:08 PM GMT	16 m	Completed

Result Summary

Median
178.95K IOPS
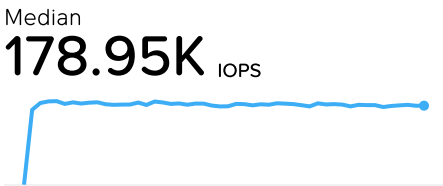
Max.
187.27K IOPS

Min.
143.2 IOPS

💡 Higher IOPS indicates better performance.

Median
1.47G Bytes/Sec
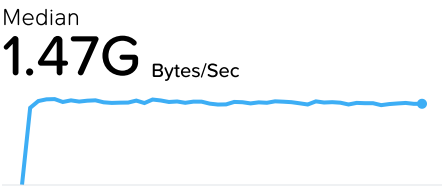
Max.
1.53G Bytes/Sec

Min.
2.5M Bytes/Sec

💡 Higher throughput indicates better performance.

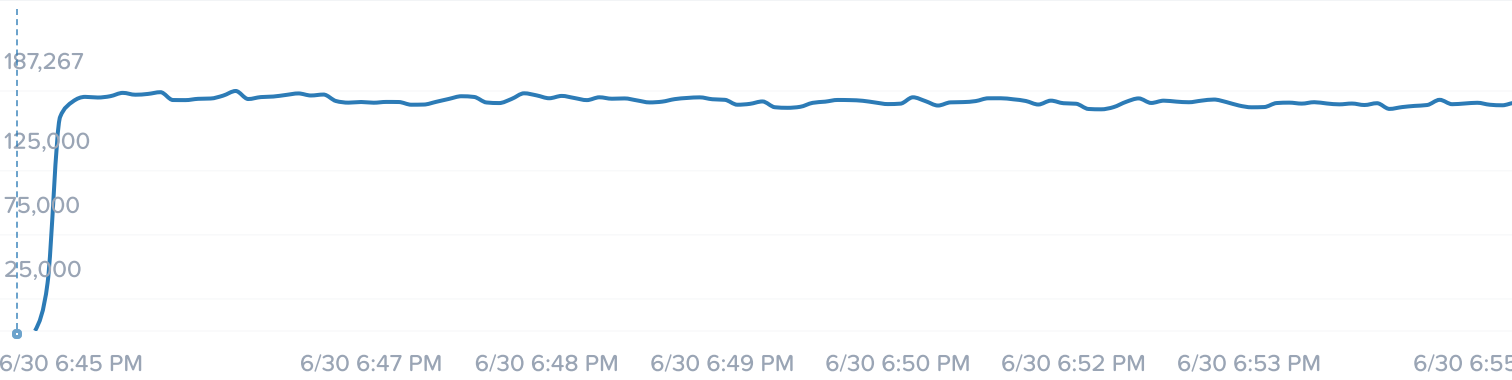Median
1.77K microseconds
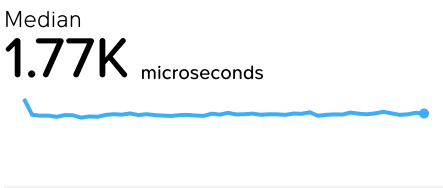
Max.
2.15K microseconds

Min.
982.85 microseconds

💡 Lower latency indicates better performance.

Workload Aggregated IOPS

Min	Max	Median	Mean	Standard Deviation
● 143	187,267	178,945	176,661	20,923

Workload Aggregated Throughput
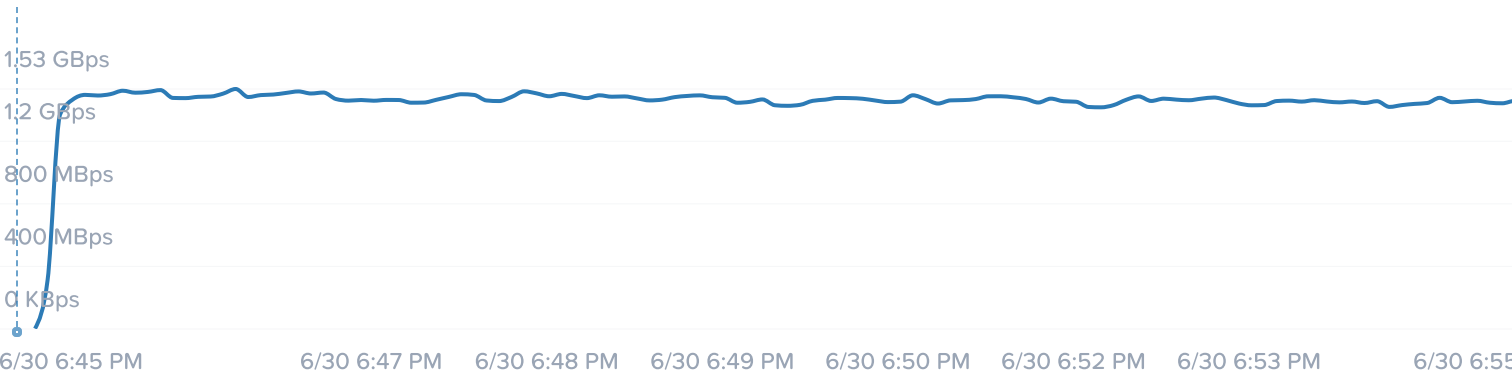
Min	Max	Median	Mean	Standard Deviation
● 2.5 MBps	1.53 GBps	1.47 GBps	1.45 GBps	171.03 MBps

Workload Aggregated Latency
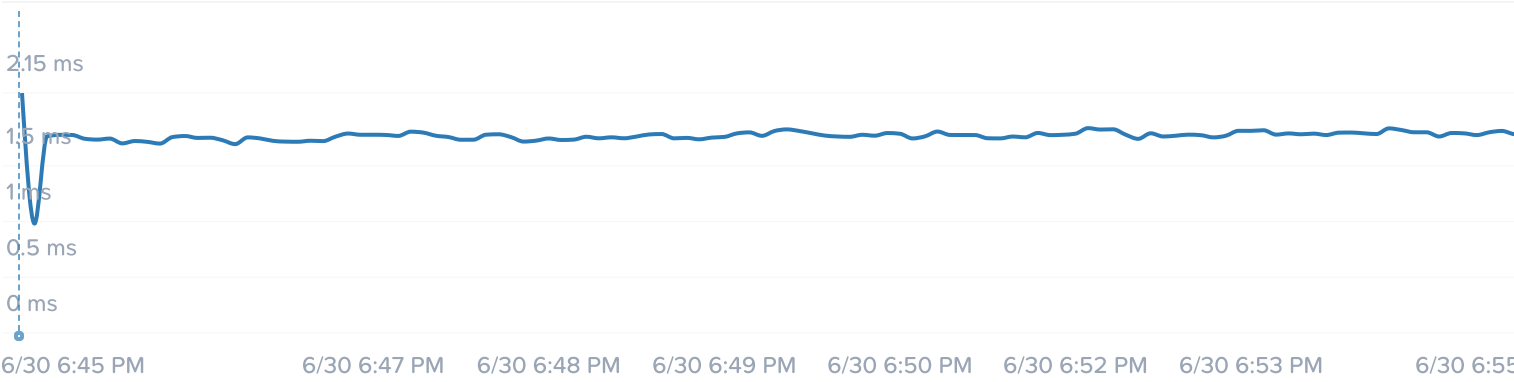
Min	Max	Median	Mean	Standard Deviation
● 0.98 ms	2.15 ms	1.77 ms	1.77 ms	0.08 ms

Chart with y-axis values: 2.15 ms, 1.5 ms, 1 ms, 0.5 ms, 0 ms
X-axis: 6/30 6:45 PM, 6/30 6:47 PM, 6/30 6:48 PM, 6/30 6:49 PM, 6/30 6:50 PM, 6/30 6:52 PM, 6/30 6:53 PM, 6/30 6:55

Cluster CPU Usage

Chart with y-axis values: 137.48 GHz, 100 GHz, 60 GHz, 20 GHz
X-axis: 6/30 6:45 PM, 6/30 6:47 PM, 6/30 6:48 PM, 6/30 6:49 PM, 6/30 6:50 PM, 6/30 6:52 PM, 6/30 6:53 PM, 6/30 6:55
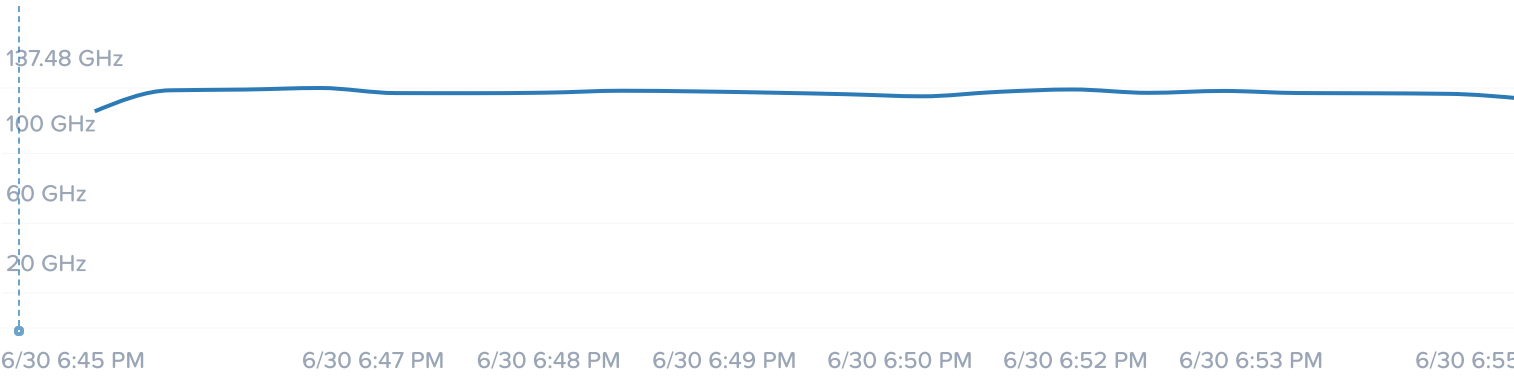
Cluster Network Received

Chart with y-axis values: 1.28 GBps, 900 MBps, 600 MBps, 300 MBps, 0 KBps
X-axis: 6/30 6:45 PM, 6/30 6:47 PM, 6/30 6:48 PM, 6/30 6:49 PM, 6/30 6:50 PM, 6/30 6:52 PM, 6/30 6:53 PM, 6/30 6:55
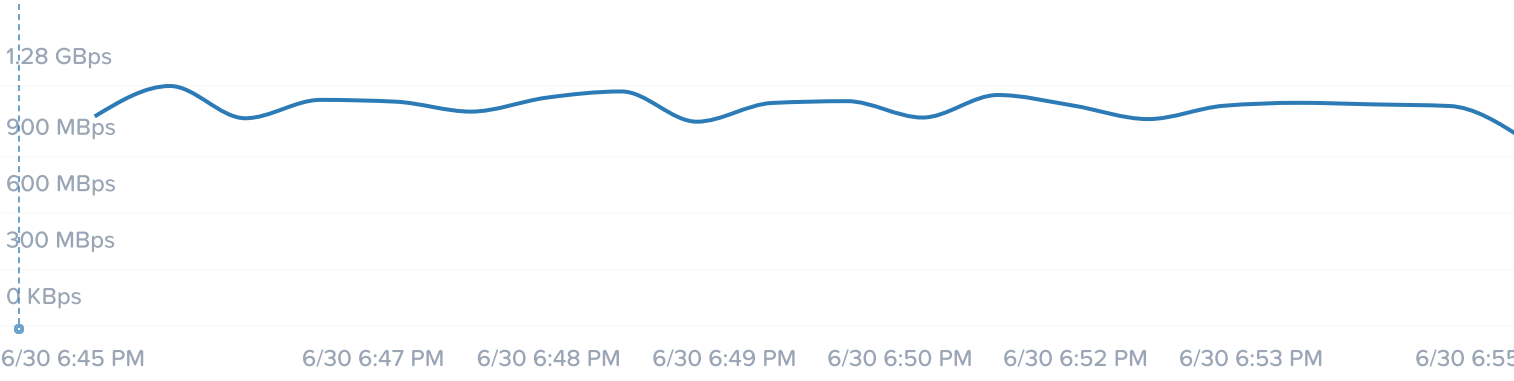
Cluster Network Transmitted

| 1.26 GBps |
| 900 MBps |
| 600 MBps |
| 300 MBps |
| 0 KBps |

6/30 6:45 PM   6/30 6:47 PM   6/30 6:48 PM   6/30 6:49 PM   6/30 6:50 PM   6/30 6:52 PM   6/30 6:53 PM   6/30 6:55