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**<br>Measure raw infrastructure performance. | Four Corner Microbenchmark<br>Throughput Scalability |
| **Application Performance**<br>Model application-specific workloads and measure performance. | VDI Scalability<br>OLTP Simulator |
| **Data Protection**<br>Measure effects of data protection features on application workload performance. | Snapshot Impact<br>VM Clone Impact |
| **Infrastructure Resiliency**<br>Measure effects of unplanned infrastructure failure events on running applications. | Sequential Node Failure<br>Rolling Upgrade<br>Extended Node Failure |
| **Infrastructure Scalability**<br>Measure effects of introducing new application workloads on infrastructure running existing workloads. | Database Colocation<br>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<br>3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD<br>1 x Amazon EC2 NVMe Instance Storage 1.49 TiB SSD<br>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<br>3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD<br>3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD<br>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<br>3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD<br>3 x Amazon EC2 NVMe Instance Storage 1.51 TiB SSD<br>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 | 3 |
| 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, 5:21:03 PM GMT | 14 m | Completed |

# Result Summary

Median
**107.6K** IOPS

Max.
111.45K IOPS

Min.
661.2 IOPS

Higher IOPS indicates better performance.

Median
**881.47M** Bytes/Sec

Max.
912.9M Bytes/Se

Min.
52.69M Bytes/S

Higher throughput indicates better performance.

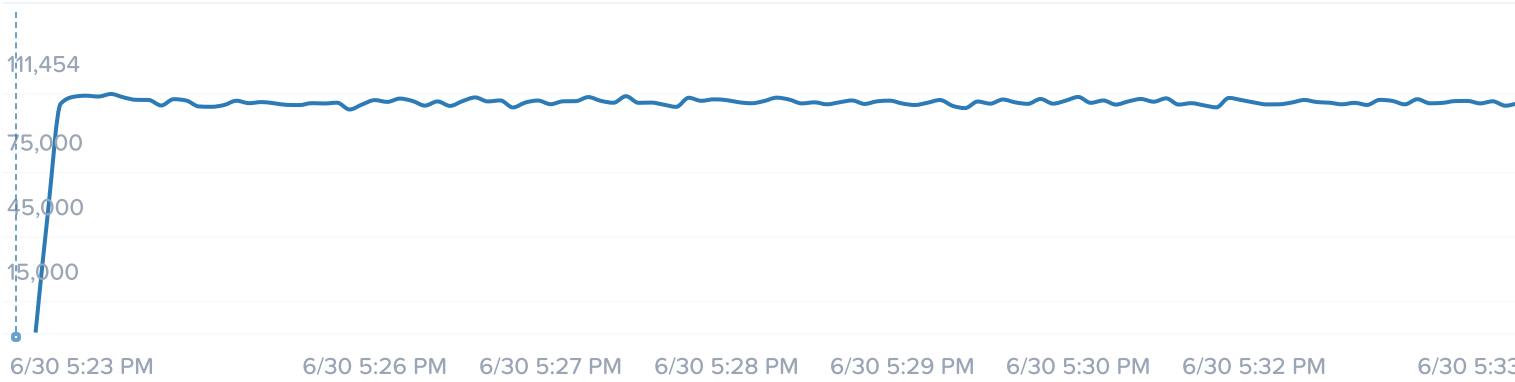
Median
**976.79** microseconds

Max.
4.97K microseconds

Min.
945.09 microseconds

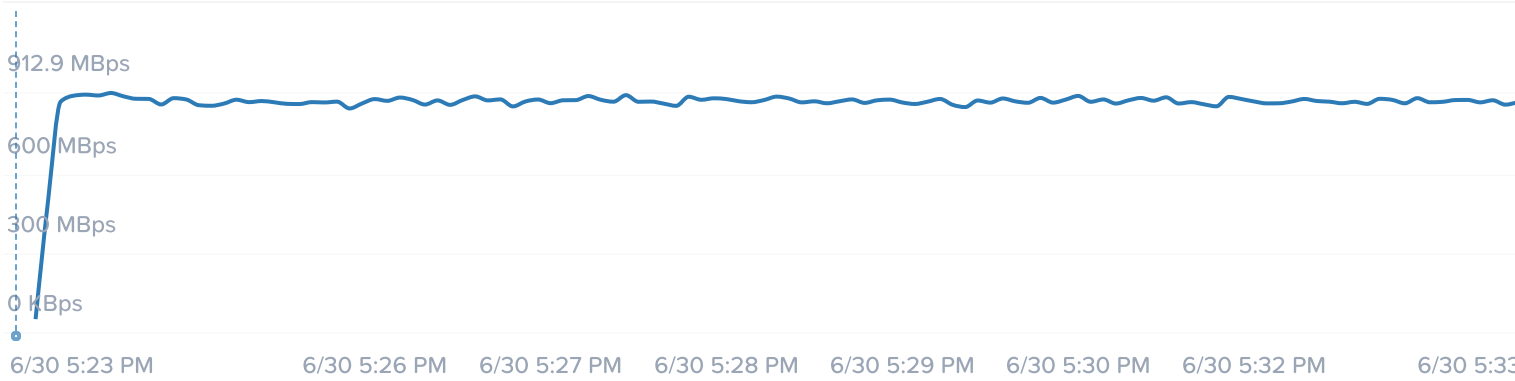
Lower latency indicates better performance.

## Workload Aggregated IOPS



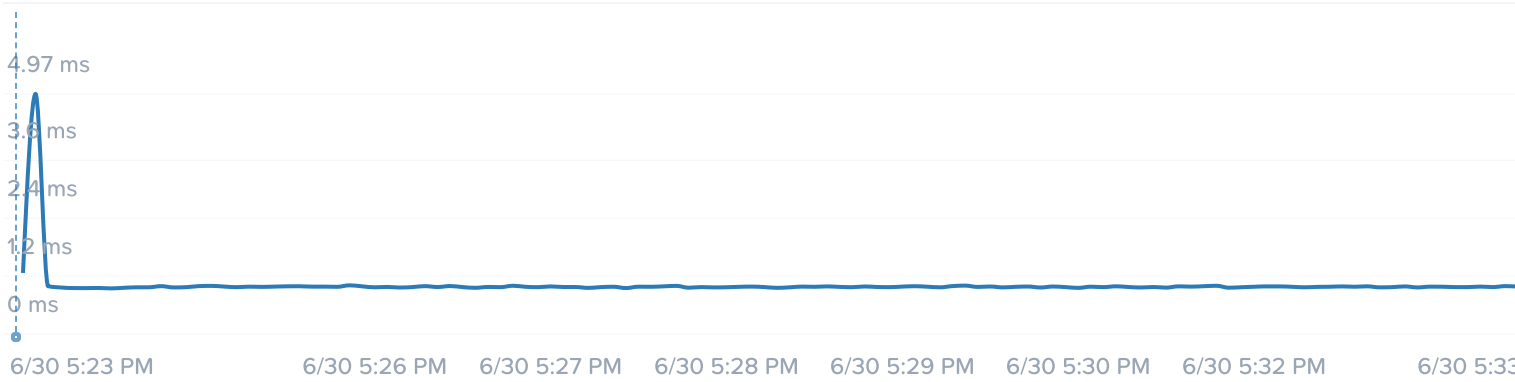

| Min | Max | Median | Mean | Standard Deviation |
|---|---|---|---|---|
| 661 | 111,454 | 107,602 | 106,433 | 10,802 |

## Workload Aggregated Throughput



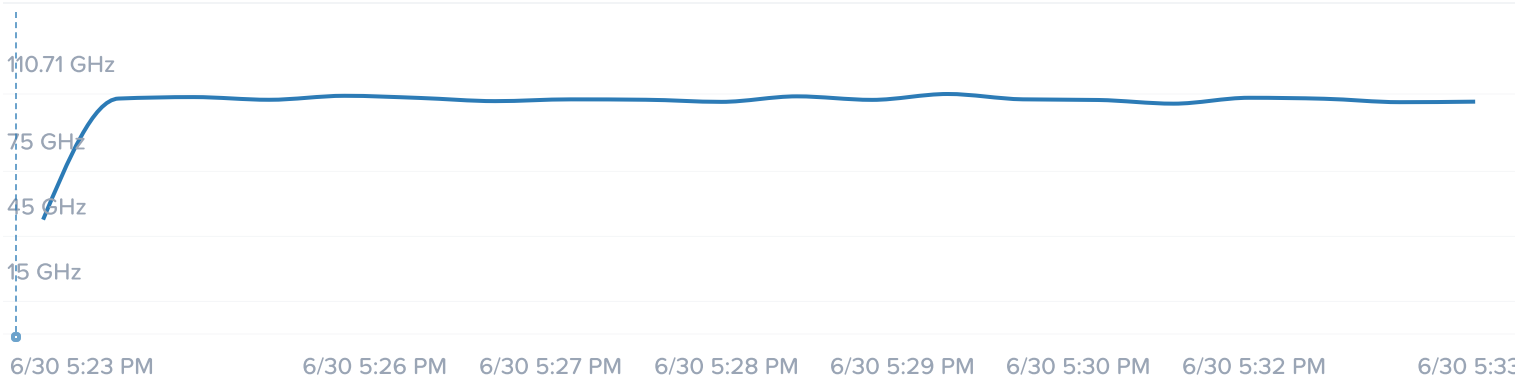

| Min | Max | Median | Mean | Standard Deviation |
|---|---|---|---|---|
| 52.69 MBps | 912.9 MBps | 881.47 MBps | 872.64 MBps | 83.31 MBps |

## Workload Aggregated Latency

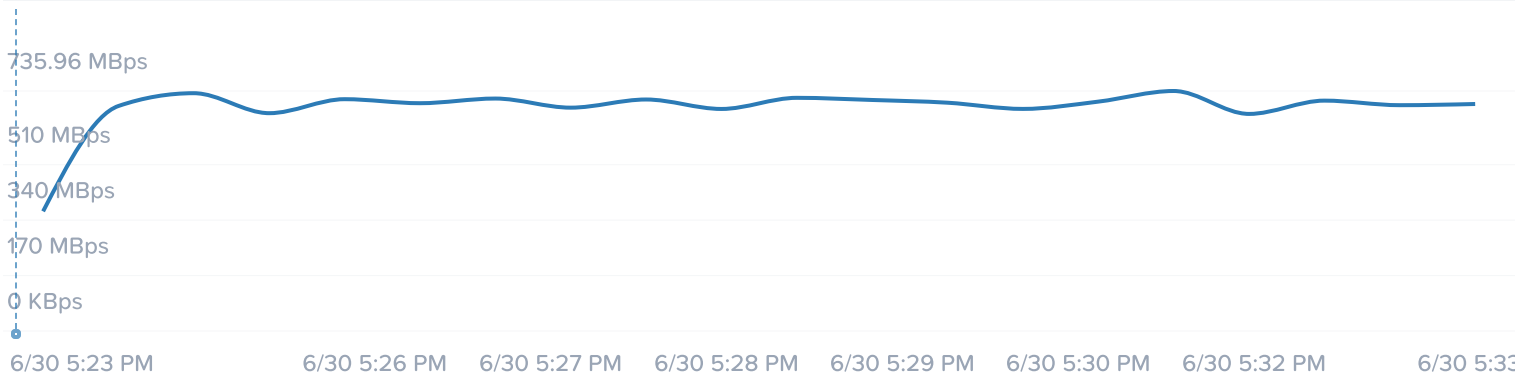



| Min | Max | Median | Mean | Standard Deviation |
|---|---|---|---|---|
| 0.95 ms | 4.97 ms | 0.98 ms | 1.01 ms | 0.36 ms |

## Cluster CPU Usage




## Cluster Network Received



## Cluster Network Transmitted