NetApp Solution Technical Report

Manually Designed Solution

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**Project ID:**

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# Business Requirements

*[Use this section to document the customer’s high-level business requirements]*

# Solution Summary

## Proposed Solution Summary

This is a summary of what the proposed solution will deliver.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | **THROUGHPUT** | | 1,000 IOPS / 3.91 MB/s | | **AVERAGE UTILIZATION** | | 1% | | **MAXIMUM THROUGHPUT****\*** | | 89,503 IOPS / 349.62 MB/s | | \* assumes best practice configuration of aggregates and workload to aggregate mapping | | |  | | --- | | **RAW CAPACITY** | | 216 TB | | **USABLE CAPACITY** | | 153.99 TiB | | **RAW CAPACITY HEADROOM****\*\*** | | 43.2 TB | | \*\* assumes future expansion using drives of same capacity | | |  |  | | --- | --- | | **STORAGE EFFICIENCY****\*\*\*** | | | 1 : 1 | | | **EFFECTIVE CAPACITY****\*\*\*** | | | 153.9922 TiB | | | **USABLE VS EFFECTIVE** | | |  | 153.99 TiB  153.9922 TiB | | \*\*\* assumes use of storage efficiency technologies like compression and deduplication  \*\*\* Lowest efficiencies have been applied to unused capacity within the cluster. | | |
|  | | | |
| |  |  |  |  | | --- | --- | --- | --- | | **CONFIGURATION** | | | | | **Model:** | FAS2750A UTA2 | **Onboard Ethernet Ports:** | 10GbE (4) | | **Nodes:** | 2 | **Onboard UTA2 Ports:** | 8 | | **Total Drives:** | 120 | **Onboard SAS Ports:** | 4 | | **Drive Type:** | 1.8TB SAS 10k | **Expansion Slots:** | 0 | | **Cluster Switches:** | N/A | **Stge Switches:** | N/A | | | |  |  | | --- | --- | | **ENVIRONMENTAL** | | | **Rack Units:** | 10 U | | **System Weight:** | 276.01 lbs | | **AC Power:** | 1394.00 W | | **Current Draw:** | 14.24 A | | **BTU/hr:** | 4761.00 | |

# Solution Details

## System Details

For rack elevation, please refer to the Storage Solution Visio Diagram

**Solution Quotation  18704751: netapp1/netapp2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Bill Of Materials** | | | | **Total** |
|  | **Description** | | **Part Number** | **Qty** |
| Systems | | | | |
|  | FAS2750A UTA2 w/ 24x1.8TB SAS 10k | 9.9.1 ONTAP | X343A | 1 |
| Grand Total | | | 1 |
| Storage | | | | |
|  | DS224C w/ 24x1.8TB SAS 10k | | X343A | 4 |
| Grand Total | | | 4 |
| Adapter Cards/ Flash Cache | | | | |
|  | Grand Total | | | 0 |

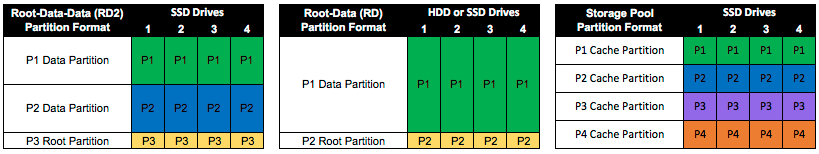
## Environmental Details

**Line Voltage: 110**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **System Components** | **Qty** | **Rack Units** | **Current**  **(Amps)** | | **AC Power**  **(Watts)** | | **AC Power**  **(VA)** | | **Thermal Rating**  **(BTU/hr)** | | **Power**  **(kWh/year)** | |
| **Typical** | **Worst** | **Typical** | **Worst** | **Typical** | **Worst** | **Typical** | **Worst** | **Typical** | **Worst** |
| FAS2750A UTA2 w/ 24x1.8TB SAS 10kX343A (2xControllers, 1xChassis) | 1 | 2 | 4.8 | 6.23 | 470 | 610 | 494.74 | 642.11 | 1,605 | 2,082 | 4,120.02 | 5,347.26 |
| DS224C w/ 24x1.8TB SAS 10kX343A | 4 | 8 | 9.44 | 15.88 | 924 | 1,556 | 972.64 | 1,637.88 | 3,156 | 5,312 | 8,099.8 | 13,639.88 |
| **Total** | **5** | **10** | **14.24** | **22.11** | **1,394** | **2,166** | **1,467.38** | **2,279.99** | **4,761** | **7,394** | **12,219.82** | **18,987.14** |

## Aggregate Details: netapp1/netapp2

This configuration leverages the Root-Data partitioning which creates one small root partition (P2) for the root aggregates and a larger sized partitions (P1) for data aggregates. Up to 24 drives are partitioned in this format when ONTAP first initializes. The partition sizes and number of partitions are dependent on the number of drives installed when ONTAP first initializes.



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Root Aggrs** | **Node** | **Devices** | **Total** | **Data** | **Parity** | **RAID/Size** | **Reserve (TiB)** | **WAFL (TiB)** | **Parity (TiB)** | **Root (TiB)** |
| **netapp1\_root** | **netapp1** | **23.4GiB P2 Partition** | **10** | **8** | **2** | **RAID\_DP/10** | **0.0000** | **0.0183** | **0.0457** | **0.1644** |
| **netapp2\_root** | **netapp2** | **23.4GiB P2 Partition** | **10** | **8** | **2** | **RAID\_DP/10** | **0.0000** | **0.0183** | **0.0457** | **0.1644** |
|  |  |  | **20** | **16** | **4** | **Totals** | **0.0000** | **0.0366** | **0.0914** | **0.3288** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Data Aggrs** | **Node** | **Devices** | **Total** | **Data** | **Parity** | **RAID/Size** | **Reserve (TiB)** | **WAFL (TiB)** | **Parity (TiB)** | **Usable (TiB)** |
| **netapp1\_aggr1** | **netapp1** | **1.61TiB P1 Partition** | **23** | **21** | **2** | **RAID\_DP/24** | **0.0000** | **17.1102** | **16.2955** | **153.9922** |
|  | **netapp1** | **1.8TB SAS 10k** | **92** | **84** | **8** | **RAID\_DP/24** | **-** | **-** | **-** | **-** |
|  |  |  | **115** | **105** | **10** | **Totals** | **0.0000** | **17.1102** | **16.2955** | **153.9922** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Spares** | | **Devices** | **Total** | **Capacity**  **(TiB)** |
| **Root** | **23.4GiB P2 Partition** | | **4** | **0.0914** |
| **Data** | **1649.93GiB P1 Partition** | | **1** | **1.6113** |
| **Data** | **1.8TB** | | **4** | **6.5497** |
|  | |  | **Total** | **8.2524** |

|  |  |  |
| --- | --- | --- |
|  | **Capacity**  **(TiB)** | **Allocation** |
| **Drive Formatting** | **0.3830** | **0.19%** |
| **Root** | **0.3288** | **0.17%** |
| **Parity** | **16.3869** | **8.34%** |
| **WAFL** | **17.1468** | **8.73%** |
| **Reserve** | **0.0000** | **0%** |
| **Spare** | **8.2524** | **4.2%** |
| **Usable** | **153.9922** | **78.37%** |
| **Total** | **196.4901** | **100.0%** |

## Drive Calculation Summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Node** | **Drives**  **(Qty) (#Partitions, #Non-Partitioned)** | **Flash Pool Drives (Qty) (#Partitions, #Non- Partitioned)** | **Aggregates**  **(Qty)** | **Space**  **Utilization** |
| **netapp1** | **(33, 92)** | **(0, 0)** | **2** | **6.49%** |
| **netapp2** | **(10, 0)** | **(0, 0)** | **1** | **N/A** |

## Workload Descriptions

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  | IO Percentages | | | | IO Block Sizes (KB) | | | |  |
| Workload  Name | Type | TPut  IOPS | Effective Capacity (TiB) | Cold  Data  % | Proto col | Read  Laten cy(MS) | Rand Read | Rand Write | Seq  Read | Seq  Write | Rand  Read | Rand  Write | Seq  Read | Seq  Write | Working  Set % |
| workload 1 | Custom | 1,000.00 IOPS | 10.00 | N/A | NFS | 20 | 70 | 30 | 0 | 0 | 4 | 4 | 32 | 32 | 5 |

## Workload Aggregate Assignments

|  |  |  |  |
| --- | --- | --- | --- |
| **Node** | **Aggregate** | **Workload** | **Workload Type** |
| **netapp1** | **netapp1\_aggr1** | **workload 1** | **custom** |

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