



# NetApp Solution Technical Report

Manually Designed Solution

Report Generated:

19-Mar-2025

**Project ID:**

157dd848

TABLE OF CONTENTS

**1 Business Requirements..... 3**

**2 Solution Summary ..... 4**

2.1 Proposed Solution Summary .....4

**3 Solution Details..... 5**

3.1 System Details .....5

3.2 Environmental Details .....6

3.3 Storage Availability Zone: netapp1/netapp2.....7

3.4 Storage Availability Zone .....9

3.5 Workload Descriptions .....10

**4 Environmental Certifications ..... 11**

4.1 Statements & Certifications .....11

**5 Copyright ..... 12**

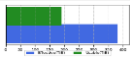
# 1 Business Requirements

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

## 2 Solution Summary

### 2.1 Proposed Solution Summary

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

| THROUGHPUT   | RAW CAPACITY   | STORAGE EFFICIENCY***   |
|--|--|---|
| 300,000 IOPS / 4,687.50 MB/s   | 261.12 TB  | 2 : 1   |
| AVERAGE UTILIZATION  | USABLE CAPACITY  | EFFECTIVE CAPACITY***   |
| 40%  | 191.62 TiB (210TB)                                       | 383.2468 TiB  |
| MAXIMUM THROUGHPUT*  | RAW CAPACITY HEADROOM**                                  | USABLE VS EFFECTIVE   |
| 721,620 IOPS / 11,275.31 MB/s  | 107.52 TB  |  191.62 TiB<br>383.2468 TiB  |
| *assumes best practice configuration of aggregates and workload to aggregate mapping | **assumes future expansion using drives of same capacity | ***assumes use of storage efficiency technologies like compression and deduplication<br><br>***Lowest efficiencies have been applied to unused capacity within the cluster. |

Note:Usable and effective capacity is calculated and reported in base-2 format which aligns with values reported in ONTAP CLI, Storage Manager, and Unified Manager. It should be noted that ONTAP CLI displays base-2 capacity values, but labels these values using base-10 descriptors (e.g. GB/TB/PB).

| CONFIGURATION     |                  |                       |     | ENVIRONMENTAL  |            |
|-------------------|------------------|-----------------------|-----|----------------|------------|
| Model:            | ASA A90A         | OnboardEthernetPorts: | 0   | Rack Units:    | 4 U        |
| Nodes:            | 2                | Onboard UTA2Ports:    | 0   | System Weight: | 118.00 lbs |
|                   |                  |                       |     | AC Power:      | 2309.27 W  |
| Total Drives:     | 34               | OnboardSASPorts:      | 0   | Current Draw:  | 13.08 A    |
| Drive Type:       | 7.68 TB NVMe SSD | Expansion Slots:      | 18  | BTU/hr:        | 7881.31    |
| Cluster Switches: | N/A              | StgeSwitches:         | N/A |                |            |

### 3 Solution Details

#### 3.1 System Details

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

cluster1: netapp1/netapp2

| Bill Of Materials          |                                    |              |             | Total |
|----------------------------|------------------------------------|--------------|-------------|-------|
|                            | Description                        |              | Part Number | Qty   |
| Systems                    |                                    |              |             |       |
|                            | ASA A90A w/ 34x7.68TB NVMe SSD SED | 9.16.1 ONTAP | X4027A      | 1     |
|                            | Grand Total                        |              |             | 1     |
| Storage                    |                                    |              |             |       |
|                            | Grand Total                        |              |             | 0     |
| Adapter Cards/ Flash Cache |                                    |              |             |       |
|                            | Grand Total                        |              |             | 0     |

### 3.2 Environmental Details

Line Voltage: 220

| 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     |
| ASA A90A w/ 34x7.68 TB NVMe SSDX4027A( 2xControllers, 1xChassis) | 1   | 4          | 13.08          | 17.65 | 2,309.27         | 3,481.59 | 2,430.81      | 3,664.83 | 7,881.31                | 11,882.33 | 20,242.63        | 30,518.97 |
| Total  | 1   | 4          | 13.08          | 17.65 | 2,309.27         | 3,481.59 | 2,430.81      | 3,664.83 | 7,881.31                | 11,882.33 | 20,242.63        | 30,518.97 |

Median Power Usage

| System Components   | Qty | Median Current (Amps) | Median AC Power (Watts) | Median AC Power (VA) | Median Thermal Rating (BTU/hr) | Median Power (kWh/year) |
|---|-----|-----------------------|-------------------------|----------------------|--------------------------------|-------------------------|
| ASA A90A w/ 34x7.68 TB NVMe SSDX4027A(2xControllers, 1xChassis) | 1   | 13.08                 | 2,309.27                | 2,430.81             | 7,881.31                       | 20,242.63               |
| Total   | 1   | 13.08                 | 2,309.27                | 2,430.81             | 7,881.31                       | 20,242.63               |

Note: Median power is based on actual power numbers reported by install base systems of similar configuration and represent the midpoint where half of the similar configurations consume less power and the other half consume more power. Typical and Worst-case power numbers are calculated based on product specifications and spot checked for accuracy. Typical power values are used when median power values are not available.

### 3.3 Storage Availability Zone: netapp1/netapp2

The information below provides details on the layout of the physical storage of proposed systema and allocation of capacity.

| RAID Group | Devices         | Total | Data | Parity | Spare |
|------------|-----------------|-------|------|--------|-------|
| raidgroup1 | 7.68TB NVMe SSD | 24    | 22   | 2      | 0     |
| raidgroup2 | 7.68TB NVMe SSD | 9     | 7    | 2      | 0     |
| Spare      | 7.68TB NVMe SSD | 1     | 0    | 0      | 1     |
|            |                 | 34    | 29   | 4      | 1     |

|        | Capacity (TiB) <sup>1</sup> | Capacity (TB) <sup>2</sup> | Percentage (%) |
|--------|-----------------------------|----------------------------|----------------|
| Usable | 191.62                      | 210.69                     | 80.71%         |
| Root   | 0.75                        | 0.82                       | 0.32%          |
| WAFL   | 10.13                       | 11.14                      | 4.27%          |
| Parity | 27.94                       | 30.72                      | 11.77%         |
| Spare  | 6.98                        | 7.67                       | 2.94%          |
| Total  | 237.42                      | 261.05                     | 100.0%         |

- Capacity values reported in this column are in base-2 format which aligns with values reported in ONTAP command line and System Manager.
- Capacity values reported in this column are in base-10 format and will not match any values reported by ONTAP. Those are provided for convenience only.



### 3.4 Storage Availability Zone

| Zone   | Workloads        | Workload Type | Ratio | Storage Availability Usage | Usable (TiB) | Effective (TiB) |
|--------|------------------|---------------|-------|----------------------------|--------------|-----------------|
| Zone 1 | workload 1 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 2 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 3 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 4 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 5 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 6 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |

### 3.5 Workload Descriptions

|                  |        |                |                          |             |          |                   | IO Percentages |            |          |           | IO Block Sizes (KB) |            |          |           |              |
|------------------|--------|----------------|--------------------------|-------------|----------|-------------------|----------------|------------|----------|-----------|---------------------|------------|----------|-----------|--------------|
| Workload Name    | Type   | TPut IOPS      | Effective Capacity (TiB) | Cold Data % | Protocol | Read Latency (MS) | Rand Read      | Rand Write | Seq Read | Seq write | Rand Read           | Rand Write | Seq Read | Seq Write | Working Set% |
| workload 1 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 16                  | 16         | 64       | 64        | 5            |
| workload 2 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 16                  | 16         | 64       | 64        | 5            |
| workload 3 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 16                  | 16         | 64       | 64        | 5            |
| workload 4 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 16                  | 16         | 64       | 64        | 5            |
| workload 5 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 16                  | 16         | 64       | 64        | 5            |
| workload 6 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 16                  | 16         | 64       | 64        | 5            |

## 4 Environmental Certifications

### 4.1 Statements & Certifications

- [Environmental Policy and Certifications](#)
- [US TSCA PBT Substances Declaration](#)
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- [European Union WEEE and Battery Statement](#)
- [E-waste Program](#)
- [ISO 14001:2015 Certificate](#)
- [European Union REACH Article Notifications - Cords and Cables](#)
- [China RoHS Compliance Statement](#)
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- [European Union REACH Compliance Statement](#)

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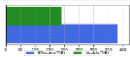
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| AVERAGE UTILIZATION  | USABLE CAPACITY  | EFFECTIVE CAPACITY***   |
| 51%  | 191.62 TiB (210TB)                                       | 383.2468 TiB  |
| MAXIMUM THROUGHPUT*  | RAW CAPACITY HEADROOM**                                  | USABLE VS EFFECTIVE   |
| 558,941 IOPS / 17,466.91 MB/s  | 107.52 TB  |  <div>191.62 TiB<br/>383.2468 TiB</div>  |
| *assumes best practice configuration of aggregates and workload to aggregate mapping | **assumes future expansion using drives of same capacity | ***assumes use of storage efficiency technologies like compression and deduplication<br><br>***Lowest efficiencies have been applied to unused capacity within the cluster. |

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## 3 Solution Details

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|                            | Grand Total                        |              |             | 1     |
| Storage                    |                                    |              |             |       |
|                            | Grand Total                        |              |             | 0     |
| Adapter Cards/ Flash Cache |                                    |              |             |       |
|                            | Grand Total                        |              |             | 0     |

### 3.2 Environmental Details

Line Voltage: 220

| 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     |
| ASA A90A w/ 34x7.68 TB NVMe SSDX4027A( 2xControllers, 1xChassis) | 1   | 4          | 13.08          | 17.65 | 2,309.27         | 3,481.59 | 2,430.81      | 3,664.83 | 7,881.31                | 11,882.33 | 20,242.63        | 30,518.97 |
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| raidgroup2 | 7.68TB NVMe SSD | 9     | 7    | 2      | 0     |
| Spare      | 7.68TB NVMe SSD | 1     | 0    | 0      | 1     |
|            |                 | 34    | 29   | 4      | 1     |

|        | Capacity (TiB) <sup>1</sup> | Capacity (TB) <sup>2</sup> | Percentage (%) |
|--------|-----------------------------|----------------------------|----------------|
| Usable | 191.62                      | 210.69                     | 80.71%         |
| Root   | 0.75                        | 0.82                       | 0.32%          |
| WAFL   | 10.13                       | 11.14                      | 4.27%          |
| Parity | 27.94                       | 30.72                      | 11.77%         |
| Spare  | 6.98                        | 7.67                       | 2.94%          |
| Total  | 237.42                      | 261.05                     | 100.0%         |

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### 3.4 Storage Availability Zone

| Zone   | Workloads        | Workload Type | Ratio | Storage Availability Usage | Usable (TiB) | Effective (TiB) |
|--------|------------------|---------------|-------|----------------------------|--------------|-----------------|
| Zone 1 | workload 1 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 2 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 3 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 4 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 5 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |
| Zone 1 | workload 6 - 50k | custom        | 2:1   | 1.00%                      | 2.00         | 4.00            |

3.5 Workload Descriptions

|                  |        |                |                          |             |          |                   | IO Percentages |            |          |           | IO Block Sizes (KB) |            |          |           |              |
|------------------|--------|----------------|--------------------------|-------------|----------|-------------------|----------------|------------|----------|-----------|---------------------|------------|----------|-----------|--------------|
| Workload Name    | Type   | TPut IOPS      | Effective Capacity (TiB) | Cold Data % | Protocol | Read Latency (MS) | Rand Read      | Rand Write | Seq Read | Seq write | Rand Read           | Rand Write | Seq Read | Seq Write | Working Set% |
| workload 1 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 32                  | 32         | 64       | 64        | 5            |
| workload 2 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 32                  | 32         | 64       | 64        | 5            |
| workload 3 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 32                  | 32         | 64       | 64        | 5            |
| workload 4 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 32                  | 32         | 64       | 64        | 5            |
| workload 5 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 32                  | 32         | 64       | 64        | 5            |
| workload 6 - 50k | Custom | 50,000.00 IOPS | 4.00                     | N/A         | FCP      | 1                 | 70             | 30         | 0        | 0         | 32                  | 32         | 64       | 64        | 5            |

## 4 Environmental Certifications

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- [European Union WEEE and Battery Statement](#)
- [E-waste Program](#)
- [ISO 14001:2015 Certificate](#)
- [European Union REACH Article Notifications - Cords and Cables](#)
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