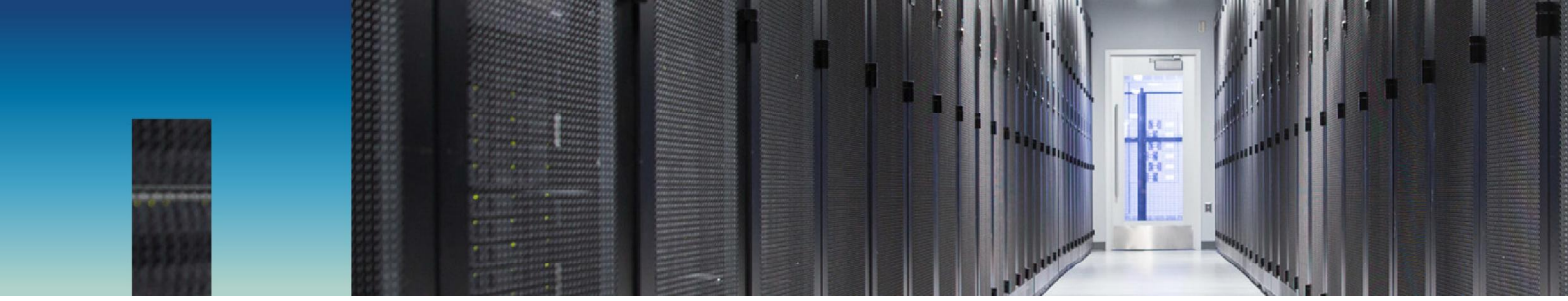

# NetApp Virtual Storage Portal

## User Guide

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### Support

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# 1 Introduction

Virtual Storage is an enterprise-class storage-as-a-service solution with advanced data management capabilities. It is composed of NetApp hardware and supported end-to-end by NetApp, including service assurance activities. The Virtual Storage service allows you to extend your data environment to the cloud to leverage NetApp storage and advanced data management functions.

You can manage storage and perform administration tasks using the web-based NetApp Virtual Storage Portal. The portal provides an environment for you to provision and self-manage virtual storage arrays (also known as storage virtual machines, vFAS or storage servers ) and the containing storage units.

After storage arrays have been created, storage units (Essential configuration) can be accessed and storage servers (Premium configuration) can be managed and accessed directly.

Telstra provides you with credentials to log in to the Virtual Storage portal based on the subscription and services you choose.

This guide provides you with instructions on how to manage and perform storage administration via the portal.

It does not provide information on procuring your user credentials, enabling a subscription nor network connectivity to the Telstra environment, including details on the prerequisite for this service: a Virtual Storage service connection to Telstra's Cloud Gateway.

This guide assumes that you already know how to manage storage systems.

This guide does not provide field-level instructions – these are displayed on the portal user interface for you to follow.

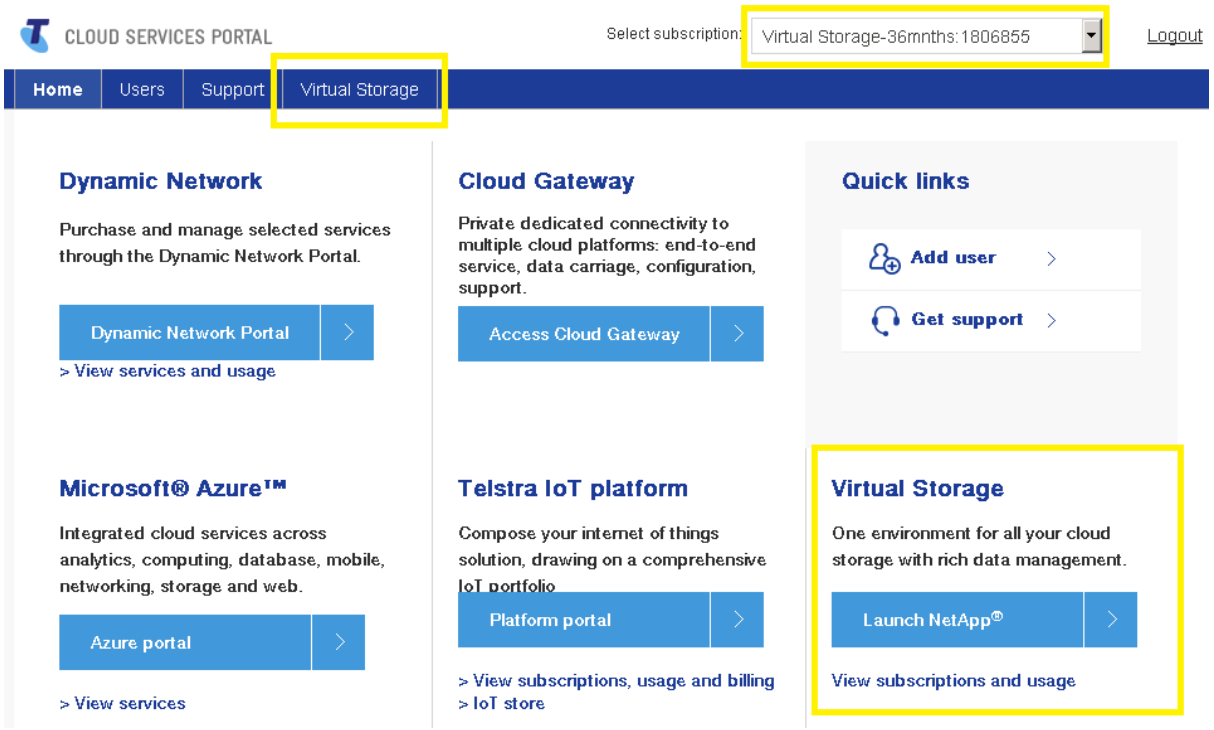
# 2 Accessing the Virtual Storage portal

You'll receive direct access to the NetApp Virtual Storage portal once you purchase a Virtual Storage plan on Telstra's Cloud Services Store.

Once your purchase is complete, there are two ways you can directly launch your access to this portal:

1. Use the link provided in your Virtual Storage purchase confirmation email
2. Log in to Telstra's Cloud Services Portal (where you manage all your Telstra cloud services) and select **Launch NetApp®** on the Virtual Storage tile.

**Figure 1 Telstra's Cloud Services Portal home page**



# 3 Portal main menu

The main menu options on the Virtual Storage portal are:

- **Administration**,– to help you:
  - Validating **User** and **Subscription** details for your account
  - Create and validate **Subtenants**
  - View **Jobs** and **Notifications**

- **Storage Management** – to create and manage **Storage Arrays, Storage Groups, Storage Units** and inter-cluster relationships (**ICR**)

- **Reports** – to view usage reports for your account

- **Support** – access online help, this user guide and the **User API Guide** for the end user APIs of the Virtual Storage portal

- **Dashboard**, accessed by clicking on the NetApp logo on the top left of the web page, to view performance and capacity data graphically

**Figure 2. NetApp's Virtual Storage portal**

# 4 Administration

## 4.1 Users

Users can only be added and managed via the Telstra Cloud Services Portal. This information is automatically sent to the Virtual Storage portal.

**Note:** You cannot delete user accounts directly from the Virtual Storage portal.

While user accounts are managed in Telstra's Cloud Services Portal, whoever purchased the Virtual Storage service can manage the types of Virtual Storage roles in NetApp's Virtual Storage portal, changing an **admin** to a **user** or **read-only** role at any time.The three types of users:

- **Admin** – assigned to all Telstra cloud customers by default: has permission to create, modify and delete virtual storage arrays, storage groups and storage units.
- **User** – has permission to create, modify and delete storage groups and storage units and will have read-only permission for virtual storage arrays.

  **Read** – has read-only permission for virtual storage arrays, storage groups and storage units. Users are assigned this role based on request.

### List and view user details

1. Click **Administration > Users > List Users**

   User account details that are configured on Telstra's Cloud Services Portal are also displayed on the NetApp Virtual Storage portal.
2. To view user details, click **Details** on the users window.

### Edit user details

You can use this capability to modify the following user details:

- First name, Last name
- Email
- Phone
- Role

**Note:** User credentials are managed on Telstra's Cloud Services Portal and cannot be changed on the Virtual Storage portal.

**Steps**

1. To validate details of users, click **Administration > Users > List Users**

   User account details that are configured on Telstra's Cloud Services Portal are also displayed on the NetApp Virtual Storage portal.
2. Click **Details** on the users window. Select **Edit** on the user details screen.
3. Update details and select **Update** to save changes.

## 4.2 Subscription

Subscriptions can only be created, modified and deleted on Telstra's Cloud Services Portal. On the Virtual Storage portal you can list and view details of all subscriptions associated with your account.

**List and view subscription details**

You can view the subscription details that are linked to your account. All subscriptions are associated to only one location.

1. Click **Administration > Subscriptions > List Subscriptions**.
2. To view subscription details, click **Details** on a subscription.

## 4.3 Subtenants

You can use the subtenancy capability to separate billing information into different departments or subsets of billing entity.

**Create subtenants**

- All users are provided with the **default** subtenant.
- All users who are part of the default subtenant will have an **Admin** role.
- Organisations with multiple entities can group their users under different subtenants so that storage array access can be restricted to select employees within the organisation.

1. Select **Administration** from the main menu.
2. Go to **Subtenants** and select **Create Subtenant**
3. On the **New Subtenant** page, specify the following information to create a subtenant
   - Name
     (E.g. Human Resources and Organisation)
   - Code
     (a short name featuring in the subtenant's names on the storage system)

**List, view and edit subtenant details**

You can use this capability to validate the subtenants created.

1. Click **Administration > Subtenants > List Subtenants**.
2. The list of subtenants (along with their codes) will be displayed.
3. To view detailed information about the subtenants, click **Details.**
4. Admin users can edit the subtenant name by clicking **Edit**. Rename the subtenant by entering the new name in the **Name** field. Click **Update**.

## 4.4 Jobs

You can use **Jobs** to track creation, deletion and updates to tasks that have been executed on the portal. You can also view the completed and failed **Jobs** in this section.

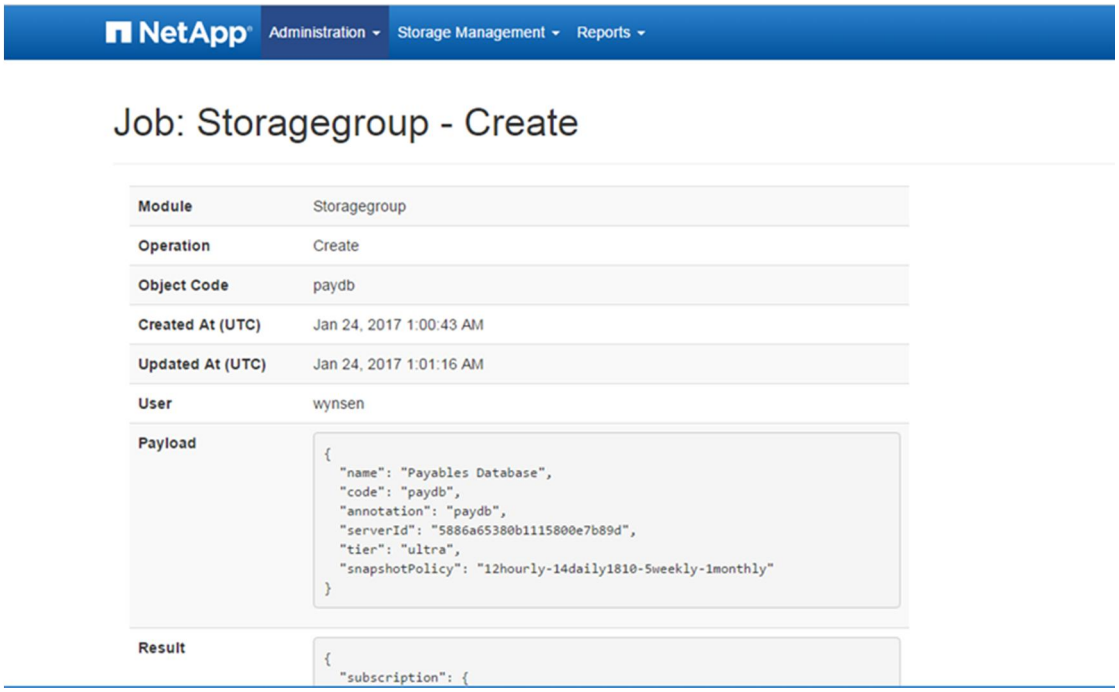
**Note:** The time displayed is in UTC. The time zone cannot be changed.

**Validate job details**

You can use this capability to determine which jobs are in process, completed and/or have failed.

1. To list all **Jobs**, click **Administration > Jobs > List Jobs.**
2. To view the details of a **Job** click on '**Details**' button.

Figure 3 Job details




## 4.5 Notifications

You can view maintenance notifications and other messages on the portal.

**Note:**

- Check this section regularly for latest technical updates.
- Time is displayed in UTC.

### View notifications

Here you'll find notifications from NetApp Managed Services regarding maintenance or activities that will be performed on the backend devices.

1. To view notifications, click **Administration > Notifications > List Notifications**.
2. A list of notifications will be displayed, along with the summary, start date, category and status information.
3. To view details of the notification, click **Details**.
4. Click **OK** to mark the notification as READ.

# 5 Storage management

## 5.1 Storage arrays

The storage lifecycle begins with storage arrays (also known as storage virtual machines or storage servers), which allow you to create Storage Groups and Storage Units.

### Create a storage array

Storage arrays can be created only by users with the admin role on the Virtual Storage portal.

1. Click **Storage Management > Storage Arrays > Create Storage Arrays**.
2. Enter all the mandatory information.
3. Contact Telstra for network-related information such as subnet IP and Cloud Gateway IP.
4. It is always recommended to select subnet /26 to have an optimal IP address range available for each Storage Array.
5. Make sure you select the correct **Site.** Site information is important to provision storage groups and storage units.
6. Select the **Subtenant** and **Subscription** fields as per your requirement.
7. You can select either the **Essential** or **Premium** configuration type. This allows users with the Admin role to manage the storage lifecycle using the NetApp Virtual Storage portal.

   Please see sections on *Essential Configuration Storage Array* and *Premium Configuration Storage Array* below for more information.
8. Once all these details are provided, click **Create**, which will take up to 15 minutes to complete.

The storage array is listed in the List View. Status is set to *Creating* and changes to *Operational* once the storage array is created.

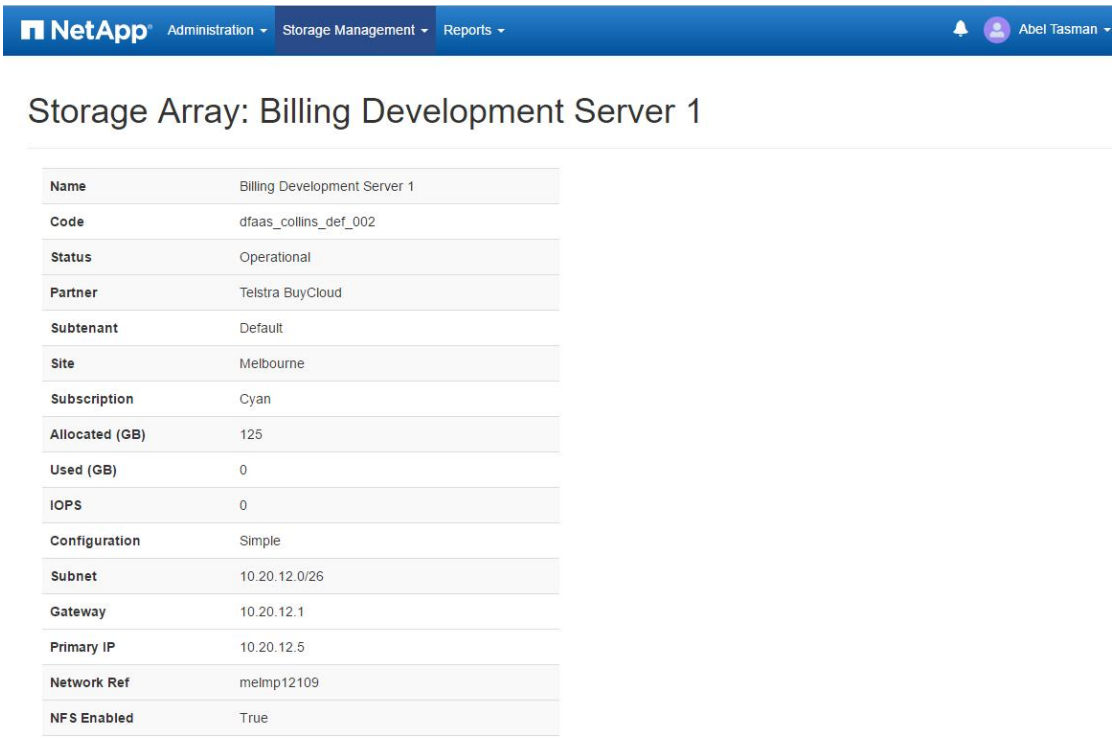
**Note:**

- Protocols are not enabled by default in storage arrays. Please see section on *Enabling Protocols on a Storage Array* in this document for more information.

**View storage array details**

1. Click **Storage Management > Storage Arrays > List Storage Arrays**.All storage arrays that are provisioned in your environment will be displayed.
2. To view detailed information about the storage array, click **Details**.

Figure 4 Storage array details




## 5.2 Essential configuration – storage array

You can select the configuration type as **Essential** if you need storage management to be performed from the Virtual Storage portal.

- Essential configuration promotes ease of management with storage configured as per best practices for versatility, performance and reliability.
- Storage groups and storage units can be rapidly configured via the Virtual Storage portal.
- Essential configuration allows for storage to be managed only via the \Virtual Storage portal.

## 5.3 Premium configuration – storage array

**Premium configured storage array** allows customised storage management. These storage arrays can be managed through standard NetApp applications. The XXX management address in the virtual storage array is the reference IP address that is entered in replacement of the hardware cluster IP address.

The following tools have been tested to work with a premium service, although all NetApp plugins and tools are expected to work seamlessly with the Virtual Storage service.

- OnCommand System Manager 3.1 – documentation on the usage and setup can be found at : https://library.netapp.com/documentation/productlibrary/index.html?productID=61372
- OnCommand Unified Manager for Clustered Data ONTAP - documentation on the usage and setup can be found at : https://library.netapp.com/documentation/productlibrary/index.html?productID=61373
- OnCommand Cloud Manager 3.2 – documentation on the usage and setup can be found at : https://library.netapp.com/documentation/productlibrary/index.html?productID=61906
- Alternatively Premium Virtual Storage can be managed through SSH in the same way as traditional NetApp ONTAP appliance via the XXX Managment address. Documentation on the command line reference guides as well as numerous guides on CIFS, NFS and iSCSI configuration can be found at ONTAP 9.1 reference documentation at: https://library.netapp.com/documentation/productlibrary/index.html?productID=62286

**Also note:**

- You must enter an 8-digit alphanumeric password as one of the inputs for an advanced storage array creation.
- Inter-cluster relationships can be requested to set up replication with cDOT storage systems outside of Virtual Storage, facilitating disaster recovery and data migration operations
- You can log in to the cluster using the cluster IP address and admin credentials (password is entered during storage array creation).
- You can also use “vsadmin” and the password provided during storage array creation to manage storage arrays.
- NetApp’s Managed Services team are not responsible for any additional storage management.
- You can use the IP address in the **“.5”** subnet range to connect to storage array usage tools such as SSH, System Manager, OCUM and OPM.
- System Manager is accessed using transport protocol **https** or port **443**.
- You can log in with the default username “**vsadmin**” and **password**, provided during Storage Array creation.
- Communication between the cluster and storage array happen with ZAPI.
- You will be prompted with pre-defined error messages when accessing certain information like Disk, Disk Shelf, RAID-DP structure etc.
- Once a storage array is given a premium configuration, it can no longer be managed via the Virtual Storage portal.

**Related references**

- OnCommand System Manager 3.1 - documentation on usage and setup can be found at: https://library.netapp.com/documentation/productlibrary/index.html?productID=61372
- OnCommand Unified Manager for Clustered Data ONTAP 7.1 - documentation on usage and setup can be found at: https://library.netapp.com/documentation/productlibrary/index.html?productID=61373
- OnCommand Cloud Manager 3.2 - documentation on usage and setup can be found at: https://library.netapp.com/documentation/productlibrary/index.html?productID=61906
- Documentation on the command line reference guides plus numerous guides on CIFS, NFS and iSCSI configuration can be found at ONTAP 9.1 reference documentation at: https://library.netapp.com/documentation/productlibrary/index.html?productID=62286

## 5.4 Enable protocols on a storage array

Enabling iSCSI functionality will configure IP SAN addresses on the storage server for iSCSI communications.

Enabling NFS will configure the default NFS server parameters.

Further customisation of a CIFS, NFS or iSCSI server will require a support case to be opened. This is due to the variety of solutions and interdependencies of each protocol's server configuration parameters.

Disabling CIFS, NFS or iSCSI functionality is not available through the portal; instead a support case can be opened.

- e.g. ou=Promotions,ou=Marketing,dc=noam,dc=reskit,dc=com

The CIFS domain, organisational unit (OU), site, username and password need to exist in your Active Directory.

The NetBios name either needs to:

- Be available for computer account creation with an authorised username .
- Have a computer account pre-created with an authorised username.

**Related references**

Naming conventions for NetBios and site names:https://support.microsoft.com/en-au/kb/909264

The naming convention of a CIFS OU:https://technet.microsoft.com/en-us/library/cc977992.aspx

**Enabling NFS, CIFS and iSCSI**

**Steps:**

1. To edit storage array properties such as protocols, select **Storage Management > Storage Arrays > List Storage Arrays > Edit**.
2. Provide mandatory information requested on the portal to enable protocols
3. Click **Update**

## 5.5 Storage groups

Storage groups (also known as NetApp volumes) are used to create storage units.

You can create up to 20 storage groups (NetApp volumes) per storage array.Thin provisioning is the default option for storage group creation.

A quality of service (QoS) policy is applied to a storage group based on the tier you select while creating it.

Within a storage group, you can select a storage tier depending on your business needs.

You can also enable a snapshot policy for each storage group. Snapshots serve as backup for the data that is contained in a storage group.A snapshot policy enables instantaneous backups to be created on the storage system.

A combination of hourly, daily, weekly and monthly schedules and retention periods can be selected.

**Note:** snapshots/backups cannot be kept for more than five weeks.

**Create a storage group**

1. Click **Storage Management > Storage Groups > Create Storage Groups**

2. Enter valid information against each mandatory field mentioned below.
    - **Name:** Enter a user-friendly name that's unique to the storage array.
    - **Code:** Enter the name of the volume that will be used at the backend during storage group creation. The storage group code should be unique in the storage array. .
    - **Storage array:** Select the array in which the storage group will be created.
    - **Tier:** Select an appropriate tier for your usage.

      **Annotation field** (optional): Information that can be used as hard reference to Configuration Management Database (CMDB).
3. Select the **Enable Snapshot Policy** option.
4. Select the snapshot schedule from the drop-down list.
    - A combination of hourly, daily, weekly and monthly schedules and retention periods can be selected.
    - You can choose the schedule for **Daily snapshots** as per your needs.
        - Select **Daily** to choose the number of days to retain the snapshot.
        - Select the box with **@** to choose what time you'd like the daily snapshot taken.
    - **Hourly snapshots** are created at 5 minutes past the hour.
    - **Weekly snapshots** are created at 00:15 every Sunday.
    - **Monthly snapshots** are created at 00:00 on the first day of every month.

    **Note:** Times are in AEST.
5. Click **Create** to finish creating the storage group.

**View storage group details**

1. Click **Storage Management > Storage Groups > List Storage Groups**.
2. To view detailed information about each Storage Group, click **Details.**

**Modify a storage group**

1. Click **Storage Management > Storage Groups > List Storage Groups**> **Edit**.
2. You can modify the **Name**, **Annotation**, **Tier** and **Enable Snapshot Policy** fields.
3. Click **Update**.

**Delete a storage group**

1. Click **Storage Management > Storage Groups > List Storage Groups**
2. Click **Details** to view complete information about the storage group.
3. Click **Delete**.
4. Review the **Note** section carefully before deleting a storage group. Click **OK** to proceed.

## 5.6 Snapshots

**Create manual snapshots**

1. Click **Storage Management > Storage Groups > List Storage Groups**.
2. Click **Details** to view Storage Group details.
3. Click **Create Snapshot** to create manual snapshots.

**List snapshots**

1. Click **Storage Management > Storage Groups > List Storage Groups**.
2. Click **Details** to view storage group details.
3. Click **List Snapshots**.

**Delete snapshots**

1. To manually delete the snapshots in each storage group, click **Storage Management > Storage Groups > List Storage Groups**.
2. Click **Details** to view storage group details.
3. Click **List Snapshots**.
4. **Delete** each snapshot you want removed.

## 5.7 Storage units

Storage units are the logical component of a storage lifecycle used by the client/host (i.e. NetApp Qtree or LUN) related to access control, size (presented to the client) and protocol (CIFS, NFS or iSCSI). A storage unit can be of type **CIFS, NFS** or **ISCSI**.

**Create storage units**

1. To create a storage unit, click **Storage Management > Storage Units > Create Storage Units**.
2. Enter details against each mandatory field.
   - Name: choose a user-friendly name for your reference in the portal; it has to be unique to the storage group.
   - Code: name of the NetApp NFS Export, CIFS share or iSCSI LUN on the storage system. The code has to be unique in the storage group.
   - Size: presented size of the NFS Export, CIFS Share or iSCSI LUN.
   - Storage array: where the storage unit will reside.
   - Storage group: where the storage unit will reside.
   - Protocol: via which the storage unit will be accessed.

**Accessing the NFS protocol**

You see an additional **Access Control List** field to enter details of the client IP address/host name (comma separated). This allows you to access the storage unit.

**Accessing iSCSI protocol**

You see additional fields such as **Access Control List**, **Operating System & LUN Type** and **LUN ID** (optional).

- Access Control List: Client IP address/host name to which mount permissions are granted.
- Operating System & LUN Type: Select which apply.
- LUN ID: This field is optional. By default, the storage system selects the next available LUN ID.

**View storage units**

1. To view the storage units and their corresponding storage array and storage group, click **Storage Management > Storage Units > List Storage Units**.
2. To view detailed information about the storage units, click **Details**.

**Modify storage units**

1. Click **Storage Management > Storage Units > List Storage Units**. Click **Edit** corresponding to each storage unit.

2. You can edit the following fields of a storage unit.

- **Name**: choose a user-friendly name.
- **Size**
- **Access Control List** - **Add Access**: allows access to the subnet or IP addresses of the client or IQN in case of ISCSI protocol
- **Access Control List** - **Remove Access**: removes access to the existing access control list entry.

**Delete storage units**

1. Click **Storage Management > Storage Units > List Storage units.**
2. Click **Details** corresponding to each storage unit.
3. Click **Delete**.
4. Click **OK** to confirm deletion of the storage unit.

## 5.8 Inter-cluster relationship (ICR)

An inter-cluster relationship is only enabled for users with a premium configured storage array.

You can use this feature to establish peer relationships between two clusters at different sites and enable backup and recovery of data.

**Create an inter-cluster relationship**

1. To create a new inter-cluster relationship, click **Storage Management > ICR> Create Inter-Cluster Relationship**.
2. Enter details against each mandatory field.
    - Message: provides details to the NetApp Managed Services team to initiate configuration of an inter-cluster relationship between a NetApp storage array and an

external cluster.

- Storage array: under which the inter-cluster relationship is to be configured.
- External cluster: the name of the external cDOT cluster to which the inter-cluster relationship is to be configured.
- External inter-cluster IP addresses: the external cDOT cluster's inter-cluster IP addresses that interface with the storage array.

3. Click **Create**. This triggers an email to you and to the NetApp Managed Services team.
4. A NetApp Managed Services engineer manually establishes the cluster peering relationship with the information you provided.
5. The engineer will update the status of the relationship accordingly.
6. The engineer will contact you if there is any extra information required to proceed with establishing the cluster peering relationship.
7. You can configure storage array peering by accessing the cluster in the premium configured array.
8. The status of your request will be updated as it progresses. You can view its status at **Storage Management > ICR > List Inter-Cluster Relationship**.

**View an inter-cluster relationship**

1. Click **Storage Management > ICR > List Inter-Cluster Relationship**.
2. Click **Details** for full details of the relationship.

**Delete an ICR**

1. Click **Storage Management > ICR > List Inter-Cluster Relationship.**
2. Click **Details** corresponding to each storage array.
3. Click **Delete**.
4. Click **OK** to confirm and proceed with deletion of the ICR.

# 6 Reports

You can view up to 30 of the most recent daily reports for your tenancy. Reports can also be generated for a specific period when you specify a start and end date.

Daily reports for your tenancy can be downloaded as a .csv file, which contains the following columns:

- site – site code
- subscription – subscription code associated with the server or storage array
- tenant – tenant code
- subtenant – subtenant code
- server – server code (storage array code)
- volume – storage volume name
- tier – storage volume tier
- type – whether or not a volume is of type FlexVol
- capacity – storage volume capacity
- used – storage volume used
- date – date in ISO-8601 format i.e. YYYY-MM-DD
- capacityPerdayPercent - the percentage of the day the capacity billed was active
- capacityBilled - max(Capacity,Used)
- capacityBilledEffective - max(Capacity,Used) x capacityPerdayPercent

**Note:** Reports are generated daily at 6am AEST, for the previous day. The report is an average of hourly allocated capacity. If you are creating new volumes or changing the allocation of volumes, this is reflected in the report the following day.

**Steps:**

1. To view the 30 most recent daily reports, click **Reports > List Reports**.
2. You can also generate reports for a specific period. To do this, enter the start and end date and click **Search**. To download the report, click **Download**.

# 7 Dashboard

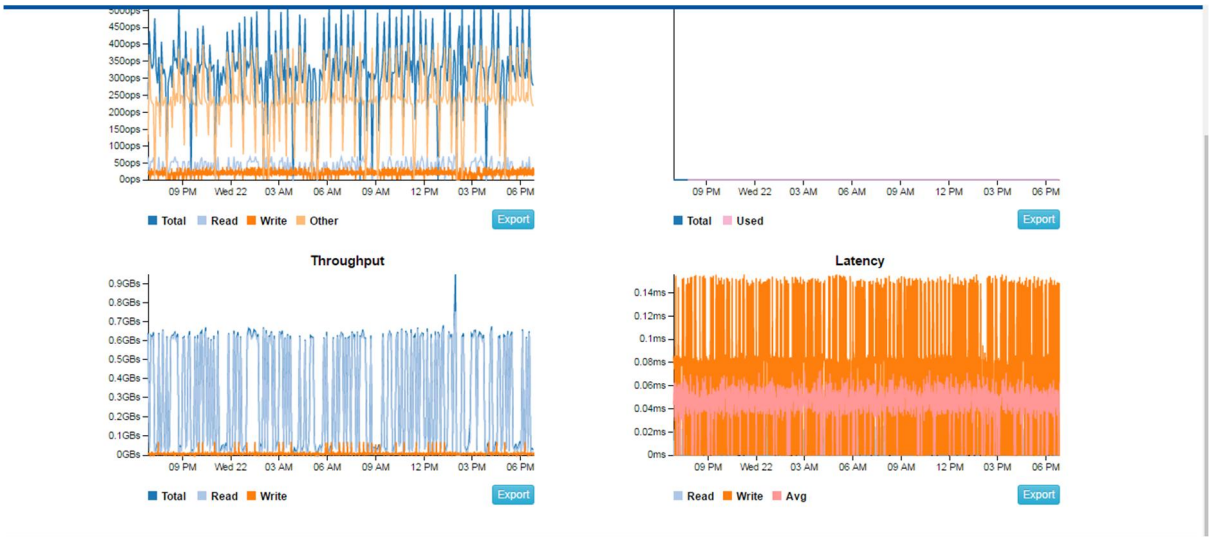
The dashboard is the home page of the Virtual Storage portal. To access the dashboard from other areas of the portal, click the NetApp logo on the main menu.

The dashboard shows the following information graphically:

- **IOPs** (input/output operations per second) – this graph contains information about input/output operations performed and mainly includes read, writes.
- **Capacity** – total and used capacity per unit of time.
- **Throughput** – of input/output operations performed per unit of time.
- **Latency** –on input/output operations in milliseconds per unit of time.

Data on each graph can be exported as a .csv file by selecting **Export**.

Figure 5 Dashboard




## 7.1 Generating graphs; applying filters

Graphs on the dashboard can be generated by applying the following available filters:

- **Year** – current year's data will be applied
- **Month** – current month's data will be applied
- **Week** – current week's data will be applied
- **Day** – current day's data will be applied
- **Hour** – current hour's data will be applied

### Customising graphs

The **Custom** option on the dashboard can be selected to apply the following options to your tenancy.

- **Site**
- **Subtenant**
- **Storage array**
- **Storage group**

**Note:** Each subsequent customisation option is populated depending on the previous selected option. If data is not available then the customisation option is disabled.