Introducing VJBOD Cloud
The block-based cloud storage gateway
Agenda

• Why Is There A Need To Back Up Data On The Cloud?
• The Issue About User Data Backup On The Cloud
• QNAP Solution-VJBOD Cloud Block-based Cloud Gateway
• VJBOD Cloud Block-based Cloud Gateway Application Scenario
• VJBOD Cloud Block-based Cloud Gateway Function Introduction
• Recommended Model

• VJBOD Cloud Block-based Cloud Gateway Application Scenario
• VJBOD Cloud Block-based Cloud Gateway Function Introduction
• Recommended Model
Why Is There A Need To Back up Data On The Cloud?

**Increased demand for integration of private and public cloud**

In recent years, as the security of public cloud space has increased, in many SMEs, local data that is expected to continue to grow can be backed up to the cloud for another data protection to prevent local storage devices from encountering disaster events.
The Issue About User Data backup On The cloud

- Is there any way I can use the custom protocol and don’t want to change the backup application to access the application service data?
- Is there any way to get the local application service on the cloud but keep the data to be identified and achieve the effect of data security protection?
- Is there any way to upload a large amount of data with a large file to the cloud and be more efficient?
VJBOD Cloud
Block-based Cloud Gateway
Introduction To The Overall Architecture And Advantages Of Block Cloud Gateway
VJBOD Cloud Block-based Cloud Gateway Architecture

QTS 4.4.1

File Services
- ISCSI (Ethernet)
- Fibre Channel
- Local Applications
- SMB
- NFS
- AFP
- FTP
- Web
- DAV
- Qsync

Local Disks/HDDs/SSDs
- Cloud LUN
  - Dedicate Local Stored Space (Local Stored mode)
  - Snapshot
  - Dedicate Local Stored Space (Local Stored mode)
  - Snapshot

Cache Engine

File Access

Cloud Storage
- Object Storage
- Snapshot

Object Storage Connector

Local Servers
- Customer File System

Client
- File Access

VJBOD Cloud Local stored Mode And Snapshot Restore Make Data Secure And Access Continuous

- VJBOD Cloud use the local stored mode, which means that data can be stored on the NAS and the data can be backed up to the cloud.
- The local stored space is paired with a cache engine that allows on-premise applications to access their entire database with low latency.
- The local stored space will be preset to be larger than the Cloud Volume/LUN space, and the extra space will store a snapshot of the automatic snapshot restore mechanism.
- Each Cloud Volume/LUN has a corresponding storage space (Stored space). In addition to storing snapshots, when the cloud is disconnected, data access is not interrupted.
Local Stored Mode Makes Backup Work Will Not Stop Because The Cloud Service Is Disconnected

- **Local Stored Mode**
  - The user uploads the data to the cloud because the VJBOD Cloud uses the Local Stored Mode method, and the data is stored in the local storage space (Local Stored Space).
  - You need to set the local storage space larger than the cloud disk area or LUN on the local device to avoid data corruption caused by abnormal cloud connection.
- **Provide data protection when the cloud service is disconnected or when the connection is unstable**
- **Backup work will not be stopped due to cloud service disconnection**
- **User access is not interrupted**
In The Event Of A Disaster, The NAS Is Damaged.
VJBOD Cloud Can Be Used On Another NAS
Block Cloud Gateway For Easy Backup Data

When a NAS is damaged (such as the A path), another NAS (such as the B path) can be used to connect to the cloud disk area and LUN established in the original cloud space by using the snapshot restore point, so that the local service application or The backup schedule continues, but since it is the previous snapshot restore point, it should be noted that there are still very few parts of the data window period.
When A Disaster Occurs
How To Use Another NAS To Migrate Data

Step 1.
At the time of the disaster
Found NAS damaged

Step 2.
Prepare another NAS to do service rescue

Step 3.
On the new NAS
Forced with cloud space cloud volume/LUN disconnection

Step 4.
In the new NAS, the cloud space will be connected back to the Cloud volume/LUN by using the snapshot restore point.
And reply to all the cloud space data in the local storage space, after the data transfer, you can continue the service or backup task.
VJBOD Cloud Local Stored Space
Local Storage Space With Cache Engine For Better Performance

Any cloud access will go through the local stored space in NAS.

- The local storage space is matched with the cache engine, which enjoys the write performance like local storage, and can store a copy of the local storage space.
- Local storage space can be full SSD, full HDD, HDD + SSD Cache or Qtier Tiered Storage.
Access Protocol Through VJBOD Cloud Block-based Cloud Gateway
No Burden On The Conversion Data

• VJBOD Cloud block cloud gateway, like a translator, can convert the cloud storage device interface to Cloud Volume/LUN.
• General corporate IT staff or users can access Cloud Volume through more familiar file access protocols (such as NFS, SMB, AFP FTP, WebDAV).
• Accessing Cloud LUNs using block-type access protocols (iSCSI, Fibre channel).
• Users can easily access data without changing the custom access protocol and without changing the backup application.
Support Up To Eleven Object Cloud Storage Service Space

Object Cloud Storage

- Amazon S3
- Azure
- BackBlaze
- HuaWei Cloud
- IBM Cloud Object Storage
- Wasabi Cloud Storage
- Alibaba Cloud
- HKT
- Google Cloud Storage
- OpenStack
- RackSpace
# Introduction to Object Cloud Storage

<table>
<thead>
<tr>
<th></th>
<th>Wasabi Cloud Storage</th>
<th>Microsoft Azure Storage</th>
<th>Alibaba Cloud Object Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price plan</strong></td>
<td>Unlimited Egress Pricing Plan</td>
<td>LRS Hot</td>
<td>Standard Storage (US East)</td>
</tr>
<tr>
<td><strong>Cloud storage fee</strong></td>
<td>$0.0059/GB/month</td>
<td>$0.0184/GB/month</td>
<td>$0.0185/GB/month</td>
</tr>
<tr>
<td><strong>Feature</strong></td>
<td>Fast</td>
<td>integrating them with Azure Active Directory (AD)</td>
<td>Integrated with comprehensive extract, transform, and load (ETL) services</td>
</tr>
<tr>
<td></td>
<td>No API request charges</td>
<td>Achieve more with open source on Azure</td>
<td>Minimum guaranteed service availability of 99.9%</td>
</tr>
<tr>
<td></td>
<td>Quick uploads &amp; downloads</td>
<td>including 70+ compliance certifications</td>
<td>Cross-region replication and remote disaster recovery</td>
</tr>
</tbody>
</table>
Object Cloud Storage Ranking

- At present, the top cloud service providers in the market share, VJBOD Cloud block-based cloud gateways have support.
- If the user has multiple cloud services, the VJBOD Cloud block-based cloud gateway can be used as a relay station for multiple cloud services.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon</td>
<td>15,495</td>
<td>47.8</td>
<td>12,221</td>
<td>49.4</td>
<td>26.8</td>
</tr>
<tr>
<td>Microsoft</td>
<td>5,038</td>
<td>15.5</td>
<td>3,130</td>
<td>12.7</td>
<td>60.9</td>
</tr>
<tr>
<td>Alibaba</td>
<td>2,499</td>
<td>7.7</td>
<td>1,298</td>
<td>5.3</td>
<td>92.6</td>
</tr>
<tr>
<td>Google</td>
<td>1,314</td>
<td>4.0</td>
<td>820</td>
<td>3.3</td>
<td>60.2</td>
</tr>
<tr>
<td>IBM</td>
<td>577</td>
<td>1.8</td>
<td>463</td>
<td>1.9</td>
<td>24.7</td>
</tr>
<tr>
<td>Others</td>
<td>7,519</td>
<td>23.2</td>
<td>6,768</td>
<td>27.4</td>
<td>11.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32,441</strong></td>
<td><strong>100.0</strong></td>
<td><strong>24,699</strong></td>
<td><strong>100.0</strong></td>
<td><strong>31.3</strong></td>
</tr>
</tbody>
</table>

Source: Gartner (July 2019)
VJBOD Cloud
Block-based Cloud Gateway Advantage

• VJBOD Cloud cuts the uploaded file into blocks, which cannot be read in the cloud, and can be used to identify the data.

• The block-based VJBOD Cloud is suitable for transferring a large number of small files and a single large file to the cloud, because only the modified blocks (variables) will be uploaded in the future, reducing the amount of cloud transmission and reducing the cloud expenditure cost.

• If the enterprise does a daily database backup, it will only back up the modified blocks (variables), no need to back up the entire database, and speed up the backup time.
VJBOD Cloud
Block-based Cloud Gateway Benefits

• Data Identification, Excellent Data Security Protection
• The Local Storage Mode Allows The Data To Be Accessed Continuously When The Cloud Service Is Disconnected, And The Backup Work Is Not Stopped.
• Snapshot Protection Mechanism, Data Security Is Guaranteed
• Local Storage Space With Cache Engine For Better Performance
• Reduce Cloud Traffic
• Reduce Enterprise Cloud Space Expenditure Costs
• Low Latency And Faster Backup Time
• IT Staff Can Easily Install And Set Up
# VJBOD Cloud VS HybridMount

<table>
<thead>
<tr>
<th></th>
<th>HybridMount</th>
<th>VJBOD Cloud</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support cloud storage</td>
<td>20 (Object Storage and File Storage)</td>
<td>11 (Object Storage)</td>
</tr>
<tr>
<td>Gateway type</td>
<td>File-based cloud gateway</td>
<td>Block-based cloud gateway</td>
</tr>
<tr>
<td>Feature</td>
<td>1. Cloud space mount, centralized management 2. Cloud file multi-endpoint synchronization</td>
<td>1. Low latency 2. Up to cloud data to identify, excellent data security protection 3. When the data is on the cloud, only the amount of change is uploaded, and the backup time is reduced.</td>
</tr>
<tr>
<td>Snapshot &amp; restore</td>
<td>Not supported</td>
<td>Support</td>
</tr>
<tr>
<td>Scenario</td>
<td>File server online collaboration and file level data analysis</td>
<td>Enterprise application or QTS application data on the cloud Large database backup Massive small file backup</td>
</tr>
<tr>
<td>Local access protocol</td>
<td>SMB AFP NFS FTP WebDAV</td>
<td>SMB AFP NFS FTP WebDAV iSCSI Fibre Channel</td>
</tr>
</tbody>
</table>
VJBOD Cloud
Block-based Cloud Gateway Application Scenario
Back Up Data From Local Application Services To The Cloud

Application Case

SMEs have many important log files or sensitive data generated by local applications. For example, customer order data, system login data files are usually a large number of small files, and it is hoped that the process of backing up to the cloud can be fast. And it can't be recognized in the cloud space, it can keep the security and privacy of enterprise data.

* A cloud volume or LUN can only be connected to a NAS at a time.
Local Data Cloud Backup Solution

- QNAP’s VJBOD Cloud feature is a block-based Gateway block cloud gateway
- VJBOD Cloud block cloud gateway allows users to easily connect to the cloud storage space and convert it to disk at the local end.
- Enterprise IT staff or general users can use the more familiar file access protocol (NFS, SMB, AFP, FTP, WebDAV) for access
- Use this cloud volume to store data generated by various application services on the NAS that support the cloud volume.
- After the files in these application services are backed up to the cloud through the block cloud gateway, the block space data is unrecognizable in the cloud space.
In addition to the backup of the local storage device, the SME database hopes to back up the database to the cloud every day or every week, and hopes to quickly and reduce the network transmission during the backup process.

* A cloud volume or LUN can only be connected to a NAS at a time.
Block-based Database Cloud Backup Solution

- QNAP NAS's VJBOD cloud block-based Gateway block cloud gateway function also provides block-type logical unit LUNs
- Enterprise users can access through block-type access protocols (iSCSI, Fibre Channel)
- When enterprises want to back up the database to the cloud, they can also use the characteristics of the block-based gateway block cloud gateway to achieve the backup difference variation, thereby reducing the overall cloud transmission volume and backup time and cloud usage.
VJBOD Cloud
Block-based Cloud Gateway
Function Introduction

- Create A Cloud Volume/LUN
- Local Stored Mode
- Snapshot Restore And Data Protection Mechanism
- Snapshot Operation Principle And Process
- VJBOD Cloud Block-based Cloud Gateway Authorization Mechanism
Create A Cloud Volume / LUN

• To use VJBOD Cloud, after downloading the Plug-in program from the App Center, you can unlock the related functions in the Storage and Snapshot Explorer and complete the Cloud Volume/LUN creation as directed by the wizard.

• VJBOD Cloud Wizard guides and easily builds a cloud volume/LUN.

1. Choose to connect to the cloud service provider and cloud space bucket
2. Set cloud volume/LUN and storage space
3. Overview setting Create a cloud volume/LUN

* Functional schematic flow diagrams, etc. may differ from final product features
Create A Cloud Volume/LUN

In the tab that stores the snapshot manager, the user will be able to view the local volume/LUN and the cloud volume/LUN created by VJBOD Cloud. Manage all the space at once.

* Functional schematic flow diagrams, etc. may differ from final product features
Cloud Connection Speed Measurement

- VJBOD Cloud supports cloud connection speed measurement.
- Let IT staff first confirm the transmission speed of the cloud connection, whether it is enough to cope with its application and adjust the network disk area, or the connection resources of the LUN.
Snapshot Restore Mechanism

- A cloud disk/LUN in the entire system will need to set a local storage space.
- The default local storage space will be larger than the cloud volume/LUN, and the extra space will help you automatically take snapshots.
- With the local storage mode, even if the cloud storage space is disconnected, the application data can be completely saved in the NAS storage space.
- Users can select the snapshot restore point that they want to return, perform snapshot restore, and currently support up to 20 snapshot restore points.
- Snapshot restore will first take a snapshot on the NAS side Local Stored Space and then back up the snapshot to the cloud.

* Functional schematic flow diagrams, etc. may differ from final product features
Snapshot Restore Mechanism Protect User's Data

- Snapshots are automatically enabled when the block change is greater than 10%.
- Snapshots are also automatically enabled every 30 minutes.
VJBOD Cloud Block-based Cloud Gateway Authorization Mechanism

- VJBOD Cloud supports up to 9 cloud storage spaces (including a free connection).
- Free connection to the first cloud storage bucket
- VJBOD Cloud can create up to 16 Cloud Volumes or LUNs*.

* According to the memory requirements, the model will have the maximum support. Cloud disk area / LUN number limit.
* Functional schematic flow diagrams, etc. may differ from final product features
VJBOD Cloud Local Storage Mode Let Data Access Continuously

- VJBOD Cloud uses the local storage mode to store the main data on the NAS and back it up to the cloud. Storing a volume allows the on-premises application to access its entire database with low latency.

- The local storage space will be preset to be larger than the VJBOD Cloud Volume space, and the extra space will store a snapshot of the automatic snapshot restoration mechanism.
When A Disaster Occurs

Forced Disconnection Of The Original NAS Cloud Volume Or LUN Connect To The Original Cloud Volume Or LUN With Another NAS

- On another NAS, choose to connect to an existing cloud volume or LUN.
- Forced disconnection This has a cloud disk or LUN in the original NAS.
- After the forced disconnection, you can select the existing cloud volume or LUN and re-link and reply the data to the local storage space.
- Let local application services and backup tasks continue. However, since it is a way to restore points with snapshots, it should be noted that there are still very few parts of the data window period.
Forced Transfer Or Secure Transfer Process

Step.1

The user chooses which cloud service provider to connect to and enters the Access key and test connection.
Forced Transfer Or Secure Transfer Process

Step 2

1. User selects Attached Cloud Volume/LUN
2. Status: Divided into three states, occupied (using), occupied (abnormal), idle (secure transfer)
3. Show last heartbeat time and NAS IP being occupied
4. After the user selects the cloud Volume/LUN of the two states of occupied (using) and occupied (unused), pressing "Next" will pop up the window to warn the user and inform that the most recent snapshot will be restored.
Forced Transfer Or Secure Transfer Process

Step.3

1. Pressing “Next” will pop up the window to warn the user. And told that it will be restored by a recent snapshot.

2. And show the time point of this snapshot restore

3. Please enter the admin of this NAS / User password, press "OK" to continue
Forced Transfer Or Secure Transfer Process

Step.4

The user presses "Finish" to start execution.
How To Safely Uninstall Cloud Volume Or LUN

- In the storage and snapshot explorer, select a cloud volume or LUN and press "manage" on the top right.
- Go to the administration page and select wired > secure uninstall.
Connection Transmission Resource Management

- VJBOD Cloud supports connection transmission resource management.
- Enables IT to tune the connectivity resources of individual cloud volumes or LUNs for different applications or temporary needs.

Transfer Resource Management

Total Resources
The capability of your NAS determines the maximum transfer resources that VJBOD Cloud can use. To conserve transfer resources on the NAS, you can reduce the maximum transfer resources for VJBOD Cloud. Increasing transfer resources will improve processing efficiency, but consume more CPU and memory resources. Reducing transfer resources will increase the time it takes to transfer data.

Total Resources: 100 (Maximum: 100, Minimum: 70)
- Reserved (70/100)
- Shared (30/100)

Cloud Volume/LUN Resources

<table>
<thead>
<tr>
<th>Type</th>
<th>Alias</th>
<th>Reserve</th>
<th>Limit</th>
<th>Set limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Volume</td>
<td>Ripple882_cloudVol1</td>
<td>20</td>
<td>80</td>
<td>limit</td>
</tr>
<tr>
<td>Cloud Volume</td>
<td>Ripple882_cloudVol2</td>
<td>10</td>
<td>40</td>
<td>limit</td>
</tr>
<tr>
<td>Cloud LUN</td>
<td>Ripple882_cloudLUN1</td>
<td>15</td>
<td>30</td>
<td>No limit</td>
</tr>
<tr>
<td>Cloud LUN</td>
<td>Ripple882_cloudLUN2</td>
<td>25</td>
<td>60</td>
<td>limit</td>
</tr>
</tbody>
</table>
Cloud Volume Supports Encryption

- Cloud Volume supports encryption, allowing enterprise users to add a layer of data protection to confidential information.

- Provides data encryption, which allows you to encrypt the Cloud Volume with AES 256-bit in the NAS. The encrypted cloud volume Cloud Volume can only be read and written normally through the previously set password. Even if the NAS is stolen, the encryption mechanism can protect the data and prevent theft of confidential information.
LIVE DEMO
**Recommended Model**

<table>
<thead>
<tr>
<th>SMB Entry</th>
<th>TVS-882</th>
<th>SMB High level</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended Model</strong></td>
<td><strong>Suggested Cloud Volume/LUN:8</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
</tr>
<tr>
<td><strong>SMB Entry</strong></td>
<td><strong>Suggested Cloud Volume/LUN:4</strong></td>
<td><strong>Suggested Cloud Volume/LUN:8</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
</tr>
<tr>
<td>TS-873</td>
<td>8 bay</td>
<td>8 bay</td>
<td>16 bay</td>
</tr>
<tr>
<td></td>
<td>AMD R-Series RX-421ND quad-core 2.1 GHz processor (Turbo Core to 3.4 GHz)</td>
<td>Intel® Xeon® E2124 quad-core 3.3 GHz processor, Max turbo to 3.8 GHz</td>
<td>Intel® Xeon® E5-2630 v4 10-core 2.2 GHz</td>
</tr>
<tr>
<td></td>
<td>Max 8GB RAM</td>
<td>Max 64GB RAM</td>
<td>Max 256GB RAM</td>
</tr>
<tr>
<td><strong>SMB Middle level</strong></td>
<td><strong>Suggested Cloud Volume/LUN:8</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
</tr>
<tr>
<td>TVS-882</td>
<td>8 bay</td>
<td>16 bay</td>
<td>16 bay</td>
</tr>
<tr>
<td></td>
<td>Intel® Core™ i5-7500 quad-core 3.4 GHz processor, Max turbo to 3.8 GHz</td>
<td>Intel® Xeon® E-2124 quad-core 3.3 GHz processor (burst up to 4.3 GHz)</td>
<td>Intel® Xeon® E5-2630 v4 10-core 2.2 GHz</td>
</tr>
<tr>
<td></td>
<td>Max 64GB RAM</td>
<td>Max 64GB RAM</td>
<td>Max 256GB RAM</td>
</tr>
<tr>
<td><strong>SMB High level</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
</tr>
<tr>
<td>TS-1683XU-RP</td>
<td>8 bay</td>
<td>16 bay</td>
<td>16 bay</td>
</tr>
<tr>
<td></td>
<td>AMD R-Series RX-421ND quad-core 2.1 GHz processor (Turbo Core to 3.4 GHz)</td>
<td>Intel® Xeon® E2124 quad-core 3.3 GHz processor, Max turbo to 3.8 GHz</td>
<td>Intel® Xeon® E5-2630 v4 10-core 2.2 GHz</td>
</tr>
<tr>
<td></td>
<td>Max 64GB RAM</td>
<td>Max 64GB RAM</td>
<td>Max 256GB RAM</td>
</tr>
<tr>
<td><strong>Enterprise</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
<td><strong>Suggested Cloud Volume/LUN:16</strong></td>
</tr>
<tr>
<td>TDS-16489U R2</td>
<td>8 bay</td>
<td>16 bay</td>
<td>16 bay</td>
</tr>
<tr>
<td></td>
<td>AMD R-Series RX-421ND quad-core 2.1 GHz processor (Turbo Core to 3.4 GHz)</td>
<td>Intel® Xeon® E2124 quad-core 3.3 GHz processor, Max turbo to 3.8 GHz</td>
<td>Intel® Xeon® E5-2630 v4 10-core 2.2 GHz</td>
</tr>
<tr>
<td></td>
<td>Max 64GB RAM</td>
<td>Max 64GB RAM</td>
<td>Max 256GB RAM</td>
</tr>
</tbody>
</table>

* Depending on the memory requirements, the model will have maximum support. Cloud disk area / LUN number limit.
VJBOD Cloud
Block-based Cloud Gateway Solution
Is The Best Choice For
Connecting Your Private Cloud
To A Public Cloud