

Roving Edge as Data Transfer Gateway

Version 2.0
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Purpose Statement

The purpose of the Roving Edge as Data Transfer Gateway is to provide a solution for addressing the complexities of data movement and synchronization between on-premises and Oracle Cloud Infrastructure (OCI) object storage. To help customers migrate their data to OCI. This solution ensures seamless connectivity, data security, and high-performance storage for organizations operating in both connected and disconnected environments.

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Introduction

Roving Edge as Data Transfer Gateway delivers a seamless, efficient solution for managing data movement, synchronization, and storage across edge locations, on-premises systems, and Oracle Cloud Infrastructure (OCI). Designed to support diverse connectivity scenarios, it facilitates data transfers of up to 45TB between edge environments, on-premises sites, and OCI Object Storage, whether via high-speed options like Oracle Fast Connect or in environments with limited network bandwidth. With advanced features such as secure data synchronization and robust protocol support, including NFS v4.1, the gateway ensures reliable connectivity and strong data security. Optimized for both connected and disconnected use cases, this solution provides high-performance local storage, enabling organizations to store and transfer data effortlessly and efficiently.

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Roving Edge as Data Transfer Gateway

The Roving Edge as Data Transfer Gateway is built to facilitate data movement between edge, on-premises, and OCI object storage for locations with high-speed connectivity, such as Oracle Fast Connect or for on-premises locations with low network bandwidth

Key Features and Capabilities

- **OCI API Integration:** Utilizes Oracle Cloud Infrastructure APIs to manage secure, authentication, and data transfer. Seamlessly integrates with OCI services for a consistent hybrid cloud experience.
- **Support for NFS v4.1 protocol:** Enables efficient file sharing and mounting across systems with support for NFS v4.1 on-premises
- **Encryption at Rest:** Implements enterprise-grade encryption at rest to protect sensitive data stored on Roving Edge devices for use cases which the Roving Edge device needs to be physically transported to different locations for data synchronization with OCI.
- **OCI Sync:** Automatically synchronizes with OCI Object Storage when connectivity is available.

On-premises locations with Oracle Fast Connect

Architecture Overview

This architecture showcases a solution tailored for customers with on-premises environments leveraging Oracle Fast Connect. It features a customized Oracle Linux server deployed on a Roving Edge device, serving as a data transfer gateway for seamless data import and export between on-premises locations and Oracle Cloud Infrastructure (OCI). The solution enables efficient data movement to and from OCI Object Storage through OCI Sync, utilizing the high-speed, secure connectivity of OCI Fast Connect.

Components and Workflow

On-Premises Data Sources: Represents the various systems, servers, and storage devices located in the on-premises environment. These data sources hold the information to be transferred to the Oracle Cloud Infrastructure (OCI). Data is exposed via the NFSv4.1 protocol, enabling easy sharing and accessibility from the Roving Edge Device.

Roving Edge Device: Serves as a on-premises data transfer gateway between the on-premises environment and the Oracle Cloud.

Configuration

- **Operating System:** The device runs customized Oracle Linux image, which provides enterprise-grade stability and support for advanced networking and data handling.
- **Oracle Linux data transfer instance:** Acts as a bridge between the on-premises NFSv4.1 share and Roving Edge Object Storage. Configured to mount the on-premises NFSv4.1 share to retrieve data for transfer, synchronize data between the local NFSv4.1 filesystem and the OCI Object Storage.
- **OCI Sync:** Manages the data transfer process, ensuring efficient and reliable synchronization between the source and target.

Features

- Handles up to 45TB data transfers with options for parallelism and incremental synchronization
- Verifies data integrity using checksum mechanisms

- Supports high-speed transfer operations
- High performance local storage - NVME

OCI Fast Connect: Provides a private, high-bandwidth, low-latency network connection between the Roving Edge Device and OCI Object Storage.

Workflow Summary

- **Data Sharing:** On-premises systems mount the NFSv4.1 share provided by the Oracle Linux data gateway instance deployed on Roving Edge Device.

NOTE: NFSv4.1 share is already pre-configured with all tunable options for performance. **/datagateway** is the NFSv4.1 share already available to be mounted by the NFSv4.1 clients Below is the recommended NFS mount options for best performance to be utilized on the NFSv4.1 on-premises clients.

```
mount -t nfs4 -o
rsz=1048576,wsz=1048576,noatime,nodiratime,actimeo=3600,lookupcache=all,timeo=600,ret
rans=10,vers=4.1,tcp <Oracle Linux Data Gateway instance IP address:/datagateway /tmp
```

- **Data Transfer Gateway:** NFSv4.1 clients upload the data to the NFSv4.1 server running on the Oracle Linux data gateway instance deployed on Roving Edge Device.
- **Data Sync Process:** Once the data is available on NFSv4.1 share, Oracle Linux data transfer gateway will automatically sync the data with the target object storage bucket configured on OCI.

NOTE: Data Sync leverages OCI Sync, a powerful and secure data transfer tool designed to synchronize data between on-premises environments and OCI Object Storage. OCI Sync can be configured to start automatically at the instance boot or scheduled to run at specified intervals using crontab, providing flexibility and reliability in data synchronization processes.

Figure 1 shows the architecture diagram of the Roving Edge as Data Transfers Gateway for on-premises locations with Oracle Fast Connect.

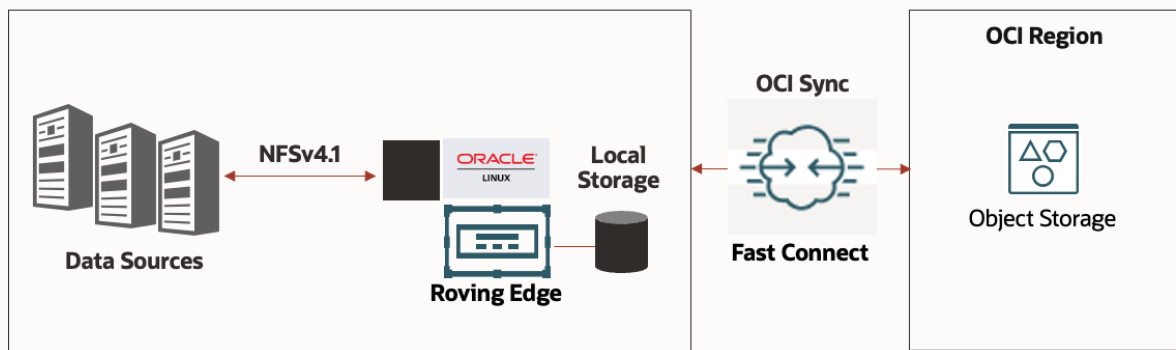


Figure 1. Architecture diagram of the Roving Edge as Data Transfer Gateway for on-premises locations with Oracle Fast Connect.

On-premises locations with low network bandwidth

Architecture Overview

This solution enables efficient data transfer from on-premises environments which do not have access to OCI Fast Connect links or high bandwidth. On this use case, the data is securely stored on the Roving Edge Device and physically shipped to the nearest Oracle Solution Center for upload to OCI, using the same Data Sync feature mentioned in the on-premises locations with Oracle Fast Connect.

Components and Workflow

On-Premises Data Sources: Represents the various systems, servers, and storage devices located in the on-premises environment. These data sources hold the information to be transferred to the Oracle Cloud Infrastructure (OCI). Data is exposed via the NFSv4.1 protocol, enabling easy sharing and accessibility from the Roving Edge Device.

Roving Edge Device: Serves as a on-premises data transfer gateway between the on-premises environment and the Oracle Cloud.

Configuration

- **Operating System:** The device runs customized Oracle Linux image, which provides enterprise-grade stability and support for advanced networking and data handling.
- **Oracle Linux data transfer instance:** Acts as a bridge between the on-premises NFSv4.1 share and Roving Edge Object Storage. Configured to mount the on-premises NFSv4.1 share to retrieve data for transfer, synchronize data between the local NFSv4.1 filesystem and the OCI Object Storage.
- **OCI Sync:** Manages the data transfer process, ensuring efficient and reliable synchronization between the source and target.

Features

- Handles up to 45TB data transfers with options for parallelism and incremental synchronization
- Verifies data integrity using checksum mechanisms
- Supports high-speed transfer operations
- High performance local storage - NVME

Workflow Summary

- **Data Sharing:** On-premises systems mount the NFSv4.1 share provided by the Oracle Linux data gateway instance deployed on Roving Edge Device.

NOTE: NFSv4.1 share is already pre-configured with all tunable options for performance. **/datagateway** is the NFSv4.1 share already available to be mounted by the NFSv4.1 clients Below is the recommended NFS mount options for best performance to be utilized on the NFSv4.1 on-premises clients.

```
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rsz=1048576,wsz=1048576,noatime,nodiratime,actimeo=3600,lookupcache=all,timeo=600,ret
rans=10,vers=4.1,tcp <Oracle Linux Data Gateway instance IP address:/datagateway /tmp
```

- **Data Transfer Gateway:** NFSv4.1 clients upload the data to the NFSv4.1 server running on the Oracle Linux data gateway instance deployed on Roving Edge Device.
- **Shipping:** The Roving Edge Device is physically shipped to the closest Oracle Solution Center for data upload to OCI using Oracle Fast Connect. Oracle Solution Center acts as the intermediary point for uploading data to the Oracle Cloud Infrastructure.
- **Data Sync Process:** At the Oracle Solution Center or on-premises location with Oracle Fast Connect available, the device is connected to the network, and the data will be uploaded to OCI Object Storage using OCI Sync tool

Figure 2 shows the architecture diagram of the Roving Edge as Data Transfer Gateway for on-premises locations without Oracle Fast Connect or low network bandwidth

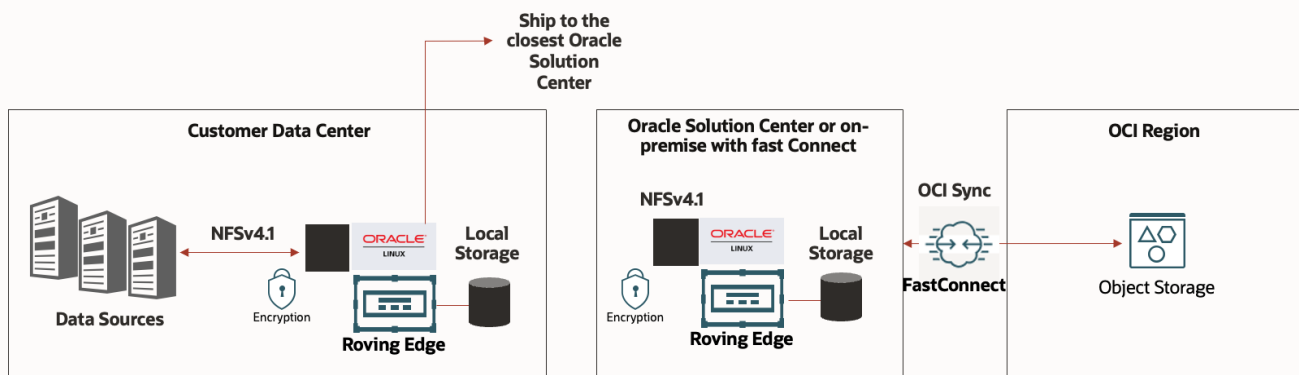


Figure 2. Architecture diagram of the Roving Edge as Data Transfer Gateway for on-premises locations without Oracle Fast Connect.

Process for Requesting Roving Edge as Data Transfer Gateway

Listed below are the steps needed to request Roving Edge devices to be utilized as data transfer gateway:

- Open a **Service Request** for the new Roving Edge device to be utilized as Data Transfer Gateway. On the Service Request, specify the following listed below
- **OCI Bucket information:** Provide the name for the OCI object storage bucket, so Oracle Linux Data transfer Gateway can be pre-configured with the correct credentials and bucket to copy the data
- **Provide the information for the OCI CLI authentication with OCI bucket:**
 - **User OCID:** Available in the OCI Console under "Identity, My Profile, User Information"
 - **Tenancy OCID:** Found in "Tenancy Details" in the OCI Console.
 - **Region:** Choose your preferred OCI region, closest one to your location or to the OSC location.
 - **Private Key:** a new oci_api_key.pem file to be utilized to authenticate with the OCI object storage bucket for data copy.

NOTE: Once the Service Request is received, the internal workflow to pre-configure the Roving Edge device as Data Transfer Gateway will be initialized and shipped to the address specified on the Service Request.

- **For customers with Oracle Fast Connect available on-premises,** the Roving Edge device serves as a Data Transfer Gateway for on-premises locations. Below is the process:
 - The device will be shipped to the customer address specified in the Service Request

- Customers will upload the data to the NFSv4.1 of the Oracle Linux data transfer gateway running on Roving edge device.
 - Once the data is uploaded to the Oracle Linux data transfer gateway via NFSv4.1, the data will be uploaded to the designated OCI bucket outlined in the Service Request using OCI Sync.
 - Once the data transfer to OCI is successfully completed, customers must delete the data from the Roving Edge device and return it to the closest Oracle Solution Center for factory reset.
 - Service Request will be closed.
- **For customers without Oracle Fast Connect**, the Roving Edge device serves as a Data Transfer Gateway for on-premises locations as well, however, the data will not be uploaded to OCI object storage bucket from the customer on-premises location. Below is the process:
- The device will be shipped to the customer address specified in the Service Request.
 - Customers will upload the data to the NFSv4.1 of the Oracle Linux data transfer gateway running on Roving edge device.
 - Once the data transfer to the NFSv4.1 is successfully completed, customer will shut down the Oracle Linux data transfer gateway instance, power off the Roving Edge device, and return the Roving Edge device to the nearest Oracle Solution Center location.
 - Once received the device, Oracle Solution Center will connect the device into the Fast Connect infrastructure and upload the customer data to the designated OCI bucket outlined in the Service Request.
 - Once the data has been successfully uploaded to the designated OCI bucket specified in the Service Request, the request will be considered complete and subsequently closed.
 - Roving Edge device will undergo a factory reset.

Refer to the Refer to [Roving Edge Infrastructure](#) and [Roving Edge device data sheet](#) for additional information regarding Roving Edge platform, contract requirements, and pricing.

For additional information regarding Oracle Solution Center, refer to: <https://www.oracle.com/corporate/osc/>

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