

Oracle edge cloud solutions - Retail and Hospitality

Step-by-step for deploying Oracle Xstore on Oracle Roving Edge Infrastructure

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Public

Purpose statement

This document provides step-by-step instructions to deploy Roving Edge for Retail Xstore

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Industry Requirements and Challenges



- **Agility, Market Conditions and Consumer Expectations**
Difficult to quickly expand, grow, and adapt to market opportunities and consumer demands
- **Resilient Business Continuity**
Lack of central oversight, location inconsistencies compromise continuity and risk disruption
- **Operational Inefficiencies**
Duplication in resources, processes, costs, inefficient store productivity can erode profitability
- **Loss Prevention**
Retailers lose more than \$110 billion a year to shrinkage. Inventories decrease because of shoplifting, vendor fraud, employee theft, and other non-sales reasons
- **Modernize Customer Experience**
Without unified view, experience can vary widely by store, product, pricing, confusing customer
- **Hyperlocal Analytics and Personalization**
Retailers want to understand customer trends in-store to run discounting, improved inventory management and regional customizations
- **Staffing Optimizations**
Retailers at times struggle with efficiently staffing stores to deal with increased footfall, crowd and queue management leading to increased wait times, poor checkout and customer experience
- **Sustainability**
Retailers globally are looking for technology solutions that can help them consolidate in-store platforms enabling more power efficiency

Solution Overview, Business Value & TCO Views

Oracle Cloud Infrastructure offers a robust distributed cloud portfolio that spans [public cloud](#), [multicloud](#), [Cloud@Customer](#), and [edge deployments](#). Oracle's edge portfolio delivers the same OCI IaaS – compute, storage, and networking capabilities at both connected and disconnected locations – in a customer's datacenter or at the edge. With a globally consistent cloud consumption model, customers can truly benefit from cloud economics, standardized deployment methodologies and user experience at a location of their choice, cloud economics, standardized deployment methodologies

Oracle's edge portfolio of products help retailers optimize and modernize infrastructure to support the requirements of Stores and Distribution Centers of the future.

- Oracle edge cloud platforms (In Customer Store/DC)
 - Oracle Compute Cloud@Customer – rack scale infrastructure in customer datacenters
 - Oracle Roving Edge Infrastructure – server scale infrastructure in-store and edge locations
- OCI AI and PaaS Services
- Partner Solutions & Integrations

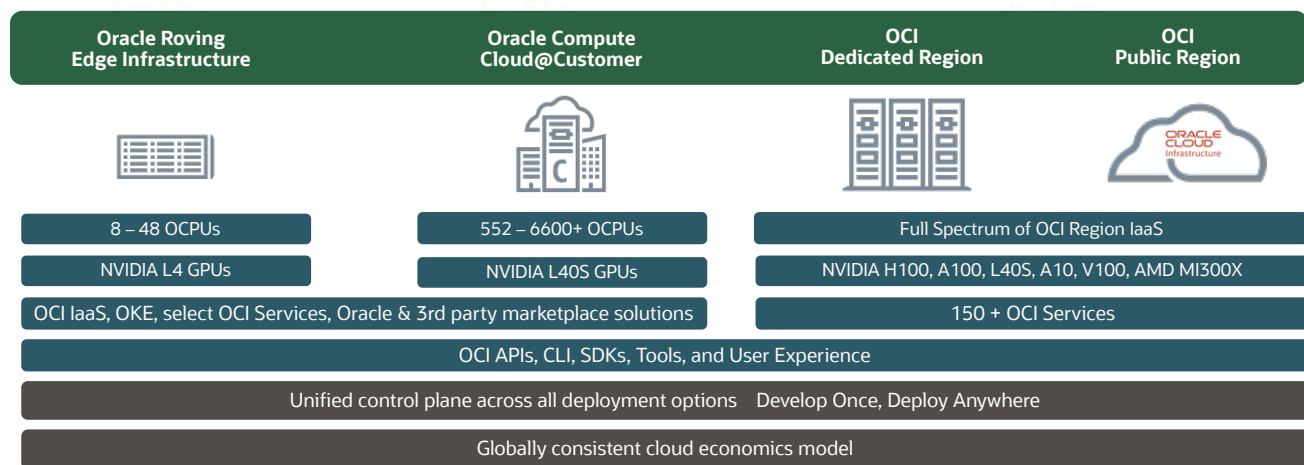


Figure-1

Key highlights of our solution include:

- Extend Oracle Cloud Infrastructure capabilities all the way to the edge
- Run your in-store operations in connected/intermittently connected or disconnected locations
- Address latency and potential data residency concerns
- Faster deployment, build once and deploy across distributed sites to support growth
- Lower ~45% TCO and leverage existing investments
- Centralized operations, security and monitoring
- Enable retail store innovations using Oracle Cloud, AI and Edge Technology (e.g., Loss prevention – Reduce shrinkage, Friction less shopping, Smart inventory replenishment, Contactless checkouts)

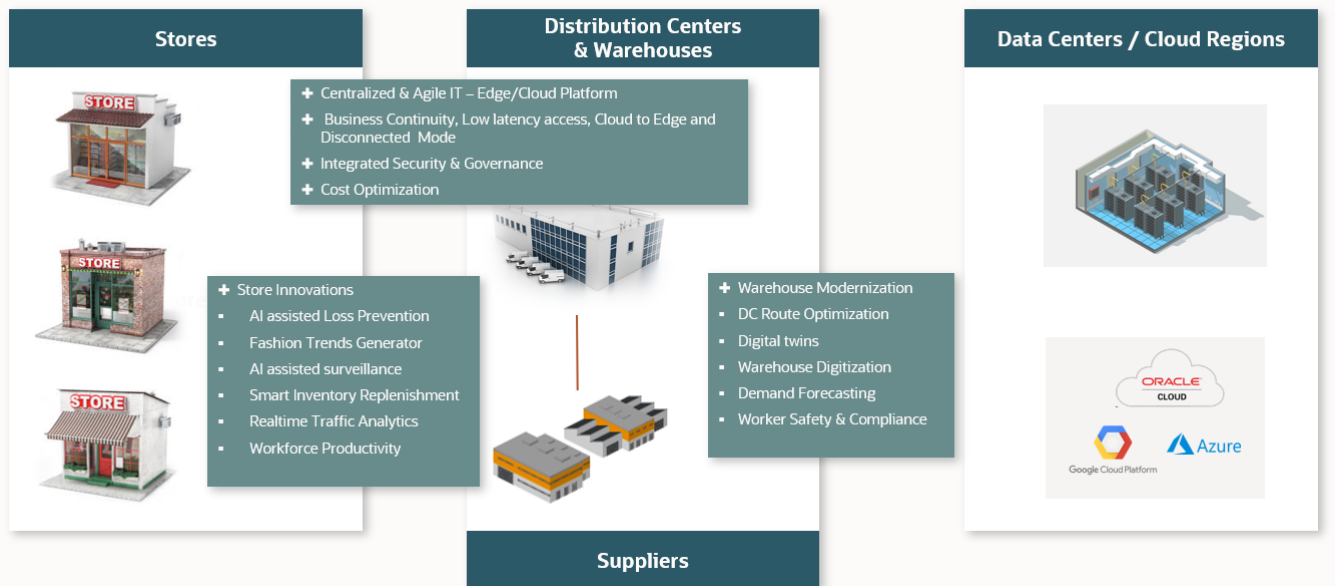


Figure-2

- **Edge Infrastructure Modernization and Automations for Stores**
OCI's IaaS capabilities and platform services with unmatched processing power, reliable connectivity, and top-tier security at the network edge – even in disconnected or offline environments.
Roving Edge Device is ideal for retailers looking to consolidate in-store workloads spanning inventory management, PoS, analytics, security and AI applications while addressing data residency and latency requirements.
- **Improve Operational Efficiencies**
OCI's distributed infrastructure enables a singular platform to develop, deploy, centrally manage and operate as well as receive insights into multiple locations
- **Low-Latency Transaction Processing**
Ensures fast and seamless transaction processing, even during peak sales periods. Improves the customer experience at the point of sale with quick checkouts and real-time inventory updates.
- **Resilience in Limited Connectivity Environments**
Stores in remote locations or areas with poor network infrastructure can function without disruptions. Transactions, inventory updates, and customer interactions are processed locally and synchronized to the cloud when connectivity is restored.
- **Enhanced Security and Data Compliance**
Ensures compliance with local data protection regulations by keeping data on-site. Protects customer and transaction data with Oracle-grade encryption and security controls.
- **Scalability and Portability**
Rapid setup of Point of Service and other store applications in new locations with minimal configuration. Flexibility to scale edge infrastructure based on store size or transaction volume.
- **Cloud & AI for Retail Innovations and Competitive Differentiation**
Enable retail store innovations using Oracle Cloud, AI and Edge Technology (e.g., Loss prevention – Reduce shrinkage, Frictionless shopping, Smart inventory replenishment, Contactless checkouts)

Roving Edge for Retail – Reference Architectures

The reference architecture below illustrates [Xstore Point of Service](#) on Roving Edge devices deployed at Retail store locations. Roving Edge for Retail deployments connect to a “parent” OCI region for centralized management, monitoring and governance. The OCI region also hosts Xstore Point of Service Non-production environments, and DevOps platform for automated build and deployment pipelines of services deployed to Edge devices.

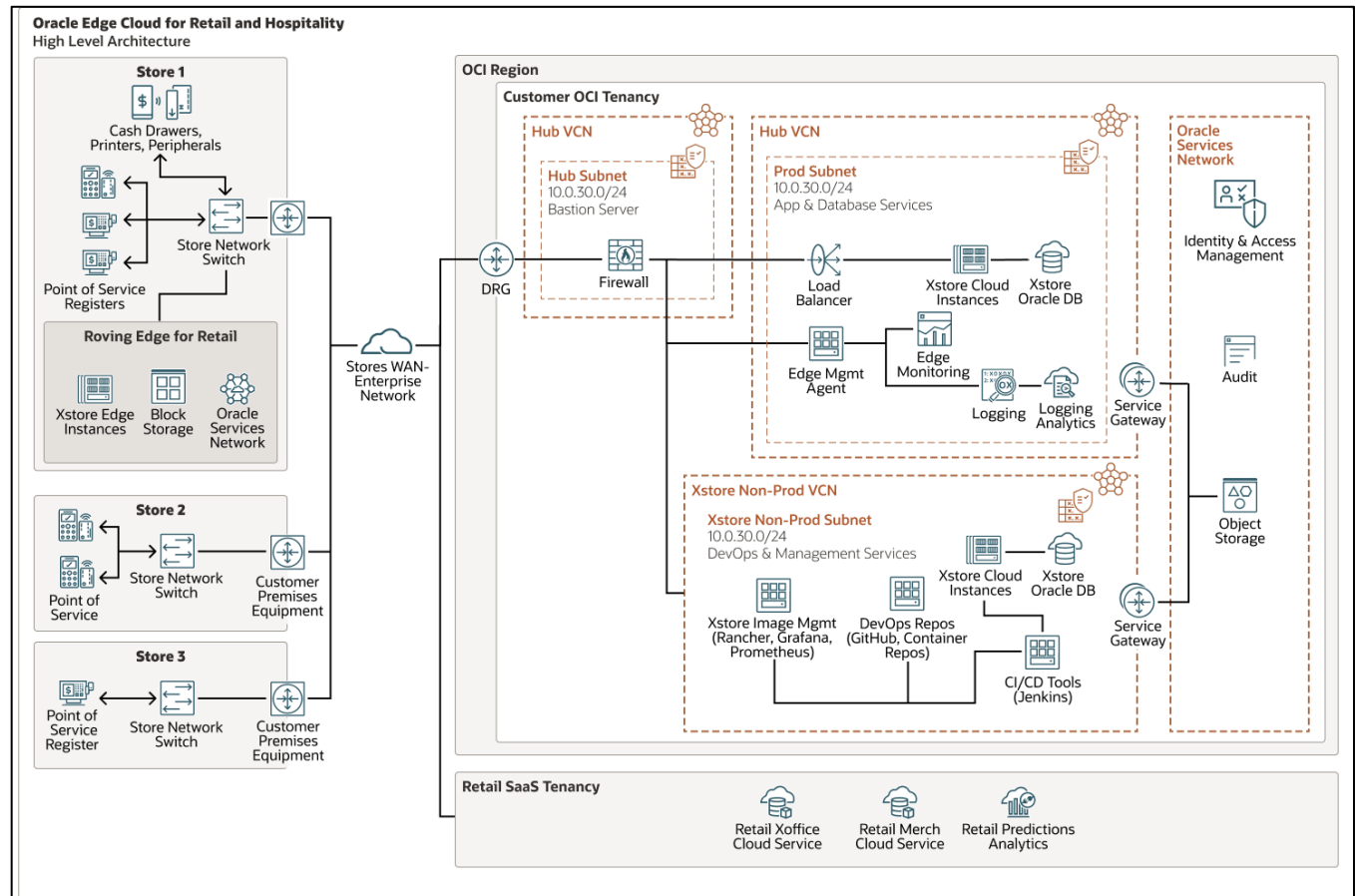


Figure-3

Retail application services like Xstore Point of Service can be deployed in one of the following configurations depending on business requirements for performance, availability and resiliency.

Option 1 Edge Deployment with DR in OCI

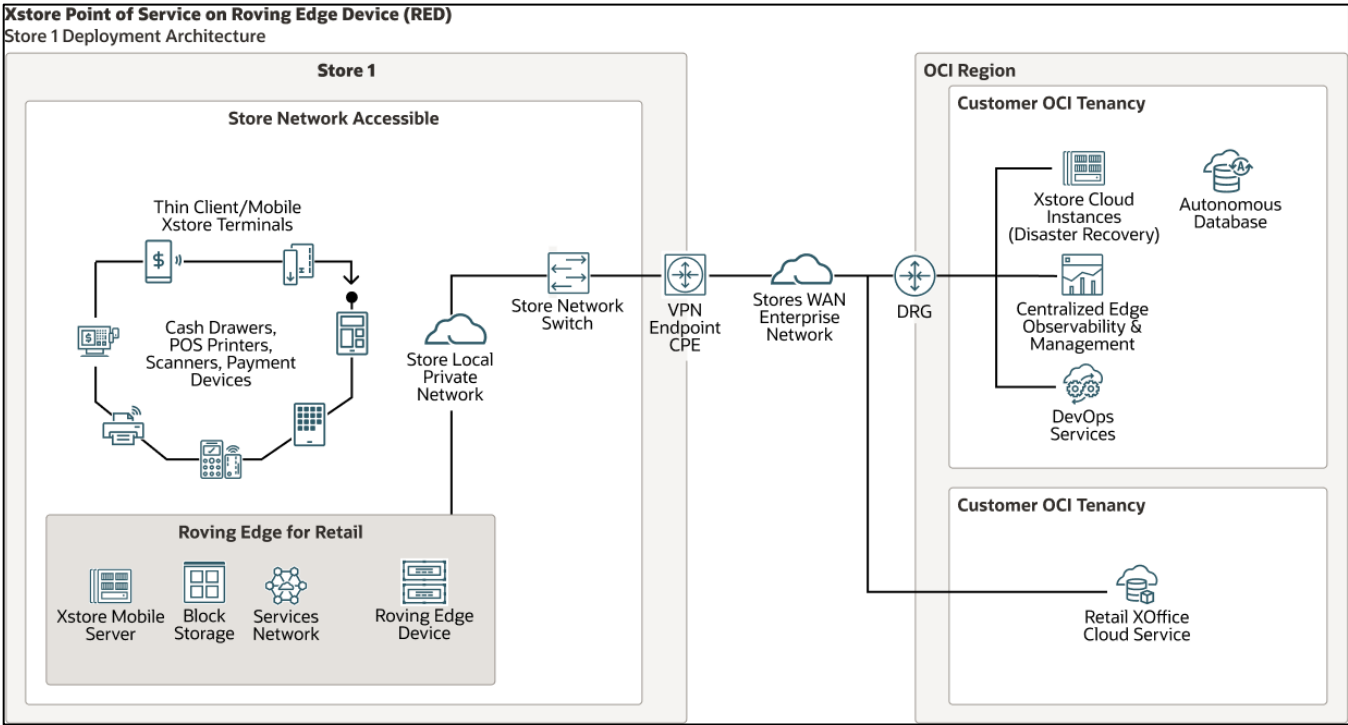


Figure-4

Option 2 – Hybrid Deployment – Edge + Cloud

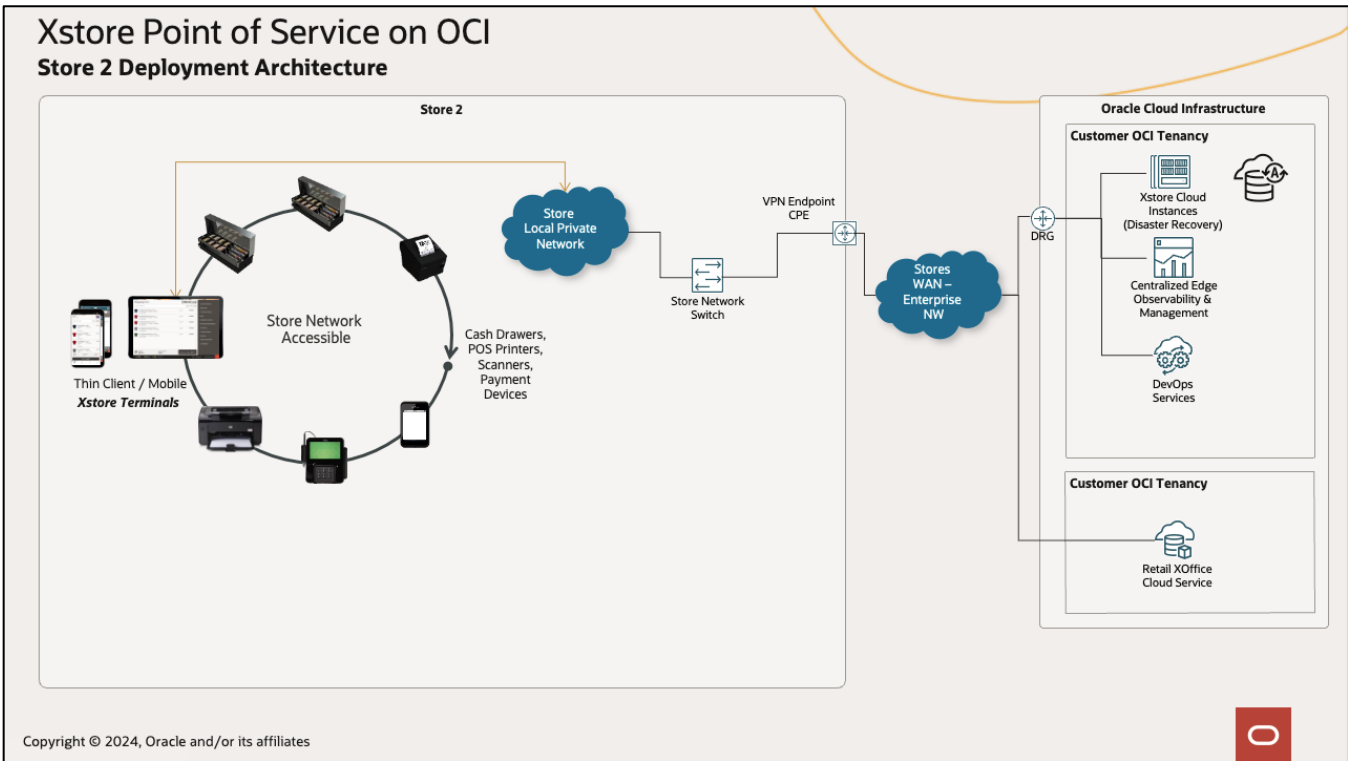


Figure-5

Option 3 – Edge Deployment with DR in OCI

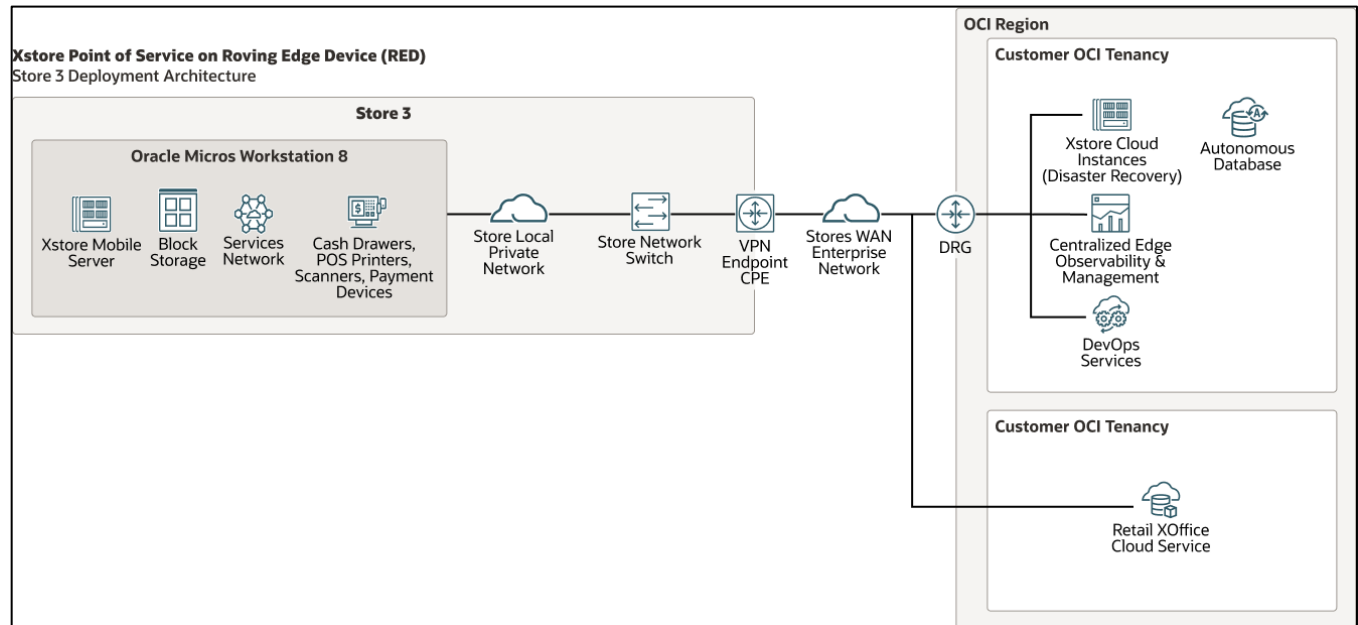


Figure-6

Deployment Options and Differentiators

	Edge Deployment with DR in OCI	Hybrid Deployment – Edge + Cloud	Cloud Deployment
Latency	Ultra-low latency ensured through edge processing	Ultra-low latency ensured through edge processing	Latency is a function of network proximity and service availability
Scalability	- Scalable instantly up to capacity limits on Edge - Edge capacity can be scaled out through multi-node clustering	- Scalable instantly up to capacity limits on Edge - Supports rapid elastic capacity expansion in Cloud to augment edge to address time bound needs like seasonal peaks and events	- Provision services instantly in Cloud - Supports rapid elastic capacity expansion in Cloud to augment edge to address time bound needs like seasonal peaks and events
Resilience	- High resiliency ensured at edge through clustered deployments - DR site in nearest Cloud region for business continuity	- High resiliency ensured at edge through clustered deployments - DR site in nearest Cloud region for business continuity	Primary and Secondary region deployments in Cloud ensure business continuity

Table-1

Getting Started – Deploying Oracle Roving Edge for Retail Xstore

[Oracle Roving Edge Infrastructure](#) is a cloud-integrated service that makes Oracle Cloud Infrastructure services available at the edge where business data is generated and consumed. This allows for highly efficient transaction and data processing at edge locations and brings to bear cloud scale, agility and economic benefits to stores, distribution centers, events and other Retail and Hospitality business formats and locations. In this section, we describe the steps to deploy Oracle Roving Edge Retail at a store location and deploy Oracle Xstore Point of Service at the edge compute location with instructions and related diagrams below.

Roving Edge Infrastructure consists of two types of devices that can be deployed at Edge:

- Roving Edge Ultra (Ultra): A single device contained in a backpack-like transporter that an individual can carry. Ultra doesn't require a separate power source.
- Roving Edge device (RED): A portable high-powered server that has been ruggedized to operate in remote and austere environments.

Pre-Requisites

The following pre-requisite tasks must be completed prior to deploying Roving Edge Devices:

- An OCI tenancy is required to subscribe to Roving Edge device nodes
- Identify the number of Roving Edge devices nodes to be deployed at Store locations
- Obtain an image of Oracle Retail Xstore Point of Service configured for deployment to Store locations. This image includes the Xstore Oracle database and Xstore application services.

Setting up Roving Edge for Stores/Edge Locations

This section describes the steps to procure a Roving Edge Ultra device:

1. Logon to the OCI Console and request for a Roving Edge Node by navigating to Home > Hybrid > Roving Edge Infrastructure > Nodes

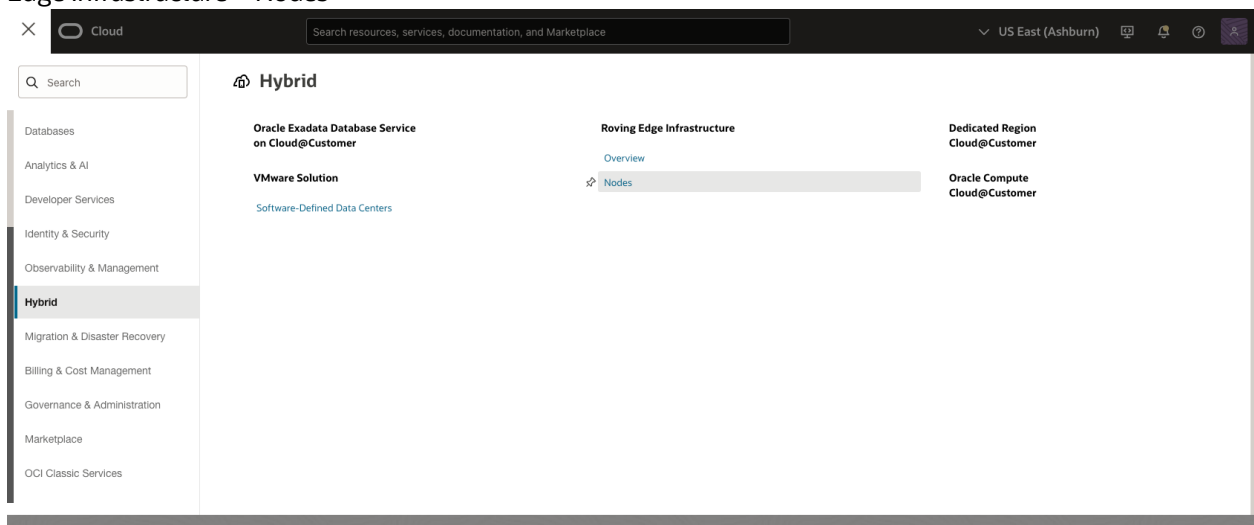


Figure-7

2. Select “Create Node” option, specify the following details and click on the “Create Node” button to submit request for a new edge device.
 - a. Device Name, Shape, Case Type (Figure-8)
 - b. Shipping Details – Contact and Mailing Address (Figures 9a/9b)
 - c. Initial administrator credentials and Certificate details (Figures 10a/10b)

Create Node

Create a Node to request a Roving Edge Device. After the Node is created, attach Object Storage and Compute Workloads to run on the Roving Edge Device.

Basic information

Name: red-ultra-store1

Create in compartment: sandbox

Shape: ULTRA.USB.1.RX2.12

Enclosure Type: Ruggedized case

Super user password: [password field]

Confirm super user password: [password field]

Unlock passphrase: [password field]

Figure-8

Create Node

Choose a shipping method: ☒ Shipped by Oracle ☐ Pickup from Oracle

Shipping information

Point of contact: Ram Venkataraman

Care of (Optional): [text field]

Recipient phone: 1111111111

Recipient email: red.admin@oracle.com

Address line 1: 123 Main Ave

Figure-9a

Roving Edge Infrastructure

Overview

Nodes

List scope

Compartment

Tag filters

Filters

State

Nodes

A Node is an Oracle Cloud Infrastructure se

Create Node

Name

State

Create Node

Address line 1

123 Main Ave

Street address to send the appliance to

Address line 2 Optional

Identifying address details like building, suite, unit, or floor information

City/Locality

Nashville

State/Province/Region

TN

Zip/Postal code

54321

Country

United States of America

Roving Edge orders can only be shipped to specific countries depending on where the order is placed. Contact your Oracle account representative for more information

Certificate options (optional)

To use OCI Certificates Service, provide the certificate information below. Additional policies are needed in order to use the OCI Certificates Service. [Learn more](#) about the policies required.

Figure-9b

Roving Edge Infrastructure

Overview

Nodes

List scope

Compartment

Tag filters

Filters

State

Nodes

A Node is an Oracle Cloud Infrastructure se

Create Node

Name

State

Create Node

Certificate options (optional)

To use OCI Certificates Service, provide the certificate information below. Additional policies are needed in order to use the OCI Certificates Service. [Learn more](#) about the policies required.

Common Name

red-store

Issuer Certificate Authority in sandbox

sbx-root-ca

It is recommended to choose a subordinate Certificate Authority

Certificate Validity End Date

Dec 31, 2025

Certificates are valid from the time at which they are generated.

Signature Algorithm

SHA256_WITH_RSA

Key Algorithm

RSA2048

Certificate Compartment

sandbox

Figure-10a

Roving Edge Infrastructure

Overview

Nodes

List scope

Compartment

Tag filters

Filters

State

Nodes

A Node is an Oracle Cloud Infrastructure se

Create Node

Name

State

Create Node

red-store

Issuer Certificate Authority in sandbox

sbx-root-ca

It is recommended to choose a subordinate Certificate Authority

Certificate Validity End Date

Dec 31, 2025

Certificates are valid from the time at which they are generated.

Signature Algorithm

SHA256_WITH_RSA

Key Algorithm

RSA2048

Certificate Compartment

sandbox

Show Tagging options

Ordering Oracle Roving Edge Infrastructure resources requires important terms and conditions to be understood and acknowledged prior to taking possession. Please confirm that these terms and conditions have been included as part of your Oracle Cloud agreement. Once we have also validated this, your resources will be provisioned and available for possession.

Create Node

Cancel

Figure-10b

3. When the device is received at the Store location, perform the following steps to prepare and install the device:
 - a. Navigate to Hybrid > Roving Edge Infrastructure on the OCI console and select the compartment for the device. Click on Manage Nodes and confirm the Device Request shows “Delivered” status. Also, verify the serial number and delivery date and time.
 - b. Unpack, visually inspect the device shipping container for any damage, tampering, and verify that the serial number matches the number displayed on the OCI console.
 - c. Mount and cable the device using the instructions provided in the [documentation](#).
 - d. Setup Terminal Emulation and power on the device.
 - e. Connect Roving Edge to the store network by completing network configuration including assigning a Device IP Address, subnet and gateway, and setting up DNS and NTP services.
 - f. Using Terminal Emulator, unlock the device by providing the secure passphrase created while requesting for the device node.
 - g. To access the Roving Edge console, download and install the Root CA Certificate following the steps described [here](#).
 - h. Add an entry into the hosts file mapping the Roving Edge device IP address and hostname to start with. This entry can be added to the DNS later if an enterprise DNS is used for name resolution within the store network.
 - i. Open the Roving Edge console using a web browser, the URL is `https://<red-hostname>:8015/`. Logon using the initial administrator credentials provided while requesting for the device.

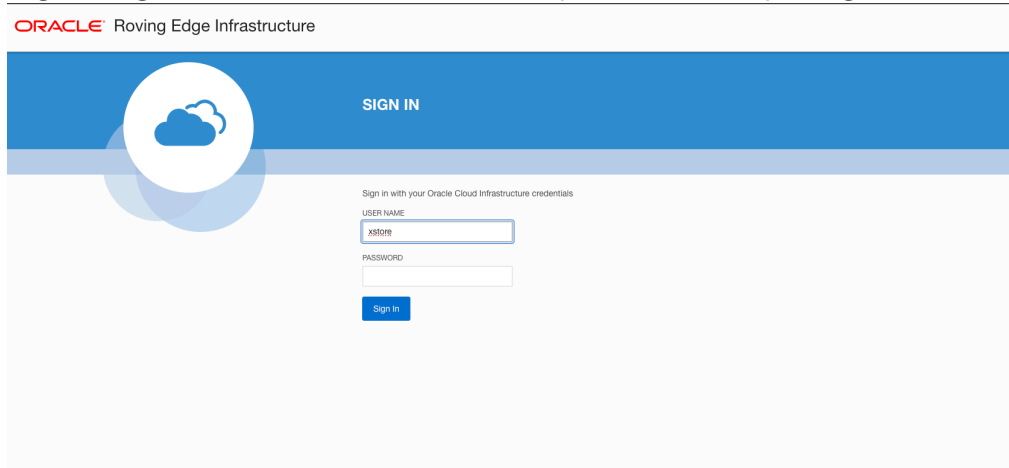


Figure-11

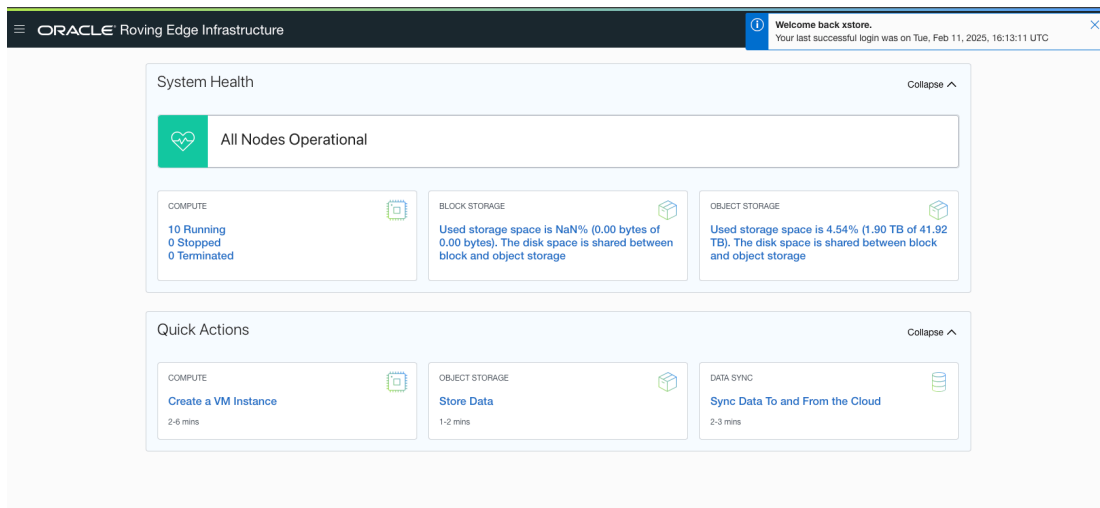


Figure-12

- j. After logging in, you are taken to the RED Infrastructure homepage. The next step is to create a Virtual Cloud Network and subnets within which Xstore Point of Service and other workloads are deployed. Navigate to Networking > Virtual Cloud Networks on the menu to create a VCN and subnets. Assign a non-overlapping private IP address range that is accessible within the store network.

Name	State	CIDR Block	DNS Domain Name	Created
vcn1	Available	10.0.0.0/16	vcn1.oraclevcn.com	Wed, Aug 9, 2023, 13:41:18 UTC

Figure-13

- k. At this stage, the Roving Edge product is ready to start deploying Xstore and other applications to the edge device at the store.

Setting up Applications/Xstore on Roving Edge

Oracle Retail [Xstore Point of Service](#) is a point-of-sale application that provides the capabilities to carry out day-to-day transactions and conduct daily store activities. Tasks such as scanning items, applying price adjustments, tendering, and printing receipts as well as processing returns, and web orders can be performed. Store operations including opening the store, managing registers and tills, and closing the store can be handled through Oracle Retail Xstore Point of Service (POS).

Xstore POS supports a fully containerized deployment option as depicted in the illustration below, this container will be deployed to the Roving Edge compute platform to enable registers and terminals running in the store.

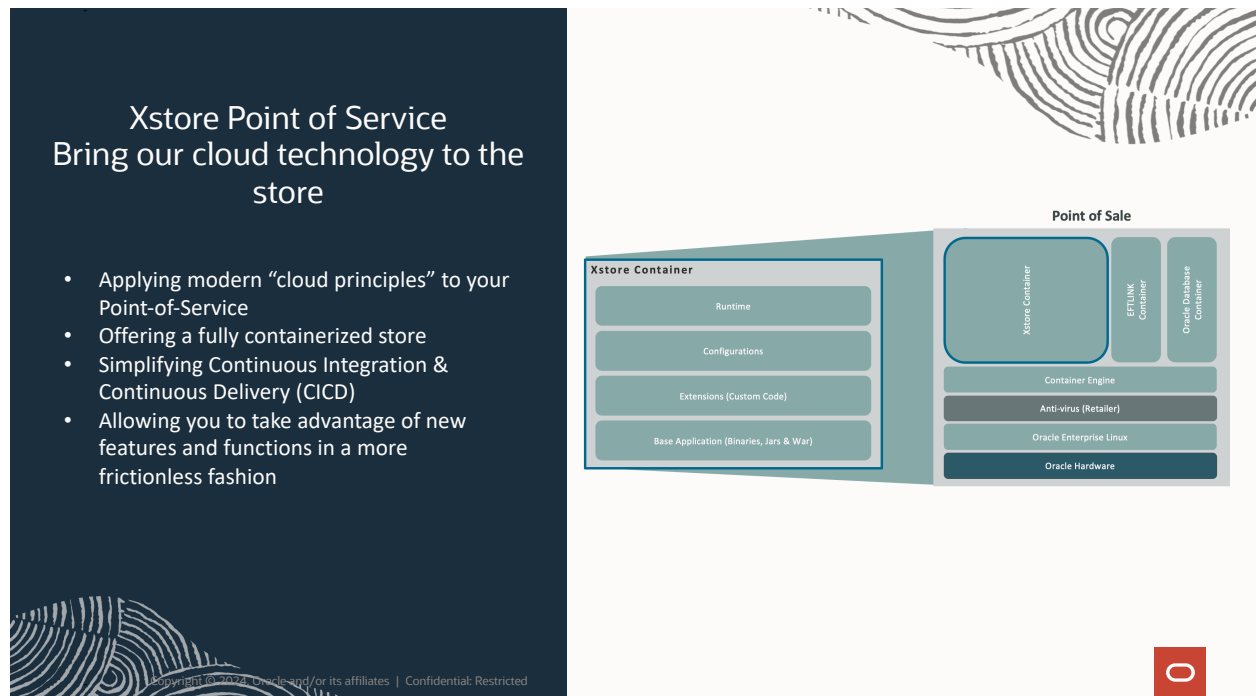


Figure-14

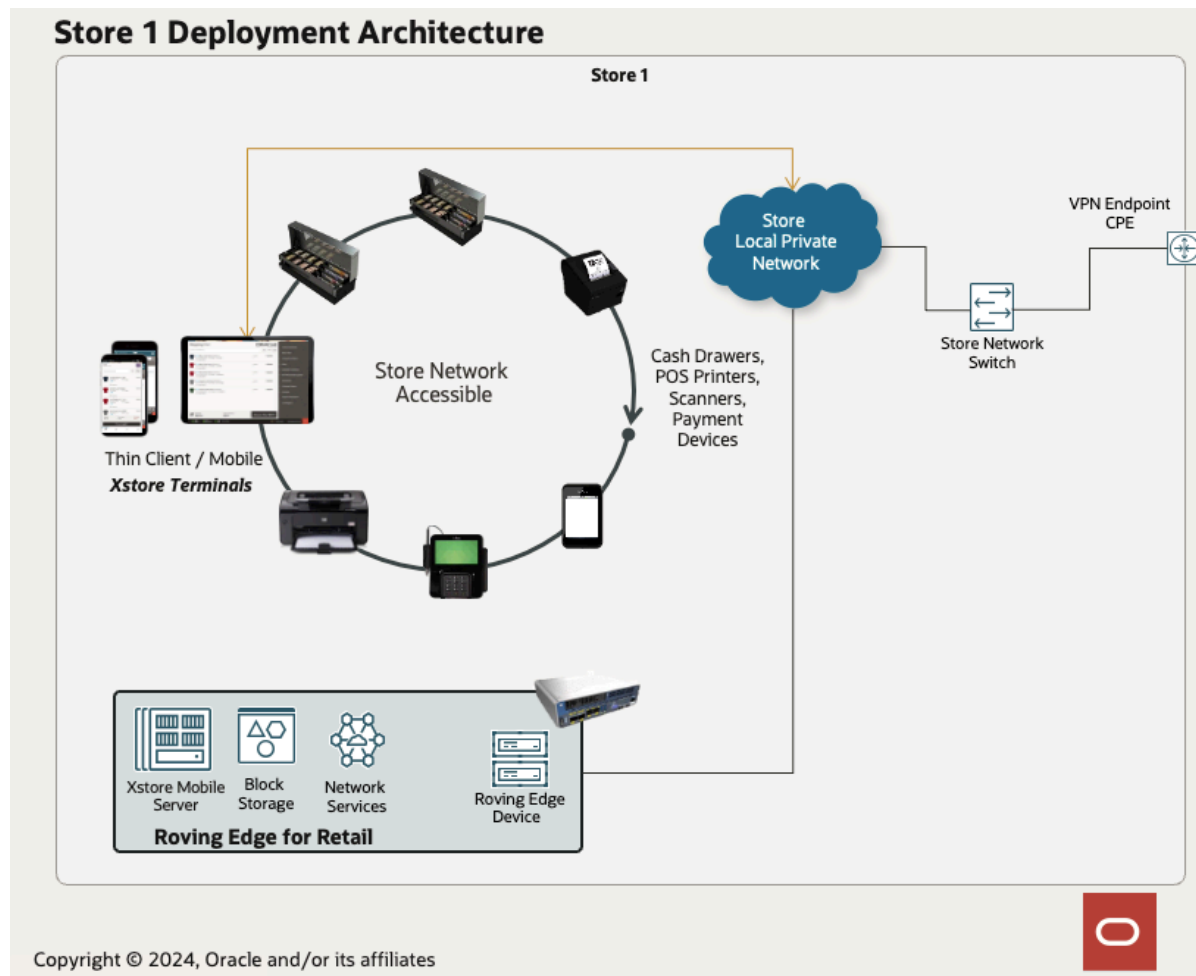


Figure-15

1. To deploy Xstore Point of Service at the edge, the first step is to obtain a container or VM image of Xstore that packages all solution components including services, interfaces, configurations and database.
2. This image file (in OCI or VMDK format) is transferred to an Object Storage bucket on the edge using the OCI CLI for Roving Edge.

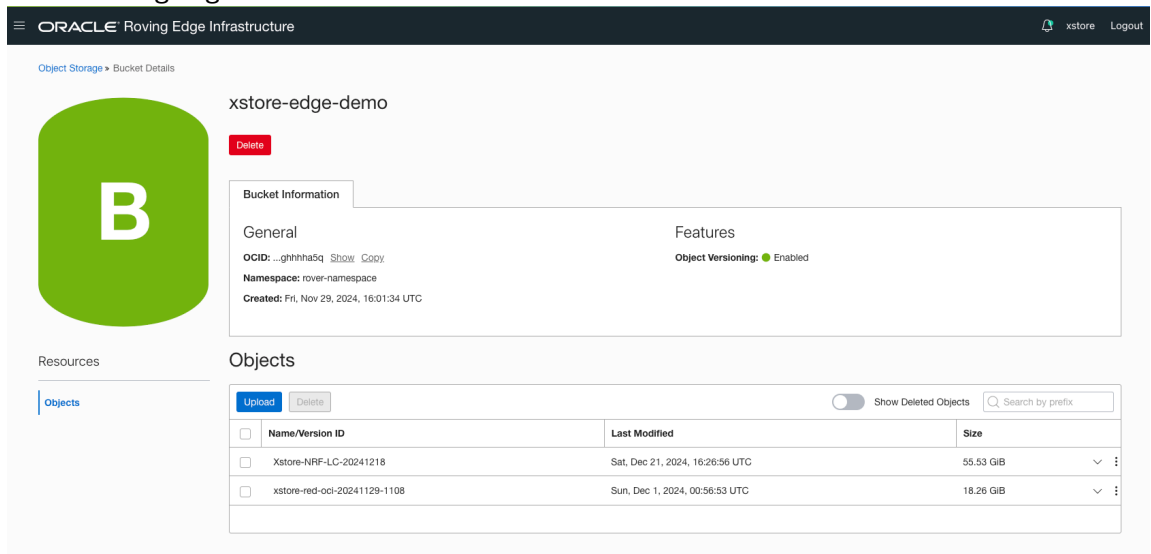


Figure-16

3. A custom image is created on the Roving Edge using the image file in the bucket – this image then becomes the source to create Xstore instances.

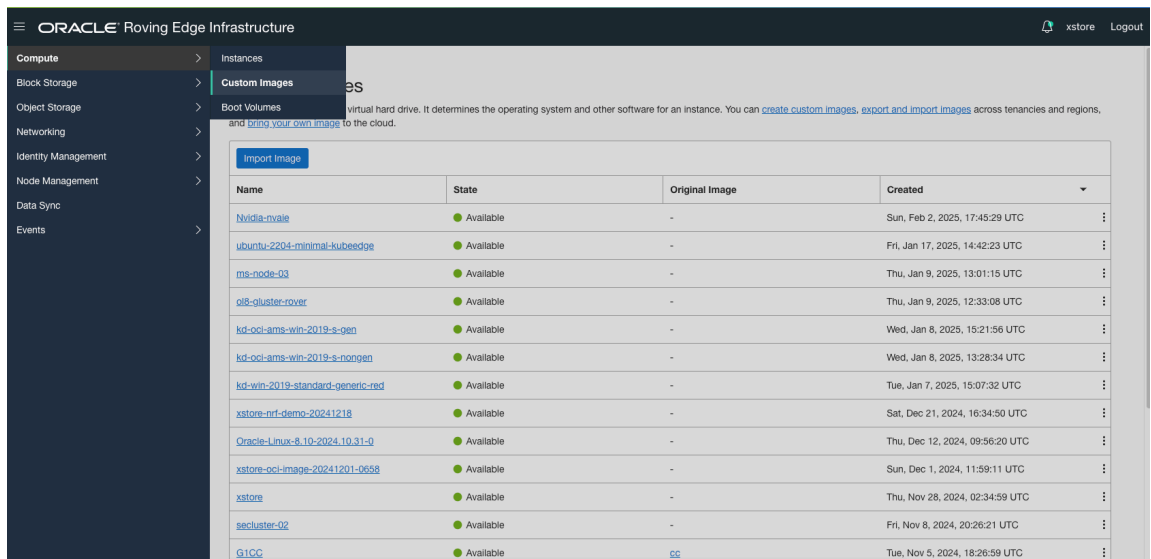


Figure-17

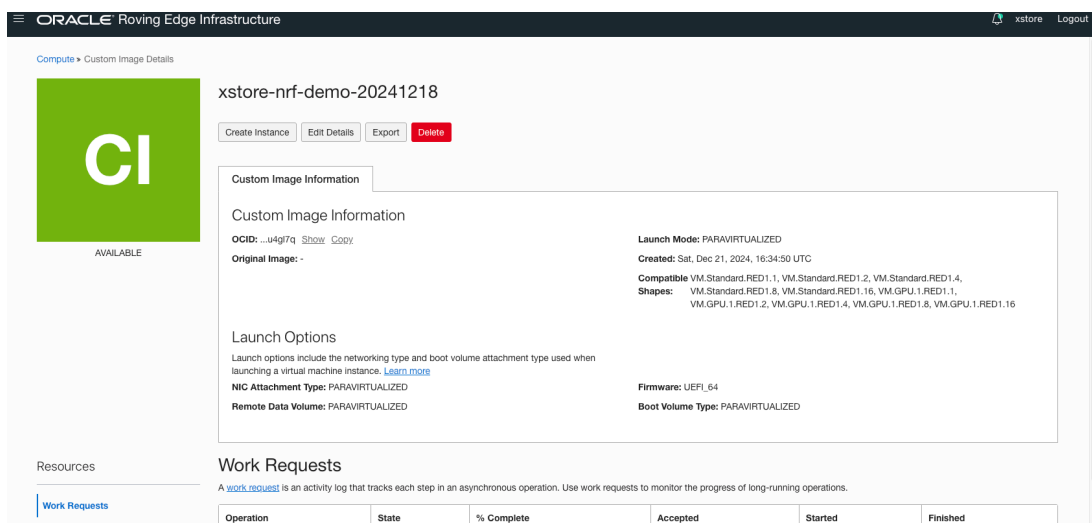


Figure-18

4. The next step is to provision one or more Compute instances using the Xstore VM image. With support for containerized deployments at the edge, these could also be deployed as container images deployed to a Kubernetes cluster. To spin up an instance, navigate to Compute > Instances on the menu and select “Create Instance”. Use the custom image created in the previous step as the source image, select the shape, network and storage size, and click “Create” to spin up the Xstore instance.

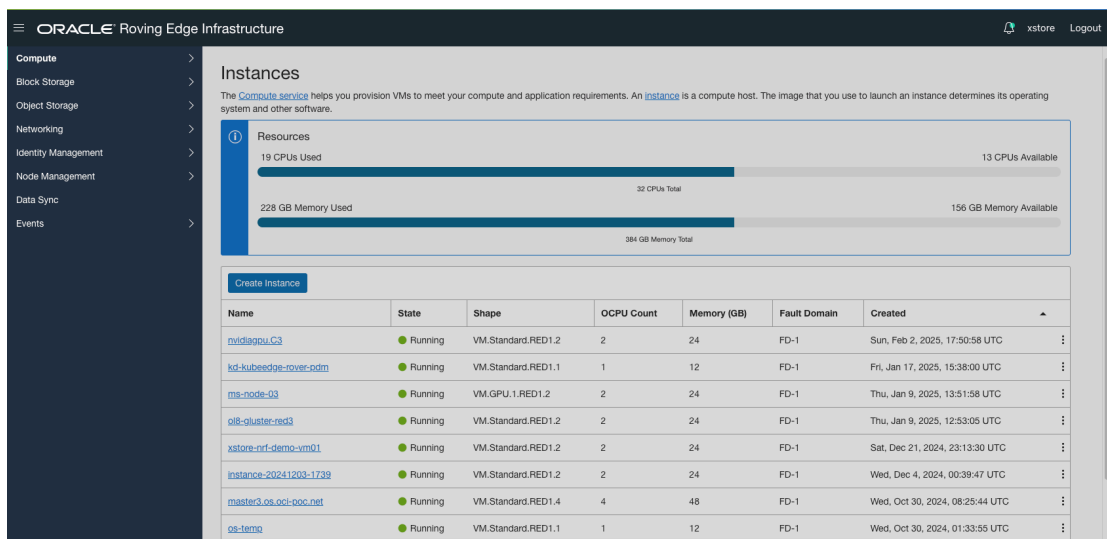


Figure-19

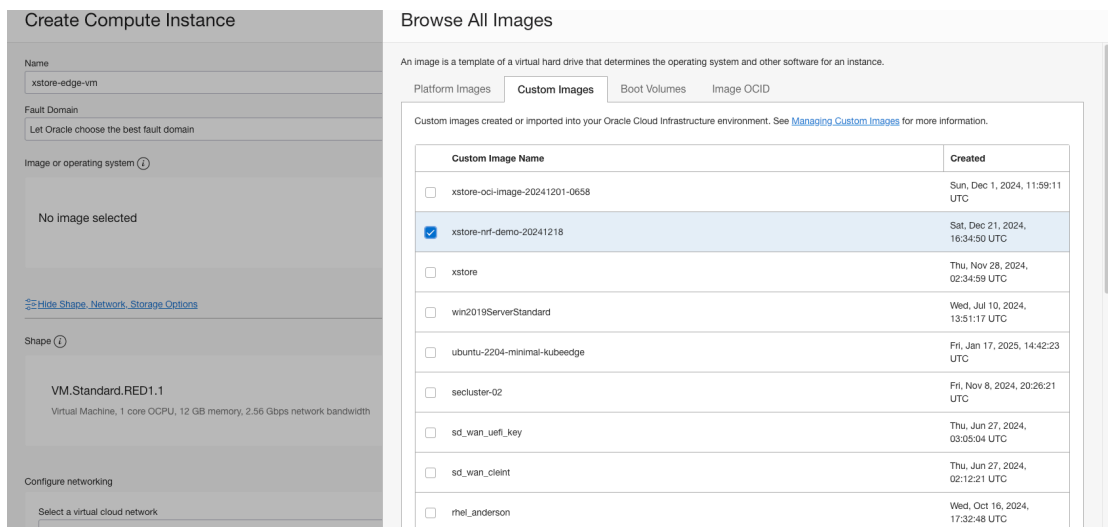


Figure-20

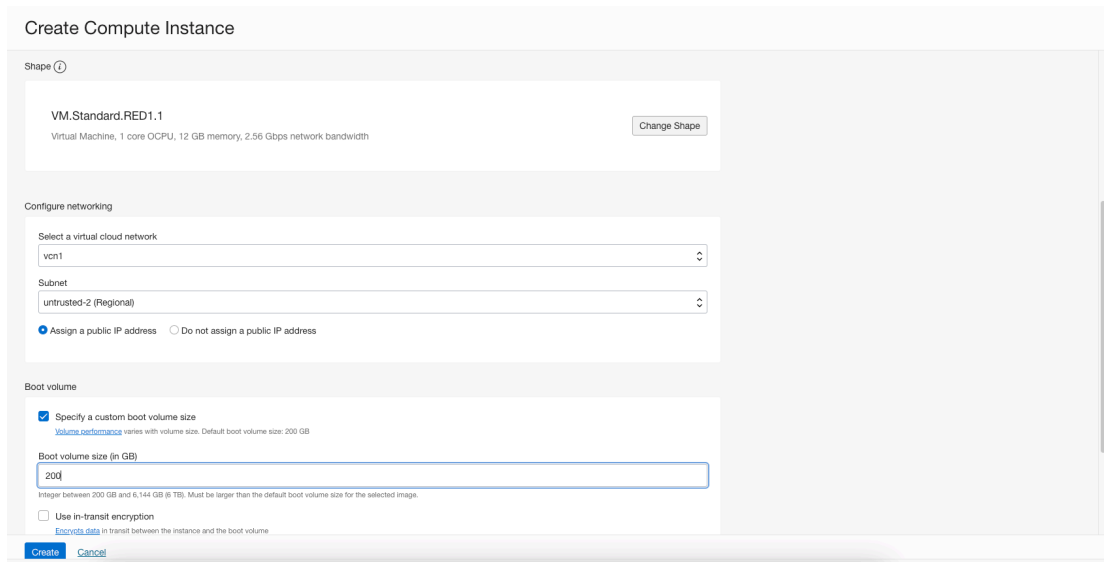


Figure-21

- When the Xstore instance is up and running, connect to the environment using a remote client to access the Xstore user interface. Xstore POS can be configured to connect with thin client and peripheral devices at the store, including terminals, printers, scanners, payment devices, mobile devices and others.

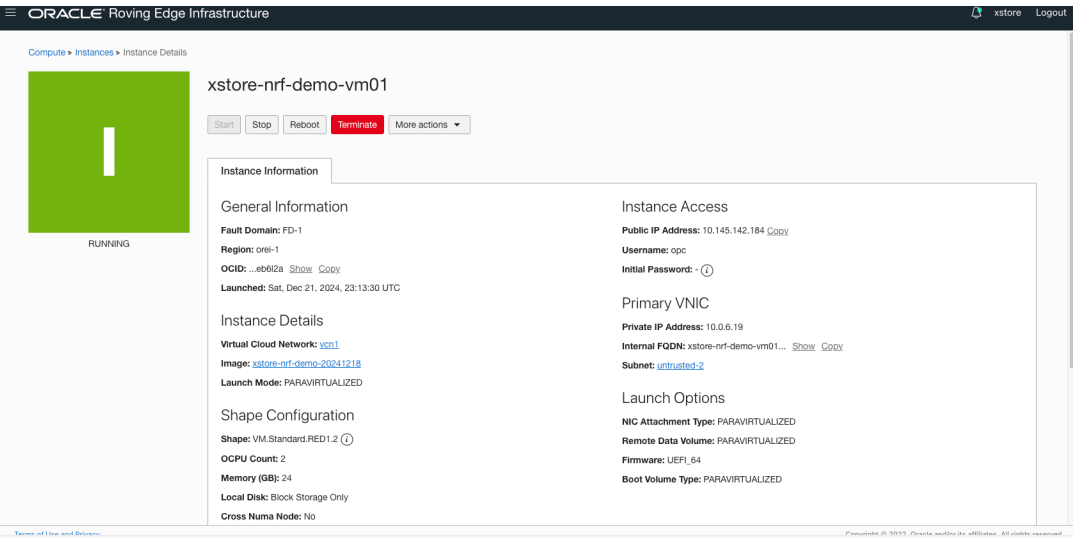


Figure-22

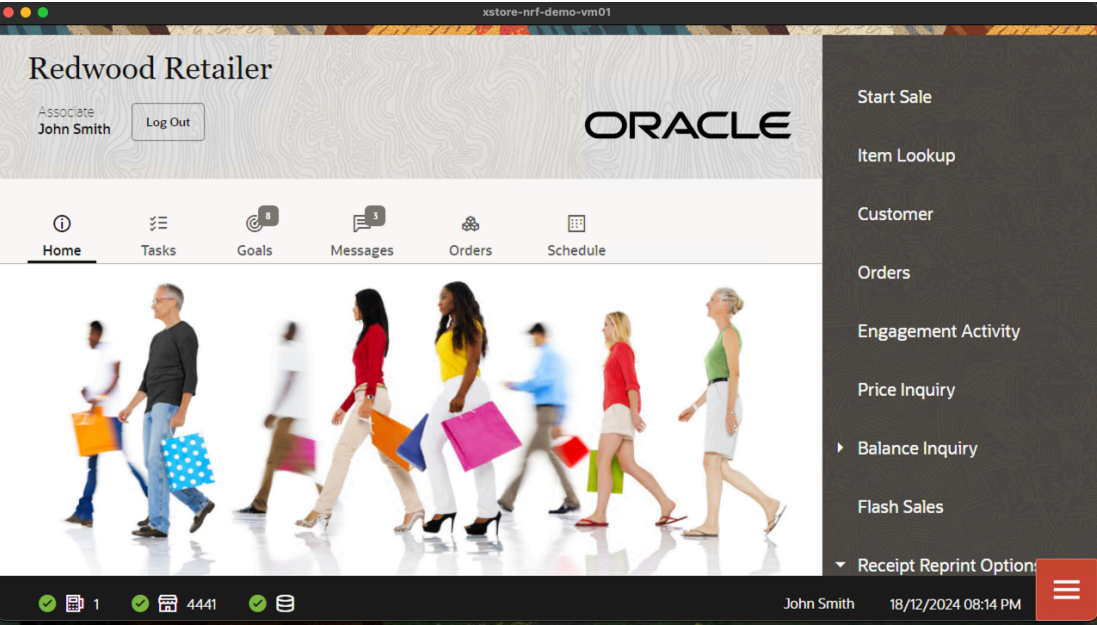


Figure-23

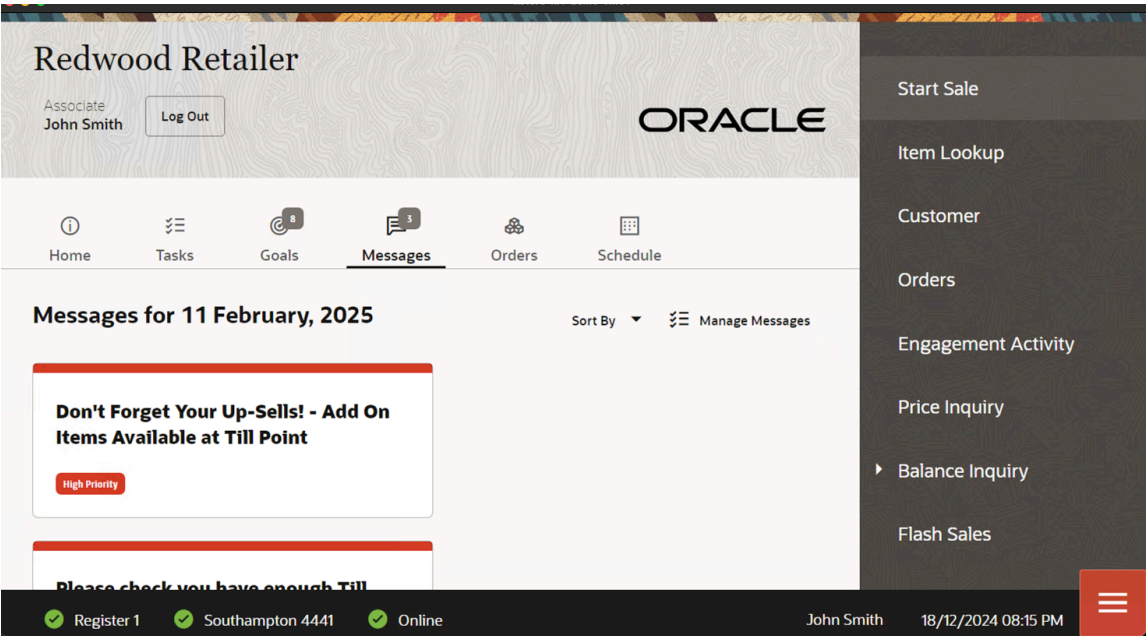


Figure-24

Administration – Operations and Monitoring

Roving Edge devices can be monitored and managed using the OCI Roving Edge console, that provides a consistent user experience and capabilities similar to the OCI Console for public cloud infrastructure. On the Roving Edge console, the System Health page provides details on resource utilization and available capacity. Devices can generate and stream metrics on device performance and health regarding block volume storage. These metrics are stored in an InfluxDB database setup in OCI. For more details, see [Roving Edge monitoring documentation](#).

Roving Edge deployment fleet also support centralized monitoring and management using OCI Cloud monitoring and management infrastructure. The diagram below illustrates centralized fleet monitoring and management using OCI Observability & Management services. A Utility VM running on the edge device with Prometheus for monitoring, Loki for log aggregation and Grafana for visualization enables capture and streaming of monitoring metrics and logs to OCI.

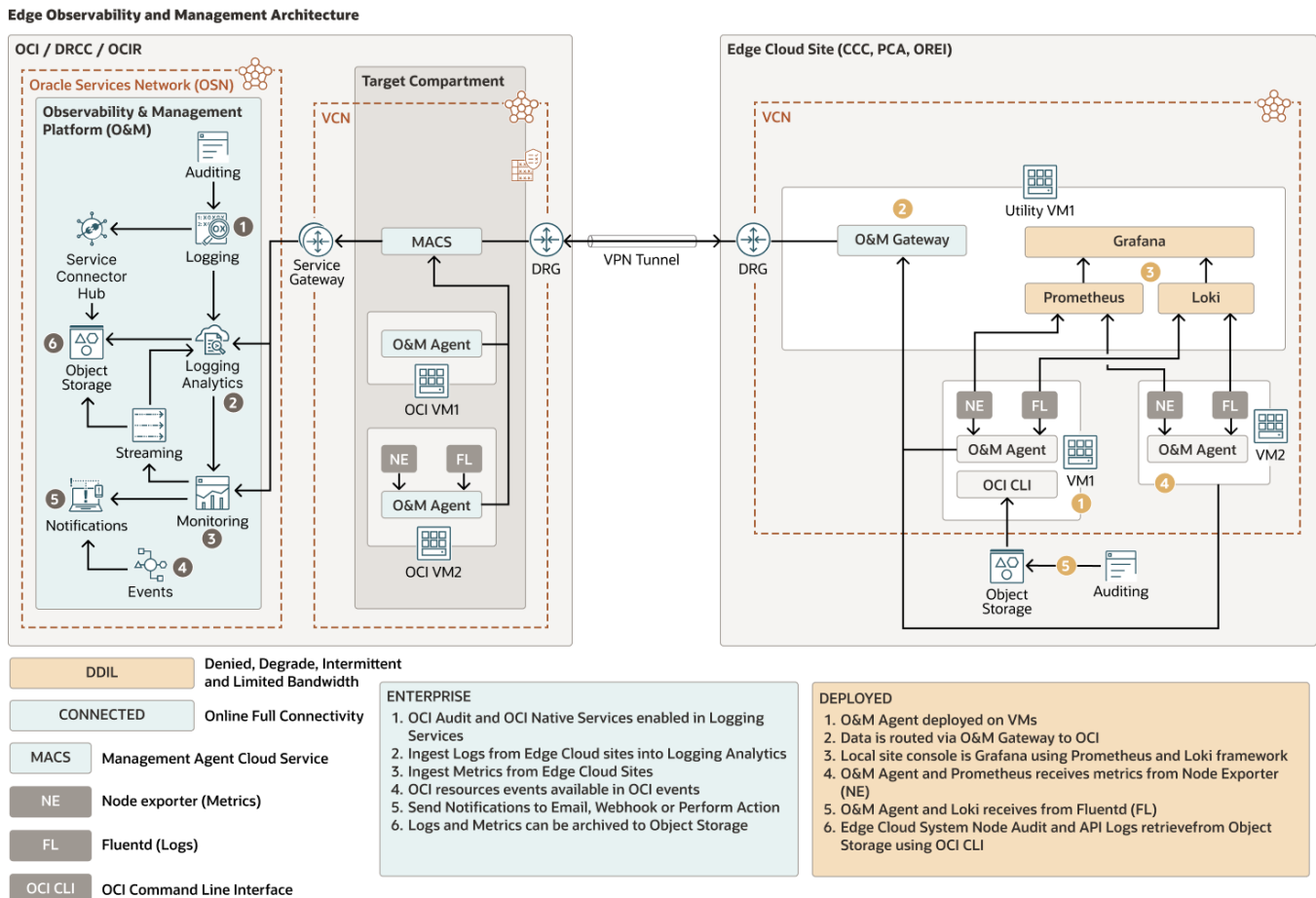


Figure-25

Oracle Edge Solutions for Retail

Learn more about OCI's Edge capabilities through our portfolio of solutions – [Oracle Compute Cloud@Customer](#), [Oracle Private Cloud Appliance](#) and [Oracle Roving Edge Device](#), and explore a world of opportunities at the Edge. Reach out to your Oracle account team today.

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