ORACLE

RIP CentOS

Now what?

David Gilpin

Principal Product Manager

Oracle Linux & Virtualization PM Team

January 20, 2022

A little bit about me

- Been in the Oracle Linux team for 12+ years
- Known Bob Netherton for over 20 years (yikes!)
- Been involved with UNIX since 1985 < not a typo
- Tektronix UNIX Workstations
- Played with SunOS, Solbourne, had a Tadpole laptop
- AIX, hpux
- Linux since about 1998 (Slackware…)
- Ham Radio licensee (K5GIL Amateur Extra), Volunteer Examiner, Skywarn Spotter

December 8, 2020

"CentOS Linux 8, as a rebuild of RHEL 8, will end at the end of 2021. CentOS Stream continues after that date, serving as the upstream (development) branch of Red Hat Enterprise Linux."

Rich Bowen

CentOS Community Manager, Red Hat

CentOS Project shifts focus to CentOS Stream

CentOS Linux 8 is now EOL

Since this fell during the holiday season, zero-day support is extended for 11 more days, ends January 31, 2022.

December 8, 2020

"CentOS Stream isn't a replacement for CentOS Linux"

Chris Wright

Senior VP and CTO, Red Hat

[CentOS Stream: Building an innovative future for enterprise Linux](#)

What are people saying?

"Have you looked at Oracle Linux yet?"

Tales from the Datacenter v2.0

"Oracle Linux is a RHEL-based Linux distribution developed by Oracle. It is one of the best alternative to CentOS Linux"

OSTechNix

"Lately, Oracle Linux has been quicker in re-basing against new RHEL releases than CentOS itself. Hence why in our article earlier this week about CentOS 8 going away, Oracle Linux is worth mentioning as an alternative"

Phoronix

"Another alternative could be the Oracle Linux from Oracle. Oracle Linux is compiled straight from RHEL source code with Oracle branding"

DebugPoint.com

"The closest alternative option to CentOS 8 Linux with RPM package management is the Oracle Enterprise Linux or OEL"

Linux Shout

"Oracle Linux as a replacement for CentOS probably makes the most sense for shops that already have a large Oracle presence"

ARS Tecnica

"With CentOS being replaced with CentOS Stream, perhaps it is the right time to give Oracle a chance?"

It's FOSS

"When Oracle Corporation, a company that is not exactly known for being friendly to free software and open source, appears to be more friendly to Linux users than Red Hat, then it is time for people to sit up and take notice"

ITWire

"If developers want a free as in beer RHEL clone, the next best choice might be Oracle Linux"

NixCraft

"If everything you need or want is a free-as-in-beer distro that monitors RHEL exactly, Oracle Linux may be your new residence"

Latest News by WordPress

Oracle Linux is perfectly positioned to step into this gap

"Oracle Linux can be a real lifeline for CentOS users who feel abandoned. It's open source, free, and compatible with their existing deployments."

Marc Staimer

Sr. Analyst, Wikibon

https://www.oracle.com/a/ocom/docs/dsc-ol-centos-replacement.pdf

Why should CentOS users start using Oracle Linux?

Open-source replacement for CentOS. Freely available with community support.

- Completely open-source binaries, security fixes, and errata

- Use as much or as little as you want for free anywhere

- Emphasis on security makes us even better
  - Oracle Linux ships with secure defaults
  - Security evaluations (e.g. FIPS and Common Criteria)
  - Ksplice zero-downtime live patching with Premier Support

- Choices of modern kernels

- Extras like KVM virtualization, Kubernetes engine, and Ansible included

- Making the switch from CentOS to Oracle Linux is proven and easy

The Winner for the Best CentOS Linux Replacement is...
Oracle Linux

by, Marc Staimer
September 2021

Could Oracle Linux be the Logical Enterprise-Ready CentOS Replacement?

Brittany Day   4 - 7 min read   6428   11/10/2021

https://linuxsecurity.com/features/could-unbreakable-oracle-linux-be-the-logical-enterprise-ready-centos-replacement

Oracle Linux & Virtualization Overview

An optimized and secure operating environment for digital transformation

Agenda

- Introduction – Oracle's contributions and commitment to Linux
- Oracle Linux and Virtualization key capabilities
  - Linux OS
  - Cloud native environment
  - Infrastructure management
  - Virtualization
- Oracle Linux for Oracle Cloud Infrastructure
- Running Oracle Linux in AWS and Azure
- Switch from CentOS / Red Hat Enterprise Linux (RHEL) to Oracle Linux
- Additional information

Kernel

Databases

Languages, interpreters

python OpenJDK php node

Virtualization, containers, emulation

podman KVM QEMU LXC / LXD

Web server, cache, proxy

NGINX HAPROXY APACHE HTTP SERVER PROJECT

Security, crypto libraries

LIBSECCOMP OpenSSL Let's Encrypt OpenSCAP

Boot loader, firmware interface

GRUB2

Toolchain: compilers, linkers, C, C++ libraries

GNU Toolchain

What makes a
**Linux
distribution?**

Developed and/or maintained by:
**Google, IBM/Red Hat, Intel, Linux
Foundation, SUSE, Oracle,** countless others

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Kernel

Databases

MySQL

Languages, interpreters

OpenJDK

Virtualization, containers, emulation

KVM

QEMU   LXC / LXD
Linux Containers

Web server, cache, proxy

Security, crypto libraries

LIBSECCOMP

Boot loader, firmware interface

GRUB2

Toolchain: compilers, linkers, C, C++ libraries

GNU Toolchain
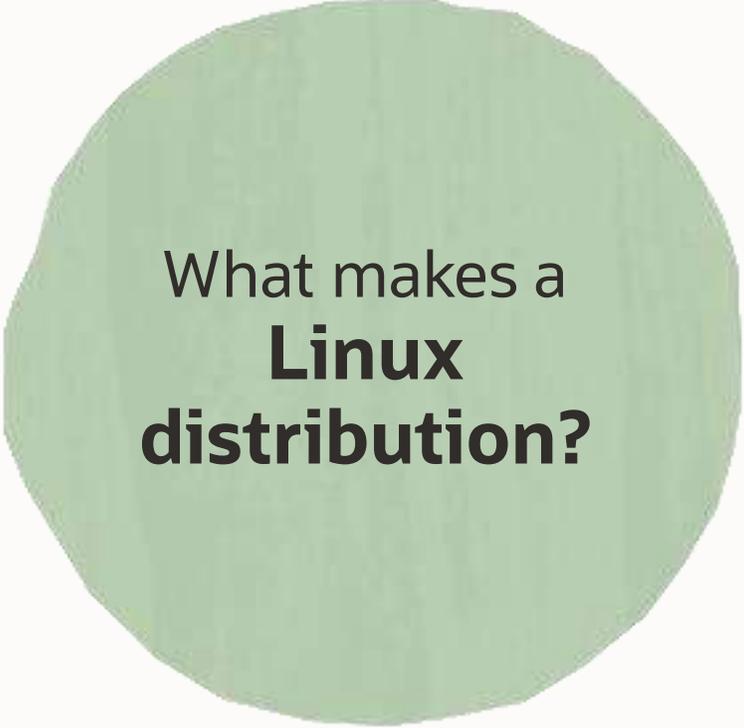
What makes a
Linux distribution?

Developed and/or maintained by:
Oracle

Top 4
Kernel contributor

Oracle's contribution in core Linux kernel
(fs, mm, kernel) since 5.10

Source: git.kernel.org

Changesets

Oracle	7.5 %
SUSE	9.4 %
IBM/Red Hat	7.9 %

0   100   200   300   400

Lines changed (thousands)

Oracle	7.3 %
Google	11.2 %
SUSE	10.7 %
IBM/Red Hat	9.4 %

0   2   4   6   8   10

Employers with most sign-offs

Oracle	5.9 %
Linux Foundation	10 %
SUSE	12.8 %

200   400   600   800

Linux kernel upstream contributions and focus areas

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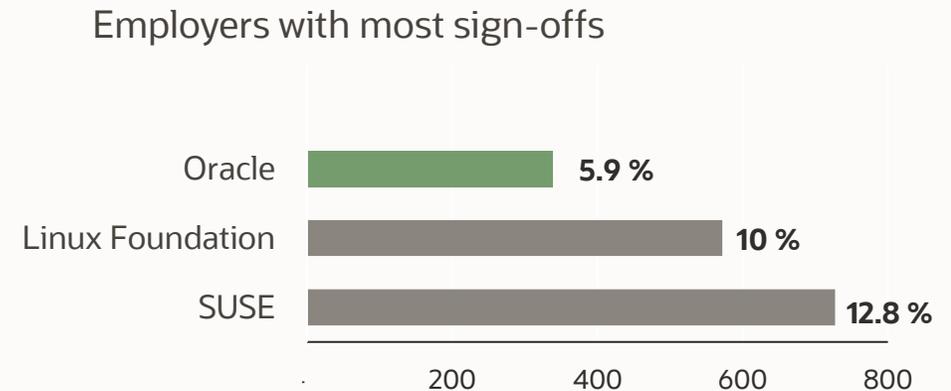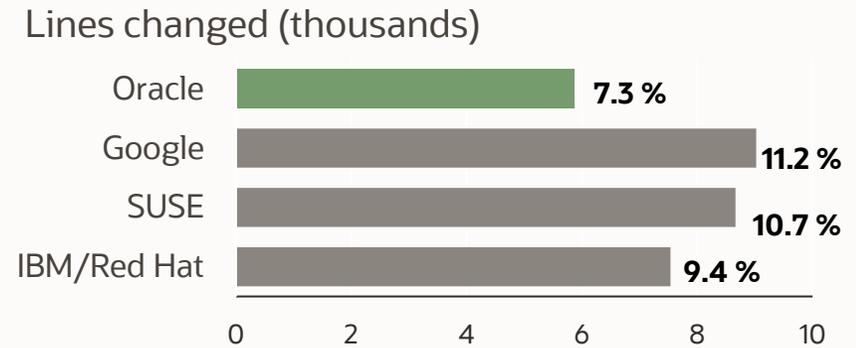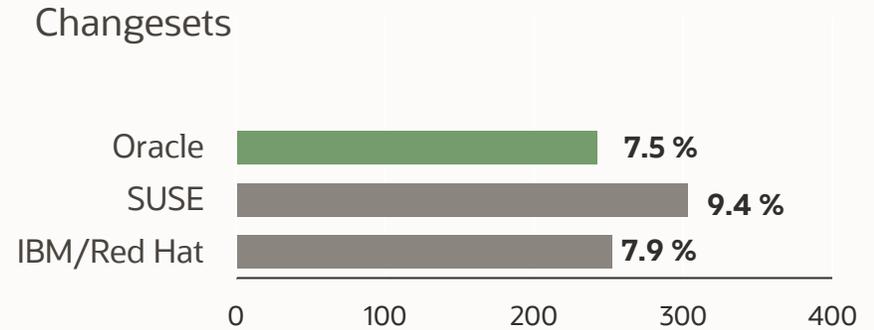
Oracle Linux – 20+ years of contribution and growth
Free to download and use since 2006

1998 — | **2020**

First commercial RDBMS for Linux

First x64 Linux Port

Unbreakable Linux Launch

Oracle Linux Free to download and use (2006)

Oracle Linux support announced in 2006

Exadata engineered with Oracle Linux

Oracle joins Linux Foundation as founding board member

Unbreakable Enterprise Kernel

Oracle Linux errata downloads free (2012)

Ksplice zero-downtime patching

DTrace dynamic tracing

Oracle joins Open Container Initiative

Oracle joins CNCF as Platinum member

Oracle Linux for Arm

Cloud Native Environment

First Linux with NIAP certification

First Autonomous Linux in the cloud

"On average, an Oracle kernel engineer sent an upstream patch or review every 10 minutes during the last year."

Wim Coekaerts
Oracle SVP, Software Development &
Vice Chairman, Linux Foundation

Oracle Linux
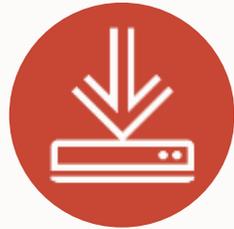
Free download
Including updates. No license or subscription fees
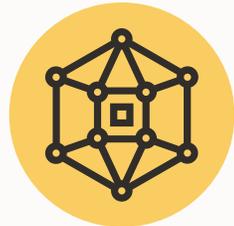
Compatible and enhanced
14+ Years. Zero compatibility bugs logged

Designed for all workloads
Oracle and third-party apps, DBs, Clouds, x86 & Arm

Oracle Linux
Recent releases

OL Automation Manager
Ansible/AWX based automation

UEK5 U5

UEK6 U2
New slab memory controller, NVMe enhancement

OCNE 1.3
K8S and CRI-O 1.20
Operator lifecycle manager

OL KVM templates for DB

OL7.6 CC and NIAP PCL

OL8 STIG published

UEK6 U3
Wireguard support, io_uring async I/O framework, enhanced nested virtualization on AMD platforms

OCNE 1.4
K8S and CRI-O 1.21
Add support for OCI and GlusterFS storage

Dec 2020   **Jun 2021**   **Dec 2021**

OL Manager
Based on Spacewalk and supports OL 8 clients and module-enabled repos

OLVM 4.3.10
OL 7.9 and UEK6 as KVM hosts
Huge pages support

OL STIG image in OCI

OL7 to OL8 upgrade with Leapp

OL 8.4

Arm based OL Cloud Developer image

OL 8 Cloud Developer image

OSMS
Adds support for Autonomous Linux with critical events monitoring and Ksplice integration

Gluster Storage 8

OL 8.5

We run the same Oracle Linux as our customers on-prem and in cloud

Oracle Cloud runs on our Linux

Applications

Infrastructure

100,000s of servers

100s millions of tx/day

Oracle's Engineered Systems run on our Linux

Exadata

Big Data Appliance

Database Appliance

Private Cloud Appliance

Our internal systems run on Oracle Linux

ERP

CX

HCM

Millions of tx/day

We develop our products on Oracle Linux

Applications

Database

Middleware

10,000s of developers

Oracle Linux & Virtualization key capabilities

Single operating environment integrating many infrastructure software components

- **Linux operating system**

- Cloud native environment

- Infrastructure management

- Virtualization

Choice of Oracle Linux kernels

RHEL application binary compatible user space

- **No reported incompatibility ever**
- 1000's of applications available
- Running on 100,000's systems

Unbreakable Enterprise Kernel (UEK)

- Based on recent stable mainline kernel release
- Latest features and innovations
- No risk feature backports into old kernels
- Supported across multiple major versions of Oracle Linux
- Powers Oracle Engineered Systems and Oracle Cloud
- Source code: github.com/oracle/linux-uek

OR

RHEL Compatible Kernel (RHCK)

- 100% binary compatible kernel
- Oracle supplies patches and updates
- For customers that require 100% binary compatibility with RHEL

Tracking upstream releases (matching "base" and "update" repos)

Major release — **3 months** — Oracle Linux 5 through Oracle Linux 8

Minor release — **5 business days** — Oracle Linux updates available on ULN & Oracle Linux yum server

Errata — **1 business day** — Oracle Linux errata updates. Some security fixes were delivered ahead of RHEL

Oracle Linux runs on all major infrastructure hardware

- Oracle Linux supports Intel & AMD (x86-64) and Arm (aarch64) platforms in the cloud or on-premises

  - Hardware compatibility list: https://linux.oracle.com/hardware-certifications

- Support the latest server chips and technologies from Intel and AMD, including all processor features, robust security mitigation, and performance optimization

  - AMD Secure Memory Encryption (SME)

  - Intel Optane DC Persistent Memory (PMEM)

- Oracle Linux 7 and 8 are also available on 64-bit Arm platforms (aarch64)

  - Same packages and advanced capabilities you expect with Oracle Linux (Ksplice, DTrace, errata releases, etc.)

  - Container runtime, MySQL, OpenJDK, EPEL, Software Collection Library, and Application Streams available for development

Extensive Oracle Linux partner ecosystem

- Applications that run on RHEL also run on Oracle Linux

- Thousands of industry leading ISVs have certified their solutions on Oracle Linux

- Apps certified on Oracle Linux run wherever Oracle Linux runs – clouds and on-premises environments

- Improve time to market and simplify deployment of applications

Oracle Linux ISV Catalog
URL: https://www.oracle.com/linux/isvcatalog

Ksplice live patching – light-years ahead of competition

- Growing security challenges
    - Severe vulnerabilities come out all the time
    - Containers patching issues
    - Time to plan scheduled downtime
- Ksplice inspector helps you identify vulnerability proactively
- Ksplice rapidly patches security vulnerabilities with no downtime
    - Applications continue running
    - Container and VM workloads are not disrupted
    - Systems are up to date and secure
- Keep critical systems patched with no downtime
    - 100,000s of Oracle Cloud servers patched in hours
    - Powers Oracle Autonomous Linux
- **Proven: 100 million+ updates delivered**

ORACLE

Staying Ahead of
Cyberthreats:
Protecting Your Linux
Systems with Oracle Ksplice

The Advantages Of Zero-Downtime Patching

Oracle Ksplice – light years ahead of the competition
Easy, comprehensive, non-disruptive patching

	Oracle Ksplice	Red Hat kpatch
Complex patch installation	Yes, almost any part of the kernel	No, limited to functions
User-space patching	✓	✗
Safety checks	✓	✗
Known exploit detection	✓	✗
Backing out a patch without reboot	✓	✗
Support for OL/RHEL 5*, 6*, 7 and 8	✓	✗
Support for multiple hypervisors	✓	✗
Support for 3rd party Linux distributions	✓	✗
Track record of over 100 million patches delivered	✓	✗

*Note: No new patches released for OL/RHEL 5. Extended support required for OL/RHEL 6.

Known exploit detection

- As CVEs are patched, Ksplice adds 'tripwires' for privilege escalation vulnerabilities to code that fire when erroneous conditions are triggered

- Helps report attempted exploitation of a known attack vector
  - Default is to log exploit attempt to syslog; email alerts can also be set
  - You can take specific action for specific tripwires (report/ignore)

- Helps system admins monitor systems for suspicious activity

```
# journalctl | tail

Apr 02 13:36:09 ol-7-sys kernel: ksplice:
Update 4qu6sl1z applied successfully

Apr 02 13:36:10 ol-7-sys kernel: ksplice:
Update fjrhf1fw applied successfully

Apr 02 13:36:16 ol-7-sys log-known-
exploit[22360]: exploit attempt detected;
id=CVE-2017-7308 pid=22358 uid=1001
comm=a.out lost=0
```

Not only is the exploit prevented, the attempted breach is logged to notify administrators there is an attacker on the system.

Security compliance requirements

- FIPS 140-2, the Federal Information Processing Standard (FIPS) Publication 140-2, is a public sector procurement requirement in both the United States and Canada, and recognized by many industries worldwide, for any products claiming or providing encryption
  - Cryptographic modules in Oracle Linux 7 and 6 completed
- Oracle Linux 7 Common Criteria (CC) certification was performed against the National Information Assurance Partnership (NIAP) General Purpose Operating System Protection Profile (OSPP)
- FIPS validation and CC certification demonstrate Oracle's commitment to security
- We constantly look into newer Oracle Linux updates to perform security certifications

ORACLE
Linux

Ten Simple Steps to Enabling FIPS 140-2
Mode in Oracle Linux

Oracle Linux Technical Brief

December 2020
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Public
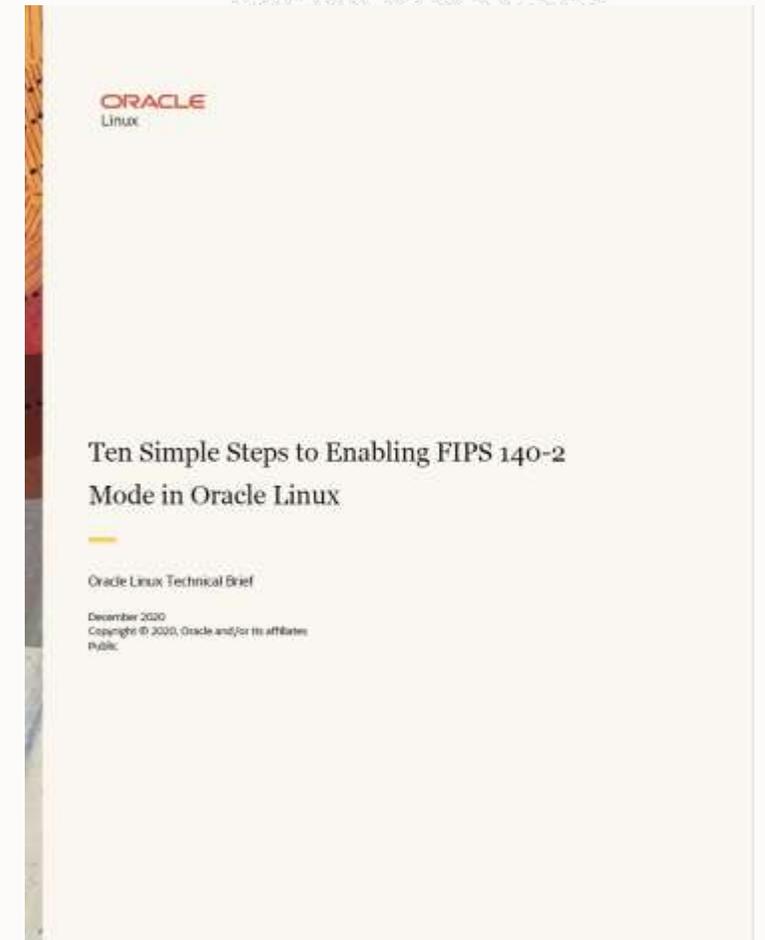
Autonomous Linux is powered by Oracle Linux

- Customers who select Oracle Linux on premises have a clear path to Autonomous Linux in Oracle Cloud
- Oracle Linux with enhanced autonomous capabilities to execute common management tasks
    - Helps eliminate complexity, human error, and manual management, ensure higher *reliability, security,* and *greater operational efficiency* at the *lowest cost*
- Integrated with Oracle Cloud Infrastructure notifications (Ksplice & yum updates, known exploit detections)
- Daily automated patching and upgrades with no downtime
    - Ksplice updates
    - yum core libraries and utils, pre-installed dependency package updates

Oracle Linux for developers

- Oracle Database development
  - Oracle Instant Client
  - Database connectors for Python, Node.js, PHP
- Software Collection Library and Application Streams
  - Current versions of GNU compiler collection, debugger, git, maven
- Web & API programming languages
  - Python, Node.js, Go, PHP
- EPEL (Extra Packages for Enterprise Linux)
  - built and signed by Oracle
  - Thousands of extra RPMs published

- Oracle Cloud Developer Image – out-of-the-box development platform built with Oracle Linux on Oracle Cloud Infrastructure (OCI)
- Oracle Linux yum server on each OCI region
- VirtualBox available on Oracle Linux yum server
- Oracle Linux Vagrant boxes

High availability solutions with Oracle Linux
Required for mission critical enterprise workloads

Oracle Clusterware

- Oracle Clusterware allows clustering of independent servers to cooperate as a single system
- Oracle Clusterware provides the integrated foundation to enable high availability and scalability for Oracle Real Application Cluster (RAC) databases and user applications
- Oracle Clusterware is included with Oracle Linux Basic or Premier support subscriptions

High availability services

- Oracle Linux high availability services comprises several open-source packages, including Corosync and Pacemaker, to provide the tools to achieve high availability for applications and services running on Oracle Linux
- Support for Corosync and Pacemaker with Oracle Linux 7 and 8 and is included in Oracle Linux Premier Support subscriptions
- Customers can migrate from Red Hat Cluster Suite

Gluster Storage for Oracle Linux

- Gluster is a scalable, distributed file system that aggregates disk storage resources from multiple servers into a single global namespace
- Available for Oracle Linux 7 and 8 on x86_64 and aarch64 platforms
  - Geo-replication support
  - Block storage support
  - Heketi scripted cluster automation
- Enables hyperconvergence of storage and infrastructure with Oracle Linux Virtualization Manager
- Integrates with Oracle Cloud Native Environment to provide persistent volume storage

DTrace real-time tracing for Oracle Linux

- Customers face challenges to debug production issues

- DTrace is a dynamic tracing tool that can be used across the entire solution stack with minimum impact to production systems
  - Fully integrated with the Oracle Linux kernels – UEK Release 4 & 5
  - Includes complete D programming language with critical providers
  - DTrace 2.0 re-implemented in UEK R6 to use the Berkeley Packet Filter (BPF), which removes DTrace dependencies on specialized kernel patches
- Use DTrace to dynamically and safely observe live production systems for performance issues, including both applications and the operating system itself
  - In addition, DTrace does a better introspection into container images

Unbreakable Enterprise Kernel 6 Update 3
Available for Oracle Linux 7 and 8

- Updated device drivers for 64-bit Intel/AMD (x86-64) and 64-bit Arm (aarm64) platforms
- Identified by 5.4.17-**2136**.xx number release
- WireGuard is now fully supported and replaces legacy IPsec and OpenVPN tunneling protocols. It is secure, easy-to-use, and faster
- Secure Boot has been modified to additionally check the platform keyring, which includes the Machine Owner Key (MOK) list. This enhancement enables third-party and custom key signed modules to be loaded whenever Secure Boot is enabled
- No need to certify applications already certified with UEK6
  - ACFS Support On OS Platforms - Certification Matrix - Doc ID 1369107.1
- Announcement with further details available at blogs.oracle.com/linux
- Updated Oracle Linux and UEK releases availability matrix at
  - https://blogs.oracle.com/scoter/oracle-linux-and-unbreakable-enterprise-kernel-uek-releases

ORACLE

NOW AVAILABLE

Unbreakable Enterprise
Kernel 6 Update 3

Unbreakable Enterprise Kernel 5 Update 5

- Introduces updated device drivers for 64-bit Intel/AMD (x86-64) and 64-bit Arm (aarch64) platforms

- Available on Oracle Linux 7 only

- No need to certify applications already certified with UEK5

- File system and storage fixes that include xfs, btrfs, CIFS, ext4, NFS, OCFS2

- Identified by 4.14.35-**2047** release number

- Announcement available blogs.oracle.com/linux

- Updated Oracle Linux and UEK releases availability matrix at https://blogs.oracle.com/scoter/oracle-linux-and-unbreakable-enterprise-kernel-uek-releases

Unbreakable Enterprise Kernel Releases

UEK Releases	Kernel Versions	Latest Release OL6	Latest Release OL7	Latest Release OL8
UEK Release 6	5.4.17	Not Available	Oracle Linux 7	Oracle Linux 8
UEK Release 5	4.14.35	Not Available	Oracle Linux 7	Not Available
UEK Release 4	4.1.12	Oracle Linux 6	Oracle Linux 7	Not Available
UEK Release 3	3.8.13	Oracle Linux 6	Oracle Linux 7	Not Available
UEK Release 2	2.6.39	Oracle Linux 6	Not Available	Not Available
UEK	2.6.32	Oracle Linux 6	Not Available	Not Available

For more details, visit
- https://blogs.oracle.com/scoter/oracle-linux-and-unbreakable-enterprise-kernel-uek-releases
- Documentation: https://docs.oracle.com/en/operating-systems/uek/

Oracle Database runs best on Oracle Linux

- Oracle Database is developed, tested and certified with Oracle Linux
- Integrated features and joint development optimize Oracle Linux for Oracle Database
  - Database Performance
  - Optimize C Library and Linux OS calls
  - Optimized compression/decompression, hashing, SIMD
  - Best-of-breed performance measurement and debugging tools
- Oracle Database Templates and Oracle Validated Configurations simplify and enable rapid Oracle Database deployments
- Oracle Linux with UEK powers Oracle's engineered systems and Oracle Cloud

Oracle Linux 8 Update 5
Generally available on November 16th, 2021

- ISO includes updated UEK R6 U3 (5.4.17-2136) as the default kernel
  - https://blogs.oracle.com/linux/post/unbreakable-enterprise-kernel-release-6-update-3-oracle-linux
- ISO includes updated RHCK (4.18.0-348)
- Available for *x86_64* and *aarch64* architectures
- Includes GCC Toolset Update to release 11
- AppStream Modules updates
  - nginx-1.20, nodejs-16, ruby-3.0, dotnet-6.0

- No re-certifications are needed for applications already certified with RHEL 8 or Oracle Linux 8
- Further details available on Oracle Linux Blog
  - https://blogs.oracle.com/linux/post/announcing-the-release-of-oracle-linux-8-update-5

Oracle Linux 7 Update 9

- ISO includes updated UEK R6 (5.4.17-2011) as the default kernel
    - https://blogs.oracle.com/linux/announcing-the-unbreakable-enterprise-kernel-release-6-for-oracle-linux
- ISO includes updated RHCK (3.10.0-1160)
- Available for *x86_64* and *aarch64* architectures
- An improved SCAP security guide for Oracle Linux 7
- Includes updated *virt-v2v* release
    - Support Debian and Ubuntu conversion to Oracle Linux KVM
- Further details available on Oracle Linux Blog
    - https://blogs.oracle.com/linux/announcing-the-release-of-oracle-linux-7-update-9
- No re-certifications are needed for applications already certified with RHEL 7 or Oracle Linux 7

Simplifying in-place upgrade from Oracle Linux 7 to 8 with Leapp utility

- The Leapp utility is a framework for updating and upgrading operating systems as well as applications. The utility's component packages enable the creation of different workflows into profiles for updating software

  - Supports x86_64 and aarch64

  - Covers both RHCK and UEK

  - Compatible with `btrfs` file systems

- Two phase process:

  - Preupgrade phase provides a detailed report showing upgrade risks and inhibitors as well as suggested remediations. Preupgrade can be executed several times until risks are cleared

  - Upgrade phase provides detailed logging and report

- Currently leapp is used to upgrade the operating system only. All standard Oracle Linux profiles on the ISO are supported

Oracle Linux 6 Extended Support
Patches access by Unbreakable Linux Network (ULN)

- Oracle Linux 6 under Extended Support from April 2021 to June 2024
- Extended Support patches are only available by ULN (linux.oracle.com)
- Critical security errata and select high-impact critical bug fixes linux.oracle.com/es/packagelist.html
- Subscribe to Extended Support (ELS) channels

| Channel Label	Channel Name	Description
ol6_x86_64_ELS	Oracle Linux 6 ELS (x86_64)	All packages released for Oracle Linux 6 Extended Lifecycle Support (x86_64)
ol6_x86_64_UEKR4_ELS	UEK Release 4 for Oracle Linux 6 - ELS (x86_64)	Latest Unbreakable Enterprise Kernel Release 4 for Oracle Linux 6 - ELS (x86_64)
ol6_x86_64_ksplice_ELS	Ksplice for Oracle Linux 6 - ELS (x86_64)	Oracle Ksplice Updates for Oracle Linux 6 - ELS (x86_64)
ol6_x86_64_userspace_ksplice_ELS	Ksplice aware userspace packages for Oracle Linux 6 - ELS (x86_64)	Latest packages for Ksplice aware userspace packages for Oracle Linux 6 (x86_64) - ELS

Oracle Linux & Virtualization key capabilities

Single operating environment integrating many infrastructure software components

- Linux operating system
- **Cloud native environment**
- Infrastructure management
- Virtualization

Oracle Cloud Native Environment

Foundation of the technology stack for next-gen apps/microservices

CLOUD NATIVE FRAMEWORK

App Definition & Development   **Provisioning**   **Orchestration & Management**   **Runtime**   **Observability & Analysis**
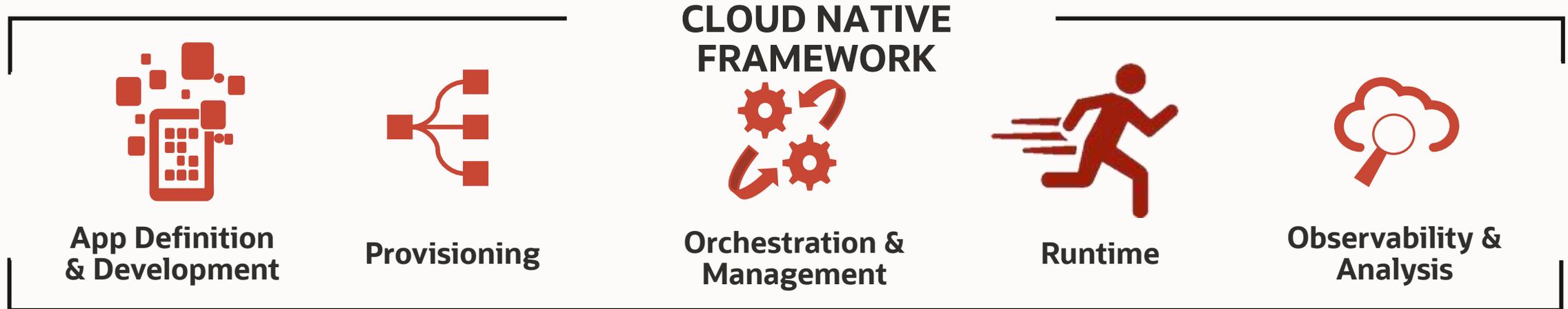
- Rich set of software components for cloud native application DevOps
- Based on open standards, specs and APIs defined by the Open Container Initiative (OCI) and Cloud Native Computing Foundation (CNCF)
- Tested and proven with Oracle products
- Integrated into a unified operating environment

Core components of Oracle Cloud Native Environment

Container runtime

- CRI-O is an implementation of the Kubernetes Container Runtime Interface (CRI)
- CRI-O runs containers directly from Kubernetes without any unnecessary code or tooling
- Supports two CNCF container runtimes
  - **runc** for trusted containers
  - **Kata Containers** for untrusted containers

Container orchestration

- The Kubernetes module has achieved Certified Kubernetes status under the Certified Kubernetes Conformance Program run by the CNCF
- Supports both single master or multiple master deployment options
- Supports either an external load balancers or will automatically deploy a software load balancer

Unified management

- An open source framework developed by Oracle that powers the installation and management of the Oracle Cloud Native Environment
- Extensible so additional functionality can be added over time
- Provides cluster-wide functionality like rolling updates, upgrades, backup and restore

Extensive ecosystem for Oracle Cloud Native Environment

Standalone container tools

- **Oracle Container runtime for Docker**
  - Includes a Docker compatible binary built and maintained by Oracle
  - Support on Oracle Linux 7 only
  - Requires UEK Release 4 or higher

- **Podman, Buidah and Skopeo**
  - upstream drop-in replacement for Docker CE
  - Conforms to OCI container and image standards
  - Available for Oracle Linux 7 and Oracle Linux 8
  - Support on Oracle Linux 8, not on Oracle Linux 7
  - RHCK and UEK Release 4 or higher

Compatible tools

Popular cloud native tools and complementary to Oracle's framework, available for self-support through open source community

- Terraform*
- Vagrant
- Ansible*
- Chef
- Puppet*
- GitLab
- Packer*
- Salt
- Clair
- Notary

* Available on Oracle Linux yum server at https://yum.oracle.com

Latest tools with no lock-in:
Oracle Cloud Native Environment

| Monitor Cloud Native projects | Preview in developer channel | Add to supported stack | Contribute improvements back to source project |

- Standards-based curated suite of open source software for cloud native DevOps
- Container runtime: CRI-O, runc, Kata Containers
- Container orchestration: Kubernetes
- Unified management
- Additional modules: Helm, Istio, Prometheus, Grafana, NGINX, and so on
- Support included with Oracle Linux Premier

Oracle Cloud Native Environment 1.4
Released in December 2021

New features introduced

- YAML Configuration File

  - A YAML configuration file that contains all the information required to create and manage environments and modules.

  - Simplified *olcnectl* commands as you no longer need to enter command line options as they are read from the file.

- Oracle Cloud Infrastructure and GlusterFS Storage

  - Container Storage Interface for OCI and GlusterFS modules added to configure Kubernetes persistent storage.

- Platform CLI Report

  - Build reports on installed environments, modules, and module properties.

  - Useful for obtaining information for validating environments, module installations, module updates, and troubleshooting.

- [Oracle Linux Cloud Native Environment Release Notes](#)

Updated and enhanced, now available!

Standard Based · Multi Tenant · Enterprise Grade · Self Service · Open Source · Centralized Control · Secure · Automation

ORACLE Cloud Native Environment 1.4

Updated Components

- Kubernetes 1.21.6
- CRI-O 1.21.4
- Help 3.6.4
- Istio 1.11.4
- Prometheus 2.30.1
- Grafana 7.3.7

Oracle Cloud Native Environment component versions

Component	Release 1.4	Release 1.3	Release 1.2
Platform API Server, Agent, and CLI	**1.4**	1.3	1.2
Kubernetes	**1.21.6**	1.20.11	1.18.18
RunC	**1.0**	1.0	1.0
CRI-O	**1.21.4**	1.20.2	1.18.4
Kata Containers	**1.12.1**	1.12.1	1.11.5
NGINX	**1.17.7**	1.17.7	1.17.7
Helm	**3.6.4**	3.5.4	3.3.4
Prometheus	**2.30.1**	2.21.0	2.21.0
Istio	**1.11.4**	1.10.4	1.9.6
Grafana	**7.3.7**	7.2.1	7.2.1
Operator Lifecycle Manager	**0.17.0**	0.17.0	-

Container-ready for Kubernetes clusters

Examples of Oracle products currently supported inside containers

- Oracle Linux
  - Releases 6, 7 and 8 with slim variants
- MySQL Community Server
- MySQL Server Enterprise Edition
- Oracle Java SE
- Oracle NoSQL Database
- Oracle Database
- Oracle GoldenGate

- Oracle Business Intelligence
- Oracle Coherence
- Oracle Middleware Infrastructure
- Oracle Data Integrator
- Oracle SOA Suite
- Oracle Tuxedo
- Oracle WebLogic Server
- Oracle HTTP Server

Available on Oracle Container Registry
https://container-registry.oracle.com

Complementary cloud native solutions:
Oracle Verrazzano Enterprise Container Platform

- An end-to-end Enterprise Container Platform for deploying cloud-native and traditional applications in multi-cloud and hybrid environments
- Based on open source components
- Simplified, automated, rapid movement of WebLogic applications to Kubernetes
- Provides multi-level platform security
- Multi-cluster/Multi-cloud/Cloud-neutral

Learn more: oracle.com/java/verrazzano/
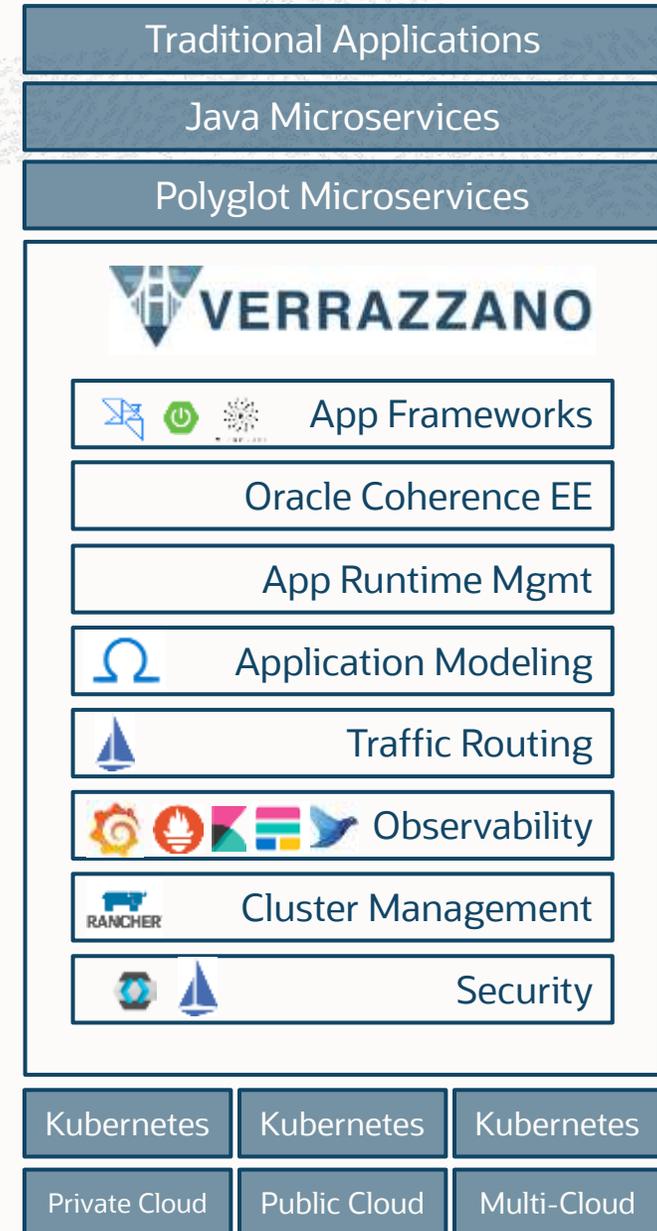
Traditional Applications

Java Microservices

Polyglot Microservices

VERRAZZANO

App Frameworks

Oracle Coherence EE

App Runtime Mgmt

Application Modeling

Traffic Routing

Observability

Cluster Management

Security

Kubernetes	Kubernetes	Kubernetes
Private Cloud	Public Cloud	Multi-Cloud

Oracle Linux & Virtualization key capabilities

Single operating environment integrating many
infrastructure software components

- Linux operating system

- Cloud native environment

- **Infrastructure management**

- Virtualization

Infrastructure management and automation options

PROVISION

ORACLE
Linux
Manager

CONFIGURE

ORACLE
Linux
Automation Manager

MAINTAIN

ORACLE
Linux
Manager

**Enterprise Manager
Cloud Control**

13c

Value of Oracle Linux Automation Manager/Engine

Enables modern provisioning, deployment, configuration management, and task automation; included with Oracle Linux Premier support

- Create and reuse playbooks to install software and implement changes on IT stack
- Control configuration drift, by ensuring systems remain in the state defined by administrators and users

- Improve security standards and quickly remediate deviations from policies or critical settings

- Define roles to control what users are allowed to modify or change systems

Foundation for standardizing automation across IT domains

Upstream automation open source projects

ANSIBLE

AWX

- Complete automation framework and orchestration capabilities
- Enables SW provisioning, configuration management, and application deployment
- Simple agentless push architecture
- Uses "Playbooks"

- Web-based user interface, REST API, and task engine
- Centralized management, Role-Based Access Control (RBAC), and API access for production environments
- Automates tasks such as job scheduling, inventory management, reporting, workflow automation, credential sharing, and tooling

Use cases and key benefits – Oracle Linux Automation Manager/Engine

Agile IT operations

- Playbooks automate tasks, especially for IT operations

Infrastructure standardization across all IT estates

- Standardize configuration and lock in standards everywhere

Capture & incorporate best practices from domain experts

- Ensure more secure and optimally configured systems

Configuration as code establishes parameters and settings

- Outcomes and tasks become auditable, versionable, repeatable, recoverable

Oracle Linux Automation Manager key capabilities
The hub for all automation tasks

- Configuration of users, groups and permissions
  - Base users can be enhanced with varying levels of privilege-based role-based access control
- Configuration of job templates
  - Job templates are the definitions and parameters for the execution of a Playbook, useful for collaborative and reusable job runs content and collaboration between teams
- Inventory management
  - Inventories are logical groups of hosts where individual modules or playbooks can be run
- Project repositories
  - Projects are a logical store for your playbooks which can be either stored locally on the Oracle Linux Automation Manager or externally sourced from a Source Control Manager (SCM) facility (e.g. *git*)
- Credential management for project source and inventory nodes
  - Credentials (e.g machine-based SSH credentials and *git* Access tokens) are centrally stored and managed for Oracle Linux Automation Manager inventories and projects

Delivering automation with Oracle Linux
Example scenario to configure SELinux across your IT infrastructure

Sends Playbook to configure 100 development servers

User selects or creates a playbook that configures an environment with the same SELinux configuration as production

ORACLE
Linux
Automation Manager

Sends configuration commands

SELinux Environment is configured

Other examples, configuring:
- Firewall
- Network
- Storage
- Compute
- Software
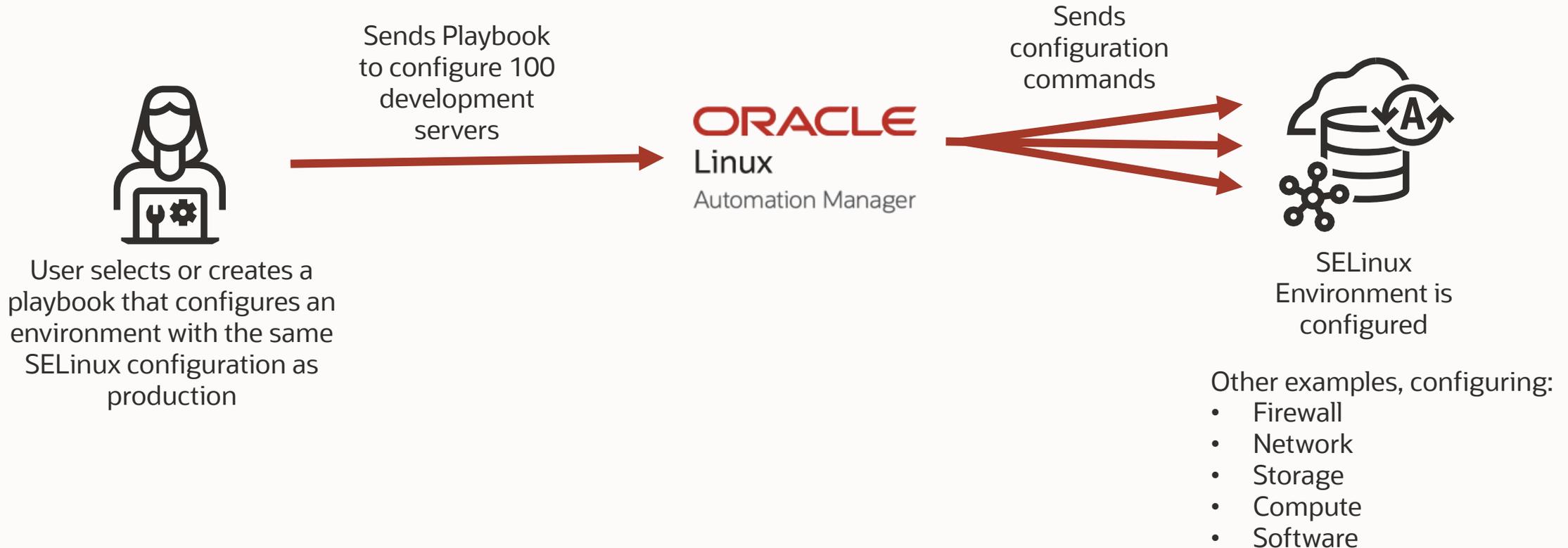
Oracle Linux Manager 2.10

- Designed to manage all stages of the Oracle Linux life cycle
  - Provisioning
  - Patching/Errata Handling
  - Configuration
  - Auditing
  - Decommissioning

- Enhanced by Oracle to support for Oracle Linux 8 Modules and AppStreams

- Provides a simple migration path for existing Satellite 5.x and Spacewalk customers

Oracle Linux Manager 2.10

Enhancements to support DNF modularity in Oracle Linux 8

Errata and package handling for channels with modules

- Errata and package upgrades are correctly filtered to only those relevant to the module:stream combinations enabled on the client
- Only works with Oracle Linux not module-enabled repos from other vendors

Module support for copying packages between channels

- Copying packages from a modular channel to another modular channel will copy the module metadata for those packages as well
- Additional module dependencies will be included
- Only works with Oracle Linux channels

Module support when cloning software channels

- Module metadata is now cloned if the channel is modular

Oracle Linux Manager 2.10
Enhancements to support DNF modularity in Oracle Linux 8

Module support for channel life cycle management

- Initializing a modular channel will copy the source channel's module metadata
- Promoting a modular channel will copy missing module metadata from the source channel to the target channel
- Promoting a modular channel with the `clear` option set, will overwrite the target channel's module metadata with the source channel's metadata
- Creating an archive of a channel will copy the module metadata from the specified channel into the new archive channel
- Rolling back a channel to an archive will copy the module metadata from the archive channel to the target channel

Oracle Enterprise Manager 13c

- Enables a simplified approach to Oracle Linux management in a single place beginning with Oracle Enterprise Manager 13c Release 3
- Provides both kernel and user space Ksplice on and off line update management
- Brings together the Enterprise Manager legacy Linux patching and Bare Metal Provisioning (BMP) frameworks under one menu
- Integration with Oracle Linux KVM and Oracle Linux Virtualization Manager in Oracle Enterprise Manager 13c Release 4
- Continues to support Oracle VM
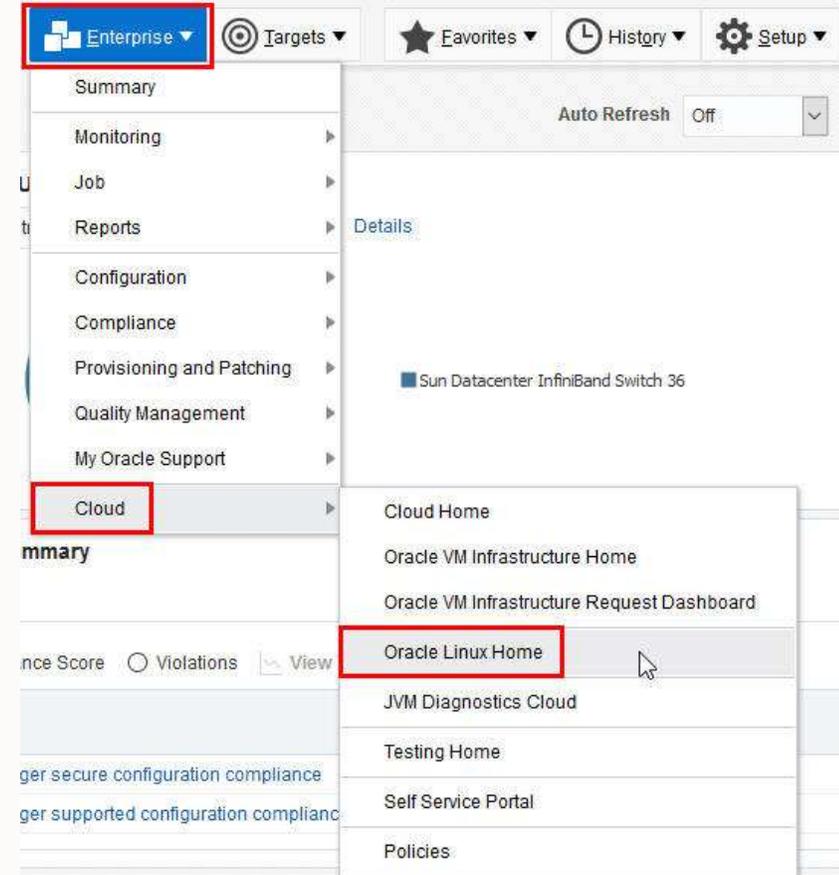
Oracle Linux Home Target in Oracle Enterprise Manager 13c

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Oracle Linux & Virtualization key capabilities

Single operating environment integrating many infrastructure software components

- Linux operating system
- Cloud native environment
- Infrastructure management
- **Virtualization**

Why Oracle Virtualization?

All the modern technology benefits of KVM and oVirt, plus:

+ No licensing costs
+ Support included with Oracle Linux Premier Support
+ Increases security and uptime with Oracle Ksplice
+ Lowers costs with hard partitioning for Oracle products
+ Provides rapid application deployment with templates for full software stack
+ Certified for Oracle software
+ Designed for hybrid cloud
+ Single pane of glass management with Oracle Enterprise Manager integration
+ No vendor lock-in

Oracle Database Templates for Oracle Linux KVM
Rapid Oracle Database and RAC deployments

- Within minutes, users deploy a single instance Oracle Database or an Oracle Real Application Cluster in Oracle KVM, managed by Oracle Linux Virtualization Manager
- Updated Oracle Database Templates for Oracle Linux KVM
    - Oracle Database 19c CPU July 2021 with Oracle Linux 7 Update 9
    - Oracle Database 19c CPU July 2021 with Oracle Linux 8 Update 4
    - Oracle Database 21c CPU July 2021 with Oracle Linux 8 Update 4
- Updated DeployCluster Tool 4.0
    - Automates the deployment on Oracle Linux Virtualization Manager
    - Leverages OLVM API to
        - Create Virtual Machines from Templates
        - Automate the Virtual Machines deployment
        - Automate the Oracle Database software installation and configuration
        - Automate the Oracle Database creation and configuration
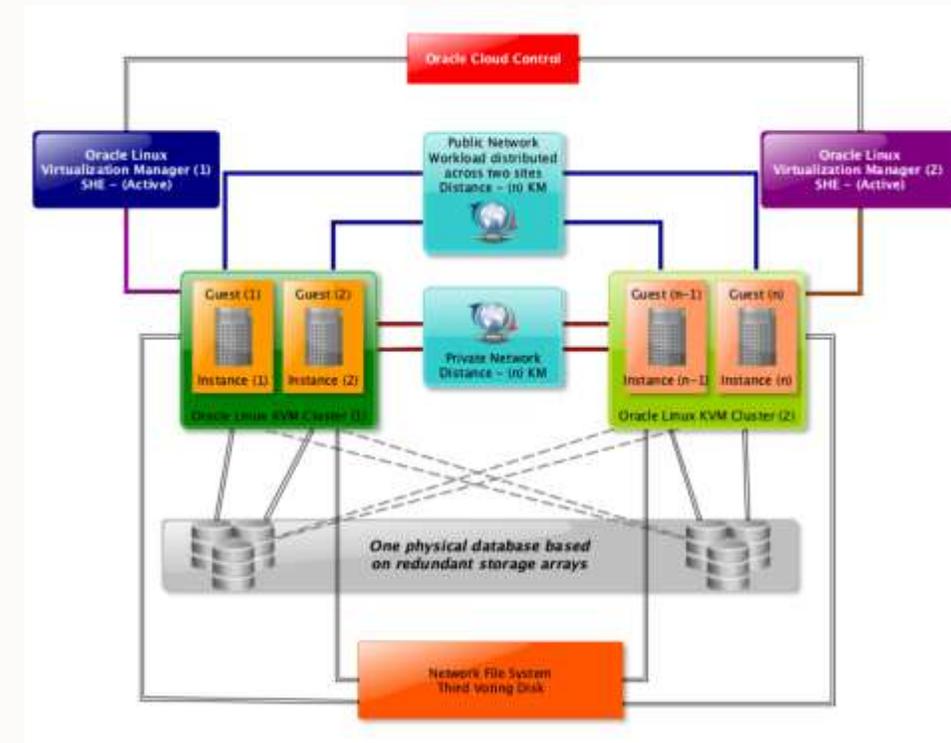
Oracle virtualization solution using KVM included with Oracle Linux

Oracle virtualization solution using KVM

- Oracle Linux KVM (host)
  - KVM hypervisor included in Oracle Linux 7 with UEK R5 and UEK R6
- Oracle Linux Virtualization Manager (management)
  - Based on open source oVirt project
  - Integrated, tested and supported by Oracle
  - Support for new features including Snapshots and Role Based Access Control
  - Available on yum.oracle.com and ULN for Oracle Linux 7
- Oracle VirtIO drivers for Microsoft Windows

Oracle Linux Virtualization Manager 4.3

- Why Oracle Linux KVM and Oracle Linux Virtualization Manager?
  - An alternative to expensive VMware deployments
  - Based on modern open source KVM and oVirt
  - Provides an easy migration path to cloud
  - Helps manage Oracle software license costs
- What's new in 4.3 release
  - Self-hosted engine – running the manager as a virtual machine to be highly available
    - a hyper-converged solution with Gluster Storage 6.0
  - Virt-v2v – enables easy migration from VMware and other hypervisors to Oracle Linux KVM
  - New guest OS support (OL8, RHEL 8, CentOS 8, & SLES 12 and 15)
  - Huge pages support for high performance VM
  - Disaster recovery solution
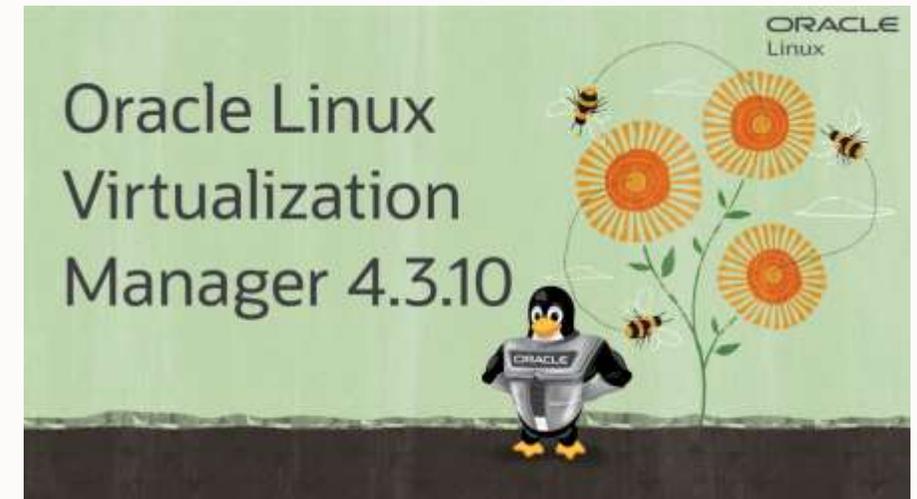
virt-v2v

Automated Migration to Oracle Linux KVM & Oracle Linux Virtualization Manager

On-Premise

virt-v2v

On-Premise

Application

Application

ORACLE
Linux

Oracle VM / VMware vSphere / RHV

Oracle Linux KVM and OLVM
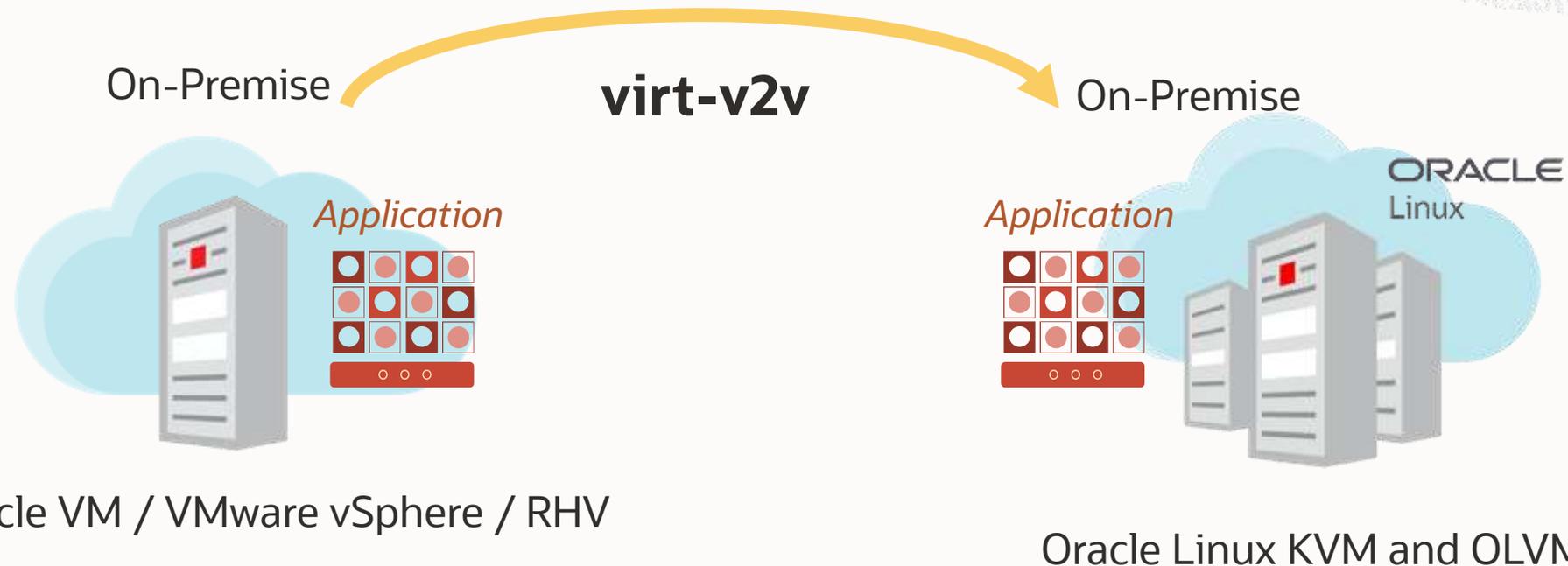
- Virt-v2v automates the direct migration from Oracle VM to Oracle Linux KVM / OLVM
- Same solution can be used for VMware migrations – requires updated qemu and libvirt
- Manual export/import and partner solutions also available

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Comparing with VMware vSphere

- Oracle Linux KVM is part of the overall Oracle Linux operating environment that provides robust, modern open source hypervisor and management technologies
  - Supports all virtualization workloads
- Oracle Linux KVM has the following key differentiators:
  - Recognized as hard partitioning technology for Oracle software licensing, and significant licensing costs savings for Oracle software
  - Management (oVirt based Virtualization Manager): Built by community with comprehensive capabilities
  - Hypervisor (Oracle Linux KVM): proven technology for scale and security, runs Oracle Cloud and Exadata
- Oracle Linux KVM and virtualization management included at no additional charge with Oracle Linux Premier Support
- Linux consulting services can provide an easy transition from VMware to Oracle Linux KVM

Comparing with CentOS / Red Hat / VMware

Feature	Oracle Linux	CentOS with oVirt	Red Hat (RHV)	VMware vSphere
Hypervisor	KVM (open - OL)	KVM (open - CentOS)	KMV (open - RHEL)	Proprietary
Manager	oVirt based	oVirt based	oVirt based	Proprietary
Cloud Experience (KVM)	Yes, same hypervisor leveraged by OCI	No	No	No
Engineered System Experience (KVM)	Yes, same hypervisor leveraged by Exadata	No	No	No
Backup Solution	Partner Integration	No	Partner Integration	Partner Integration
Networking Solution	Partner Integration	No	Partner Integration	Yes - NSX
Enterprise Support	Yes	No	Yes	Yes
Pricing	$	0	$$$	$$$$$

Oracle VM VirtualBox

Develop on any desktop and deploy to any cloud

Most popular cross platform open-source virtualization software with vibrant community participation, combined with Oracle development and support

- Run almost any type of application on your existing machine
- Create a multi-platform test and development environment
- Build a multi-tier demo system on a single portable machine
- Create an isolated and secure desktop environment for classified access
- Run legacy platforms and applications on modern hardware
- Build a consistent workflow with ready-to-run Vagrant images to quickly deploy Oracle Linux environments on your development platforms

Private Cloud

Public Cloud

Hybrid Cloud

Download & Test

Dev & Deploy
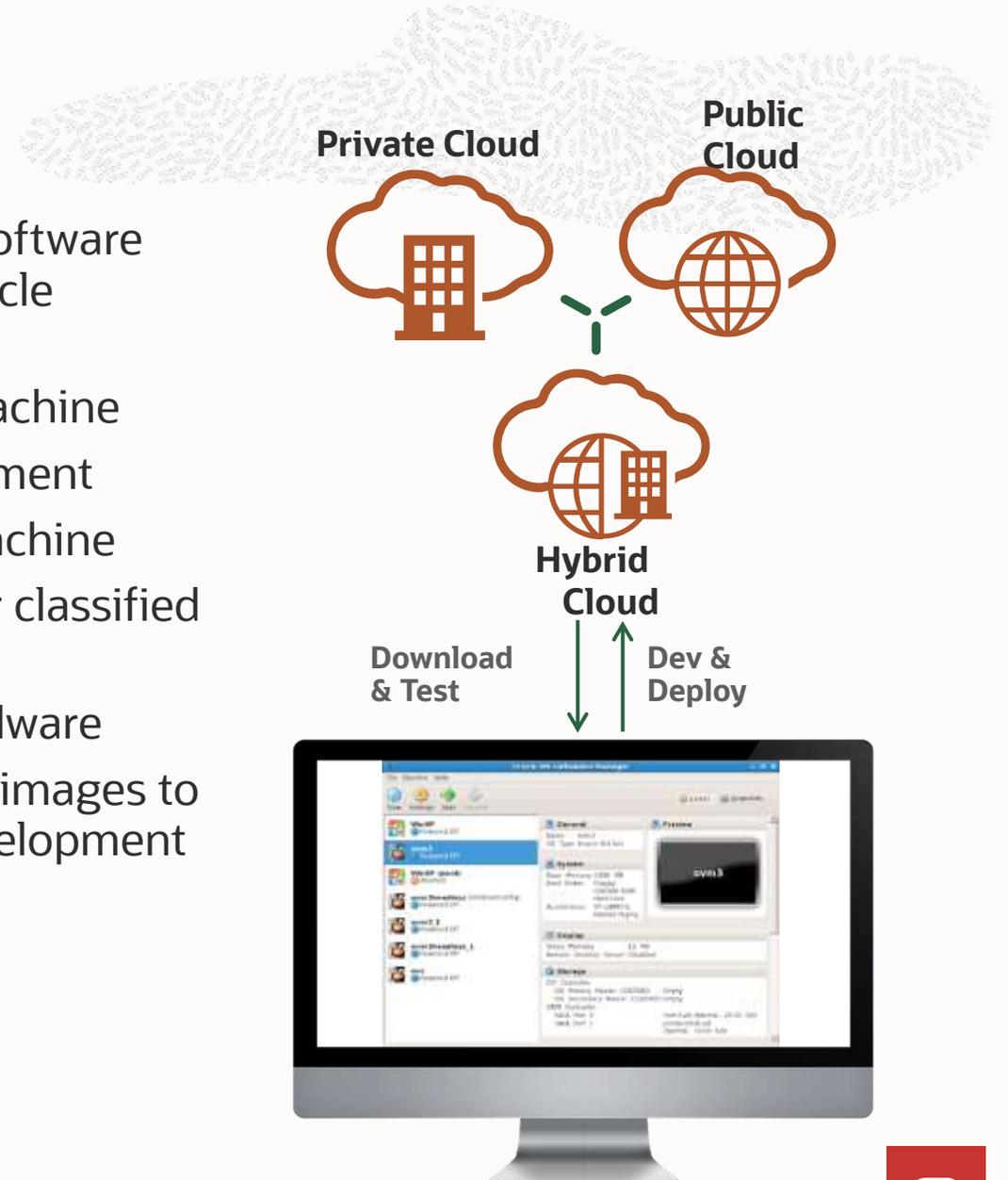
Oracle VM VirtualBox
VirtualBox recognized as VDI Leader by G2

https://www.g2.com/products/virtualbox/reviews
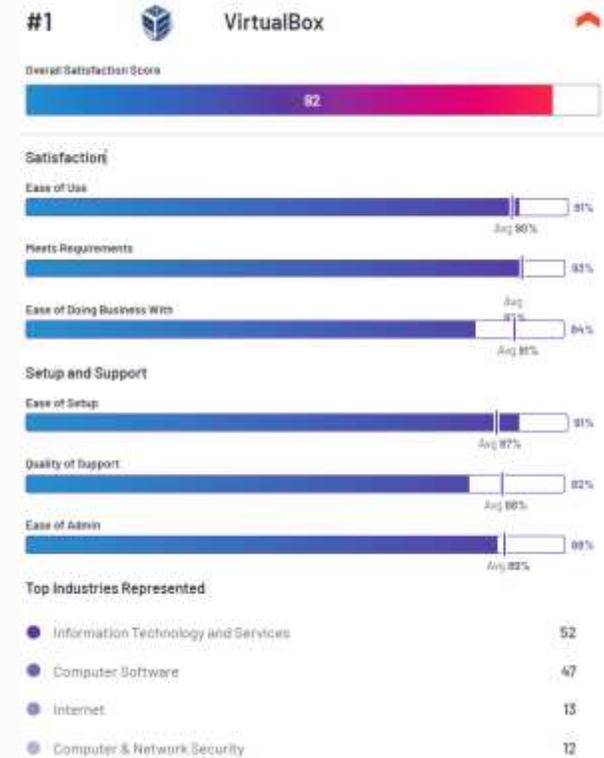
VirtualBox 6.1 – continuous innovations

- Import from Oracle Cloud Infrastructure

- Enhanced Export to Oracle Cloud Infrastructure

  - Option to create OCI Instances from existing uploads

  - Paravirtualized Instance type now available

- Start/Stop OCI instances by VirtualBox CLI

- Nested hardware-virtualization on Intel CPUs

- Enhanced 3D support with VBoxSVGA and VMSVGA

- Old style 3D support (VBoxVGA) has been completely removed

- Read the technical paper to learn "Export/Import to/from OCI"

  - http://www.oracle.com/us/technologies/virtualization/oracle-vm-vb-oci-export-20190502-5480003.pdf

Oracle VM VirtualBox Enterprise offerings

Base package

- Consists of all open-source components and is licensed under the GNU V2
- **Totally free for personal and business use**
- Customers can distribute and modify it
- Contains all basic features

Extension Pack

- Binaries are released under the VirtualBox Personal Use and Evaluation License (PUEL)
- **Mandatory to buy license for business/commercial use of the Extension Pack**
- Customers cannot distribute it
- Contains the Enterprise Extension of the product and features like (here the main):
  - ✓ Virtual USB 3.0 xHCI Device Support
  - ✓ VirtualBox Remote Desktop Protocol (VRDP)
  - ✓ Disk Image Encryption
  - ✓ NVMe Emulation
  - ✓ Export/import to/from Oracle Cloud Infrastructure

Software Download
- https://www.oracle.com/virtualization
- https://www.virtualbox.org
- https://edelivery.oracle.com

Personal, Educational and Commercial use for Extension Pack
- VirtualBox PUEL License Text
- VirtualBox PUEL License FAQ

Oracle VM VirtualBox Enterprise features

Feature	Base Package	Base + Extension Pack	VirtualBox Enterprise
Multiple operating systems on one desktop	Y	Y	Y
Cross-platform hosts including Windows, Linux, macOS, and Solaris	Y	Y	Y
Live migration of virtual machines between hosts	Y	Y	Y
Up to 32 virtual CPUs	Y	Y	Y
"Guest Additions" are a set of drivers and utilities for performance and usability	Y	Y	Y
OVF format support	Y	Y	Y
Virtual USB 2.0 (EHCI) and 3.0 (xHCI) devices	N	Y	Y
VirtualBox Remote Desktop Protocol (VRDP) Support	N	Y	Y
Host webcam passthrough and PCI passthrough	N	Y	Y
Intel PXE boot ROM	N	Y	Y
Disk image encryption	N	Y	Y
Cloud integration – export/import virtual machines to/from Oracle Cloud Infrastructure	N	Y	Y
Multiple remote desktop connections (VRDP) to virtual machine	N	N	Y
Centralize Extension Pack download and installation within your company	N	N	Y
Ensure the latest VirtualBox release and the latest security patches for installations	N	N	Y
24x7 support from Oracle for the Base Package and Extension Pack.	N	N	Y

Oracle VM VirtualBox Enterprise use cases

Healthcare and life sciences

Requirements

- Different medical devices
  - Bio Diagnostics
  - Surgical Devices
  - Analytics Instruments
- Different applications/OS requirements
- One desktop/laptop required for each medical device

Solution

- Same software everywhere
- Common images distributed
- One desktop/laptop to manage all medical devices
- Always able to supply updated image releases
- No issue due to different HW
- Allow secure remote access to medical devices

Medical Center   Hospital   Clinic

Analytics   Surgical Device   Bio Diagnostics

Oracle VM VirtualBox (Encryption)

Encrypted application distribution

Headquarters
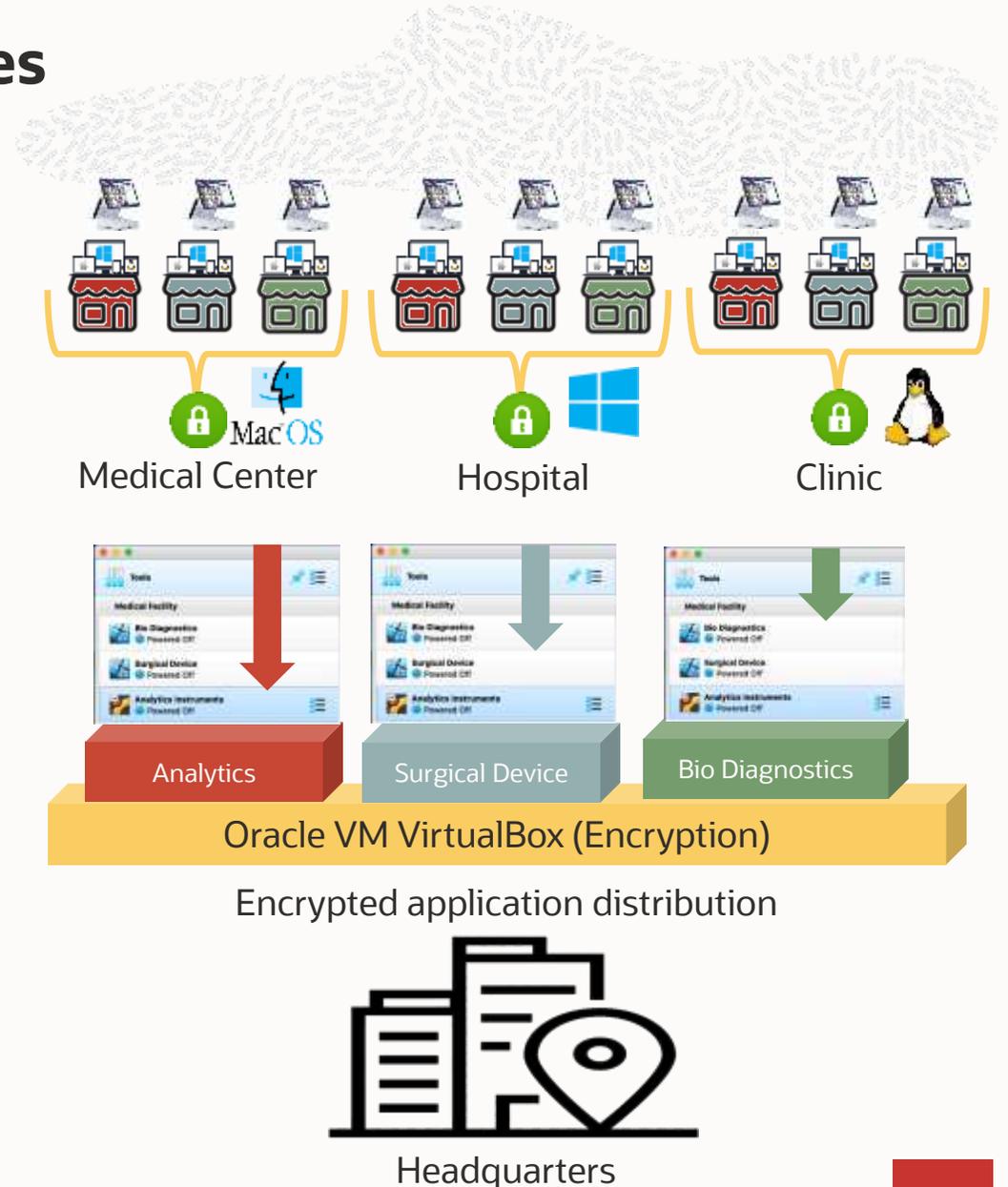
Oracle VM VirtualBox Enterprise use cases
Retail chain store

Requirements

- Different Systems required on each Retail Chain Store
- More applications
- Update application based on seasons

Solution

- VirtualBox same software everywhere
- Common image distributed internally
- No need to work on hardware devices
- Always able to restore initial image in minutes if required

Retail Chain Store(s)

Winter Season

Summer Season

Weekly Discounts

Oracle VM VirtualBox (Encryption)

Encrypted application distribution

Headquarters

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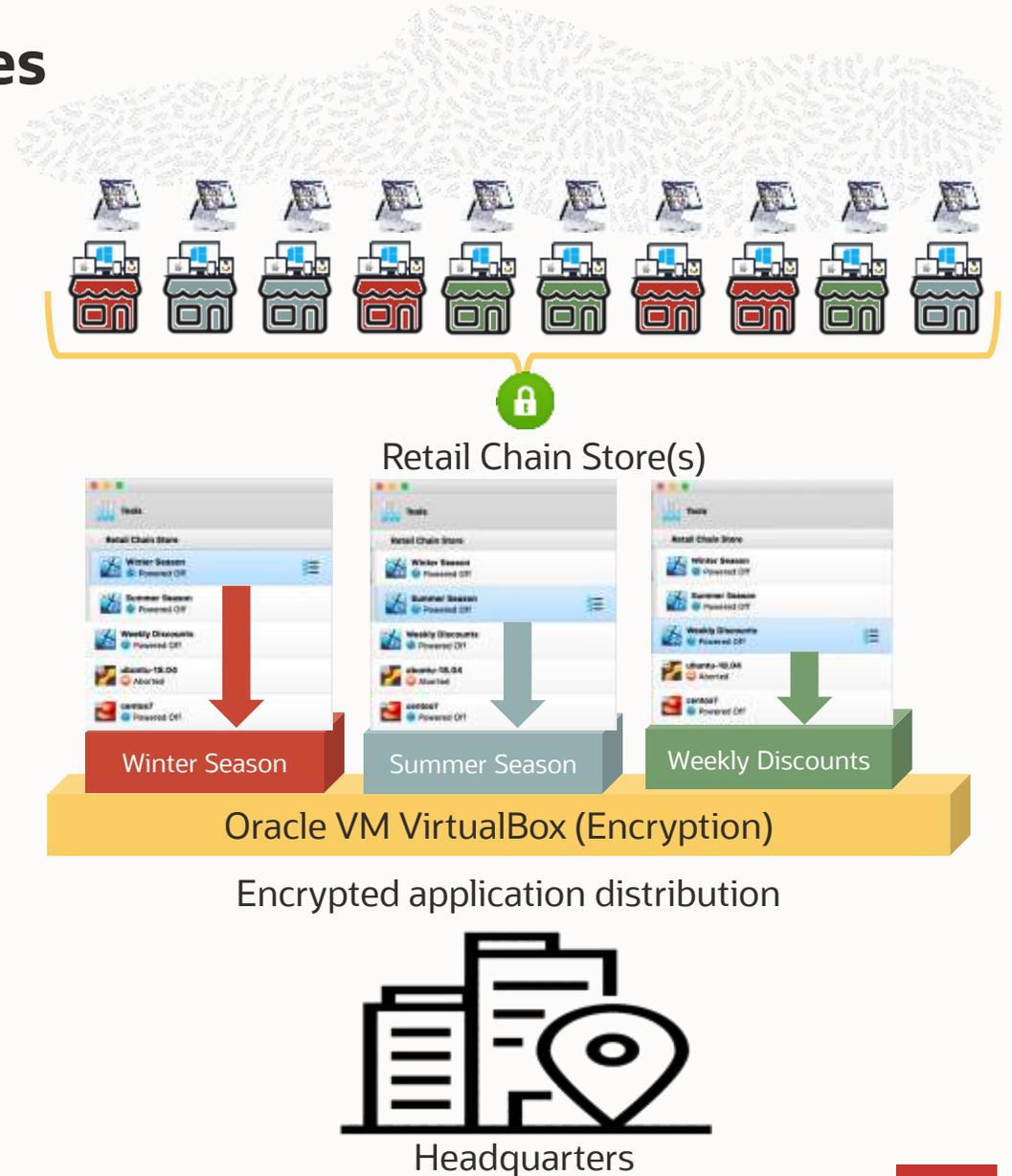
Oracle VM VirtualBox Enterprise use cases
Development

Requirements

- Prototype Chip Design (virtual)
- Hardware/Software development
- One chip, more platforms at the same time

Solution

- Use VirtualBox passthrough functionality
- One system, more Operating Systems

Oracle VM VirtualBox (Encryption)

Unified Development Platform
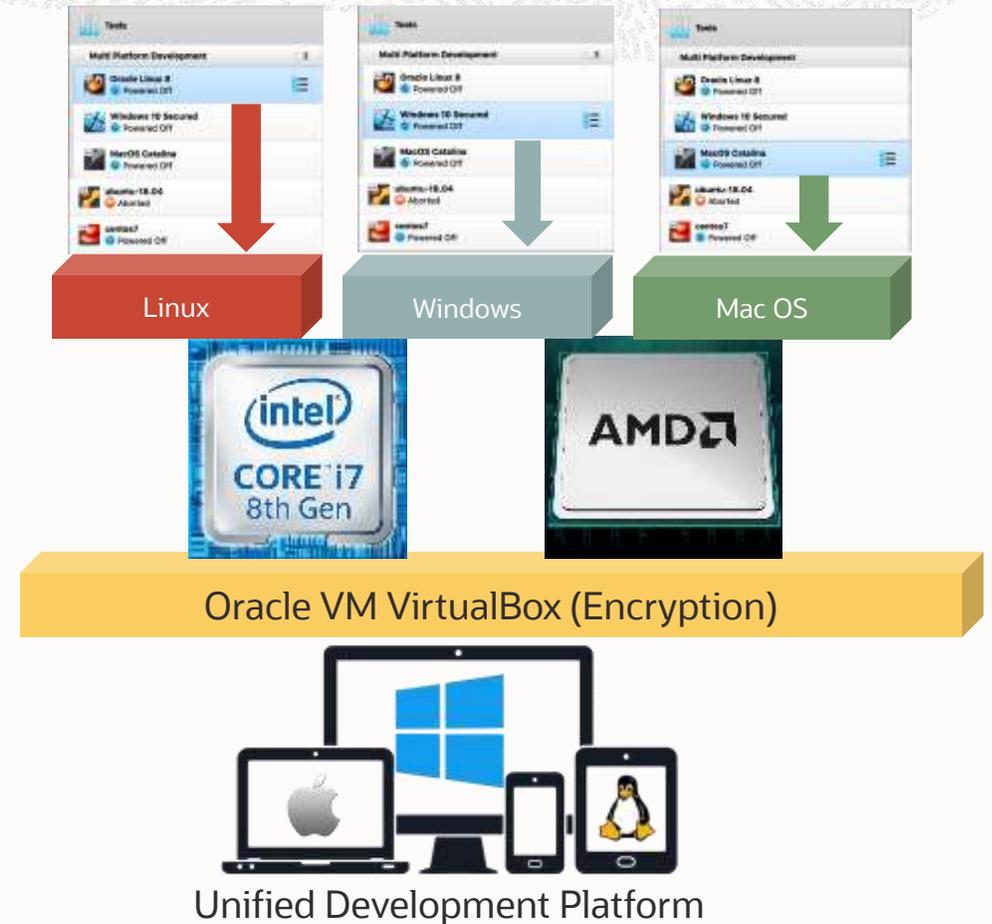
Oracle VM VirtualBox Enterprise use cases
Development

Requirements

- Antivirus software development
- Validate solutions for different viruses
- Validate solutions on different OS
  No impact on the host OS

Solution

- VirtualBox as hypervisor
- Sand-Box test and development
- Snapshot capability to revert changes and/or faults on VMs

Windows 7   Windows 8   Windows 10

Oracle VM VirtualBox (Encryption)
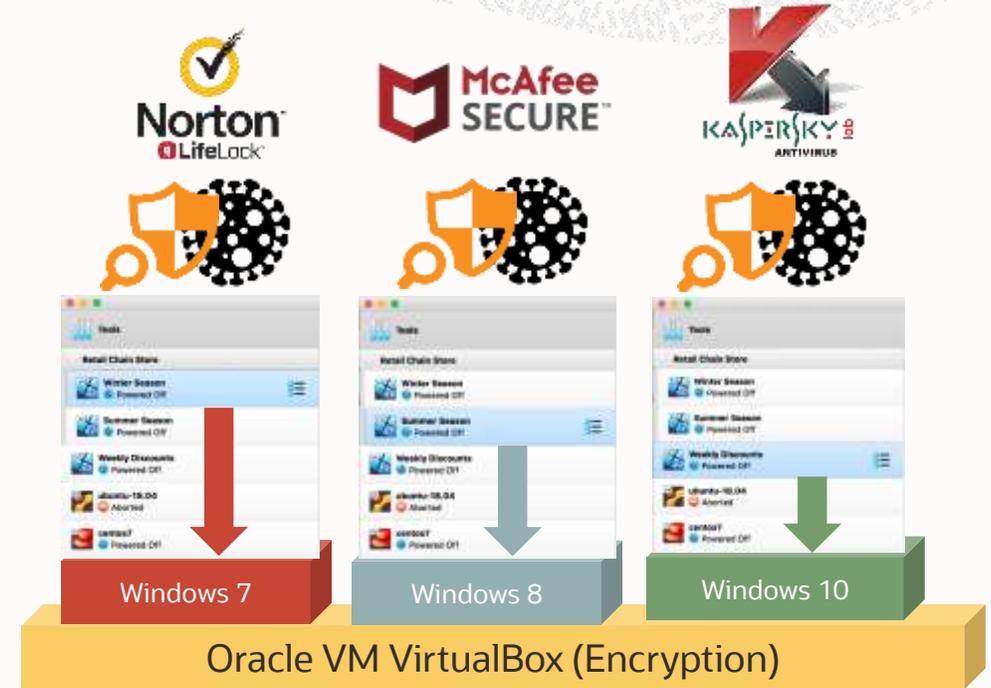
Testing Computer Viruses

Antivirus Company

Oracle VM VirtualBox Enterprise use cases

Embedded

Requirements

- Deployment of new VDI solution
- Desktop Player for Mac OS X and Windows platforms from another vendor

Solution

- Embedded use of VirtualBox functionalities
- Example of copyright software leveraging OSS to add functionalities and security

Thin Clients

Third Party Application (Virtual Desktop Infrastructure)

Oracle VM VirtualBox (Encryption)
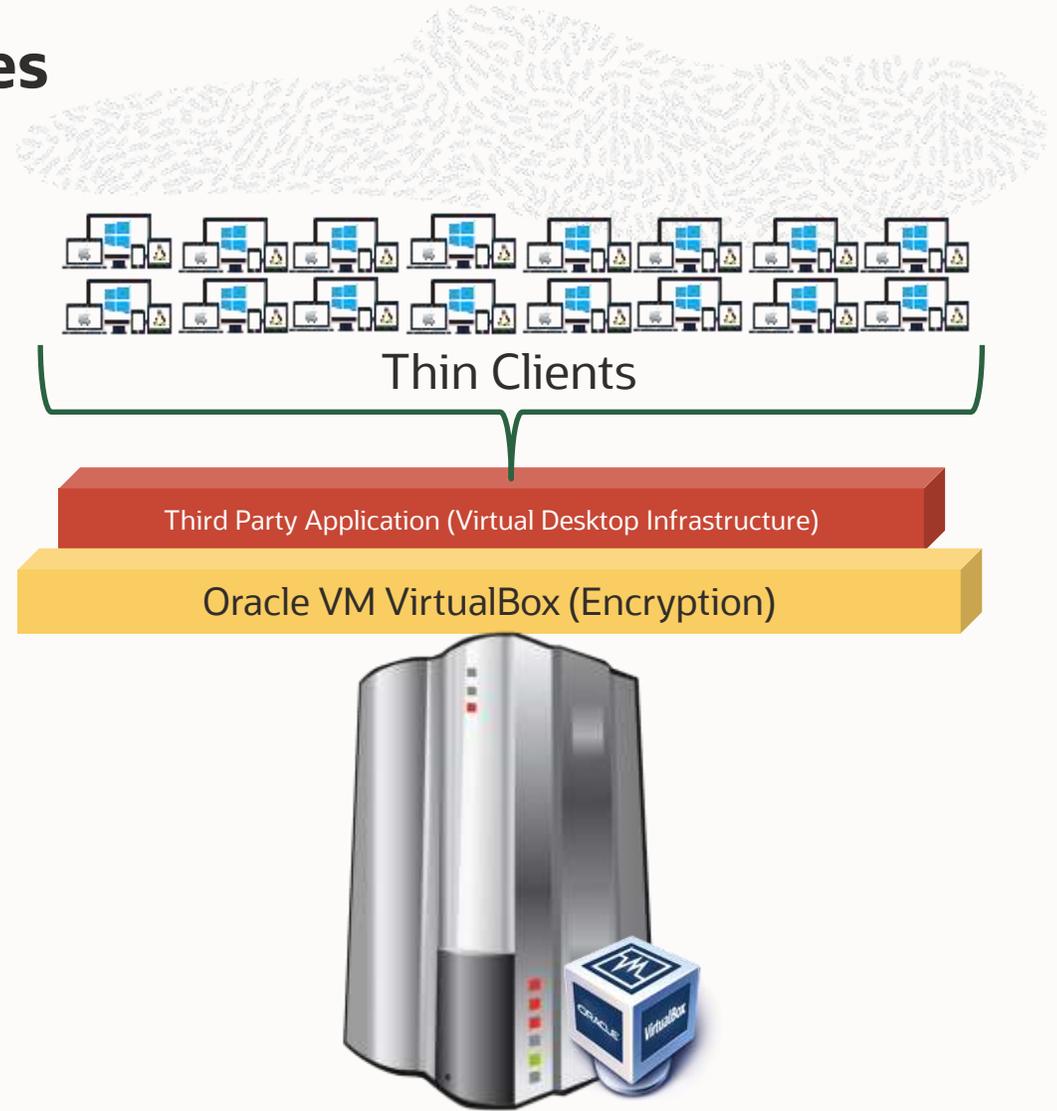
Benefits of deploying Oracle Linux on Oracle Cloud

Cloud-ready, integrated

- Access to frequent and latest Oracle Linux image updates

- Faster downloads from mirrored Oracle Container Registry and OL yum server within OCI

- Zero-downtime OS kernel and user space updates with Ksplice pre-installed in OCI

- Comprehensive containers and container management support

- Oracle Linux Storage Appliance offers an easy way to build NFS and Samba shared storage in OCI

Enhanced developer platform

- Oracle Cloud developer tools such as Terraform, SDK's, and CLI are deployed faster and easier via local yum server

- Easy access to Linux developer and preview software channels in local OL yum server

- Thousands of EPEL packages built and signed by Oracle for security and compliance

- Software Collection Library support included to install recent versions of Python, PHP, NodeJS, nginx, and more

Cost effective compute

- Oracle Linux Support is provided at no additional cost on OCI

- Take advantage of its 24 x7 best-in-class support services and tools

- No need to budget for OS support fees on OCI

- Use Oracle Linux as part of a fully and extensively tested cloud infrastructure stack

Enterprise-class Oracle Linux support included with Oracle Cloud

Oracle Linux Premier Support included in Oracle Cloud infrastructure at no additional cost

- Support for Oracle Ksplice, KVM, Containers, Kubernetes, Gluster, Clusterware, high availability services with Corosync and Pacemaker, and more
- Access to latest Oracle Linux packages, updates
- Optimizations and tools developed for enhanced Oracle Cloud experience
- Oracle Enterprise Manager Cloud Control to manage and monitor Oracle Linux instances

24 x 7 global enterprise-class support

- Expert around-the-clock global Linux support
- My Oracle Support portal with extensive Linux knowledge base
- Single point of contact for applications, middleware, database, management tools, OS, virtualization, cloud services.

Instant savings migrating to Oracle Linux on Oracle Cloud Infrastructure

- Virtually eliminate OS support costs by migrating applications to Oracle Cloud
- No need to budget for OS support fees or manage Linux support contract compliance

Oracle Linux images for Oracle Cloud Infrastructure
Cloud ready and integrated

- Frequently updated Oracle Linux 6, 7, 8, and Oracle Linux 7 GPU images available on Oracle Cloud
- Fast and easy creation of Oracle Linux instances on OCI using Oracle provided OS Platform images
- Updated with the latest critical security patches
- Pre-packaged cloud-ready enhancements
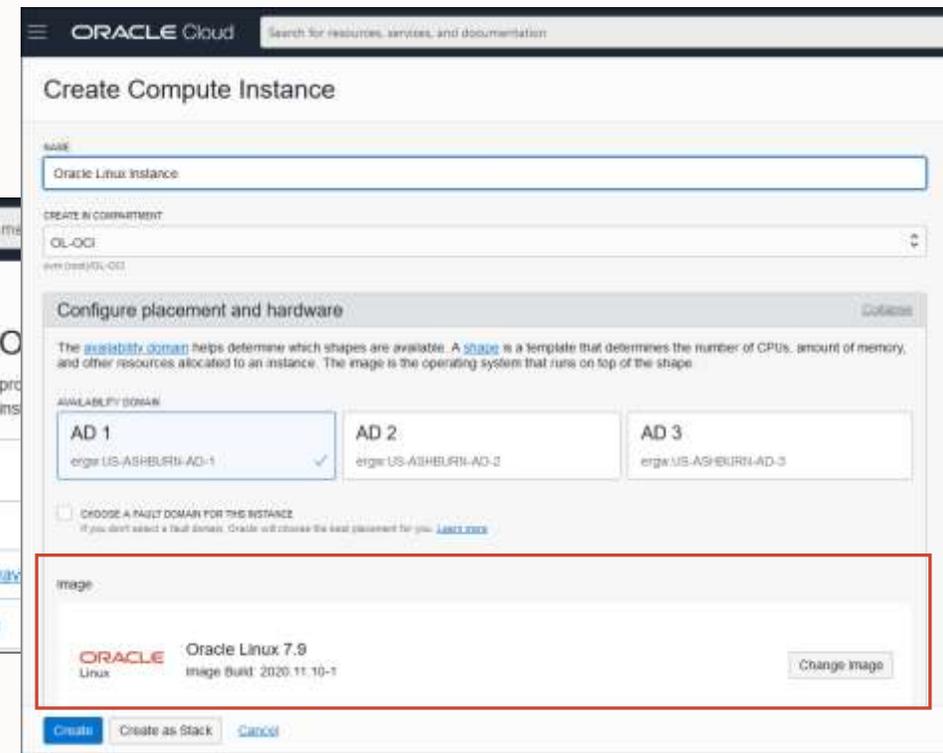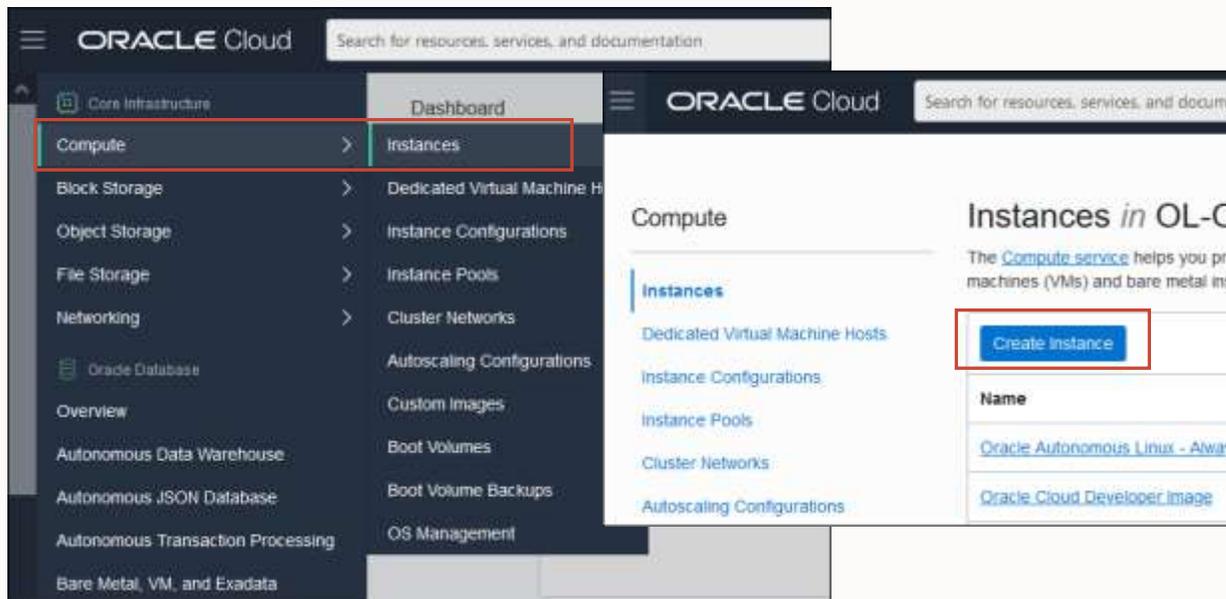
Oracle Ksplice zero-downtime live patching

Ksplice applies Oracle Linux user-space (`glibc,OpenSSL`), kernel, and hypervisor patches and updates without rebooting the system

Rapidly patch zero-day vulnerabilities, no need to plan or schedule downtime

Save costs

- No additional cost to OCI subscribers
- No operational downtime costs incurred
- Helps prevent costly and disastrous security incidents

Flexible patching options to complement existing operational processes

Known exploit detection provides suspicious activity alerts

Installed / configured by default for Oracle Linux images deployed within OCI

Kernel patching support for Oracle Linux, RHEL, CentOS, and Ubuntu on Oracle Cloud Infrastructure at no additional cost

High speed access to OCI regional yum server

- Fast access to Oracle Linux local yum server downloads within Oracle Cloud Infrastructure

- No additional network charges incurred.

- Oracle Linux images in OCI default to use mirrored Oracle Linux yum server per OCI Region
  - Examples:

    http:s//yum-us-phoenix-1.oracle.com – Ashburn, US
    https://yum-uk-london-1.oracle.com – London, UK
    https://yum-ca-toronto-1.oracle.com – Toronto, Canada
    https://yum-ap-seoul-1.oracle.com – Seoul, South Korea
    https://yum-sa-saopaolo-1.oracle.com – Sao Paulo, Brazil

    http://yum-us-phoenix-1.oracle.com – Phoenix, US
    http://yum-eu-Frankfurt-1.oracle.com – Frankfurt, Germany
    http://yum-ap-Tokyo-1.oracle.com – Tokyo, Japan
    http://yum-ap-Mumbai-1.oracle.com – Mumbai, India
    http://yum-ap-Sydney-1.oracle.com – Sydney, Australia

- When launched, Oracle Linux images have a yum variable set by default in /etc/yum/vars/ociregion to connect to a mirror in the appropriate OCI region.

- Instructions to verify connection to local yum server: https://yum.oracle.com/getting-started.html

Fast and east access to developer resources

- Linux developer and preview software channels
- Thousands of EPEL packages built and signed by Oracle for security and compliance
- Software Collection Library support included to install recent versions of Python, PHP, NodeJS, nginx, and more
- Oracle Cloud developer tools such as SDK's, CLI's, and Terraform are deployed faster and easier via local yum server

Oracle Autonomous Linux on Oracle Cloud

- **Autonomous execution of common management tasks**
  - Daily automated patching and updates
    - Oracle Ksplice zero-downtime updates
    - yum Oracle Linux core libraries and utilities, pre-installed Oracle software dependencies package updates
  - Known exploit attempt detection of Ksplice patched vulnerabilities
- **Easy, rapid deployment**
  - Pre-built, frequently updated image available from Oracle Cloud Infrastructure
  - Easy click-to-launch deployment in Oracle Cloud
- **Integrated with Oracle Cloud Infrastructure notifications**
  - Ksplice updates and certain known exploit attempts
  - yum package updates
  - Update job status
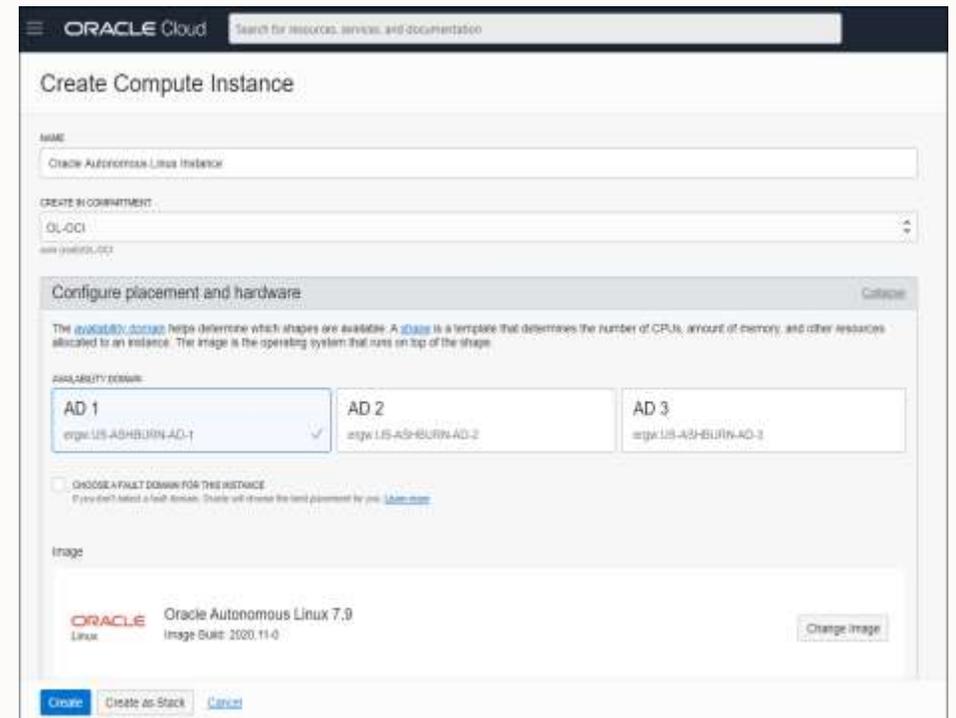
Oracle Linux KVM image for Oracle Cloud Infrastructure
Click to launch using Oracle Marketplace

- Simplifies deploying a KVM host and VMs using Oracle Linux
- Image based on Oracle Autonomous Linux with automated zero-downtime patching
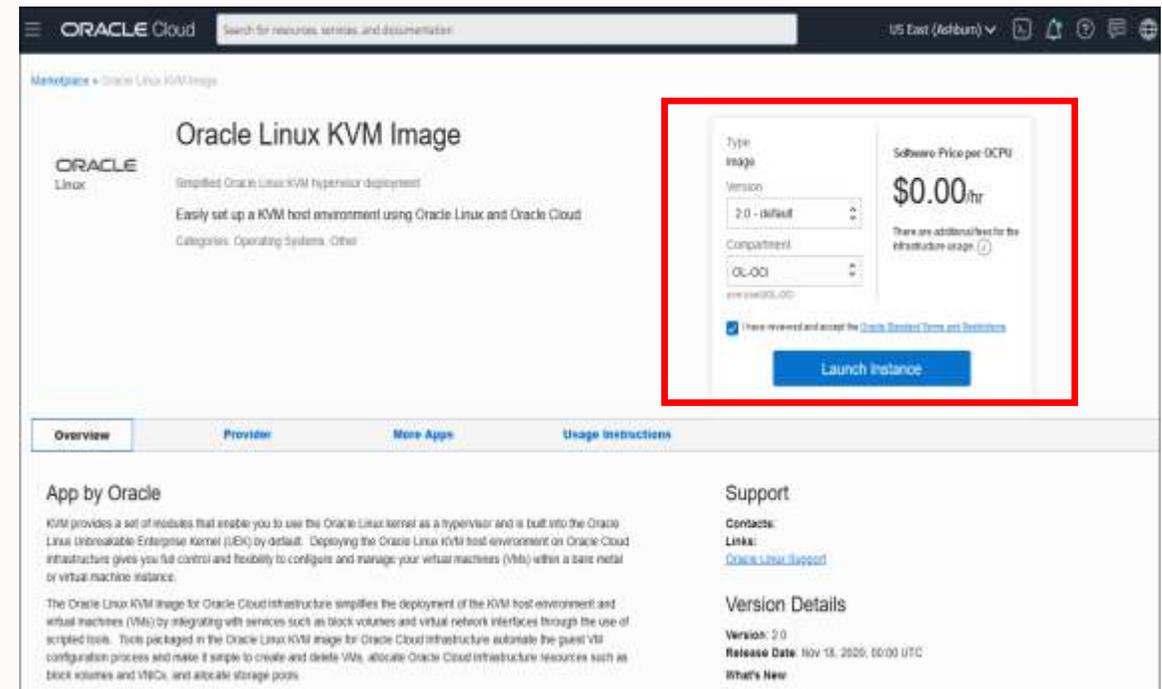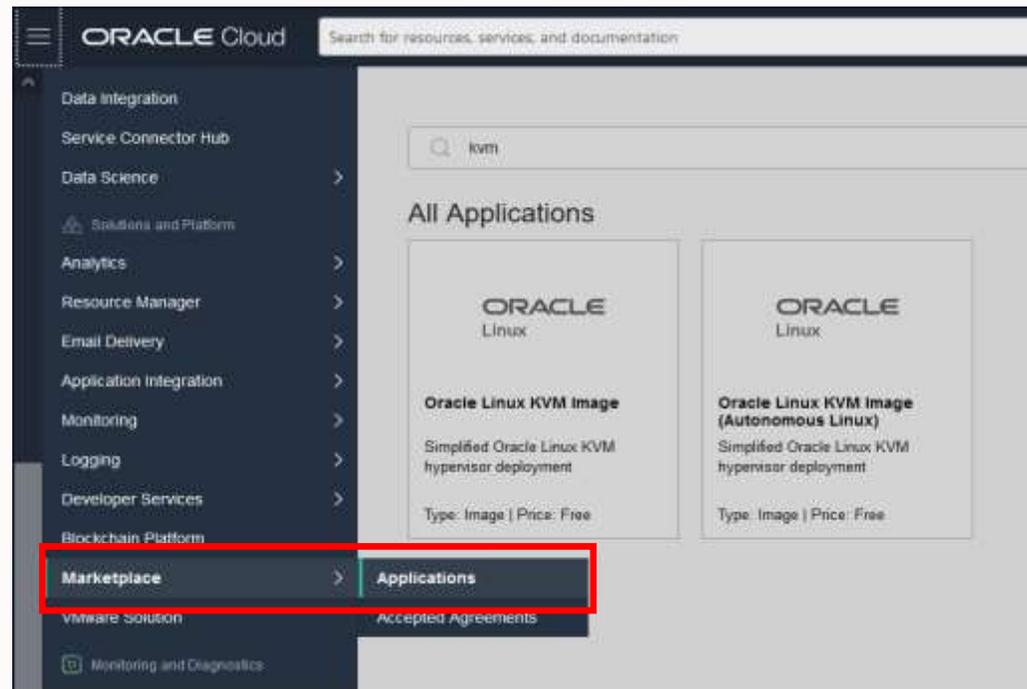
Oracle Cloud Infrastructure Marketplace

https://cloudmarketplace.oracle.com

Oracle Cloud Developer image
Out-of-the-box development environment

- Oracle Linux based images with latest development tools, languages, OCI SDKs, CLIs, Oracle Database connectors

- Provides easy access to an out-of-the-box development environment for developers on OCI

- Easily deployed via the Marketplace or Oracle Images Catalog within OCI

- Oracle Linux Premier Support and Java SE/GraalVM Enterprise subscriptions at no additional cost to OCI customers
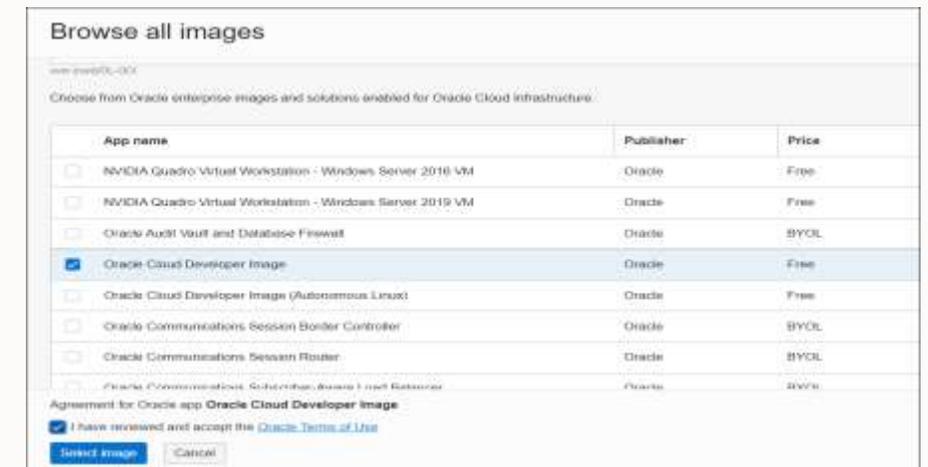
Oracle Linux Cloud Developer image
Quick start Arm-based application development

- Oracle Linux 8 (`aarch64`) based image with the latest development tools, languages, database connectors, OCI SDKs and CLIs.

- Quickly launch a comprehensive Arm development environment directly from platform images within the OCI console.

- Easily deploy image on OCI Ampere A1 compute (bare metal, VM), and/or sign up for Oracle Cloud Free Tier or OCI Arm Accelerator free credits.

- Visit Oracle Cloud Infrastructure Arm Developer for more resources on developing Arm-based applications in OCI.

- Documentation: Getting Started: Oracle Linux Cloud Developer Image

- Data sheet: Oracle Linux for Arm
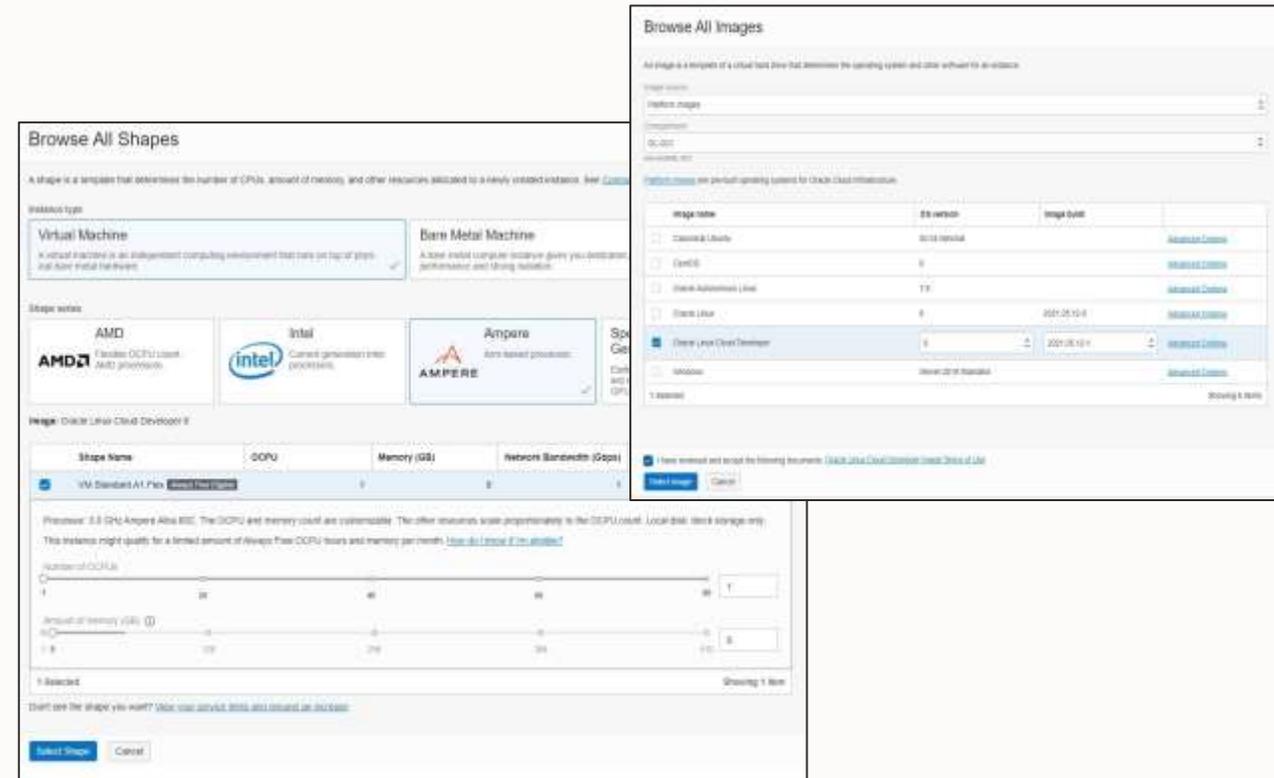
Oracle Cloud Developer image components

- **Oracle Linux 7, Autonomous Linux 7 (`x86_64`) for OCI or Oracle Linux 8 (`aarch64`) for OCI**

- **Languages and Oracle Database Connectors and Tools**

  - Java Platform and Standard Edition (Java SE)
  - Oracle GraalVM Enterprise Edition
  - Python and cx_Oracle*
  - Node.js 10 and node-oracledb*
  - Go
  - Oracle Instant Client
  - Oracle SQL Developer*
  - Oracle SQL Developer Command Line (SQLcl)*

- **Oracle Cloud Infrastructure CLIs, SDKs, Tools**

  - Oracle Cloud Infrastructure CLI
  - Python, Java, Go, and Ruby Oracle Cloud Infrastructure SDKs
  - Terraform and Oracle Cloud Infrastructure Terraform Provider
  - Oracle Cloud Infrastructure Utilities
  - Ansible and Oracle Cloud Infrastructure Ansible Collection

  * Components currently not in the Oracle Linux Cloud Developer (`aarch64`) image.

- **Other**
  - Oracle Container Runtime for Docker
  - Extra Packages for Enterprise Linux (EPEL) via yum
  - GUI Desktop with access via VNC Server
  - Ansible
  - .NET Core
  - Visual Studio Code
  - PowerShell Core
  - Rclone
  - Eclipse IDE

Oracle Database App for Oracle Cloud Infrastructure
Rapid database deployment on Oracle Cloud

- Deploy Oracle Database on Oracle Cloud Infrastructure in minutes
- Includes Autonomous Linux for automated zero-downtime OS patching
- Based on decade long Oracle VM Templates for Oracle Database framework
  - Built on the Oracle Linux 7 / Autonomous Linux 7 image for Oracle Cloud Infrastructure
  - Updated Oracle Database 12cR2, 18c and 19c with critical catch updates
  - Learn more https://blogs.oracle.com/virtualization/db-deployment-oci-19c

Oracle Linux 7 STIG image

- Oracle Linux 7 implementation of the Security Technical Implementation Guide (STIG) for OCI.

- Easily create an Oracle Linux instance in OCI that you can configure to match certain security standards and requirements set by the Defense Information Systems Agency (DISA) of the U.S. Department of Defense (DoD).

- Oracle Linux STIG image is scanned against the target DISA STIG Security Content Automation Protocol (SCAP) Benchmark profile.

- Resulting SCAP Compliance Checker (SCC) score and details are published in the Oracle Linux 7 STIG image documentation.

- Available for deployment on Oracle Cloud Free Tier resources, and in commercial and U. S. government OCI regions.
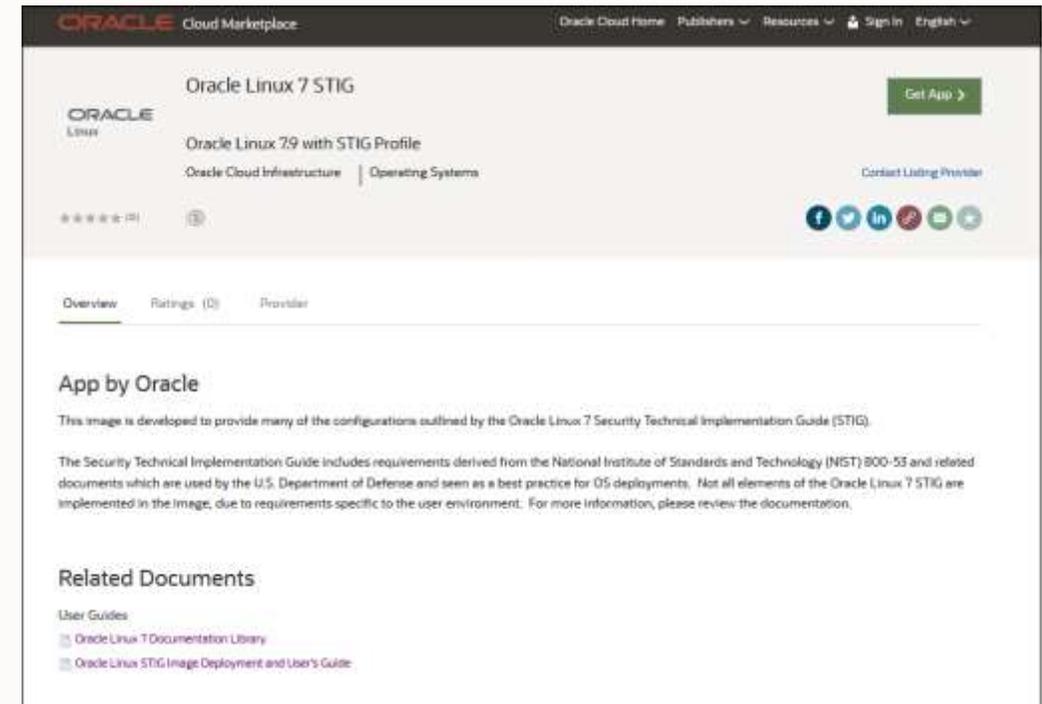
Oracle Linux STIG image available on the
Oracle Cloud Marketplace
https://cloudmarketplace.oracle.com

Terraform with Oracle Linux and Oracle Cloud Infrastructure

- Terraform is open-source software that allows users to define a data center infrastructure in a high-level configuration language used within a supported public cloud using API's.

  – Create a new OCI Virtual Cloud network, Internet Gateway, Route Table, Security List, Public Subnet, etc.

- Terraform install on Oracle Linux for OCI
  - Enable ol7_developer yum repository and run

    ```
    # yum install terraform terraform-provider-oci
    ```
  – Download Terraform binary and provider
    – https://github.com/terraform-providers/terraform-provider-oci
  - Install Oracle Cloud Developer Image using Oracle Cloud Marketplace

- Setup
  – Generate RSA key pair, enter public API key via OCI to connect to OCI tenancy
  – Set environment variables tenancy/user ocid, private key path, pubkey fingerprint, region (terraform.tfvars file)
  – Build configuration files *.tf

Terraform configuration example


```
variable "tenancy_ocid" {}
variable "user_ocid" {}
variable "fingerprint" {}
variable "private_key_path" {}
variable "compartment_ocid" {}
variable "region" {}

provider "oci" {
  tenancy_ocid     = "${var.tenancy_ocid}"
  user_ocid        = "${var.user_ocid}"
  fingerprint      = "${var.fingerprint}"
  private_key_path = "${var.private_key_path}"
  region           = "${var.region}"
}

resource "oci_core_virtual_network" "vcn1" {
  cidr_block     = "10.0.0.0/16"
  dns_label      = "vcn1"
  compartment_id = "${var.compartment_ocid}"
  display_name   = "vcn1"
}
```

```
# Initialize the plugin for this template directory
$ terraform init

# Run the plan command to see what will happen
$ terraform plan

# If the plan looks right, apply it
$ terraform apply

# If you are done with this infrastructure, take it down
$ terraform destroy
```

Oracle Linux Storage Appliance for Oracle Cloud Infrastructure

- Fast and easy deployment of NFS and Samba shared file system storage on Oracle Cloud Infrastructure

- Deployed from Marketplace or Oracle Images Catalog within OCI

- Based on Oracle Linux 7 shared file systems, and Oracle Autonomous Linux 7 for automated zero-downtime patching

- Support for OCI block volumes and NVMe devices

- Oracle Linux Storage Appliance image can be deployed on all OCI shapes

    - Standard shapes (no NVMe)

    - Dense I/O shapes (with local NVMe)

- Block volumes are used to create storage pool when the appliance is deployed on a compute shape with no NVMe disks attached
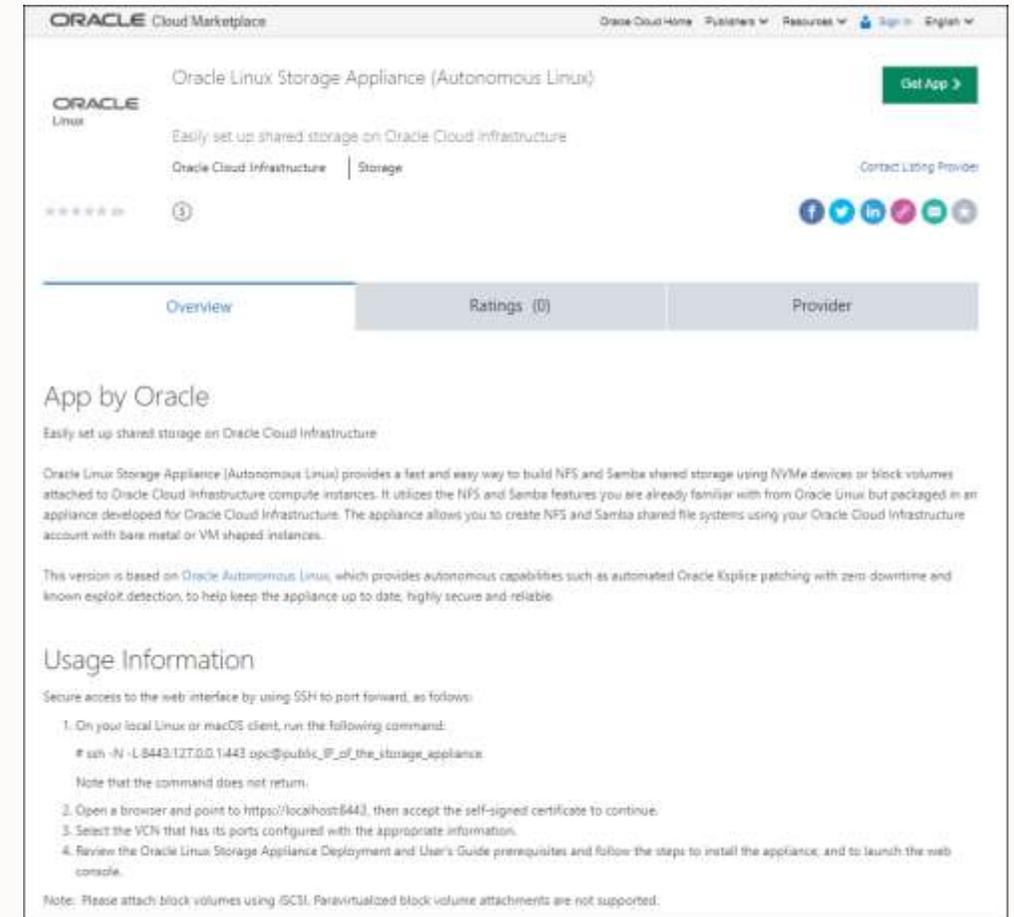
Oracle Cloud OS Management Service

- Included service in OCI delivering tools to manage Linux and Windows Server instances in Oracle Cloud

- Tightly integrated with Oracle Cloud Infrastructure for a seamless user experience

- Displays OS details, available and installed updates, and installs security, bug, and enhancement updates

- Group instances for automating common tasks

- Package updates can be scheduled for immediate, future, or recurring execution.

- Search by CVE, determine the packages involved and any affected instances, and install packages.

- Documentation: https://docs.cloud.oracle.com/en-us/iaas/os-management/osms/index.htm
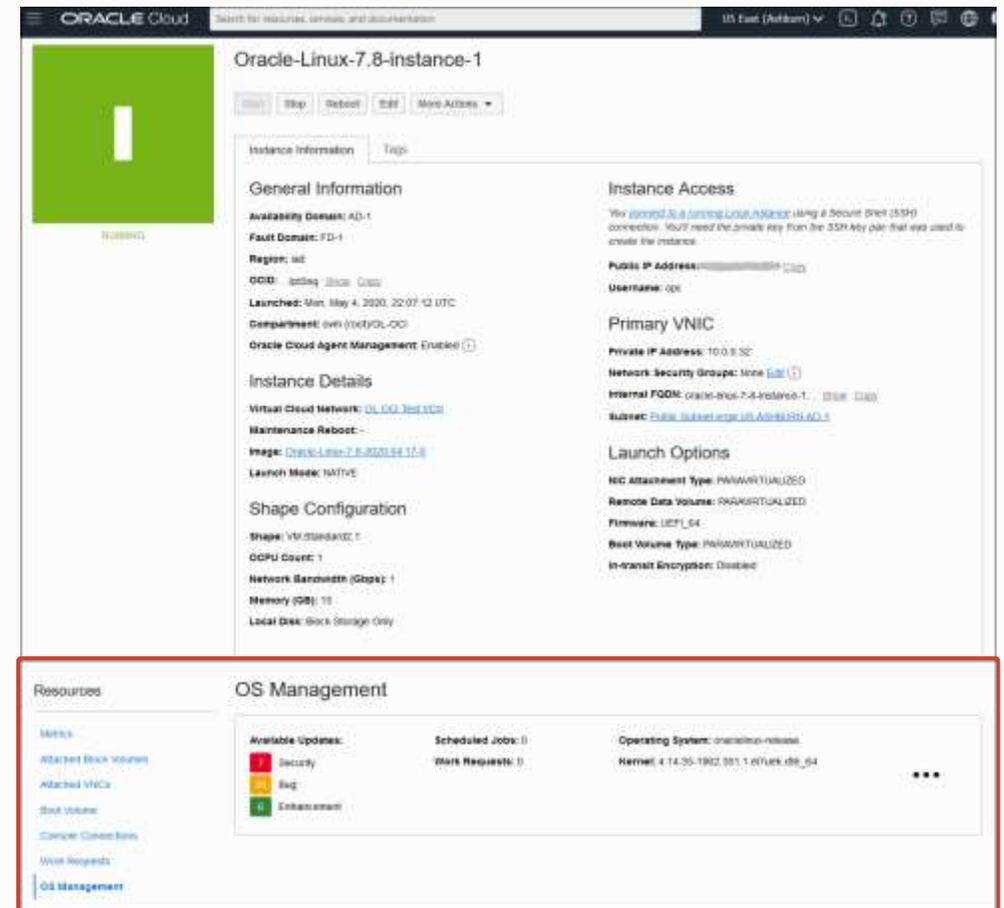
Extensive Oracle Linux partner ecosystem

- Thousands of industry leading independent software vendors (ISVs) have certified their solutions on Oracle Linux.

- Applications certified on Oracle Linux run wherever Oracle Linux runs – on Oracle Cloud Infrastructure, other clouds, and on-premises environments.

- Improve time to market and simplify deployment of applications.

- Certified solutions enable seamless transition of partner applications on Oracle Linux from on-premises to Oracle Cloud.

- Oracle Linux cloud solutions are available on the Oracle Cloud Marketplace

Oracle Linux and Virtualization ISV Ecosystem Catalog
URL: https://www.oracle.com/linux/isvcatalog

Getting started with Oracle Cloud Free Tier Services

https://www.oracle.com/cloud/free/

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Running Oracle Linux in Microsoft Azure

- For Microsoft Azure, Oracle offers certification and support for Oracle Linux on Microsoft Windows Server Hyper-V

- Customers can bring their own image or obtain Oracle Linux software from the Azure Marketplace and deploy it on Microsoft private clouds and Microsoft Azure using Azure console

- For Authorized Cloud Environments such as AWS or Azure, customers receive the standard entitlements and support services associated with their Oracle Linux Basic and Premier Support contracts
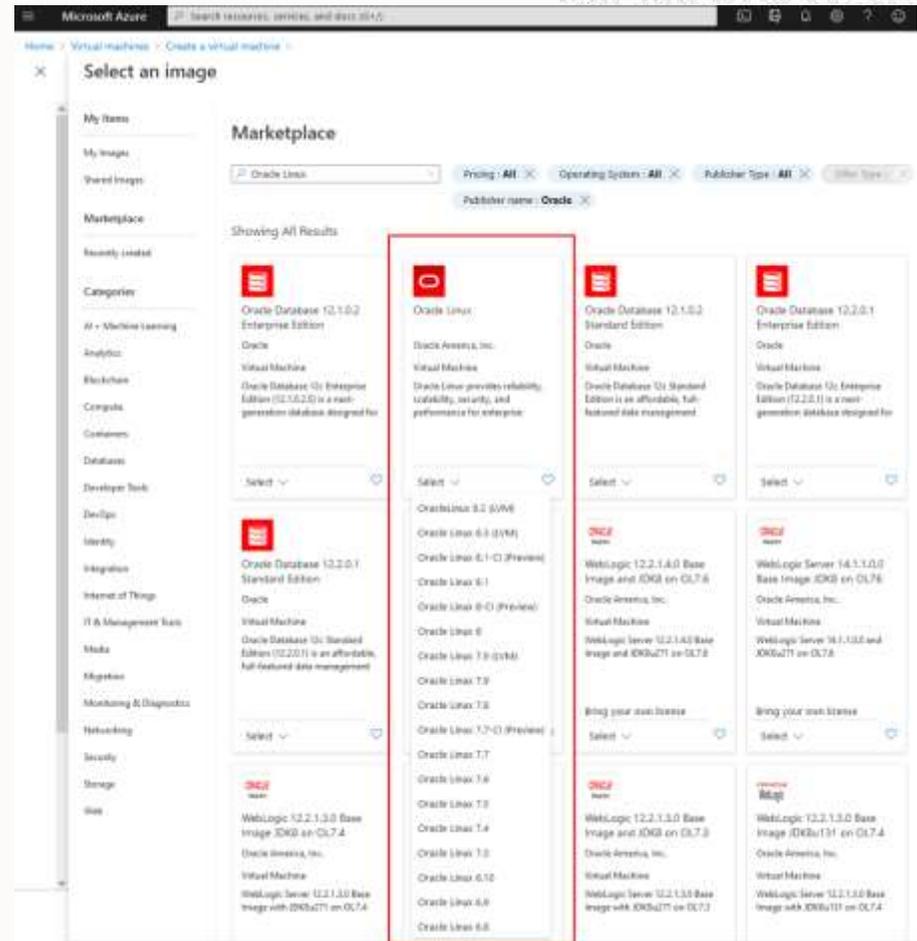
Running Oracle Linux in Amazon Web Services

- For Amazon Web Services (AWS), Oracle offers support for Oracle Linux running in Amazon Elastic Compute Cloud (EC2) and Relational Database Service (RDS)

- Customers can create their own Amazon Machine Images (AMIs) or they can obtain Oracle-provided Oracle Linux AMIs from an Amazon EC2 console by searching for the owner ID 131827586825 and deploying the Oracle Linux images on Amazon EC2 and RDS

- For details, please refer to this technical article on how to find the Oracle-provided Oracle Linux AMIs and launch an Oracle Linux instance using Amazon's EC2 console

  https://community.oracle.com/tech/apps-infra/discussion/4417739/launch-an-oracle-linux-instance-in-aws
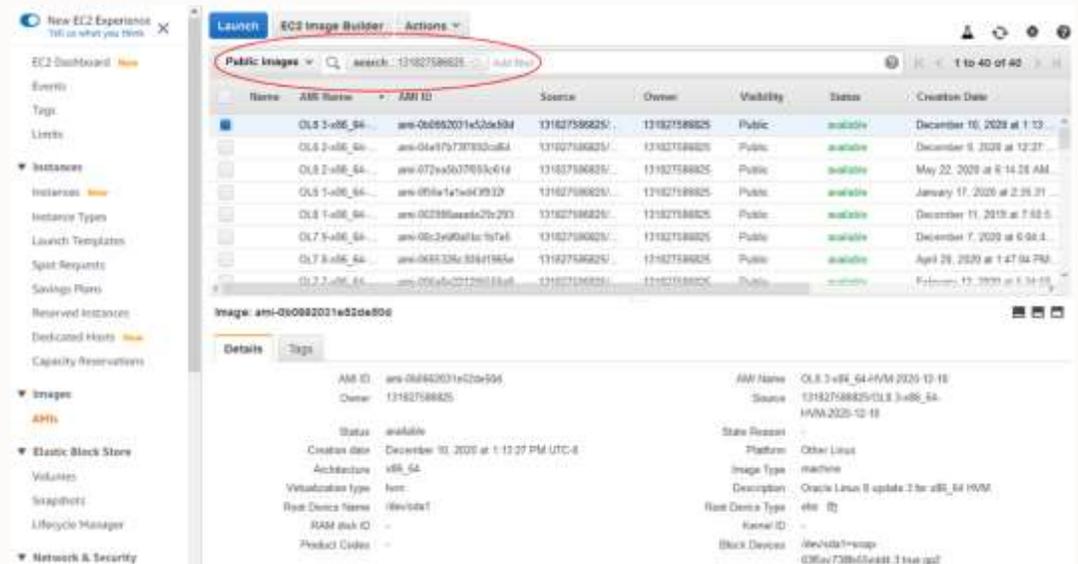
Oracle provides support for CentOS Linux or RHEL installations

- Oracle Linux support subscriptions can be used to support a customer's existing RHEL or CentOS Linux installations
- There is no need to reinstall the existing operating system such as RHEL or CentOS Linux to obtain Oracle Linux software updates
- Customers should check their Red Hat contract to determine what may be required to cancel Red Hat support
- Oracle recommends using Oracle Linux consulting services to assist with the transition

Why CentOS users are considering Oracle Linux

ORACLE
Linux

| Free software; no account needed to download ✓ | Free, stable updates ✓ | No license fees ✓ | No subscription fees ✓ | 100% RHEL compatible ✓ | For x86 and Arm, including Raspberry Pi ✓ |

Get Oracle Oracle Linux

- [Download](#) for free
- [Switch](#) from CentOS Linux

Our goal is consistency

Time to Deliver Linux Kernel Security Advisories starting January 2018
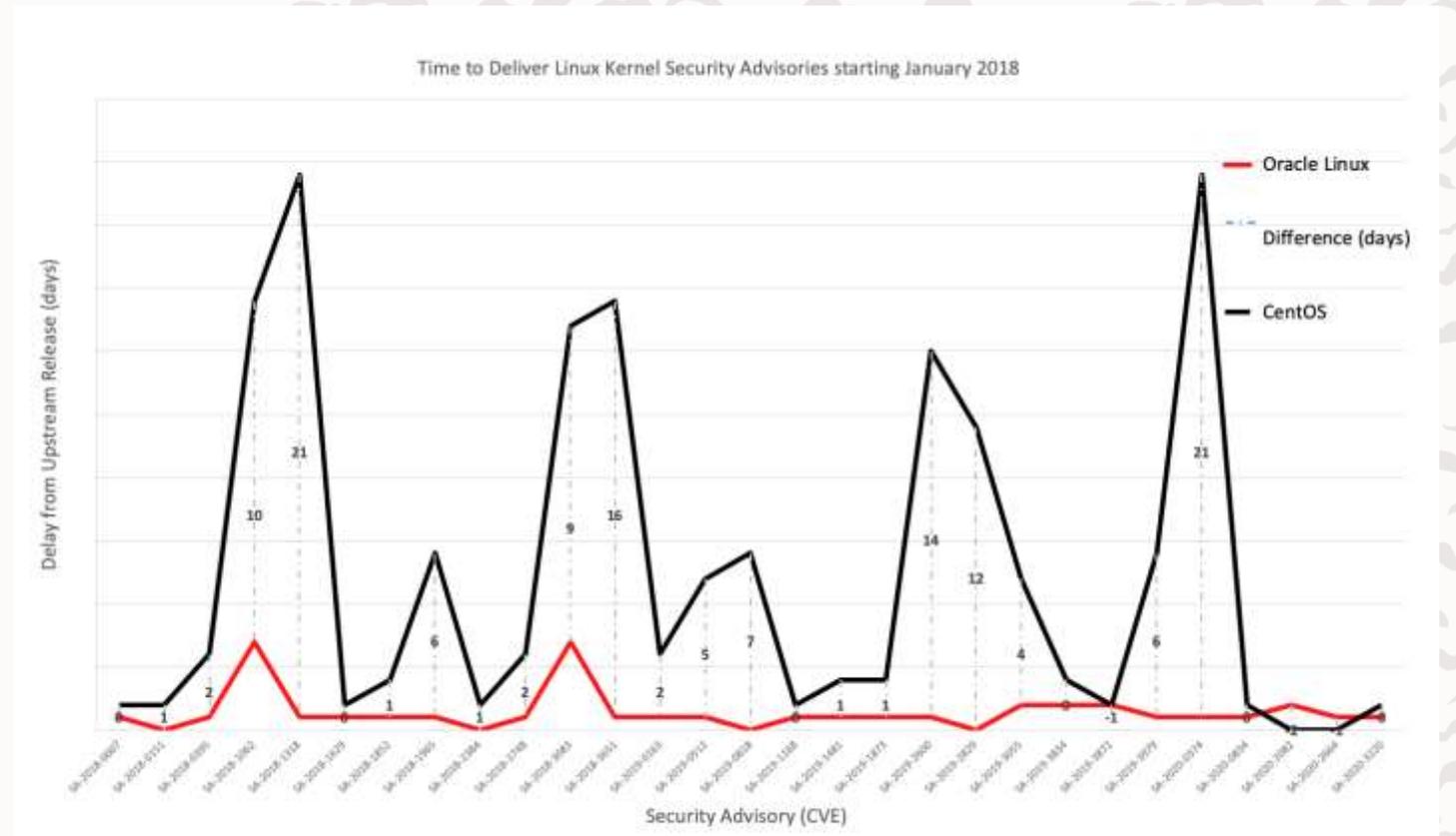
How to switch from CentOS Linux

1

Download Script

github.com/oracle/centos2ol

Works for CentOS 8, 7 and 6

2

Run Script

```
$ sudo bash centos2ol.sh
```

3

Reboot (optional)

Switching from RHEL to Oracle Linux

Step 1

Step 2

Step 3

Step 4

Remove the Red Hat Subscription Manager packages

Download and install the Oracle Linux GPG key to enable verification of Oracle built packages

Install the Oracle Linux release package which will enable the required yum repositories. Additional optional repositories can be manually enabled prior to step 4

`# yum distro-sync` Replace the existing packages with ones from Oracle Linux, This will remove the Red Hat logos and imagery and replace it with Oracle Linux imagery

Get Oracle Linux Consulting Services to do the hard work for you

Transition to Oracle Linux

- Create transition strategy
- Perform transition process
- Customer training
- Implement additional tools, including:
  - Ksplice
  - Cloud Native Environment
  - Spacewalk
  - Gluster

Oracle Linux KVM

- Architect virtualization solution
- Installation and implementation
- Migration of VM workloads
- RBAC user configuration
- Integration with backup software
- Disaster recovery implementations

Technical Account Manager

- Implementation Advisory Services
- Technical Advisory Services
- Assistance with Critical SRs

Oracle Linux support offerings
Extended and sustaining support offered according to release lifecycle

Support Level	Lifetime Support Stages for Oracle Linux
Basic Support	• 7x24 support during the 10-year period of Oracle Linux releases.
Premier Support	• Includes Basic Support and supplies additional Premier Entitlements for Oracle Linux.
Extended Support	• Extended Support requires Premier Support subscriptions plus price uplift. • Available for a period of 3 years after 10-year lifecycle of a major Oracle Linux release. • Access to patches and fixes for critical security errata and select high-impact critical bug fixes.
Sustaining Support	• Included with Premier Support subscriptions. • Continues to access to Oracle online support tools, operating system upgrade rights, pre-existing fixes, patches and assistance from technical support experts, but no new bug fixes or program updates. • Sustaining Support is available for lifetime.

* Basic Limited and premier limited with 2-socket or smaller servers

Oracle Linux support subscription levels & features

Feature	Basic	Premier
24x7 telephone and online support	Y	Y
Around-the-clock access to enhancements, updates, and errata	Y	Y
Oracle Enterprise Manager for Linux Management	Y	Y
Oracle Linux Manager (formerly Spacewalk)	Y	Y
High availability with Oracle Clusterware	Y	Y
Comprehensive tracing with DTrace	Y	Y
Oracle Linux load balancer	Y	Y
Comprehensive indemnification	Y	Y
Oracle Container runtime for Docker	Y	Y
Zero-downtime patching with Ksplice	N	Y
Oracle Cloud Native Environment	N	Y
Gluster Storage for Oracle Linux	N	Y
Oracle Linux Virtualization Manager	N	Y
Oracle Linux software collections	N	Y
Oracle Linux high availability services with Corosync and Pacemaker	N	Y
Premier backports and lifetime sustaining support	N	Y

Note: Basic Limited and Premier limited are available for with 2-socket or smaller servers

Free training resources

Learning paths

- Introduction to Oracle Linux
- Oracle Linux Automation Manager
- Oracle Linux Virtualization Manager
- Oracle Cloud Native Environment
- Linux on Oracle Cloud Infrastructure
- OS Management
- Oracle Linux 8

www.oracle.com/goto/oraclelinuxlearningpath

Hands-on labs on Oracle Help Center Learn

docs.oracle.com/learn/

Training blog postings

blogs.oracle.com/linux/category/lnx-training

Documentation

docs.oracle.com/en/operating-systems/oracle-linux/

Key takeaways

- Oracle is a leader and strong contributor to the open source community
- Since 2006, Oracle Linux has been completely free to download and use. Free source code, binaries, and updates. Freely redistributable. Free for production use
- Single operating environment delivers virtualization, management, and cloud native computing tools, along with the operating system, in a single support offering
- Oracle is the only company that offers the same Linux that powers its public cloud to customers
- The same Linux runs across all deployment models of customer's infrastructure on premises, in the cloud, or dedicated regions (cloud at customer)
- Customers can leverage Oracle Linux to build an optimized and secure operating environment for their digital transformation
- Oracle Linux is a stable alternative to RHEL/CentOS

Thank you

Visit oracle.com/linux
oracle.com/virtualization
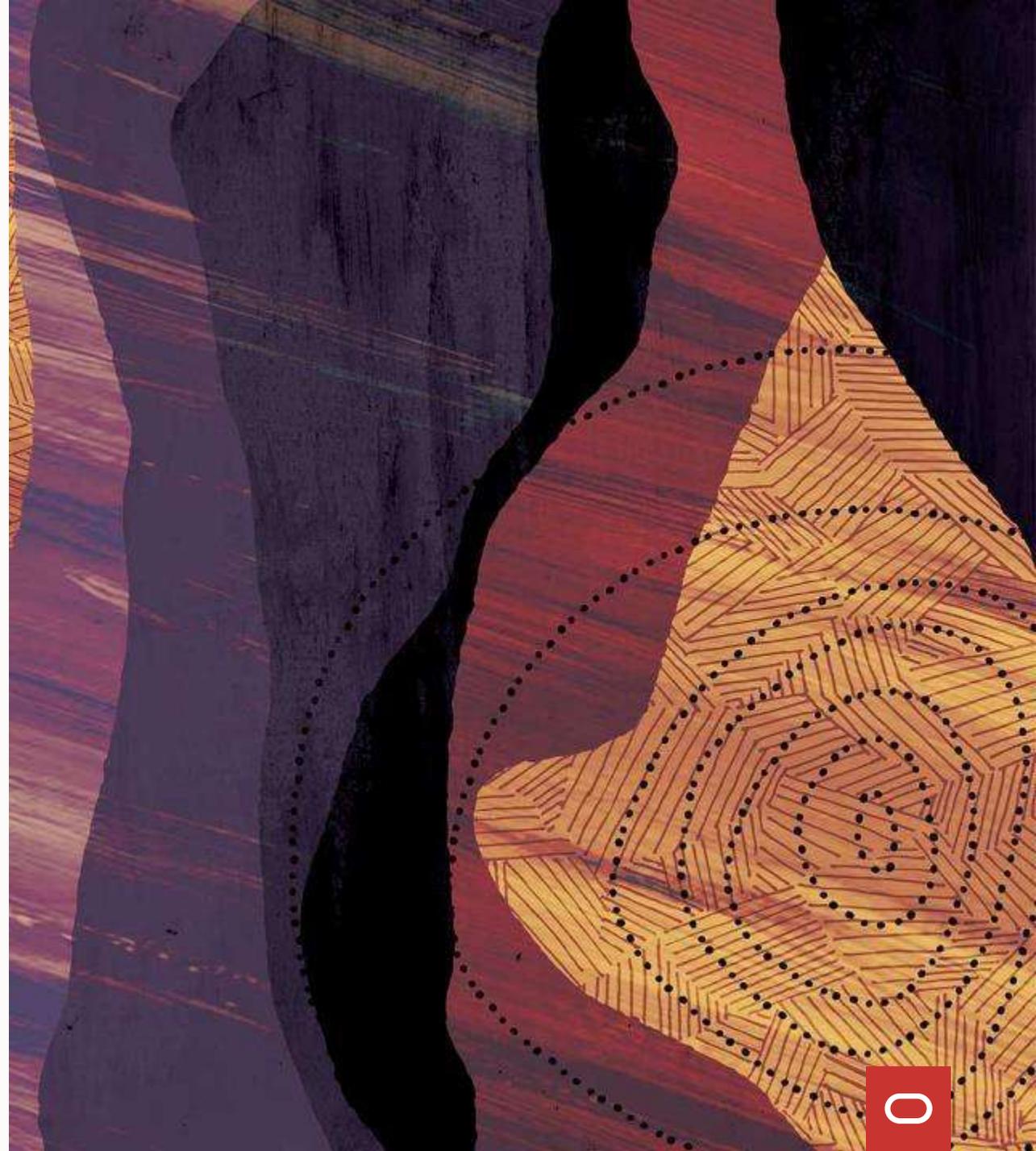
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