

The background features a dark blue gradient with abstract, glowing shapes in shades of purple and pink. Two thin, light blue lines intersect to form a large 'A' shape. The text is positioned on the left side of the image.

AWS re:Invent

DECEMBER 2 - 6, 2024 | LAS VEGAS, NV

CMP206

Amazon Linux: AL2023 and beyond

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Agenda

- 01 What is Amazon Linux
- 02 Why Amazon Linux
- 03 Genesys: Amazon Linux 2023 at Genesys
- 04 Roadmap Updates

What is Amazon Linux ?

- Linux Operating System maintained by AWS and optimized for AWS
- First version was launched in 2010
- AL is a general purpose OS
- 95% of AWS runs on Amazon Linux



Why Amazon Linux



Optimized for AWS

Integrated with tools, agents and services



Secure by default

Ensures safety from threats by fixing all CVEs



Simple to maintain

Delivers the simplest maintenance experience



Cost

Available at no additional licensing cost

Amazon Linux is optimized for AWS

- Default recommended image on EC2 and EKS
- Kernel tailored for EC2 instances and specialized drivers
- EKS and ECS-optimized images
- Integration with AWS services and agents

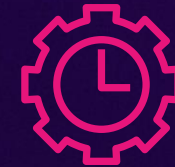
Amazon Linux is highly secure



Smaller package
footprint



SELinux



Kernel Live Patching



Bi-Weekly security
updates



Kernel Hardening

Common Vulnerability and Exposures (CVE) Stats

Amazon Linux 2023 (2024 Year-to-date)

Severity	Evaluated CVEs	Fixed CVEs	End-to-End Duration
Critical	0	0	0
Important	159	173	30
Medium	743	530	38
Low	83	59	42
Total	985	798	

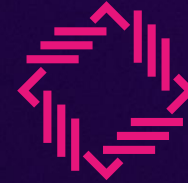
Amazon Linux is simple to maintain



Repository locking



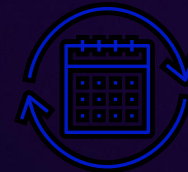
Predictable
maintenance during
product life cycle



Integrated with SSM
Patch Manager



Bi-Weekly security
updates



Batched updates every
quarter

Who should use Amazon Linux

- General purpose OS, optimized for running workloads on AWS
- Fedora-based, but not a direct CentOS replacement
- Ability to upgrade OS version every 3 to 5 years

AL2023 highlights (2024 updates)

- ECS and EKS optimized images available
- PHP 8.3 and .NET 8.0 Added
- Deep learning images available
- Support for all new EC2 instance types including accelerated platforms

AL2023 upgrade

- Most customers have upgraded or have started the upgrade process from AL2 to AL2023
- Best practices for OS version upgrades



Amazon Linux 2023 at Genesys Cloud

Nicholas Barber

(he/him)

Senior Manager, Principal Software Engineer

Genesys



Me

- Platform Engineering and Developer Experience
- Stewardship of the Genesys Cloud BaseAMI since 2021
- OS Configuration Automation since 2005

Genesys Cloud

- Communications for Contact Centers
- Over 8,000 customers
- Servicing over 100 countries
- Immutable Infrastructure Paradigm

Covering...

- Paradigms
- Pipeline
- Challenges
- Lessons learned
- Migration gotchas
- Note: Viewpoint of EC2 microservices

Paradigms and Pipelines

- BaseAMI is a product to be consumed
- Part of internal product suite
- Goal of the BaseAMI versus Goal of a Service
- Internal contributions welcome, encouraged

Challenges

- Ephemeral, Immutable Instances
- 30 Day Maximum BaseAMI Age
- Compliance Requirements

Base AMI Pipeline

Steps

Launch Latest
AmazonLinux 2023 AMI

Copy & Run
Base AMI Automation

Deploy AMI for
Functional & Security
Tests

Release Base AMI

Launch a service
Install Runtimes
Verify Environment
Config Variations
Check Connectivity
Server Hardening
CVE Scans

Milestone

Base-AMI
Created

Func/Sec Tests
Complete

Base-AMI
Available for Use

Lessons Learned

- First Migrated to Amazon Linux 2
 - Performance testing was critical
 - Functional testing was lackluster
- Archetypical services make great test beds
- Stay on top of deprecations
 - <https://docs.aws.amazon.com/linux/al2/ug/deprecated-al2.html>
 - <https://docs.aws.amazon.com/linux/al2023/ug/deprecated-al2023.html>

Sharp Edges

- FIPS 140-2 vs FIPS 140-3
 - Classic Load Balancers and AL2023 in FIPS mode
 - Extended Master Secrets in TLSv1.2 are required
 - No matching cipher suites on backend
- Ensure your security tooling is compatible
- IMDSv2 required by default
- Cron not installed by default
- EPEL not supported
- Keep libraries up to date

Recap

- Different pipelines will net different challenges
- Strong fundamental testing goes a long way
- Keep things up to date

Amazon Linux roadmap

- Amazon Linux 2 end of support
- Amazon Linux life cycle
- New packages
- FIPS

Amazon Linux 2 end of support

- AL2 used by most of AWS customers
- AL2 end of support date is June 30, 2026



- Documentation and FAQs will be updated in the coming weeks

Amazon Linux 2023 life cycle

- AL2023: Standard support phase and maintenance support phase
- AL2023 will be in standard support until June 30, 2027, and maintenance support until June 30, 2029.



Amazon Linux life cycle

- We will provide 12 to 18 months of notice prior to new major version launch (no AL2025)
- Newer kernel version and latest versions of select packages will be available in AL2023 in future minor versions

More packages

- Added ~200 packages to date
 - Openvpn
 - Freeipa
 - .NET8
 - Netplan
 - ...and more

Release notes



Search in this guide

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Release Notes

- ▼ **AL2023 release notes**
 - ▶ 2023.6 release notes
 - ▶ 2023.5 release notes
 - ▶ 2023.4 release notes
 - ▶ 2023.3 release notes
 - ▶ 2023.2 release notes
 - ▶ 2023.1 release notes
 - ▶ 2023.0 release notes
 - ▶ Pre-GA AL2023 release notes
- ▶ All AL2023 packages
- ▶ Package changes in AL2023
- ▶ Package support statements
- ▶ Package support status
- ▶ Document history

Amazon Linux 2023 release notes

[RSS](#)

This section contains upcoming changes and ongoing releases.

Feedback on AL2023 can be provided through your design issues in the [amazon-linux-2023 repo](#) on GitHub.

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- [Amazon Linux 2023 2023.6 release notes](#)
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- [Amazon Linux 2023 2023.1 release notes](#)
- [Amazon Linux 2023 2023.0 release notes](#)
- [Pre-General Availability \(GA\) Amazon Linux 2023 release notes](#)

Amazon Linux 2023 2023.5 release notes

[RSS](#)

The following releases are updates to the fifth quarterly release of AL2023.

Release notes

- [AL2023 version 2023.5.20241001](#)
- [AL2023 version 2023.5.20240916](#)
- [AL2023 version 2023.5.20240903](#)
- [AL2023 version 2023.5.20240819](#)
- [AL2023 version 2023.5.20240805](#)
- [AL2023 version 2023.5.20240730](#)
- [AL2023 version 2023.5.20240722](#)
- [AL2023 version 2023.5.20240708](#)
- [AL2023 version 2023.5.20240701](#)
- [AL2023 version 2023.5.20240624](#)

Source RPM	RPM	Architectures	Version
catch1	catch1-devel	aarch64, x86_64	1.12.2-16.amzn2023
edid-decode	edid-decode	aarch64,	0-68.20240130git7a27b33



More packages

- Send us feedback on any AL2023 package requests
- Requests on our radar include mod_auth_mellon, LLDP agent, and pam_radius

Federal Information Processing Standards (FIPS)

- AL2 modules have full validation based on FIPS 140-2 standards
- AL2 modules will reach sunset date between October 2024 to September 2025

Cryptographic Module Name	Associated Packages	Status	Certification Number	Certification Expiration Date
OpenSSL	openssl1.0.2k	Historical	4548	2024-10-22
Libcrypt	libcrypt-1.5	Active	3618	2025-02-18
NSS	nss-softhkn-3.36/nss-softhkn-freebl-3.36.	Active	4565	2025-04-19
GnuTLS	gnutls-3.3	Active	4472	2025-04-19
Kernel Crypto API	kernel-4.14	Active	4593	2025-09-13

FIPS on AL2

- Consult your compliance team on using modules in historical status

Cryptographic Module Validation Program CMVP



Certificate #4548





Historical - The referenced cryptographic module should not be included by Federal Agencies in new procurements. Agencies may make a risk determination on whether to continue using this module based on their own assessment of where and how it is used.

Details

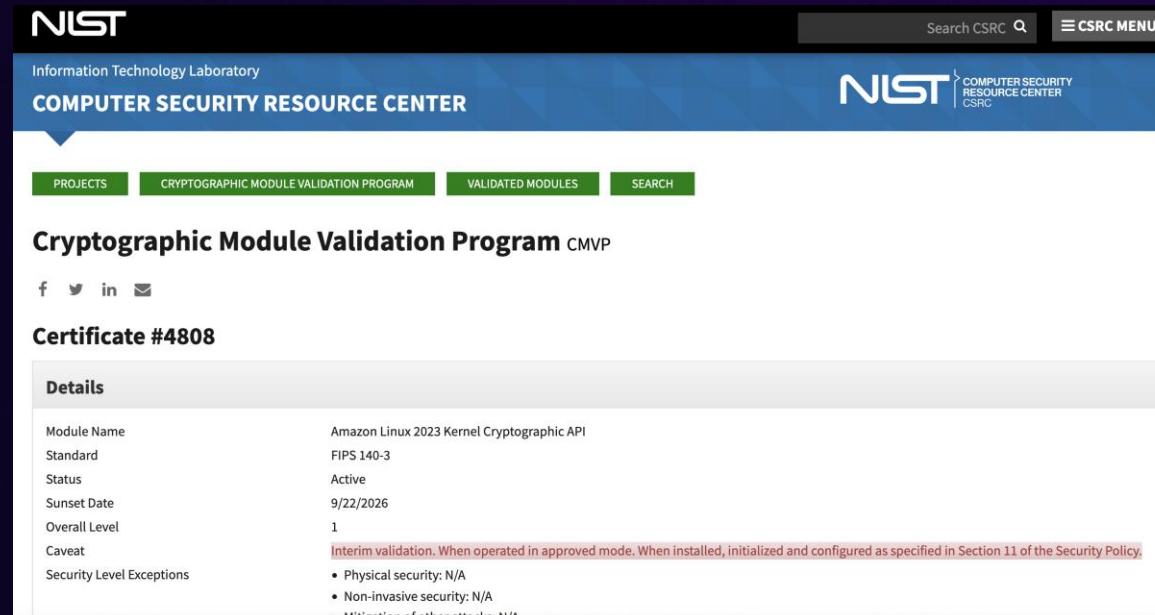
Module Name	Amazon Linux 2 OpenSSL Cryptographic Module
Standard	FIPS 140-2
Status	Historical
Historical Reason	Moved to historical list due to sunseting
Overall Level	1
Caveat	When operated in FIPS mode

FIPS on AL2023

- AL2023 modules in progress (FIPS 140-3) - OpenSSL, NSS, Libgcrypt, GnuTLS

Amazon Linux 2023 GnuTLS Cryptographic Module	Amazon Web Services, Inc. 	FIPS 140-3	Review Pending (2/2/2024)
Amazon Linux 2023 Libgcrypt Cryptographic Module	Amazon Web Services, Inc. 	FIPS 140-3	Review Pending (2/2/2024)
Amazon Linux 2023 NSS Cryptographic Module	Amazon Web Services, Inc. 	FIPS 140-3	Review Pending (2/2/2024)
Amazon Linux 2023 OpenSSL FIPS Provider	Amazon Web Services, Inc. 	FIPS 140-3	Review Pending (2/2/2024)

- AL2023 modules with interim validation - kernel cryptographic API



The screenshot shows the NIST Computer Security Resource Center (CSRC) website. The page is titled "Cryptographic Module Validation Program CMVP" and displays details for "Certificate #4808". The details section includes the following information:

Details	
Module Name	Amazon Linux 2023 Kernel Cryptographic API
Standard	FIPS 140-3
Status	Active
Sunset Date	9/22/2026
Overall Level	1
Caveat	Interim validation. When operated in approved mode. When installed, initialized and configured as specified in Section 11 of the Security Policy.
Security Level Exceptions	<ul style="list-style-type: none">Physical security: N/ANon-invasive security: N/AMitigation of other attacks: N/A

FIPS on AL2023

- FIPS mode on AL2023 can be enabled
- Consult your compliance team to ascertain if AL2023 crypto modules are acceptable

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User Guide

▼ Recently added to this guide

- [List of AL2023 Reserved Groups](#)
November 18, 2024
- [List of AL2023 Reserved Users](#)
November 18, 2024

Enable FIPS Mode on AL2023

[PDF](#) | [RSS](#)

This section explains how to enable Federal Information Processing Standards (FIPS) on AL2023. For more information about FIPS, see: [Federal Information Processing Standards \(FIPS\)](#)

Enable FIPS Mode

1. Connect to your AL2023 instance using SSH or AWS Systems Manager.
2. Ensure the system is up to date. For more information, see [Manage package and operating system updates in AL2023](#).
3. Ensure the `crypto-policies` utilities are installed and up-to-date.

```
sudo dnf -y install crypto-policies crypto-policies-scripts
```
4. Enable FIPS mode by running the following command.

```
sudo fips-mode-setup --enable
```
5. Reboot the instance using the following command.

```
sudo reboot
```
6. To verify that FIPS mode is enabled, reconnect to your instance and run the following command.

```
sudo fips-mode-setup --check
```

The following example output shows FIPS mode is enabled:

```
FIPS mode is enabled
```

Conclusion

- Amazon Linux is the most optimized Linux OS for AWS
- Upgrade to AL2023, reach out to us if you have any questions or requests

Thank you!

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