An introduction to today’s Modular Operating System

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Agenda

Why the Clear Linux* OS?
Security & Performance
Other Distinguishing Features
Modular for Customization & Control
Why the Clear Linux OS?
Today’s operating systems are required to meet new expectations.
Clear Linux

a modular open source OS optimized for **performance** and **security**, from the Cloud to the Edge, designed for **customization**, and **deploy-ability**.
Why Clear Linux?

Designed from the ground up, an industry blueprint to incorporate Intel platform features and optimizations in a single, performance-driven Linux distribution.

A modular, cross architecture open source OS providing customers the ability to differentiate.

Delivering tuned performance of Intel features on Linux across the entire OS stack.

Available at:

Clearlinux.org  Azure  Amazon web services  Alibaba Cloud  docker
Security and Performance
Focused
Security

Clear Linux* stays in lockstep with upstream for **current security upgrades** and is designed to deliver available security mitigations to customers rapidly.

- **Constant vulnerability scanning**

- **Aggressive mitigation policy**
  Incorporates threats posted to the National Vulnerability Database. Applies patches and distributes in daily releases.

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Security

Clear Linux enables security from the Cloud to the Edge, to the End Device.

**Unified "Trust" Store**
Provides a common place for Certificate Authority Management
Packages points to one location to find certs, ensuring you can manage your trust policy consistently

**Industry standard security features**
Out of the box industry standard security features enabled
Eg. SecureBoot, IPTables, SSH, OpenSSL, IPSec VPN, Signed Update Content
Performance throughout the stack

**Clear Linux** optimizes across the whole stack

To get end user performance, optimization at all layers is required.

Clear Linux is highly tuned for Intel platforms where all optimizations turned on by default.

Clear Linux channels the best of Intel's industry leading kernel expertise to provide the highest performing kernel for your OS.
Optimization methods

Kernel
- Ships the latest Linux kernel
- Includes staged performance patches

Libraries
- Leverages runtime optimizations to auto-select compiled binaries

Compiler
- Optimizes compiler flags
- Compiles twice to ship multiple libraries

AVX512
- On the latest hardware, the AVX512 optimized library is auto-selected at application startup
Ex: TensorFlow* library optimizations throughout the stack

- AVX512 Optimizations
- Optimized Python modules
- AVX2 & AVX512 Python optimizations
- Additional routines for AVX512
- Tuning kernel for critical workloads

Intel Hardware

GLIBC

Numpy / Pandas

Python

EIGEN

TensorFlow

GCC

Kernel

IA optimizes builds
Other Distinguishing Features
Bundles

Vehicle for install and update
Bundle content is tied to a specific version number

Dependencies resolved upstream,
not at install or runtime

Basis for testing and validation
Components of each version are tested together for a specific function

Guides stack optimization
Bundles are curated & optimized based on functionality

Functionality based content curation
Update Principles
Allowing for Over-the-Air Updates

1. Lightweight
2. Incremental
3. Whole system updates
4. Version controlled
5. User control of updates

Update size is relative to the size of the change
Stateless

Clear Linux employs the stateless concept - a strict separation between User and System files for easier OS manageability.

Provides functional and secure default configuration in `/usr`

Defaults can be overridden or modified in `/etc` and the home directory

Wiping `/etc` and `/var` is effectively a factory reset

This modularity allows for easier manageability, simplifying customization and updatability.
**Opt-In Telemetry Solution**

- Opt-in telemetry solution
- Lightweight client service
- Client-side probes send records to help debug software anomalies
- Probes don’t collect PII (personal identifiable information) and records comply with Intel’s Privacy Policy
- Records are analyzed and displayed in a developer-oriented format on the telemetry server
Modular for Customization and Control
Become a derivative of Clear Linux*

Clear Linux tooling enables you to create your own distribution. Tools are open source. The source code for security and performance patches is on GitHub. Complete control of a downstream version is available.

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The Mixer Tool: Accelerating Customization

Allows for Incremental Effort
Build customer solutions on top of Clear Linux easily with the Mixer
Don’t need to recompile entire OS, work is only required on the customization piece

Cost Proportionate to Customization Level
Take advantage of the Clear Linux automated development model for faster TTM
Cost = complexity

Clearlinux.org Release → Mixer Tool → Clear Linux Updates → Clear Linux OS
Customer Software → Mixer Tool → Clear Linux Updates to Customized OS → Clear Linux Customized OS
Simplifying Manageability of Your Custom Clear Linux OS

As a derivative, **you decide** when or if to consume content from Clear Linux just as you decide whether to update after changes to the software you are developing.
Summary

Clear Linux a modular open source OS optimized for performance and security, from the Cloud to the Edge, designed for customization, and deployability.

Clear Linux optimizes throughout the entire stack; it is the most tuned implementation of Linux for Intel platforms with demonstrated superior performance—as much as 4x in independent testing.

The Clear Linux OS and its surrounding components are being developed in lockstep with upstream development.

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Try us out

Engage with us at clearlinux.org

See our source code at github.com/clearlinux

Public IRC #clearlinux on Freenode

Public Mailing List https://lists.clearlinux.org/mailman/listinfo/dev

Images available at:

Clearlinux.org  Azure  Amazon Web Services  Alibaba Cloud  Docker  ...
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