Geekbench 7 CPU Workloads

Introduction

Geekbench 7 CPU Benchmark scores are used to evaluate and optimize CPU and memory performance using workloads that include data compression, image processing, machine learning, and compiling code. Performance on these workloads is important for a wide variety of end-user applications including web browsers, image editors, and developer tools.

CPU Benchmark

Scores

Geekbench 7 scores are calibrated against a baseline score of 2,500 (which is the score of a Lenovo Legion with an AMD Ryzen 7 7700 processor). Higher scores are better, with double the score indicating double the performance.

Productivity Workloads

Productivity workloads measure how well your CPU handles common operations critical to everyday tasks, including data compression, image compression, web browsing, and 2D graphics.

File Compression

The File Compression workload compresses and decompresses numerous files using different compression formats. It models use cases where users and software applications compress files to reduce data and bandwidth (such as compressing photos and files when sending emails).

The File Compression workload compresses and decompresses three different archives (one containing source code, one containing object code, and one containing text files) using three different compression formats (LZ4, zlib, and Zstandard). It also verifies the files using the SHA1 (Secure Hash Algorithm 1) function.

Navigation

The Navigation workload generates directions between a sequence of locations and draws the routes on a map. It models the use case of users asking for directions from an offline navigation app (such as offline Google maps).

This workload uses Dijkstra's algorithm to calculate 24 different routes on two OpenStreetMap

maps — one for a small city (Waterloo, Ontario) and one for a large city (Toronto, Ontario).

HTML5 Browser

The HTML5 Browser workload renders web pages using a web browser. It models the use case of a user navigating the web with a browser (such as Google Chrome or Apple Safari).

This workload uses a headless browser to open, parse, lay out, and render web content from eight web pages modeled on popular websites (e.g., Ars Technica, Instagram, and Wikipedia).

PDF Viewer

The PDF Viewer workload opens complex PDF (Portable Document Format) documents using PDFium, Google Chrome's PDF renderer. It models the use case of a user opening and viewing PDFs of different complexities.

This workload renders six different PDFs of varying complexity and includes park maps from the American National Park Service, a technical document, and an academic abstract.

Photo Library

The Photo Library workload categorizes and tags photos based on the objects that they contain. The Photo Library workload models importing, organizing, and tagging photos based on detected objects. This lets users search their photos by keyword in photo library applications like Adobe Lightroom, Apple Photos, and Google Photos.

The workload imports images in JPEG, JPEG-XL, and DNG formats, generates thumbnails, and uses Machine Learning (using the MobileNetV1 SSD model) to tag the photos, storing the resulting metadata and tags in a SQLite database.

Developer workloads

Developer workloads measure how well your CPU handles typical developer tasks such as processing text files, compiling code, and compressing assets.

Clang

The Clang workload uses the Clang compiler to compile the Lua interpreter, a popular open-source language interpreter. It models the use case of developers building their code and the just-in-time compiling that general users can encounter on their systems (such as JIT compilation for scripting Java and compilation for shading languages in GPU drivers).

Text Processing

The Text Processing workload loads multiple files, parses the contents using regular expressions, stores the metadata in a SQLite database, and finally exports the content to a

different format. It models typical text processing tasks that manipulate, analyze, and transform data to reformat it for publication and to gain insights.

This workload uses Python 3.13 as its interpreter and converts 190 Markdown files to HTML.

Asset Compression

The Asset Compression workload compresses texture and geometry assets using popular compression codecs. It models content compression pipelines used by game developers.

This workload compresses six texture assets using the ASTC and BC7 codecs, and four geometry assets using the Draco library.

Image Editing

Image editing workloads measure how well your CPU handles making simple and complex image editing tasks.

HDR

The HDR workload blends Standard Dynamic Range (SDR) photos to create a single High Dynamic Range (HDR) photo that is more colorful and vibrant than any of the individual SDR photos. It models HDR features that are standard in modern smartphone camera apps (such as Google Camera and Apple Camera).

This workload creates one 16 MP HDR image from six 16 MP SDR photos.

Photo Editor

The Photo Editor workload applies a series of edits, such as cropping, color adjustment, and retouching, to photos. It models the editing features found in photo editing apps (such as Adobe Photoshop or Apple Photos).

This workload applies different effects to ten photos. Among them are color and tone corrections (e.g., levels, brightness, saturation), stylistic filters (e.g., sepia, grayscale, hue shifts), geometric adjustments (e.g., rotate, crop, scale), and overlay composites (e.g., borders, vignettes).

Image Synthesis

Image synthesis workloads measure how well your CPU handles content creation tasks, including image rendering and image processing.

Ray Tracer

Ray tracing is a rendering technique used to generate photorealistic images by modeling how light rays interact with objects in a virtual scene. It models the rendering processes employed in 3D rendering software (such as Blender, Maxon Cinema 4D, and Chaos Corona).

The Ray Tracer workload generates a photorealistic image from a virtual scene using the Blender Cycles renderer and the Intel Embree library.

Structure from Motion

The Structure from Motion workload takes 2D images of the same scene and constructs an estimate of the 3D coordinates of the points that are visible in both images.

Structure from Motion is a technique that generates 3D geometry from multiple 2D images. Augmented Reality (AR) systems use techniques like Structure from Motion to understand real-world scenes and integrate computer-generated graphics into these scenes.

The Structure from Motion workload takes nine 2D images of the same scene and constructs an estimate of the 3D coordinates of the points that are visible in both images.

Simulation

Simulation workloads measure how well your CPU handles physical simulation tasks.

Game Physics

The Game Physics workload simulates rigid body physics, including collisions, in a 3D environment.

Game Physics uses the Jolt Physics engine, which is used in several popular video games.

Media workloads

Media workloads measure how well your CPU handles common media encoding, decoding, and processing. Media workloads model applications like video conferencing and online streaming.

Video Encoder

The Video Encoder workload simulates the screen-sharing feature in video conferencing applications, encoding static screenshots with programmatically generated cursor movement using the AOM library and the AV1 video codec. It models the use case of users sharing their screen during video calls (such as Zoom and Microsoft Teams).

Audio Encoder

The Audio Encoder workload encodes audio data (both music and spoken word) into a compressed audio format. It models use cases where applications compress audio for storage or streaming (such as recording and sharing voice memos or podcasts).

The Audio Encoder workload uses the Opus compression codec to compress two minutes of audio data.

Video Decoder

The Video Decoder workload integrates video decoding, audio decoding, audio resampling, and speech recognition into a single workload. It models the use case of users watching videos with automatic subtitling enabled (such as YouTube's auto-generated captions).

The Video Decoder workload is implemented using the AV1 video codec, the Opus audio codec, and the Whisper speech recognition model.