Geekbench 6
CPU Workloads

Introduction

Geekbench 6 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 applications including web browsers, image editors, and developer tools.

CPU Benchmark

Scores

Geekbench 6 scores are calibrated against a baseline score of 2,500 (which is the score of a Dell Precision 3460 with a Core i7-12700 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 apps compress files to reduce data and bandwidth (such as compressing photos and files when sending emails).

This workload compresses and decompresses the Ruby 3.1.2 source archive (a 75 MB archive with 9,841 files) using different compression codecs (such as LZ4 and ZSTD). 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 opens various web pages using a web browser. It models the use case of a user browsing the web with a browser (such as Chrome and Safari).

This workload uses a headless browser and opens, parses, lays out, and renders text and images from 8 web pages from popular websites (such as Ars Technica, Instagram, and Wikipedia).

PDF Render

The PDF Render workload opens complex PDF (Portable Document Format) documents using PDFium, Google Chrome's PDF renderer. It models the use case of a user opening PDFs in a browser.

This workload renders PDFs of park maps from the American National Park Service (sizes from 897 KB to 1.5 MB) that contain large vector images, lines and text.

Photo Library

The Photo Organization workload categorizes and tags photos based on the objects that they contain. This lets users search their photos by keyword in image organizer apps (such as Adobe Lightroom, Apple Photos, and Google Photos).

The workload uses MobileNet 1.0 to classify the photos and a SQLite database to store the photo metadata (including their tags).

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).
This workload uses the musl libc as its C standard library.

Text Processing

The Text Processing workload loads numerous files, parses the contents using regular expressions, stores 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 3.9.0 as its interpreter and converts 190 Markdown files to HTML.

Asset Compression

The Asset Compression workload compresses 3D textural and geometric assets using a variety of popular compression codecs (ASTC, BC7, DXT5). It models standard content compression pipelines, such as those used by game developers.

This workload prepares 16 textures and geometry assets for distribution using the following codecs and encounters: ASTC, BC7, DXTC, and Draco.

Machine Learning Workloads

Machine Learning workloads measure how well your CPU handles recognizing objects in images and scenes.

Object Detection

The Object Detection workload uses machine learning to detect and classify objects in photos and then highlight them in the photo. It models features in photo apps (such as Google Photos or Apple photos) that identify people, animals, and objects in photos.

This workload uses the convolutional neural network (CNN) MobileNet v1 SSD to detect and classify objects in 16 photos (300 X 300 px).

Background Blur

The Background Blur workload separates the background from the foreground in a video stream and blurs the background. It models background blurring features in video conferencing apps (such as Zoom, Slack Huddles, and Microsoft Teams).

This workload uses DeepLabV3+ as its network and blurs 10 frames from a 1080p video stream.

Image Editing

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

Object Remover

The Object Remover workload removes an object from a photo and automatically fills in the gap left behind. It models content-aware fill and magic eraser features in photo editing apps (such as Adobe Photoshop and Google Photos).

Given a 3 MP image with an undesirable region (indicated via a mask image), this workload removes the region and uses an inpainting scheme to reconstruct the gap left behind.

Horizon Detection

The Horizon Detection workload detects and straightens uneven or crooked horizon lines in photos to make the photos look more realistic. It models horizon line correctors in photo editing apps (such as Adobe Lightroom, Google Gallery, and Apple Photos).

This workload reduces the detail in the photo using the Canny edge detector and then applies the Hough transform to detect the horizon line.

Photo Filter

The Photo Filter workload applies filters to photos to enhance their appearance. It models common filters available in social media and photo editing apps (such as Instagram and Adobe Lightroom).

This workload applies the following effects to 10 photos: color and blur filters, levels adjustments, cropping and scaling, and image compositing.

HDR

The HDR workload blends 6 SDR (Standard Dynamic Range) photos to create a single HDR (High Dynamic Range) 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 a 16 MP HDR image from six 16 MP SDR photos.

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).

This workload renders the Blender BMW scene using a custom ray tracer built with the Intel Embree ray tracing library.

Structure from Motion

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.