A pint-sized workstation that can power your demanding engineering and design applications

The Intel Core i9-12900 processor-powered Intel NUC 12 Pro X Kit executed representative tasks in 18 professional apps without crashing or experiencing problems

Those who work in the media and engineering fields typically rely on compute-intensive applications that require more powerful systems than the average office worker needs. It isn't always easy to determine whether a particular workstation can handle the demands of your apps, and you certainly don't want to invest in a new system only to find it unable to run them.

At Principled Technologies, we carried out testing to assist power users who are interested in new next units of computing (NUCs) from Intel®. The compact Intel NUC 12 Pro X Kit we evaluated—measuring only 4.7 by 7.4 by 14 inches—featured an Intel Core i9-12900 processor with Intel vPro®. We put it to the test with 18 demanding apps used by professionals in fields such as video, design, and architecture, engineering, and construction (AEC). They came from independent software vendors (ISVs) such as Adobe®, Autodesk®, and Siemens®. We also tested using the Intel NUC 12 Pro X Kit as a virtual desktop client with VMware® Horizon® View. The NUC 12 Pro X Kit ran each of the apps smoothly, letting us carry out tasks that users regularly perform. If you or the professionals for whom you purchase workstations use one or more of the apps we tested, our validation could save you time researching the system requirements for each app.

This report explains our testing and shows how the Intel Core i9-12900 processor-powered Intel NUC 12 Pro X Kit could benefit your studio or firm.

We installed, used, and closed 18 demanding applications without failure

Installing and setting up the apps
18/18

Performing common tasks without crashing
18/18

Closing the apps
18/18

Plus

We successfully installed and ran the VMware Horizon View virtual desktop application

How we tested

The Intel NUC 12 Pro X Kit effectively handled 19 applications: one VMware application for virtual desktop environments and 18 compute-intensive applications that feature prominently in fields such as design, engineering for product lifecycle management (PLM), and media and content creation. We aimed to use the most recent versions of the compute-intensive apps.

Professionals using such applications require a great deal from their systems—without sufficient processing power, a workstation can crash under heavy compute demands, causing users to lose their work and impeding productivity.

For each of the compute-intensive apps we tested, our scenario comprised three phases:

1. Setup: Downloading and installing the application
2. Common task execution: Performing one or more typical tasks or actions
3. Closure: Saving our work and closing the application

For us to consider a phase successful, we had to be able to complete it without the system crashing or our experiencing any other performance issues.

For the VMware app we looked at, our test scenario consisted of only the first phase, setup, which included installing and logging into a VDI session. Because the VMware app functions to create a virtual desktop environment, end users who carry out these professional workflows typically would neither perform specific tasks using this app nor close it.

About the Intel NUC 12 Pro X Kit powered by the Intel Core i9-12900 processor with Intel vPro

The Intel NUC 12 Pro X Kit packs its powerful capabilities into a small package. Users can rely on it to run computer-aided design (CAD) apps without devoting a great deal of desk or floor space to the device, which they could even mount under a desk. Its compact size and strong performance also make it well suited to powering interactive kiosks and digital displays.

The Intel NUC we tested featured an NVIDIA® Quadro® P2200 discrete graphics card, which would support connecting four 5K displays to the device. The graphics card has a Pascal GPU with 1,280 Compute Unified Device Architecture (CUDA) cores and 5GB GDDR5X on-board memory.

With its Intel Core i9-12900 processor and the NVIDIA graphics card, the Intel NUC 12 Pro X Kit was able to run every one of the graphics-intensive applications we tested, rendering images and objects as necessary without crashing.
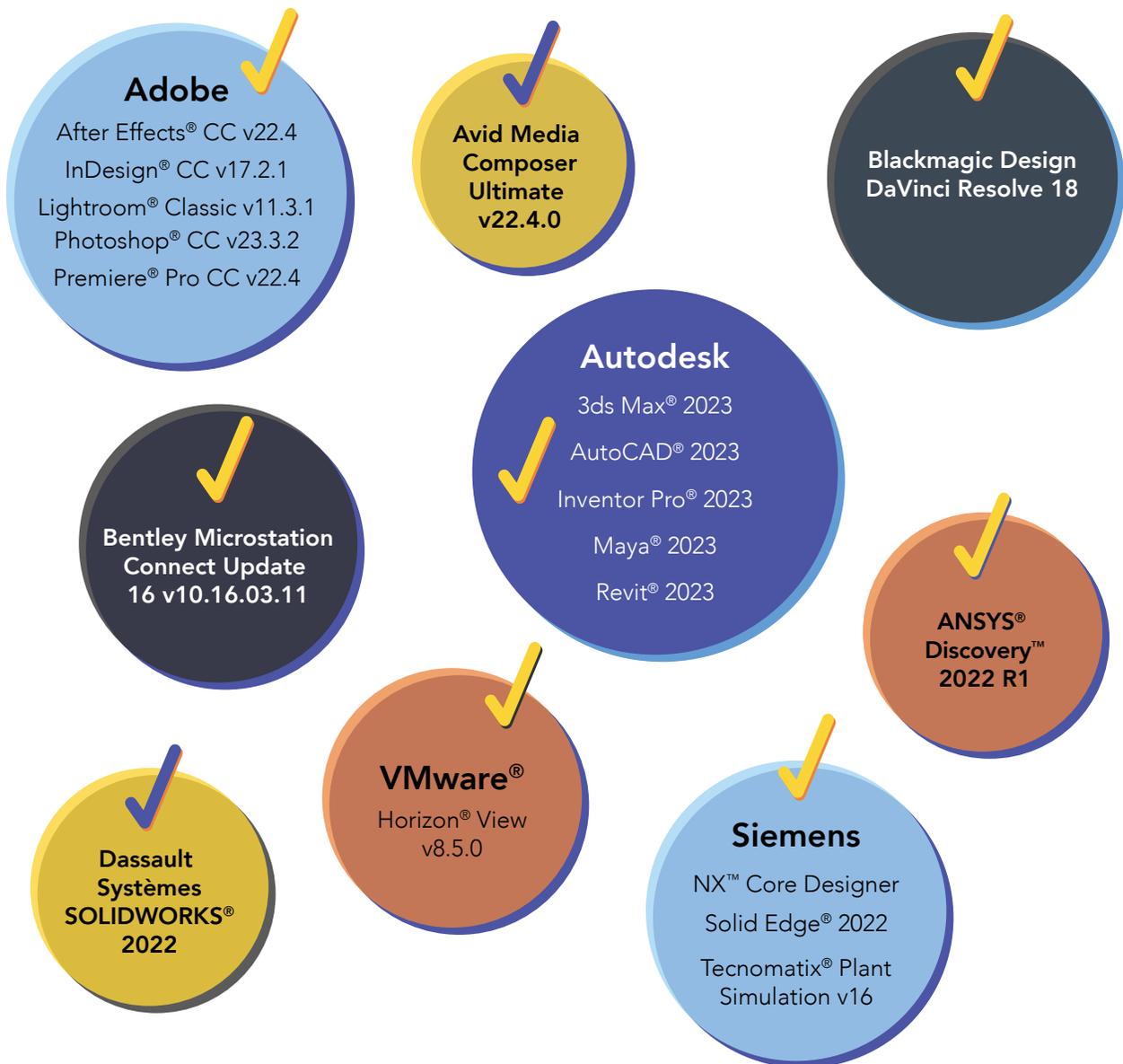
The Intel NUC we tested also featured a 500GB Samsung 980 Pro solid-state drive. For connectivity, the system had six rear and two front USB 3.2g2 ports, two Thunderbolt 4 ports, one HDMI® port, and four DisplayPort™ receptacles.

Our findings

The Intel NUC successfully ran 100 percent of the 19 apps we tested. Our findings demonstrate that whether you work in a video studio that uses high-end production applications or an engineering firm that relies on demanding computer-assisted drafting (CAD) tools, the Intel Core i9-12900 processor-powered Intel NUC 12 Pro X Kit is up to the task.

The Intel NUC 12 Pro X Kit combines the Intel Core i9-12900 processor with an NVIDIA GPU to run compute-intensive apps and handle professional-grade workflows.

The Intel NUC ran these 19 programs successfully:

Adobe
After Effects® CC v22.4
InDesign® CC v17.2.1
Lightroom® Classic v11.3.1
Photoshop® CC v23.3.2
Premiere® Pro CC v22.4

Avid Media Composer Ultimate v22.4.0

Blackmagic Design DaVinci Resolve 18

Bentley Microstation Connect Update 16 v10.16.03.11

Autodesk
3ds Max® 2023
AutoCAD® 2023
Inventor Pro® 2023
Maya® 2023
Revit® 2023

ANSYS® Discovery™ 2022 R1

Dassault Systèmes SOLIDWORKS® 2022

VMware®
Horizon® View v8.5.0

Siemens
NX™ Core Designer
Solid Edge® 2022
Tecnomatix® Plant Simulation v16

Details on our scenarios

For more detail on our testing scenarios, please see the science behind this report.

Adobe products

Professionals in content creation fields—film, photography, graphic design, and web design, among others—use these Adobe desktop applications on a daily basis.

InDesign v17.2.1

Graphic designers use InDesign to create, edit, and format graphically intensive PDF documents for publishing. Readers can view PDFs onscreen or print them. In this test scenario, we performed the following tasks: creating a new document, adding a picture and text, and exporting the document as a PDF. The Intel NUC 12 Pro X Kit handled all tasks successfully.

Lightroom Classic v11.3.1

Photographers use Lightroom to edit and manage photos. In this test scenario, we performed the following tasks: importing photos from a folder, merging them into a panoramic image, and exporting the file as a JPEG at 100% quality. The Intel NUC 12 Pro X Kit handled the tasks well, allowing us to perform the actions without issue.

Note: Digital cameras typically offer two formats: JPEG and RAW. The JPEG format involves processing and compression, and makes for smaller file sizes, while the RAW format retains more of the original photo and makes for larger files. Travel, nature, and fine arts photographers who work with RAW files might perform workflows such as the one in our test, and then further edit the JPEG in Adobe Photoshop.

Photoshop v23.3.2

Creatives in many fields use Photoshop to manipulate images. It shares some features with Lightroom, but allows users to edit at the pixel level for more granular control. You can use Photoshop to assemble multiple images into a composite or blend high-contrast images into a high dynamic range (HDR) photo.

For this scenario, we selected five HDR files and merged them together. We then exported the picture as a JPEG at 100% quality. The Intel NUC 12 Pro X Kit allowed us to perform these activities without any problems.

Premiere Pro v22.4

Videographers and video editors use Premiere Pro to edit footage. In this test scenario, we performed the following tasks: creating a new project, importing a RED 4K RAW video file, formatting the video to H.264 for HD video and audio, and exporting the file. A videographer who shoots in 4K might use this workflow if they needed to edit video and audio for HDTV. The Intel NUC 12 Pro X Kit had no issues as we carried out these the tasks.

After Effects CC v22.4

Videographers and video editors use After Effects to carry out a variety of postproduction activities. In our test scenario, we performed the following tasks: adding a keyframe to set the parameters for an effect, moving it to a new location in the video timeline, generating motion graphics, and rendering the file. A videographer, video editor, or graphic designer creating or collaborating on a commercial or video for a kiosk might perform the actions in this scenario. In our test, the Intel NUC 12 Pro X Kit handled these activities smoothly.
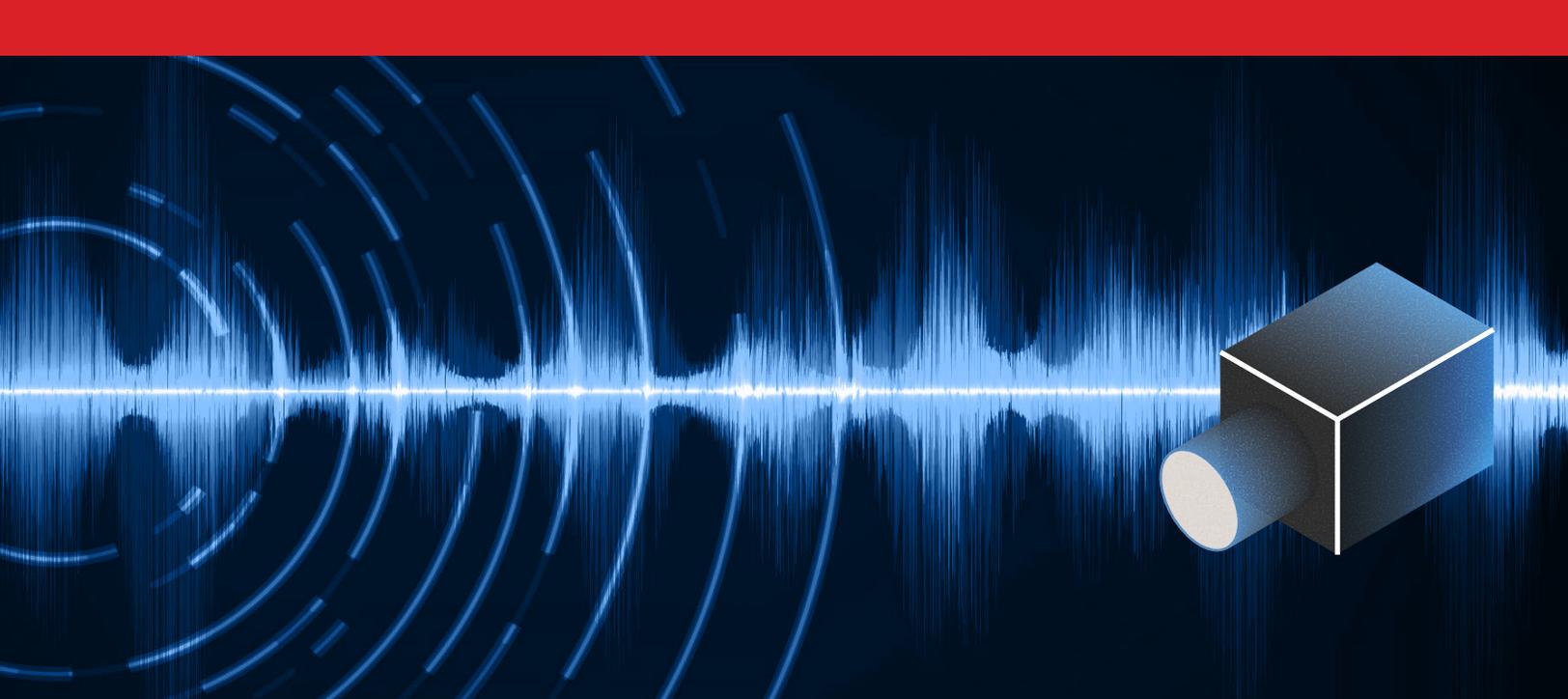
Avid Media Composer | Ultimate v22.4.0

Avid Media Composer | Ultimate v22.4.0 is non-linear editing (NLE) software for video editors, videographers, and filmmakers. In our test scenario, we performed the following tasks: importing a RED 4K file, applying the Color Correction effect, and exporting the file to H.264. As in our Premiere Pro scenario, a videographer who shoots in 4K might use this workflow to edit video and audio for HDTV, and as in that scenario, the Intel NUC 12 Pro X Kit let us successfully execute the tasks.

Blackmagic Design DaVinci Resolve 18

DaVinci Resolve is an NLE video editing app that video editors, videographers, and others in film and TV production use. As in the Premiere Pro and Avid Media Composer scenarios, we imported RED 4K video; however, we increased the video speed before rendering it as H.264. We experienced no issues executing these tasks on the Intel NUC 12 Pro X Kit.

ANSYS Discovery Live Release 2022 R1

ANSYS software helps engineers and others develop physical and digital products. The app we tested, ANSYS Discovery Live, lets engineers "start seeing simulation results in seconds after importing a geometry, with no need for a high-performance computing system."[1] For our scenario, we ran a heat sink temperature simulation that showed heat dispersal over time, and found that the Intel NUC 12 Pro X Kit carried out the simulation without any problems.

Autodesk

Autodesk calls itself a company that "makes software for people who make things."[2] Creators use Autodesk software to engineer cars, design skyscrapers, make films, and more. They offer many products that focus on the design and rendering of products, systems, infrastructure, and buildings. Autodesk users work in AEC fields, product design, manufacturing, and media and entertainment creation—all areas that rely on compute-intensive apps.
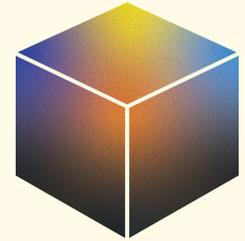
3ds Max 2023

Animators and video game designers use 3ds Max for modeling, rendering, and animating 3D models and objects. Using the app to create simple shapes and objects is the first step to developing fully functional and visually compelling models for movies, video games, and commercials. For this scenario, we created a cylinder and saved the project. We encountered no problems as we performed these tasks using the Intel NUC 12 Pro X Kit.

AutoCAD 2023

Autodesk AutoCAD software is well known to most professionals in AEC fields. It is a CAD app that allows users to create two- and three-dimensional drawings for floor plans, electrical wiring diagrams, topography maps, and other visual planning projects. In our test scenario, we performed the following tasks: creating a 2D drawing, rotating it, and saving the project. We did not experience any obstacles while completing these steps with the Intel NUC 12 Pro X Kit.

Inventor Pro 2023

Inventor Pro is a CAD app that allows designers, engineers, and others to design and test 3D models in an environment with stress, motion, and other factors. For example, a mountain bike manufacturer might use Inventor Pro to adjust the interaction between components in a prototype's suspension system. In our test scenario, we performed the following tasks: creating a basic 3D rectangle, rotating it, and saving the project file. Carrying out this scenario on the Intel NUC 12 Pro X Kit presented no issues.

Maya 2023

Animators and other artists can use Maya to animate, render, and model their 3D characters and worlds. For this scenario, we created a torus shape (a three-dimensional ring) using the Intel NUC 12 Pro X Kit and did not run into any problems.

Revit 2023

Many professionals in AEC fields can use Revit, a building information modeling (BIM) app, when designing and constructing buildings. In our test scenario, we performed the following tasks: opening a sample project file with the app, changing a single door to a double door, rotating the 3D image, and saving the project. Completing this set of steps posed no challenges for the Intel NUC 12 Pro X Kit.
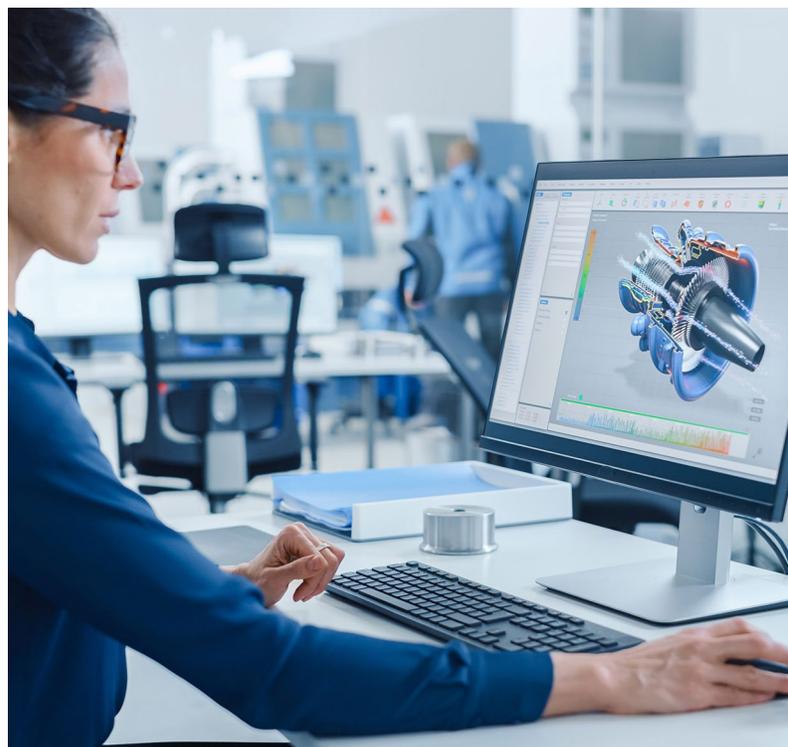
Bentley MicroStation Connect Update 16

Like AutoCAD, MicroStation is a CAD app for 2D and 3D design and drafting. It generates 2D and 3D vector graphics objects and has BIM features. Professionals working on infrastructure projects can view, model, and document their work. In our test scenario, we performed several tasks—opening a sample project file, adding a rectangular addition to the structure in the file, and saving the file—without issue.
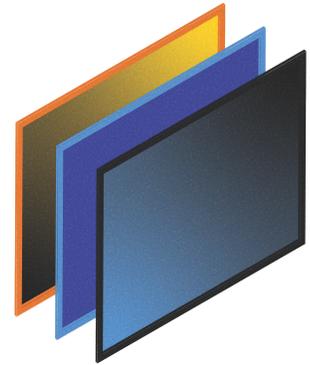
Dassault Systèmes

SOLIDWORKS 2022

SOLIDWORKS is a computer-aided engineering (CAE) and CAD app that focuses on solid modeling and runs primarily on Microsoft Windows. According to Dassault, "The companies using Dassault SolidWorks are most often found in United States and in the Machinery industry."[3] We were successful in using the app to create a rectangular aluminum extruded base and then saving the project.

Siemens

NX Core Designer

Engineers can use the CAD app NX Core Designer to design products using solid part modeling and assembly modeling. Automotive engineers working at large manufacturers are good examples of Siemens NX software package users.[4] We successfully used the app to create an extruded rectangle.

Solid Edge 2022

Solid Edge is a 3D CAD app for mechanical designers. It runs on Microsoft Windows and provides solid modeling, assembly modeling, and two-dimensional orthographic-view functionality. As with the NX Core Designer scenario, we succeeded in creating an extruded rectangle.

Tecnomatix Plant Simulation v16

Tecnomatix produces software to help manufacturing organizations make assembly, logistics, and other critical workflows digital. We used the app to create a production line model, a basic function that manufacturing engineers could use in a production plant design. The Intel NUC 12 Pro X Kit handled this function as we expected it to.

VMware

Horizon View 8.5.0

If you wanted to use an Intel NUC 12 Pro X Kit as a virtual desktop client using VMware Horizon View, we confirmed that it is possible to do so by installing the application and logging into a VDI session. You could also use Horizon View to configure the Intel NUC to function as a kiosk or shared workstation, or restrict app access to the Intel NUC and applications for security. (We did not test this functionality.)

About the Intel vPro platform

Available since 2006, the Intel vPro platform is a set of hardware and software technologies used for building business computers featuring Intel Core vPro processors. (For more information from Intel, visit https://intel.com/vpro.) Though we tested only the Intel NUC 12 Pro X Kit for this study, you can also purchase laptops and full-sized desktops powered by Intel Core vPro processors.

With Intel® Active Management Technology (Intel® AMT) and Intel Endpoint Management Assistant (Intel® EMA), key features of the Intel vPro platform, 12th generation Intel Core vPro processors include several features that, according to Intel, can improve manageability and user experience:

- Keyboard Video Mouse Remote Control: Allows IT to run diagnostics, turn systems on and off, and perform other management tasks from anywhere with an Internet connection
- PC Alarm Clock: Enables IT to remotely schedule updates and patches for any time, even when the system is off
- Power Control: Allows IT to change the power state of a system remotely
- Inventory Collection: Allows IT to use a single console to track management statistics about any system they manage using Intel AMT
- Extended environment capabilities: Intel EMA allows IT to use Intel AMT for remote management of devices that are outside the corporate firewall, including off-premises and hybrid-cloud-based environments.

Conclusion

If your organization is in the market for powerful workstations to run essential design and engineering apps, the new Intel Core i9-12900 processor-powered Intel NUC 12 Pro X Kit warrants consideration. Thanks to its processor and NVIDIA GPU, the Intel NUC we tested ran 18 demanding apps for media and AEC workflows and one virtual desktop app without any problems. When we installed apps, performed routine tasks, and closed the apps, the Intel NUC 12 Pro X Kit completed these tasks successfully, with no crashes at all. The small footprint of the Intel NUC 12 Pro X Kit is another advantage—a user can tuck it away out of sight, or place it on a corner of their desk and still have room for sketch books and blueprints.

1. ANSYS, "ANSYS Discovery Live: Real-Time Simulation Revolution," accessed June 10, 2022, https://www.ansys.com/content/dam/product/3d-design/discovery/ansys-discovery-live-aa-v11-i3-12.pdf./
2. Autodesk, "Autodesk makes software for people who design and make things," accessed June 10, 2022, https://adsknews.autodesk.com/app/uploads/2019/10/autodesk-corporate-one-pager-en.pdf
3. enlyft, "Companies using Dassault SolidWorks," accessed June 10, 2022, https://enlyft.com/tech/products/dassault-solidworks
4. enlyft, "Companies using Siemens NX," accessed June 10, 2022, https://enlyft.com/tech/products/siemens-nx

Read the science behind this report at https://facts.pt/6ZirgVS ▶

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