NVIDIA OMNIVERSE AEC EXPERIENCE

Leeza SOHO, Beijing, China. Image provided courtesy of Zaha Hadid Architects

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"At KPF, we're constantly testing new applications that help us to engage with our clients. We see NVIDIA Omniverse as an application that will enable our real-time and collaborative requirements in one platform, changing the way we progress as a sustainable design practice."

– Cobus Bothma, Director, Applied Research, KPF

Image Courtesy of Woods Bagot

NVIDIA OMNIVERSE™ AEC EXPERIENCE, BUILT ON THE OMNIVERSE PLATFORM, FOCUSES ON THE CONCEPT DESIGN, VISUALIZATION, AND REVIEW NEEDS OF PROFESSIONALS IN ARCHITECTURE, ENGINEERING, AND CONSTRUCTION (AEC).

For the first time, teams located around the world can collaborate in real time on the same model, creating and iterating on new designs even while they're working in different software applications. Through NVIDIA Omniverse Connectors, which act as application portals, top industry tools are united in a collaborative space, giving individuals and groups the ability to work seamlessly across multiple design and visualization applications. This means that designers and engineers can use the best tools for their needs while collaborating. And teams can leverage incredible new technologies like real-time NVIDIA RTX™ rendering, light studies, physics, and simulation tools that accelerate innovation and productivity.

ENHANCING DESIGN WORKFLOWS

NVIDIA Omniverse AEC Experience delivers unparalleled benefits to the industry's designers and engineers—from streamlined workflows and easy collaboration using the latest graphics applications to faster design cycles and stunning results.

Seamless Collaboration

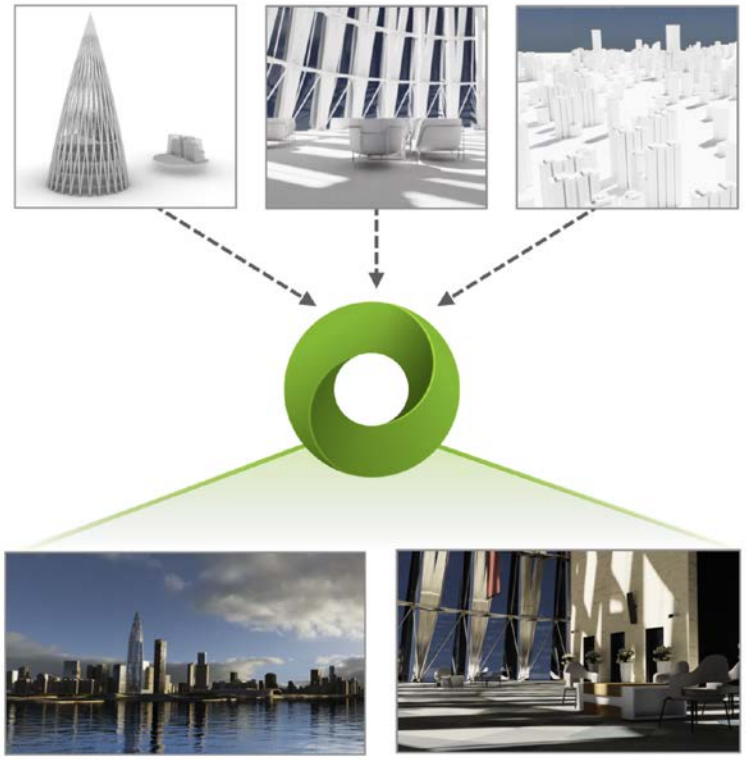
Project teams are unified on a single, interactive platform, even when simultaneously working with different software applications, allowing them to rapidly develop architectural models in real time.

Design to Ray Traced in One Click

Teams can produce beautiful, physically accurate visuals with minimal effort—no data prep or model decimation needed.

Faster Time to Approvals

Omniverse AEC Experience makes it possible to iterate quickly and explore more designs, as well as export the designs with RTX ray-traced quality. Teams, clients, and contractors can view the high-fidelity models on any device, anywhere.



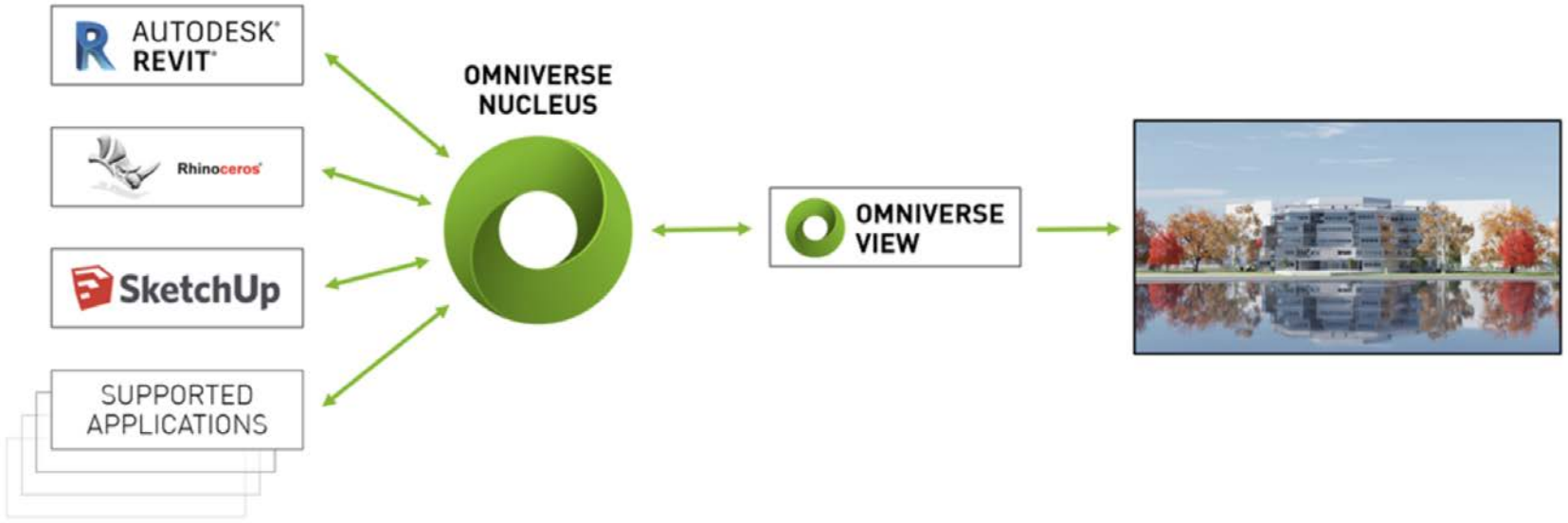
HOW OMNIVERSE WORKS

The Omniverse Nucleus server hosts and synchronizes—in real-time—a 3D world shared by connected digital content creation applications. The NVIDIA Omniverse View™ App renders and simulates this world in real time, providing individual architects and designers with instant feedback from the changes they make in their applications.

Omniverse Nucleus is a file server that hosts and synchronizes the shared Universal Scene Description (USD) files.

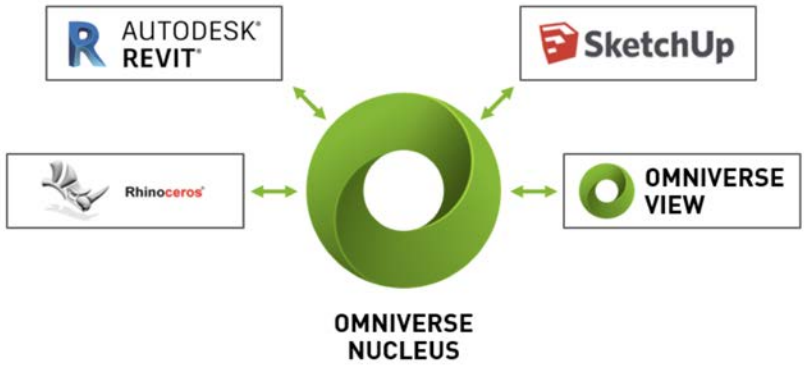
Omniverse Connectors installed in each application being used provide live links between the applications and Omniverse Nucleus.

Omniverse View App is a standalone application that provides a view of the USD scene augmented with real-time RTX rendering. It offers basic scene and material editing capabilities, as well as industry-specific features like light studies.



LIVE LINKS BETWEEN REVIT, RHINO, AND SKETCHUP WITH OMNIVERSE CONNECTORS

Using Omniverse Connectors, applications like Autodesk Revit, Rhino, and Trimble SketchUp can connect and collaborate on the same scene file hosted by the Nucleus server. This live connection enables users to quickly iterate on a project while Omniverse View renders the scene in real time with physically accurate materials, lights, reflections, and shadows.



A central USD file with live-connected applications allows for unprecedented levels of collaboration. Across the office or the globe, the Omniverse platform connects workstations, virtual machines, and even tablets to enable new levels of immersion, mobility, and productivity.

Image courtesy of Neoscape

In this example, a landscape designer is working on the left in Adobe® Photoshop® and is live-linked to Omniverse Nucleus. On the right, an architect is working on the lobby dome and furnishings using Autodesk 3ds Max. Since both designers are connected to the same scene in Nucleus, they can see a photorealistic result of their collaboration in real time in Omniverse View, shown in the center screen.

EXCEPTIONAL VISUALIZATION WITH OMNIVERSE VIEW

Omniverse View is a reference application built on NVIDIA Omniverse Kit™ that's been specially created for professional AEC workflows.

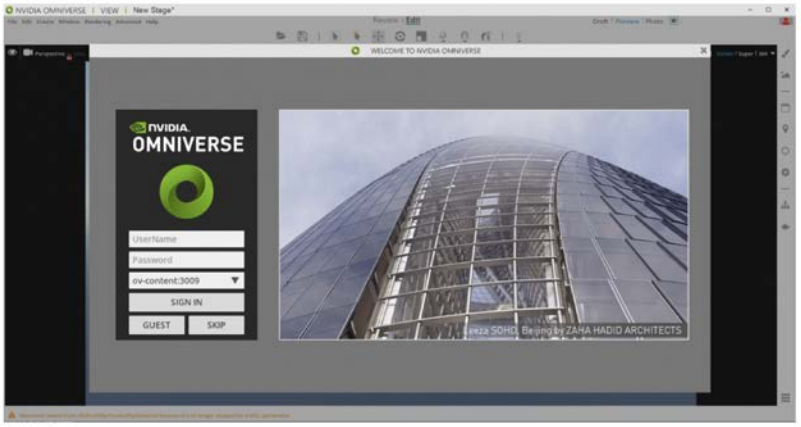
View connects to Omniverse Nucleus and works alongside other connected digital content creation applications—for example, Adobe Photoshop and Autodesk 3ds Max—to provide a highly accurate, interactive viewport of the shared scene.

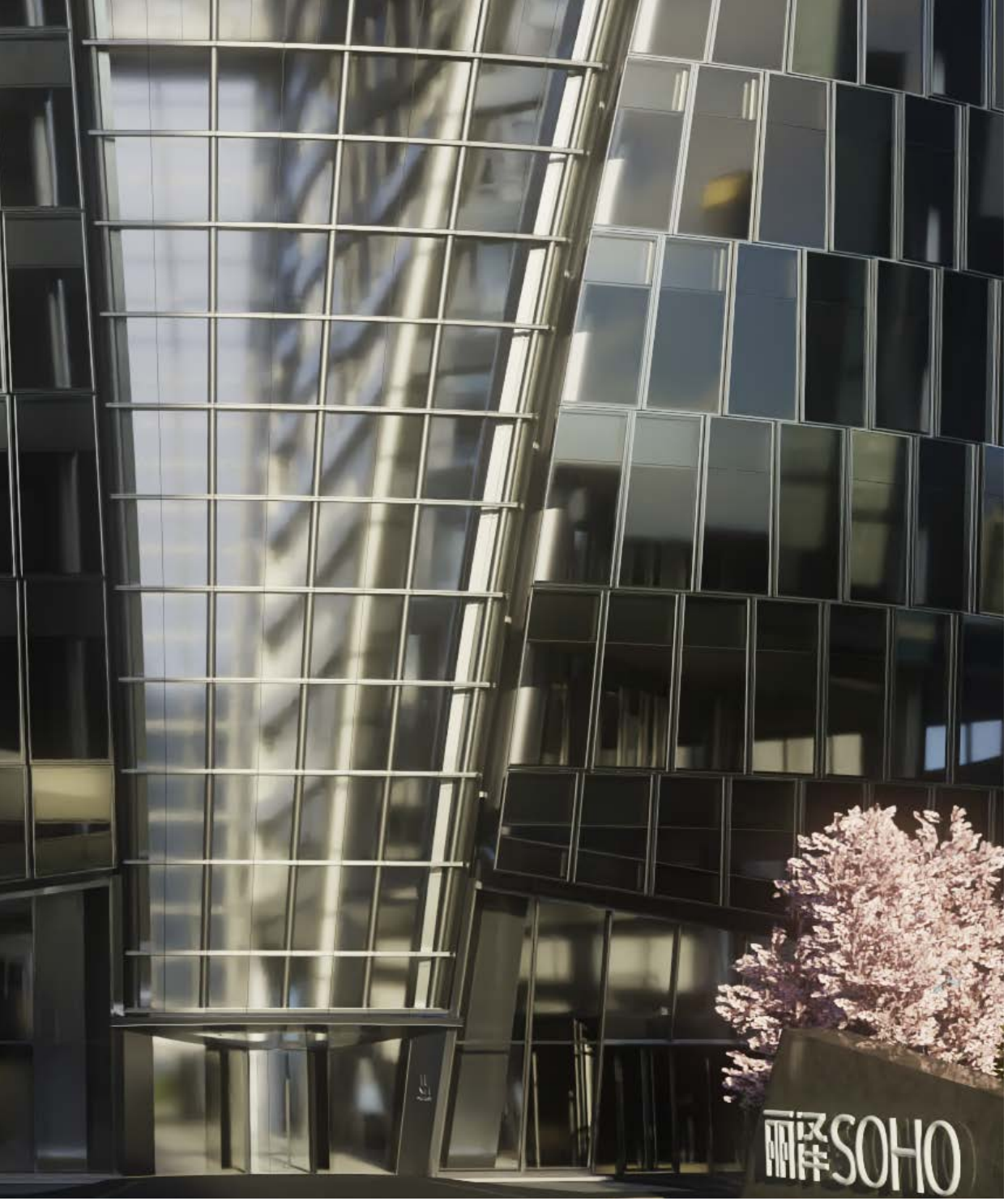
Rendering performance scales over multiple GPUs or multiple nodes to provide real-time, ray-traced results, even with very large scenes.

View can be modified and extended by technical artists and developers to integrate into specific workflows, such as manufacturing and product design.

The app can load very large scenes composed of different assets that are live-linked from multiple applications.

Designers and engineers can import or assign physically accurate materials, add environments and lights, and see results in real time.





Photorealistic Image Quality

Omniverse View includes the new Omniverse RTX viewport, which leverages RT Cores for ray tracing and Tensor Cores for AI denoising and scaling to deliver real-time rendering.

Omniverse RTX Renderer, part of Omniverse Kit, doesn't rasterize before ray tracing, so very large scenes can be handled in real time. It has two modes: traditional ray tracing for fast performance and path tracing for the highest-quality results.

The renderer natively supports multiple GPUs in a single system and will soon support interactive rendering across multiple nodes.

Physically Based Materials and Lights

Omniverse supports NVIDIA Material Definition Language (MDL). Each Omniverse Connector maps non-physically-based (PBR) materials to MDL materials, greatly enhancing the experience and bringing the design to life. Designers can expand the library by including their own MDL materials.

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A Living World

Omniverse View includes a library of trees and vegetation to enliven any environment and has the performance to handle billions of polygons required for realistic results.

This scene contains approx 70 billion triangles.

Real Lighting

View supports Illumination Engineering Standard (IES) lights, simulating the correct distributions for specific bulbs and fixtures.

IES files are freely available from many manufacturers and ensure that accurate lighting levels are represented in virtual environments.

Sun Study with Dynamic Clouds

The Sun Study feature provides an accurate way to review a model with sunlight using latitude and longitude. With the ability to visualize natural lighting, designers can make informed decisions on materials, light fixtures, and their placement. Dynamic clouds enhance the visual fidelity of simulations.

(Left) 3D Modern Town Hall model provided courtesy of sss3D and TurboSquid.
(Right) Washington DC Full City model provided courtesy of BlueModels and TurboSquid.

Augmented Reality

Omniverse View, available March 2021, will incorporate NVIDIA CloudXR™ and allow interactive content streaming to a head-mounted display (HMD), phone, or tablet.

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CREATE AT THE SPEED OF LIGHT

With NVIDIA Omniverse AEC Experience, designers, architects, and engineers can design, visualize, iterate, and review at unprecedented speeds. And they can do it while collaborating in real time from anywhere in the world using the latest in cutting-edge applications and technology.

See what happens when innovation and productivity are accelerated. Visit www.nvidia.com/omniverse

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