NVIDIA Omniverse

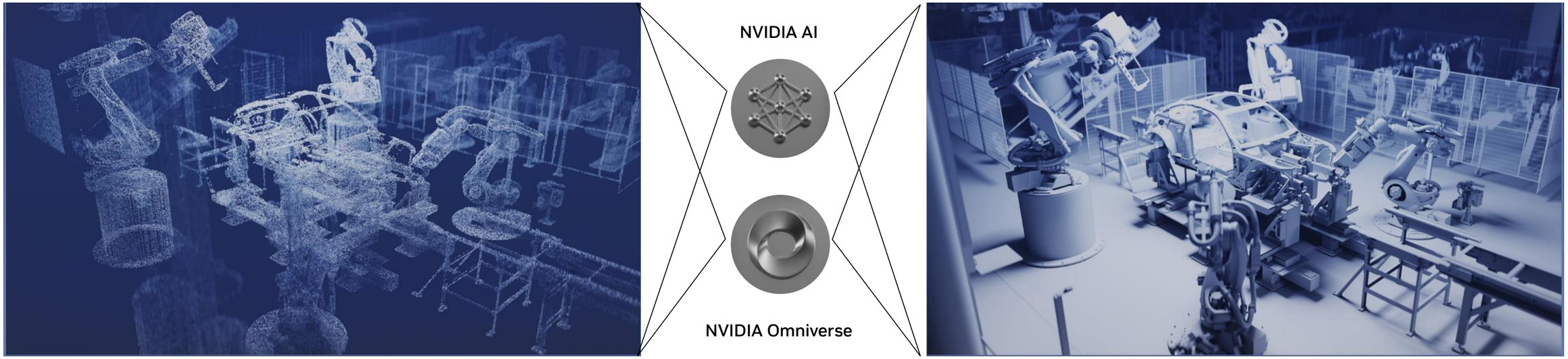
Connect and Develop 3D Pipelines, Tools, and Apps on OpenUSD

Texas A&M University

DLI Session

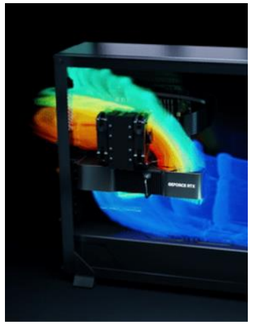
Oct 26, 2023

Industrial Enterprises are Racing to Digitalize

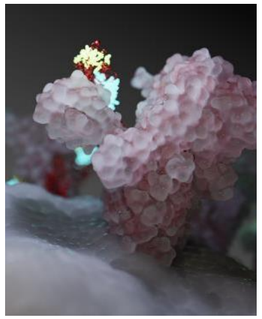


Automotive & Transportation

Electronics & Semiconductor



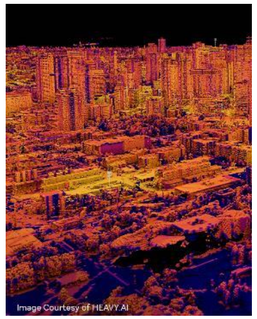
Energy



Manufacturing

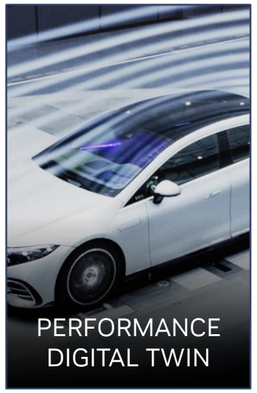
Retail & CPG

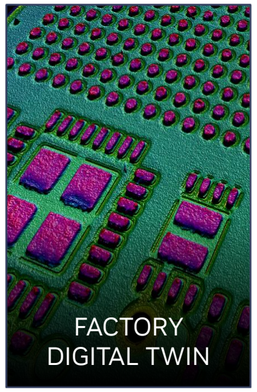
Telco

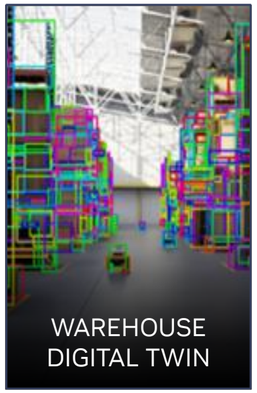


Digitalizing the World's Largest Industries

Design, Build, Operate, Optimize - Virtually







NVIDIA
Omniverse

Omniverse Unifies the Entire Product Lifecycle with OpenUSD

From Concepting & Design, to Manufacturing, to Marketing & Advertising

Design

Manufacturing

Advertising

a 3D model of a rock from the desert, showcasing rugged texture, white background, object centric

a desert shrub with small leaves, featuring a twisted trunk, and clusters of delicate yellow flowers, white background, object centric

a beautiful desert sky in the late evening with red clouds

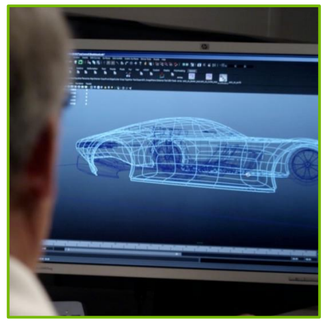
Supercharge with Gen AI

NVIDIA Omniverse Unlocks Unified Digitalization

One Foundational Platform to Connect Every Step of Industrial Processes

Concept & Styling

Design & Engineering

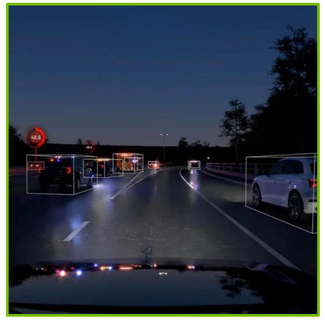


Software & Electronics

Smart Factory

Retail Experience

Autonomous Driving



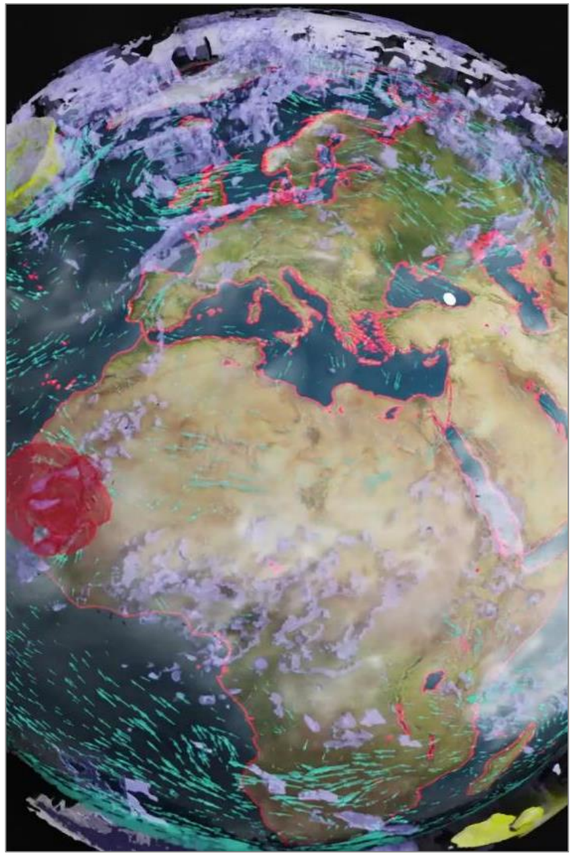
NVIDIA Omniverse

We built Omniverse to develop our own reference applications

ACE
AI driven avatars

DRIVE Sim
AV testing and validation

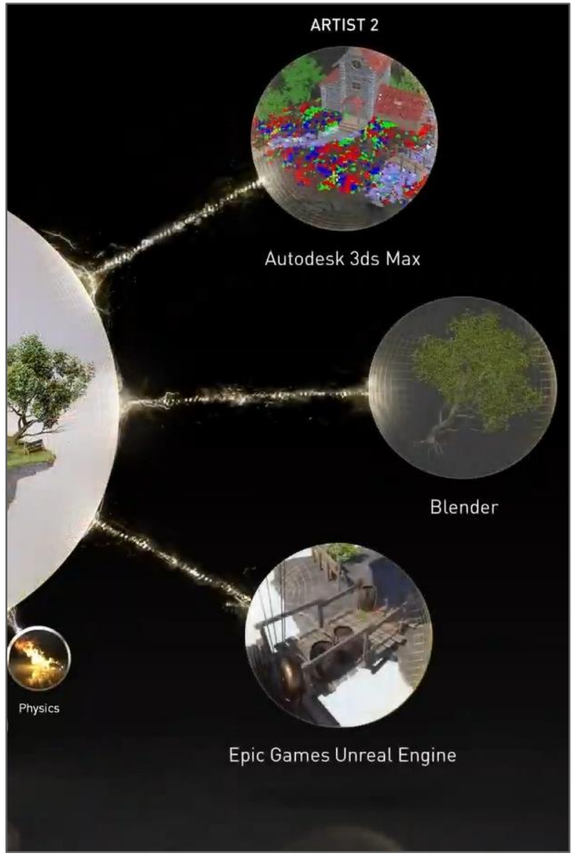
Isaac Sim
Robotics Simulation



Earth-2
Climate simulation

The Big Bang of Omniverse

Confluence of Enabling Technologies



OpenUSD

Powerful Asset Interchange

RTX Technology

Physically Accurate Simulation

Accelerated Computing

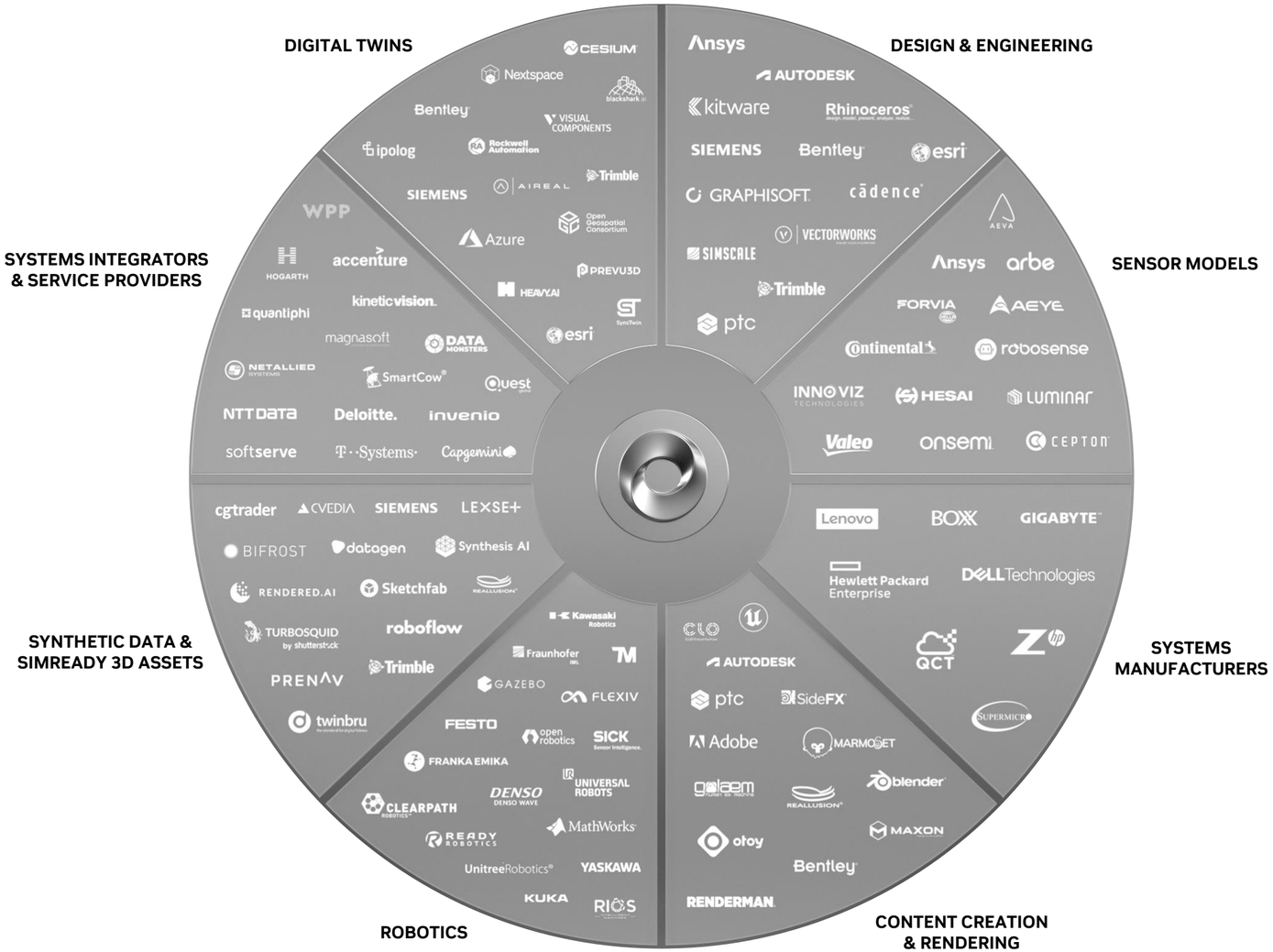
Scalable Accelerated Computing

AI Revolution

Demand for Simulation

Omniverse is Not a Tool

Omniverse is a Connecting Fabric of the World's Largest Tool Ecosystems



300K
Downloads

220
USD Connections

100%
Connections to World's Leading 3D Apps

The World's Largest Industries are Adopting Omniverse

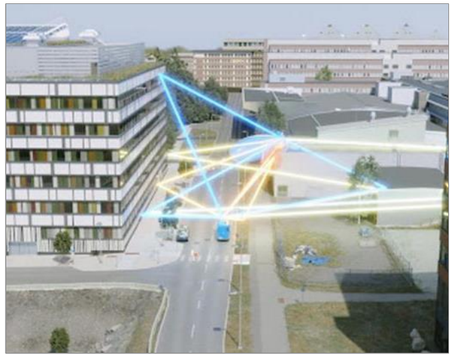
Industrial Digitalization at Every Scale

amazonrobotics · ASTEC · AT&T · BIG · BMW GROUP · CATALYST ENTERTAINMENT + TECHNOLOGY · DELTA · DNEG · ERICSSON · FOXCONN · gm · GWANTSI 觀池 · IBI · INDUSTRIAL LIGHT & MAGIC · KPF · Kroger · JAGUAR · LAND ROVER · LOCKHEED MARTIN · LOTUS · LOWE'S · LUCID · MATTEL · NORTHROP GRUMMAN · PEGATRON · PEPSICO · QCT · 6 RIVER SYSTEMS · SIEMENS energy · SONY PICTURES ANIMATION · UK Atomic Energy Authority · SPACE FORCE · UNIVERSAL ROBOTS · UNIVERSITY OF CALGARY · UTSA The University of Texas at San Antonio · Valeo · wistron · WOODS BAGOT · WPP · Zaha Hadid Architects

BMW Group
AI Smart Factories

Amazon Robotics
Warehouse Automation

Deutsche Bahn
Autonomous Railways

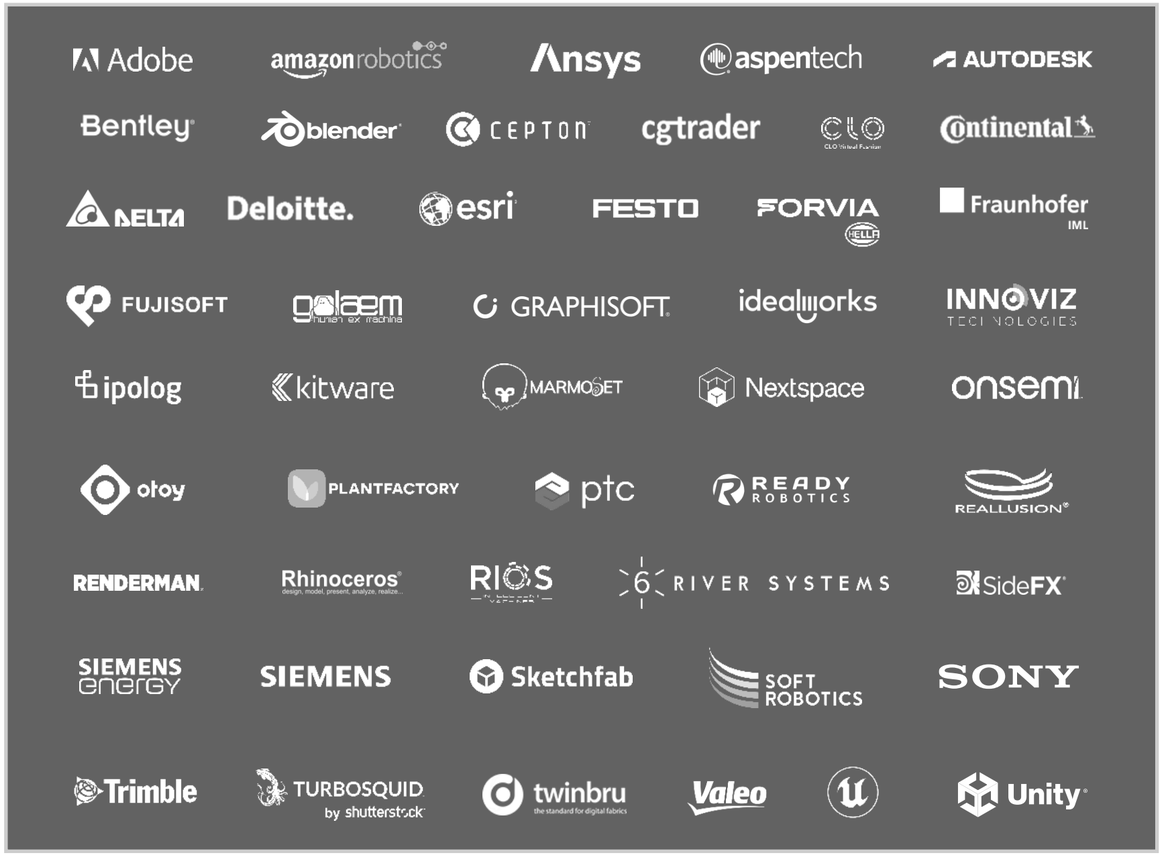


Ericsson
5G Network Simulation

NVIDIA

Omniverse is Everywhere

Connecting Fabric Across the World's Largest Industries



Software Partners

Over 150 Universal Scene Description (USD) Connections Across Industry Applications

Adopters

Across Transportation, Retail, Manufacturing, Energy, Telco, and More

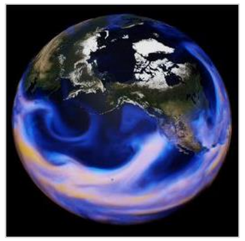
NVIDIA Omniverse

Platform for Connecting and Developing Industrial Digitalization Applications on OpenUSD

AI Avatars

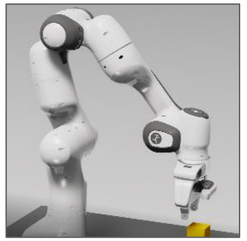
3D Design

Autonomous Vehicles

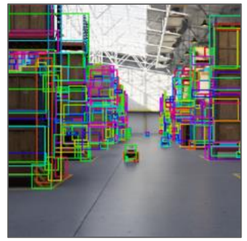


Scientific Digital Twin

Industrial Digital Twin



Robotics



Synthetic Data Generation

Foundation Applications & APIs

Code | USD Composer | DRIVE Sim | Isaac Sim | Replicator | USD-GDN Publisher

Development Platform

NVIDIA Omniverse

NVIDIA RTX-Enabled Systems from Edge to Cloud

NVIDIA Omniverse

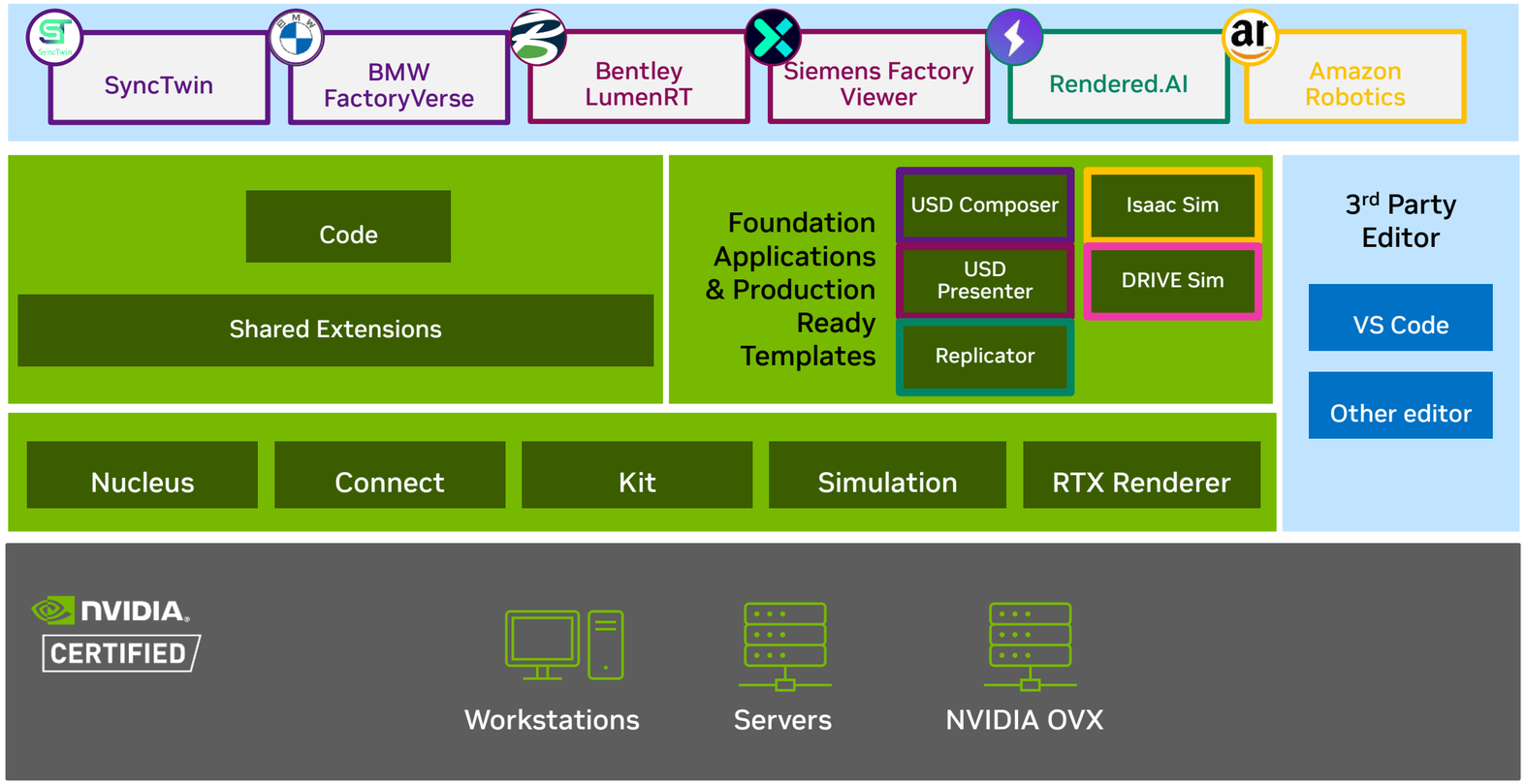
Cloud Native Platform for Connecting and Developing Industrial Digitalization Applications on OpenUSD

Open, Interoperable

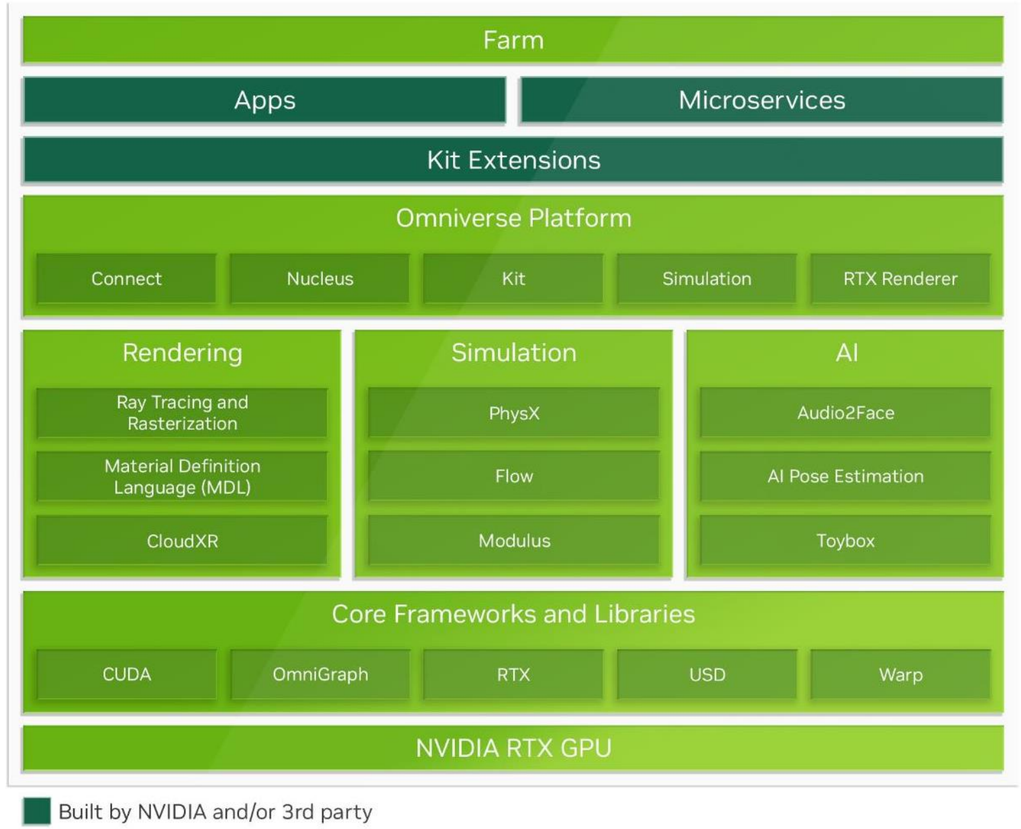
Easily Extensible, Customizable

Scalable from Workstation to Data Center

Connected

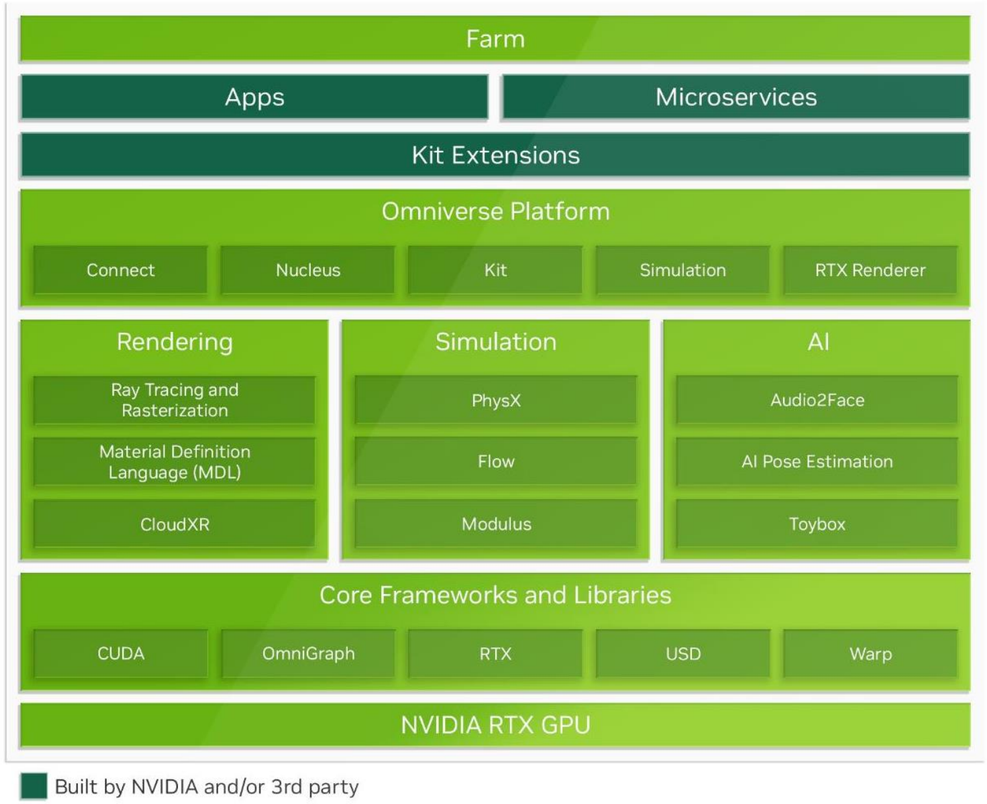


Modular Development Platform for Building OpenUSD Applications

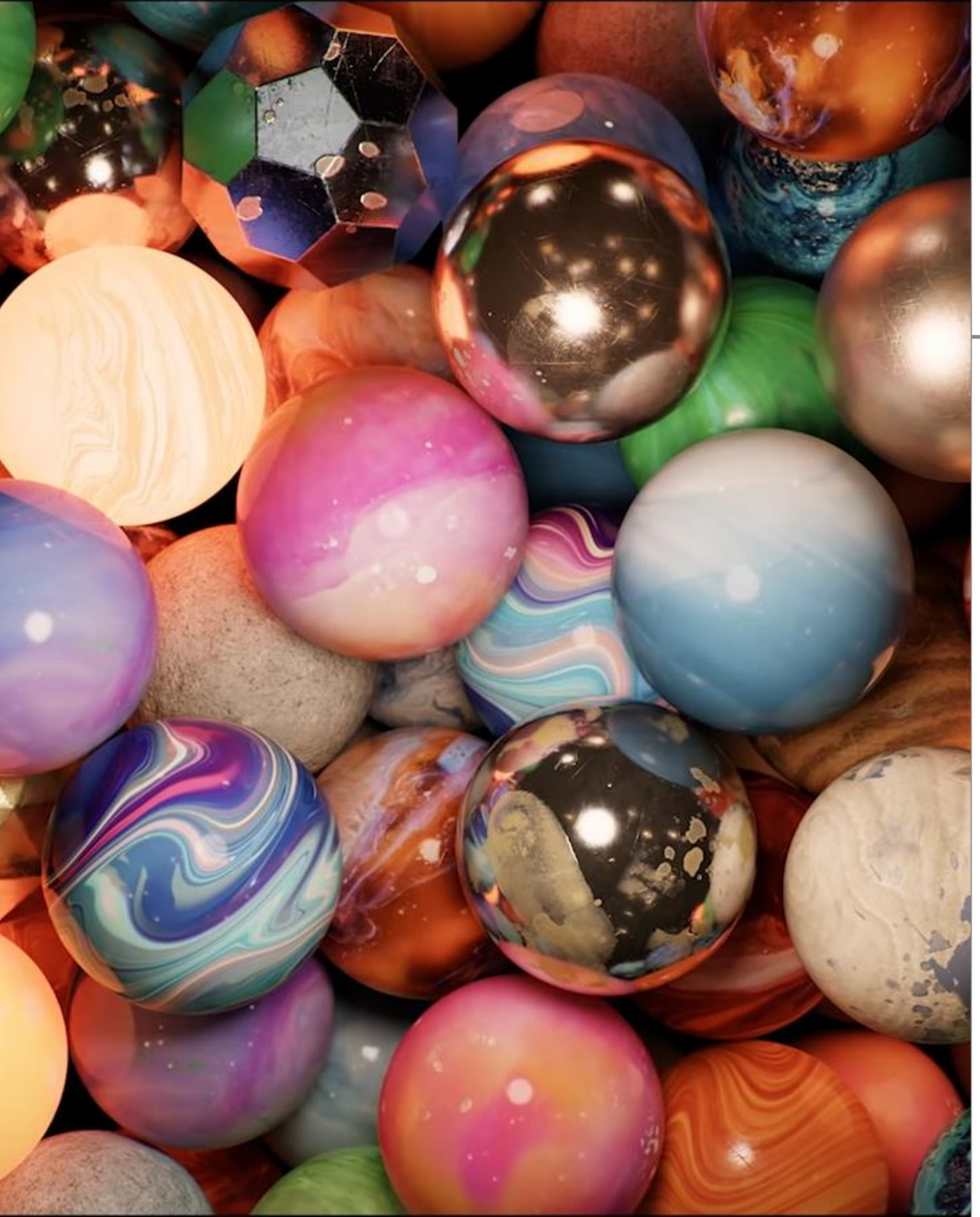


- Cloud-native
- Multi-GPU Enabled
- Built on Universal Scene Description (OpenUSD) for cross-team, tool and workflow collaboration
- Ability to use, customize, or copy foundation applications
- Deploy applications on all NVIDIA RTX™ solutions, from laptops to data centers

Modular Development Platform for Building OpenUSD Applications



- Integrate NVIDIA core technologies directly into any custom applications and tools
- Build once for interoperability everywhere
- Leverage Omniverse's network of networks to grow audience and user base



Material Definition Language (MDL)

Open standard to define physically-based materials

- Declarative material definition based on a powerful material model
- Procedurally programmable functions that compute values for the parameters of the material model
- Defines what to compute, not how to compute it, leaving this for the renderer of choice
- Designed for modern highly-parallel machine architectures

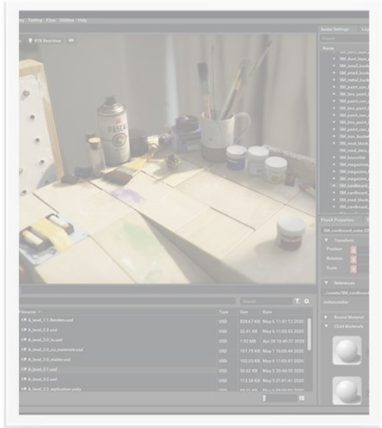
Advanced Tools and Technologies

Foundational Platform Components

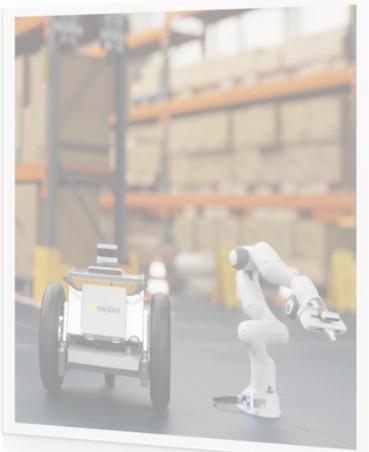
NUCLEUS

CONNECT

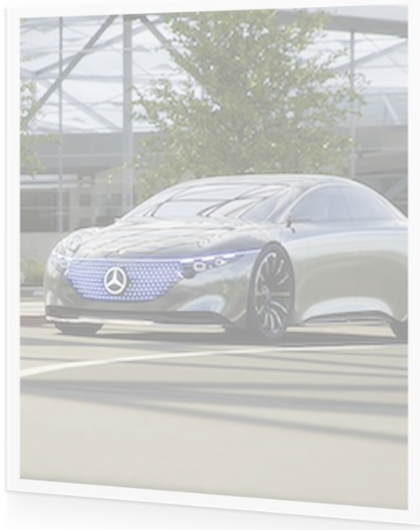
KIT



SIMULATION



RTX RENDERER

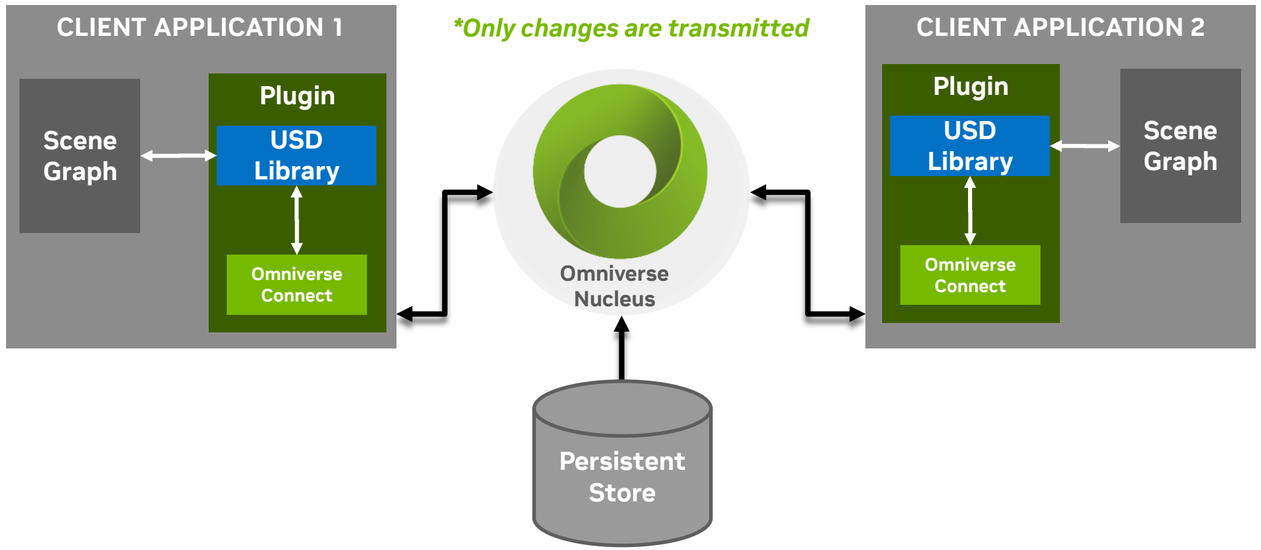


USD

Omniverse Nucleus

Asset Database and Collaboration Engine

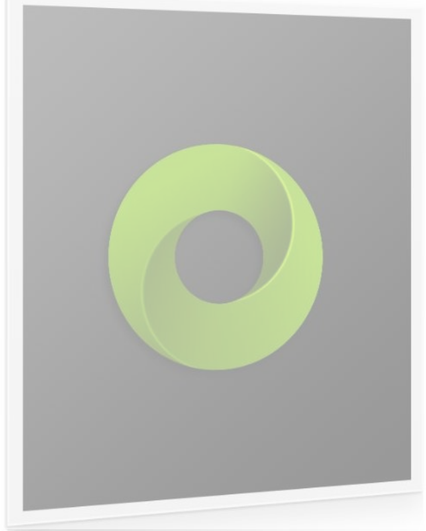
- Allows multiple software tools to talk to each other as well as live sync workflow
- Universal asset exchange – can house assets of any filetype
- Enables collaboration on large, ultra-complex scenes and passes only the change deltas
- Because only deltas are exchanged, extremely fast creation/replication is enabled
- No more hour-long or overnight uploading/downloading of entire scene files – everything is real-time and live
- Enables a single source of truth and eliminates messy, redundant file copies



Advanced Tools and Technologies

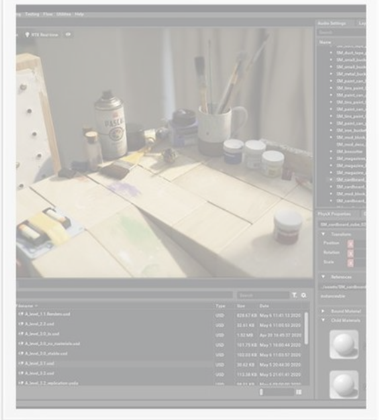
Foundational Platform Components

NUCLEUS



CONNECT

KIT



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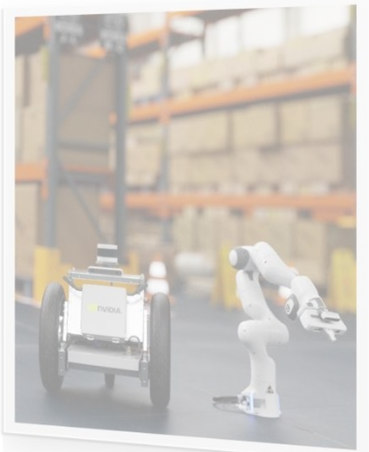
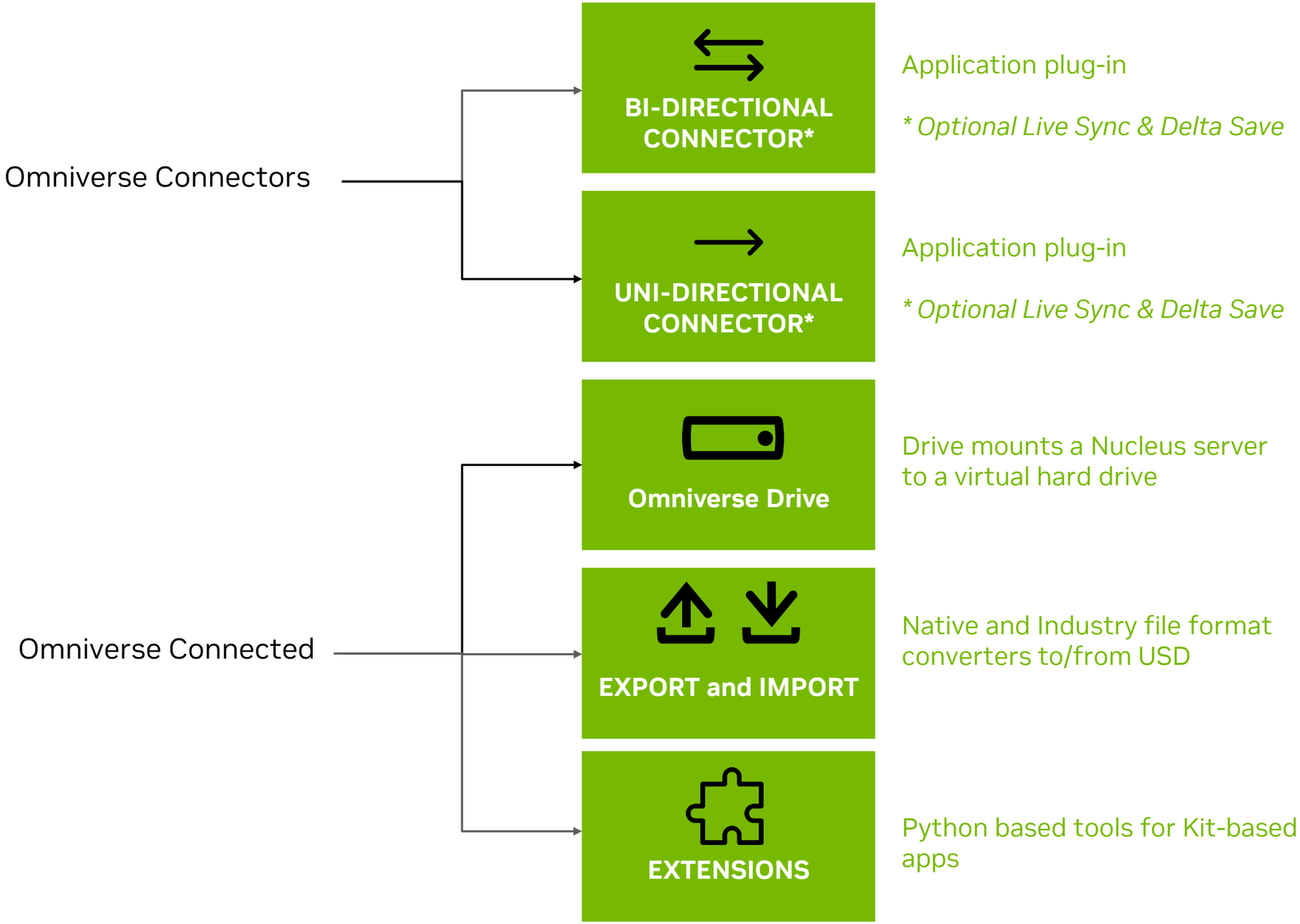


RTX RENDERER

CONNECTING TO OMNIVERSE

Multiple Ways to Interact – Some in Real-Time with Automated Material Conversion



Connect to Omniverse with USD

Many Ways to Connect, Baseline is USD Ingest

BI-DIRECTIONAL NUCLEUS CONNECTION	Updates shared between 3rd party tools and Omniverse after a single export/import. Live sync available for some connectors.	**ENTERPRISE SUPPORTED**	AUTODESK 3ds Max, Bentley Advancing Infrastructure, AUTODESK Maya, ipolog, UNREAL ENGINE
		BETA	Houdini, iClone, CESIUM
UNI-DIRECTIONAL NUCLEUS CONNECTION	Updates reflected from 3rd party tool to Omniverse but aren't shared back. Material conversion supported. Live sync available for some connectors.	**ENTERPRISE SUPPORTED**	GRAPHISOFT Archicad, CityEngine, Pt, AUTODESK Revit, Rhinoceros, SketchUp, SIEMENS
		BETA	blender, CHARACTER CREATOR, creo, onshape, ParaView, Unity, VECTORWORKS
USD INTERCHANGE	Similar to uni-directional. Allows for USD or texture export.	**BETA**	AUTODESK Alias, CINEMA 4D by MAXON, ZBRUSH, Ps, Ds, SIMSCALE
	Conversion to USD via direct import or third-party app.	**EXPORT AND IMPORT**	3MF, FBX, GLB, glTF, OBJ, OpenVDB, USDZ, USD
		IMPORT	3D PDF, 3DS, 3DXML, ACIS, Alembic, CATIA V4, CATIA V5, Collada, DWF, DWG, E57, IFC, IGES, Inventor, JT, LXO, MD5, NX, Parasolid, PRC, PRO/E, ShapeNet, Solid Edge, SOLIDWORKS, STL, STP, U3D, URDF, VDA-FS, VRML, X3D

Incorporating Non-Geometric Data into Omniverse

Building 3D Data

Non-Geometric Data

- Lights
- Elevations
- Location
- Construction Timeline
- BIM
- IoT
- Metadata

Connectors, Extensions, Plugins

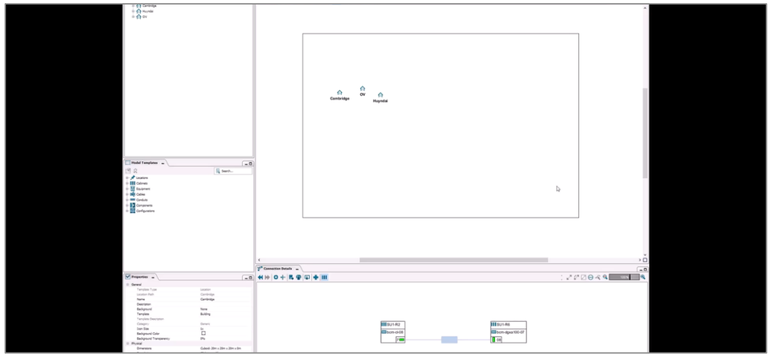
Combined USD Model

Omniverse USD Composer (formerly Create), View

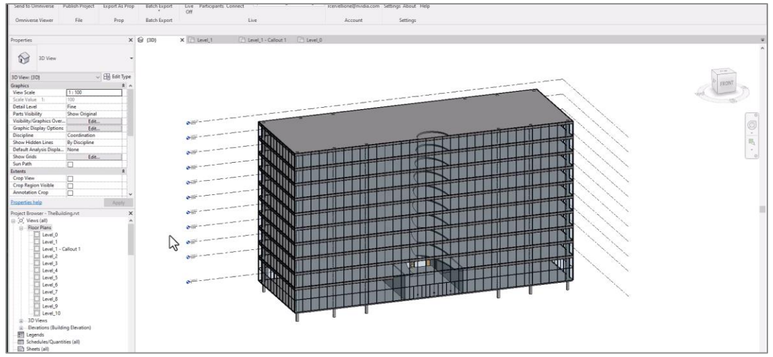
USD

Incorporating Non-Geometric Data into Omniverse

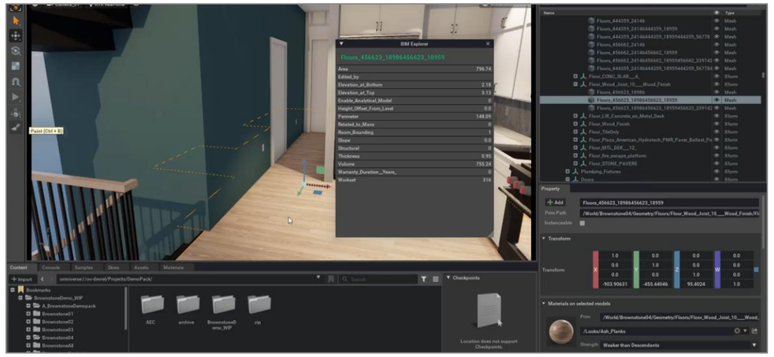
Connecting Various Sources including Metadata & IoT



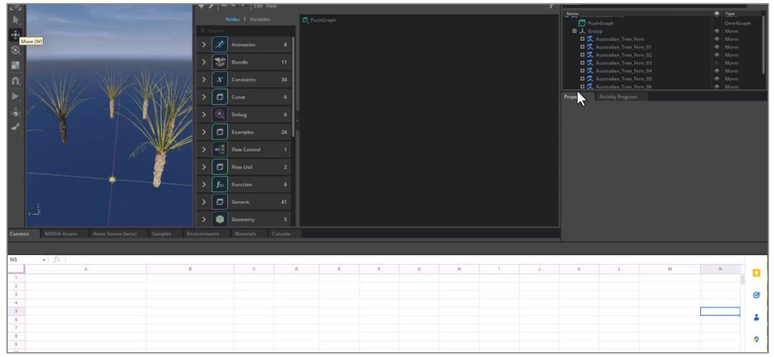
CSV Data – Patch Manager



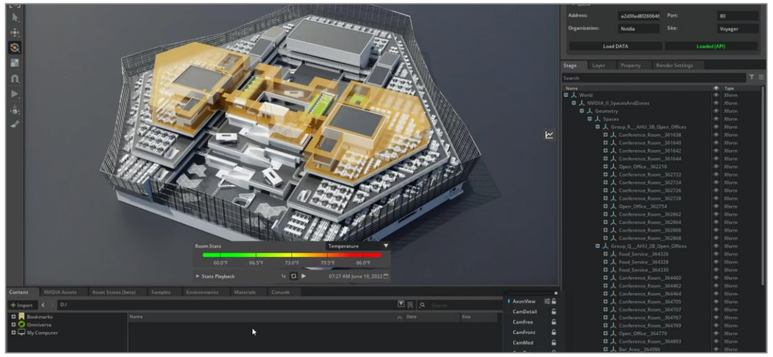
2D Floorplans/Drawings – Autodesk Revit



BIM Data – BIM Explorer Extension



Google Sheets - to OmniGraph



IoT – Cooling Systems

USD and Omniverse Break Data Siloes

Combine datasets into a unified view for faster iteration

Design, Edit, Create
3rd Party Tools

AUTODESK 3ds Max

AUTODESK Revit

Rhinoceros
design, model, present, analyze, realize...

AUTODESK 3ds Max

SketchUp

SketchUp

FBX

AUTODESK Maya

Aggregate Data
Omniverse Nucleus

PROJECT.USD

STREET.USD

BUILDING_1.USD

BUILDING_3.USD

STREETLIGHTS.USD

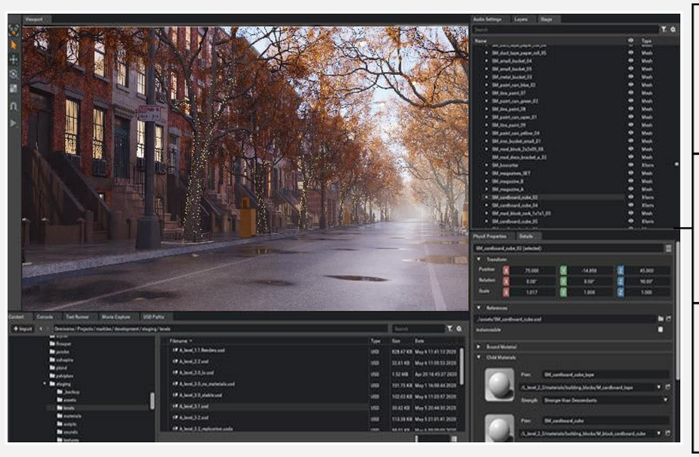
PROP_1.USD

PROP_2.USD

TREE_MAPLE.USD

TREE_OAK.USD

Interact, View, Edit, Collaborate
Omniverse USD Composer &
USD Presenter



WORKSTATION

VIRTUAL REALITY

AUGMENTED REALITY

WEB BROWSER

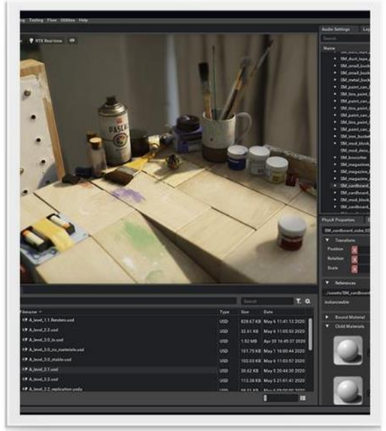
Advanced Tools and Technologies

Foundational Platform Components

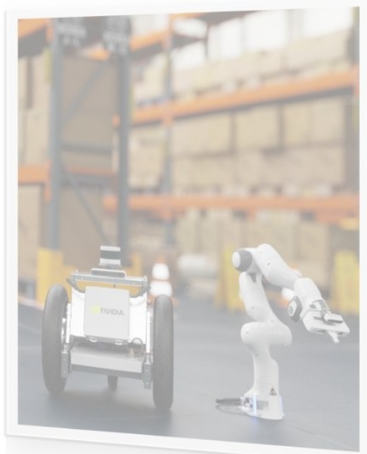
NUCLEUS

CONNECT

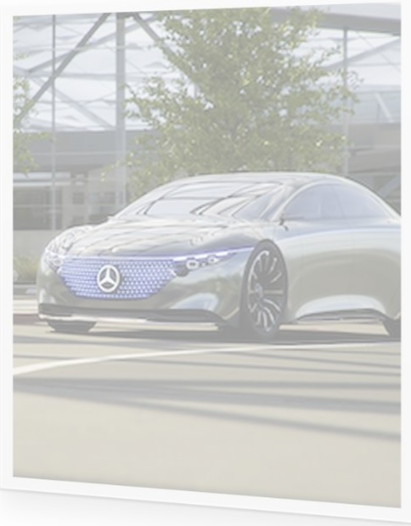
KIT



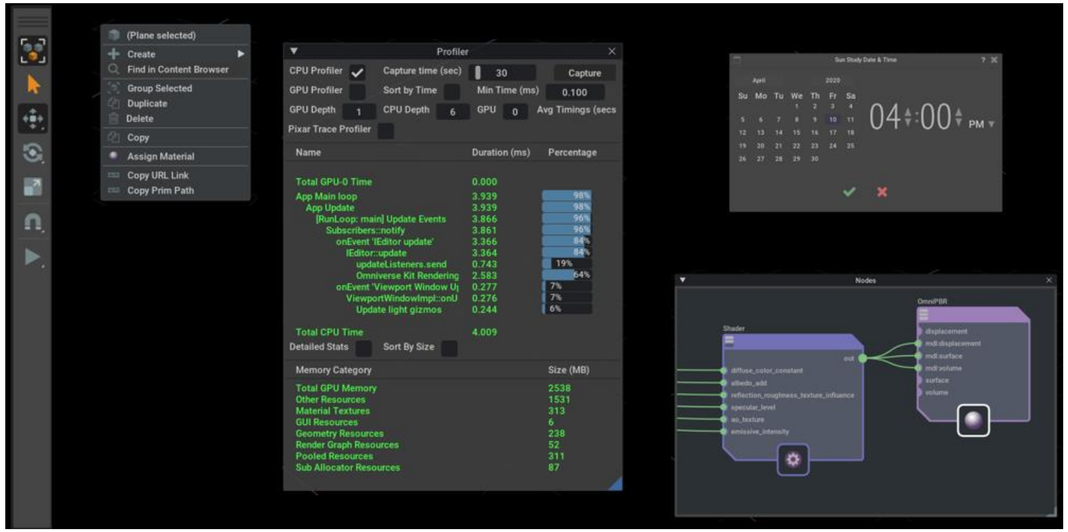
SIMULATION

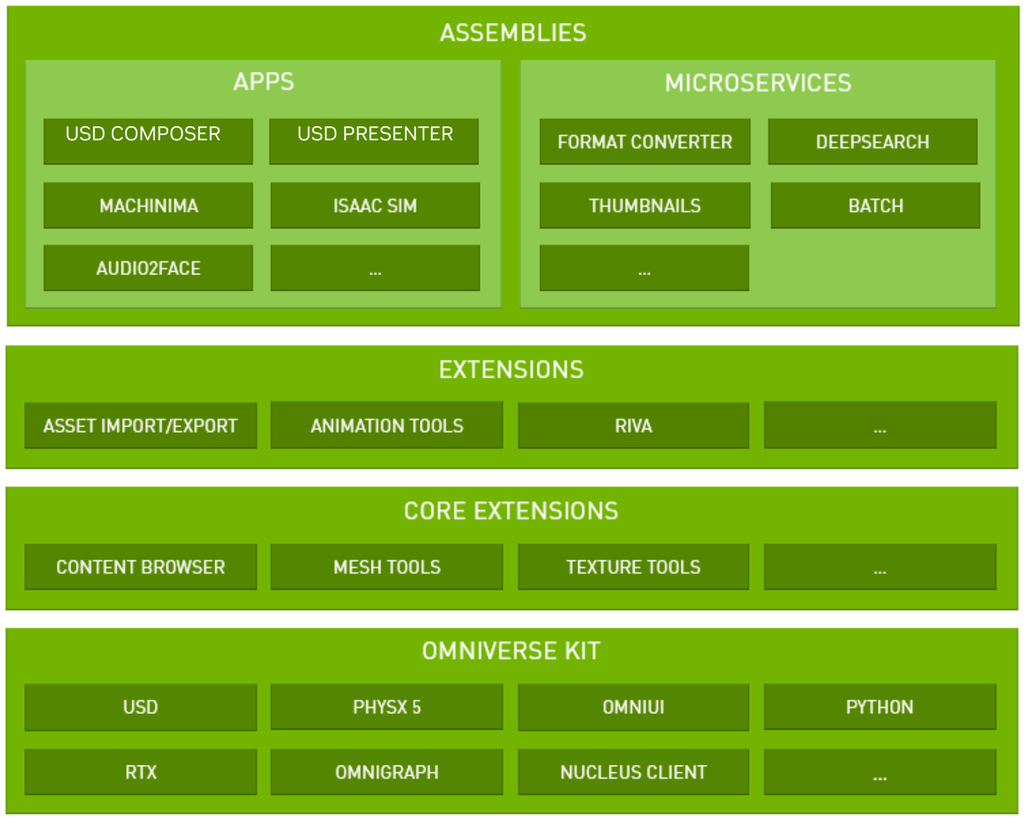


RTX RENDERER



USD





Omniverse Kit & Kit Extensions

Easily Build Advanced 3D Tools, Services, Applications

- Extensible platform, modular, flexible, open
- **Omniverse Kit** – SDK to build extensions, apps, microservices
- **Omniverse Extensions** - the building blocks of Omniverse Apps
- Provide over 300 extensions as source
- Majority written in Python
- Provide app templates to build-your-own

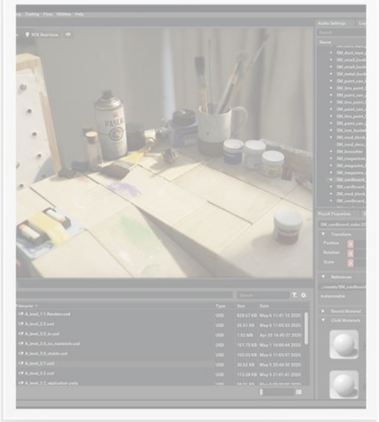
Advanced Tools and Technologies

Foundational Platform Components

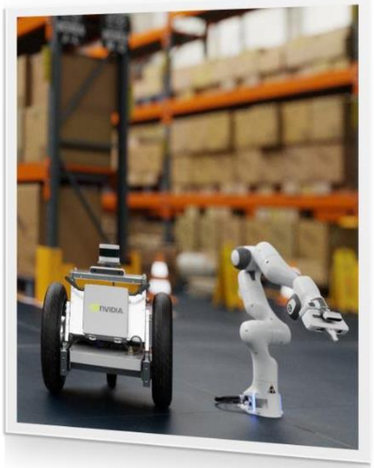
NUCLEUS

CONNECT

KIT



SIMULATION



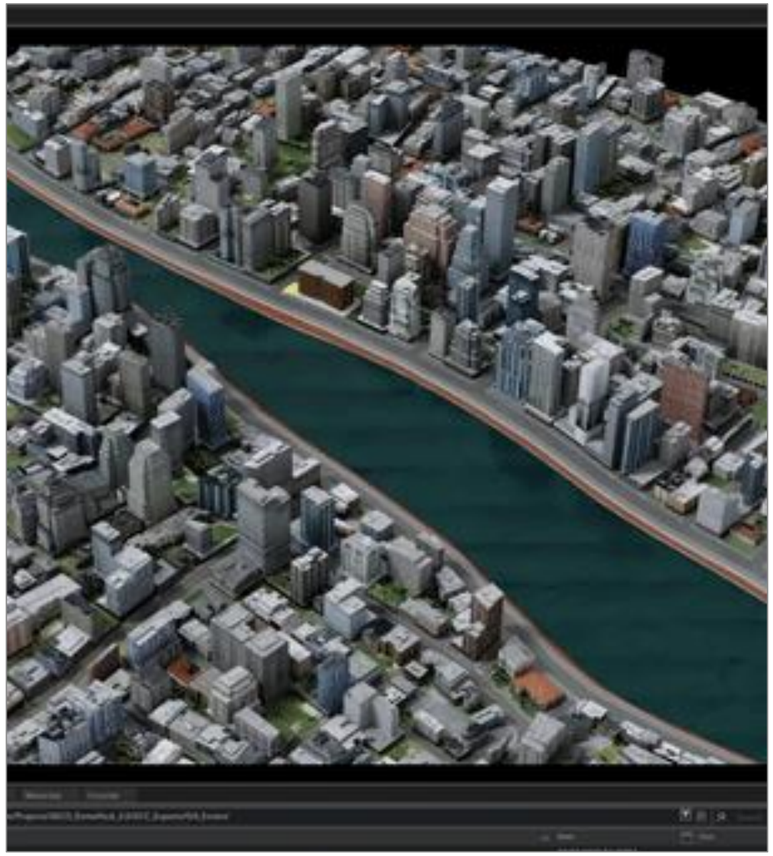
RTX RENDERER

USD

Bringing in Physics Data in Omniverse

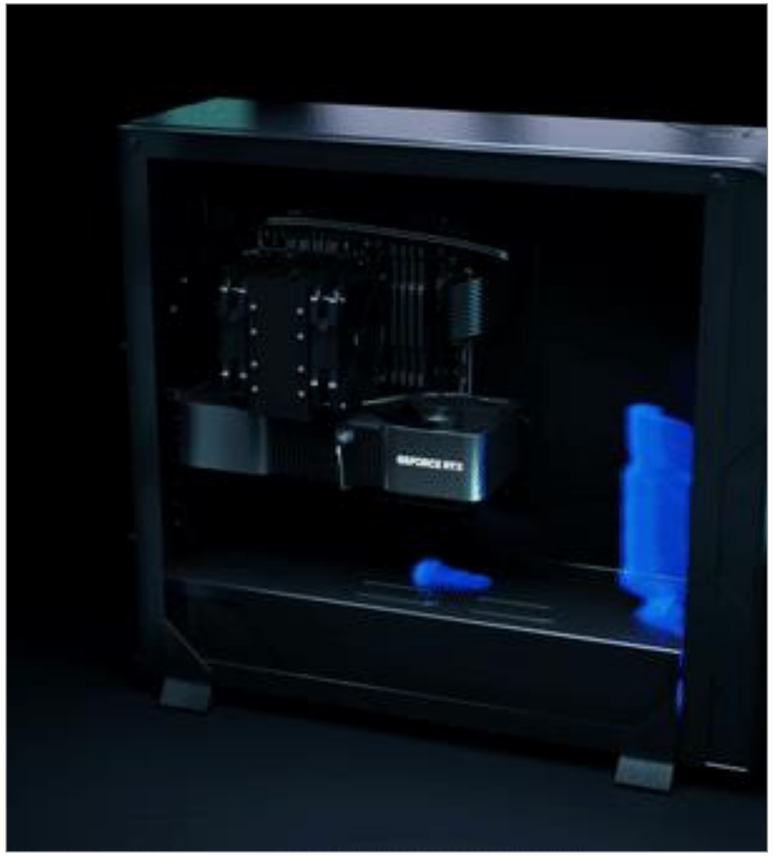
NVIDIA PhysX

Rigid & Soft Body Dynamics, Destruction, Fluid & Fire



Import Physics Instance

Offline from External 3rd Party Application

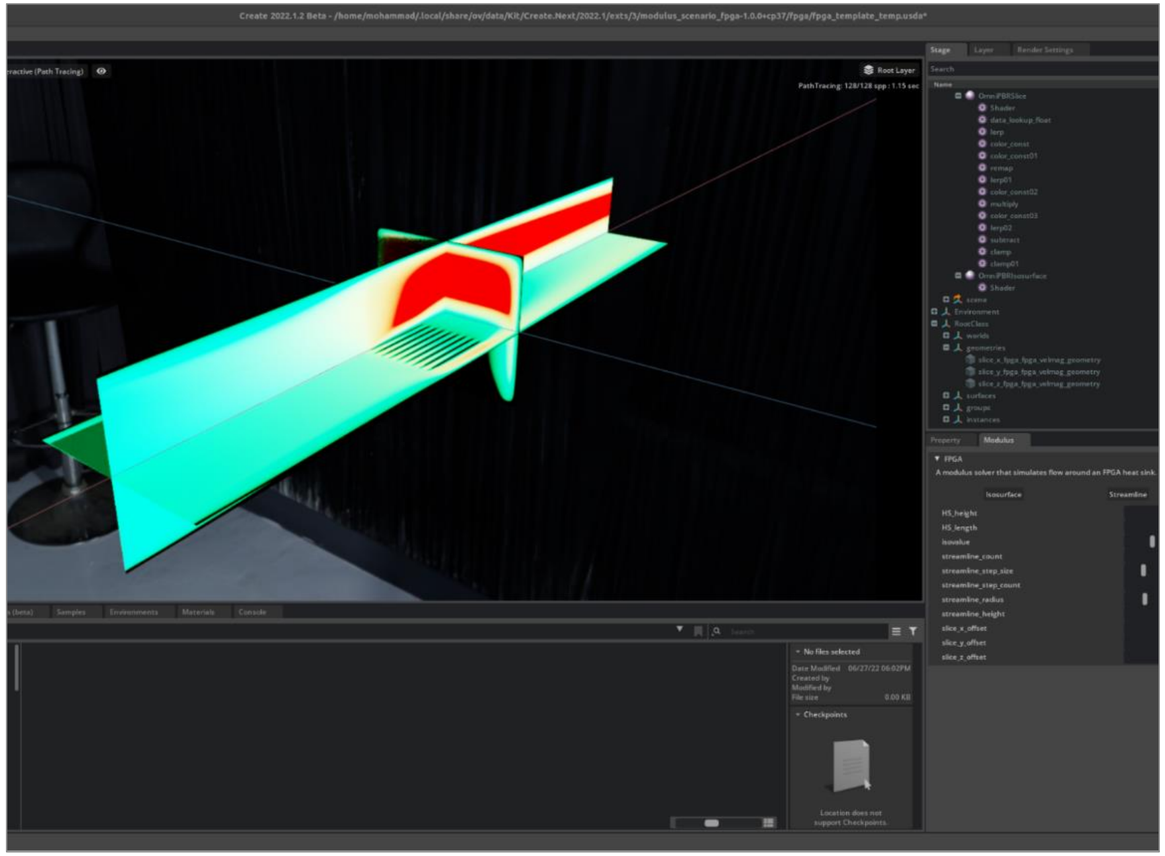


NVIDIA Modulus

Accelerated with Physics-ML Platform

NVIDIA Modulus

A Framework for Developing Physics-ML Models for Digital Twins



- Available as Omniverse Extension
- Train Physics-ML Models Using Governing Physics, Simulation, and Observed Data
- Multi-GPU Multi-Node Training
- 1,000-100,000X Speed Models – Ideal for Digital Twins

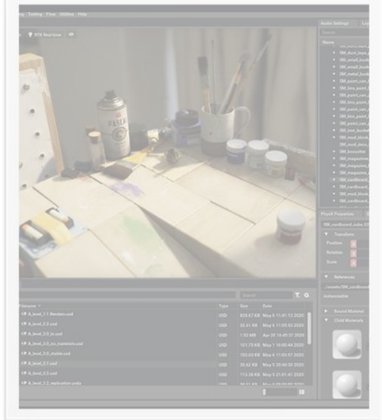
Advanced Tools and Technologies

Foundational Platform Components

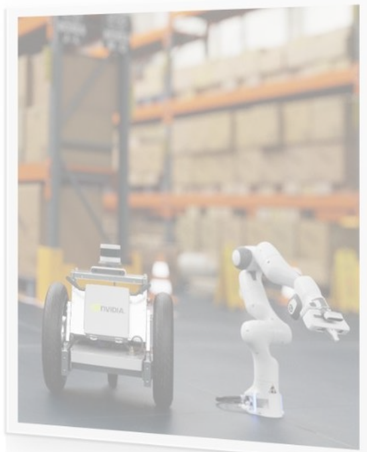
NUCLEUS

CONNECT

KIT



SIMULATION

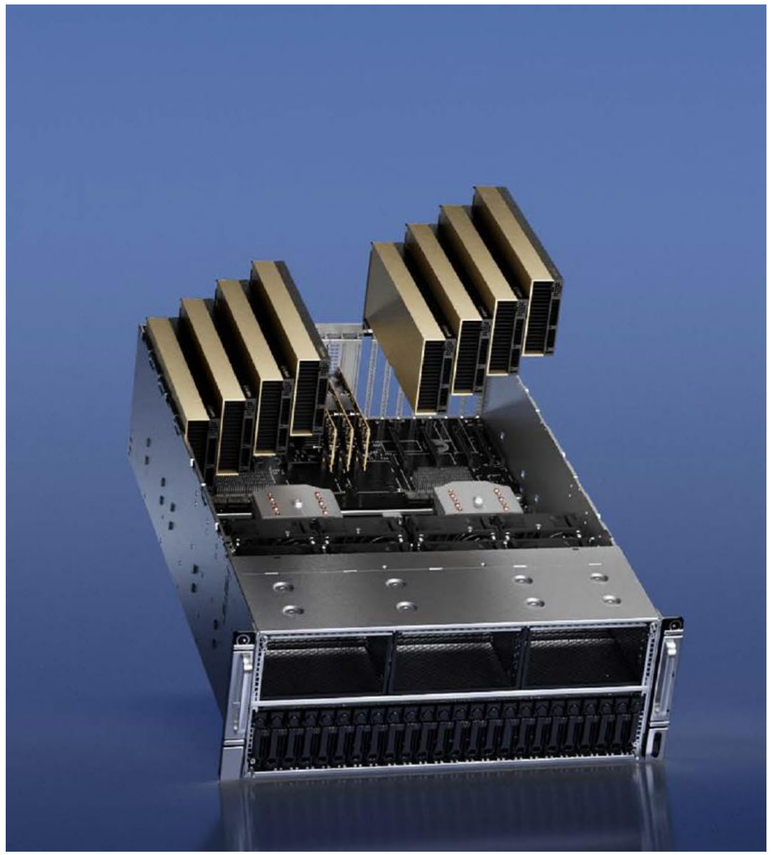


RTX RENDERER

USD

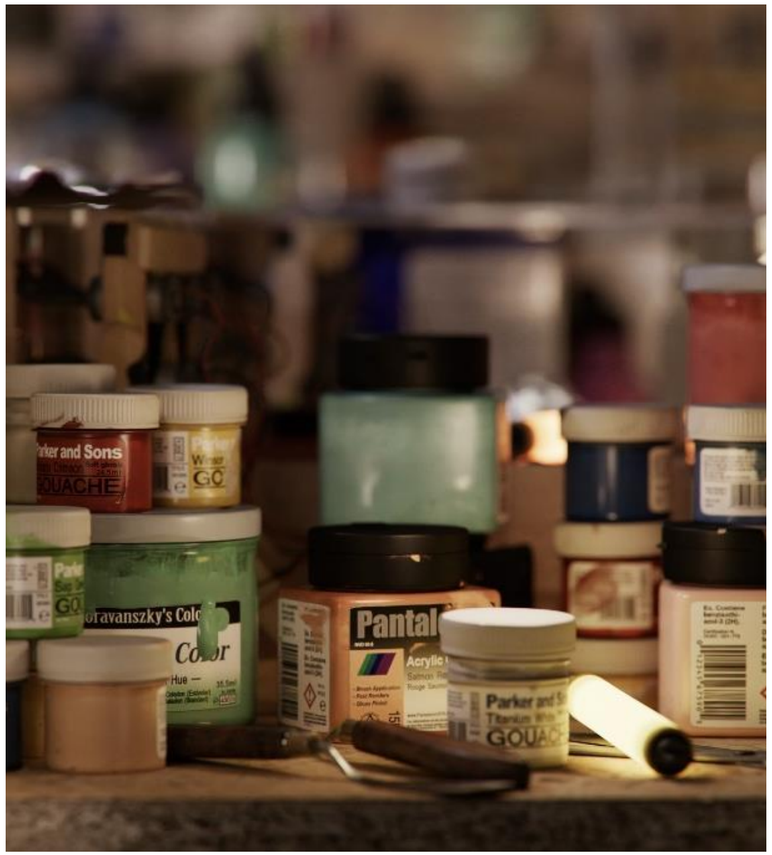
Omniverse RTX Renderer

Advanced, Multi-GPU, Multi-Node Renderer for World Simulations



Scalable, Multi-GPU, Multi-Node

Infinitely scalable ray tracing to handle more geometry, thousands of dynamic lights with no baking.



Real time, Photoreal, Physically Accurate

Leading the convergence of real time and offline renderers.

Based on Open Standards

USD-enabled, flexible MDL, MDL-based procedural dome lights

Omniverse Farm

Systems Layer to Harness Multiple Compute Resources

- **Infrastructure Agnostic**
  - Works on workstations, servers, bare metal, virtualized
- **Task Agnostic**
  - Rendering, synthetic data generation, file conversion, thumbnail creation
  - Rendering: GTC Spring – rendered 60,000 frames across 800 NVIDIA servers and workstations with minimal set up
  - Synthetic Data Generation: Farm was used in both Isaac Sim and DRIVE Sim demos during GTC – generating
- **Licensing**
  - Omniverse Farm now included in Omniverse Enterprise Creator Subscription – up to 64 agents/license

XR in Omniverse

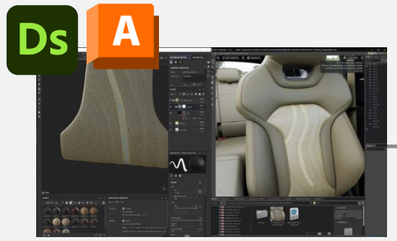
Collaborative, Full Fidelity Ray Traced XR

- **AR in Omniverse**
  - Streaming Omniverse RTX-ray traced scenes via CloudXR for AR and Virtual Camera modes
  - Omniverse Streaming Client App is now available
    - iOS – available on the App Store
    - Android – generally available
- **VR in Omniverse**
  - World's first full frame, real time ray traced VR
  - Native in all foundation applications

Full-Fidelity XR

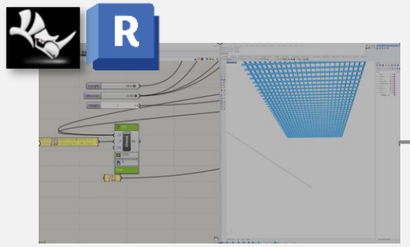
Immersive, Real-Time, Collaborative Design Review

Product Design Review



Design & CAD Data

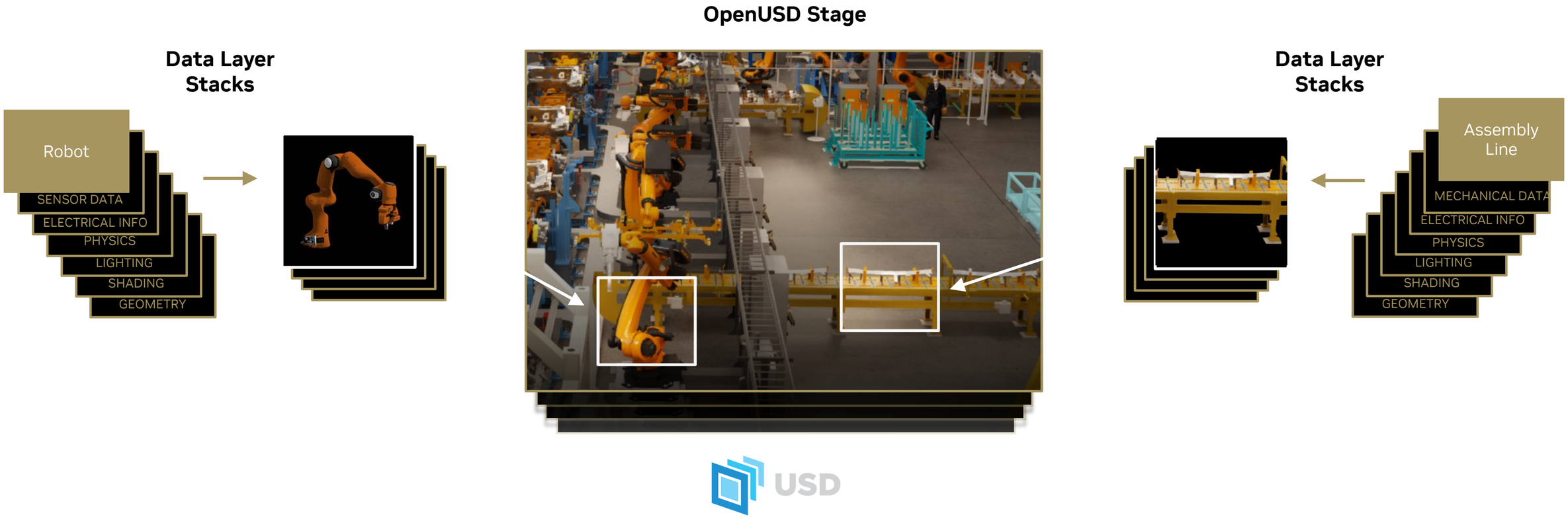
Architectural Design Review



Design & CAD Data

NVIDIA Omniverse is Built on Universal Scene Description

3D Tool Interoperability, Non-Destructive, Collaborative Workflows



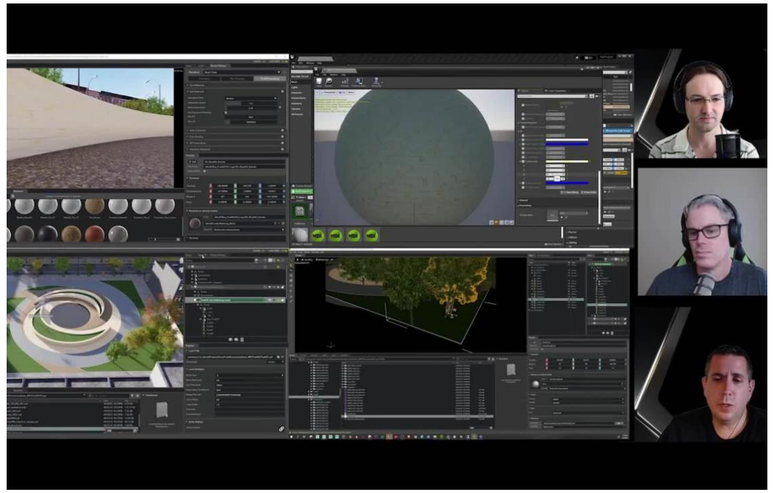
Universal Scene Description (OpenUSD)

Framework and Universal Interchange for Describing, Simulating and Collaborating Across Tools

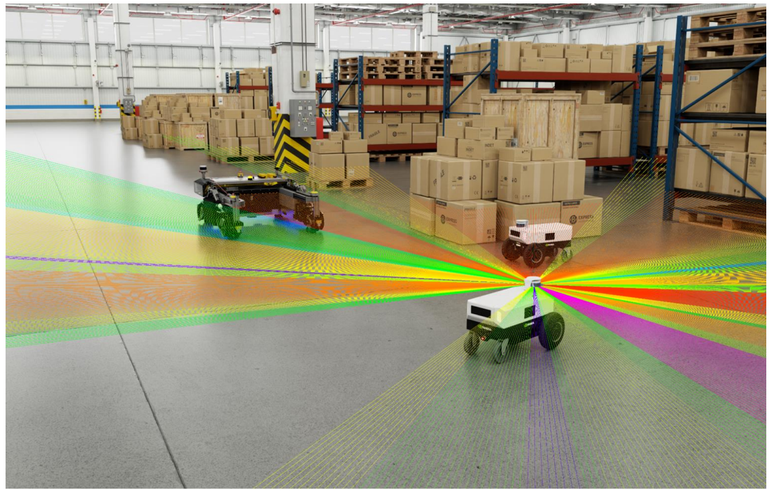
Universal Scene Description (OpenUSD)

More than just a file format

Connects Tools, Data



Enables Collaborative, Non-Destructive Workflows



Connects Devices, Humans, AI Agents

What does this mean for content creation?

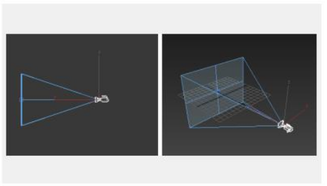
Non destructive, layer based workflows; protects every layer of data

Masterscene.usd

Contains

Vehicle.usd

Road.usd

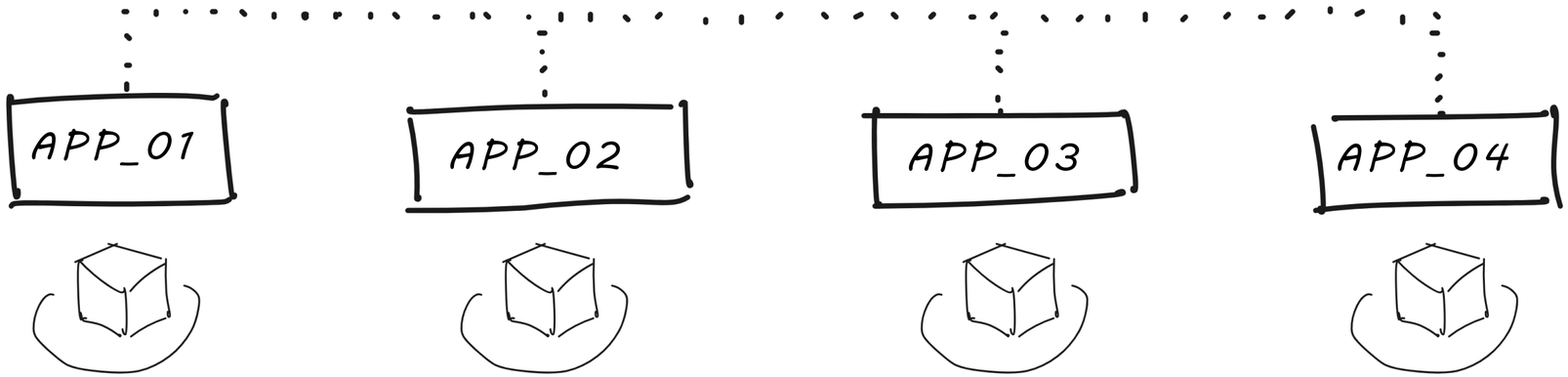


Camera.usd

Image Courtesy of WPP

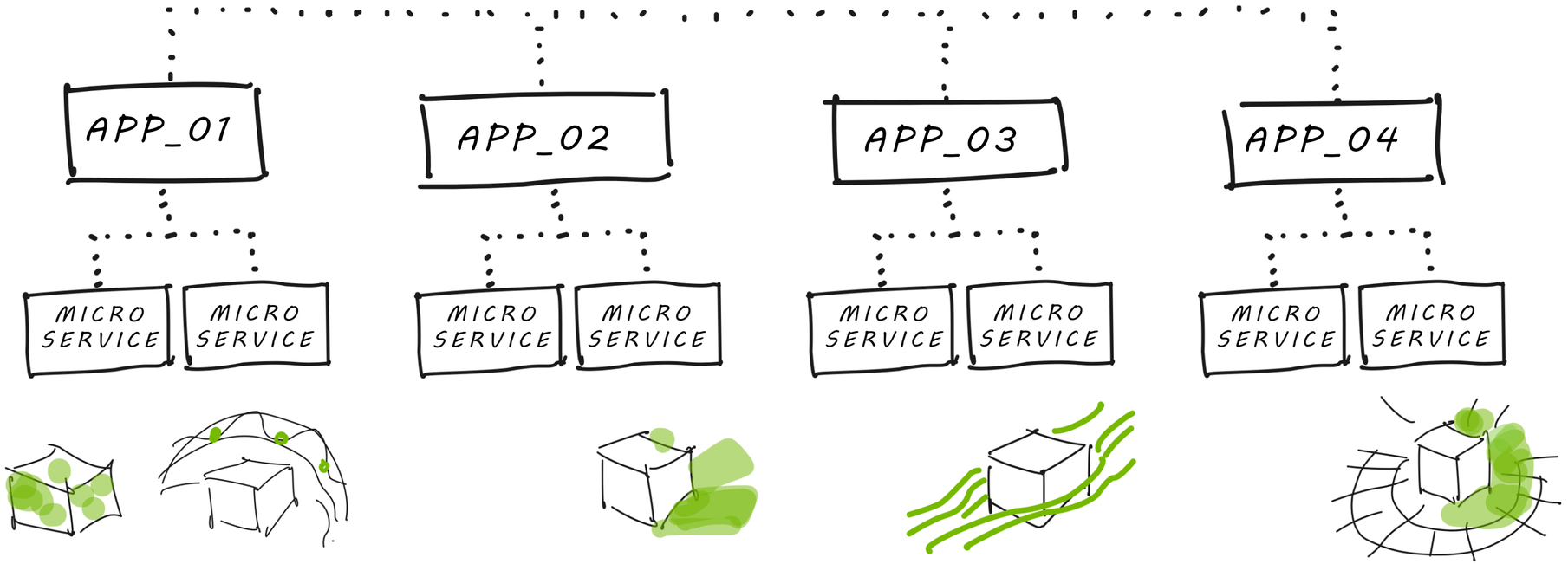
Traditional 3D Multi-App Workflows

Each User Iterating in a Silo – Linear Process



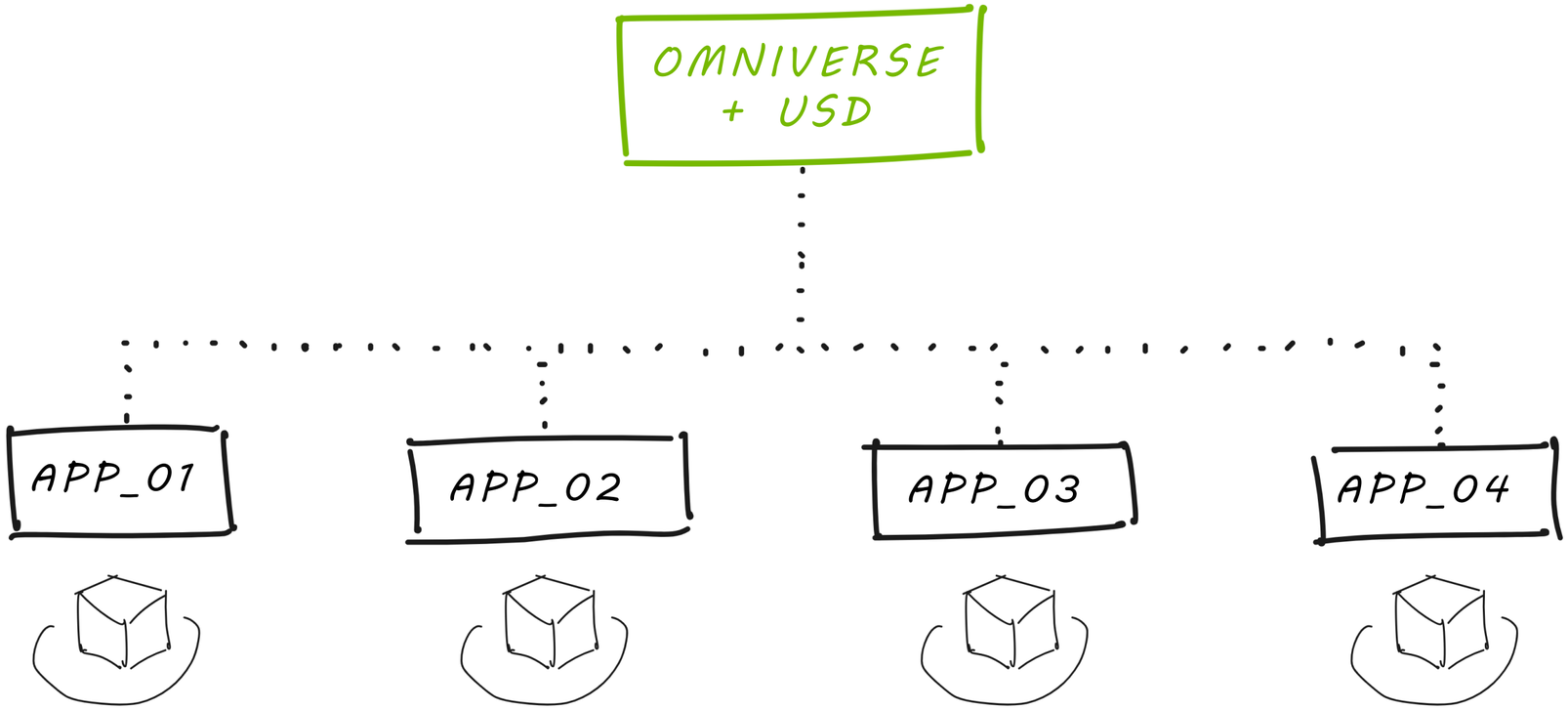
Traditional Multi-App Workflows

Increased Complexity with Custom Apps/Plugins



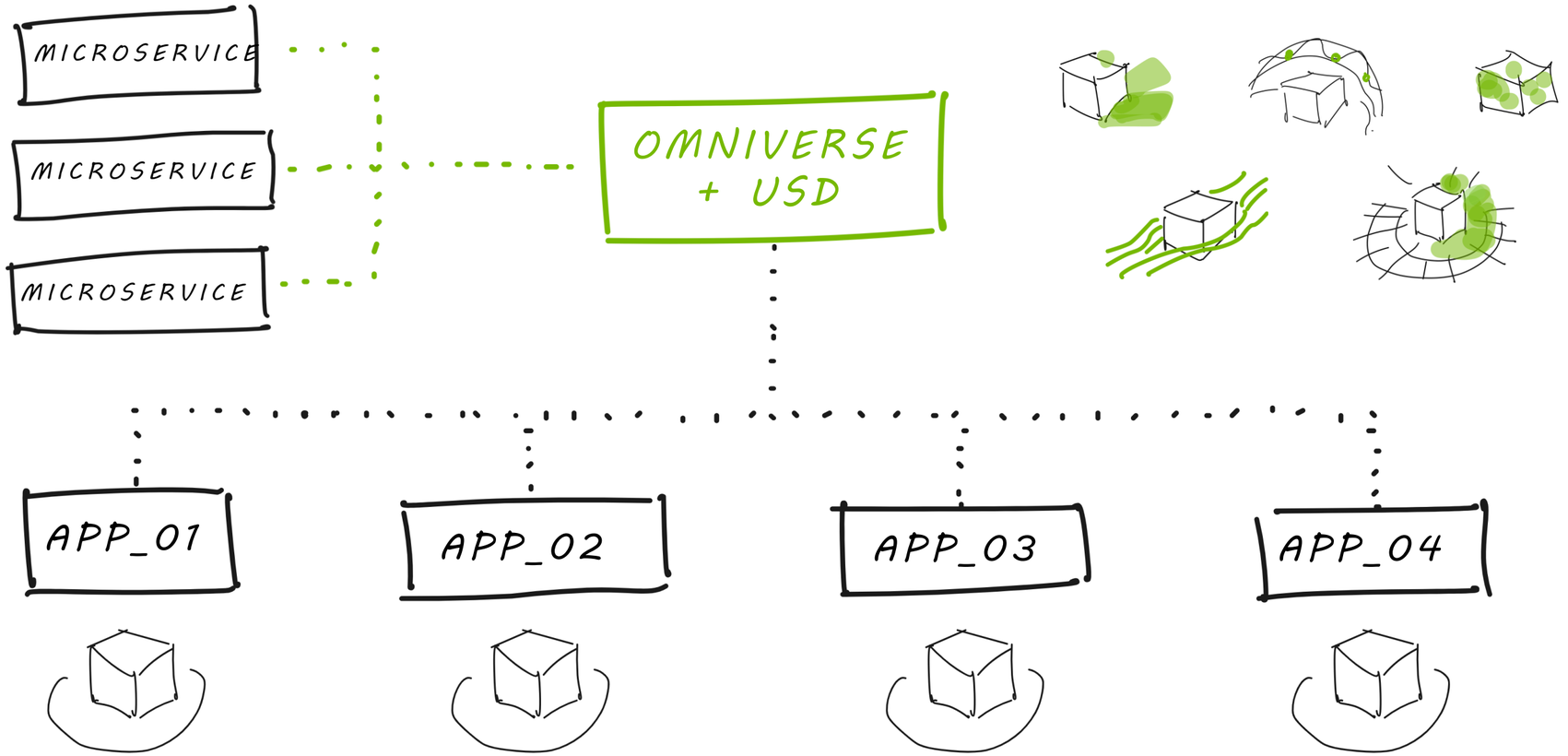
Collaborative Workflows with Omniverse & USD

Use Preferred 3rd Party Applications, Collate to Open Format, All Data and Geometry is equal



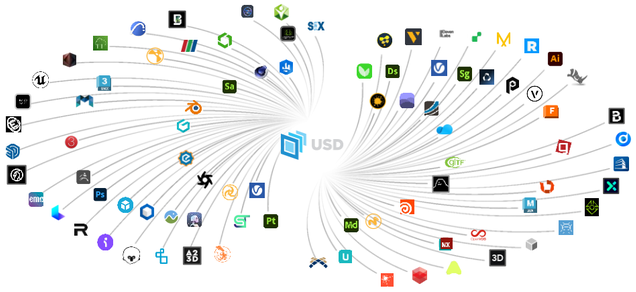
Collaborative Workflows with Omniverse & USD

Build interoperable plugins for Omniverse & USD, to enhance global workflow

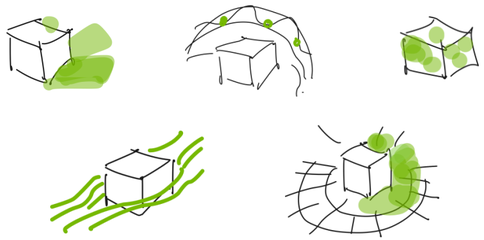


NVIDIA Omniverse

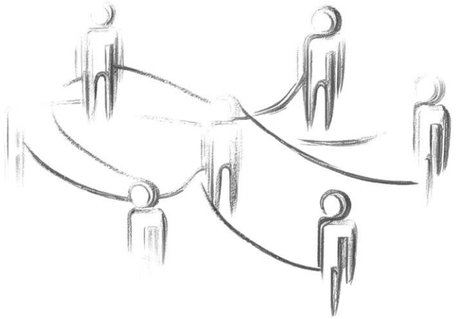
Connect and Develop Connected 3D Pipelines and Applications based on OpenUSD



Connect Your Tools & Data with OpenUSD



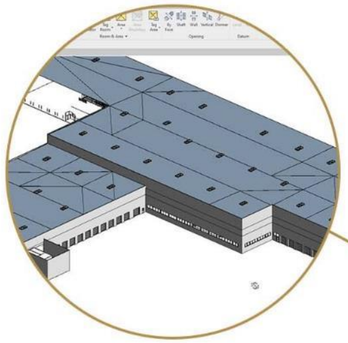
Build New, Interoperable Tools on OpenUSD



Connect Your Teams

Omniverse Connects Artists' Favorite Tools via OpenUSD

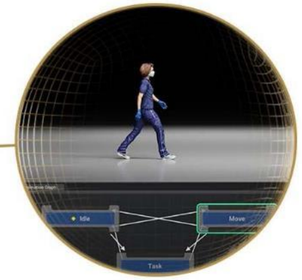
Omniverse Connects Industrial 3D Tools & Data via OpenUSD



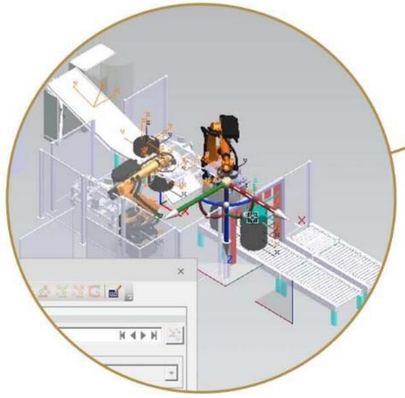
Factory CAD

Factory Digital Twin

Factory Planning



Digital Human Training



Robot CAD

Robot Gym

Path Tracing

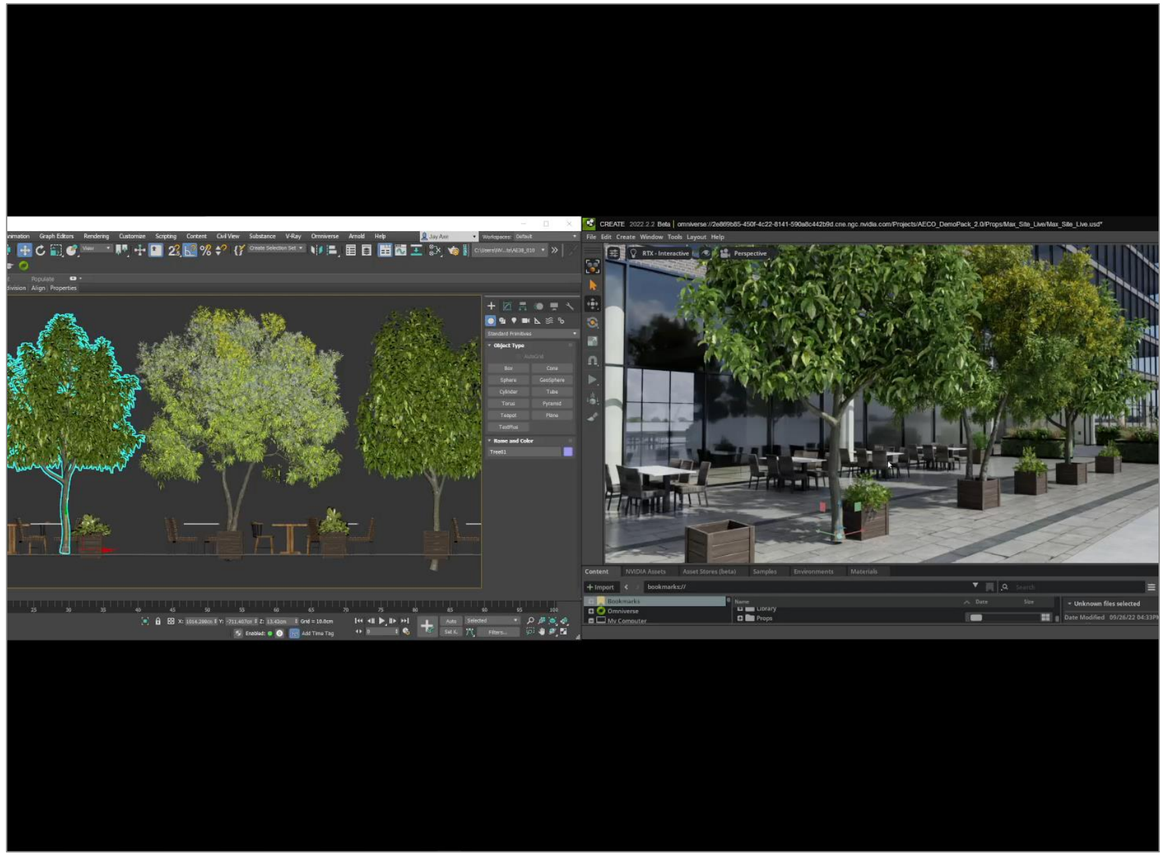
AI

MDL

Physics

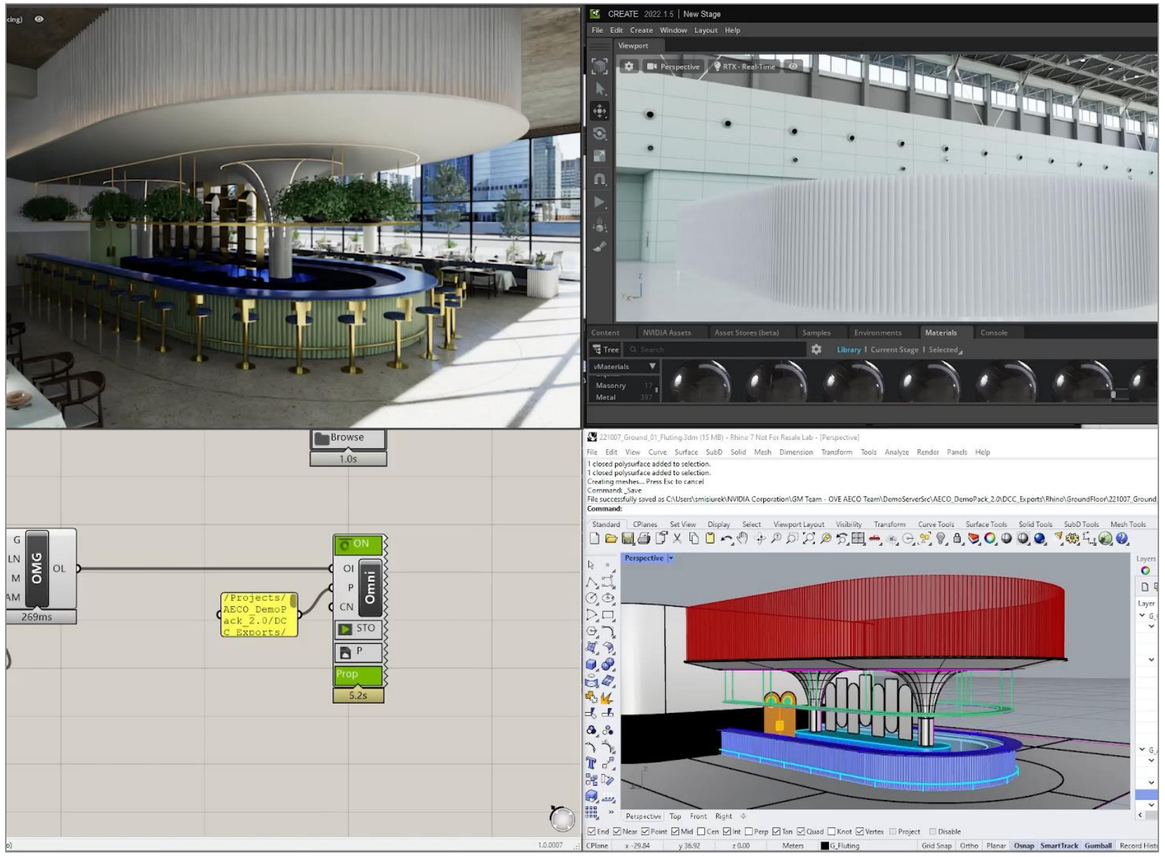
Connect Your Tools with OpenUSD and Omniverse

Real Time, Collaborative, Non-Destructive Workflows



Simple Full Fidelity Visualization Workflows

Rhino Grasshopper to Omniverse USD Composer (formerly Create)



Complex 3D Workflows with Legacy Software

Autodesk 3ds Max to Omniverse USD Composer (formerly Create)

Connect Your Existing Tools, and Easily Build Custom Tools

WPP, World's Largest Ad Agency, Builds 3D Content Creation Pipeline with Omniverse Enterprise

Design & CAD Data

NVIDIA Edify360

Unified Car Digital Twin & AI Environment in NVIDIA Omniverse

WPP

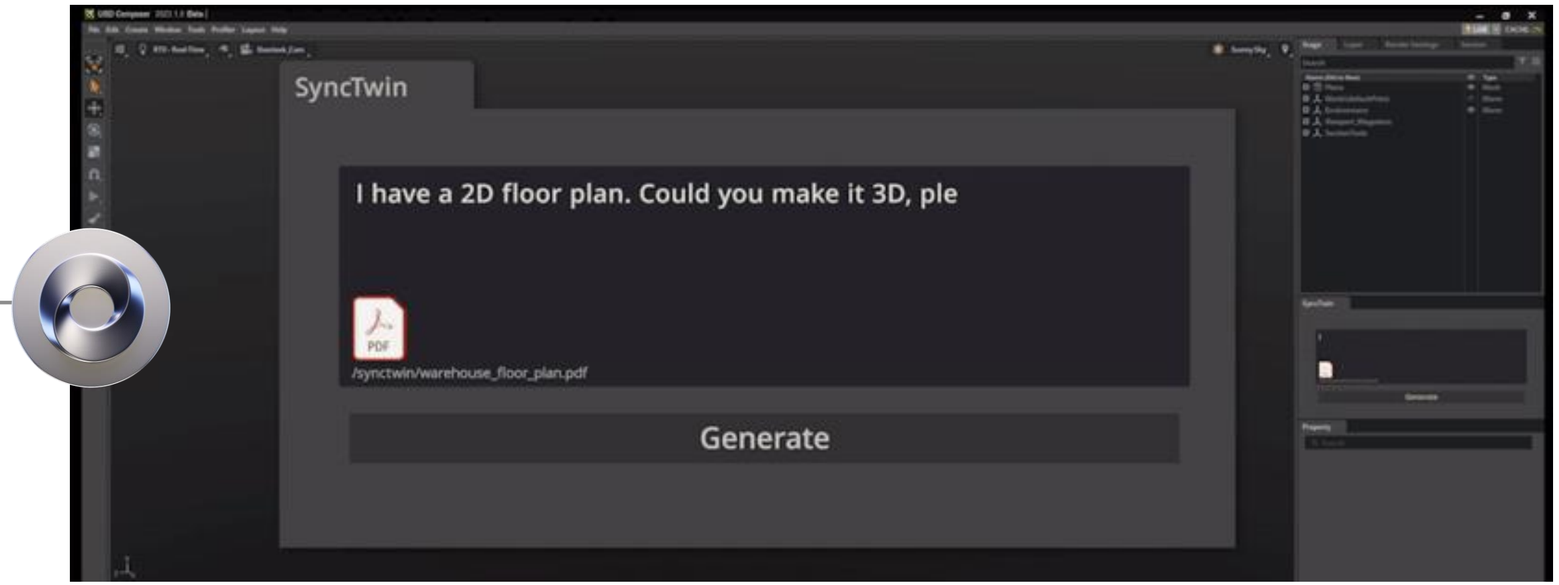
Deploy Real Time Configurator

Generate Cinematics

Generative AI in 3D Workflows

Omniverse Enterprise Lets You Connect Your 3D and Generative AI tools

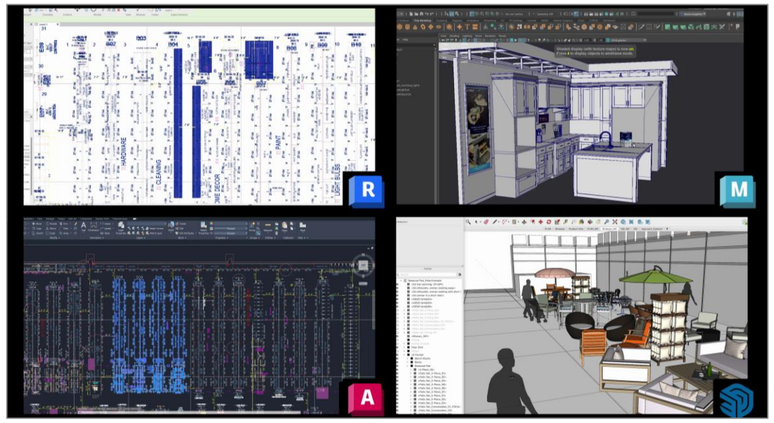
3D & Generative AI Tools



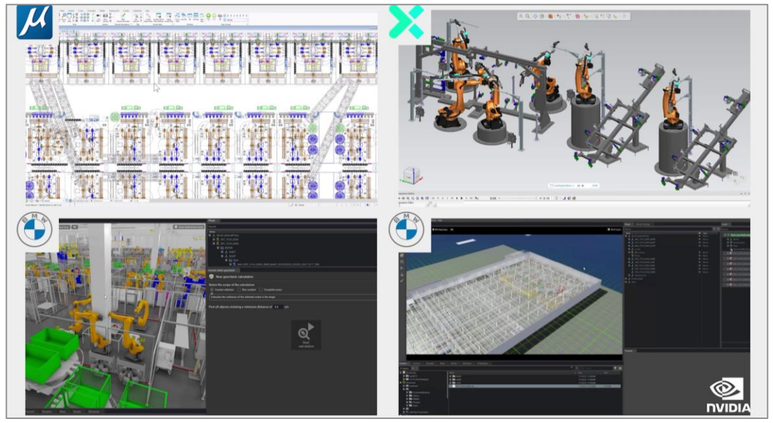
Real Time, Unified View in NVIDIA Omniverse

Customers Unifying their Workflows with OpenUSD and Omniverse

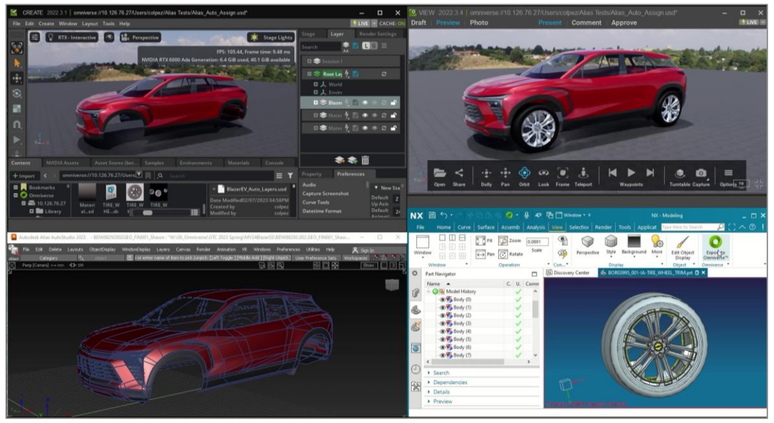
Lowe's



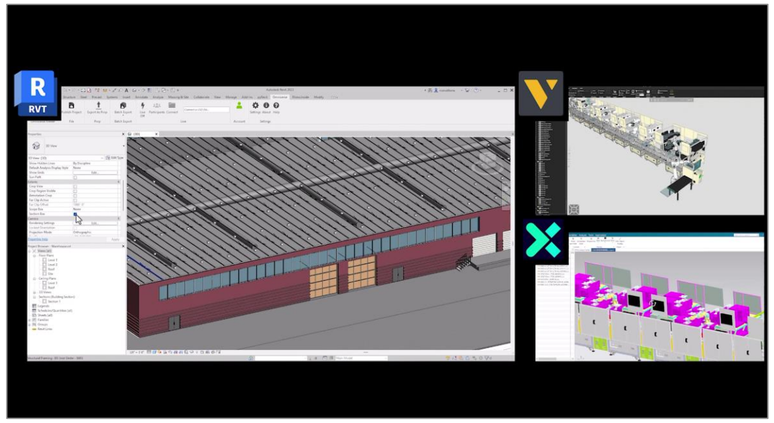
BMW Group



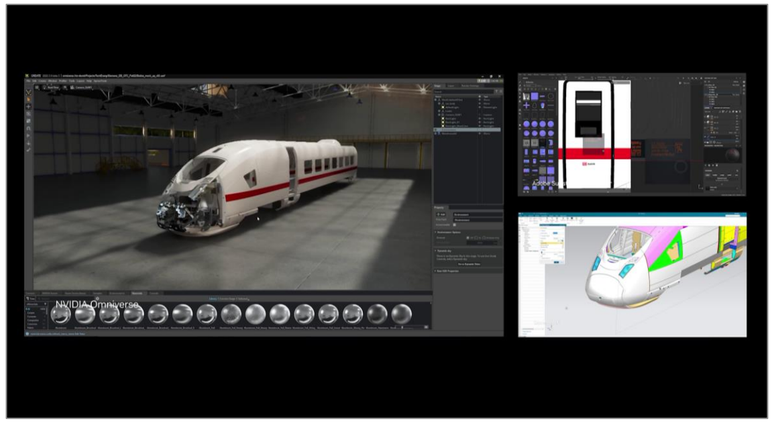
General Motors



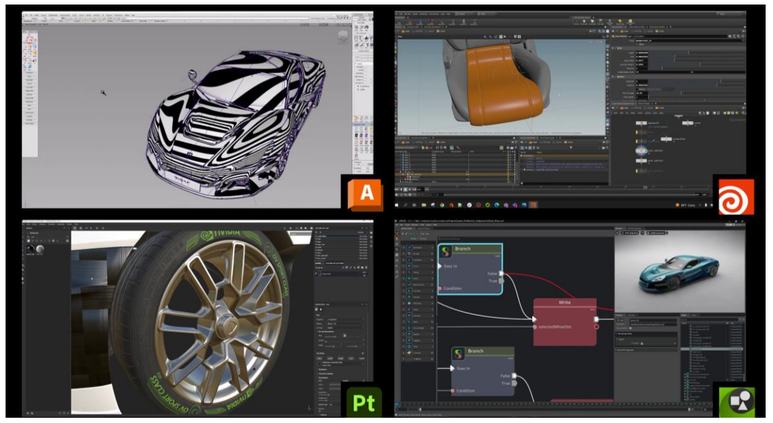
Pegatron



Deutsche Bahn

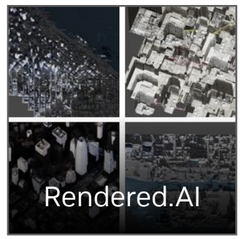


Rimac

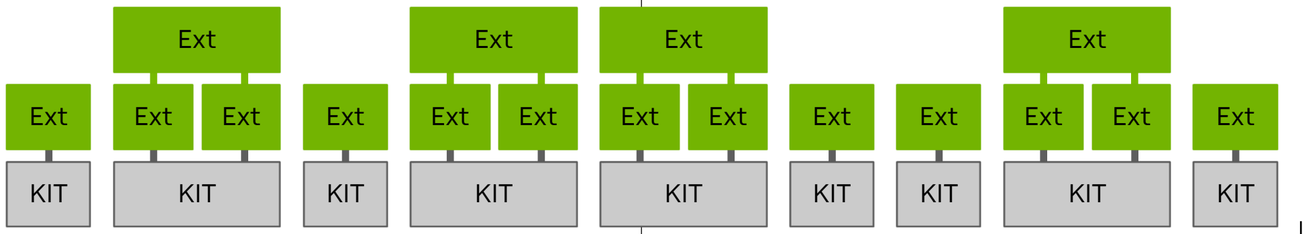


Build the Next Era of 3D Applications on Omniverse

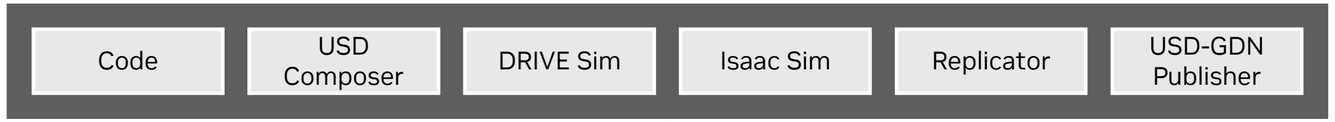
3rd Party Applications



Application Building Blocks



Foundation Applications

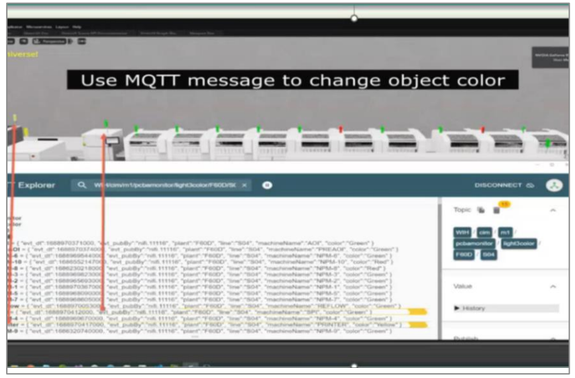


Development Platform

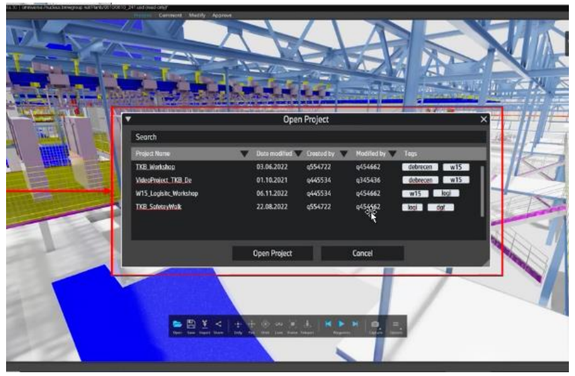
NVIDIA Omniverse

Developers Building Custom OpenUSD Applications with Omniverse

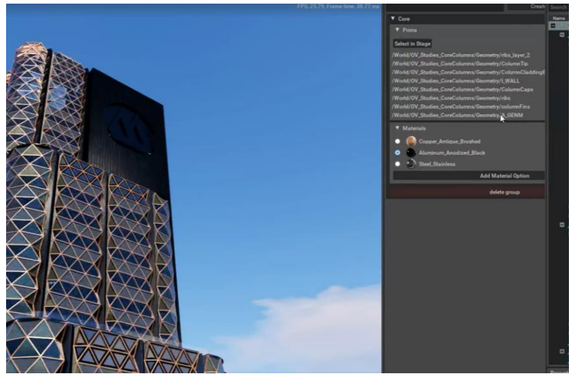
Wistron
Developed an IoT Extension



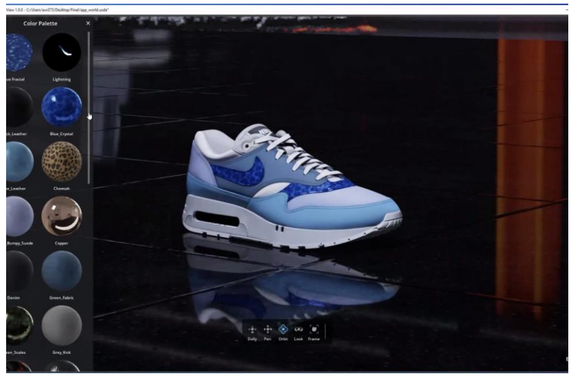
BMW Group
Factory Viewer



Fosters + Partners
Presentation App (Variant Viewing)

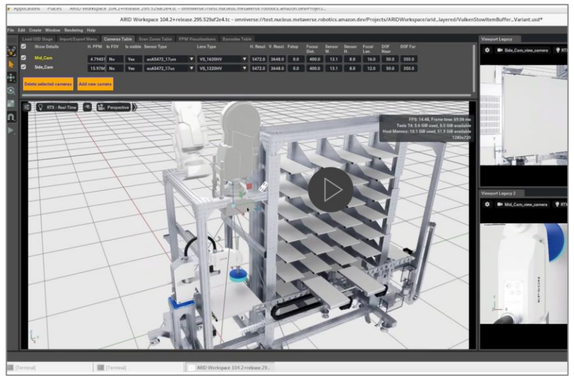


Nike
Integrated USD Workflow & Applications



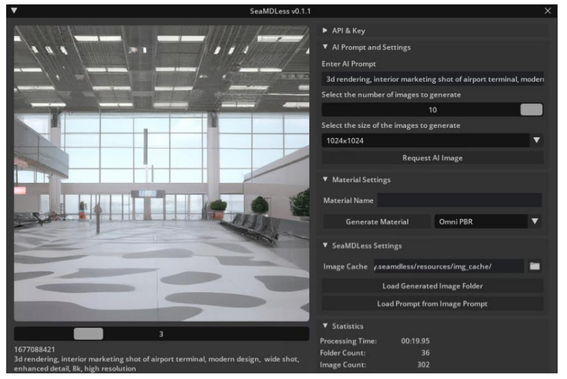
Lowe's
Extensions to Planogram Tools & Asset Store

Amazon Robotics
Package Stowing & Sensor Placement Emulators



Moment Factory
Extension bringing live video feeds into Omniverse

Mead & Hunt
Seamless MDL – text-to-material



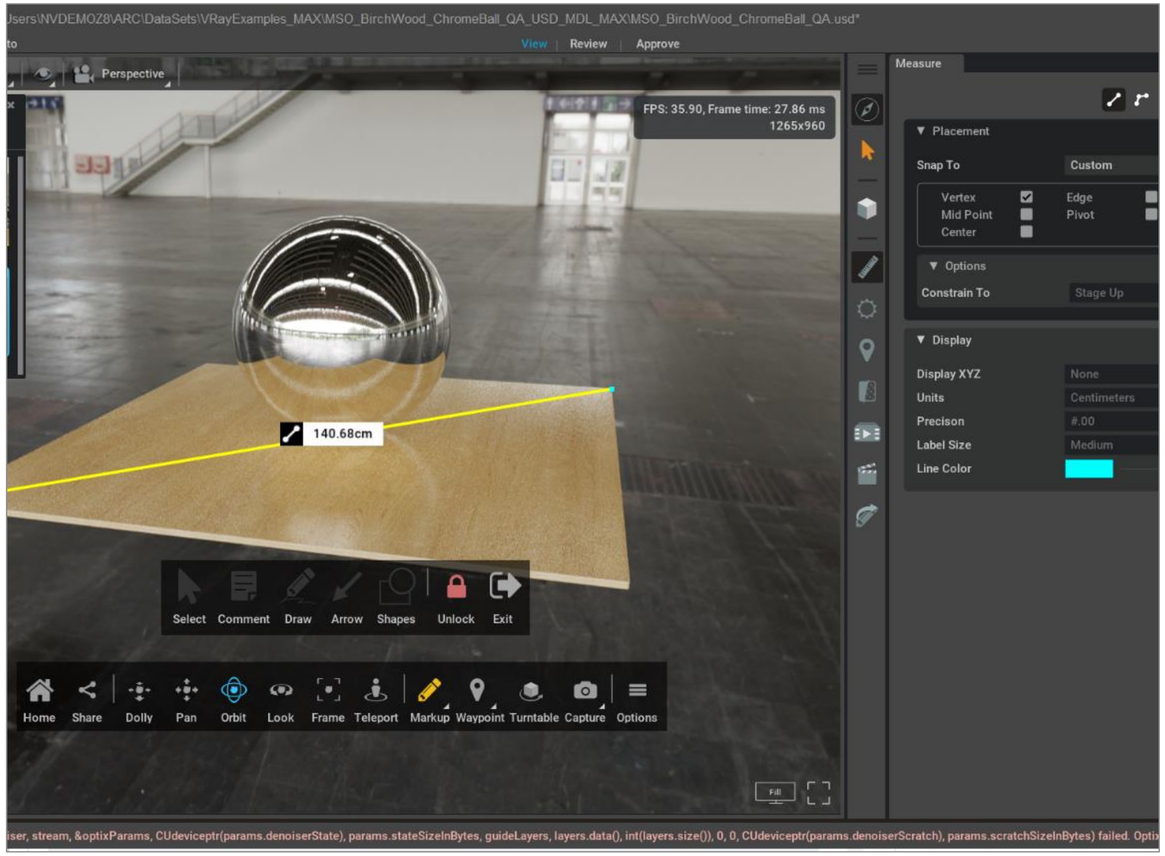
Omniverse USD Composer (formerly Create)

Advanced USD Scene Composition, Lighting, Rendering

- Simplify world building with intuitive layout tools and physics
- Breathtaking photorealism with physically-accurate materials, and real time ray and path traced rendering
- Advanced simulation capabilities with NVIDIA PhysX 5, Flow, and Blast integration

Omniverse USD Presenter (formerly View)

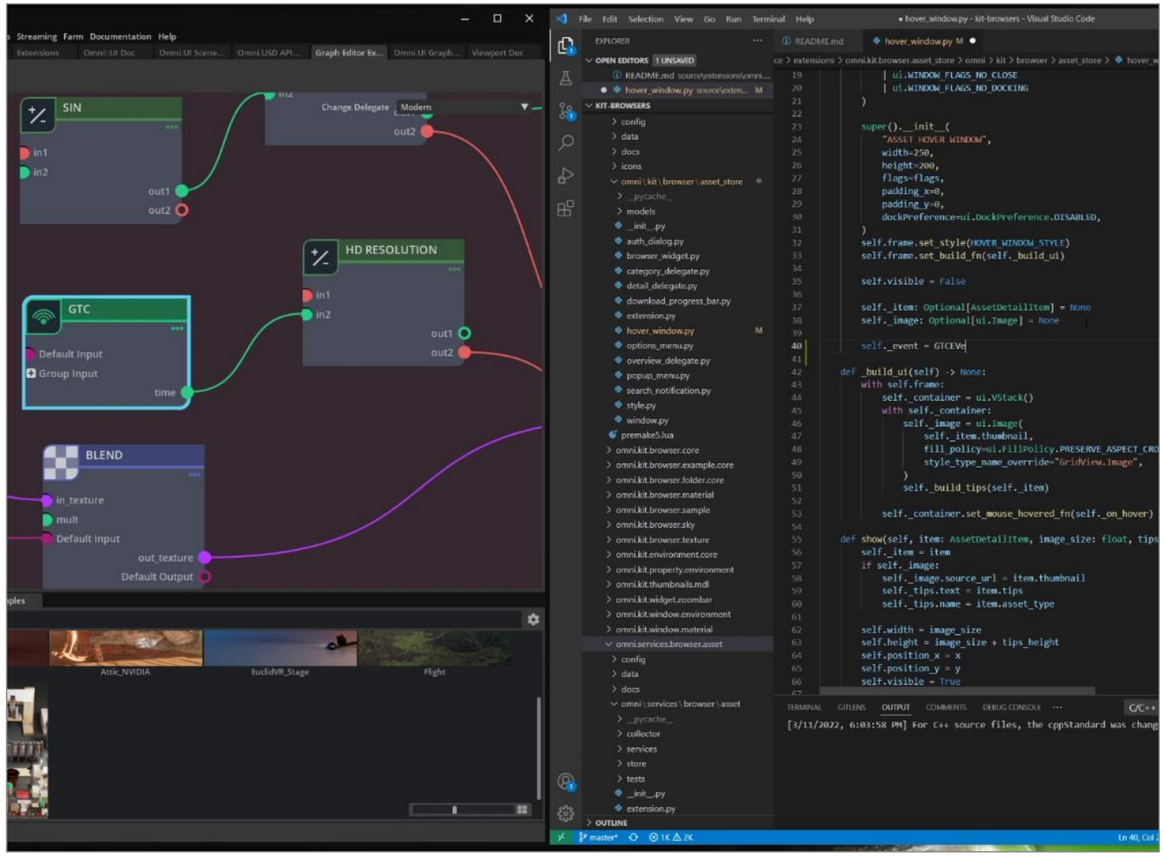
Immersive, true-to-reality visualization for reviews & approvals



- Simple to use tools for project reviews including camera waypoints, annotations, measure, and markup
- Ability to make minor environment or material iterations and edits to present multiple options
- Quick toggling between real-time ray traced and ultra-high-fidelity path-traced mode allows teams to visualize interactively

Omniverse Code

Integrated Development Environment (IDE) to build Omniverse extensions, apps, microservices

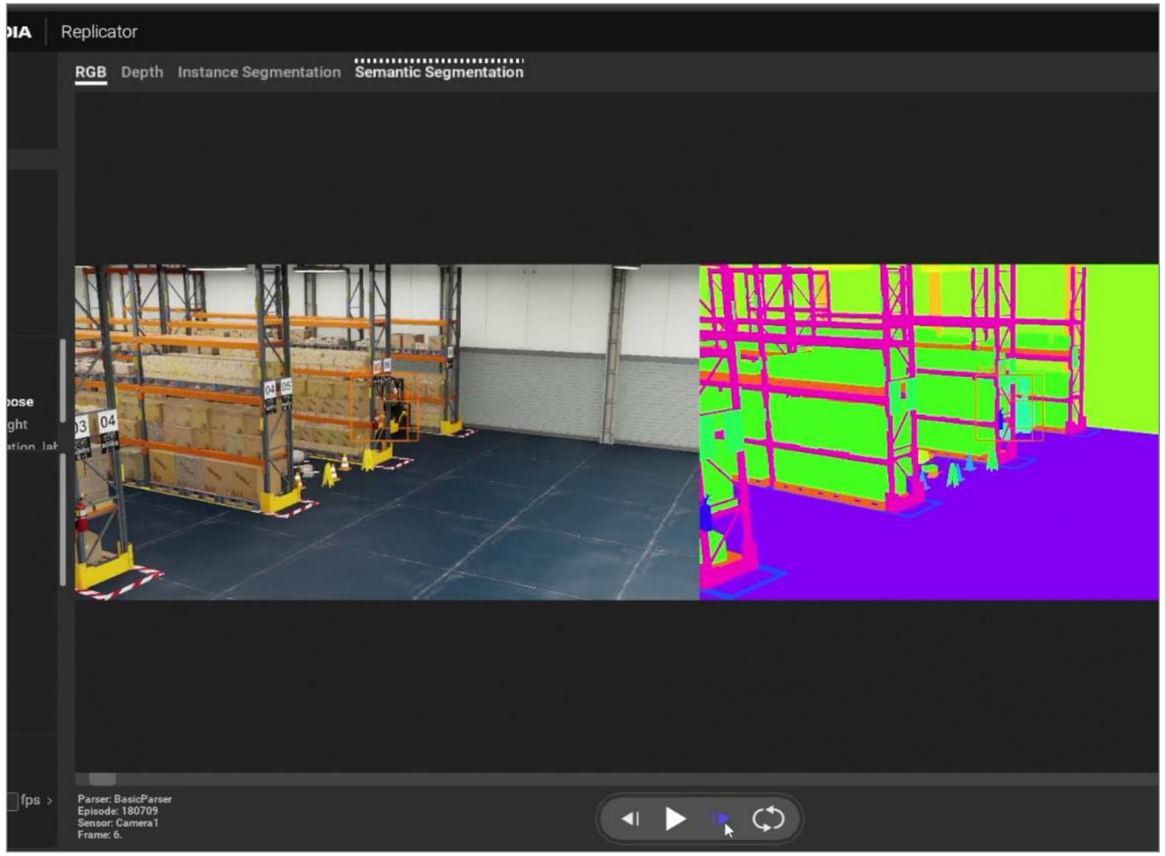


OMNIVERSE CODE

- Simple to learn and use – easy user interface, interactive documentation, sample templates, and ‘Hello World’ exercises
- Helps developers and power users achieve maximum output with minimal code – free to use any of the 300+ NVIDIA-built Omniverse Extensions in their projects, so no need to start from scratch
- Easily package and publish to a private or public registry
- Includes Omniverse Kit runtime

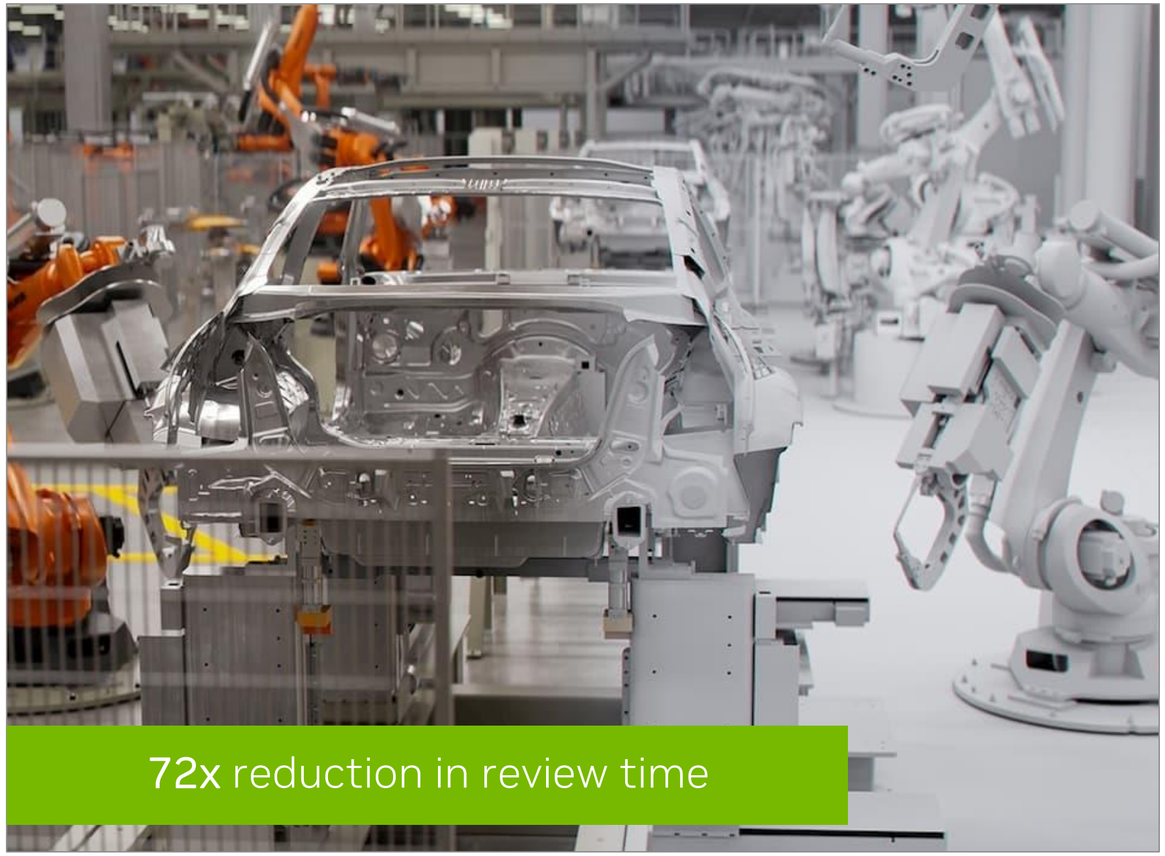
Omniverse Replicator

Build Custom Synthetic Data Generation Pipelines



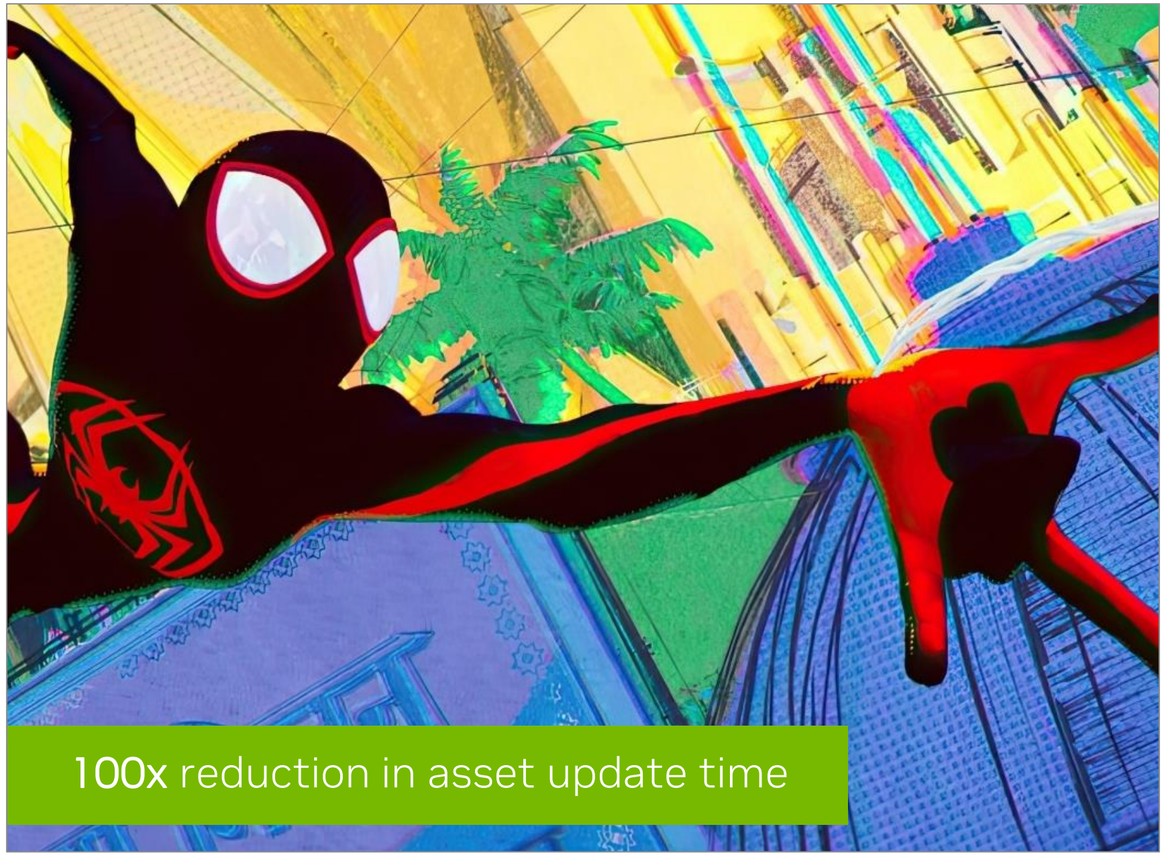
- SDK to build custom synthetic data generation pipelines
- Bootstrap AI model training
- Generate quality data faster than ever
- Integrates seamlessly with existing SDG tools

Saving Time and Money with Omniverse & OpenUSD



Omniverse for OpenUSD Factory Data Workflows

BMW Group reduced design freeze times from 3 days to 1 hour by building a custom Omniverse OpenUSD application

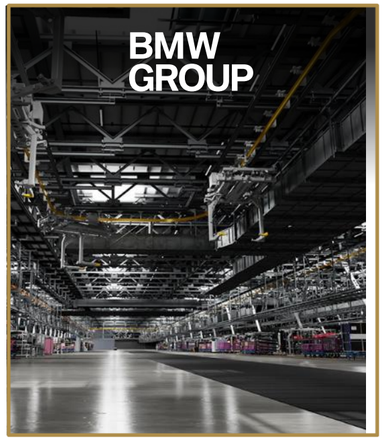


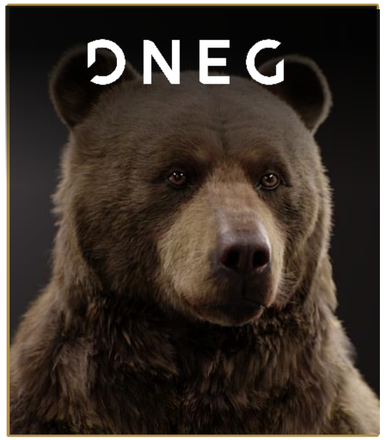
Omniverse for OpenUSD M&E Workflows

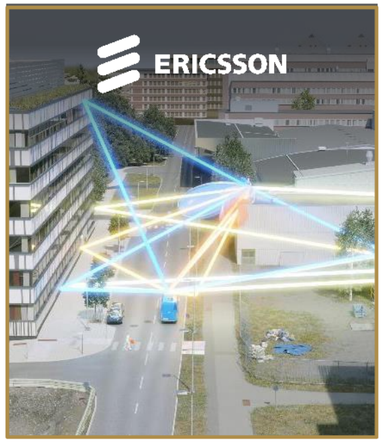
Sony Pictures Animation reduced asset update times in previz workflow from 5 days to 1 hour by building a custom Omniverse OpenUSD application

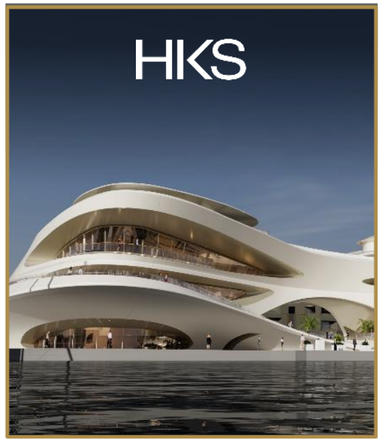
Omniverse Is Everywhere

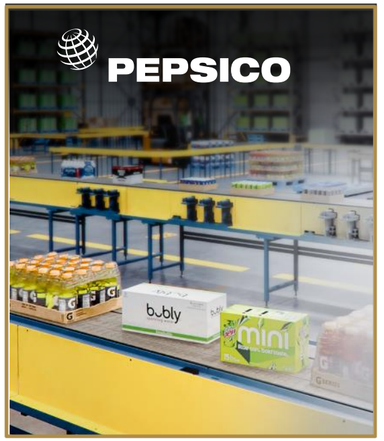
Customers Across Every Industry Building Custom 3D Pipelines & Virtual Worlds

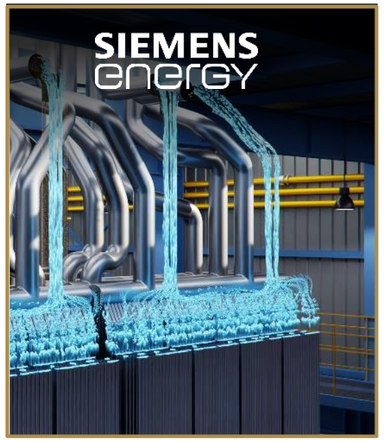


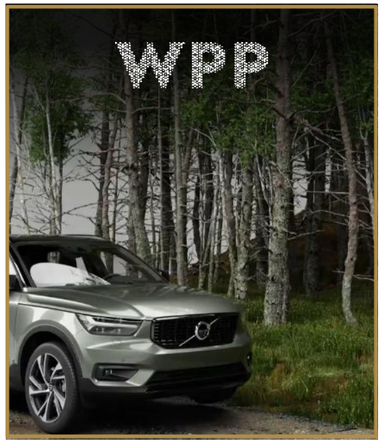












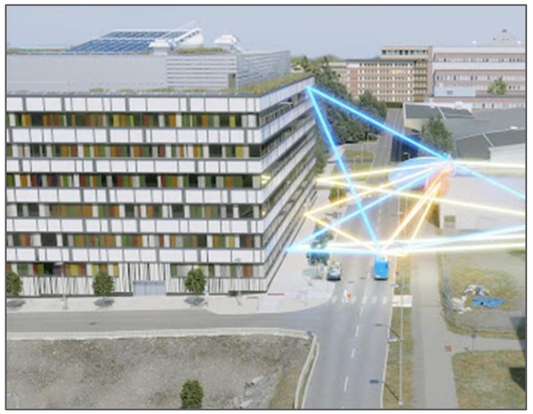
Industries Racing to Digitalize with NVIDIA Omniverse

Amazon Robotics
Warehouse & Supply Chain Automation

BMW Group
Automotive Manufacturing

Deutsche Bahn
Autonomous Railways

Ericsson
5G Network Simulation

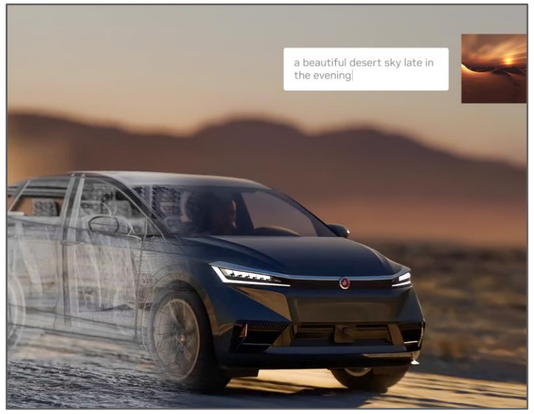


KPF
Architecture, Construction, Engineering

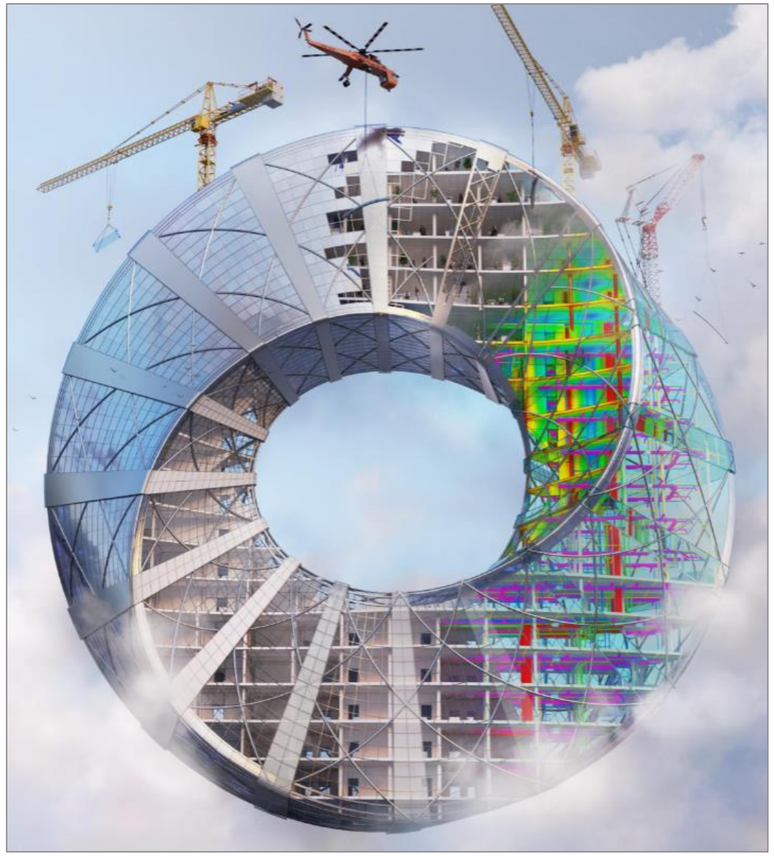
Pegatron
Electronics Manufacturing

Siemens
Industrial Automation

WPP
Digital Advertising, Consumer Experiences

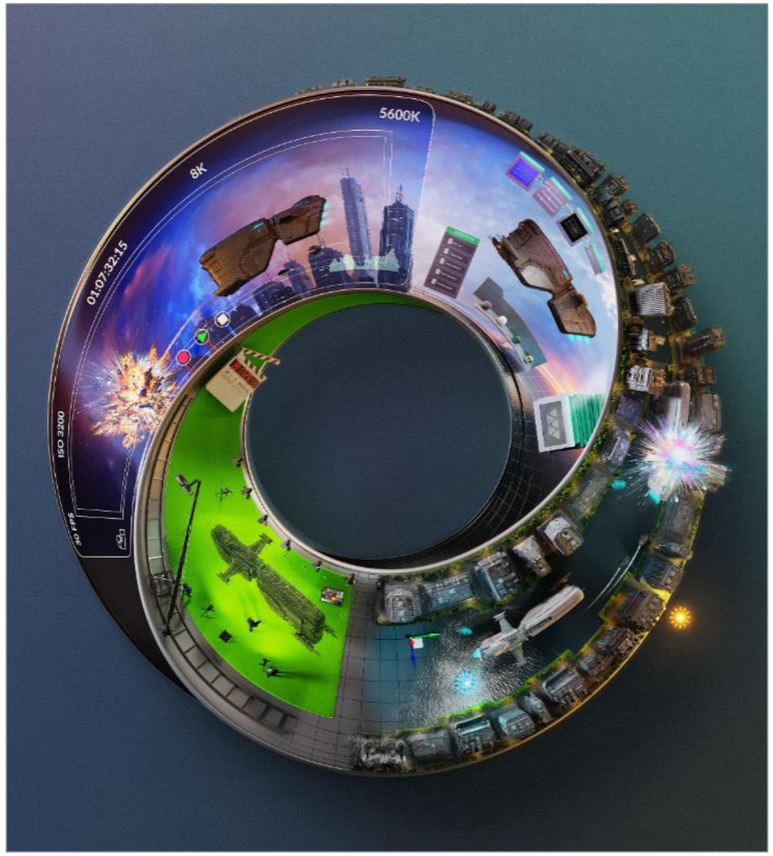


Priority Industries & Workloads



AECO

Architectural Design Review



Media & Entertainment

Previsualization

Manufacturing - Product Development

Product Design Review

OMNIVERSE FOR AECO

Common Architectural Design Review Workflows

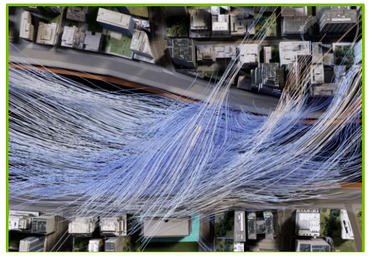
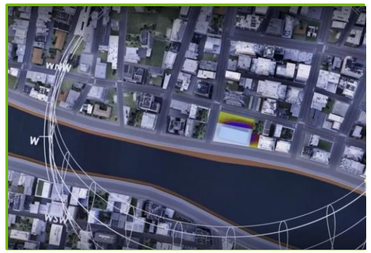
Disconnected Tools, Data, Teams

Legacy Infrastructure

Incompatible Tools

Siloed Data

Disconnected Teams

Pre-Design	Schematic Design	Design Development	Construction Documentation	Bidding & Negotiation
				

3D Modeling

AUTODESK 3ds Max · blender · AUTODESK Maya · Rhinoceros · SketchUp

BIM

GRAPHISOFT Archicad · Bentley Advancing Infrastructure · AUTODESK Revit · VECTORWORKS A NEMETSCHEK COMPANY

Geospatial

CESIUM

Urban Studies

CityEngine

Environmental & Simulation

ParaView · SIMSCALE

Misc.

Adobe · TURBOSQUID by shutterstock · twinbru

Game Engines

UNREAL ENGINE · Unity

NVIDIA Omniverse Enterprise in Architectural Design Review

1

Connect your tools & data

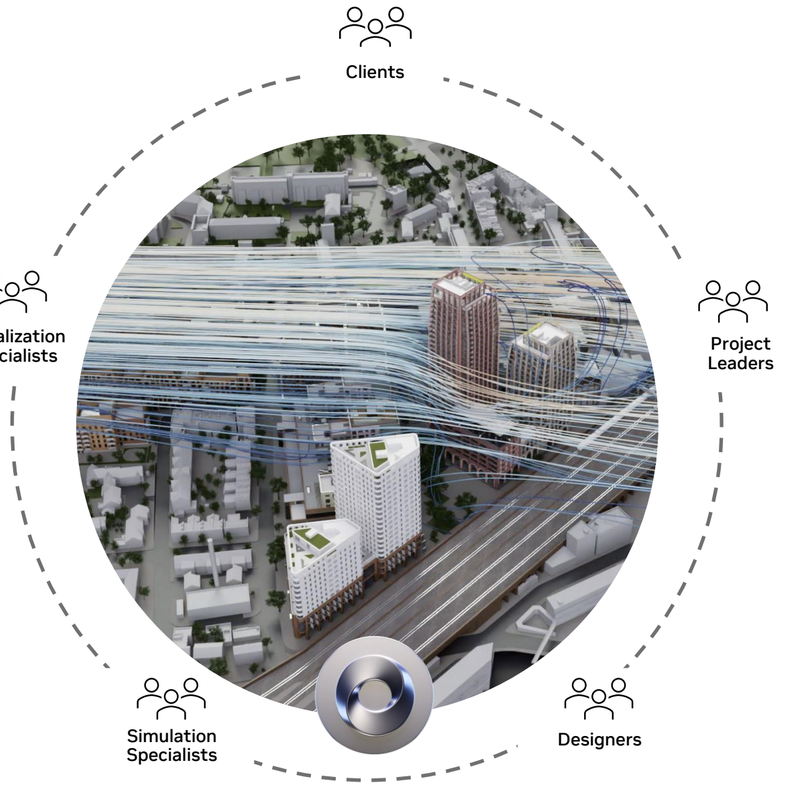
AUTODESK Maya
GRAPHISOFT Archicad
Bentley Advancing Infrastructure
AUTODESK 3ds Max
CESIUM
CityEngine
Adobe
blender
ParaView
Rhinoceros
SketchUp
AUTODESK Revit
SIMSCALE
Unity
TURBOSQUID by shutterstock
twinbru
UNREAL ENGINE
VECTORWORKS

- Structure
- Layout
- Product
- Process & Metadata
- Lighting
- Analyses
- Point Cloud

USD

2

See it in a single view



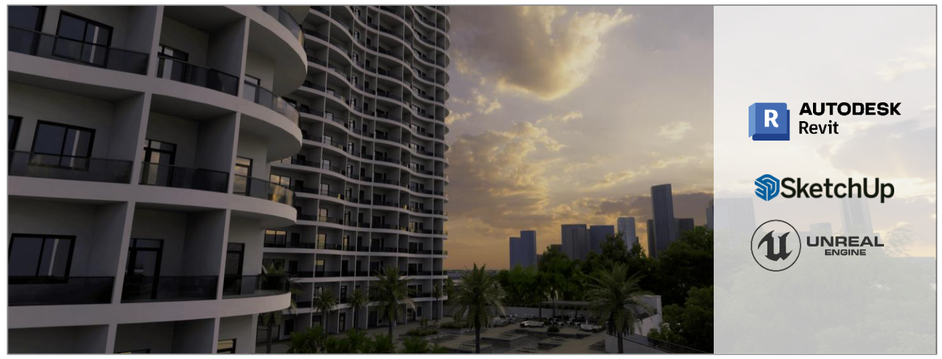
USD

3

Develop new experiences

- Viewing App (WOODS BAGOT)
- Variant Presenter (Foster + Partners)
- One-Click to XR App (KPF)
- Your Custom App

Omniverse Enterprise in Architectural Design Review



Outdoor Living

KPF

300%

Increase in annual output

OutdoorLiving3D

Reduced
Cost & Waste

Increased
Quality & Output

Accelerated
Speed to Market

KPF

CHALLENGES

- ✗ Importing and exporting data across apps leading to data loss
- ✗ Unable to visualize and simulate all project data in a single platform
- ✗ Remote collaboration across multiple users and stakeholders

OMNIVERSE VALUE

- ☑ Interoperability between preferred 3D apps
- ☑ Visualized and simulated environmental, wind and agent crowds in master models
- ☑ Interactive and vivid environment for design reviews including AR/VR

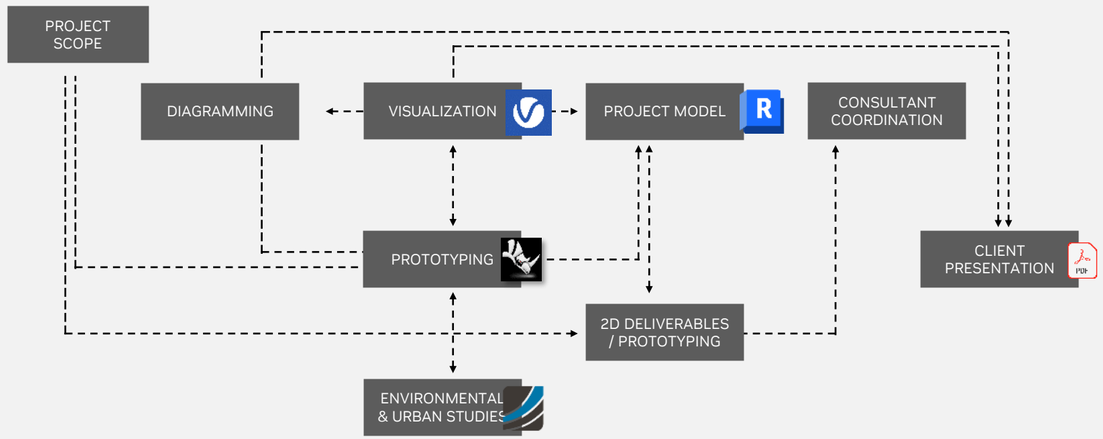
Transforming Architectural Design Pipelines

KPF – Global Architectural Firm

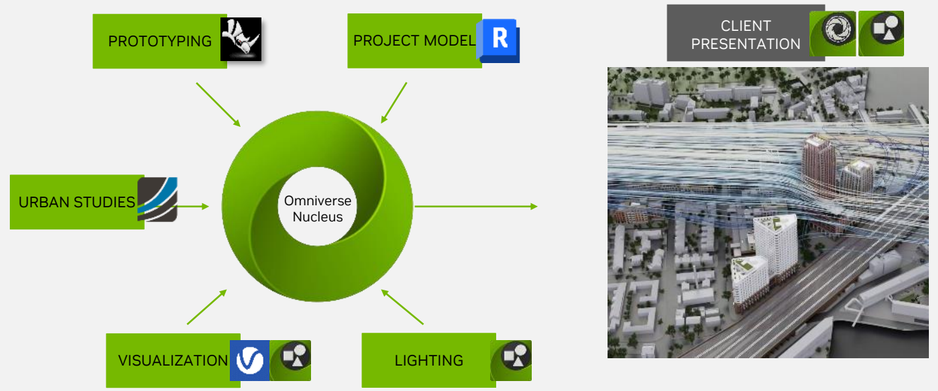
Workflows – Before and After

Full Fidelity Visualization

LEGACY 3D PIPELINE



PIPELINE WITH NVIDIA OMNIVERSE



OMNIVERSE FOR M&E

Common Previsualization Workflows

Disconnected Tools, Data, Teams

Legacy Infrastructure

Incompatible Tools

Siloed Data

Disconnected Teams

Modelling

Layout

Animation

Lighting & Surfacing

Adobe

AUTODESK 3ds Max

AUTODESK Maya

blender

Houdini

REALLUSION

Unity

UNREAL ENGINE

NVIDIA Omniverse Enterprise in M&E Previz

1

Connect your tools & data

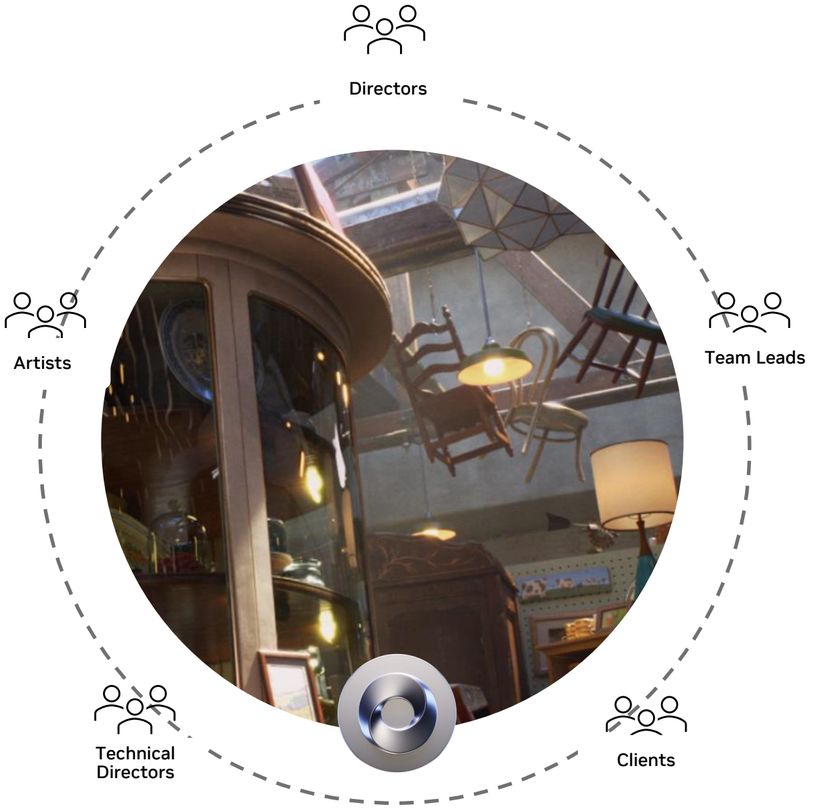
AUTODESK Maya
AUTODESK 3ds Max
Adobe
blender
Houdini
REALLUSION
Unity
UNREAL ENGINE

- Models
- Environment
- Rigging
- Animation
- Materials and Textures
- Lighting
- Cameras

USD

2

See it in a single view



USD

3

Develop new experiences

- Viewing App (Flixiverse)
- Variant Presenter
- Lighting Simulator
- Your Custom App

NVIDIA

Omniverse Enterprise in Media & Entertainment Previz

Sony Pictures Animation

DNEG

4x

More time for creative iterations

Sony Pictures Animation

Reduced Redundant Processes

Increased Quality & Output

Accelerated Speed to Market

Transforming Global Film Production Workflows

DNEG – Leading Visual Effects and Animation Studio

CHALLENGES

- ✗ Making creative decisions with limited visual information, such as reduced scene information including no lighting or fur
- ✗ No context of character interactions with self and environment
- ✗ Notes on renders take a long time to turnaround and implement any changes requested

OMNIVERSE VALUE

- ☑ Artists can see their work in context at full fidelity before they deliver and get closer to final frames faster
- ☑ No long wait times for renders, accelerating review cycles from days to hours
- ☑ A flexible non-linear workflow means departments can contribute at the same time. Reviews are interactive and iterations can be made on the fly

DNEG Case Study

Pre-Visualization Before Omniverse and After

AUTODESK MAYA PLAYBLAST - OFFLINE

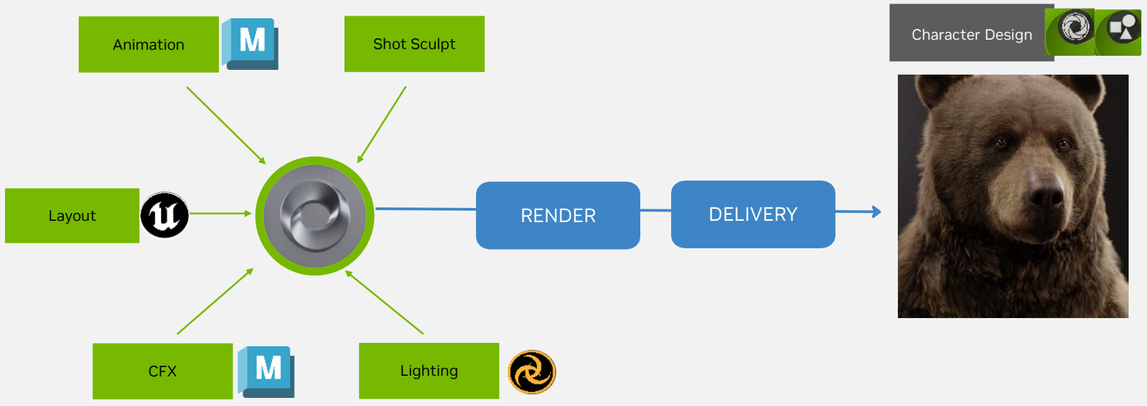
Omniverse USD Composer (formerly Create) – REAL TIME

Connect Your Tools with OpenUSD and Omniverse

Build Unified Asset Pipelines

LEGACY 3D PIPELINE

USD PIPELINE



CHALLENGES

- ✗ Delivering Luxury, High end Sales Experience
- ✗ Existing method required lengthy asset prep time
- ✗ Localizing interactive content for new markets

OMNIVERSE VALUE

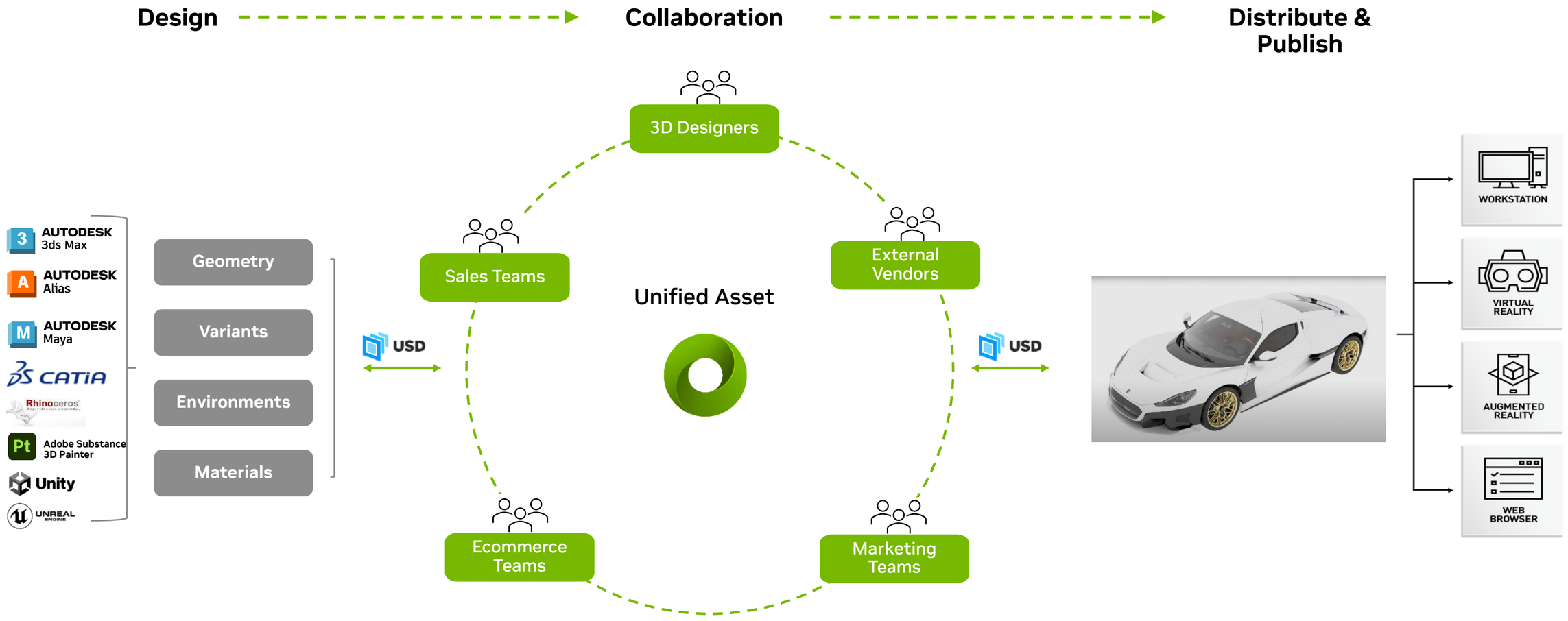
- ☑ Unlock Design Data for Marketing Purposes
- ☑ Reduce Duplicative 3D Work & Data Prep
- ☑ Deliver Personalized Content at Scale
- ☑ Library of Reusable 3D Assets
- ☑ Automate the Content Supply Chain

Case Study: Rimac

Unlocking the content supply chain for automotive marketing

Workflow Example: Automotive Marketing

Automation of the content supply chain



OMNIVERSE FOR MANUFACTURING

Common Product Design Workflows

Disconnected Tools, Data, Teams

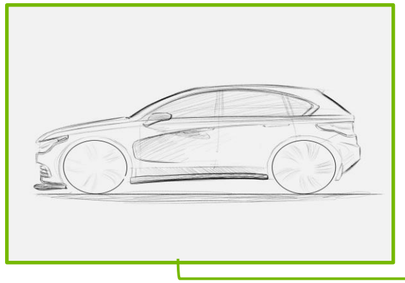
Legacy Infrastructure

Incompatible Tools

Siloed Data

Disconnected Teams

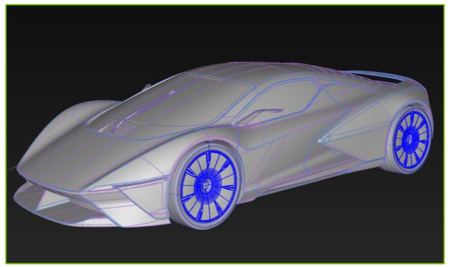
Concept Design



Prep

Review

Surface Modeling



Prep

Review

Render & Visualize

Ps Ae blender KeyShot by Luxion UNREAL ENGINE

AUTODESK Alias AUTODESK Fusion 360 blender CATIA SOLIDWORKS Rhinoceros design, model, present, analyze, realize... SIEMENS

Pt Ps AUTODESK Maya AUTODESK VRED AUTODESK 3ds Max Houdini CINEMA 4D by MAXON KeyShot by Luxion UNREAL ENGINE

NVIDIA

NVIDIA Omniverse Enterprise in Product Design Review

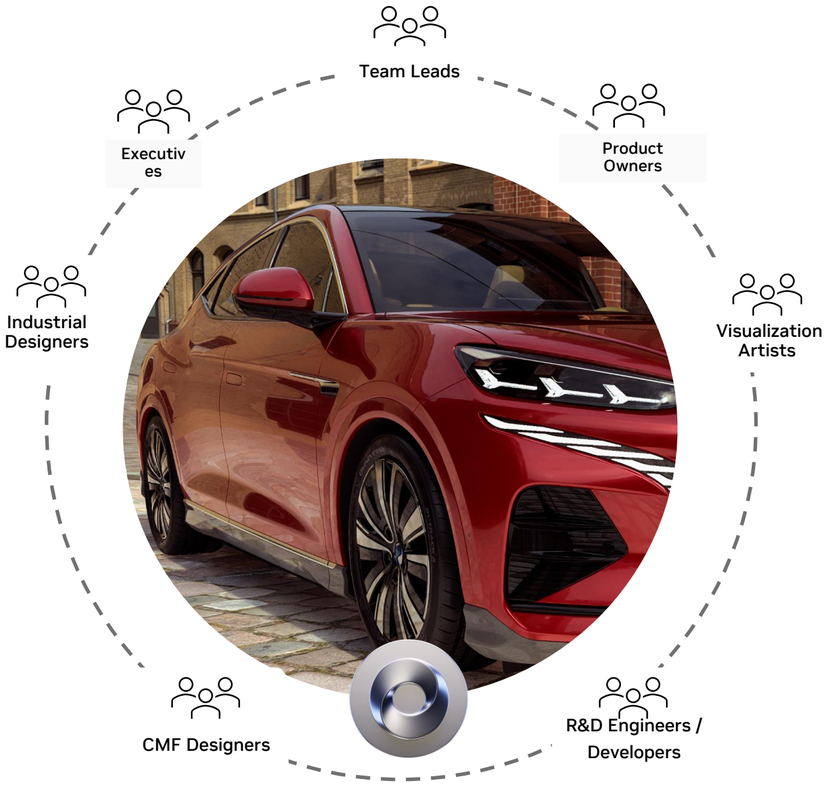
Minimize Data Prep, Accelerate Design Reviews, Enable Full-Fidelity Collaborative Workflows

1 **Connect your tools & data** → 2 **See it in a single view** → 3 **Develop new experiences**

Ae Ps Pt
AUTODESK Alias
AUTODESK Fusion 360
AUTODESK VRED
AUTODESK Maya
AUTODESK 3ds Max
blender
CATIA
SOLIDWORKS
Houdini
KeyShot
CINEMA 4D by MAXON
Rhinoceros
SIEMENS
UNREAL ENGINE

Geometry
Variants
Materials & Textures
Environments
Animations

USD

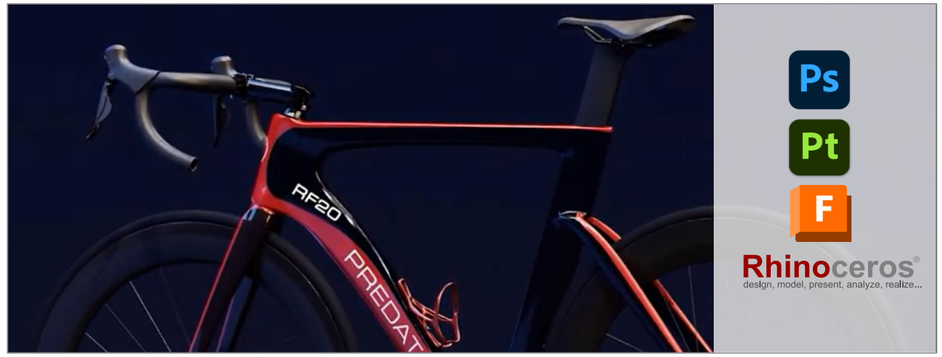


USD

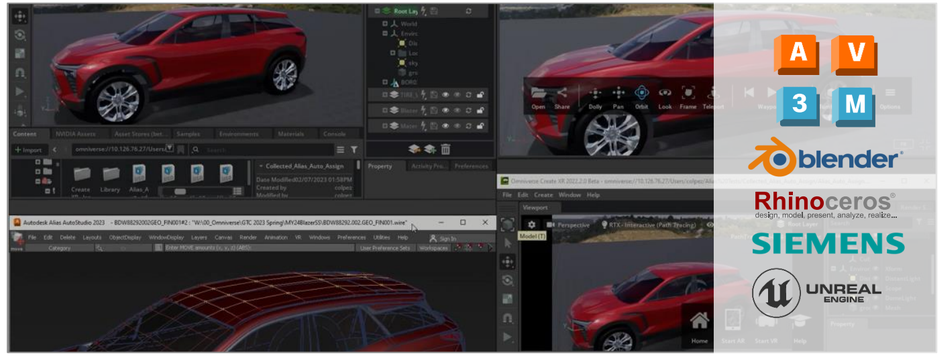
Viewing App
Variant Presenter
One-Click to XR App
Your Custom App

Omniverse Enterprise in Product Design Review

Minimize Data Prep, Accelerate Design Reviews, Enable Full-Fidelity Collaborative Workflows



Predator Cycling



General Motors

75%

Reduction in product development time

Predator Cycling

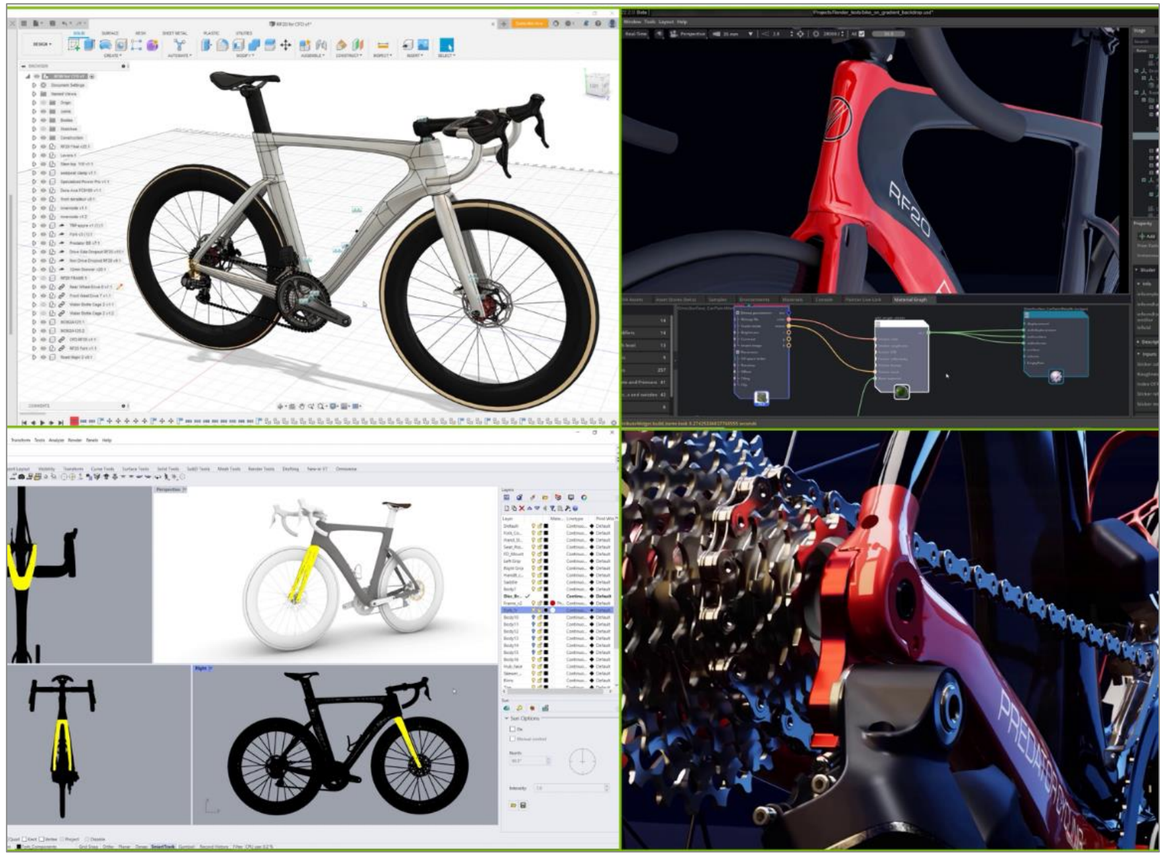
Reduced Cost & Waste

Increased Quality & Output

Accelerated Speed to Market

Transforming Product Design Workflows

Predator Cycling – Design and Manufacturing Company



More Seamless Multi-App Workflows

Rhino, Fusion360, Omniverse USD Composer (formerly Create)

CHALLENGES

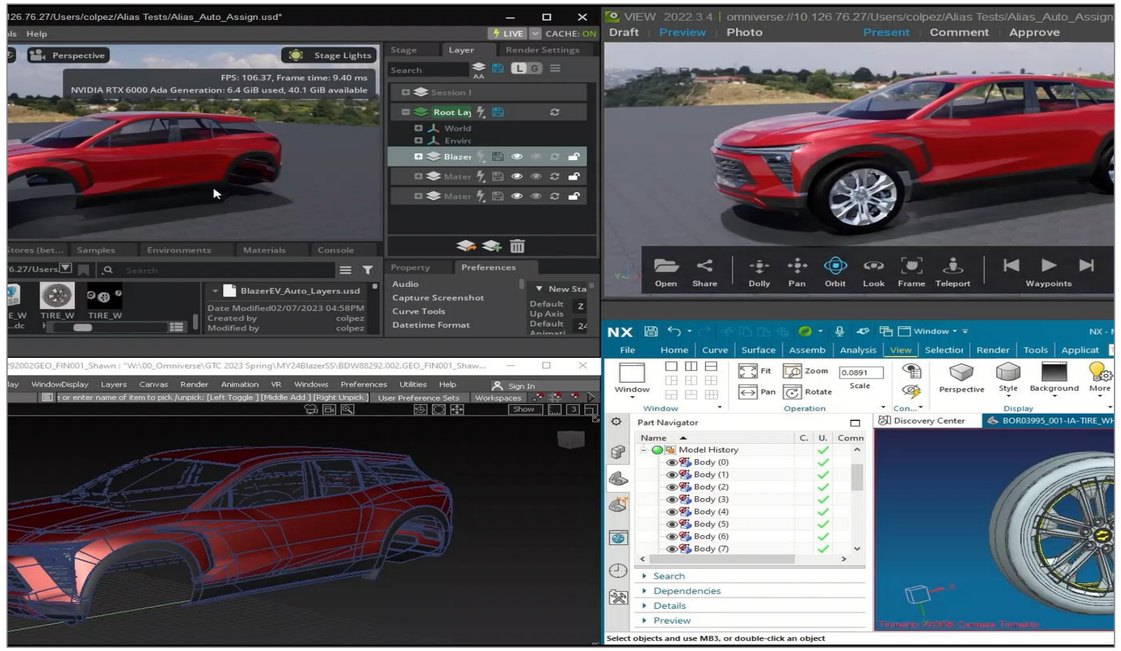
- ✗ Complex design workflows leading to delays in product launch
- ✗ Incompatible data formats from multiple engineering applications hamper creativity
- ✗ Lag in synchronizing data between design, engineering, manufacturing and marketing

OMNIVERSE VALUE

- ☑ Better communication, feedback, and decision-making, dramatically reducing production time from 12-18 weeks to 4 weeks
- ☑ Efficient and modern manufacturing workflow that aggregates full-fidelity 3D data across multiple apps without any data loss
- ☑ Interactive and vivid environment for design reviews; photorealistic models for marketing and customer engagements

Use Case: Design and Styling

Building Unified Data Pipeline to Unlock Real-Time, Collaborative Workflows



CHALLENGES

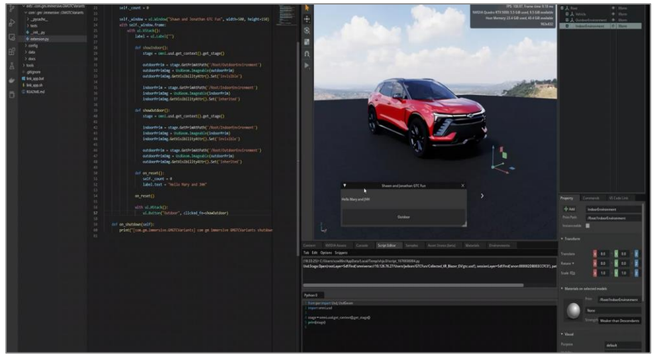
- ✗ Fragmented design and engineering data, tools, and workflows
- ✗ Lengthy design and engineering review preparation
- ✗ Lengthy marketing asset preparation

OMNIVERSE VALUE

- ☑ Breaks data and design team siloes
- ☑ Enables multi-stakeholder, real time collaboration
- ☑ Accelerates decision-making, review cycles
- ☑ Reduces data prep, export/import time
- ☑ Eliminates rework, lost and stale data

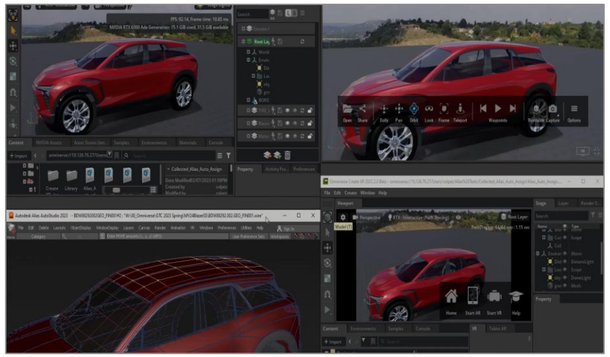
Developer Tools

Building Custom Kit-Based Applications



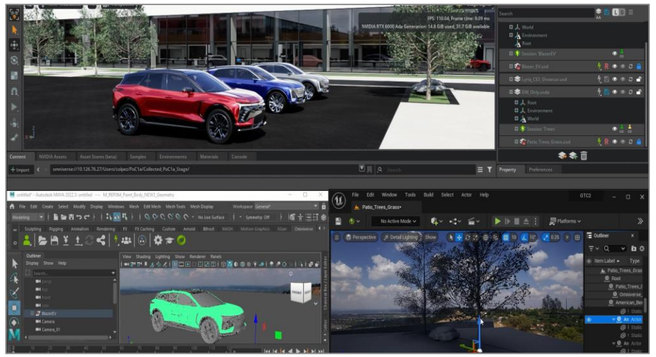
USD Workflow - Modeling

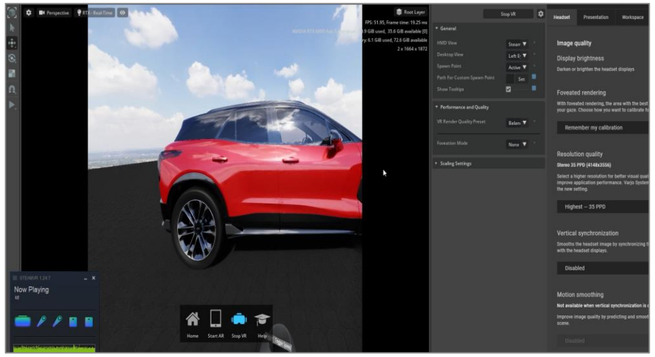
Autodesk Alias & Siemens TeamCenter to Omniverse



USD Workflow – Set Dressing

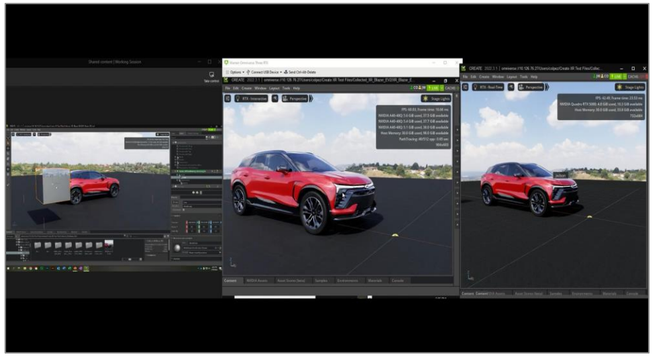
Autodesk 3ds Max, Maya, Unreal Engine to Omniverse





XR in Omniverse

Varjo HMDs



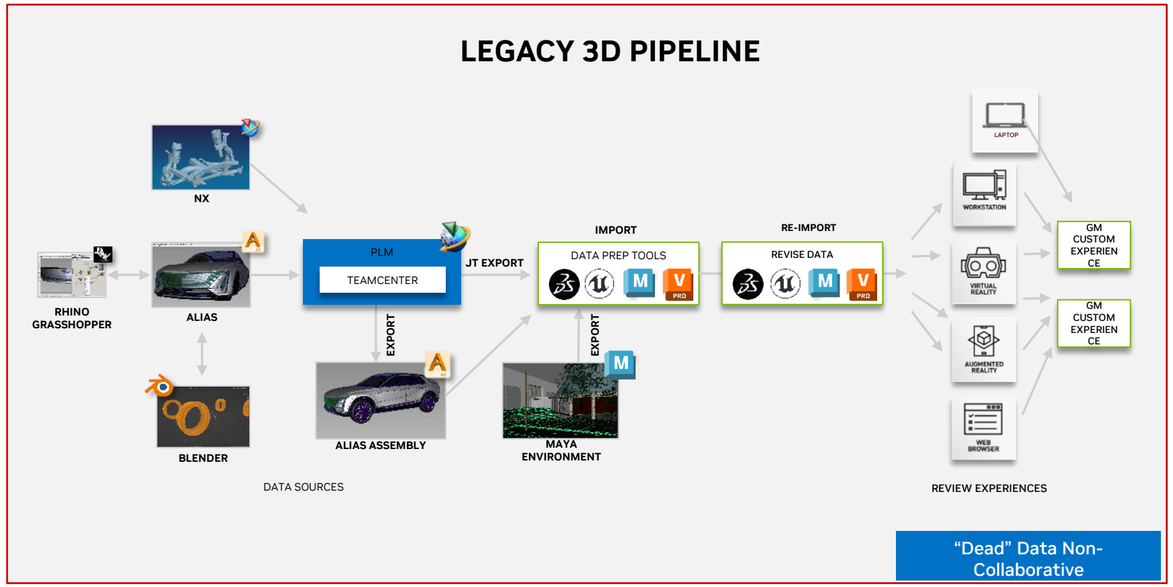
Multi-User, Live Collaborative Review

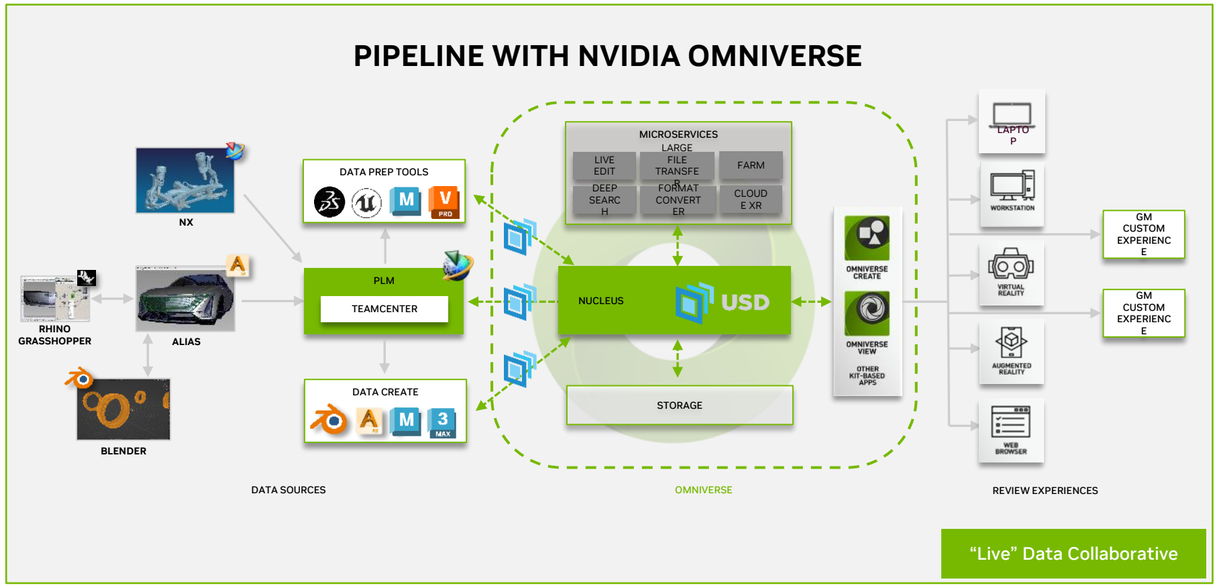
Geographically dispersed, virtualized from the data center

Use Case: Design and Styling

Key Omniverse Features Used

Workflows – Before and After

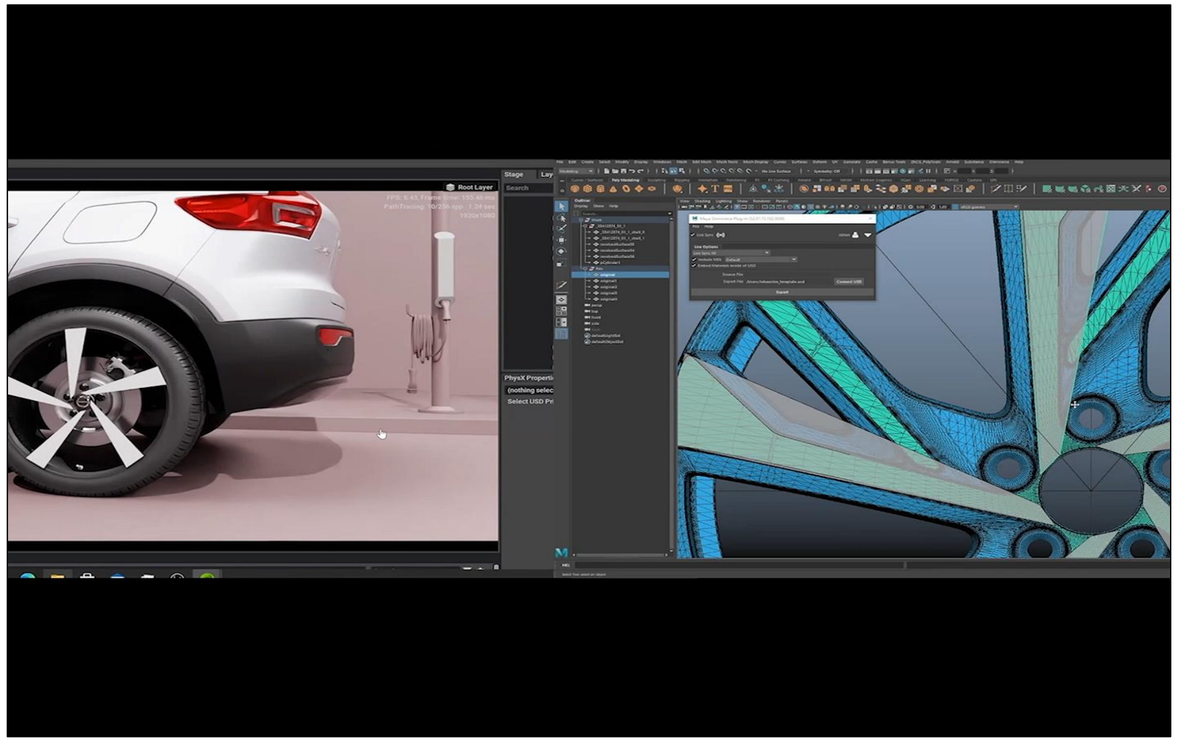




VOLVO

Use Case: Design and Styling

Building Unified Data Pipeline and Real-Time, Collaborative Workflows



CHALLENGES

- ✗ Access and tracking of latest geometry and files
- ✗ Departments lack context when designing individual components
- ✗ High res renders not accessible during design phase

OMNIVERSE VALUE

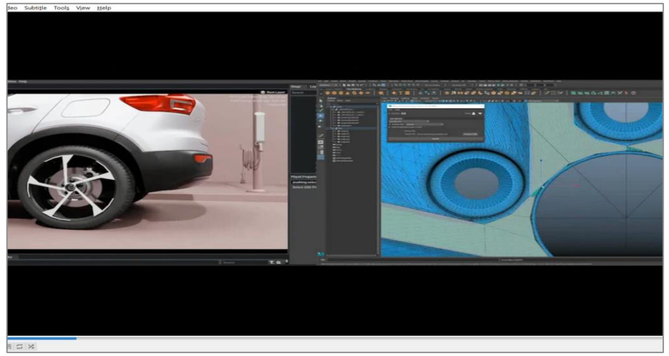
- ☑ Breaks data siloes
- ☑ Enables multi-stakeholder, real time collaboration
- ☑ Accelerates decision-making, review cycles
- ☑ Reduces data prep, export/import time
- ☑ Eliminates rework, lost and stale data

NVIDIA

VOLVO

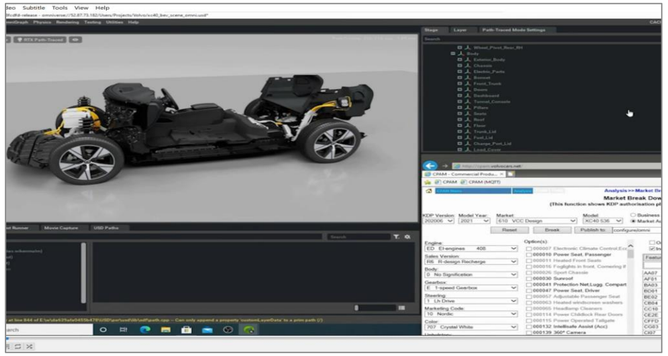
Use Case: Design and Styling

Key Omniverse Features Used



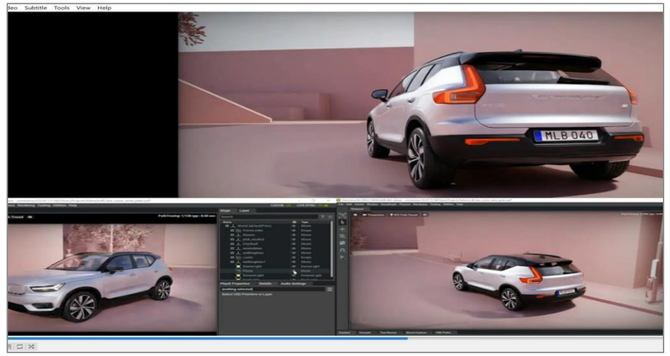
Visualize Design in Context

Break Down Design Data and Workflow Siloes



USD Workflow - Configure & Review Variants

Connect to Configurator and Business Logic



Multi-User, Live Collaborative Design Review

Accelerate Review Process, Increased Iterations

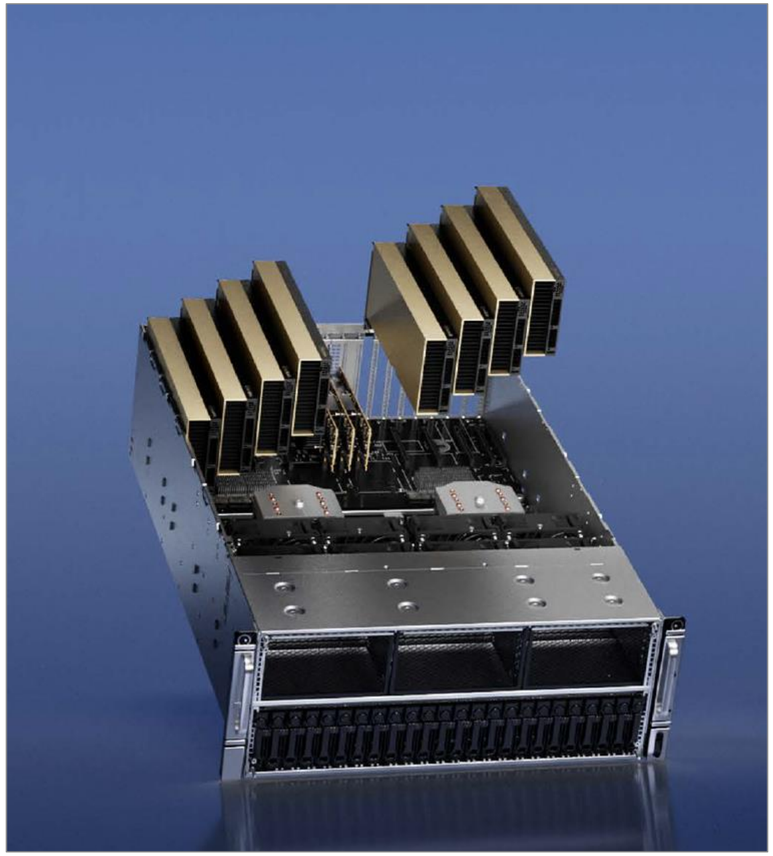
NVIDIA

Omniverse Runs on NVIDIA RTX

NVIDIA-Certified Systems Optimized for Omniverse Workloads

RTX WORKSTATIONS

Desktop: RTX 6000 Ada 1-4x GPU
Mobile: Up to RTX 5000 Ada Laptop GPU



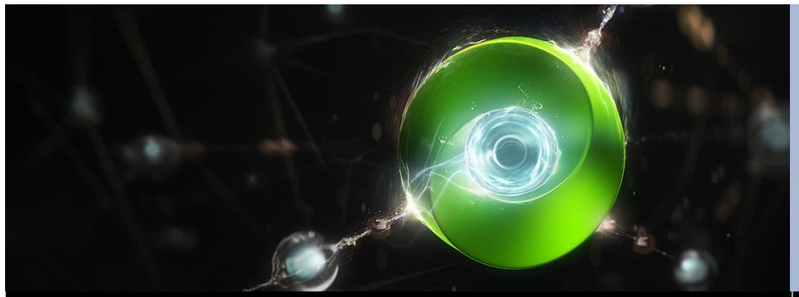
NVIDIA-Certified Servers

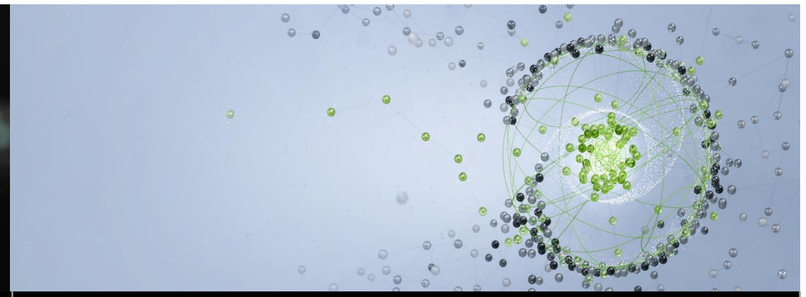
1-8X GPU
L40S / L40 / L4 / A40 / A10

NVIDIA OVX

High Performance, Scalable Reference Architecture
L40S / L40 + CX7 + BF3

Omniverse For Everyone





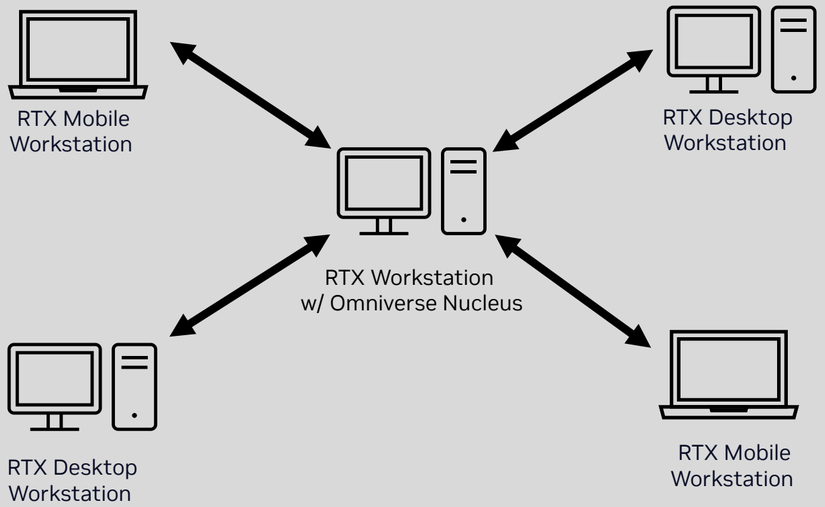
	OMNIVERSE FOR INDIVIDUALS	OMNIVERSE ENTERPRISE
COLLABORATION	Between multiple apps and one other user	Between multiple apps and licensed users *Maximum 8 concurrent editors per scene session*
LICENSING	Free for individuals	Subscription License, Annual and Multi-Year
SUPPORT	Public Forums, Training Videos & Community	Full Enterprise Support
NUCLEUS	Nucleus Workstation only	Enterprise Nucleus Server Nucleus Workstation
CONNECTORS	Use of all Connectors, including beta	Use of all production Connectors, beta at own risk
APPS	All Omniverse apps, including beta	Omniverse USD Composer (formerly Create) Omniverse USD Presenter (formerly View) **Use of custom Omniverse Kit-based apps require an Omniverse Enterprise license*

Easy Recipes for Omniverse Enterprise

Building Block Designs

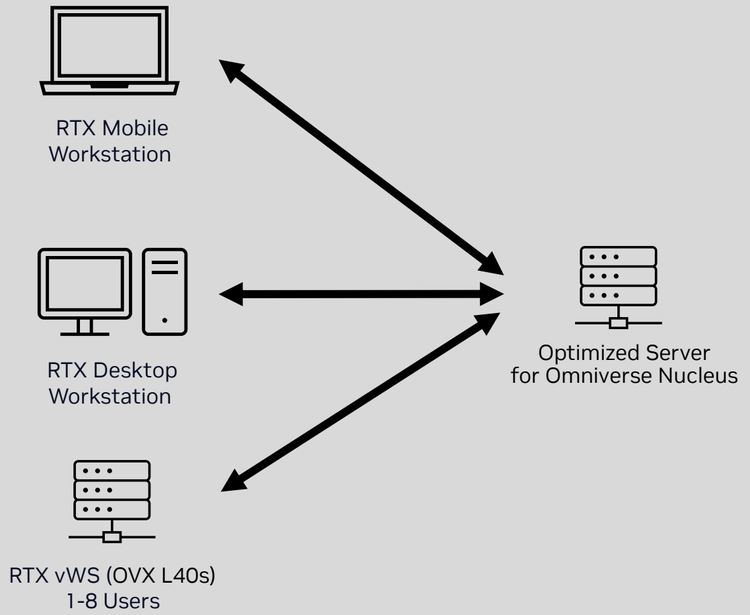
Small Workgroup

1 - 5 Users



Enterprise Workgroup

1 – 1000 Users



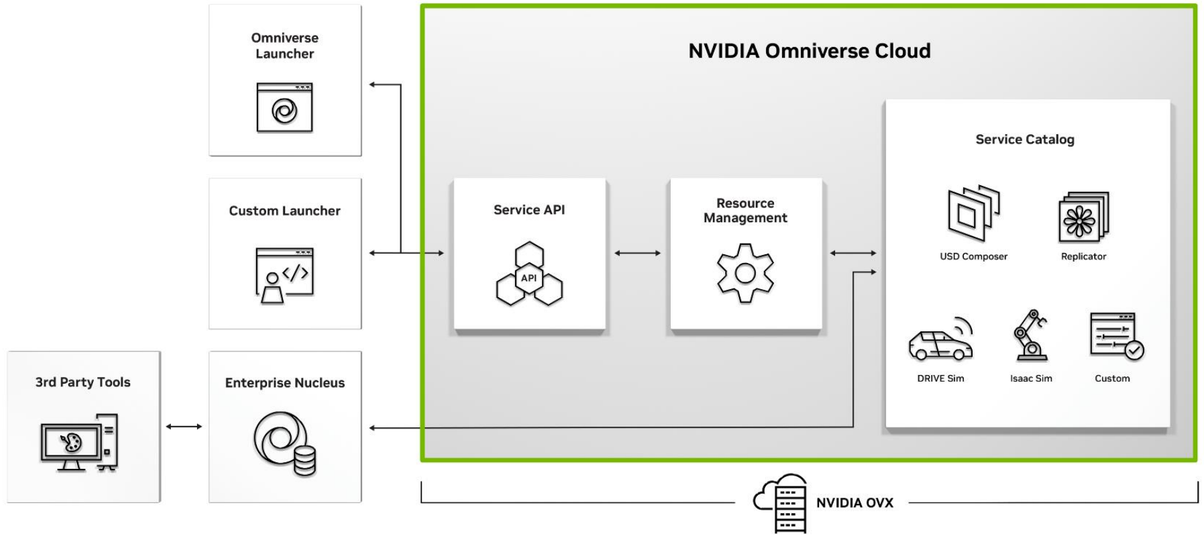
Recommended Configurations

NVIDIA-Certified Systems Optimized for Omniverse Workloads

Form Factor	Mobile Workstation	Desktop Workstation	Server for Nucleus	NVIDIA OVX 4-GPU	NVIDIA OVX 8-GPU
CPU	Intel Core i7-13700H or HX	Intel Xeon W5-3435X	Intel w/ 3.6GHz+ & 16+Cores	2x Intel SPR 32 Cores 2x AMD Genoa 32 Cores	2x Intel SPR 56 Cores 2x AMD Genoa 56 Cores
System Memory	32GB DDR5	256GB DDR5 ECC	96GB+ DDR5 ECC	512GB DDR5 ECC minimum 384GB DDR5 ECC minimum	1024GB DDR5 ECC minimum 768GB DDR5 ECC minimum
Boot Drive	512 M.2 NVMe SSD x1	1TB M.2 NVMe x1	512GB M.2 NVMe SSD x1	1TB M.2 NVMe x1	1TB M.2 NVMe x1
Data Drive	—	2-41TB M.2 NVMe SSD x2	1TB M.2 NVMe SSD x2	4TB M.2 NVMe x2	8TB M.2 NVMe x2
Networking	—	10G + CX6 DX Active	2x CX7 (2x200GB)	2x CX7 (2x200GB) + BF3	4x CX7 (2x200GB) + BF3
GPU	1x NVIDIA RTX 5000 Ada Mobile	Min 1x NVIDIA RTX 6000 Ada	—	4x NVIDIA L40S	8x NVIDIA L40S

NVIDIA Omniverse Cloud

Fastest path to end-to-end industrial digitalization, digital twin and metaverse applications



- Access Omniverse services via Omniverse Launcher in a web browser, or a custom integration
- Omniverse services deployed on NVIDIA OVX instances
- Power users work in 3rd party tools on RTX Workstations, publishing to Nucleus
- Customer sets up and manages Nucleus
- Available on Microsoft Azure

Bringing NVIDIA Omniverse to the Cloud

Purpose-built platform-as-a-service for industrial metaverse workflows

Instant, Secure Access

Single Source Solution

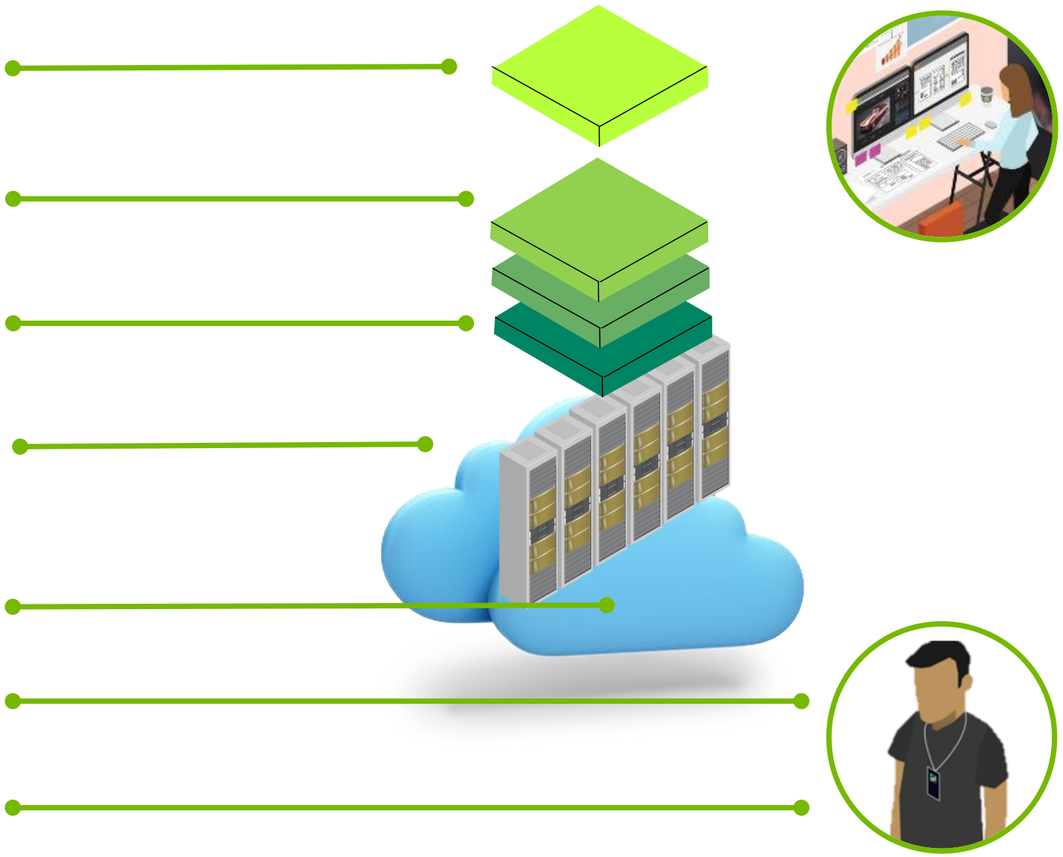
Interoperable & Extensible by Design

Expand with Ease

NVIDIA Omniverse Cloud

Enterprise Private Offer – Now Available

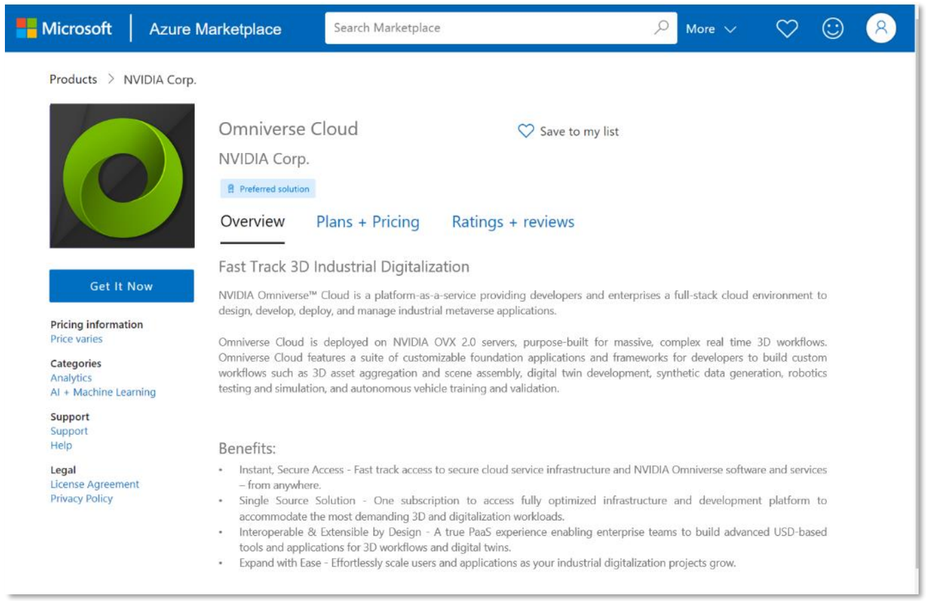
- ✓ **NVIDIA Omniverse Foundation Apps & APIs**
- ✓ **NVIDIA Omniverse Platform-as-a-Service**
- ✓ **NVIDIA Omniverse Nucleus** – customer chooses where to deploy, owns management
- ✓ **NVIDIA OVX Instance (on Azure)**
- ✓ **180 TB of Data Egress** per OVX node purchased
- ✓ **Production Onboarding** with a technical Omniverse deployment expert
- ✓ **Dedicated Support** 24x7 Business Critical Support, Technical Account Mgr.



Omniverse Cloud on Azure Marketplace

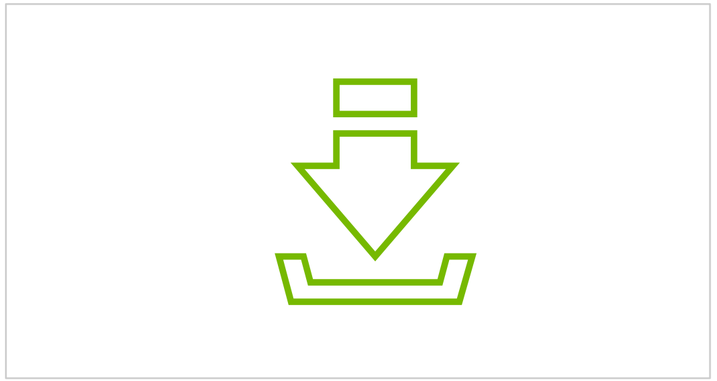
Customer Journey

Appears on Azure Mktplce → **Request Private Offer** → **Negotiate with NVIDIA** → **NVIDIA Creates & Sends Private Offer** → **Accepts Private Offer** → **Deploy from Mktplce**

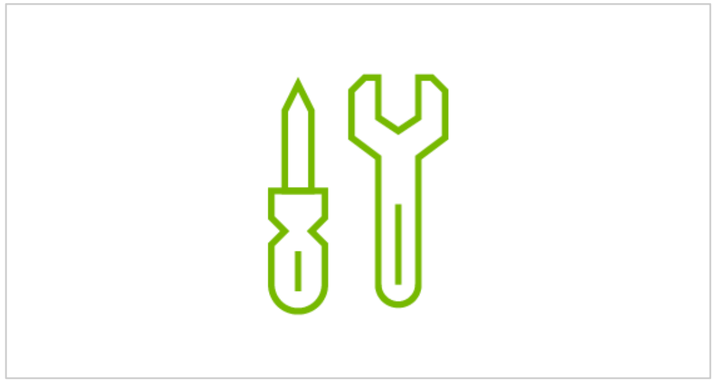


SEE YOU IN OMNIVERSE

EXPLORE OMNIVERSE ENTERPRISE



TRY OMNIVERSE NOW
nvidia.com/omniverse



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