Rockwell Automation

Simulating factories of the future with Hyper-Scale, Hyper-Reality Digital Twins

John Pritchard – Business Manager, Emulate3D

Greg Berger – Solution Consultant and (former) Platform Lead FactoryTalk® Design Hub™

expanding **human possibility**®

Presenters

John Pritchard, Business Manager for Emulate3D™
Joining Rockwell Automation, after 5 years working for a technology startup, John has worked across the USA and EMEA in a variety of technology innovation and business management roles. In 2019, John played a pivotal role in the acquisition of Emulate3D, a leading provider of manufacturing digital twin software. Following the acquisition, John assumed the role of Integration Lead and today serves as Business Manager based at the HQ in Reading, UK.

Greg Berger, Solution Consultant and (former) Platform Lead FactoryTalk® Design Hub™
With over 11 years of experience in industrial automation, Greg has a passion for design, simulation and emulation. He has a diverse background of industry knowledge with a focus on discrete automation. Over the years he has worked with end users, integrators, and equipment builders across automotive, EV, battery and semiconductor. Greg led the FactoryTalk® Design Hub™ team, creating a cloud platform for manufacturing design and recently returned to solution consultancy with a focus on the semi-conductor business.

Rockwell Automation

expanding **human possibility**®

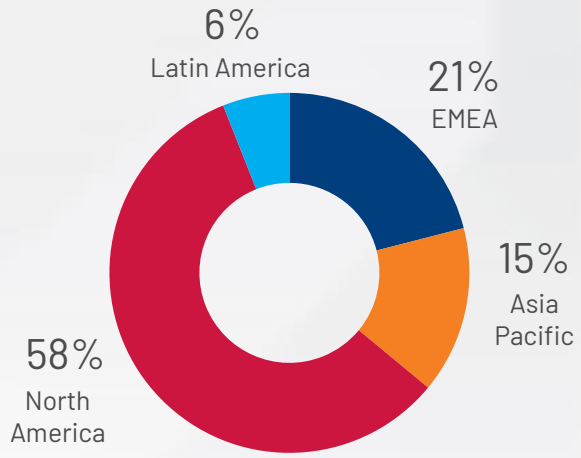
As the world's largest pure-play industrial automation and digital transformation company,

we are creating the future of industrial operations.

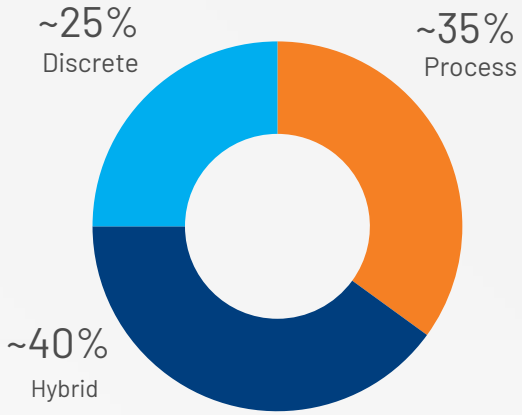
SERVING CUSTOMERS FOR 120 YEARS

AT A GLANCE

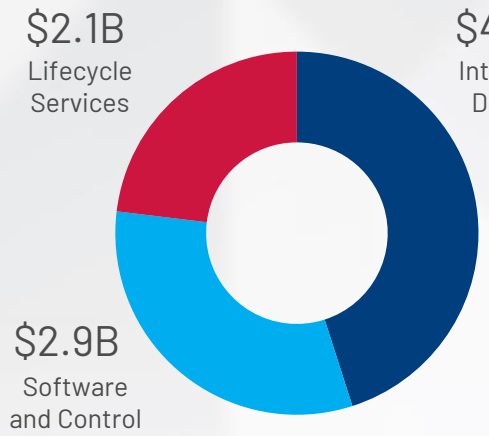
$9.1B 2023 sales



BY **REGION**



BY **INDUSTRY**



BY **SEGMENT**

GLOBAL

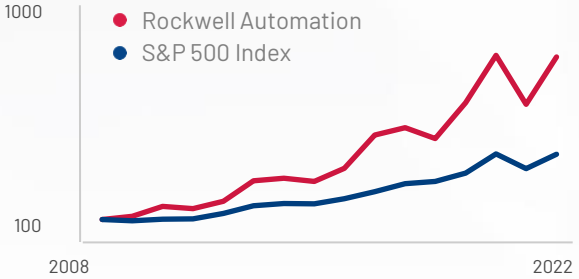
100+ Number of countries

29k Employees: more than half outside the U.S.

2023 WORLD'S MOST ETHICAL COMPANIES® ETHISPHERE 15-TIME HONOREE™ World's Most Ethical Companies

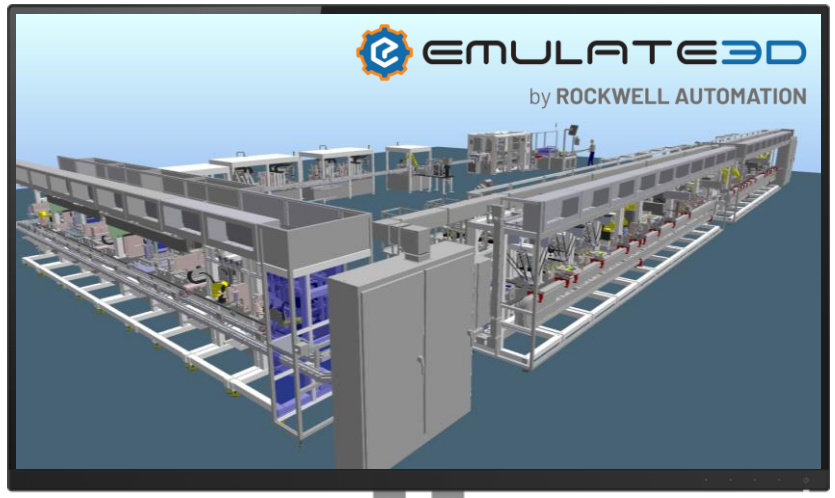
FAST COMPANY The 50 best places to work for innovators

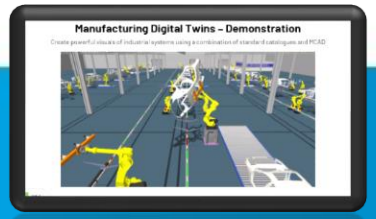
Total shareowner return



Rockwell Automation

Accelerate time to **value** in manufacturing with physics based digital twins

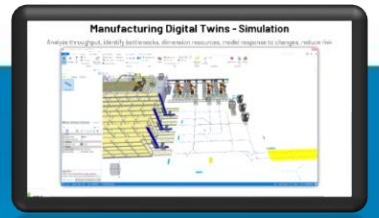




Demonstration

Create dynamic system models rapidly with supplied generic objects and imported CAD.

Generate impressive videos and even demonstrate operating systems within a Virtual Reality environment.



Simulation

Analyze system throughput, identify bottlenecks, dimension resources appropriately and understand the system response to operational changes.

Reduce the investment risk with repeatable experimentation.

Virtual Commissioning

Take controls testing off the critical path by connecting a dynamic model of the machine or system to real controls.

Verify the logical operation of the controls offline, before building the real system.

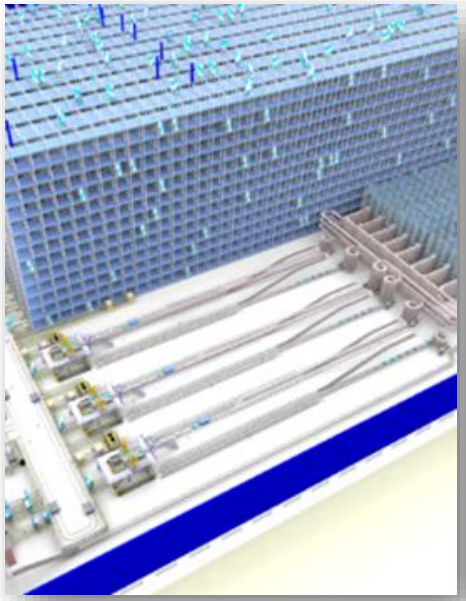
Manufacturing Digital Twins – Extended Reality

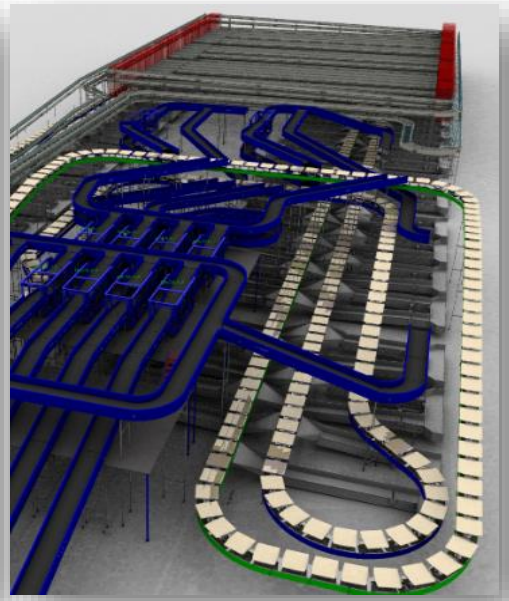
Gain a more immersive perspective at any point in the project with extended reality

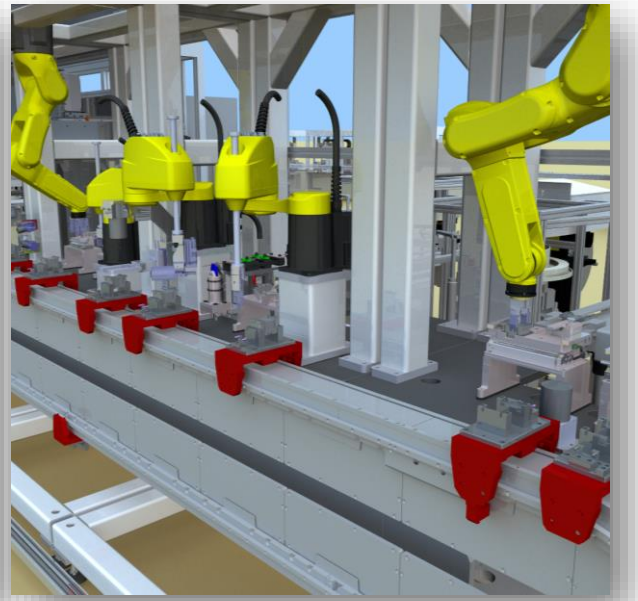
Primary Applications

Automated warehousing, fulfillment, distribution, material handling, baggage handling...

...to production lines, robot cells, complex machines and intelligent cart technology systems







Application Example – Republic National Distributing Company

Morgan Hill, CA distribution center ships 3M+ cases beer, wine, and spirits per year for Silicon Valley

Digital twin used daily to help place pickers, forecast departure times, balance ingress/egress loads, union breaks…

Challenges Building Digital Twins of Factories of the Future

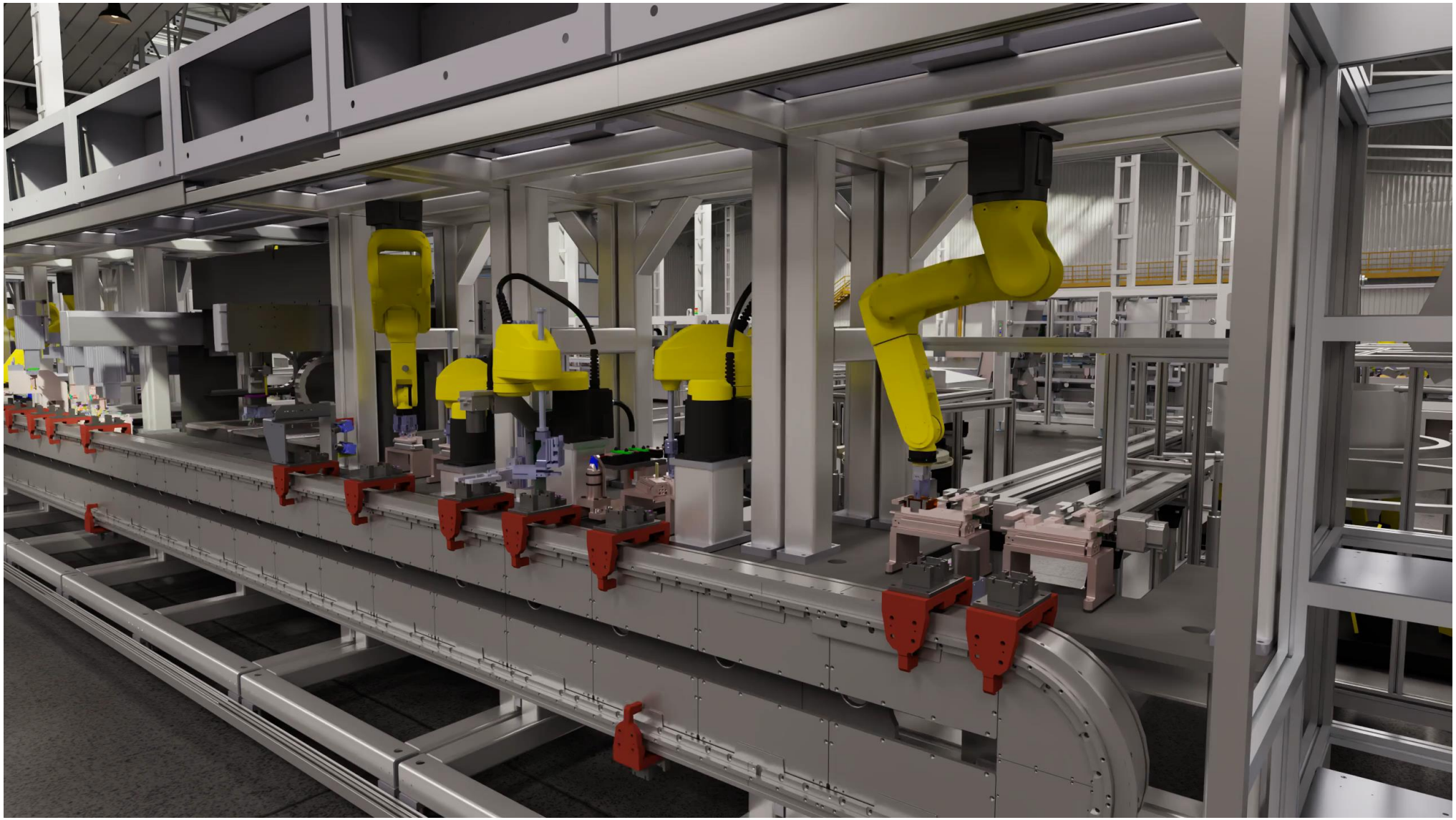
- Multiple stakeholders across geographies and time zones
- Multiple equipment suppliers each with their own design data
- Increased flexibility but also complexity (autonomous material handling)
- Need for models to run real-time to support controls testing but also create photo realistic visuals

- In 2022 identified NVIDIA Omniverse as a potential solution
- Ability to aggregate a visual of all design data into one place
- Supports all stakeholder collaboration
- Helps spot system integration issues in the digital world
- Allows multiple models to be run and merged

NVIDIA Omniverse – First PoC 2022

Aggregation of multiple simulation models with other 3D content

Omniverse Example – Discrete Manufacturing

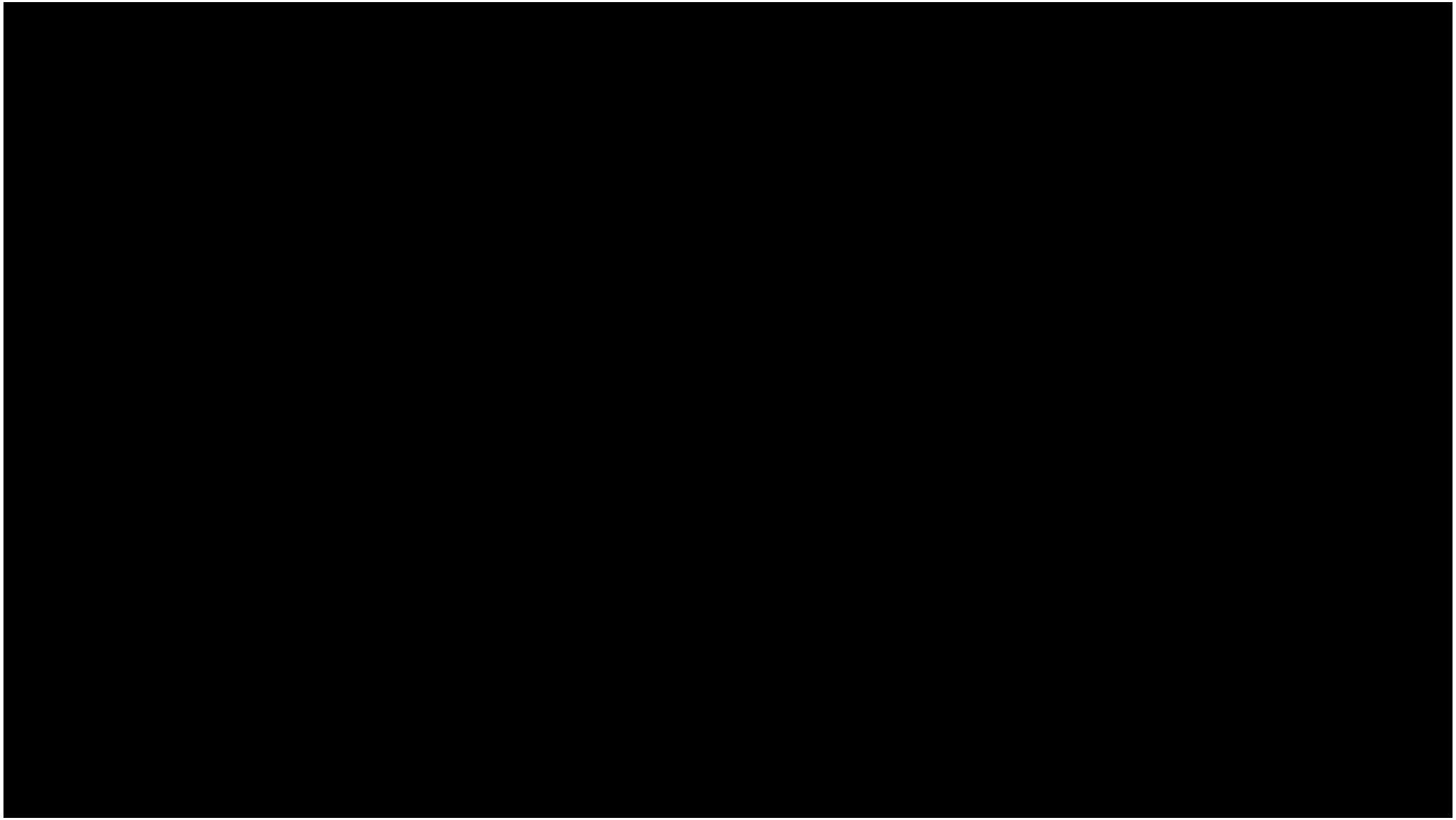


Omniverse Example – Discrete Manufacturing with AMR's

Omniverse Example – EV Battery Assembly Demo San Jose

Animation interface in Omniverse make last minute changes easy (camera, material, lighting)

Semiconductor Fab

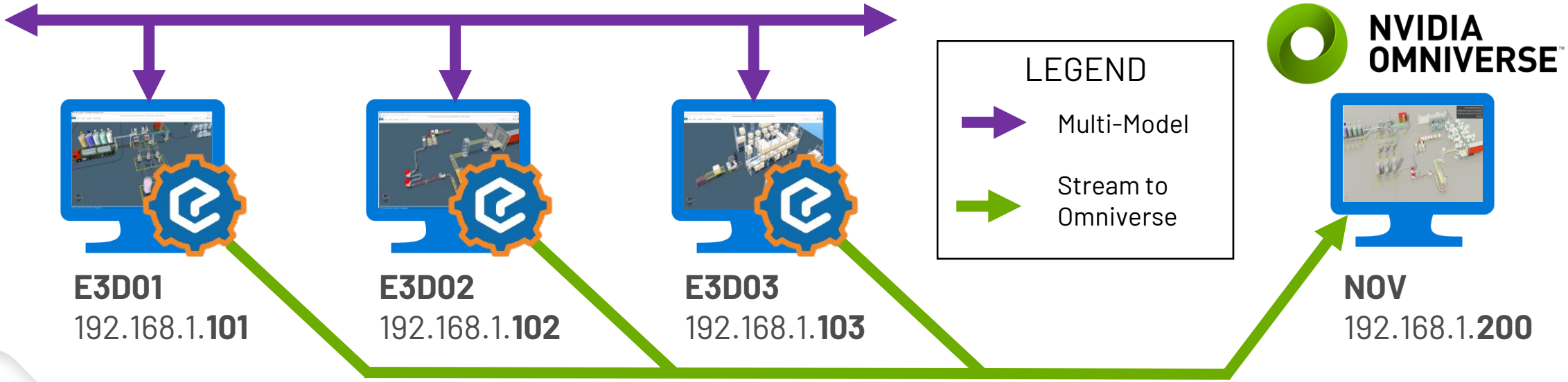


Omniverse Example – Semiconductor Fab

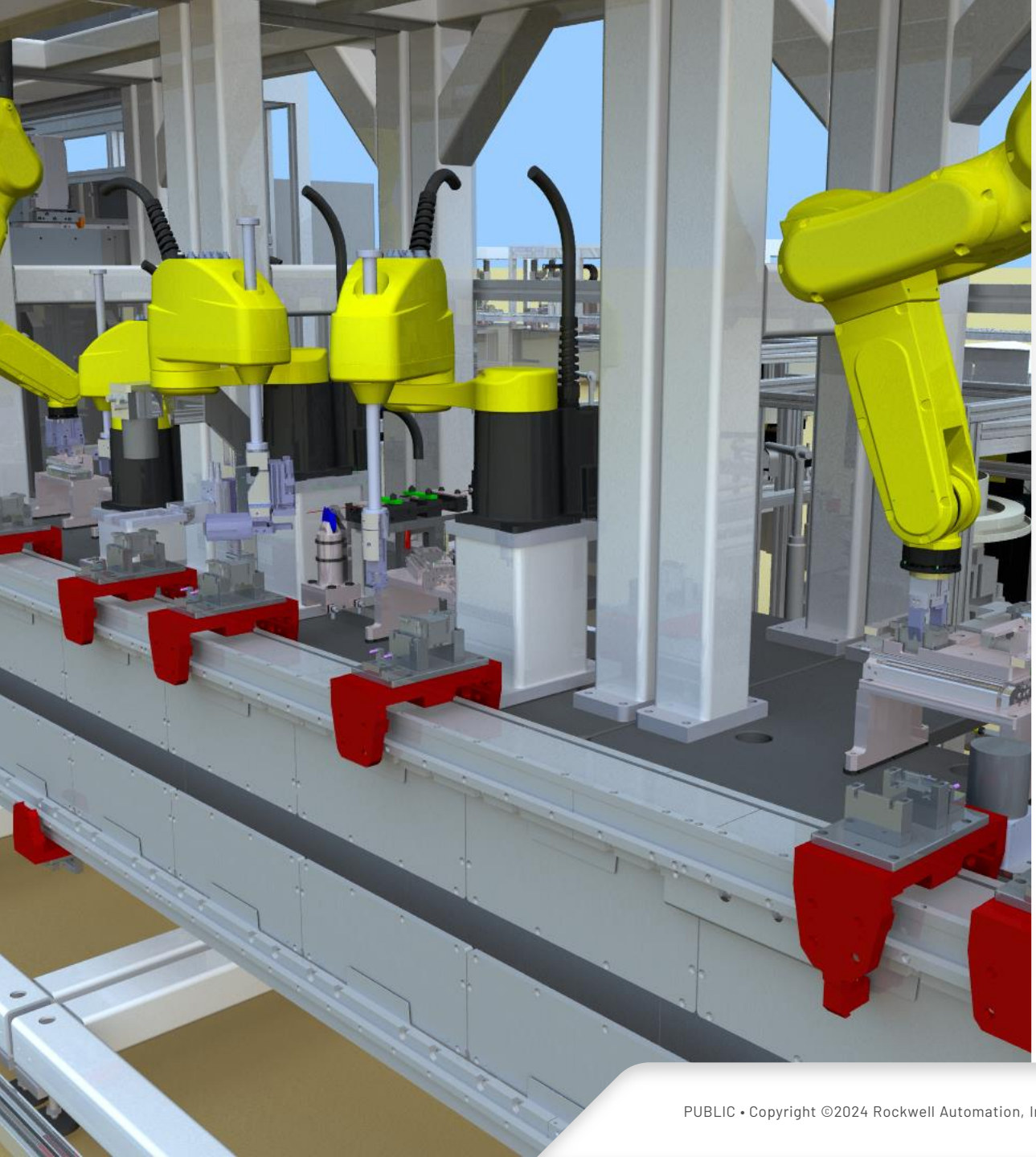
~3K moving carriages with routing logic required a modular copy/paste design

Deployment

- Traditionally on-prem with high GHz CPU and NVIDIA RTX GPU (Ada x2.5)
- More recently available AAS through FactoryTalk® Twin Studio™ (RTX GPU in cloud)
- Large projects use custom Azure deployment (e.g. recent factory model consisted of 12 Emulate3D models and over 100 FT Logix Echo instances)
- In addition to CPU and GPU performance, network is also key



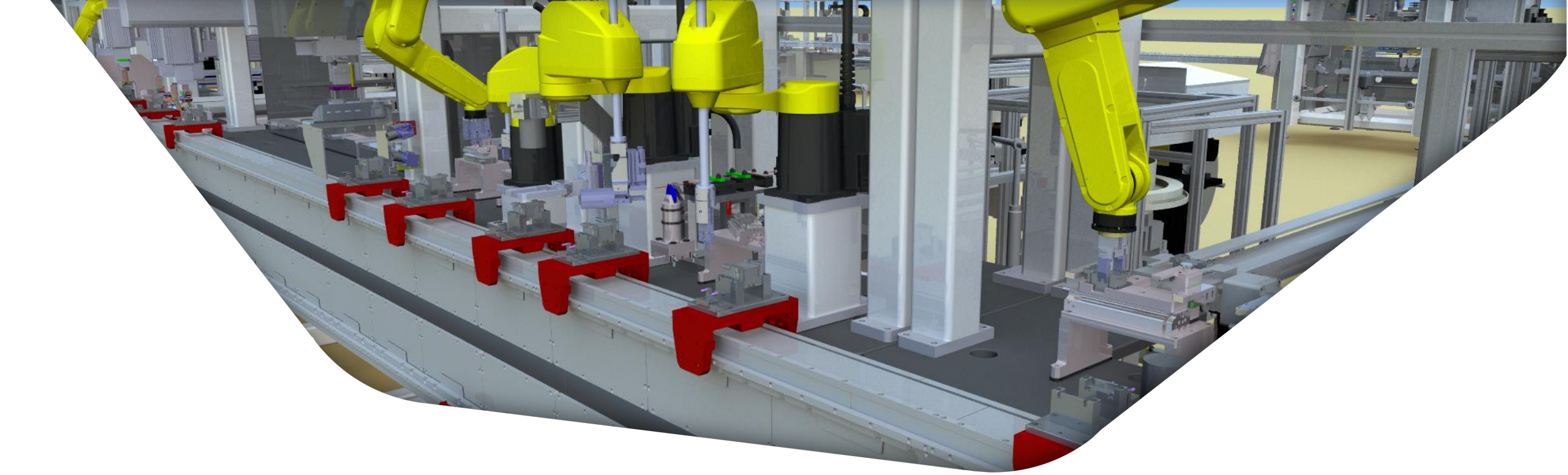
Hyper-scaling Architecture



Summary

- Rockwell Automation customers use Emulate3D to create physics based digital twins of their equipment and facilities
- Primarily used for demonstration, simulation and controls testing resulting in a faster time to value
- Scaling these models while maintaining real-time execution and visual quality had been a challenge
- NVIDIA Omniverse helps solve this by enabling a modular modelling approach and creating photorealistic renderings and animations
- Omniverse Cloud APIs will help deliver factories of the future with hyper-scale, hyper-reality digital twins

Questions?



Thank You

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EMULATE3D by ROCKWELL AUTOMATION