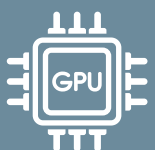
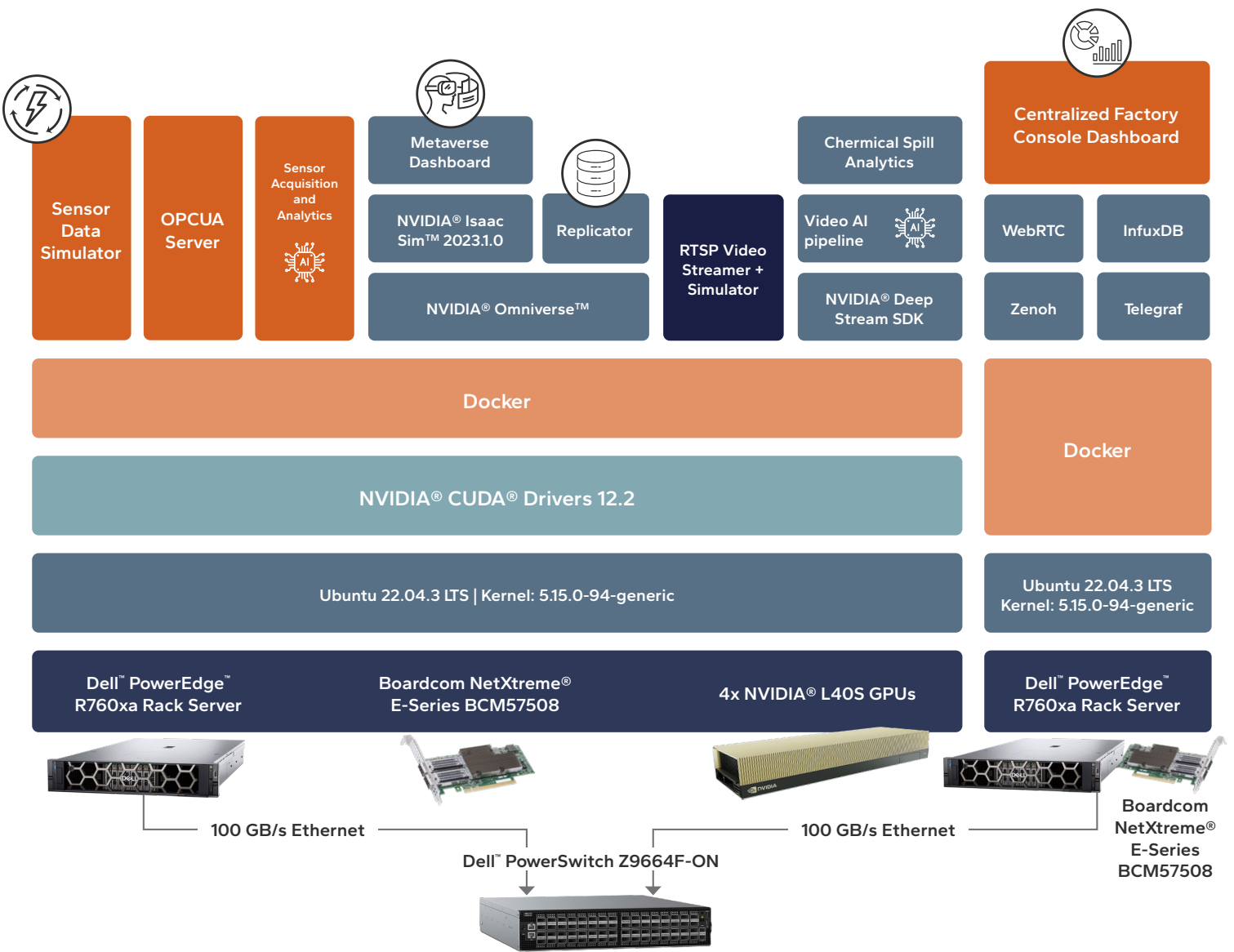


Industrial Metaverse AI Solution Overview

Leveraging Dell™ PowerEdge servers and Broadcom™ NetXtreme E Series Ethernet adapters, this Proof of Concept demonstrates an AI-powered solution for detecting hazards and enabling predictive maintenance in manufacturing environments. The PoC utilizes a digital twin factory floor built in NVIDIA™ Omniverse to quickly train and test an AI solution, which can later be deployed in a physical environment. The factory floor is monitored with Autonomous Mobile Robots (AMRs) which stream video data to an image detection AI pipeline trained to detect hazardous chemical spills. The solution additionally showcases predictive maintenance capabilities by detecting bearing faults in industrial compressors using sensor data and machine learning. This PoC specifically addresses challenges found in chemical manufacturing environments, however, the solution is designed as a reference for organizations that can be flexibly modified or extended to monitor various hazards and equipment failures across distinct manufacturing environments.



Powerful GPU-Dense Hardware

The PoC leverages Dell PowerEdge R760xa servers that feature a high GPU capacity to deploy the PoC's compute intensive AI, Metaverse, and video processing workloads. The servers utilize NVIDIA L40S GPUs to flexibly support both Metaverse graphics processing and AI inferencing requirements.



Metaverse Accelerated Development

By utilizing a digital twin factory environment, built with NVIDIA Omniverse, the PoC leverages Metaverse technology to quickly and accurately develop an AI solution. The digital twin is utilized both to create an AI training dataset as well as test the solution before deploying it in a live factory environment. This approach provides a safe, practical way to develop a solution involving hazardous conditions, while maintaining accuracy to a physical factory environment.



High Bandwidth Connectivity

The PoC features a scalable, modular design that connects Dell PowerEdge servers with high bandwidth Broadcom Ethernet. The design allows the AI pipeline to be scaled independently from the visualization service, providing flexibility for organizations to scale the solution as needed. The high bandwidth connectivity is crucial for providing alerts of equipment failures and hazardous events, enabling rapid response.



Standard Protocol Integration

The PoC's predictive maintenance capabilities leverage machine sensor data published over the standard OPC Unified Architecture (OPC UA) protocol. By utilizing OPC UA, this PoC demonstrates how manufacturing organizations can leverage machine generated data over standard protocols to gain valuable AI-powered insights.