NVIDIA RTX™ SERVER FOR BARE METAL COMPUTE WITH ALTAIR NANOFLUIDX™ 2019 DESIGN GUIDE

VERSION: 1.0

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Chapter 1.
SOLUTION OVERVIEW

Designed and tested through multi-vendor cooperation between NVIDIA and its system and ISV partners, NVIDIA RTX™ Server provides a trusted environment for Simulation Engineers/Analysts to run overnight simulations for the Manufacturing & Design, Architecture, Engineering & Construction industries.

1.1 NVIDIA RTX SERVER OVERVIEW

Introduction:
Product Designs are increasingly complex making design validation and verification difficult with engineering simulations. Simulation models for such designs tend to be big as they need to be accurate. This leads to cost-prohibitive, time-consuming simulations. To perform more simulations in less time and to try out many product design ideas, one needs a powerful computer hardware to increase the engineering productivity by accelerating the engineering simulation throughput. NVIDIA RTX Server is a validated solution that brings GPU-accelerated power and performance to deliver the most efficient end-to-end design simulation solution, from interactive sessions in the desktop to batch simulation in the data center.

Audience:
The audience for this document include, but not limited to: Sales Engineers, Field Consultants, Professional Services, Partner Engineers, IT Managers and Customers who wish to take advantage of an appliance that is built and optimized to deliver on simulation workflows.

Chapter 2.
SOLUTION DETAILS

NVIDIA RTX Server is a highly flexible reference design that combines NVIDIA Quadro RTX 6000 and 8000 GPUs with NVIDIA virtual GPU software and leading third-party applications to deliver exceptional compute power in a validated system.

NVIDIA RTX Server for Bare Metal Compute with Altair nanoFluidX™ 2019 on the ASUS ESC8000 G4 is a reference design comprised of (a) NVIDIA Quadro RTX 8000 or RTX 6000 graphics cards; (b) Altair nanoFluidX 2019 CFD solver software; and a (c) Qualified OEM server system. Combined, this validated solution provides unprecedented rendering and compute performance at a fraction of the cost, space, and power consumption of traditional CPU-based simulation nodes.

NVIDIA Quadro RTX 8000 and RTX 6000, powered by the NVIDIA Turing™ architecture and the NVIDIA RTX platform, brings the most significant advancement in computer graphics in over a decade to professional workflows. Not only can Designers and artists now wield the power of hardware-accelerated ray tracing, deep learning, and advanced shading to dramatically boost productivity and create amazing content faster than ever before, Simulation Engineers, and Fluid Dynamicists can also benefit from fast performance single precision GPU computing.

Altair nanoFluidX is a particle-based hydrodynamics (SPH) simulation tool to predict fluid flow around complex geometries under complicated motion. It can be used, for example, to simulate oiling within conventional high-performance or electric vehicle powertrain systems comprising rotating shafts or gears and analyze forces and torques on individual components of the system. In addition, sloshing can be predicted in tanks experiencing transient motions. Conceived and optimized for use on clusters of Graphical Processing Units (GPUs), the software is extremely fast. For such typical gear-train applications, without the need to simplify geometries, the code can run an order of magnitude faster than a Finite-Volume code. GPU computing provides a significant performance advantage and power savings with respect to their more cumbersome CPU counterparts. nanoFluidX is one of the pioneering commercial software packages written

with NVIDIA CUDA bringing significant speed to the overall product development process with NVIDIA GPUs.

RTX Servers, built by our OEM Partners, undergo NVIDIA's Qualification test suite. Among systems that qualify as an RTX Server there is a subset that has gone through additional testing and validation for Altair nanoFluidX workload. These RTX Server Validated systems capture best practices from NVIDIA and its ecosystem partners.

Configurations for the Validated RTX Servers are listed in the below segment.

2.1 VALIDATED SERVER CONFIGURATIONS

Table 1 outlines the servers utilized to complete the NVIDIA RTX Server validation process.

Table 1: Validated Server Configurations

Server Model	Graphics	Configuration
ASUS ESC8000 G4	8x Quadro RTX 8000 or RTX 6000 4x Quadro RTX NVLink HB bridge 2-slot Quadro Driver Release 430 U2 (440.36)	• Dual Intel® Xeon® Gold 6248 processor: 2.5-3.9GHz; 20 Cores, 40 Threads • 384 GB ECC DDR4 memory • 1TB M.2 PCIe NVMe SSD • Ubuntu 18.04 LTS

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