# DELIVERING EXCEPTIONAL DENTAL TRAINING WITH VIRTUALIZATION



Image courtesy of University of Colorado School of Dental Medicine

**NVIDIA**

# UNIVERSITY OF COLORADO SCHOOL OF DENTAL MEDICINE DELIVERS THE NEXT LEVEL OF INSTRUCTIONAL EXCELLENCE



Image courtesy of University of Colorado School of Dental Medicine

## SUMMARY

> The School of Dental Medicine needed to provide graphics-rich virtual workstations to enable students and staff to access dental applications.

> Moving to VDI enabled the school to deploy and manage the solution much more efficiently than individual physical workstations.

> Sophisticated visualizations needed for dental instruction could not be virtualized without GPUs, so the IT team deployed NVIDIA T4 powered by NVIDIA Quadro vDWS.

> The virtualized environment also enabled the school to continue remote instruction during a pandemic.

### INTRODUCTION

The University of Colorado School of Dental Medicine is nationally-recognized for the quality of its educational programs, its interdisciplinary research and its excellent clinical care programs that contribute to the health and well being of many of Colorado's most underserved citizens.

Situated in the heart of the Rocky Mountain West, the School of Dental Medicine is located on the growing University of Colorado Anschutz Medical Campus in Aurora, CO.

The School of Dental Medicine educates more than 400 students and provides nearly 100,000 clinical visits both on the Anschutz Medical Campus and across the state of Colorado.

### CHALLENGE STATEMENT

The School of Dental Medicine seeks to continuously improve the quality of its instruction and student experience through the use of technology. During the COVID-19 pandemic, it became essential to enable remote teaching and learning.

The University of Colorado School of Dental Medicine uses technology as much as possible to enable impactful learning and teaching for students and faculty. Some time ago, the school implemented a virtual desktop infrastructure (VDI) on Dell Technologies solutions powered by NVIDIA virtual GPU (vGPU) technology to give students and instructors access to the school's digital resources.

When the school needed to plan a VDI hardware refresh that would also improve user access to software applications and improve system performance,they chose Dell and NVIDIA.

## CUSTOMER PROFILE

**School of Dental Medicine**
UNIVERSITY OF COLORADO
**ANSCHUTZ MEDICAL CAMPUS**

**Organization:**
University of Colorado

**Industry:**
Higher Education

**Location:**
Colorado, United States

**Website:**
dental.cuanschutz.edu

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## SOFTWARE

**Hypervisor:** VMware ESXi

**Software Client:** Citrix Virtual Applications

**Graphics Acceleration:** NVIDIA Quadro vDWS

## HARDWARE

**GPU:** NVIDIA T4

**Server:** Dell PowerEdge R740

**Client:** Wyse zero client

## REASONS FOR NVIDIA

> Allows a seamless transition to remote-class delivery and learning during the pandemic

> Performs software updates in two hours versus 160 hours

> Enables high-quality dental training with an outstanding user experience

> Supports innovation that attracts more students and faculty

> Simplifies IT infrastructure and application management

## UPDATING AN INSTRUCTIONAL VDI ENVIRONMENT

For the refresh, the School of Dental Medicine acquired Dell EMC PowerEdge R740 servers to replace older PowerEdge hardware in an easy upgrade. For each server, the school deployed three NVIDIA T4 Tensor Core GPUs. These powered the sophisticated visualizations needed in dental instruction, which run on applications that cannot be virtualized without GPUs. The school also purchased 650 licenses of NVIDIA Quadro Virtual Data Center Workstation (Quadro vDWS) software to virtualize the NVIDIA GPUs and share them across multiple virtual machines.

Technology managers set up two resource sites for the virtualized environment, both running on NVIDIA Quadro vDWS software:

> An application site (2 GB profile size) for all remote users and clinical chairs at the school requiring access to axiUm, the dental and electronic health record software; the Dolphin orthodontics program; and MiPAX radiology software

> A desktop site (3 GB profile size) for faculty and administrators using business and instructional applications, with Wyse zero clients for part-time faculty

Today, the VDI supports close to 900 users, about 500 of whom are students and the remainder comprise faculty and administrators. IT manages the entire environment—except the axiUm database—on VMware ESXi software.
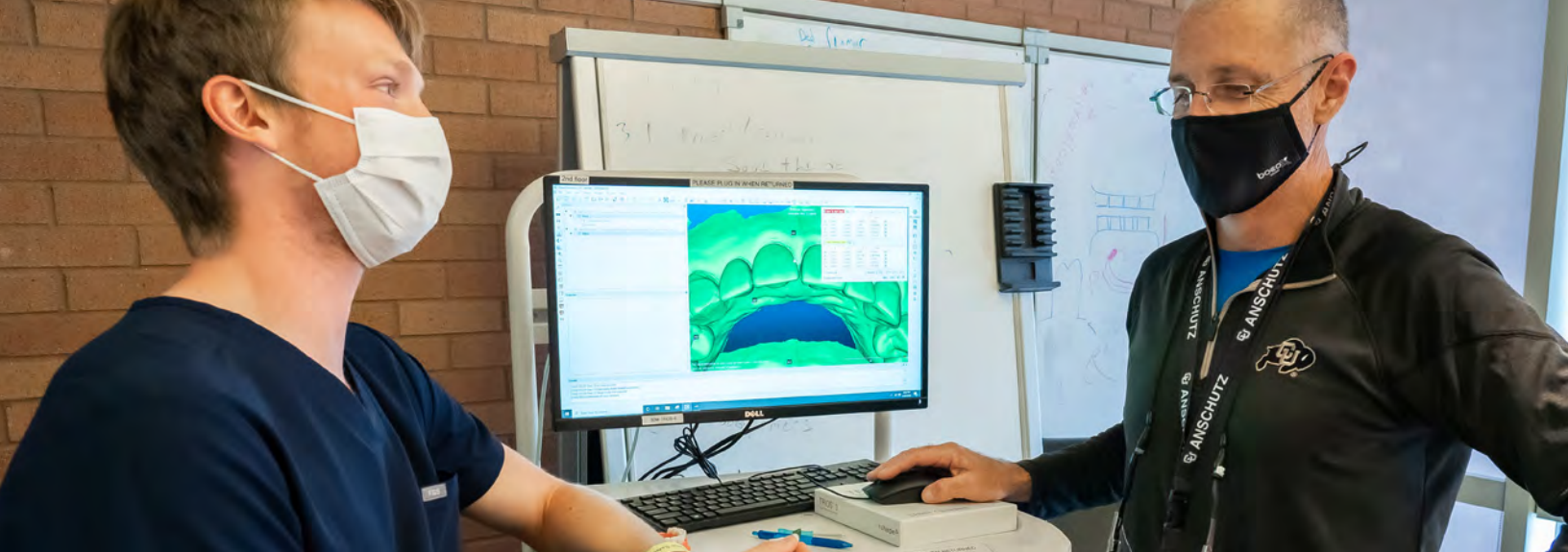
Image courtesy of University of Colorado School of Dental Medicine

"Dell Technologies and NVIDIA have long been our strategic partners. Their solutions met our needs for the next five years."

"Once we deployed VDI with NVIDIA vGPUs, the user experience improved significantly. The greatest change was excellent system performance and responsiveness."

Ernesto Jamison,
Infrastructure Engineer, University of Colorado School of Dental Medicine

### SIMPLIFYING AND REFOCUSING IT

Deployment by the dental school's IT team was easy and efficient, and so are software updates. "IT no longer has to touch all the computers at clinic chairs and in users' hands to perform software updates, which required eight people working 10 hours a day on both weekend days," Jamison says. "Instead, a team member spends a couple of hours updating servers and spot-checking devices and peripherals." Without that large manual effort, IT can deploy more updates faster to enhance learning and teaching and spend more time on tasks like infrastructure optimization.

### DRAMATIC USER-EXPERIENCE IMPROVEMENTS

Students and instructors shifted smoothly from physical, nonvirtualized technology and the first-generation VDI into the re-created digital landscape. Jamison explains, "Once we deployed VDI with NVIDIA vGPUs, the user experience improved significantly. The Quadro vDWS-powered virtual workstations also allow us to avoid disruptive reboots when our server isn't processing license updates accurately."

### PANDEMIC-PROOF EDUCATIONAL TECHNOLOGY

The VDI didn't require any adjustments during the pandemic. IT helped instructors and students adapt to all-virtual teaching and learning instead of the mix of hands-on and digital dental training they were used to. Jamison comments, "Our VDI enabled readiness for completely remote teaching and learning during COVID-19. We experienced no interruptions at all."

"Our VDI enabled readiness for completely remote teaching and learning during COVID-19."

"With support from Dell Technologies and NVIDIA, we are ahead of many other schools in using virtualization."

Ernesto Jamison,
Infrastructure Engineer,
University of Colorado
School of Dental
Medicine

## POWERFUL SUPPORT FROM TECHNOLOGY PARTNERS

The partnership with Dell Technologies and NVIDIA has been a powerful asset for the School of Dental Medicine. They've helped the school augment the remote-learning technology, for instance, by adding intraoral cameras. Such enhancements are critical for attracting gifted students and high-caliber faculty.

To learn more about NVIDIA virtual GPU solutions, visit: **www.NVIDIA.com/virtualGPU**