



CNN ELECTION NIGHT COVERAGE WINS BY A LANDSLIDE WITH NVIDIA® QUADRO®

CNN
CASE STUDY

Always looking for an edge in the intensely competitive TV news industry, broadcast networks pull out all the stops for their election-night coverage. They know that more people turn to TV news on election nights than usual, so they amp up their voting-related programming to entice and impress viewers. Using attention-grabbing 3D graphics to educate voters with the information they need to follow the major races and their implications, networks hope to convert interested people into regular viewers of network programming all year long.

For the 2010 U.S. elections, CNN hired independent producer Jason W. Odell to manage the creation of an ambitious NVIDIA Quadro-fueled 3D virtual set. Called the CNN Election Matrix, this live environment presented election results and other political data in an extremely compelling 3D format. Odell is no stranger to CNN or to groundbreaking digital television production. In 2008, he led the CNN election team responsible for the network's impressive Data Wall and the first live 3D hologram ever broadcast, which effectively made a remote person look dimensionally accurate and as if they were live in the studio.

The CNN Election Matrix, based on NVIDIA Quadro-powered 3D graphics workstations and Vizrt software, enabled the network's anchors to interact easily with statistical and

polling data. The display of the data being controlled by John King using touch screens and Ali Velshi using a tablet helped viewers to stay up-to-date on the most competitive Senate and House races.

As CNN Senior VP and Washington Bureau Chief David Bohrman said in an interview published by TV Newser just prior to the 2010 elections: "We are taking capabilities of the Data Wall and quadrupling it in order to report the story in the clearest way we can. Viewers are ready for a rich meal of election items, and with CNN's technology on-air and online, paired with the 'Best Political Team,' we will serve an unparalleled election-night experience."

Creating the CNN Election Matrix

To create the CNN Election Matrix environment, Odell and his team needed to retrofit CNN's existing 5,000 square foot Studio 51 in New York, replacing traditional sets and lighting with new camera tracking systems.

"Camera tracking technology was the base of the new environment, because once you can track your cameras well, you can do lots of interesting things," says Odell. "Retrofitting the CNN stage to do the tracking was difficult, and we settled on using Motion Analysis motion capture technology for camera tracking because it could cover the biggest footprint and was the easiest way to retrofit existing equipment."

CNN Studio 51 was retrofitted with 48 measurement cameras that transformed it into a virtual stage. A 10' x 20' green screen was erected in the studio, and two Perceptive Pixel multitouch plasma touchscreens were mounted vertically within the wall. Vizrt, CNN's long-time graphics technology partner, provided the graphics engine for the CNN Election Matrix, and powering it all were the NVIDIA Quadro Digital Video Pipeline and Quadro GPUs. The system enabled polling data to be displayed as colored blocks appearing to rise out of the floor.



Image courtesy of Jason Odell

We couldn't have created the CNN Election Matrix solution without NVIDIA Quadro technology. No one else has the pipeline that brings it all together.



is the only platform to deliver up to four HD-SDI video inputs and HD-SDI video output from each GPU while keeping the processing power fully available for processing graphics. Because the Digital Video Pipeline can pull graphics directly off the video card and send it out as an SDI signal, without having to go via the PC's internal bus, the Pipeline saves an entire step in the process.

"We couldn't have created the CNN Election Matrix solution without NVIDIA Quadro technology. No one else has the pipeline that brings it all together," says Odell.

CNN also counted on NVIDIA's reliability to make everything work. The team was finalizing the dynamic CNN Election Matrix environment until just before air time, so they had to trust that the NVIDIA technology would work without fail – which it did. The live production was flawless.

"The Quadro Digital Video Pipeline is crucial for two reasons," says Gerhard Lang, Chief Engineering Officer of Vizrt. "The first is for its low latency, which is important so that camera operators viewing composited graphics don't look at images that are lagging the live action – which is enormously confusing."

"Even more important, though, is the amount of time available for pure rendering when using the system," Lang continues.

"The Quadro Digital Video Pipeline uses only 2.3 milliseconds per field for the whole video transfer process, from video in to video out. Even with nine rendering passes by Vizrt to make these effects happen within the 16.7 milliseconds of processing time per frame available for 60 Hz format, that still allows greater time to render more complex graphics and apply additional effects, making the final graphics more realistic. In the end, NVIDIA Quadro technology and the increased performance available to designers, results in enhanced creative."

On election night 2010, the CNN Election Matrix had six tracked cameras in the studio. Video from these cameras fed into the Vizrt system powered by NVIDIA Quadro hardware, and Motion Analysis camera tracking data was pulled into VizIO software. All this telemetry data fed into six VizEngines (one engine per camera), which controlled every aspect of the cameras' operation: lens, focal length, zoom, position in the studio, orientation in the studio, etc.

The Quadro-powered VizEngines rendered each scene from the correct perspective. A Vizrt Chromakeyer, taking advantage of the NVIDIA Shader feature, keyed the graphics over the green wall containing the touchscreens, while linear keying was used for the foreground elements.

Putting it together in real time

"The biggest issue was making this complicated environment work in real time," says Odell. "To see both the exit polling graphics in the middle of the room and the touchscreen wall in the background, live and simultaneously, required a lot of polygons. Luckily, the Quadro Digital Video Pipeline solved that problem for us."

The Quadro Digital Video Pipeline is the industry's only GPU-accelerated solution for real-time acquisition, processing, and delivery of high-resolution video across both standard and 3D video broadcast environments. In addition, it



Images courtesy of Jason Odell

To learn more about NVIDIA Quadro, go to www.nvidia.com/quadro

© 2011 NVIDIA Corporation. All rights reserved. NVIDIA, the NVIDIA logo, and NVIDIA Quadro are trademarks and/or registered trademarks of NVIDIA Corporation. All company and product names are trademarks or registered trademarks of the respective owners with which they are associated. Features, pricing, availability, and specifications are all subject to change without notice.

