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Case Study: Animation Studio Unlocks VDI Performance and Efficiency with Liqid

Liqid's Composable GPUs Propel Squeeze Animation Studios Artists to New Heights

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About Squeeze

Squeeze is an animation studio located in Quebec and Montreal, Canada with an international reputation. Co-founded by Denis Doré and Patrick Beaulieu and supported by a creative team of more than 220 artists and technical expert, Squeeze provides a range of services including animation, character and environment design, motion capture and story development with flexible rendering pipelines.

By embracing innovative hardware, software and processes, Squeeze enables their top artistic talent to deliver outstanding results for every unique project. Consistent quality results have made them a go-to studio for some of the world's elite entertainment industry companies such as Disney, Marvel, Universal, Illumination, Supercell, Warner and Ubisoft.

Squeeze is a subsidiary of Cinesite, an independent, multinational visual effects and animation studio headquartered in London, England.

Challenges

As with any Media & Entertainment (M&E) company, Graphics Processing Units (GPUs) are a crucial tool for both the daily work of Squeeze's artists as well as the ongoing processing and rendering of their output. GPUs are used in both the multi-display artist workstations and server-based simulations and rendering.

GPUs are currently the most expensive component in the datacenter as well as the most difficult components to host, with specialized servers required for adequate space, power and cooling for even modest numbers of cards. At the same time, there are resource balance issues in traditional server architectures that make it difficult to keep those expensive GPUs busy to maximize that investment.

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Before going down the path with monolithic GPU servers, Squeeze was looking for a more flexible solution to simplify the hosting, management and redeployment of resources and allow the use of standard, readily available server and GPU options. Transitioning from traditional physical workstations to End User Computing (EUC) and Virtual Desktop Infrastructure (VDI) solutions for high-end users such as artists can be a particularly painful problem to solve, but a necessary step for Squeeze to level up their capabilities, plus ensure security and controls around their clients' proprietary data.

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>
> TEDDY WONG, SQUEEZE CTO

Solution

Engaging with their infrastructure provider and Liqid partner Quadbridge, Squeeze's CTO Teddy Wong and team explored a Liqid Matrix Composable Disaggregated Infrastructure (CDI) solution. Their goal was to build a space-optimized dynamic GPU On-Demand platform to consolidate all physical artist workstations to central Accelerated VDI services, with the flexibility to redeploy GPU resources back and forth between VDI and dedicated simulation and rendering services.

For the initial Proof of Concept work targeting 10 Accelerated VDI artists, a Liqid SmartStack 10 was deployed containing a pair of NVIDIA A40 GPUs along with a pair of Dell R750 servers, each containing a Liqid LQD4500 "Honey Badger" IO Accelerator (IOA) card. The Liqid SmartStack 10 consists of a 4U Liqid EX-4410 10-slot enclosure and a 1U Liqid Director, allowing up to four hosts to dynamically compose up to 10 GPUs in any combination or quantity.

The entire solution consumes 9U of rack space and will scale far beyond the initial 10 artists when fully populated with devices and attached hosts. Looking to future server refreshes with 192+ cores in 1U or less, Liqid Matrix allows Squeeze to maintain the CPU-RAM-GPU-VRAM balance required for dense accelerated VDI hosting. Traditional servers cannot host enough GPUs to achieve this balance, forcing users to rely on overall lower density components and infrastructure to minimize stranded resources. Over time, Liqid customers like Squeeze can expect

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significant TCO savings in servers, space, power, cooling, Ethernet/Infiniband ports, licensing and other supporting infrastructure.

Liqid SmartStacks allow the transition to a flexible component-based purchasing and support model as compared to traditional monolithic server building blocks. This affords Squeeze the flexibility to add new GPUs of varying vendors, models/specifications, and quantities to accommodate emerging project needs, without needing to buy whole new servers full of CPUs, RAM, and identical GPU types. Similarly, when individual components fail, the impact is minimal and quickly recoverable when compared to the relative emergency of a whole GPU server being offline.

In attempting to meet or exceed the graphics performance their artists were used to from their physical workstations with NVIDIA consumer GPUs, Squeeze turned to NVIDIA Enterprise GPUs and their virtual GPU (vGPU) solution for consolidation and control. As this was the first time Squeeze deployed vGPU and fully virtualized workstations, so they decided to try both VMWare and KVM hypervisors to learn which was a better fit for their environment.

Liqid engineers assembled the SmartStack and configured the fabric for the Single Root IO Virtualization (SR-IOV) needed to create vGPU instances. Squeeze and Liqid worked together to build and validate both VMware ESXi and KVM and the associated vGPU management and licensing tools, then demonstrated a successful vGPU-accelerated client connection.

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Squeeze then set to work adapting their standard workstation imaging and project pipelines to the new virtual infrastructure and deployed new Linux VMs for 10 test artists on the Liqid “Honey Badger” NVMe IO Accelerator cards installed in each server, using A40-8Q (8GB VRAM) vGPU profiles to stack five artists on each server.

The artists then performed their normal project work with Autodesk's Maya, using their familiar endpoint displays and peripherals on the remote VM.

Results

"The Liqid Matrix SmartStack and IO Accelerator cards both performed as expected and response from the test artists was positive," said Teddy Wong, Squeeze CTO. "The artists all agree it's the same or faster than their physical workstations. The Liqid piece was smooth; most of the effort was understanding and implementing the new vGPU components and quickly adapting our pipeline for the new artist environment due to the specific vGPU driver used."

> **"It's been a pleasure working with Liqid on this project. In addition to the excellent product, the support we got from the whole Liqid team stands out from our other vendors. We look forward to a great partnership as we grow together, and Quadbridge gets kudos for making a complex deal easy on us."**
>
> JOE SANGINARIO, FOUNDER OF THE [RE]DESIGN GROUP

Artists were able to work in their native 4K 60Hz resolutions and delivered frame rates, including multiple displays. Applications and screen updates remained stable and responsive throughout entire work sessions.

Squeeze tried and proved the vGPU solution on Liqid with both VMware and KVM, though chose to focus more on VMware for the POC and initial production for ease of use and familiarity. Some in-house tooling for KVM with vGPUs was started and will continue to be explored for future projects. Using the reporting features built into vSphere and extrapolating sizing, final server configurations for the target number of production artists were derived.

Liqid IO Accelerator cards were tested in both passthrough and paravirtual modes as the underlying storage for the VMs, with some artists reporting notably superior disk IO. "These cards are very interesting. We're trying to decide how best to use them going forward, both in the servers alongside network storage as well as in the SmartStack" said Wong, referring to the ability to compose up to eight separate NVMe devices from each IOA card to any host in the Liqid fabric.

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Squeeze ultimately decided to move forward with Liqid, using the initial SmartStack 10 with a total of ten NVIDIA A40s and memory upgrades to the servers to accommodate a potential total of 50 artists. There is additional expansion room on this stack for future hosts, plus expanding to a SmartStack 20 and adding a second SmartStack 20 is being considered for additional capacity for the larger stable of Squeeze's artists, rendering jobs, and business continuity. The unique telemetry available from Liqid and NVIDIA GPUs will help to continually tune and optimize as requirements evolve.

Wong continued, "In a studio such as ours, predicting resource availability can be challenging, especially when the projects are diverse and dynamic. It requires accurate estimations for timely decision making and futureproofing against a dynamic and fast-paced workforce. The traditional way of buying equipment and supporting physical workstations doesn't scale. It's costful and forces the need to staff up as we grow. I understood Liqid could open the possibility to futureproof our infrastructure by:

- Increasing the density users per rack within our data center.
- Reducing the need to support hundreds of physical workstations.
- Optimizing resource utilization with automated provisioning orchestration for workstations and render nodes.
- Reducing our operational costs."

Wong offered a look at future plans, saying, "Up next is adapting our real-time pipelines, which includes Windows and Unreal Engine and more experimentation with Wacom drawing tablets. We're also excited to explore how Liqid IOA cards and PCIe Peer-to-Peer (P2P) can work with GPUs using emerging APIs like DirectStorage and RTX IO to enhance our real-time pipelines and further improve VDI efficiency and density."

On the experience overall, he concluded, "It's been a pleasure working with Liqid on this project. In addition to the excellent product, the support we got from the whole Liqid team stands out from our other vendors. We look forward to a great partnership as we grow together, and Quadbridge gets kudos for making a complex deal easy on us."

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About Liqid

LIQID Inc.'s composable infrastructure software platform, Liqid Matrix™, unlocks cloud-like speed and flexibility plus higher efficiency from on-prem infrastructure. Now IT professionals can configure, deploy, and scale physical, bare-metal servers in seconds, then reallocate valuable accelerator and storage resources via software as needs evolve. Dynamically provision previously impossible systems or scale existing investments, and then redeploy resources where needed in real-time. Unlock cloud-like datacenter agility at any scale and experience new levels of resource and operational efficiency with Liqid.

About Quadbridge

Quadbridge is a North American IT services provider with over 10 years of experience delivering next generation solutions to the Media and Entertainment industry. The company offers an array of industry-leading hardware, software, consulting, and managed services solutions.

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