

Case Study

Renaissance art brought to life by Front Pictures and Datapath

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When investor and developer, Art Mall, announced it was going to create a 50,000 m² shopping centre in Kiev, Ukraine, perhaps more surprising was the fact that it was going to feature an eye-catching and innovative art gallery as its centrepiece. Furthermore, this was to be no ordinary gallery – the developer wanted to create a 1400 m² multimedia art space, and enlisted the services of Front Pictures, a leading provider of visual and interactive solutions, to bring the ambitious concept to fruition. The system had to deliver high resolution (47,344 x 800 px), an affordable price and high space/power efficiency. Deployed to help meet these demanding criteria were no less than 14 Datapath x4 display wall controllers.

The idea was quite a challenge – to create the first ever permanent media exhibition in Ukraine – a multi-functional place usable for both projection mapping and as a conventional art gallery. Front Pictures, as a studio of innovative technologies, knew it was faced with creating something really outstanding and large-scale.

Initially, the company illuminated one wall of the gallery with eight projectors to prove the concept, producing a small demonstration for the client. The idea was well received, and so Front Pictures started to develop the necessary project documentation. The company aimed to map the walls and columns of the gallery with the maximum resolution and brightness, keeping cost-effectiveness in mind.



Front Pictures had experience of creating large-scale multimedia installations before, using a multi-projection set-up, but this particular project raised the bar. The projection was intended to cover an area measuring 200 m in width and 3.4 m in height, resulting in an extremely high resolution of 47,344 x 800 px, with a 60:1 video aspect ratio. In addition, the pixel density had to be much higher than in outdoor mappings.

Preliminary calculations showed that the company might need 50-55 projectors. Normally, so many projectors would require the use of at least five powerful media servers. However, prior to this project, Front Pictures already had the experience of connecting up to 32 projectors to a single media server, using its proprietary Screenberry technology to create immersive visual experiences for events and shows.

The company's engineers started looking for a way to connect all of the projectors to a single computer. In the beginning, Front Pictures designed server architecture that would support up to 64 projectors. The company assembled a powerful server with a six-core Intel processor, 32 GB RAM, SSD RAID array (offering a staggering 3 GB per second) and two of the latest NVIDIA Quadro GPUs (K6000) based on Kepler technology.



GPUs were synchronised with the help of the NVIDIA Quadro Sync. Front Pictures used 14 Datapath display wall controllers connected to just one media server to distribute the video signal from two NVIDIA Quadro graphics cards (with eight outputs) to all 52 projectors – the company says that 52 projectors could well be a world record. Front Pictures also says that it cannot reveal all of the project details because the company engaged its unique technology, which lets that many projectors be connected – usually it is impossible to use more than 16.

The company has been using Datapath products in its systems since 2001, predominantly because “the products are very reliable and allow for creation of very stable and simultaneously flexible systems”.

A major feature of x4 display wall controllers is their ability to be programmed easily to any frequency and resolution. This means they can be deployed in both events and permanent installations, with a degree of flexibility that offers some level of future-proofing. In the Art Mall, which is located on a busy crossroads near the south bridge in Kiev, the potential exists to increase the number of projectors up to 64 in the future without major changes. This can be made possible simply by adding more Datapath x4 display wall controllers.



Other project challenges involved modifying TouchDesigner software to play back files with such an extreme resolution, while the subsequent step was to configure the GPUs – to achieve maximum performance and smooth video playback, the company had to go through numerous combinations of settings and parameters.

To achieve perfect projector alignment, the output pipeline included not only video playback, but also geometric distortion, blend effects and colour correction, which were applied to the video stream in real time. After two months of fine-tuning and a number of experiments, fully synchronised and smooth playback was realised.

From a hardware perspective, Front Pictures used ultra-short throw projectors with a 0.49 ratio, so that visitors would not cast shadows on the walls. However, the specifics of wide-angle lenses is that they have no zoom or lens shift. So each projector had to be mounted with centimetre-level precision. Video cables were also laid out in such a way that power cables would not cause interference. The total length of the cables exceeded 1800 m.

Another vital stage of the project was to create a template for Front Picture's video designers. Based on the projection layout drawing, a UV map was created where the exact position of each pixel on the map corresponded to the projected pixel on the wall. The UV map (or frame) had an extreme resolution of 6,848 x 6,848 px, or 46.9 MP for each frame. Furthermore, the total length of the video was 43 minutes or 64,500 frames, and thus the company had to upgrade its file server, adding another 20 TB of disk space and 10 Gbit cards to the server and workstations to ensure effective workflow.



The first exhibition at the Art Mall's A-gallery (Renaissance: the Age of Genius) opened on 29 March 2014 and has become a great attraction for the whole city. The exhibition transforms classic art works from the Renaissance period into a digital, visually stunning multimedia experience.

Front Pictures has demonstrated that it can deliver not just a technical solution, but create exciting content as well. Such has been the positive feedback that the client has now engaged Front Pictures in two new projects. One project, the Alice in Wonderland exhibition, will connect up to 64 projectors on a single media server, thus making it even more spectacular. The company also plans to use this proven technology for the creation of multimedia galleries all around the world.