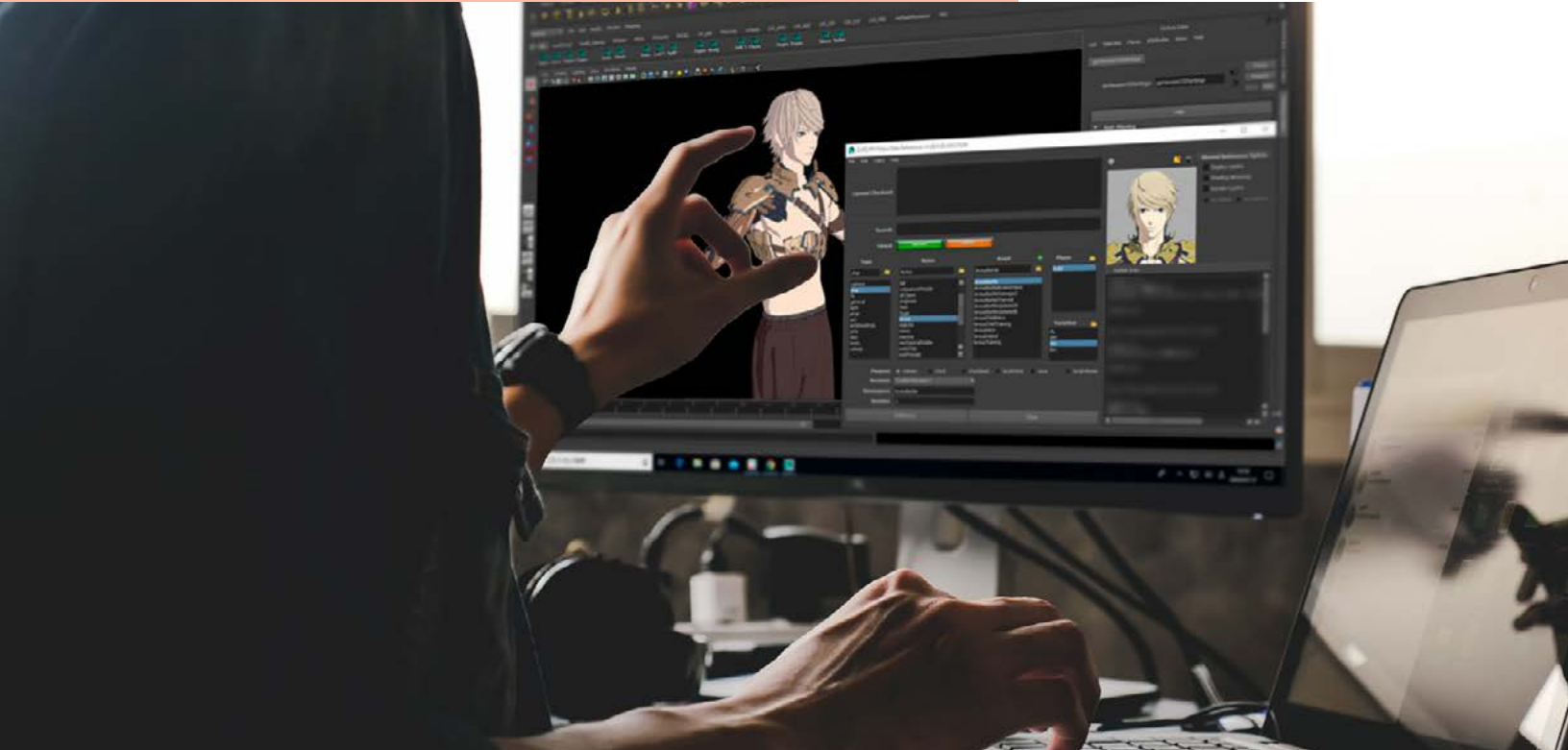# Polygon Pictures animates a high-performance production pipeline

■ NetApp

Cloud Volumes ONTAP and Google Cloud are the stars of blockbuster next-generation production platform

Polygon Pictures is a creator and distributor of cutting-edge 3D computer graphics (3DCG) animated works that are loved by fans worldwide. And the company is forging ahead with construction of its third-generation video production pipeline, Cloud-Based Pipeline System (PPiP3.0).

The company has adopted NetApp® Cloud Volumes ONTAP® software for this system running on Google Cloud, achieving NFS/CIFS file access from various 3DCG production applications. Cloud Volumes ONTAP improves the cost performance of the entire storage system through excellent data compression, deduplication, and automatic tiering with object storage.

By 2022, Polygon Pictures will complete its next production platform, which will consist of PPiP3.0 and a virtual studio, and collaborate with creators in Japan and overseas. With the new investments, the company plans to grow in the global market.

POLYGON PICTURES

20%

to 30% of all data handled in 3DCG production. Cloud Volumes ONTAP brings reduction in storage costs.

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-Yoshinori Yokoyama-san
System 2nd Group Leader, Systems Department
Polygon Pictures

Polygon Pictures' 3DCG animations are attracting attention worldwide

As a digital animation studio, Polygon Pictures has been practicing its vision of "disseminating to the world what no one is doing, with overwhelming quality" for many years. Founded in 1983, the company boasts the world's longest history as a digital animation studio. It's a history of meeting challenges in innovative 3DGC video production.

"We have more than 300 creators at Polygon Pictures, including at our studio in Malaysia," said Yoshinori Yokoyama-san, leader of System Group 2 in Polygon Pictures' System Department. "Not only that, but also we have established a large-scale division-of-labor system, in collaboration with a large number of cooperating studios and creators. This allows us to produce feature-length animations for theaters and anime programs for TV and online distribution."

The company has produced many overseas works such as Tron: Rising (Disney), Transformers (Hasbro Studio), and Star Wars: Clone Wars (Lucasfilm). Eight Emmy Awards confirm the high quality of the company's work, and the outstanding creativity of the production team. With the growth of the content distribution business, as represented by Netflix and Amazon Prime Video, the industry is paying attention to Polygon Pictures.

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"In 2020, the technology to achieve this was finally in place, and the project to build a third-generation pipeline on Google Cloud started full swing. By adopting NetApp Cloud Volumes ONTAP as the ideal storage environment that we were looking for, the plan has made great strides towards realization."

Cloud Volumes ONTAP for file storage on Google Cloud

In 3DCG animation production, a 2D image is generated through processes such as modeling, rigging, layout, animation, effects, lighting, and rendering. The pipeline is responsible for the proper transfer of data and version control at each production stage.

"Our current pipeline (PPiP2.5), built on premises, has had much large-scale content development experience poured into it, thanks to Polygon's unique know-how. It seamlessly connects processes involving many creators, and supports high productivity in the entire 3DCG production process," said Yokoyama-san.

In the third-generation pipeline, the company will focus on the cloud. It will be harnessed as a way for Polygon Pictures and many other studios and creators to access files.

"By building a pipeline running through the cloud, the aim is to provide a more efficient workflow and a more flexible work style," Yokoyama-san said. "We are also looking to collaborate with creators globally. What was needed to achieve this was a highly reliable storage environment, which allows flexible data access from various 3DCG production applications. We had been considering various products for over 3 years, when we finally arrived at NetApp Cloud Volumes ONTAP."

Polygon Pictures was looking for cloud storage with NFS/CIFS file access. With REST API–based object storage such as Google Cloud Storage, it was difficult to read and write data directly from the 3DCG applications and tools used by the production team.

Cloud Volumes ONTAP is a storage service that can be used in public clouds such as Google Cloud. With Cloud Volumes ONTAP, the company achieves the same level of data management and data access as with its on-premises NetApp ONTAP storage. "There is also the option of Filestore to store on Google Cloud," Yokoyama-san said. "However, building storage of several hundred terabytes is not worth the cost. As Cloud Volumes ONTAP has a flexible licensing system, we were able to select the best usage model for our file storage requirements for the third-generation pipeline."

Controlling storage costs

The advantage of using Cloud Volumes ONTAP is that the company can use the proven storage functions of ONTAP. The ONTAP functions that Mr. Yokoyama-san is focusing on are tiering (automatic layering) and data compression and deduplication.

"Constant-use active data is 20% to 30% of all data handled in 3DCG production. By combining Cloud Volumes ONTAP with object storage, Google Cloud Storage, and tiering, we expect to use a large storage volume while keeping costs down. Also, since 3DCG production has a lot of historical data, we can expect much from the effect of deduplication. It was clear that Cloud Volumes ONTAP could reduce storage costs," said Yokoyama-san.

The company finished implementing Cloud Volumes ONTAP on Google Cloud in August 2020. Yokoyama-san said that the effect could be felt as early as the trial stage.

"When we had stored several terabytes of data, the deduplication effect reached about 20%, and the performance was as expected. Also, tiering is really comfortable, and it automatically distributes the data to the object area. The more data you have, the more cost-effective you are," he said.

Also, Yokoyama-san has high expectations for the high reliability of ONTAP, which is backed by results. "Well, the ONTAP function that can be used with Cloud Volumes ONTAP gives you a great sense of security. I sense the high reliability that has been forged in a mission-critical environment," he said. "At the moment, we are only using Snapshot for backup of file-sharing infrastructure. We are also considering using SnapMirror to remotely copy data to another Cloud Volumes ONTAP environment and use it for another purpose.

"Cloud Volumes ONTAP is also used as a back-end NAS for CIFS-based shared storage and FTP servers. It's nice to be able to use it like our on-premises NetApp," said Yokoyama-san. He said that Polygon Pictures planned to start production operation of PPiP3.0 using Cloud Volumes ONTAP, in December 2020.

Toward a global workflow and new work styles
COVID-19 had a major impact on Polygon Pictures' 3DCG production processes. Yokoyama-san recalled, "We managed to continue the production by remote work, keeping to schedule for the virtual studio by VDI.

"From 2021, we will gradually expand the range of use of the third-generation pipeline and virtual studio, and bring the next-generation production platform closer to the completed form," he said. "We will also boost the network bandwidth that connects creators and storage. In the future, we will also actively utilize cloud resources for rendering firmware. I'm expecting great things of ONTAP's FlexCache here."

NetApp FlexCache® software provides a remote cache function that simplifies file delivery. By geographically distributing the cache volume, it offers faster access to branch offices. In addition, it's effective in multiplexing the read processing required for rendering.

"One ideal would be to manage all the data with a central Cloud Volumes ONTAP, to distribute the active data to each studio as a FlexCache volume, and to use Google Compute Engine as the server resource. It also fits the concept of the next-generation production platform, which puts the cloud front and center," said Yokoyama-san.

Polygon Pictures is ready to further promote the use of containers from Kubernetes in its third-generation pipeline. Kubernetes creates synergy between on-premises environments and the cloud, enabling further efficiency, speed, and automation of the production process. And Cloud Volumes ONTAP, along with facilitating file storage, can also be used as persistent storage for containers.

Yokoyama-san concluded:

"As the next-generation production platform approaches completion, the system for creating works will be further strengthened while networking creators around the world. While transferring to the cloud, we will pursue the most rational data management and data utilization mechanism. We look forward to NetApp's continued support in making us a storage environment that meets our business goals."

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