Western Digital.

CloudFerro Builds Highly Reliable Public Cloud for Earth Observation Data

Leveraging Western Digital's innovative technologies enabled CloudFerro to drive down issues, increase reliability and provide the "always-on" cloud services that customers expect

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Marcin Kowalski
Product Management, CloudFerro

Background

Many enterprises are currently hammering out long-term data strategies, preparing for a future when they will need to reliably, economically and effortlessly manage petabytes of information. For CloudFerro, a public cloud provider specializing in Earth observation data for the European space sector, that future is now.

Based in Warsaw, Poland, CloudFerro provides cloud computing services for the massive volumes of satellite imaging data collected by the European Space Agency's (ESA) Copernicus satellite program. Among other projects, CloudFerro hosts CREODIAS, a European Commission-sponsored data and information service (DIAS) that integrates with the ESA's Earth observation data repository.

Through CREODIAS, government and academic institutions can directly access Copernicus satellite imaging data on CloudFerro's self-built public cloud, without needing extensive onsite infrastructure or expertise. In addition, CloudFerro provides cloud infrastructure-as-a-service (IaaS) to enable customers to easily deploy and scale applications that utilize that data.

The European Commission prides itself on making Copernicus Earth observation data free and open to any public institution that wishes to use it. As the cloud provider offering access to that data, CloudFerro is equally committed to open-source software and tools. The company built its cloud service entirely on OpenStack™ software, using open-source Ceph™ scale-out storage software.

Challenge

Previously, institutions seeking to use Earth observation data had to pull it from many different repositories located across Europe—at significant operational complexity and expense. Thanks to CloudFerro and the CREODIAS platform, all satellite data from the Copernicus program can now be accessed in one place. This offers enormous benefits to institutions using this data, but it also creates significant operational challenges for CloudFerro. CREODIAS alone represents a massive amount of data to manage—currently 17 petabytes and growing.

CloudFerro needed sophisticated data management tools to support its services and ensure that customer data and applications are always available. The company also required a data storage infrastructure capable of supporting its public cloud with the utmost reliability and efficiency. Previously, CloudFerro was using low-cost JBOD enclosures filled with lower-tier hard drives for its object storage devices (OSDs). While the initial Capex price was good, the poor quality of components lead to high failure rates, high Opex costs and higher Capex expenditures in the long run.

CloudFerro Rack

Short Term Savings Negated by Increased Capex and Opex Costs

CloudFerro employs state-of-the-art data protection and monitoring to ensure that customers never lose their data, even if multiple devices fail. At the scales at which CloudFerro operates—running thousands of OSDs 24/7—the statistics dictate that some number of devices will fail every week, and occasional multi-device failures are inevitable. When they occur, the CloudFerro team must manually recover that data.

"Rebuilding a 10- or 13-terabyte drive can be a multi-day process that takes significant time and effort," says Marcin Kowalski, product management, CloudFerro. "That adds up to a lot of business resources that could be better spent elsewhere."

Issues like these only get worse as the size of a public cloud grows—a significant issue, given that the CREODIAS project alone adds approximately 1 petabyte of new satellite data every quarter.

"The drives are the fundamental building blocks of our services," says Kowalski. "There are just so many of them that, if you start introducing a higher failure rate, those problems get unwieldy very quickly. Finding a way to reduce the failure rate for those devices had become a top priority."

Western Digital Innovations to the Rescue

To improve the reliability and efficiency of their storage infrastructure, CloudFerro turned to Western Digital for help. Western Digital Ultrastar® Storage Platforms filled with Ultrastar HelioSeal® hard drives now form the storage foundation of CloudFerro's cloud. The engineering innovations, such as patented IsoVibe™ and ArcticFlow™, included in Western Digital storage platforms deliver real-world benefits of better cooling, lower fan speeds, less noise and reduced power consumption.

IsoVibe technology provides a vibration-isolating suspension for drives in the chassis, helping them maintain consistent performance even when all drives are working. ArcticFlow thermal zone cooling reduces fan speeds, vibration, and power consumption to improve reliability. Together, these innovations have translated to a 62% lower return rate for hard drives than in previous-generation enclosures.

Ultrastar Data102 and Ultrastar Data60 Storage Platforms

With these building blocks, CloudFerro has created a massive public cloud to support the CREODIAS project. Currently, the implementation includes more than 140 nodes with up to 40 cores and 160 Gigabytes of RAM per node, and more than 4,700 OSDs.

Results Speak for Themselves

By shifting to Western Digital storage, CloudFerro has dramatically improved the failure rate for its thousands of OSDs—freeing up substantial resources that used to be devoted to dealing with hardware failures.

"Given our size, we still have the occasional device failure, of course, but it's now well in line with our requirements, below half a percent per year," says Kowalski. "Western Digital storage enclosures and hard drives have made a huge improvement. For our customers, it was just business as usual. But for our internal team, it means much less work."

Ultimately, CloudFerro is able to provide a robust, reliable, easy-to-use service for its customers, and fulfill the ESA charter for the CREODIAS project.

"For our clients, the biggest benefit is that they can access the entire collection of CREODIAS Earth observation data all in one place," says Maciej Krzyżanowski, President and CEO, CloudFerro. "Previously, our customers had to collect Sentinel satellite data from multiple repositories dispersed across Europe. Having all the data available in one place, and the power to access that data using the tools and applications they choose, is a huge advantage."

The Sky's the Limit

Western Digital has helped CloudFerro stabilize their storage infrastructure to meet the challenges they face today. However, since CloudFerro's public cloud grows by approximately 20 terabytes daily, what will the future hold? CloudFerro is ready for the future. By combining open-source Ceph software with highly reliable Western Digital storage, CloudFerro has put in place a platform capable of supporting multiple DIAS projects, adding new data intensive projects and meeting all their customers' needs far into the future.

For more information on how Western Digital innovations can help reduce drive field returns by 62%[1], please visit westerndigital.com/campaign/platform-innovations

IsoVibe™ Vibration Isolation Technology

Precise cuts in the baseboard provide a suspension for the drives in the chassis, isolating them from transmitted vibration. The result is that consistent performance is maintained, even when all the drivers are working hard.

IsoVibe
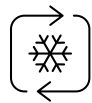
ArcticFlow™ Thermal Zone Cooling Technology

By Introducing cool air into the center of the chassis, drives operate at lower and more consistent temperatures than conventional systems. This results in lower fan speeds, reduced vibration, lower power consumption, quieter operation and ultimately higher reliability.

ArcticFlow

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