(intel)

An OpenStack Cloud for the Global Enterprise

Volkswagen Group capitalizes on a cloud platform based on technologies from Intel and Mirantis

Executive Summary

To accelerate the delivery of IT infrastructure, speed the production of new software applications, and improve IT responsiveness to the business, the Volkswagen Group deployed a next-generation cloud based on Intel® Architecture and the Mirantis* OpenStack* cloud platform. Infrastructure resources that were previously locked into rigid silos can now be pooled, shared, and accessed on demand, enabling greater business and IT agility.

The company's head of IT infrastructure shares that the cloud solution and standardization on Intel-based platforms have helped the Volkswagen Group cut IT infrastructure costs by more than 70 percent. Going forward, the OpenStack-based cloud will help the Volkswagen Group accelerate existing business functions and the rollout of new technologies that enable business transformation and keep the Volkswagen brand at the leading edge of the industry.

Business Challenge: Address New Business Model

In many enterprises, business agility is slowed by outdated IT environments that are difficult to change. When developers need IT resources to support the development of new applications and business services, the IT procurement and provisioning processes might take weeks or even months—while the business needs immediate responses.

The Volkswagen Group faced these challenges that are inherent to large legacy IT environments. In more specific terms:

- The company's heterogeneous IT platforms included specialized hardware, often with long procurement cycles. It could take months to provision platform resources.

- The provisioning of new resources required a great deal of manual work.

- While public cloud services could be quickly provisioned for early stages of application development and burst capacity, the public cloud didn't offer the data control and privacy compliance the company needed for consumer-facing applications.

- Expensive storage solutions were being consumed by applications with rapidly growing capacity requirements.

- IT complexity made it difficult for the company's IT organization to meet the demands of its internal customers.

To overcome these challenges, and to lead in a rapidly changing industry, the Volkswagen Group determined that it needed to reinvent its IT infrastructure. Specifically, it needed a next-generation private cloud platform that would accelerate the delivery of IT infrastructure, speed the production of new software applications, and improve IT responsiveness to the business.

Use Cases: Infrastructure and Platform as a Service

After a detailed evaluation of cloud technologies and vendor offerings, the Volkswagen Group elected to start the process with a next-generation private cloud based on Intel Architecture and the Mirantis OpenStack cloud platform. The goal was to deploy a private cloud that would deliver immediate benefits while establishing a foundation for a hybrid cloud—the long-run vision.

The company's Group IT Cloud initiative progressed in a stepwise manner, beginning with the virtualization of standardized Intel® Architecture-based platforms, proceeding to the deployment of an OpenStack-based infrastructure-as-a-service (IaaS) platform, and culminating in the upcoming launch of an OpenStack-based Cloud Foundry* platform-as-a-service (PaaS) environment.

Ultimately, the Group IT Cloud will be shared by all brands and divisions within the Volkswagen Group—from global corporate initiatives to emerging research labs in Beijing, Berlin, and San Francisco—and will reach employees, suppliers, dealers, and customers.

> **To drive business transformation, enterprises need agile IT environments that can react quickly to the needs of a dynamic business. As the Volkswagen Group experience shows, hybrid clouds based on the OpenStack platform and Intel Architecture enable this IT agility.**

Solution Value: Empower the Business

With the private cloud in place, infrastructure resources that were previously locked into rigid silos can now be pooled, shared, and accessed on demand via self-service portals, enabling greater business and IT agility. This quick access to resources helps Volkswagen's developers build and deliver software faster and accelerate innovation across business and consumer applications.

"When there's a new software release, we're now able to test and deploy it immediately," says Thole Groeneveld, the Volkswagen Group's IT project lead. "In the past, it took hours to test new software, so we couldn't easily test it, and software deployments took two to three months in total. Now we can react much more quickly and we've increased the satisfaction of our business department because we can deploy new software releases every day."

The OpenStack-based cloud is also a key to business agility. As the Volkswagen Group moves forward in a rapidly changing industry, the cloud will help the company accelerate existing business functions and the rollout of new technologies that enable business transformation and keep the Volkswagen brand at the leading edge of the industry. "With our OpenStack cloud solution, we are now able to add new functionality every two weeks to our web-based car configurator, which allows customers in more than 30 markets to design and build their ideal custom vehicle," adds Groeneveld.

Viewed through a financial lens, the Group IT Cloud has helped Volkswagen cut IT infrastructure costs through standardization and the lower cost structure of the private cloud relative to the company's existing heterogeneous IT platforms.

"Our private cloud solution has allowed us to cut IT infrastructure costs by more than 70 percent through standardization on Intel-based platforms," says Holger Urban, the Volkswagen Group's head of IT infrastructure. "We can now realize the economic and efficiency benefits that come with using the same IT platforms throughout the Volkswagen Group."

Solution Architecture: An OpenStack Cloud on Intel Architecture

The design of the private cloud solution was based on a Mirantis reference architecture and systems that were optimized to take full advantage of the features of Intel Architecture.

Solution components included:

- Mirantis OpenStack Private and Hybrid Cloud
- Cloud Foundry open source PaaS software
- Servers based on the latest Intel® Xeon® processor E5 v4 product family
- Open source KVM hypervisors for compute and Ceph* for distributed object storage
- Intel Ethernet adapters
- Intel SSDs, which are planned to be included in subsequent build-outs

Volkswagen centrally deployed the OpenStack software on Intel-based servers in the company's new Wolfsburg data center. The data center has the capacity to house more than 5,000 Intel Architecture cores, 150,000 GB of RAM, and 600 TB of storage by the end of 2016. More than 2,000 square-meters of space are dedicated to the OpenStack environment, which currently includes 900 cores.

As part of the cloud project, Volkswagen worked with Mirantis to add critical enterprise features to OpenStack to ensure that applications can be managed with high performance and that IT administrators have full control of the data center infrastructure. Supported by Intel's engagement in the OpenStack development community, such enterprise features

were provided back into the open-source projects at the heart of this program.

The cloud platform was optimized to take full advantage of the features of Intel Architecture and Intel's many contributions to the open-source projects that continue to enhance OpenStack, Linux*, and Ceph—key components of the Volkswagen IaaS solution. In addition, Intel's expertise in configuring these components for best results on Intel Architecture was provided directly to Volkswagen's IT architects.

At a higher level, Intel provided key initial guidance from a corporate cloud strategy perspective and Intel's own journey of implementing OpenStack in its own data centers. The sharing of best practices from Intel's in-house IT experts helped the project's leaders avoid costly mistakes and shape efficient operations. Intel further supported the group of Volkswagen's internal developer communities by providing training resources and trial platforms.

"Intel offered more than leading-edge technologies," Urban says. "Intel IT experts shared best practices from their own IT organization and their experiences with leading enterprises around the world. These insights helped us build a reliable, high-performance cloud, while avoiding costly mistakes that some companies have made."

Keys to a Successful Cloud

As exemplified by the Volkswagen experience, cloud is a journey best taken in a step-by-step manner. The company's Group IT Cloud initiative began with the virtualization of standardized Intel Architecture-based platforms, advanced to the deployment of an OpenStack-based infrastructure-as-a-service (IaaS) platform, and headed toward the launch of an OpenStack-based Cloud Foundry platform-as-a-service (PaaS) environment.

Another key lesson from the Volkswagen experience is that a successful cloud requires the right technologies. OpenStack is increasingly recognized as a viable private cloud environment and as an enabler of a hybrid cloud strategy, due to its openness, and Intel is a key driver behind OpenStack's increasing enterprise readiness. Thanks to the active contributions of Intel engineers and the support of a broad ecosystem, the OpenStack platform can deliver excellent performance on Intel Architecture.

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