China’s Retail Giant Unveils Massively Scalable, OpenStack-Based E-commerce and IaaS Platform

Bailian Group launches multi-channel commerce platform using Mirantis OpenStack design and UMCloud managed services

The Business

Shanghai-based Bailian Group is China’s largest retailer with more than 6000 department stores, supermarkets, and outlets across 25 cities and provinces. With over one billion annual store visits, the state owned enterprise has grown to become the nation’s 84th largest company.

Like other fast growth geographies, however, China’s retail business continues to transform from brick and mortar to online commerce. Remarkably, mobile phone users in China reached 1.3 billion in 2015, and mobile internet access soared to over 400 million users.

This massive mobile and online growth, combined with China’s entrepreneurial culture, brought major changes to the retail industry. New competitors now offer mobile, social and celebrity-based sales models, while established companies launched multi-channel retail that merges e-commerce with in-store services.

To match these changes and build on existing leadership, Bailian Group accelerated its multi-channel selling efforts in 2014 with the goal to build the industry’s largest offline to online commerce platform and increase market share. To do so, the company’s leaders needed to replace existing complex IT infrastructure with a flexible, cost-effective, and scalable cloud.

Challenges

While Bailian Group continued to grow brick and mortar retail sales over the last 10 years, online competitors such as JD.com, Suning, and Taobao quickly unveiled new e-commerce sites and campaigns. And despite slowing gross domestic product gains in recent years, Chinese consumers drove market growth, purchasing almost $600 billion worth of goods online in 2015, a 33 percent increase from the prior year.

To meet the competition and capture online business, Bailian Group needed to accelerate e-commerce innovation and simplify existing IT infrastructure. The IT team was aware that low server utilization, long provisioning times, and high operating costs of their hundreds of applications and thousands of bare metal servers would impede omni-channel sales growth.
Faced with matching challenges and opportunities, Bailian Group leaders set aggressive goals to build a new technology platform that would expedite development while streamlining operations for online payments, business intelligence, and loyalty programs.

“Our transition from traditional brick and mortar to omni-channel business presented a great opportunity but an equally large challenge,” says Lu Qichuan, Director of IaaS and Cloud Integration Architecture, Bailian Group. “We needed a large-scale IT platform that would enable our innovation and growth.”

Thinking big, Lu and his team outlined four guiding principles for their new platform — fast development, dynamic scaling, uncompromised availability, and low cost of operations. These guidelines would support aggressive online growth targets through 2020.

Bailian Group had recently launched e-commerce applications, including a Shanghai grocery delivery service, on existing IT platforms. However, many applications not yet cloud-ready faced six-month development cycles and complex support. These applications would benefit from one to two-week release cycles and more efficient management when moved to an IaaS (infrastructure as a service) platform.

The IT team also planned to port legacy applications such as supply chain logistics and data management to the private cloud as well others that run on public cloud sites. Further, all new cloud-ready development would run on the new cloud.

Additionally, as a state-owned enterprise, Bailian Group desired to align its technology initiatives with the national “Internet Plus” strategy that promotes the use of open platforms and cloud services along with green growth and coordinated planning of resources.

Thus, the IT team began their comprehensive search for an open cloud platform to drive business transformation, neutralize the competition, and replicate its leadership in physical stores.

“We set our goals to build a highly scalable e-commerce platform that takes advantage of our unique offline strengths and provides a strong foundation for online sales growth,” says Lu.

Solution

In early 2015, Lu and his staff spent six months in a thorough evaluation of 20 cloud technology providers, conducting over 200 meetings during the time span. Early in the process, the team found OpenStack technologies to bring a strong combination of extensive cloud development and production deployment functionality, fueled by open source community cooperation.

Bailian Group was particularly impressed by the OpenStack Foundation's continuous innovation and rich feature releases every six months. The IT team also valued OpenStack's lower licensing and maintenance cost, flexible architecture, and its complete elimination of vendor lock in.

In late 2015, China's Ministry of Industry and Information (MIIT) drew similar conclusions and officially declared its intention to support OpenStack ecosystems. MIIT, thereafter, encouraged state-owned enterprises to use OpenStack-based cloud products.

Once committed to OpenStack, Bailian Group narrowed their search to a handful of experts including HP, IBM, and Mirantis. After additional meetings and a successful proof of concept, Bailian Group selected Mirantis as the vendor to best guide their OpenStack platform design and development.

Specifically, Bailian Group found the Mirantis OpenStack distribution to have a strong set of unified APIs that easily integrate with their existing heterogeneous environment. Furthermore, the IT team valued Mirantis’ strong IaaS, PaaS (platform as a service) and CI/CD (continuous integration / continuous deployment) experience, as well as a pure play OpenStack focus that prohibits vendor lock in.

Bailian Group then selected the OpenStack managed services of UMCloud, the Shanghai based joint venture between Mirantis and UCloud, China’s largest independent public cloud provider. UMCloud’s charter to accelerate

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OpenStack adoption and embrace China’s “Internet Plus” national policy closely matched Bailian Group’s platform strategy.

“We found OpenStack to be the most open and flexible cloud technology, and Mirantis and UMCloud to be the best partners to help us launch our new omni-channel commerce platform,” says Lu.

Bailian Group’s IT leaders worked with Mirantis and UMCloud to quickly build a 20-node MVP (minimum viable product) using the latest OpenStack distribution and Fuel software to deploy and manage all cloud components. The architecture included Ceph distributed storage, neutron and OVS software defined networking, KVM virtualization, F5 load balancers, and the StackLight logging, monitoring and alerting (LMA) toolchain.

While initially small, the MVP was designed to scale fast and embraced an open architecture to allow integration with a multitude of existing and new technologies. The MVP provided a solid and stable foundation for the next phase of their private cloud evolution.

With this early success, the team quickly added capacity and will soon reach 300 nodes and 5000 VMs in this first phase of a three phase, five-year plan. Already a handful of applications are in production on the new platform including one that manages offline to online store advertisement images using distributed Ceph storage.

The team has also added new cloud application development tools and processes that foster a CI/CD and DevOps culture and increase innovation and time-to-market. This development environment includes PaaS platform powered by the Murano application catalog management and Sahara for data analysis.

Results

Early platform testing of the phase one deployment has shown excellent results. Bailian Group’s OpenStack-based, e-commerce and IaaS platform proved its high availability and seamless switching between control nodes as services. Comprehensive evaluations also included more than 1000 API and 100 performance pressure tests in dozens of high usage scenarios.

The IT team also successfully completed deep optimization of the cloud platform including F5-based load balancing as a service, distributed Ceph storage, and Murano-based PaaS. Mirantis training courses have also smoothed the transition of cloud management to Bailian Group’s IT team.

And with new tools, developer creativity and innovation has already increased. Developers are now liberated from old processes and benefit from faster application release cycles.

Early analysis of production application performance has also shown strong results. Thus, Bailian Group has approved more migration of legacy applications including online purchasing systems that will transition gradually during each sales season.

To accommodate this and other workload migrations, the IT team has established phase two goals to expand the OpenStack platform to 500 nodes across two data centers and more than 10,000 applications by the end of 2018. Phase two will also add SOA, micro services, and dynamic energy savings.

Embracing the strategy of starting small, thinking big, and scaling fast, phase three will extend to 3000 nodes and over 10 million virtual machines and applications by the end of 2020. Phase three will also add an industry cloud and SaaS services that drive prosperity of the retail business and show other retailers the processes and benefits of cloud platform innovation and offline to online digital transformation.

“Bailian’s cloud platform engineering team, combined with the software and technical expertise from Mirantis and UMCloud, create a powerful force to build the largest offline to online commerce platform and extend our success in the digital era,” says Lu.