IT infrastructure can be a critical differentiator for business today as it enables nimble and efficient engagement to evolving market opportunities. However, IT organizations face challenges with achieving the desired speed and agility due to infrastructure complexity, budget constraints, and proliferation of custom applications. As such, these organizations must shift how an infrastructure is consumed, deployed, and procured. Performance needs and real-time analytics require that compute and storage processes run adjacent to each other on the same physical hardware, and those processes need to be capable of expanding rapidly to meet tomorrow’s IT demands. The desire to abstract resources and manage IT as a service has resulted in the integration and preconfiguration of compute, storage, and networking functions—hyper-converged infrastructure. Open source software, including the OpenStack* platform, has emerged as an agile and cost-effective response to these challenges, and enterprises are increasing use of open source solutions to their benefit. As key contributors to OpenStack, Huawei and Intel have worked together to develop a turnkey, enterprise-ready, hyper-converged OpenStack solution for private cloud projects.

Summary of Solution Brief

Illustrates the joint OpenStack* effort between Intel and Huawei for implementing the Huawei FusionCube*, FusionSphere*, and hyper-converged infrastructure turnkey solution for private cloud deployments.

Describes the competitive advantages for data centers of the Huawei and Intel solution to improve scalability, performance, security, ease-of-use, high availability, and disaster recovery.
The Advantages of Huawei’s Hyper-Converged OpenStack Solution

As more workloads continue to run on virtual or abstracted infrastructures, the commingling of storage and compute on a common set of physical resources is a natural outcome in the evolution of a software-defined infrastructure (SDI), such as hyper-converged infrastructure. These private cloud solutions bring not only economic benefits but also performance, reliability, and availability advantages compared to traditional IT infrastructures.

As a hyper-converged infrastructure and OpenStack innovator, Huawei FusionCube*, powered by the Intel® Xeon® processors, provides a fully optimized OpenStack solution that can facilitate IT-infrastructure transitions. FusionCube offers compute, storage, network, and management systems that meet enterprise demands through the scalability through the scalability, performance, high availability, and disaster recovery capabilities of the solution’s hyper-converged architecture.

Notably, FusionCube includes its OpenStack-based cloud operating system—Huawei FusionSphere*, OpenStack Powered—to help enterprises quickly stand up a private cloud.

Huawei and Intel have collaborated to incorporate state-of-the-art technologies and best practices into the FusionSphere and FusionCube offerings. FusionSphere, for example, is not only built using the latest Intel Xeon processors, but it also incorporates many adjacent Intel features such as security, performance acceleration, manageability, and virtualization technologies. FusionSphere also integrates open source optimizations to both OpenStack and Linux* contributed upstream by both Huawei and Intel.

**Huawei and Intel Collaborate to Optimize Your Private Cloud Solution**

The Huawei FusionCube solution offers several market advantages, including delivery of a turnkey hyper-converged solution that collapses storage, computing, and networking functions for easy and efficient cloud deployment and capacity growth. FusionSphere provides industry leading virtualization performance and optimization tuning utilizing Intel® Virtualization Technology (Intel® VT) and Intel Xeon processor advanced performance technologies. By embracing the open source and hyper-converged architecture, FusionSphere provides seamless integration with heterogeneous infrastructures. It is one of the most efficient and scalable cloud operating systems on the market, and it offers flexible orchestration with easy-to-use templates to speed implementation. FusionCube is a turnkey hyper-converged infrastructure. Increasing capacity is as easy as simply adding more FusionCube nodes.

FusionSphere consists of three main components, each adding value to OpenStack:

- **FusionCompute**: Offers non-uniform memory access (NUMA) affinity-based scheduling, which improves application performance, and memory overcommitment, which increases VM density and reduces the cost for memory.

- **FusionStorage**: A distributed software-defined storage that offers parallel input/output (I/O) read/write with scalability that spans across up to 4,096 nodes with automatic fault recovery and high reliability.

- **FusionNetwork**: A software-defined network that offers full support of IPv4 and IPv6 and highly performing vRouter, vFW, and vLB.

With its superior capacity to run mission-critical workloads, FusionCube can support workloads ranging from web, virtual desktop infrastructure (VDI), and microservices to mission-critical storage back-end infrastructures like SAP HANA* and Oracle* databases.
FusionSphere* and FusionCube* Are Built on a Foundation of Intel® Architecture

Huawei’s collaboration with Intel provides a multitude of advantages for the enterprise, including:

• Network performance optimization: FusionSphere networking throughput and latency are enhanced with its use of the Data Plane Development Kit (DPDK). Intel developed DPDK as a set of libraries to accelerate packet processing on Intel Xeon processors.

• Security and compliance capabilities: The FusionCube platform’s integrity can be audited, and it can provide additional security and compliance capabilities by using Intel® Trusted Execution Technology (Intel® TXT). Intel TXT is an instruction-set extension in Intel Xeon processors that detects unknown software in the BIOS, firmware, and operating system used during the boot sequence.

![Huawei FusionCube*](image)

Easy management
Rapid deployment; system go-live time shortened from weeks to hours

Modular design
Modular design, meeting IT hardware-resource requirements in multi-service scenarios

High-density architecture
Computing density improved by 66 percent; supports next-decade evolution of CPU and network technologies

Energy conservation
Industry-leading Platinum PSUs; improves energy efficiency by 13 percent with patented energy-conservation technologies

1. Computing
A single chassis supports 64 Intel® Xeon® processor E5-2699 v3 CPUs (145 W), the highest density in the industry

2. Storage
A single chassis supports an internal storage capacity of up to 316.8 TB, the largest single-chassis internal storage capacity in the industry

3. Networking
Based on state-of-the-art Huawei data-center switch technologies, and supports 10 gigabit Ethernet (GbE)/InfiniBand®/Fibre Channel over Ethernet (FCoE); 15.6 terabits per second midplane switching capacity, up to 128 10 GbE uplink ports per chassis

4. Reliable
Supports continuous running at 40°C; failure rate 15 percent lower than the industry average

5. Energy efficiency
China Environmental Labeling certified, with top ranking in China Mobile and China Unicom tests

6. Ease-of-use
Boards and cards plug-and-play, automatic configuration, and transfer of parameters

**Figure 2.** Huawei FusionCube* provides multiple IT-enterprise competitive advantages
Conclusion

Data center managers are increasing utilization of hyper-converged solutions—characterized by fluid resource pools that are abstracted from the underlying hardware and managed as services—for on prem cloud deployments. This transformative approach, coupled with open source innovations, is providing the agility that businesses will need to remain competitive in today’s digital economy. Huawei and Intel have been partnering as contributors to the OpenStack community for years, bringing cloud innovations to enterprise customers’ IT environments. Huawei FusionCube, powered by Intel Xeon processors, provides a fully optimized hyper-converged solution to the market. Based on OpenStack, FusionCube provides competitive advantages by offering a simple to deploy, turnkey cloud solution. It is easy to deploy and ready to support private cloud and hybrid cloud initiatives.

Learn More

Check out these resources for more information:

- **Intel® Cloud Builders**: https://cloudbuilders.intel.com/
- **“Unleashing Tens of Thousands of New Clouds” video**: intel.com/cloudforall